EVIDENCE FOR VIRTUAL ELASTIC STRING THEORY

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This book entitled Evidence for Virtual Elastic String Theory is based to a great extent on previous books written by the author, including "VES theory and the forces of nature. This book was first copyrighted in 2004, and was continually expanded and copyrighted in 2008, 2011, 2012. 2013, and 2017.

An article on this subject was originally copyrighted by Kelland Terry, 2001. The title of this paper was On the Nature of Gravity, Energy, and Matter.

DEDICATION

It is with pleasure that I dedicate this book to Mary, my wife, who has patiently listened to my theories. Her steadfast belief in me was one of the principal forces that allowed me to finish this work. By the way, Mary is a faculty member of the University of Nevada.

ACKNOWLEDGEMENTS

My intent from the beginning was to base my examination of virtual elastic string theory on the sound experiments and observations that thousands of scientists in various fields of physics have accumulated over the centuries. For this reason, I am greatly indebted to the countless scientists who have spent their lives exploring the world of physics.

I thank my good friend Dr. Wallace Tucker, science spokesperson for the Smithsonian Astrophysical Observatory's Chandra X-Ray Center, who has on several occasions come to my rescue by pointing out some error in my thought or in my math; however, he is certainly not responsible for any errors made in this book.

I also thank Dr. Travis Hirschi who suggested several subjects that he thought I should explore. Travis is my first cousin and close friend who was awarded the prestigious Stockholm Prize for his life's work in Criminology.

PROLOGUE

I began my thoughts on the forces of nature and virtual elastic string theory when I received an e-mail from my friend, Dr. Travis Hirschi, who asked me what I thought about an article on the Internet. The article explained that Dr. Tom Van Flandern had come to the conclusion that the force of gravity had to act billions of times faster than the speed of light. For some reason, this fired my imagination, and I began thinking about gravity and the other forces of nature.

I should mention to the reader that this is not my first foray into theoretical physics. In 1971, I coauthored an article with Dr. Wallace Tucker that was published in "Science", a prestigious peer review journal. The article provided the calculations and rational why we should consider a supernova as a source of mass extinction.

In the beginning, I thought I would be able to solve gravity by studying Mercury's orbit, but after months of study and research, I realized I was taking the wrong approach to the forces of nature. It became obvious to me all forces of nature (gravity, electricity, magnetism, and the nuclear forces) had to share some common, underlying, property. The next morning, I woke up with the inspiration that these forces had to have strong elastic properties if they were to create a force of attraction. I knew nothing about perfect elasticity at the time nor was I aware of many other properties of matter and energy long accepted by physicists.

The more I became involved in this subject the more I began to undertake experiments and review long established observation in hopes of finding support for my theory or prove it false. My experiments, which took several years of my life to complete, are described in detail in the first 17 chapters of this book. In every case, the experimental results support my basic theory that forcefields are composed of matter with perfect elasticity just like the atoms that create these fields.

I started with a simple theory and applied it to one subject at a time that I was forced to study in detail. To accomplish the task I set for myself, I had to come to grips with hundreds of experiments, observations, and explanations provided by several physics books that I had at my disposal as well as those at the local college. Eventually, the Internet became my friend, and I spent a good deal of time studying original scientific articles available through various data bases. Most of it was new to me, and at times, it required a good deal of research to find the answer to some important question.

I'm sure you can appreciate how excited I must have been when my theory fit the facts, subject by subject, and at the same time added to a deeper understanding of the various subjects. Physics actually became easier because of my theory. On many occasions, I told Mary I had discovered some observation or experiment that proved my theory was wrong, only to reverse myself a few minutes later after pacing around the house. Mary got to the point she would simply tell me that I would solve it.

On several occasions, I wrote up my progress in this endeavor and had it printed in book form. I simply had to see something tangible that I had accomplished. It also meant I was sick of the project and would leave it for months at a time only to finally return with renewed vigor and resolve.

Kelland Terry, May 2020.

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Chapter 1: Introduction

One has to ask this question, how is it possible that thousands of brilliant physicists from around the world, over many generations, have not been able to solve the underlying mechanism for the forces of nature, and why are there dozens of other important conundrums that have remained a mystery for more than 100 years? It is not reasonable, and yet these conundrums exist.

Dr. Lee Smolin, a theoretical physicist, explains in his book, "The Trouble with Physics….", (2006, page 3) his whole generation of physicists, beginning in the 1970's, has not produced a single basic discovery in physics. "To put it bluntly", he says, "…we have failed." "For more than two centuries, until the present period, our understanding of the laws of nature expanded rapidly. But today, despite our best efforts, what we know for certain about these laws is no more than what we knew back in the 1970's."

He can't explain why, and I don't think anyone can explain it unless we assume that physicists have been working under a false theory; a theory that has permeated and restricted thought in many different areas of science for more than a hundred years. The only theory that might fit this unfortunate condition is Albert Einstein's theory of relativity that has held sway since 1907.

We may think of this great man as brilliant and awe inspiring, but I believe his theory of relativity has played havoc with the field of physics. It has led a whole generation of physicists off on a tangent with almost no point of return. The problem with relativity is this: It suggests very few experiments or lines of research for electricity, magnetism, gravity, and the nuclear forces. Even far worse, it has confused and obstructed thought in these areas, including the concept of energy, because it has forced scientists to exist in a state of denial in their attempt to fit relativity to existing observations. If we free our minds, the evidence tells us that we do not live in a four-dimensional world no matter how romantic and mysterious it may sound.

This book has a twofold purpose. First, it is my objective to introduce the strong evidence I have accumulated that proves beyond any doubt that forcefields are composed of matter that has strong elastic properties. I have devoted chapters 3 through chapter 17 to this subject. I set this as a goal because if true, it forces us to rethink how electricity, magnetism, gravity, and the nuclear forces create a force of attraction between two objects, and it forces us to rethink how electricity and magnetism create a force of repulsion between two electrons or between two protons. It also forces us to come up with a different solution for those observations and experiments that heretofore can only be explained by Einstein's theories of relativity. In fact, it forces us to completely rethink the whole subject of forcefields and the forces of nature.

> Forcefields
>
> Forcefields refer to the entities ejected from electrons, photons, and quarks that are responsible for the forces of nature: electricity, magnetism, gravity, and the nuclear forces.

My second objective in this book is to present a theory based on evidence established by scientific research, including the fact that forcefields are composed of matter that has strong elastic properties. It is based on the idea that forcefields are composed of virtual elastic strings—VES theory for short. My theory provides a workable, unifying model for the forces of nature, and it solves 80 plus conundrums of science that range from galaxies to electrons in orbit. And finally, and perhaps most importantly, VES theory suggests and embraces experimentation at all levels.

At the present time, the forces of nature remain shrouded in mystery along with scores of other conundrums of science. The solutions to these conundrums will remain a mystery as long as we turn a blind eye to the wealth of information that demonstrates beyond question that forcefields are composed of matter that has strong elastic properties. Actually, this concept is not startling because all matter has perfect elasticity.

Matter has perfect elasticity and perfect cohesion

The evidence for the elastic properties of matter is all around us. When air molecules collide in an enclosed chamber, physicists tell us they bounce away from each other with perfect elasticity. This conserves the energy of these particles, which allows them to collide with each other and spread at random to fill the chamber. The motion is ceaseless. They never come to rest at the bottom of the chamber even though they are under the influence of gravity. Because all atoms are composed of the same building blocks as found in air molecules, we know all matter has strong elastic properties.

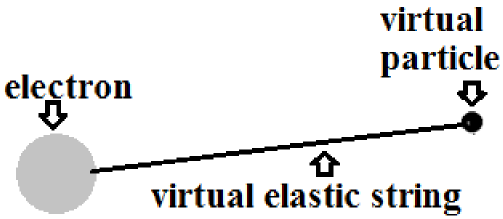
When an atom is subjected to fusion on the Sun, it is exposed to extreme high temperatures (15 million degrees Celsius) and violent physical bombardment, yet the mass of the atom is not destroyed. It may redistribute itself to form other subatomic particles, but the elastic mass remains intact; it has perfect cohesion.

I believe mass has perfect elasticity and perfect cohesion because the two attributes flow from the same physical property of matter. No one can define the physiochemical makeup of a substance that has perfect elasticity, yet it exists. It is likely that this property endows mass with perfect cohesiveness.

In order to understand and appreciate the experiments I will introduce in the chapters that follow; it is necessary to take a quick look at my basic theory for the forces of nature.

VES theory in brief

All virtual elastic strings that make up forcefields begin as virtual particles that are ejected from photons, electrons, and quarks with great velocity.



Because a virtual particle remains attached to its source, a virtual elastic string is created in its wake as the virtual particle careens through space. The virtual particle is traveling at immense velocity. It is composed of matter, and it has momentum, which means it pulls on the elastic string and stretches it out through space. The farther the virtual particle travels the greater the stress on the string and the greater the potential energy stored in the string. Each force of nature is composed of a unique string that differs because of its mass. It is essential that we have different names for these strings. The names I use in this book are listed below.

The virtual elastic strings that make up forcefields
Gluon: Strong nuclear force
Graviton: Gravitational force
Magnon: Magnetic force
Elon: Electric force

The terms **gluon** and **graviton** have been in use by physicists for many years. I was introduced to the term **magnon** by Demokritov and his colleagues (2006). They found that condensates form at room temperature when a thin film of yttrium iron garnet is treated with microwaves. They believe the quasi particles formed are magnetic waves they call magnons. "Magnons are the quanta of magnetic excitations…."

Elon was coined by the author because I found no other term in the literature for the entity that causes electric forcefields. By the way, I decided on this term long before I knew of Elon Musk. However, it does seem to fit this energetic man.

Weak Nuclear Force

I have not discussed the weak nuclear force in this book, and I don't intend to, but I assume the forcefields are composed of virtual elastic strings and behave in a similar manner to the other forces of nature. Now that's the last you'll hear from me on this subject—well almost.

A guide to this book

It is likely a daunting and unpleasant task for many readers to wade through the experiments and observations that are explained in Chapter 3 through Chapter 17; however, I have included this information up front because it contains crucial evidence that supports the two most basic properties of forcefield: They are composed of matter that has strong elastic properties.

In addition to my numerous experiments, I have included observations and experiments long established by the scientific community. They also provide important evidence that forcefields are composed of matter with strong elastic properties. This information should no longer be ignored.

Now to ease the reader's task, I have included an abstract at the beginning of my experiments and a short easily read conclusion at the end of the chapter. However, I strongly urge you to at least leaf through the experiments and take note of the results. I lucked out. The results in all cases clearly support my conclusions. I have left in all the details in hopes other scientists will duplicate my experiments. I would be pleased to hear from anyone who is attempts this endeavor.

After reading Chapter 2, should you wish to go directly to a summary of the evidence that forcefields are composed of mater that has strong elastic properties, go to Chapter 18: however, keep in mind there is strong evidence that backs up this summary.

Consider the following for a moment

The evidence I have accumulated and explained in the first chapters of this book makes it almost impossible to deny that forcefields are composed of matter with strong elastic properties; however, it is human nature to frequently deny the obvious as explained by Richard Tedlow, [2010, page 3], a Harvard faculty member: "Denial is the unconscious calculus that if an unpleasant reality were true, it would be too terrible, so therefore it cannot be true. It is what Sigmund Freud described as the combination of 'knowing with not knowing.' It is, in George Orwell's blunt formulation, 'protective stupidity'."

Dr. Daniel Kahneman, a Noble Prize-winning psychologist who has spent a lifetime studying the human mind and how we think, states in his recent book "Thinking, Fast and Slow (2011, page 25) there are "two important facts about our minds: we can be blind to the obvious, and we are also blind to our blindness."

I am asking you, the reader, to recognize your own prejudices and act accordingly. Please consider the following:

I have assembled numerous experiments and observations that show forcefields are composed of matter with strong elastic properties. One experiment or observation might cause you to ponder, but you could easily dismiss it; even two might easily be denied—perhaps three—how about four? Would you still be dubious? How about 5 or 6 or 7 or 8 or even 9 experiments—would you still be dubious? Let's up the ante. How about a whopping 16 such experiments and observations as explained in the chapters that follow? Will this convince you forcefields are composed of matter that has strong elastic properties?

I spent years on these experiments as did other scientists; please treat them with kindness, and if you are in a position to do so, please repeat my experiments and publish your findings.

The status quo has failed

If scientists ignore the evidence that forcefields are composed of matter with strong elastic properties, the status quo will endure, and another generation of physicists will be making the same statement as Dr Lee Smolin: “My generation has not produced a single basic discovery in physics. To put it bluntly”, he says, “…we have failed.”

Chapter 2. The graviton matrix

Graviton matrix is the term I use that refers to the vast number of graviton strings in space that are not only oriented in every conceivable direction but intertweave to form a dense three-dimensional network in space. It is perhaps one of the most important concepts developed in this book, and in the chapters that follow, I will present a great deal of evidence that supports the concept of the graviton matrix.

There are two important reasons to believe that the space around us contains a vast number of gravitons. First it is known that the entire Local Group of galaxies contribute to the gravitons that permeate this space. The Local Group is a relatively small cluster of galaxies held together by a gravitational field This includes 200 billion to 400 billion stars in the Milky Way Galaxy, a trillion stars in the huge Andromeda Galaxy, and it includes gravitons from approximately 30 other smaller galaxies that make up the local group. All contribute to the gravitons that strike us here on Earth. In addition, the objects in our solar system, including our sun, moon, and all the planets supply even more gravitons in the space about us than far away stars in the galaxies mentioned.

A second important reason there are a vast number of gravitons in space comes from the fact that gravitons likely last for a full second, (as discussed in future chapters), whereas the virtual elastic strings that make up other forcefields only last a very brief a period of time before they retract back to their source. For example, photons make and retract their magnetic and electric fields every time they oscillate, which can be more than 10^{15} times per second. I will examine the concept of string creation and self-induction in detail later in this book. In this Chapter, I will attempt to arrive at an estimate for the quantity of gravitons in space.

A physicist by the name of William Hiscock (2002) stated that scientists would like to believe that the energy of a graviton approaches Planck’s constant, which is only 6.63 x 10^{-34} joule-seconds. This means there must be a vast number of gravitons connecting Earth and Sun because the energy expended between Earth and Sun is vast,

We can arrive at an estimate of the number of gravitons connecting Earth and Sun by calculating the binding energy between these two bodies, then divide this by Planck’s constant. Halliday and Resnick (1981, page 261) provide the following equation to calculate the binding energy between Sun and Earth:

$$\text{Binding energy} = G \frac{Ms \ Me}{r} = 5 \times 10^{33} \ \text{Joules}$$

Where G is the universal constant (6.67×10^{-11}), Ms the mass of the Sun (1.989×10^{30}), Me the mass of Earth (5.98×10^{24} kg), and r is the distance between the two bodies (1.5×10^{11} meters).

If the maximum energy of a graviton is equal to Planck's constant, we can achieve an estimate for the number of gravitons connecting Earth and Sun by dividing the binding energy by Planck's constant.

$$\text{number of gravitons connecting Earth and Sun} = \frac{5 \times 10^{33} \ \text{Joules}}{6.63 \times 10^{-34} \ \text{joules/graviton}} = 7.54 \times 10^{66} \ \text{gravitons}$$

This gives us an estimate of 7.54×10^{66} gravitons connecting Earth and Sun. However, even this vast number seriously underestimates the number of gravitons because the gravitons connecting Earth and Sun do not expend their maximum energy. Only when there is 100 percent resistance to graviton retraction does the graviton exert 100 percent of its available energy. Only then can the retracting elastic string do 6.63×10^{-34} joules of work.

The analogy that fits this situation is a stretched rubber band. If we allow the stretched rubber band to slip through our fingers, it cannot achieve maximum force, nor can it utilize its full potential energy. The same is true for gravitons connecting two bodies. Those gravitons penetrating the center of the Sun are the only gravitons that have any hope of achieving their full potential, and even then, there may be insufficient resistance to achieve this goal. I examine resistance to graviton retraction in Chapter 23.

Obviously, it would be useful to have an estimate of graviton concentration in space if we are to focus on numerous conundrums in physics. The following is my attempt at this problem.

We know the number of gravitons in space is vast because of the above calculations, and it must be vast to explain my experiments, Chapters 9 through 17. The number must also be vast to explain numerous observations made by scientists as discussed in the chapters that follow.

Planck demonstrated the energy of a photon divided by its oscillation frequency is the same for all photons, and this became known as Planck's constant: 6.63 x 10^{-34} joule seconds.

$$\text{Planck's constant} = \frac{\text{Photon energy}}{\text{Oscillation frequency per second}} = 6.63 \times 10^{-34} \text{ joule-second}$$

If the energy of a graviton is tied to Planck's constant, it is obvious that the number of gravitons created by matter must be tied to the oscillation frequency of the subatomic particles creating these strings. Using this as a starting point, I arbitrarily assumed that gravitons are created at the same frequency that protons oscillate, which theoretically is 2.3 x 10^{23} per second [note 8].

I might have used a combination of quarks and electrons since they are likely the principle source of gravitons other than photons. And of course, there are three quarks and one electron associated with every hydrogen atom, and every atom has a different number of protons, neutrons, and electrons that potentially make gravitons. Because of these complications, I have used the vibration frequency of a proton. This may seem like a stretch to you, but as you will see shortly, my analysis of the bonding energy in planet sun systems suggests this method of estimating the number of gravitons created by matter is reasonably close to that expected; in other words, energy per graviton approaches Planks constant when retracting through a very large body.

I have no illusions that this method of estimating the number of gravitons in space is perfect; however, I believe it is close enough to reality to make it a valuable statistic when analyzing numerous conundrums in physics. By approaching the force of gravitation in this manner, it has made it far easier for me to think about individual gravitons and their attributes. I hope it will make it easier for the reader as well.

Gravitons Generated by the Sun and Earth

If we take the mass of the Sun (1.989 x 10^{30} kg) and divide it by the mass of a proton (1.673 x 10^{-27} kg), we find there are 1.189 x 10^{57} proton equivalents in the Sun. Assuming that each proton equivalent generates 2.3 x 10^{23} gravitons per second, then the number of gravitons generated by the Sun per second would be 2.7 x 10^{80} [note 9]. This is a vast number, but even if the graviton persisted for several seconds with no retraction and no re-absorption, total graviton mass generated per quark or electron would be small compared to the mass of these subatomic particles. In addition, there will be no loss in mass because gravitons are reabsorbed.

If the sun generates 2.7×10^{80} gravitons per second, there would be a total of 1.2×10^{71} gravitons from the Sun striking Earth per second [note 12], which means there would be 10^{56} gravitons per second from the Sun bearing down upon every square meter of Earth's surface [note 11].

Using the same rationalization, Earth would generate 8×10^{74} gravitons per second, and the number striking the Sun would be 4.5×10^{69} per second [note 19]. If we add these two estimates together, ($1.2 \times 10^{71} + 4.5 \times 10^{69}$), we find there are 1.25×10^{71} gravitons connecting Earth and Sun. Using this estimate, we can calculate the average energy per graviton in this system.

Once again, the total bonding energy between Earth and Sun is 5×10^{33} joules. If we divide this by 1.25×10^{71} gravitons, we find the energy of the average graviton is 4×10^{-38} Joules.

$$\frac{5 \times 10^{33} \text{ Joules}}{1.25 \times 10^{71} \text{ gravitons}} = 4 \times 10^{-38} \text{ Joules per graviton}$$

Now this is more in line with what we might expect if the maximum energy of a graviton is 6.64×10^{-34} Joules.

As stated previously, Earth is a relatively small body, and we cannot expect gravitons retracting through this body to develop maximum force nor utilize maximum energy because these gravitons do not meet maximum resistance. The same is true for those gravitons retracting through the sun because the vast majority are not retracting through its center. I discuss resistance to graviton retraction in Chapter 23. This explains why the average energy expended per graviton is less than Planck's constant.

Although my method for estimating the number of gravitons cannot be expected to be 100 percent correct, it does satisfy the number of gravitons expected in the space about us for several reasons:

First: The energy per graviton calculated for those connecting Earth and Sun approach Planck's constant, a figure suggested by physicists.

Second: The concentration of gravitons calculated in the space around us fits the vast number required to explain numerous observations, including the velocity of electrons and photons and those observations previously explained by special relativity.

Third: The concentration of gravitons calculated fits those expected by my experiments described in Chapters 9 through 17. These experiments are based on the idea that the space about us contains a vast concentration of gravitons oriented in every conceivable direction, which intertwine to form a dense, three-dimensional matrix of tough elastic strings.

Taken in toto, we are literally forced to believe in the concept of the graviton matrix.

With these thoughts in mind, I turn your attention to my calculations that estimate the concentration of gravitons we can expect from various sources.

Concentration of gravitons

Gravitons arrive here at Earth's surface from our Sun, our planets, and from the 200 to 400 billion stars found in the Milky Way Galaxy, and in fact, from all 30 plus galaxies that belong to our Local Group, including Andromeda that is thought to have a trillion stars. However, as shown in the following table, the objects in our solar system provide more gravitons to the space around us than giant galaxies situated lightyears away.

The following table shows the concentration of gravitons we can expect from several major sources.

Table: Graviton concentration at Earth's surface

Source	Source's total gravitons	Gravitons at Earth's surface m^2	Gravitons per size of a proton, 10^{-15} m
Milky Way	1.9×10^{92}	*2.2×10^{53}	7×10^{20}
Andromeda	2.7×10^{92}	1.4×10^{47}	1×10^{17}
Earth	8.2×10^{74}	1.64×10^{60}	1×10^{30}
Sun	2.7×10^{80}	9.89×10^{56}	8×10^{26}
Moon	1.1×10^{73}	5.6×10^{54}	4×10^{24}
Mercury	4.6×10^{73}	4.3×10^{50}	3×10^{20}
Venus	6.8×10^{74}	3.8×10^{52}	3×10^{22}
Mars	8.9×10^{73}	1.2×10^{51}	9×10^{20}
Jupiter	2.7×10^{77}	3.3×10^{52}	3×10^{22}
Saturn	7.9×10^{76}	4.4×10^{51}	3×10^{21}
Uranus	1.2×10^{76}	1.3×10^{50}	1×10^{20}
Neptune	1.4×10^{76}	5.7×10^{49}	4×10^{19}

*Very rough estimate for the milky way. The North Star, Polaris, in the Milky Way is 5 million times larger than our Sun, but 323 lightyears away. It would by itself deliver 10^{49} gravitons per square meter surrounding Earth.

The gravitons emanating from Earth form a staggering 1.6 x 10^{60} gravitons in every square meter at Earth's surface, which is far denser than from any other source. The next strongest source is our Sun because it is a large body close at hand. As you can imagine, the Milky Way Galaxy with its 200 billion to 400 billion stars send gravitons into our area that are oriented in all directions, perhaps exceeding 10^{53} gravitons per square meter. Even the Andromeda Galaxy that is 2.5 million lightyears away contributes an estimate of 1.4 x 10^{47} gravitons per square meter at Earth's surface. Of course, there are close to 30 galaxies in the Local Group that send gravitons into the space about us that arrive here in every conceivable direction. For example, Triangulum galaxy is estimated to deliver 10^{45} gravitons per square meter. Our nearest neighbor galaxy, SagDeg, will only furnished approximately the same number because they are a much smaller galaxy than Triangulum. Taken in total, those galaxies other than Andromeda and the Milky Way can be expected to send in the neighborhood of 10^{49} gravitons through every square meter surrounding Earth.

The planets in our solar system supply even more gravitons to Earth than the more distant stars found in the other galaxies that surround the Milky Way. Most of the planets furnish more than 10^{50} gravitons per square meter. And perhaps somewhat surprising, our Moon furnishes more than any other source other than our Sun and Earth, some 5.6 x 10^{54} gravitons per meter at Earth's surface.

Because Earth is surrounded by our Sun, our planets, our Moon, and the stars in the Milky Way Galaxy and approximately 30 other galaxies, we can expect the gravitons from these sources to arrive at our shores in vast numbers that are oriented in every conceivable direction. This is an important point that explains numerous conundrums.

Another way to view the vast number of gravitons is to reflect on how small the areas are that do not contain one of Earth's gravitons, only 1.6 x 10^{-60} square meters, and the distance between strings is at most 8 x 10^{-31} meters in any direction even if the string takes up no space. Of course, a vast number of gravitons from numerous other sources invade this same area as well. This means there is a veritable sea of gravitons that infuse our space and crisscross in all directions.

The concept of the graviton matrix led me to the idea that spinning bodies in flight will react to this matrix in predicable ways, just as spinning bodies react to any other matter they encounter. For example, spinning baseballs in flight curve because of their interaction with air molecules; spinning billiard balls curve as they move along the billiard table because they interact with the felt; and in the same manner, spinning bowling balls curve as they move down the bowling alley, etc. In all cases, spinning objects curve in the same direction as the leading edge of the ball.

In my studies, I have carried out numerous experiments and analyzed numerous observations that support the idea that spinning objects are affected by a dense concentration of gravitons that exists in the space about us. This includes how satellites spin on their axes, degree of anomalous planet precession, passing of angular momentum between planet and sun, and between planet and moon, degree of planet tilt on axis, and Earth's wobble on axis. In addition, I have carried out other experiments I report in this book that show the graviton matrix affects table tennis balls in flight, curvature of photons in flight, and the fall of light weight objects in a vacuum. And every experiment provides important evidence that gravitons form a dense fabric of interlaced strings in space that are composed of matter.

Physicists have long believed that the space surrounding us contains a vast amount of energy. This is explained by the graviton matrix and the waves moving along these strings as discussed in this book. The graviton matrix also explains the behavior of gyroscopes, which has confused everyone for centuries.

This brings us to another category of bodies that are affected by the graviton matrix. In this category, we find small subatomic particles that create virtual elastic strings. Here we are talking about photons and electrons that eject their electric and magnetic strings into the graviton matrix at a 90-degree angle to their line of flight. This means photons and electrons in flight meet with great resistance as explained in the section dealing with VES ether theory. This resistance is overcome by graviton waves that push on the particle's elons and magnons, and therefore the particles through space. For this reason, the graviton matrix is essential to explain the velocity of photons and electrons.

The graviton matrix is also a vital component of my model for ether theory that can explain special relativity in a three-dimensional world. At the same time, the graviton matrix explains Maxwell's equations, the Michelson-Morley experiment, and other observations examined in the chapters ahead. The very large number of conundrums that can be solved in the macro world of large spinning objects and in the micro world of electrons and photons confirms and establishes the existence of the graviton matrix.

In Chapter 12, I explain my experiments that demonstrate light weight objects in a vacuum fall slower towards Earth's surface than heavier objects. My experiments demonstrate this is particularly true for long acrylic fibers that fall slower than tufts of downy afterfeather, and both fall far slower in a vacuum than a magnet weighing a little more than 2 grams. This is just one of many experiments that demonstrates the existence of the graviton matrix.

Perhaps you are worried about the vast number of gravitons penetrating the human body. Shouldn't they cause damage to the cells as well as cause mutations in the same manner as x-rays? The answer is no. The momentum of a single x-ray photon is in the neighborhood of 10^{-25} kg-seconds, while the momentum of a graviton particle is in the neighborhood of 10^{-56} kg-seconds (explained in Chapter 45 and elsewhere). In other words, the momentum of a single x-ray photon is 10 x 10^{30} times greater than the momentum of a graviton. There is no reason to suspect that graviton virtual particles would destroy tissue or cause mutations. They are simply too small to cause damage. They easily pass through our bodies without notice.

You might also be wondering why we can't feel them in the space about us if they are present in such vast numbers. It is well to remember that all the graviton strings in one cubic meter surrounding Earth have less mass than one molecule of air, even less than one electron. In addition, they are super long strings that stretch across galaxies, and they have perfect elasticity, which means they yield easily when we brush them aside with the movement of our hands. It's as if they do not exist. In addition, a graviton may only exist for one second, which means they disappear and regenerate with every movement of your arm, your eyelid, or the wag of your tongue.

Perhaps you are struggling with these two questions: How can a graviton be ejected 5 million lightyears? And how can it remain a cohesive string over a vast distance?

First, if the graviton only has a mass of 1.3 x 10^{-79} kilograms (Chapter 45), it means the elastic string is reduced to only 10^{-102} kg per meter when stretched 5 million lightyears. It is reasonable that a string with an extremely small mass per meter will provide little resistance to the forward progress of the super dense virtual particle traveling at 10^{23} meters per second. This greatly helps to explain how the graviton is ejected a vast distance through space during self-induction (Chapter 22).

The second major consideration is the cohesive nature of the string. How can a graviton string that consists of just 10^{-102} kilograms per meter remain a coherent string when ejected 5 million lightyears? This begs the question what is matter? A question better left to nuclear physicists. However, it must be kept in mind gravitons have perfect elasticity, and it is this property that endows virtual elastic strings with perfect cohesiveness.

Graviton matrix is a term that refers to the vast concentration of gravitons that are oriented in every conceivable direction in the space about us. Gravitons are virtual elastic strings that are composed of matter. They form a dense, interlaced, super-tight, three-dimensional network of virtual elastic strings—a veritable fabric that infuses all space.

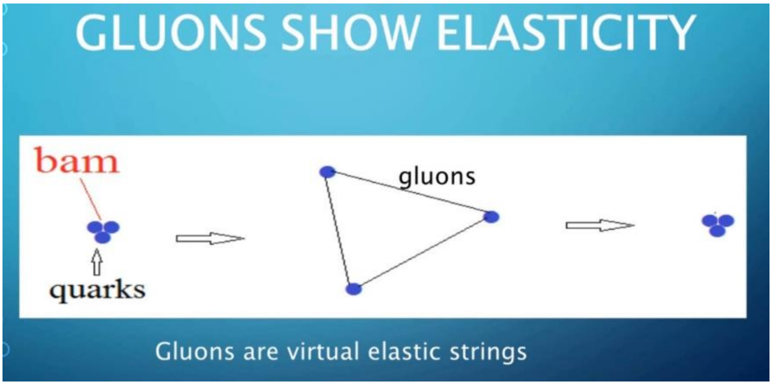
The graviton matrix is responsible for numerous phenomena as explained in this book.

Chapter 3: Strong nuclear force has elastic properties.

As far as VES theory is concerned, one of the most important observations made by nuclear physicists is the finding that the nuclear force of attraction between quarks increases as the distance between quarks increases. Recall that quarks are small subatomic particles found within protons and neutrons. They make up less than two percent in weight of these structures, but they are responsible for creating the strong nuclear force that binds quarks, protons, and neutrons together within the nucleus of the atom. If it were not for this strong force of attraction between quarks, the positive (electric) repulsion forces between quarks would cause the disintegration of the atom. It would fly apart. As we shall see in Chapter 36, quarks are normally found as triads, three quarks bound together by gluons. According to VES theory, gluons are virtual elastic strings.

Physicists R. Michael Barnett, Helen R. Quinn, and Henry Muhry (2000) explain that when a high-energy collision takes place between elemental particles, it results in the formation of individual quarks that move away from the point of collision. The distance they move apart is much more than the diameter of a proton. In this process, a strong force of attraction develops between quarks that increases dramatically with distance. This slows down the motion of the quarks, and they eventually recombine to form a triad of quarks. For this reason, scientists have concluded that it is impossible to isolate free quarks.

The following illustrates how quarks, when forced apart, quickly recombine.



As the quarks move apart, the potential energy between quarks increases just as the potential energy of an elastic band increases when it is stretched. It does not take a great deal of imagination to believe that quarks are connected by virtual elastic strings, the gluons, whose potential energy increase when the quarks are forced apart. Gluons behave as if they are rubber bands.

There are two reasons that gluons might show greater potential energy when quarks are forced apart. If the action is quick enough, the original gluons would remain in place long enough to be stretched by the collision, which would increase their potential energy. It is also possible that gluons never reach their full potential energy when quarks are at close range. Thus, when they are artificially separated, it allows gluon virtual particles to travel a longer distance before bonding with other gluons. In this case, the virtual gluon particle is stretching the string left behind as it develops in space. This increases the potential energy of the gluon just as the potential energy of a rubber band increases when stretched.

The elastic nature of gluons should not be dismissed lightly. They provide dramatic evidence that forcefields have elastic properties. Why on Earth should we believe electricity, magnetism, and gravity differ in a fundamental way from the strong nuclear force?

Gluons

Nuclear physicists have demonstrated there are three quarks bound together inside a proton. They call the elastic bonds gluons. When the triad of quarks is blasted apart by elemental particles, they never completely separate as individual quarks, and the farther they are blasted apart, the stronger the force binding them together. They have strong elastic properties, and they are composed of matter just like the atoms they spring from.

If we live in a three-dimensional world, it almost forces us to believe that forcefields are composed of matter that has strong elastic properties. To believe otherwise leaves us in a quandary that has existed for a thousand years.

Chapter 4: Electric forcefields have elastic properties

There are several lines of evidence that plainly show us that electric forcefields have elastic properties, but I will start this chapter with the following quote.

Professor Marvin Johnson (2011), a physicist at California State University, sums up his views as follows: “The bonds between atoms in a solid or liquid act like springs, when you compress or stretch them, they store potential energy. The vibrations due to thermal motions stretch and compress these bonds producing potential energy. Therefore, some of the energy associated with thermal motion is stored as potential energy.”

When springs are stretched or compressed, it stretches the distances between atoms, which increases the potential energy of the stretched virtual elastic strings. Halliday and Resnick (1981, page 124) made this statement: “For example, when we compress a spring and give it elastic potential energy…” It was refreshing to find this statement in their textbook.

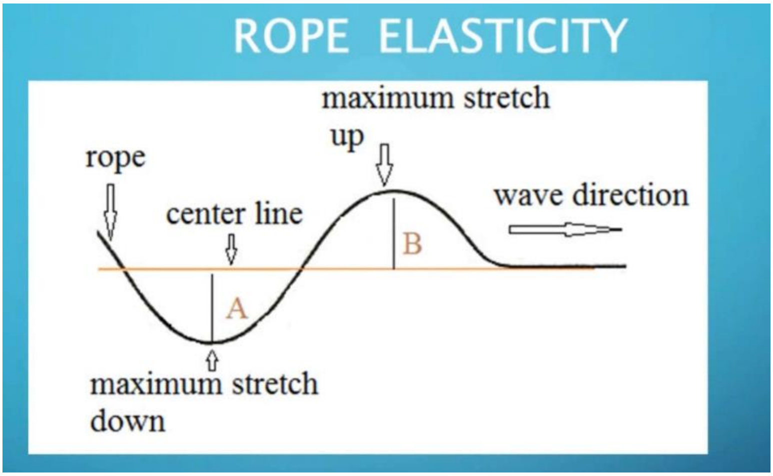
Stretched rubber bands.

Perhaps there is no greater example that demonstrates electric bonds have elastic properties than rubber bands.

When a common rubber-band is stretched, potential energy develops in the rubber, which causes the rubber-band to retract back into its original shape. The increase in potential energy can best be explained by an increase in potential energy stored in the electric bonds between atoms. In fact, there is no other simple explanation. Keep in mind that billions of new connections are made every second, which tells us the connections made when the rubber-band is fully stretched are new and constantly being refreshed. While it is true that stretching a rubber-band realigns the atoms in the rubber, it is also true that the bonds must be storing additional potential energy to pull the rubber-band back into its original length. The simple explanation is this: Stretching the rubber-band increases the distance the bonds must travel to connect the atoms, which means the connecting bonds are stretched over a greater distance. Even if we hold the rubber-band for an extended period of time, the potential energy of the connecting strings is not lost because billions of new strings are created every second. It is fundamental to VES theory that the farther the virtual particle travels to make a connection the greater the potential energy stored in the string.

Waves moving along a common rope

Halliday and Resnick (1981, page 294) explain that a wave moving along a common rope owes its properties to the elasticity of the rope.



When a taut rope connecting two objects is plucked at one end, it sends a transverse wave moving along the rope. When the wave is moving downward as shown in position A in the illustration, the electric bonds are stretched. This stores potential energy in the rope, and when it contracts, it pulls the string back into alignment and on up to form a wave above the center line.

Physicists believe the wave will continue alone the rope indefinitely as long as there is no interference. Secondly, the smaller the rope the faster the wave will travel along the rope. Electric bonds must have strong elastic properties just like the atoms that create these bonds. There is virtually no other explanation for the elastic properties of the waves moving along a taut rope.

Chemical bonds

We normally only think of electric energy in terms of electricity zinging through a wire in our homes. In this case, electric energy is supplied by electrons in the wire that create a negative electric current, and protons (quarks) at ground that create a positive electric current. I discuss this in detail in Chapter 20. These same electric fields are responsible for the chemical bonds that bind atoms into molecules and molecules into compounds. These chemical bonds are composed of electric forcefields created by the same subatomic particles that create electricity in a wire—electrons and protons (quarks) create elons.

Electric bonds have strong elastic properties

The elasticity of electric bonds allows them to store potential energy when stretched.

- Rubber-bands stretch and store potential energy in their electric bonds, which allows them to retract back to their original shape. This is a common but dramatic observation that should not be dismissed.
- Transverse waves moving along a rope do so because potential energy is stored in the electric bonds that continually stretch and retract. Physicists agree it is due to the rope's elasticity.
- The chemical bonds that bind atoms to form molecules and compounds depend upon the elastic properties of the virtual elastic strings.

It is fundamental to virtual elastic string theory that all forcefields share common fundamental properties—one being their elasticity just as exhibited by the atoms that create these forcefields. Thus far we have seen that the strong nuclear force and the electric force have strong elastic properties. In the next Chapter, I will discuss the evidence that gravitational forcefields also have strong elastic proprieties.

Chapter 5: Gravitational forcefields have elastic properties

We can expect the distance the virtual particle has to travel to achieve maximum stretch will vary according to the mass of the string. For this reason, it is not surprising that gluons, likely the most robust and most massive strings, show an increase in potential energy over short distances that correspond to the distances found within nuclei, some 10^{-14} meters. In contrast, elons (virtual elastic string that creates the electric force between atoms), which are likely billions of times less massive than gluons, gain additional potential energy when stretched over greater distances—some 2×10^{-10} meters. Now we come to gravitons, the least massive of all strings. They have to be stretched across a galaxy, some 5×10^{20} meters in order to double their potential energy. This suggests that gluons are thousands of times more massive than elons, and gravitons are thousands of times less massive than elons and gluons.

Virtual elastic strings have perfect elasticity and perfect cohesion. This explains why it is possible for a graviton virtual particle to race across a galaxy at tremendous velocity yet remain intact even though it is composed of a mass too small to be comprehended. No force, blade, or Thor's hammer can disconnect the graviton from its source because it has perfect elasticity and perfect cohesion. Perfect elasticity also explains why a graviton can retract back to its source at great velocity, and if bound to some object create a force of attraction.

Let's examine the evidence that the gravitational force has elastic properties. In 1932, Jan Oort, a Dutch astronomer, first raised the possibility that stars in galaxies are rotating too fast to stay in orbit according to the accepted laws of gravitation. Since that time, numerous studies have shown that the outermost stars in a galaxy are rotating at velocities that are too fast to allow them to remain in orbit. They seem to defy Newton's universal law of gravitation.

Scientists hypothesize that the additional gravitational force necessary to hold stars in orbit comes from additional objects that cannot be detected by any known means. For this reason, it is referred to as dark matter. This theoretical mass is hypothesized to be distributed throughout our own Milky Way Galaxy, and other galaxies. In fact, 50 to 80 percent of our galaxy would have to be dark matter to account for the rotation of the stellar bodies in the Milky Way. The dark matter would have to form a cloud surrounding and permeating the Milky Way and other galaxies.

This subject was reviewed by the Tuckers (1986). They examined every known type of matter including gasses, dust, rocks, asteroids, planets, dark stars, white dwarfs, neutron stars, black holes, quasars, etc., in hopes of pinpointing a source of dark matter. After this exhaustive search, it was concluded that none of these objects were likely candidates for dark matter. They could find nothing that qualified for the theoretical mass that would have to make up 70 to 80 percent of our universe.

The detection of dark matter has not improved over the 70 plus years it has been studied even though there has been a massive search for this material using every known technique available, including instruments aboard satellites. In April 2011, a group of scientists headed by Elena Aprile at Columbia University published their findings that show dark matter in the form of low mass particles does not exist. The negative results can be found online at arXiv.org in an article describing their Xenon100 experiments. Thus, to date, scientists have not been able to find significant hidden matter in our galaxy that could account for what would have to be an unlikely 85% percent of the matter in the universe.

If dark matter makes up a large percentage of all the matter in our universe, then surely, we should have some in our solar system. But there is no evidence for such matter. There is not a single hint that any significant amount of matter exists in our solar system other than that identified as asteroids, planets, the Sun, and a few stray comets. In all cases, the orbital patterns of the objects in our solar system down to the last arc second can be justified by the push and pull of known existing bodies (okay, there is anomalous precession of some bodies, but it has nothing to do with dark matter as explained in Chapter 16). There are no surprises, and there is no hint of a vast amount of hidden matter that would disrupt and play havoc with known orbital patterns that completely obey Newton's universal law of gravitation. This alone should discourage, if not completely discredit, the concept of dark matter. We are searching for something that would have to make up almost all the matter in our universe, yet there is not a trace of it in our solar system, nor in our galaxy, nor in any other galaxy. It seems we are reaching the point where we can say with complete confidence that dark matter does not exist.

My hypothesis that explains this conundrum is rather simple. It says that the force of attraction exerted by a graviton depends on its elasticity and the distance between objects, which accounts for the additional gravitational force necessary to hold stars in their orbits as observed. It says that gravitons are like gluons and elons; they have elastic properties, and the more we stretch something elastic the greater the potential energy that accumulates in the string, at least until maximum stretch is reached.

STARS ORBIT FASTER THAN EXPECTED
The outer stars in our galaxy, and other galaxies, orbit too fast to stay in orbit according to Newton's universal law of gravitation. They should fly off into space but they do not. This can be explained completely if virtual elastic strings develop more force the farther apart the objects are separated, just as scientists have shown for the strong nuclear force, and just as the evidence shows this is true for the electric force.

Forces affecting satellites in orbit

The force necessary to hold a satellite in orbit is known as the centripetal force. It is calculated as follows:

$$\textbf{force in newtons} = \textbf{mass}\ \frac{\textbf{(velocity) 2}}{\textbf{radius}}$$

Where the mass is in kg, velocity in meters per second, and the radius is in meters.

The universal law of gravitation computes the actual force available to keep a rotating body in orbit:

$$\textbf{gravitational force} = \frac{g\ m_1\ m_2}{r^2}$$

This is known as the universal law of gravitation. Notice as the distance increases, the gravitational force decreases as the square of the distance while the centripetal force decreases with r. The only way these two equations can be equal is if the velocity decreases as the radius increases. This is exactly what we see for planets in our solar system. The two equations give identical results because the velocity of the planets decrease the farther they are from the Sun. The results are shown in the next table.

Table: Gravitational force in solar system

Planet	Centripetal force in newtons	Universal law of gravitation force in newtons	Orbital velocity m/s
Mercury	1.31×10^{22}	1.31×10^{22}	47880
Venus	5.52×10^{22}	5.52×10^{22}	35020
Earth	3.55×10^{22}	3.54×10^{22}	29790
Mars	1.64×10^{21}	1.64×10^{21}	24130
Jupiter	4.17×10^{23}	4.16×10^{23}	13070
Saturn	3.72×10^{22}	3.69×10^{22}	9670
Uranus	7.57×10^{20}	7.54×10^{20}	6810
Neptune	6.75×10^{20}	6.7×10^{20}	5450

This is not true for the stars in orbit in the Milky Way Galaxy where stars at distances greater than 31,000 lightyears all travel at 225,000 m/s (Krauss, 2000). A lightyear is the distance light can travel in one year, which is 9.46×10^{15} meters. Stars at the edge of the Milky Way Galaxy are 50,000 to 60,000 lightyears away from the galactic center, yet they continue to orbit at 225,000 meters per second.

We can calculate the orbital radius where the centripetal force and gravitational force of attraction should be equal when the velocity of the star is 225,000 m/s. If we combine the two equations and solve for r, we get the following relationships.

$$\textbf{gravitational force} = \frac{g\, m_1\, m_2}{r^2}$$

$$\textbf{centripetal force} = \frac{m_2\, v^2}{r}$$

$$r = \frac{g\, m_1}{v^2}$$

We can eliminate the mass of the star, $\mathbf{m_2}$, when we combine the two equations. We can solve for radius because we know $\mathbf{m_1}$, the mass of the galaxy (2.2×10^{41} kg), and we know the velocity of the star (225,000 m/s). The gravitational constant, **g**, is 6.67×10^{-11}. The radius of this orbit becomes or 30,640 lightyears. At this distance, the gravitational force and the centripetal force needed to keep the star in orbit are the same. However, the gravitational force of attraction at any distance past this point is less than the force needed to keep the star in orbit.

I used the mass of a theoretical star the size of our Sun to compute the centripetal force and the gravitational force at different distances from the galactic center, assuming all were traveling at 225,000 m/s. Of course, the two should be the same when they are 2.9 x 10^{20} meters or 30,640 lightyears from the center of the galaxy. The following calculations show this is true.

universal law of gravitaion

$$\text{newtons} = \frac{(6.67 \times 10^{-11})(2.2 \times 10^{41})(5.98 \times 10^{24})}{(2.9 \times 10^{20})^2}$$

Force equals 1.04 x 10^{15} newtons.

The calculation for the centripetal force at the same distance is as follows:

centripetal force

$$\text{newtons} = \frac{(5.98 \times 10^{24})(225{,}000)^2}{2.9 \times 10^{20}}$$

Force equals 1.04 x 10^{15} newtons, as expected.

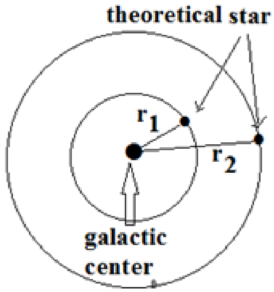
I also made the same calculations using a radius twice as large. The forces are compared in the next table

Table: Comparison of forces in Milky Way Galaxy

Radius meters	Centripetal Force newtons	ULG* Force newtons	Ratio
2.9 x 10^{20}	1.04 x 10^{15}	1.04 x 10^{15}	1.0
5.8 x 10^{20}	5.22 x 10^{14}	2.59 x 10^{14}	2.0

*ULG: universal law of gravitation

I made the simple assumption that the relationship between radius and mass of the galaxy is as follows:

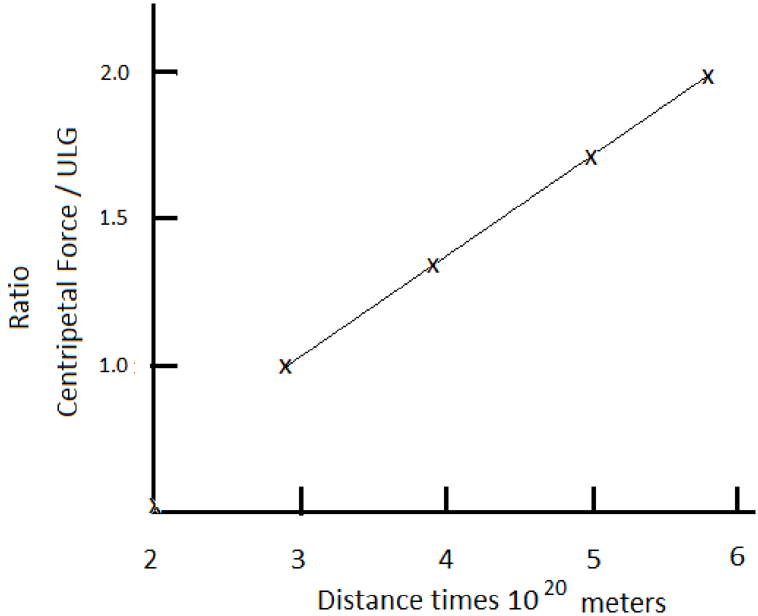


As you can see, this approach is acceptable for the first radius, r_i, because we expect the two methods of calculating the forces to be the same and that is what was found. This gives me confidence that using the radius and central mass in the simple way that I approached it is acceptable to calculate gravity.

When the radius is doubled, r_2 in the illustration above, it is 5.8 x 10^{20} meters from the center. This distance lies at the outer limit of the Milky Way Galaxy, which has a radius of 50,000 to 60,000 lightyears. The calculations show that the gravitational force of attraction is only half that needed to keep the star in orbit, as shown in the previous table. Obviously, there is either a great mass of dark matter that supplies the additional force of gravitation or the gravitons that connect star and galaxy gain greater potential energy when stretched over a greater distance.

Notice, the graviton only needs to double its potential energy over the vast distance of 5.8 x 10^{20} meters to account for the rotation of stars at the edge of the galaxy. We don't have to have 50 to 80 percent of the mass of the universe in the form of some mysterious, unknown mass. This completely solves the so-called dark matter problem.

One would think that something composed of matter that has perfect elasticity would accumulate potential energy at a constant rate when stretched. This is exactly what we find in the Milky Way Galaxy where all the stars past 2.9 x 10^{20} meters from the galactic center are rotating at the same velocity, which is 225,000 m/s. If potential energy of the graviton accumulates at a constant rate, then the ratio we obtain by dividing the centripetal force by the Newtonian Universal Law of Gravitation should increase at a constant rate over this immense distance. This is shown in the next slide. Here we see the ratio does increase at a constant rate, and for this reason, the stars in this region all travel at 225,000 m/s.



Computed using a theoretical star the size of our Sun

However, the increase in gravitational force per meter due to an elastic effect in this system is actually very small (3.45×10^{-21} newtons per meter) and would be insignificant in our solar system. For example, the distance between our Sun and Neptune, our most distant planet, is 4.5×10^{12} meters, and even if the increase in the elastic effect as seen here applied, there would only be an additional elastic effect of 1.55×10^{-8} newtons between Sun and Neptune, and this is insignificant compared to the 6.7×10^{20} newton gravitational force of attraction between these two bodies.

> Orbital patterns of the stars in our galaxy are exactly as expected if the stars are held in orbit by virtual elastic strings that exert greater force when stretched over a great distance.
>
> The elasticity of a graviton is too small to be of significance in our tiny solar system but is observed when the graviton is stretched across a galaxy whose distance is measured in lightyears.

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Evidence forcefields have elastic properties

In this section I have discussed some important evidence that forcefields have elastic properties just like the individual atoms they spring from that scientists tell us have perfect elasticity. This property allows forcefields to store potential energy when stretched, which allows them to create a force of attraction between particles when they retract back to their source.

These observations provide important evidence that one of the most fundamental assertions of Virtual Elastic String theory is demonstrated beyond reproach: strong nuclear forcefields, electric forcefields and gravitation forcefields have elastic properties that allows them to store potential energy and carry out a force of attraction when they retract back to source.

Elasticity of forcefields

In this section I have presented strong evidence that

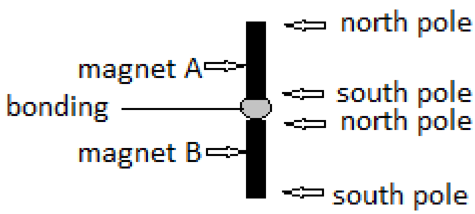
- Gluons that bind quarks together have strong elastic properties as demonstrated by nuclear physicists.
- Elons, the electric bonds that bind atoms and molecules together, have strong elastic properties as shown by rubber bands and transverse waves moving along a rope.
- Gravitons that create the gravitational force of attraction have strong elastic properties as demonstrated by stars in orbit. The potential energy stored in a graviton doubles when stretched across the Milky Way Galaxy, yet this increase in elastic potential energy is too small to be observed in our solar system.

If forcefields have elastic properties, it demands they are composed of matter. As you will see in the next section of this book, we don’t have to merely assume this because the evidence is overwhelming—virtual elastic strings are composed of matter.

Chapter 6. Magnetic fields have physical properties.

We are all familiar with the fact that the north pole of one bar magnet is attracted to the south pole of another bar magnet. We are also familiar with the fact that two identical magnetic poles repel each other because of magnetic repulsion forces. From this it is evident, north pole magnetic fields and south pole magnetic fields differ in some aspect from each other.

I will discuss this issue at length in Chapter 19. Suffice it to say here that all forcefields come in more than one form. In this book, I refer to the north pole magnons as n-magnons and south pole magnons and s-magnons.



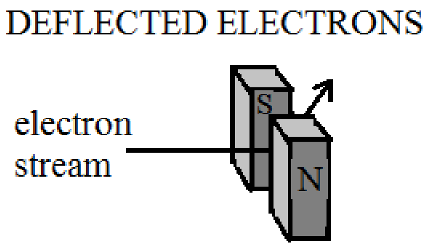
Bonding between bar magnets A and B causes a force of attraction when the virtual elastic strings retract back to their sources. Bonding is likely due to entanglement.

Forcefields are composed of virtual elastic strings. All forcefields come in more than one form. The two different forms for magnons are shown below. We will meet up with the other forms for gluons, gravitons, and elons later in this book.

Gluon: Strong nuclear forcefield
Graviton: Gravitational forcefield
Magnon: Magnetic forcefield
n-magnon: north pole magnons
s-magnon: south pole magnons
Elon: Electric forcefield

Magnetic fields deflect electrons

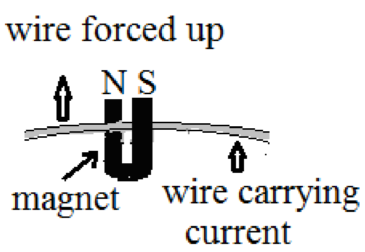
Scientists have shown that electrons are deflected when they move between the north and south poles of a permanent magnet. This is shown in the next illustration. They are either deflected up or down depending on the orientation of the magnet's north and south poles and the direction the electrons are spinning.



According to VES theory, a permanent magnet has billions of n-magnons and s-magnons stretched between the two poles of the magnet that bond and form a physical barrier to the onrushing electrons. When the electrons meet this barrier, they will tend to either move up or down the barrier depending upon their spin direction. This observation provides sound evidence that magnons are composed of matter.

When a wire carrying an electric current is placed between the poles of a stationary magnet, the electrons moving through the wire strike the magnon barrier and are either deflected up or down depending on spin direction.

If the electrons move upward, they bang into the atoms in the wire and force the wire up as shown in the next illustration.



Scientists tell us the magnet is passive; it provides no energy to the deflected electron or to the movement of the wire just as expected if its only function is to provide a physical barrier to the onrushing electrons, According to VES theory, the magnons stretched between the two poles of the magnet provide a means of orienting the electrons already moving through the wire, and they provide a physical barrier that deflects the electrons.

I will discuss magnetic forcefields in more detail in Chapter 21.

Demokritov and his colleagues (2006) believe they have observed magnon waves with at least quasi momentum when they form condensates of yttrium iron garnet treated with microwaves. “Magnons are the quanta of magnetic excitations….” I believe it is entirely possible that magnons as defined in this article are the elastic magnon strings as defined in this book.

Conclusions

Scientists have long known that electrons are deflected when they encounter a magnetic forcefield. The barrier created by the magnetic forcefield provides no energy to the deflected electrons. This is sound evidence that magnons are composed of matter—they have mass.

Electrons are deflected by magnetic fields

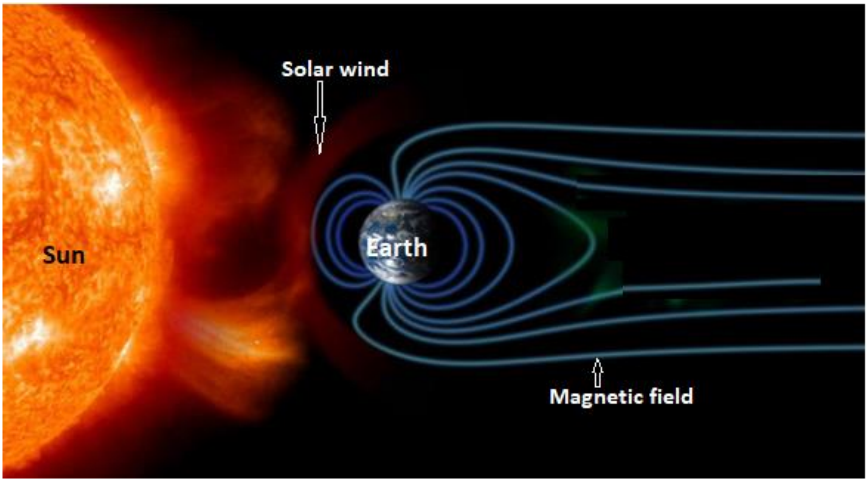
- Physicists have shown that electrons are deflected when they encounter a magnetic field.
- The magnetic field provides no energy to the deflected electrons—the magnetic field merely provides a passive barrier.
- It is sound reasoning to believe magnetic fields deflect electrons because magnons are composed of matter.

Chapter 7. Magnetic fields deflect solar winds.

Earth's magnetic field is thought to originate from the molten iron core surrounding the solid core that makes up the center of the planet. Earth's magnetic field is composed of magnons that form a physical shield surrounding Earth. This shield has a very useful purpose for life on Earth because it deflects the dangerous incoming solar wind.

The solar wind is composed of electrons and protons traveling at great velocity, as much as 750,000 meters per second. If it were not for Earth's magnetic field, electrons and protons flowing from the Sun and directed at Earth would annihilate most life on Earth. Earth's magnetic field is able to divert the dangerous incoming electrons and protons traveling with great velocity because magnetic fields are composed of matter.

The interaction between the solar wind and Earth's magnetic field has a second effect. The incoming electrons and protons blast much of Earth's magnetic field to the far side of Earth as depicted in the next illustration that I copied from Wikipedia (slightly modified by me).



The solar wind accomplishes this feat because the incoming electrons and protons are composed of matter, and they collide with Earth's magnetic fields also composed of matter.

Conclusion

Earth’s magnetic field creates a physical shield surrounding Earth because magnons are composed of matter. It is for this reason; Earth’s magnetic field is able to divert the highly dangerous solar wind that is composed of electrons and protons traveling at high velocity.

The observation that Earth’s magnetic field deflects incoming electrons and protons traveling at high velocity supports the idea magnetic fields are composed of matter. And this concept is further supported by the observation that Earth’s magnetic field is blasted to the far side of Earth by the incoming electrons and protons that make up the solar wind.

In the next Chapter, I report an experiment of mine that directly demonstrates magnons are composed of matter.

Earth’s magnetic field is composed of matter

- The solar wind is composed primarily of electrons and protons traveling at high velocity (up to 750,000 m/s).
- Earth’s magnetic field is composed of magnons that create a physical shield that surrounds Earth.
- Earth’s magnetic shield deflects incoming electrons and protons traveling at high velocity because Earth’s magnetic field is composed of matter.
- The electrons and protons traveling at high velocity are able to blast much of Earth’s magnetic field to the far side of Earth because magnetic fields are composed of matter.

Chapter 8. Magnetic fields deflect tennis balls in flight

If magnetic fields deflect electrons because they create a physical barrier, I wondered whether such a barrier would deflect spinning table tennis balls in flight. This experiment is very important because the little plastic balls are not attracted to either the north pole or south pole of a magnet, and for this reason, there is no magnetic force of attraction or repulsion that might have a bearing on the outcome of my experiments.

. To test this question, I shot spinning table tennis balls through a magnetic field and observed where they struck a target.

Title of this experiment

Magnetic forcefields deflect spinning table tennis balls in flight.

ABSTRACT

In this experiment, I used a Robo Pong to shoot spinning table tennis balls between the north pole and south pole of a series of three electromagnets with a total length of 137 cm. Each field was about 7 cm apart. It didn't matter whether the balls were spinning clockwise or counterclockwise, those balls shot through the magnetic field curved more when the magnet was on than when the electromagnet was off. The balls in the magnetic field curved more in the direction the leading edge of the ball was spinning. There was no overlap in averages. I view this as direct evidence that magnetic fields have a physical presence in space—they are composed of matter. How else is it possible for magnetic fields to deflect a spinning table tennis ball if there is no magnetic attraction or repulsion between the small plastic ball and the electromagnet?

INTRODUCTION

I undertook the following experiments to determine whether spinning table tennis ball in flight are deflected by a magnetic field. In this experiment, I shot spinning table tennis balls through a magnetic field created by electromagnets. The results reported here are most gratifying. They absolutely demonstrate that spinning table tennis balls in flight are deflected by a magnetic field. This experiment is reported in detail as follows:

APPARATUS

The table tennis balls used were rated 3-star and were four centimeters in diameter. They were composed of plastic, and when dangled by a thread show no tendency to be attracted to or repulsed by a magnet. They were placed in flight using a Robo-Pong instrument that allows an individual to practice table tennis. Robo-Pong was first set up to eject the balls with a clockwise side spin, which induces the balls to curve to the right. In all cases, they were ejected with maximum velocity.

With the help of my friend, Ben Mc Culley, I constructed an electromagnet from one half of a pipe cut lengthwise that was 46 cm long and 15 cm diameter. It had a steel core 0.635 cm thick and was covered with two insulated wires at the same time. Both wires were 14-gauge and 152 meters in length. Thus, one wrap encompassed 92 cm of wire. This electromagnet when turned on did deflect spinning table tennis balls in flight but the difference on and off was not decisive so I added two additional magnets.

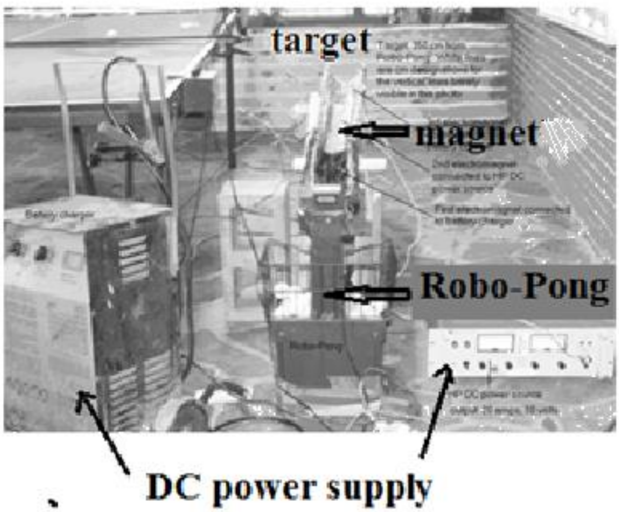
A steel pipe 46 cm long with an internal diameter of 15 cm was cut in half lengthwise, creating two steel cores 46 cm in length. The steel was 0.635 cm thick. The lengthwise edges of one of these magnets was heated and bent inward such that the edges were facing each other. This magnet was placed first in line next to the Robo-Pong. The edges of the other magnets were left straight up to accommodate the variability in the trajectory of the balls sent flying by the Robo-Pong. Each magnet made from the pipe received approximately 72 complete wraps of insulated 10-gauge wire, which completely covered the core.

The three magnets when placed in line created a magnetic field that was approximately 137 cm long with the north and south poles about 15 cm apart.

The two magnets with 10-gauge wire were connected to a DC battery charger that put out 64 amps at 12 volts that was divided between the two magnets. This was determined using a DC clamp on amp meter. The middle magnet was connected to a Hewlett Packard DC power supply. This instrument delivered 20 amps DC with 10 volts.

No residual magnetism remained in the electromagnets when the electricity was turned off. For this reason, I was able to shoot the controls through the magnets with the electricity turned on or off. Thus, the only difference between the control trial and the experimental trial was the magnetic field created by the electric current. Although I could sense no temperature increase in the magnets after running a trial with the electricity on, I overcame this possibility by rotating which was shot first, control or experimental.

The target was a piece of plywood that was partitioned with vertical lines spaced 2 cm apart. The partitions were labeled according to distance from the end with multiple copies of easy to read numbers. The Robo-Pong was positioned 350 cm from the target. The average curvature at this altitude (Carson City, NV) is about 45 cm when the target is 350 cm away. Of the 350 cm between Robo-Pong and target, the magnetic field covered 137 cm. The complete setup is as pictured in the following photograph and in the accompanying illustrations.



Below illustrates the setup for the experiment.

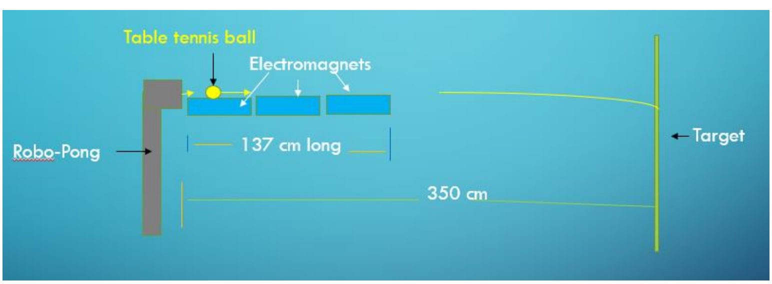
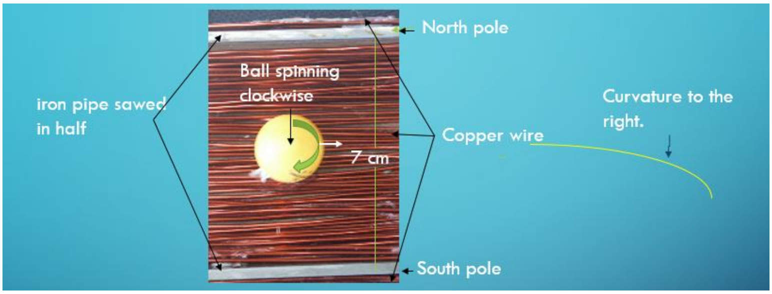


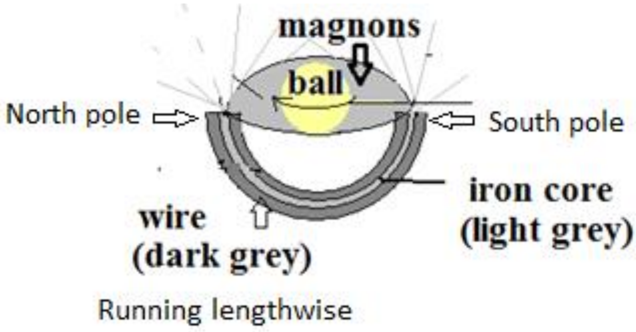
Photo showing copper wire running lengthwise along the inside of the iron pipe, which resulted in both sides being uniformly covered with wire. This results in one side being the north pole of the electromagnet and the other side the south pole as shown.



Ball traveling in a magnetic field

PROCEDURE

The magnets were adjusted vertically so that the balls in flight were in line or slightly above the exposed edges of the magnets where it was expected that the magnetic fields would be the strongest as illustrated in the figure below.



Approximately 76 balls were shot spinning clockwise through the gauntlet with no electricity applied, and another set of 76 balls were shot through the gauntlet after the electricity was applied to create a magnetic field. This experiment was replicated 10 times. With some trial pairs, controls were measured first and in others the experimental set was shot first. The points where they struck the target were recorded, and from this, an average was calculated for the 76 controls and for the 76 balls shot with the electromagnetic field in place.

RESULTS

The above procedure was carried out 10 times, meaning that a grand total of 760 balls were shot as controls and 760 with the electromagnet on. The presence of a magnetic field was confirmed by touching the magnet with a steel nail. Of the 10, eight trials were carried out December 4, 2010, and two were recorded the next day. My wife Mary graciously helped me as chief scribe. I told Mary that I wanted to make certain we would find the same results on Sunday that we found on Saturday. Just a little levity. The results are shown in the table below. Each value found in the table is the average of approximately 76 balls where the front edge of the ball was spinning to the right. Every ball that struck the target was recorded.

Table: Magnetic field increases the deflection of a spinning ball in flight

	Electromagnets OFF (cm)	Electromagnets ON (cm)
Averages	22.92	24.94
Averages	23.37	24.91
Averages	23.5	24.86
Averages	22.27	24.27
Averages	22.88	25.08
Averages	24.06	25.91
Averages	23.07	25.46
Averages	23.37	25.93
Averages	22.38	25.1
Averages	23.2	26.98
Average of all balls	**23.102**	**25.344**

An examination of the table clearly shows that none of the averages in one column overlap any of the averages in the other column. A group comparison t-test using the data in the above table yields a value for P of 4.68×10^{-7}. It is easy to conclude that a magnetic field increases the deflection of a spinning table tennis ball in flight.

In order to put any doubt to rest, I compared clockwise and counterclockwise spin. In these experiments, the north magnetic field of all three magnets was on one side and the south magnetic field on the other side.

This experiment was carried out just as described previously. In the first trial approximately 76 balls were given clockwise spin without the presence of a magnetic field and another 76 with the magnetic field in place. In both trials the balls were deflected to the right. As expected from the previous experiment, those shot through the magnetic field were deflected more than the controls. The values are found in the next table.

The deflection of the balls given counterclockwise spin was measured next. To accomplish this measurement, the pathway of the electromagnets had to be altered to accommodate a ball curving to the left. This experiment was carried out twice. Once again, those balls shot through the magnetic field were deflected more than the controls. The magnetic field enhances deflection by approximately the same amount whether the ball is given clockwise spin or counterclockwise spin.

Table: Clockwise spin versus counterclockwise spin.

	Average increase in deflection with magnetic field ON
Clockwise spin	2.31 cm
Counterclockwise spin	2.81 cm
Counterclockwise spin	2.61 cm

DISCUSSION

This study provides strong evidence that magnons, the elastic strings responsible for magnetism, deflect spinning table tennis balls in flight. I view this as direct evidence that magnons have mass.

VES theory states that the n-magnons arising from the north pole of the electromagnet bind to the s-magnons of the south pole. When they retract back to the atoms that generated them, they form a barrier across the magnet that the spinning balls must traverse on their way to the target. In addition, magnons composed of matter are ejected through the balls as they travel down the gauntlet.

The magnetic field increases deflection by approximately 4.5%. The increase in deflection created by a magnetic field is independent of the orientation of the north and south poles of the magnet. The increase is only dependent upon spin direction. When a table tennis ball is hung by a thread next to a magnet, it shows no tendency to be attracted to either pole of the magnet.

The magnetic field causes the table tennis balls to curve more in the direction the leading edge of the ball is spinning. Physicists have shown in a variety of ways that electrons in flight are deflected in a magnetic field. This is true whether the electrons are traveling in air between the poles of a permanent magnet or traveling through a wire carrying electric current. In either case, when the electrons enter the magnetic field they are deflected according to their direction of spin. This is additional evidence that a barrier of magnons stretched between the two poles of a magnet have physical properties; namely, they have mass and when spinning objects encounter this barrier they are deflected.

The results of my experiment are very unambiguous. Balls traveling through an electromagnet are deflected more when the magnetic field is turned on than when the field is turned off. There is no overlap in values for the data collected. I believe the easiest and most likely conclusion is that the strings responsible for the magnetic force interact with the spinning ball in flight. For this to occur, the strings must be composed of matter because there is no magnetic attraction between the plastic balls and the electromagnet. These findings not only show that magnons have mass, they also strongly support my theory that electrons are deflected in a magnetic field according to their spin direction as they interact with the physical magnon barrier in their path.

This experiment was done in my sunroom that has become one of my favorite spots. I wish to thank my wife, Mary, who helped me with this experiment. This experiment was exciting because there is no ambiguity in the results. Tennis balls do curve more in magnetic fields.

Experiment: Spinning table tennis balls were shot through a magnetic field provided by an electromagnet that was either on or off.

- Table tennis balls are not attracted to either field of a magnet when not moving.
- When spinning table tennis balls were shot through an electromagnet turned on, they curved more to the right with clockwise spin and more to the left with counterclockwise spin.
- When the magnetic field was cut off, the balls curved normally.
- Spinning table tennis balls are reacting to a magnetic field that is composed of matter.

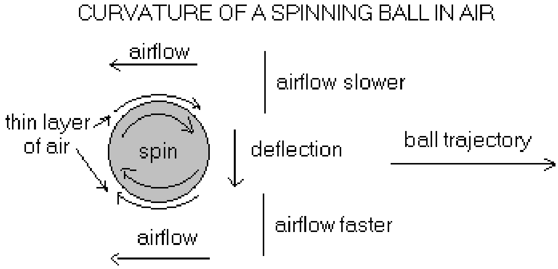
Chapter 9. Effect of altitude on tennis ball curvature

I carried out the following series of experiments to determine whether gravitons were composed of matter, and at the same time, determine whether there was any validly to the concept of the graviton matrix.

Anyone who has played tennis, golf, or Ping Pong, or followed the sport of baseball knows that the flight path of a ball is dependent upon the ball's spin direction. For example, topspin on a ball causes it to curve downward, while sidespin causes it to curve either left or right depending on the direction of spin. In all cases, the ball curves in the direction that the leading edge of the ball is spinning. This is referred to as the Magnus effect.

The Magnus effect

A spinning ball curves in flight in the same direction as the leading edge of the ball. The consensus is that a thin layer of air molecules surrounding the ball is also moving in the same direction as ball spin because of friction between ball and air. How this might work, is shown in the next illustration.



A thin layer of air next to the bottom of the ball is traveling in the same direction as air flow to the rear. This increases the overall flow of air in that direction. The opposite occurs on the top portion of the ball. This causes a force at right angle to the flight of the ball which causes it to curve. This explanation was provided by Heinrich Magnus who described it in 1852.

Equations used to calculate deflection show that it is directly proportional to the density of the air. This means deflection should decrease with increasing elevation at the same rate that air density decreases. To test this hypothesis, I examined the curvature of table tennis balls at various altitudes. The question I ask is this: Will curvature of the ball be directly proportional to the density of air as we increase elevation going from Death Valley to the mountains in Utah?

There is a potentially important complication to this experiment. The speed of the ball will likely increase with decreasing air density, and the speed of the ball will influence degree of deflection. There is an offsetting limitation, however. The greater the speed of the ball the faster it arrives at its target, which means there is less distance for deflection. It was shown by Briggs (1959) that the deflection of a baseball thrown by a pitcher has little to do with the speed of the ball. www.nist.gov/curverelease.htm. In fact, if the ball is traveling more than 100 feet per second, the deflection remains the same with increasing speed. The distance from mound to plate is 60 feet.

It is common knowledge that spinning table tennis balls always curve in the same direction as the leading edge of the ball in the same manner as spinning baseballs. The question is this. Are spinning table tennis balls affected by the graviton matrix? I examined this question by determining the effect of elevation on spinning table tennis balls.

Title of experiment by Kelland Terry.

As the elevation above Earth increases, atmospheric pressure decreases faster than the curvature of spinning table tennis balls.

ABSTRACT: I used a Robo Pong to eject spinning table tennis balls at a target at four different elevations above sea level: Kolob mountains in Utah, 2469 meters elevation; Carson City, Nevada 1463 meters; Rockville, Utah, 1158 meters; and Death Valley 6 meters. I discovered that air pressure decreases faster than ball curvature. From this I conclude, something in space, in addition to air molecules, cause spinning table tennis balls to curve in the same direction they are spinning. It suggests that the graviton matrix may be responsible for this effect. This in turn provides evidence that gravitons are composed of matter.

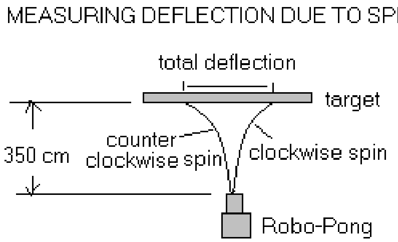
PURPOSE: The purpose of this experiment was to determine whether spinning table tennis balls in flight curve more than expected at higher altitudes?

METHODOLOGY: A Robo-Pong was used to hurl the balls towards a target 350 centimeters away. The target was a sheet of plywood with vertical lines placed 2 cm apart. This made it possible to record where the balls struck the target.

Table tennis balls are ejected out of a Robo-Pong by a spinning wheel, which also imparts spin to the ball. The ejection apparatus can be rotated, making it possible to adjust it to impart left side spin or right-side spin on the ball, as well as topspin and bottom spin. It can also be adjusted for the height it reaches.

In practice, I sent off approximately 80 balls curving to the left (counterclockwise spin) followed by 80 balls curving to the right (clockwise spin). I recorded where each ball struck the target, and then I calculated an average for each sample. The distance between means became a measurement of the total displacement due to spin; i.e., the sum of its curvature left plus the sum of its curvature to the right. I repeated this procedure several times for each elevation.

In all cases, the Robo-Pong was set at maximum velocity.



Measurements were made inside rooms at Death Valley, California (a motel); Rockville, Utah (a home); Carson City, Nevada (a home); and Kolob Mtn, Utah (cabin). The elevations at these sites, air pressure, and the percentage of air pressure compared to sea level are shown in the following table. It should be noted that the temperature (about 70 degrees) and weather in general was approximately the same at all location, even Death Valley.

Table: Relevant facts for sites used

Location	Elevation meters	Pounds per square inch	Percentage of air pressure remaining
Death Valley, CA	6	14.96	100
Rockville, UT	1158	12.88	86
Carson City, NV	1463	12.79	85
Kolob, UT	2469	10.92	73

RESULTS: The average distances in centimeters between the mean of the balls sent off to the right (clockwise spin) and those set off to the left (counterclockwise spin) are shown below. A large number of balls were used for each measurement because of the large variability in the direction and speed of each ball. However, the average value of 80 balls going left and 80 balls going right gave fairly consistent results as shown in the table below.

Table: Observed curvature of spinning balls.

Death valley, CA cm	Rockville, UT cm	Carson City, NV cm	Kolob, UT cm
102	97	89.2	82.4
102	94.5	92.8	85
111	95	96	84.5
109		94	85
		87	
		90	
		90	
106*	95.5*	91.44*	84.3*

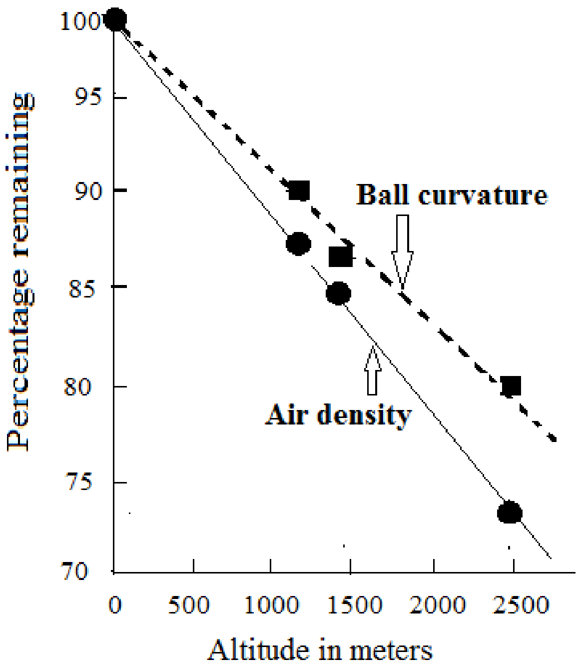
*Averages of samples

In the next table, I have shown percentage of air and curve remaining for each site.

Table: Percentage of air pressure and curve remaining

Site	Total Curve cm	Air pressure PSI	Percentage curve remaining	Percentage air pressure remaining
Death Valley	106	14.96	100	100
Rockville	95.5	12.88	90	86
Carson City	91.44	12.79	86	85
Kolob	84.3	10.91	80	73

The data for percentage of curve remaining versus air pressure remaining is presented in the figure below. In this experiment, air pressure was found to decrease faster than ball deflection.



CONCLUSION: The results confirm expectations that air density has a strong influence on the curvature of a spinning table tennis ball. However, it was found that the concentration of air decreases faster than the curvature of the ball. The data suggest that a portion of the curve might remain even in a high vacuum.

Although the deflection of balls at different elevations does not prove why ball deflection and air density are not more closely linked, it does leave open the idea that something other than air molecules might work in concert with air to influence the flight path of a spinning ball. Is it possible that this “something” is a vast number of elastic strings, gravitons? Is it possible that a table tennis ball will curve in high vacuum? The results of this experiment encouraged me to build a vacuum chamber and examine this phenomenon in more detail. These experiments are discussed in the following Chapter.

I remember this experiment most because Mary and I stayed in a motel in Death Valley. I was banging balls against a target while Mary was trying to sleep. Rockville is my homesite where I was born, and my work on Kolob Mountain in Southern Utah was made possible by my friends, the Ballards, who provided the facilities for this experiment. Much of Kolob Mountain is part of Zion National Park. Can you believe it, Mary couldn’t, I ate fish for dinner in the middle of Death Valley.

Gravitons act on spinning table tennis balls in flight

- Air is known to cause small spinning objects, such as baseballs, to curve in flight.
- My experiment demonstrated table tennis balls curve less at higher altitudes as expected because of a decrease in air concentration; **however,**
- Air molecules decrease faster than ball curvature.
- Interpretation: In addition to air molecules, the graviton matrix causes spinning table tennis balls to curve.

Chapter 10. Curvature of tennis balls in a vacuum.

In the previous Chapter, I presented my findings that spinning table tennis balls curve more at higher altitudes than expected. In other words, air concentration drops faster than curvature of ball. This suggested to me the possibility that the dense matrix of gravitons in space deflect spinning balls. In this case, the air molecules force the balls to curve and the graviton matrix increases this deflection. To explore this idea a little further, I decided to eject balls from my Robo-Pong inside a vacuum chamber. Fortunately, I chose to use a steel culvert for this project because my friend, Kelly Pentaco, told me later of a large steel pipeline that collapsed when, unfortunately for them, it came under high vacuum.

When I first decided to carry out this experiment, I bought a large steel culvert that was readily available to me. I called Ben McCulley, a good friend of mine, who I knew was a master builder, to check on just how difficult it would be to build a vacuum chamber from a steel culvert. He immediately volunteered to donate his time and equipment to this project. I thank you Ben. The results prove that our efforts were not in vain.

Title of experiment: Spinning able tennis balls in flight continue to curve in a high vacuum. Kelland Terry

ABSTRACT: I used a Robo-Pong to eject spinning table tennis balls in a chamber where the state of vacuum could be controlled. I discovered spinning table tennis balls continue to curve even in a high vacuum, and likely even in a total vacuum. These results support and extend the results found when curvature of spinning table tennis balls was examined at different altitudes as explained in the previous Chapter. The results lend strong support for the graviton matrix—gravitons are composed of matter and are present in space in vast numbers.

PURPOSE

The purpose of this experiment was to measure the effect different concentrations of air have on the curvature of a spinning table tennis balls. The ultimate goal was to determine whether a ball would curve in a high state of vacuum, and if so, what direction it would curve in relationship to its direction of spin. This necessitated building a large vacuum chamber.

EQUIPMENT

Vacuum chamber: The vacuum chamber was constructed out of a steel culvert that measured 300 cm in length and 76 cm in diameter. The zinc coat on the culvert on both ends was burned off, which made it possible to weld steel endplates to it. The endplates were composed of ¼ inch (6.3 mm) steel plates. In hindsight, it would have been better to have used ½ inch steel plates. However, we overcame the strong inward force on the plates by reinforcing them with tubular steel bars. And quite miraculously a culvert does not leak air if undamaged, and it does not collapse even when air has been removed.

One endplate contained a 40 cm x 20 cm view portal reinforced with thin steel bars. This was covered with ½ inch thick plastic. The second endplate had an access portal that measured 35 x 35 cm. When a vacuum was being pulled, the access portal was covered with a steel plate (door) measuring 46 cm x 46 cm. Eventually we added two small windows to the steel plate. One was placed slightly above and directly behind Robo-Pong. This window was used to examine the flight of the ball with a video camera. The other allowed us to augment the light on the far endplate with a flashlight.

The seal for all windows and access door was composed of three materials. The most inside layer was a flexible rubber liner normally used for window and door insulation (see Chapter 12). This material had a layer of glue that held the liner in place. A layer of pure silicone sealant was placed next to the flexible rubber liner. The next layer consisted of a material much like plumber's putty, but already formed into a thin band approximately 15 mm wide and 2 or 3 mm thick. On the outside of this we laid down another thick band of pure silicon sealant.

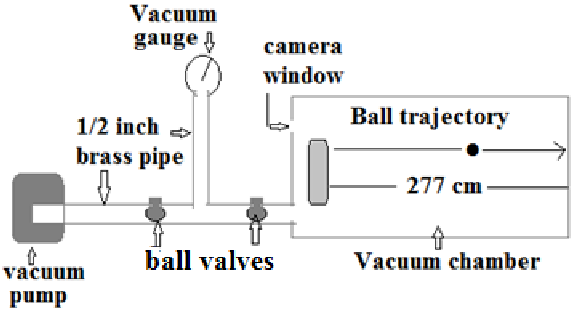
The clear plastic was 12 mm thick. Its trade name is Lexan. The manufacturer claims it has 250 times the strength of glass. A rectangular frame of tubular steel covered the outside edge of the plastic. Bolts were welded to the end plates approximately every 5 cm. The bolts protruded from the end plates and ran through holes in the plastic and holes in the tubular steel. The last step was to place nuts on the bolts and wretch the metal frame tight against the plastic, which forced the plastic against the sealants described above.

The endplate with the access door also had a ¾ inch hole with pipe welded to it. This hole was used as an access for the electrical line going to the Robo-Pong. Once the electric line was in place the three-centimeter-long adapter was repeatedly filled with liquid rubber glue until a solid sealant several centimeters long was formed. Quite amazingly this held a high vacuum. A second hole with a ½ inch pipe welded to it was used to attach a vacuum pump.

Vacuum gauge: The gauge used to measure the vacuum created was manufactured by Wika. The manufacturer states the error in the gauge is 0.2 percent. It continually adjusts itself to local air pressure. The gauge reads in negative inches of mercury.

Vacuum pump: The vacuum pump was a 1/3 horsepower, two stage pump capable of removing greater than 99% of all the air in a chamber. The manufacturer states that it removes air down to 25 microns. At sea level there are 760,000 microns. This means the fraction of air remaining after the pump has reached its capacity is just 0.00003289. The pump is capable of evacuating 3 cubic feet per minute. It took approximately 7 hours to achieve a high state of vacuum in the chamber.

Connections leading from pump to chamber and valves: A ½ inch brass pipe was used to connect vacuum chamber, vacuum gauge, and vacuum pump.



The two ball valves allowed us to separate the vacuum gauge from the vacuum pump and from the vacuum chamber. By closing the valve next to the chamber, we got a maximum vacuum possible on that day at current atmospheric pressure. By closing the value next to the vacuum pump while leaving the value open next to the chamber, we could readily determine the vacuum in the chamber.

Testing for leaks in pipes and chamber:

The ½ inch brass pipe going to the chamber, along with the two ball valves and gauge, were shown to hold the total vacuum achieved by the pump for at least 24 hours. In practice, the chamber was evacuated and allowed to sit for as long as 45 minutes to prove that it was holding vacuum before an experiment was undertaken.

Method of ejecting balls

Robo-Pong: This device has the trade name of Newgy Robo-Pong 1040. It was nice to find that it worked in a vacuum. It ejects balls by means of a spinning wheel that comes in contact with the table tennis ball. The spinning wheel can be rotated into various positions. This means it can send balls off with topspin, bottom spin, or side spin, either clockwise or counterclockwise. The point where the ball is ejected can be adjusted up or down making it possible to adjust it to hit the intended target. The balls were always ejected with maximum velocity, which means the balls also had maximum spin rate. The balls are traveling at approximately 30 kilometers per hour (18 miles/hour). A baseball thrown by a professional baseball player is more in the range of 75 to 100 miles per hour.

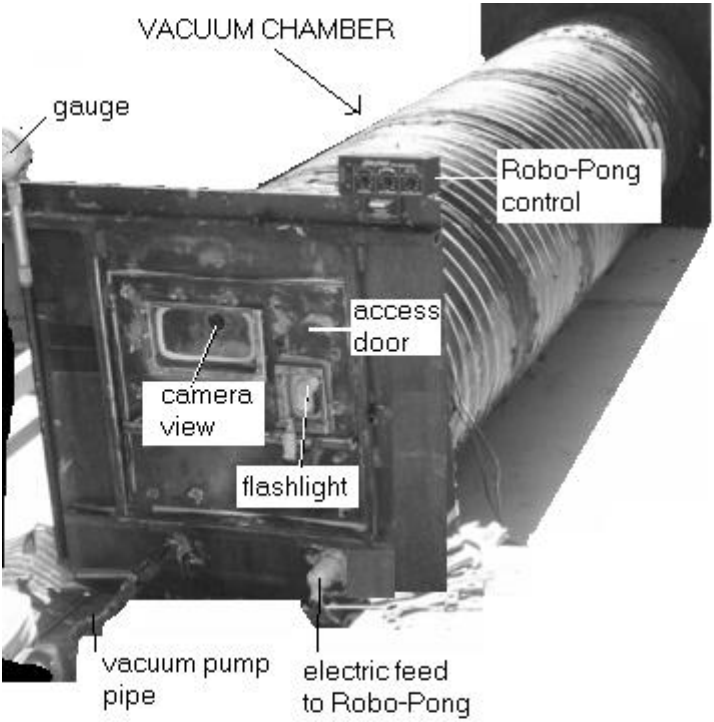
Table tennis balls: The balls used were rated 3 star and were 40 mm in diameter. A tiny hole was made into each ball to allow air to readily move in and out of the ball. The hole was made by a hot pin near the point where the two halves of the ball are joined. The holes did not seem to influence how the balls were ejected from the Robo-Pong.

Altitude and barometric pressure considerations

The vacuum chamber was located in Carson City, Nevada. The altitude of the chamber is approximately 4790 feet as determined by two different GPS instruments (Garmin). This fits well with that reported on the Internet for Carson City (4700 feet) since the vacuum chamber is approximately 100 feet above main street.

A complete vacuum is achieved at sea level when the gauge reads -29.92 inches of Mercury. However, at 4790 feet above sea level, the gauge indicates a complete vacuum when it reads -25.10 inches of Mercury.

There is a second parameter to consider, local barometric pressure. When there is no high or low-pressure system in the area, the gauge should read 25.10 if the chamber has reached a complete vacuum. However, we found it frequently true that Carson City had a slight high-pressure system in the area when running the experiments. The pump at full vacuum on gauge might read as high as -25.36 while at other times it read -25.1. For this reason, we used the negative pressure on gauge alone to help identify state of vacuum on the chamber. At the same time, we attempted to correlate this with a barometric pressure gauge we had in our possession.



Note in passing: At one time we thought we had a leak in the culvert, but it proved to be a leak in one of the viewing windows, which closed with internal pressure and opened with vacuum. This proved to be an extremely difficult leak to detect. This is the reason for the unsightly gunk on the outside of the chamber that proved futile and unnecessary.

RESULTS:

Experiment #1

In this initial experiment, we determined the deflection of the ball given clockwise side spin under high vacuum versus clockwise side spin with no vacuum. Thus, the balls were curving to the right in this experiment. We measured deflection by noting where the balls struck a view plate at the end of the chamber. It was necessary to use a large number of balls because of the large variability in direction. Centerline was determined by sending balls off towards the view plate with bottom spin. The distance between the exit point for the Robo-Pong to the target is 277 cm. The results are shown in the next table.

Table: Deflection in a vacuum using clockwise spin on the ball (right hand curve)

Inches of Mercury (IM)	Point where the average ball struck the view plate, cm	Deflection determined by subtracting bottom spin, cm
0 IM with bottom spin	5.6	
0 IM with side spin	30.3	24.7
-11 IM with side spin	19.3	13.7
-25 IM with side spin	6.7	1.1

With no vacuum in the chamber we determined that a ball given clockwise spin was deflected to the right 24.7 cm while traveling 277 cm. We then evacuated the chamber until there was a negative 25 inches of mercury on the gauge, a point close to a pure vacuum. We did not correlate this with barometric pressure, nor did we know what the pressure on the gauge was when separate from the chamber. These refinements came later.

If we subtract out the value found with bottom spin from that found at -25.0 inches of mercury, we are left with 1.1 cm of deflection. This suggests that the ball is being deflected even with a high state of vacuum. Unfortunately, this experiment is dependent upon a centerline that is established by using the average of balls sent off with under spin, which means there is room for error. Another drawback is the large variability found among balls at any one state of vacuum. This also leads to error. The next series of experiments were designed to eliminate these sources of error as well as better define the actually value of the vacuum achieved.

Some considerations when using a video camera

In this experiment, we made use of a small viewing portal slightly above and directly in back of the Robo-Pong. A video camera was installed at this position on the outside of the chamber. This enabled us to record the ball's curvature inside the chamber and the point where it struck the end plate 277 cm away. Thus, each ball became a separate experiment independent of the initial direction it left the instrument. A second small portal was used to shine a flashlight on the end plate to ensure good visibility if the ball missed the viewing window that was part of the end plate.

Once the flight of the ball was recorded on the Sony Handycam video camera, the flight was examined using Corel Video Studio. This program stops the action 30 times per second. In a typical experiment, the ball can be viewed at 10 different locations during its flight over the 277 centimeters from the exit point of Robo-Pong to the end plate.

For any one point along the flight path, it is necessary to know two facts: The distance the ball has traveled after leaving Robo-Pong and the distance between the center of the ball and the center of the chamber. In both cases the known 4.0 cm width of the ball became important. I will first discuss how I arrived at the distance traveled.

Using the same degree of wide angle on the camera as that used to film the balls in the chamber, I set up balls along a ping pong table and noted their width on film as a function of how far they were away from the camera lens. I constructed a chart for distance in cm traveled for every 0.1 cm change in ball size as viewed in the video film. In practice, I measured the width of the ball on the film and used the chart to determine its distance from the lens. The end point 277 cm away could be easily observed because the ball deflected sharply off the end plate. It should be noted that in all experiments, distance was also determined by noting the elapsed time. This was a valuable adjunct to the other method.

A centerline was established from Robo-pong to end plate in the following manner: An antenna was installed directly above the center of the ball exit point of Robo-Pong. This was clearly visible on film. At the far end of the chamber, there is a view port 40 cm long and 20 cm high. The plastic covering this opening was reinforced by a metal grid. The center of this metal grid, both left and right and up and down was clearly visible. In practice the edge of a clear plastic ruler was aligned with the antenna at the bottom of the screen and the center point in the view window. The distance left or right from this centerline was measured on screen.

Two measurements were taken for each stop action point as the ball traversed the 277 cm. One was the size of the ball and the other was the distance from the outside edge of the ball to the centerline. Because the real size of the ball is 4 cm, I was able to use the size of the ball on film versus the real size of the ball to determine the true distance of the ball from the centerline. For example, if the ball is 2 cm wide on film, the distance between the center of ball and centerline on film must be multiplied by 2 (4/2) to arrive at the true distance between ball and centerline.

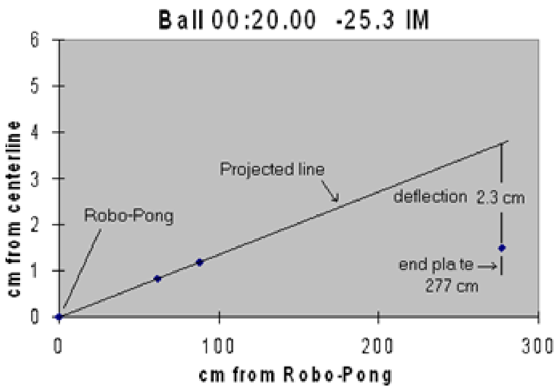
The distance between the center of the ball and the centerline for the end point was determined accurately because the window is 40 centimeters long. For example, if the 40 cm span was 5.4 cm on film, the film distance from ball to centerline must be multiplied by 7.4 (40/5.4) to determine the true distance from centerline.

The position of the ball at its first point after it leaves the Robo-Pong could not be measured with any accuracy. Thus, I used the 2nd and 3rd points to establish the original flight path of the ball. This means a significant portion of the deflection is lost, but this is true for all points measured at all states of vacuum.

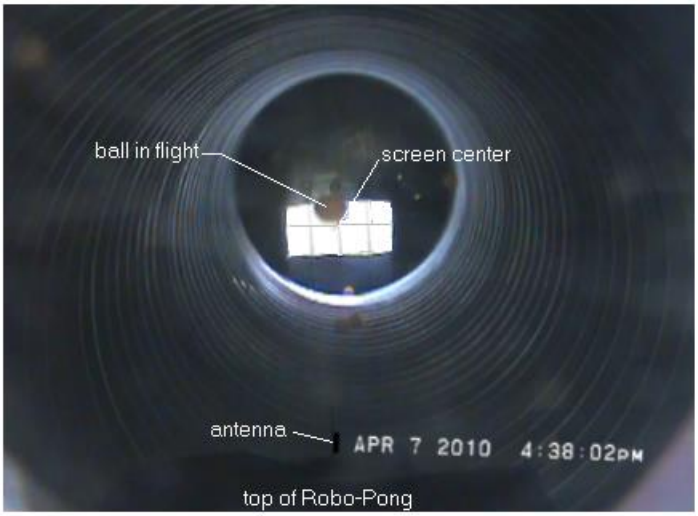
Results for experiment #2

After evacuating the chamber for 7 hours and 36 minutes, the gauge on the chamber read -25.3 inches of mercury. Our barometer located at the site read 30.18 inches of mercury, showing a high pressure in the area. To convert this to inches of mercury at 4790 feet, I subtracted the barometer reading by 4.82, which gives a value of 25.36. Thus, on this date to achieve total vacuum means the gauge on the chamber must read -25.36 inches of mercury. We actually achieved -25.3. This means we removed 0.997634 of the air from the chamber. To put it another way, the fraction of air remaining in the chamber was 0.002366. It should be noted that the chamber held this high vacuum for 45 minutes before we began the experiment. For this reason, I am confident there were no leaks in the chamber.

After the data was recorded on the video camera, the 2nd and 3rd points along the flight path were calculated as explained above. The flight path was then plotted, and the figure printed. Once I had a hard copy, I was able to extrapolate the flight path from the first points taken to the end of the chamber 277 cm away. The distance between projected flight path and the point where the ball actually struck the end plate was measured with a ruler. This became the amount of deflection measured in centimeters. An example of one such measurement is shown in the figure below.



The following picture was taken with the video camera. It captures a ball in flight inside the chamber.



I was able to obtain my measurements from video images that were much clearer because they filled the entire monitor screen in color.

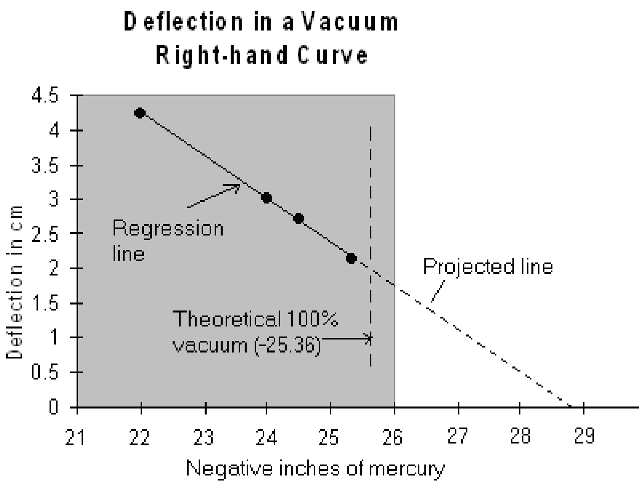
Table: Deflection to right with clockwise spin at various states of vacuum

-25.3 IM cm	-24.5 IM cm	-24.0 IM cm	-22.0 IM cm
2.6	1.9	3.6	4.4
1.9	2.8	3.4	4.4
1.9	2	2.8	4.2
2.2	3.2	3.1	4.4

4.2	2.8	3.2	2.1
2.3	2.2	2	5.5
1.6	3.4	2.1	4.8
2.4	3.2	2.8	
1.2	3.4	3.2	
1.1	2.3	3.9	
2.14*	**2.72**	**3.01**	**4.26**

*Last figure in each column is an average of those above.

The results of this experiment clearly demonstrate that spinning table tennis balls continue to curve under high vacuum. A regression line, which shows the best fitting lines between points, was calculated using Microsoft Excel. The results are shown in the next figure.



This figure clearly shows that to reach zero deflection, the regression line would have to be extrapolated to almost -29 inches of mercury, which is slightly less than found at sea level. There are only two explanations. Either there is a leak in the chamber or spinning table tennis balls are deflected in an absolute vacuum. I offer this: The chamber was evacuated and allowed to rest for 45 minutes. At the end of this time, the vacuum on gauge remained steady. It still read a negative 25.3 inches of mercury. The experiment was repeated two weeks later, and the same results were found. Finally, in a third experiment, the balls were sent off with counterclockwise spin and the same results were found. This experiment is reported below.

Experiment # 3

There were two main objectives for this experiment: One was to chart the deflection of balls given a counterclockwise spin, thus curving to the left. Another objective was to follow the curve from no vacuum to a high state of vacuum. On a day with no high or low barometric pressure in the area, the pump on gauge alone should very quickly go to a nearly complete vacuum, and the gauge should read -25.1 inches of mercury. This reading can then be compared with the vacuum on the chamber when the chamber shutoff valve is open. It can also be compared with local barometric pressure.

Results

In this experiment, the gauge alone at highest vacuum read -25.1 inches of mercury, while the chamber read -25.0. The barometric pressure at this time was close to 29.92 indicating normal pressure in the area. This confirms that the two-stage pump we were using was capable of achieving a near vacuum.

We filmed the deflection of the balls at various states of vacuum and analyzed deflection as outlined previously. The results are shown in the following two tables.

Table A: Deflection values for counterclockwise spin (left-hand curve)

Fraction air 0.00398 -25.0 IM	Fraction air 0.02390 -24.5 IM	Fraction air 0.04382 -24.0 IM	Fraction air 0.08366 -23.0 IM	Fraction air 0.12350 -22.0 IM
cm	cm	cm	cm	cm
1.1	0.9	1.8	2.5	4.5
1.4	1.25	2.2	2.7	2.8
2.1	0.6	1.9	2.9	4.0
1.6	1.65	2.6	2.9	3.2
0.8	1.9	1.6	2.3	3.7
0.7	2.1	2.3	3.4	3.3
	2.4	2.4	3.1	
1.28*	**1.54***	**2.11***	**2.83***	**3.58***

*Average values for columns

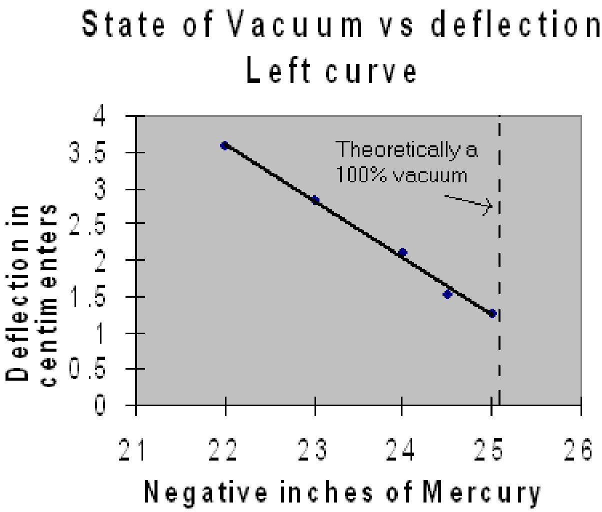
Table B: (Continuation of table above). Deflection values for counterclockwise spin
(left-hand curve)

Fraction air 0.20319 -20.0 IM	Fraction air . 0.40239 -15 IM	Fraction air 0.60159 -10 IM	Fraction air 0.80080 -5 IM	Fraction air 1.0 0 IM
cm	cm	cm	cm	cm
5.2	8.9	14.2	14	20
6	8.1	10.8	14.2	17
5.05	7.4	10.6	14.2	15
5.5	9	8.8	14.1	19
5.8	8.2	9.7	14.9	20
5.6	7.5	9.5	13.3	16
	8.8	10.2		
5.525*	**8.27***	**10.54***	**14.12***	**17.83***

*Average values for columns

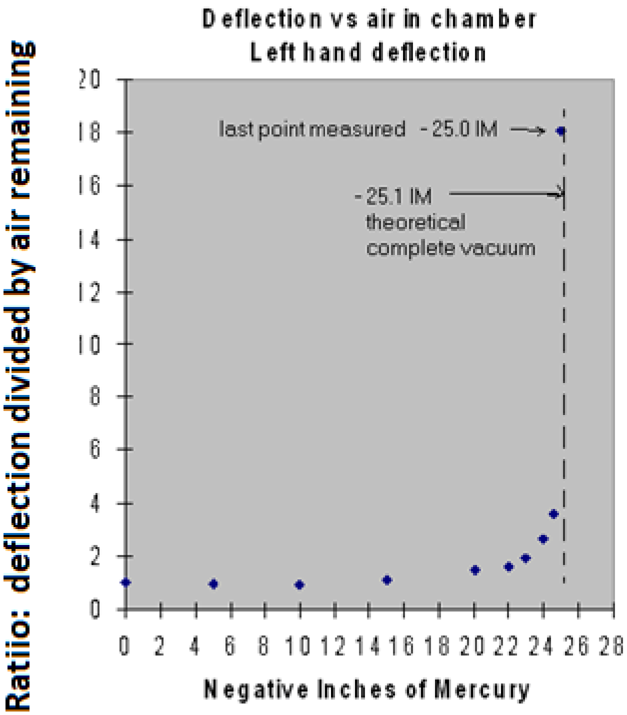
It should be noted that the average values are fairly consistent for the points taken. This is true because the measurements are independent of the original flight path of the ball, which varies considerably.

The five points measured beginning at -22 inches of mercury and ending at -25 inches of mercury are plotted in the following figure. The theoretical point for an absolute 100% vacuum is close to -25.1. If the regression line is extrapolated to zero deflection, it is well beyond this point. There is every indication that the table tennis balls will continue to curve even in a complete vacuum. Approximately 7 percent of the curvature remains as we approach a total vacuum.



The regression line in this figure shows that it is highly likely the ball will continue to curve even after all the air is removed from the chamber.

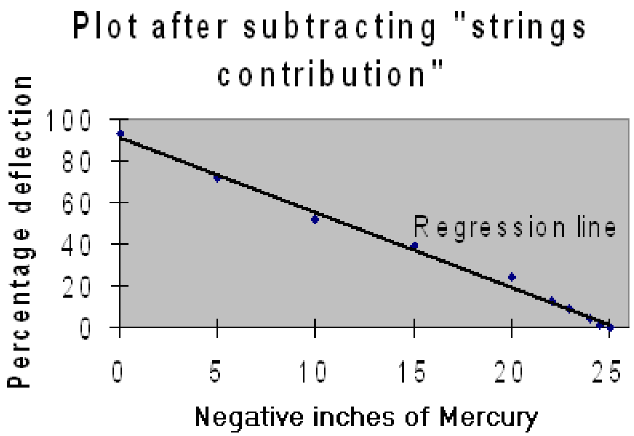
It is instructive to examine the deflection remaining as a function of the air remaining in the chamber. This relationship is examined in the figure that follows. The points in this figure were obtained by dividing the deflection remaining by the air remaining in the chamber.



This figure shows emphatically that deflection remaining divided by air remaining rises as the air is removed from the chamber. In fact, the ratio increases 20-fold as the chamber approaches a complete vacuum.

In this experiment, 7.2 percent of the deflection still remains when there is less than 0.4 % of the air remaining in the chamber. Even more impressive is the nature of the curve as shown in the figure. This is exactly what you would expect if air is not the only mass in the chamber that causes the Ping Pong ball to curve. I believe this mass is composed of elastic strings; i.e., a vast concentration of gravitons.

In the figure that follows, I plotted all the points after removing what I believe is the contribution of graviton strings (7.2%). The regression line is more or less perfectly linear with regard to the density of air plotted here as inches of mercury.



Conclusion

The results of this series of experiments clearly provide strong evidence that spinning table tennis balls are deflected under conditions close to a complete vacuum. This was found to be true for balls given clockwise spin and for balls given counterclockwise spin.

This shows us that the space surrounding us must contain a substance other than air that interacts with a spinning ball to cause it to curve. This substance must have physical properties--namely matter. I have every reason to believe that the vacuum chamber in these experiments became an elastic string detector, or more precisely, a graviton string detector.

In the presence of air molecules, a ball spinning clockwise in-flight curves to the right in the same direction as the leading edge of the ball. Gravitons have the same effect. In a preceding Chapter, I reported experiments that show a magnetic field also causes table tennis balls to curve more in the direction the leading edge of the ball is spinning.

These experiments provide addition evidence that virtual elastic strings are composed of matter.

Spinning table tennis balls continue to curve in a vacuum

- The results of these experiments support the idea that the graviton matrix is composed of matter.
- The graviton matrix induces the spinning table tennis balls to curve even in a high vacuum.
- Balls curve more in the direction the leading edge of the ball is spinning just as observed for magnons in Chapter 7.

I ran these experiments at Ben McCulley's workshop, across town from where I live. This chapter is easy to summarize, but it took months of hard work to complete it, plus a couple of thousand dollars of my own money. I loved it, but you would have to threaten to pull my teeth to get me to repeat it.

If we live in a three-dimensional world, it almost forces us to believe that forcefields are composed of matter that has strong elastic properties. To believe otherwise leaves us in a quandary that has existed for a thousand years.

Chapter 11 Curvature of photons in flight

My reason for carrying out the experiments discussed in this Chapter came from the observation that atomic clocks flown east around the world ran slower than atomic clocks flown west. This work was completed by C. Hafele and R. Keating (1971). I thought it highly possible that these results were due to the graviton matrix and Earth's spin on its axis.

A vast concentration of gravitons with mass are constantly being ejected from the Earth, and because Earth is spinning on its axis, the gravitons leaving Earth will tend to be bent towards the west. This results in a slight reorientation of the graviton matrix. This means an object flying East will be running into gravitons and their waves oriented somewhat in the opposite direction. This will decrease self-induction cycles and slow down clock speed. The opposite can be expected when flying west. This is exactly the results of the Hafele and Keating experiment.

With these ideas in mind, I designed a experiment to determine whether north bound radio photons are pushed to the west by the graviton matrix, and I compared these results with radio photons traveling west.

Photons traveling north are pushed west by gravitons and their waves.

Author: Kelland Terry

ABSTRACT: I measured the signal received by my linear 48 meter receiving antenna from radio station KMJ in Fresno, Ca., which is almost due south of Carson City, NV some 297km. The strength of the signal was measured using a very sensitive HP 8560E spectrum analyzer. I discovered that the signal increased significantly when my linear receiving antenna was aimed 1738 meters to the east of the true location of the AM radio station transmitter. In contrast, the AM station KMTI situated nearly due east in Utah, some 675 km away, showed no increase in strength of signal when the antenna was oriented either a little north or south. I propose that the graviton matrix shifts as earth rotates to the East on its axis. This sends physical gravitons and their waves traveling more to the west, which in turn pushes against the photons arriving in Carson City from Fresno, Ca. This explains why a stronger signal was measured coming from 1738 meters East of the KMJ transmitter.

INTRODUCTION:

.C. Hafele and R. Keating (1971) tested time dilation by flying atomic clocks around the world on commercial jets. Those atomic clocks flown east around the world ran slower than reference clocks at the U.S. Naval Station, and atomic clocks flown west around the world ran faster. This was attributed to time dilation by those who believed in relativity, but this explanation was sharply criticized by other scientists.

The obvious variable in this equation is the direction Earth is spinning on its axis. When flying east, the plane is flying in the same direction Earth is spinning on its axis, and the opposite is true when flying west.

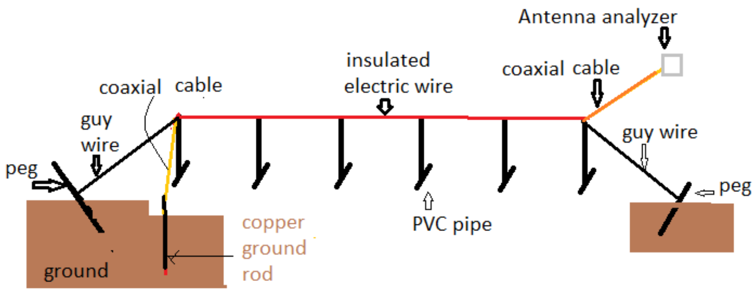
I believe the difference in clock speed can be explained by a shift in the graviton matrix that surrounds Earth. Earth spinning on its axis to the east will tend to shift the matrix and orient Earth's gravitons and their physical waves to the west. This means a plane flying east will be flying against graviton waves reoriented in a westerly direction. This will lengthen the clock's self-induction cycles and oscillation frequency. The clock will tick fewer times per second. In contrast, clocks flown west will be flying with a greater concentration of graviton waves moving in the same direction. This will increase the number of ticks per second for the atomic clocks going west.

This explanation suggests that the trajectory of radio photons might also be influenced by the graviton matrix. I theorized that radio photons traveling north or south would be pushed west by gravitons and their waves, while those radio photons traveling true east or west would tend to travel in a straight line. To examine this possibility, I built a long linear receiving antenna, and examined several radio stations whose transmitters were situated in California, almost due south of Carson City, Nevada, and in Utah, almost due east of Carson City.

EQUIPMENT:

Antenna: I first used a null type antenna but found it less capable of picking up radio stations than a positive type antenna that I used for the experiments. My linear antenna consisted of a copper electric line with two insulated, solid, number 12 wires that were joined at their ends. It was rated for 700 volts. The antenna was 48 meters long, and when in use was suspended four feet off the ground with 2-inch PVC pipe. At one end, it was connected to a copper ground rod via a coaxial cable, and at the other end, it was connected to an antenna analyzer by a coaxial cable.

The following illustration shows the orientation of the antenna, ground wire, and antenna analyzer.



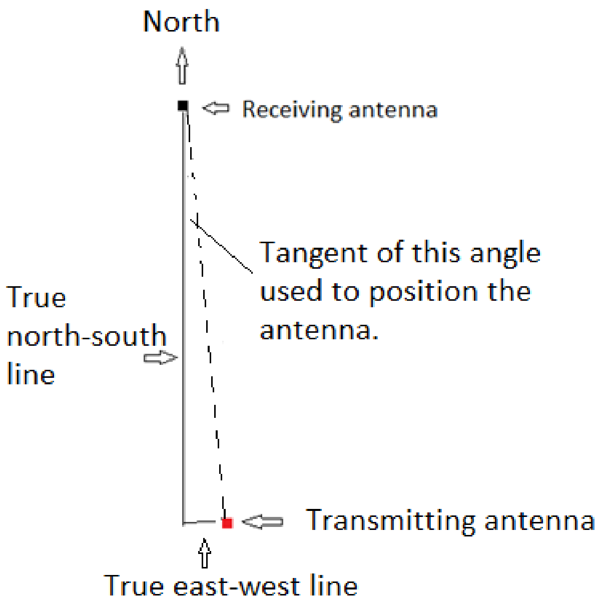
The antenna analyzer I used was an HP 8560E spectrum analyzer used for measuring spectral content of signals down to very low levels and with excellent precision. It was kindly made available to me by Matt Eiting, owner of EM Research Sparks, Nevada. Thank you, Matt. This study would have been impossible without this super sensitive spectrum analyzer.

ANALYSIS OF RADIO WAVES:

The following experiments were carried out with the help of a young man named Mathew Garret one evening in June 2013 at the Carson City Edmonds sports complex. The grass fields at this complex are laid out for soccer. The boundary for one of the soccer fields forms a true north-south line, and it is intersected with a boundary running true east and west. I confirmed this by using Google Maps and coordinates.

The intersection formed by the north-south and east-west white soccer field lines became the point the antenna was attached to the ground rod. The coordinates for this intersection were obtained using Google. I used the coordinates for the transmitting antenna and the coordinates for my receiving antenna to calculate distances between the two antennae.

The distance due south from the receiving antenna to the southern latitude formed by the transmitting antenna was determined using a website called ‘distance and azimuths between two sets of coordinates’ that belongs to the Federal Communication Commission. I also determined the distance between the two longitudes at the south latitude by the same method.



I used the tangent of the angle shown above to position the receiving antenna such that it was pointed directly at the transmitter.

The first radio station examined was KMJ in Fresno, California. This was a 50,000-watt radio station, broadcasting at 580 kilohertz. The coordinates for the transmitting antenna are found in the next table. This station actually uses three different, closely space antennae to transmit the radio signal. I took the average to arrive at the coordinates shown below.

LOCATION OF KMJ TRANSMITTING ANTENNA

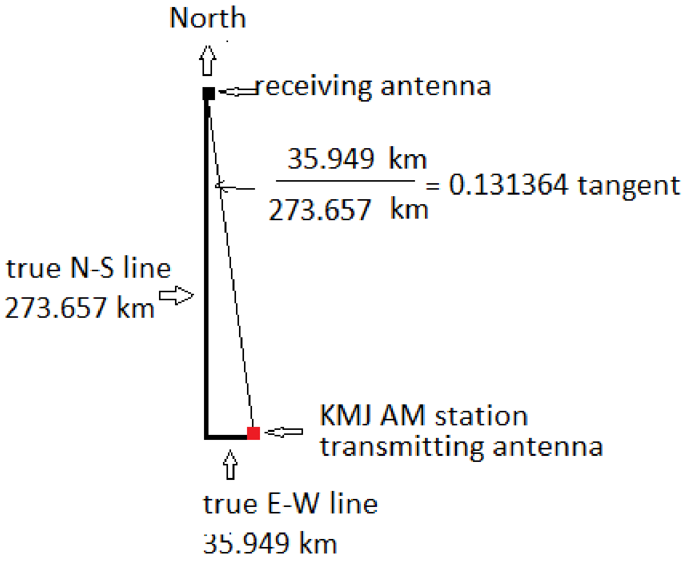
Coordinates	Degrees	Minutes	Seconds
Latitude	36	39	32.7
Longitude	119	20	50.25

LOCATION OF THE SOUTH END OF THE RECEIVING ANTENNA (the ground rod end)

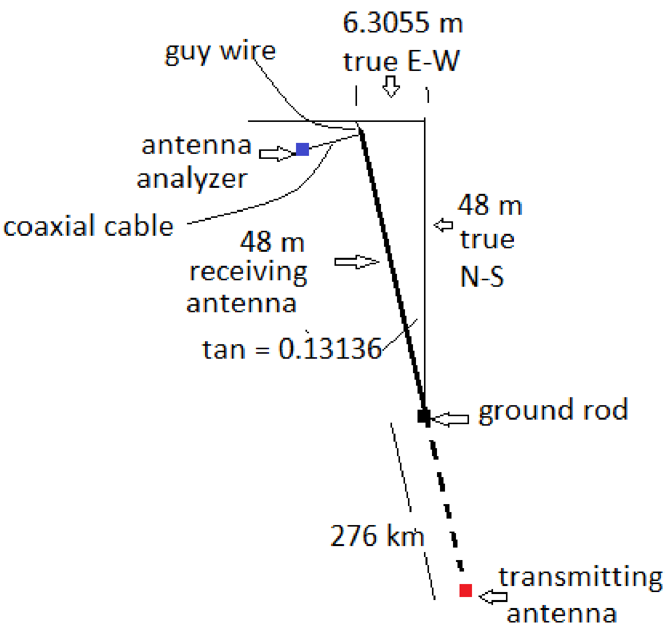
Coordinates	Degrees	Minutes	Seconds
Latitude	39	7	13.7
Longitude	119	45	1.3

As the crow flies, the transmitting antenna is about 297 km (184 miles) from Carson City, Nevada.

The following is a diagram showing distances and tangent from my receiving antenna in Carson City to radio station KMJ in Fresno, Ca.



The receiving antenna is 48 meters long and the tangent to KMJ station is 0.131364. Using this tangent, I calculatated the distance the receiving antenna had to be offset to point directly at the transmitter for radio station KMJ: (48 m x 0.131364 = 5.2546 m) This is depicted in the next illustration.



The antenna analyzer was tuned to pick up signals form radio station KMJ broadcasting at 580 KHz. The signal detected by the analyzer has lower negative values when the signal is higher. As can be seen in the next table, the signal increased when the antenna was directed east of the transmitter. This orientation was accomplished by keeping the ground rod end stationary, while shifting the other end westward.

Readings from the HP 8560E spectrum analyzer

30.5 cm east	Zero (directed at KMJ)	30.5 cm west	61 cm west
-66.15	-61.5	-62.17	-64.67
-65.27	-63.67	-61.83	-63.33
-64.21	-64.83	-62.67	-62.67
-64.95	-64.17	-63.0	-63.50
-64.15	-64.67	-63.5	-64.33
-64.95 average	**-63.77 average**	**-62.63 average**	**-63.70 average**

Each value in the table is the average of 100 measurements determined by the instrument; thus, the average for the column is for 500 measurements.

The highest signal received (lowest negative value) occurred when the antenna at the analyzer end was moved 1-foot (30.48 centimeters) west of the original position. This means the signal that was picked up began in a more easterly direction, but curved west to reach the receiving antenna. We can arrive at what seems to be the new position of the transmitting antenna by first calculating the tangent of the angle when the analyzer end of the receiving antenna was moved 30.48 cm west. Total distance west off the true north-south line becomes 30.48 m + 6.3055 m, which equals 6.6103 meters. This distance divided by the length of the antenna 6.6103 m/48 m equals .137715. Using the new tangent, it now appears that the transmitter is 37.68656 km east off the true north-south line (0.137715 x 273.657 km = 37.68356 km). If we subtract this value by the true distance east (37.68656 km – 35.949 km), we find that the transmitter appears to be 1738 meters to the east of its true location.

This experiment supports the idea that AM radio photons traveling almost due north are pushed west by the graviton matrix that becomes reoriented in a westerly directly by Earth spinning on its axis. Graviton waves and graviton virtual particles may both have a hand in this phenomenon. In either case, it suggests that gravitons have physical properties, which means they are composed of matter.

KQKL is a FM radio station located in the Fresno, CA area. It broadcasts at 88.5 MHz with 50,000 watts, but its signal was no better than that obtained without an antenna.

FM radio station KPFK located in Los Angeles was also analyzed. It was a 110,000 watt station broadcasting at 90.7 MHz.

LOCATION OF KPFK RADIO ANTENNA

Coordinates	Degrees	Minutes	Seconds
Latitude	34	13	45
Longitude	118	4	3

The results are shown in the following table:

30.5 cm east	Zero (directed at KPFK)	30.5 cm west
-96.83	-95.5	-96
-96.33	-95.5	-97.17

-96	-94.33	-96
-95	-86.33	-95.83
-95.17	-95.67	-97
-95.9 average	-95.5 average	-96.4 average

Although the readings here are close to those obtained with no antenna (-97.3 on average), it does appear that the FM signal did not curve significantly on its journey to Carson City. There are two major differences between FM and AM signals. The momentum of the KPFK, FM station photons is 147 times greater than the KMJ AM station photons. Secondly, the AM station photons arrive in Carson City after bouncing off the ionosphere, which is several hundred kilometers in space, while the FM station photons are thought to travel near the surface of the Earth. FM radio photons are thought to pass through the ionosphere, and therefore do not reach Carson City. Of course, this means the photons from the AM station transmitter will have a much longer time to be pushed west by the graviton matrix.

AM Radio Station KMTI:

This station is located almost due East of Carson City (Manti, Utah area). During the day it was a 10,000-watt station broadcasting at 650 KHz. This station is 675 km from Carson City.

Coordinates	Degrees	Minutes	Seconds
Latitude	39	17	39
Longitude	111	56	34

With the ground rod end of the antenna placed east, and the antenna at the antenna analyzer end set west such that the antenna was aimed directly at the transmitting antenna, I got the following results:

South 30.5 cm	Zero (directed at KMTI)	30.5 north cm
-75.18	-76.33	-74.17
-76.17	-73.33	-77.50
	-74.00	-75.50
	-74.5	
	-74.67	
-75.67 average	-74.6 average	-75.72 average

Apparently, the AM photons from this source show little or no curvature on their way west to the receiving antenna. This is the expected event if the graviton matrix is responsible for curvature. When oriented west, graviton waves and graviton virtual particles would have little or no effect on photons traveling almost due west.

DISCUSSION:

The results found in this study suggest that small AM radio photons traveling north are pushed to the west, while those traveling east and west, travel in a straight line. In the case of AM station KMJ, located 276 KM almost due south of Carson City, the transmitter appears to be 1738 meters to the east of its true location. In contrast, photons from an AM radio station transmitting from a position 640 km almost due east of Carson City (KMTI) showed no tendency to curve. Unlike the AM radio photons, the FM station photons traveling in a northerly direction showed no tendency to curve. All of this can be explained by the graviton matrix.

The super dense concentration of gravitons arising from Earth are oriented in a more westerly direction as Earth spins to the east on its axis. Graviton waves travel along these strings at immense velocity. The waves originate from the subatomic particles on Earth that create gravitons. This means the waves travel away from the Earth, and because Earth is spinning to the east, there is a tendency for the virtual elastic strings and their waves to be oriented in a westerly direction. There are two actions that may contribute to the curvature of AM photons traveling in a northerly direction. There is the possibility that graviton virtual particles will slam into the photons and drive them westerly. In addition, and likely more important, graviton waves passing through the photons will push the photons in a westerly direction.

AM photons are influenced more than FM photons by the graviton matrix for several reasons. AM photons have less momentum than FM photons, which means it will take less energy to push them to the west. Secondly, AM photons bounce off the ionosphere several hundred kilometers in space, while the recorded FM radio photons tend to travel along Earth's surface. This is particularly important because the graviton matrix will be bent more in a westerly direction at greater distances from earth. It also means AM photons will be subject to the graviton matrix over a much greater distance.

Photons traveling west may be pushed westerly, but they remain on a true trajectory. Thus, I found little tendency for the photons from AM station KMTI to curve. The transmitting antenna for this station is in the Manti, Utah area, almost due east of Carson City.

CONCLUSION:

The evidence shows that AM radio photons traveling north are pushed to the west on their journey from the Fresno, CA area to Carson City, Nevada, while AM radio photons traveling west from the Manti, Utah area appear to travel in a straight line. The author believes this is due to a reorientation of the graviton matrix and the graviton waves as Earth spins to the east on its axis. This pushes AM photons traveling north in a westerly direction. This study supports my interpretation of the J.C. Hafele and R. Keating (1971) experiment as explained at the beginning of this Chapter.

What I remember most about this experiment was the effort of young Mathew Garret who ran not walked to set each experiment up because we were told we had to be off the field by 10:00 PM. We were off by 10:30, and a Carson City sheriff was there to ensure compliance. Meanwhile we were serenaded by numerous coyote's that surrounded us to the point it was nerve racking. Were we going to be their next meal? By the way, I would be remiss if I did not thank Dr. Bob Renden and Matt Eiting who helped me when using a large null antenna that proved too weak to be useful.

> This experiment supports the most fundamental precept of virtual elastic string theory: Gravitons, and the waves moving along these strings, are composed of matter. It also supports the concept of the graviton matrix.
>
> At the same time, it provides a reasonable solution to the dramatic results of the Hafele and Keating experiment.

Chapter 12: Fall of lightweight objects in a vacuum.

Once again, if there is truly a graviton matrix as described in this book, it seemed likely to me that a vast concentration of gravitons crisscrossing in all direction might slow down light weight objects as they fall to Earth. To test whether this was true, I compared the rate of fall of three different objects in a vacuum: afterfeathers, small acrylic fibers, and a comparatively heavy magnet.

Experiment with the following title by Kelland Terry

Lightweight objects fall slower than expected in a vacuum

ABSTRACT
I constructed a small vacuum chamber, then used a high-speed video camera to record the fall of various objects under a high vacuum. The objects included a small piece of downy afterfeather, a short piece of acrylic fiber that was almost invisible to the naked eye, and a small magnet. I was able to demonstrate that the acrylic fiber fell noticeable slower in a vacuum than the downy afterfeather, and much slower than the magnet. I predicted these findings because the graviton matrix provides a veritable fabric in space that will impede the fall of light objects. In addition, Earth creates a vast number of virtual graviton particles and their waves that are directed against falling objects. This experiment is yet another demonstration that gravitons are composed of matter.

INTRODUCTION:

The following experiments were carried out in September and October 2016. As you will see they provide additional evidence that gravitons are composed of matter.

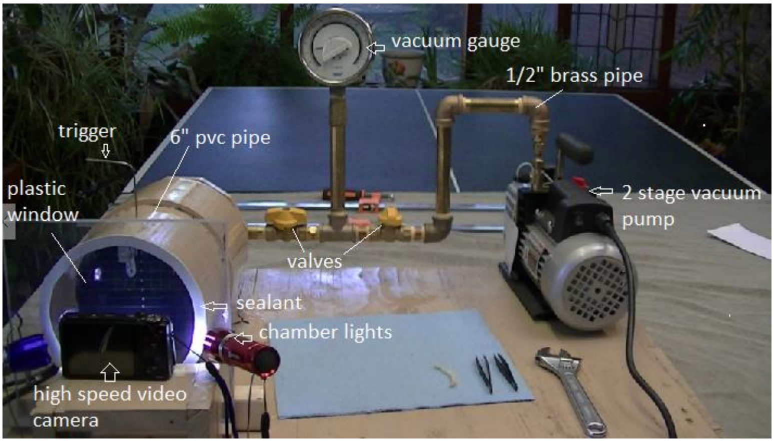
The universal law of gravitation, derived by Sir Isaac Newton, dictates that two objects falling towards Earth in a vacuum should fall at the same rate regardless of their mass. This is true because force in newtons between Earth and any falling object is directly proportional to the weight of the object. If we double the weight, we double the newton force, which allows all objects to be pulled towards Earth at the same rate.

This concept is also shown by a second equation that calculates the velocity of falling objects where the mass of the object is not a consideration. All objects should fall at the same rate in a vacuum regardless of their size and weight.

It occurred to me, however, that a dense graviton matrix coupled with a dense concentration of graviton waves emanating from Earth might slow down the rate of fall for a very small, lightweight object. Of course, this is only possible if gravitons and y waves are composed of matter. The following experiments were designed to settle this question.

APPRARATUS

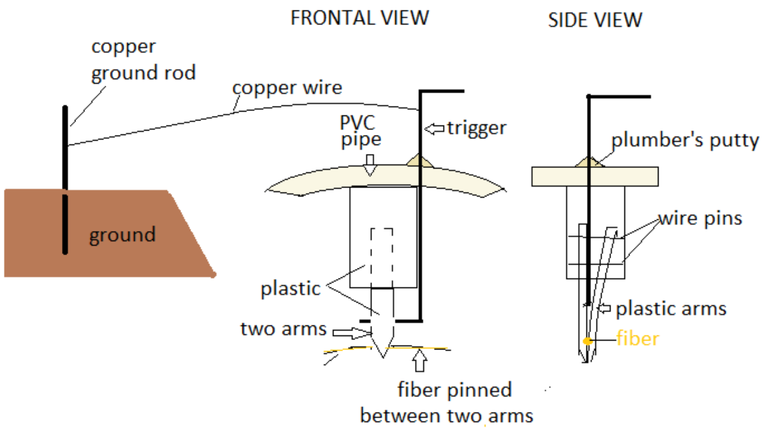
The complete set up for these experiments is shown in the following photo:



The three CFM, two stage vacuum pump was built by Pittsburgh Company. According to the manufacturer it is capable of removing air to 22.5 microns, which means 99.99 percent of the air has been removed. The Wika vacuum gauge reads to the nearest -0.1 inches of mercury. At an elevation of 4730 feet above sea level, the gauge should read at least -25.5 inches of mercury at maximum vacuum with this pump, depending on the local atmospheric pressure.

The pump is connected to the vacuum chamber with ½” brass pipe that has two ball valves that encompass the vacuum gauge. This allows the gauge to be connected or disconnected from the pump and from the chamber. In practice, the valve between chamber and gauge was in a closed position at the beginning of a run to check what the gauge alone read at maximum vacuum. After the chamber reaches this state of vacuum, which most days was -25.6 inches of mercury, the valve between gauge and pump was closed. With no leaks, the chamber remained at the -25.6 inches of mercury.

The trigger is a 1/16" steel wire that connects with the release mechanism in the vacuum chamber. When the stiff wire is twisted a quarter turn, it spreads apart the two arms of the release, which allows the fiber or tuft of feather to fall.



Plumber's putty is man's best friend when dealing with a small potential air leak. It was placed around the trigger as shown in the diagram. At the time the steel wire is twisted to release the fiber, the putty is held firmly against the wire with four fingers. The safety feature here is the fact that if air enters the chamber at the time the fiber is released, it will force the fiber downward at a faster pace. Obviously, this would destroy the experiment. I would never be able to show that a fiber in a vacuum chamber falls slower than expected.

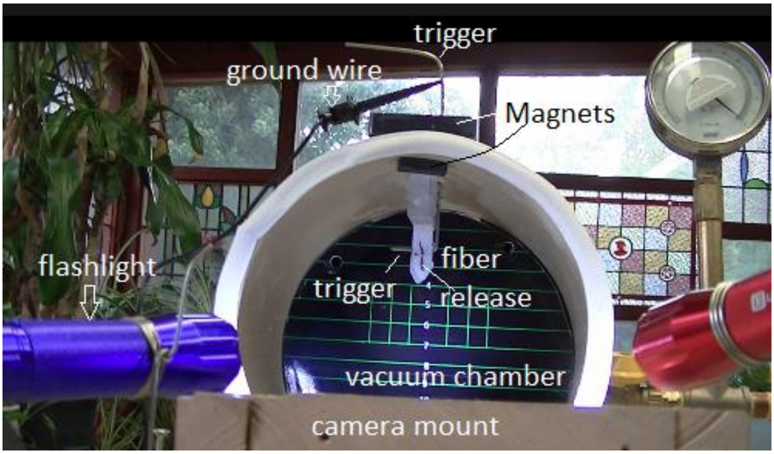
The two plastic arms that hold the fiber are composed of the ends of two large zip ties. When left as manufactured, they are highly polished, which discourages the fiber from clinging to the release mechanism. It was found that the trigger needed to be turned and quickly released to force the fiber to fall.

Static electricity is another nuisance. It causes the fiber to cling to or be forced away from objects it comes near to, including the trigger mechanism and the person running the experiment. For this reason, I connected the whole apparatus to a copper ground wire, and at the beginning of every run, I touched the fiber release mechanism, and any instrument, including myself, to the ground wire. This eliminated the static electricity problem.

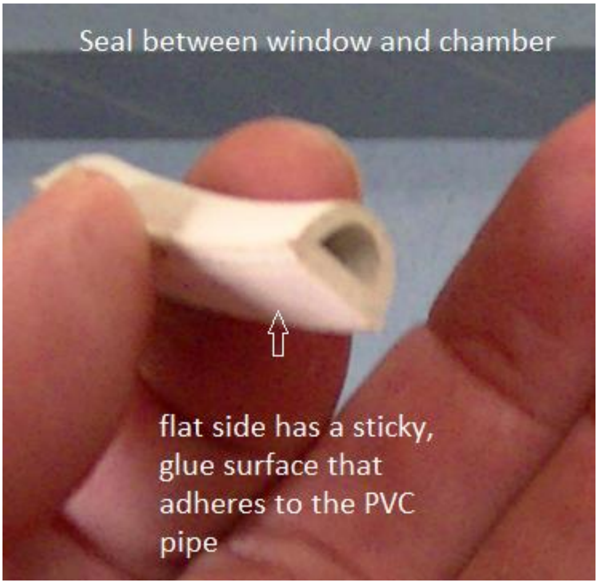
The vacuum chamber was made from schedule forty, thick wall, PVC pipe. The vacuum chamber is 14 inches long.

I used a printer to paint a photo quality paper black. I then typed the scale and lines on the black paper as shown in the following illustration. The lines are one centimeter apart when printed. The photo paper was mounted on thin cardboard and cut to fit the 6” PVC pipe. Four holes were punched through the cardboard to facilitate evacuation of the chamber. This black photo paper was set 3.5” to the rear of the window, and the release mechanism halfway between the black photo paper and window.

The viewing portal into the chamber was covered with a clear plastic window that is 8” x 8” and is ½” thick. The name of this plastic is Lexan.



Glass of sunroom in background



The sealant between the plastic window and the end of the 6” vacuum chamber is composed of weather stripping used to insulate windows. It is called Rubber Window Seal, and it’s a product of N-D Building Products, Inc. The sticky side of the window seal is adhered to the end of the PVC pipe. The plastic window is positioned against the window seal. When the window is under vacuum, the rubber window seal is pressed firmly between the plastic window and the end of the PVC pipe. This prevents any air from entering the chamber. On occasion, where the two ends of the rubber window seal met, there was a potential air leak, but this was easily overcome with plumber’s putty. The latest version of this apparatus required no plumber’s putty because the two ends were touching and were pressed firmly against each other when under pressure created by the vacuum.

The chamber was lighted with fluorescent ceiling lights, my sunroom windows, and two flashlights mounted as shown. The color of the chamber wall inside was found to be important. Neither black nor white proved to be useful. The color used is the same as the tan outside color (previous picture), that Ben painted by chance, which proved to be the best.

The small ceramic magnet used in these experiments was ¼” x ¼” x 7/8”. The small magnet is 2.7 grams in weight, and it was held in place inside the vacuum chamber by a larger magnet outside the chamber as shown in the picture above. The small magnet was released by removing the larger magnet. Trapping a fiber between the small magnet and the roof of the chamber was not useful as a release mechanism for the fiber. When the fiber was released by this method, it traveled with the magnet except the ends of the fiber streamed behind.

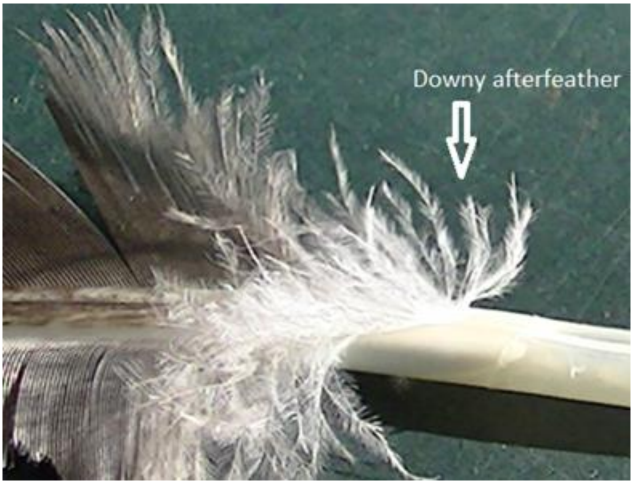
The high-speed camera used was a Casio Exilim. It is capable of recording at 1000 fps, 480 fps, 240 fps, 120 fps, and 30 fps. The pros and cons of the different rates is discussed for each experiment.

The videos recorded were examined using a PC computer. The application I used for examining the videos was Magix Movie Edit Pro 2016. It allowed me to view the falling object one frame at a time, which allowed me to record the number of elapsed frames as it passed by the lines on the black photo paper. The number of elapsed frames was divided by the recorded frames per second, either 480 fps or 240 fps, to determine elapsed times in seconds. The objects were recorded using a wide angle setting on the camera.

RESULTS

Experiments with afterfeathers:

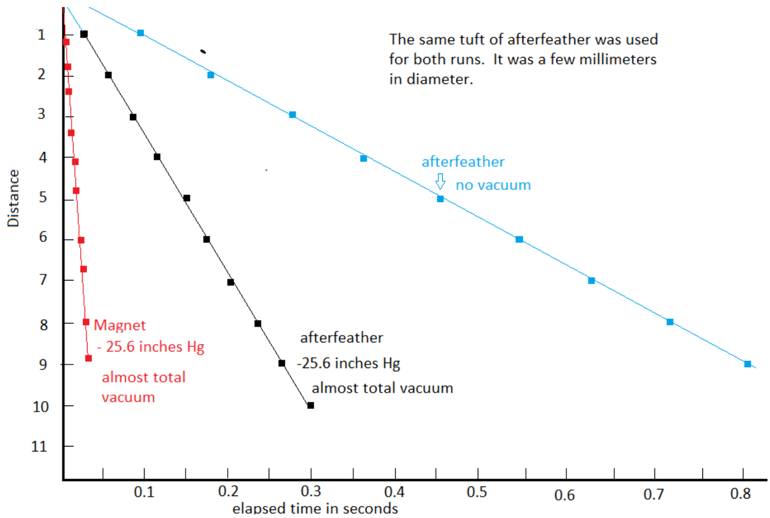
The afterfeather of a bird consists of the downy lower barbs of feathers that lie next to the skin. A photo of this material is shown in the next illustration. It is composed of beta keratin, a protein that makes up feathers and beaks.



A small portion of this material, which was a few millimeters in diameter, was examined falling in a vacuum and in the chamber at normal air pressure at 4730 feet above sea level. When no vacuum was placed on the chamber, the plastic window was held in place by clamps to prevent any disturbance to the air in the chamber. No clamps were necessary when under vacuum.

A photo of the falling afterfeather in the vacuum chamber is shown in the following illustration. It was easily distinguishable in the video because of its constant rate of fall.

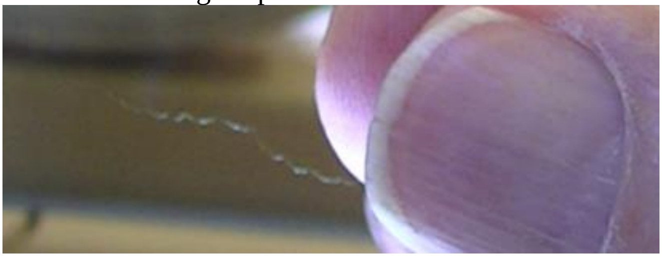
I was fortunate to be able to use the same tuft in a vacuum and at normal air pressure. It was filmed at 480 frames per second, which was not the best for clarity, but it sufficed to determine rate of fall when measured one frame at a time. After the tuft of afterfeather fell, the small magnet inside the chamber was released by removing the larger magnet outside the chamber. The results are shown in the next figure.



It is obvious that the afterfeather descended slower when air was in the chamber, but it also traveled slower than the magnet when more than 99.99 percent of the air was removed. The distance traveled may be slightly skewed because I was using a wide-angle lens.

Experiments with cloth fibers:

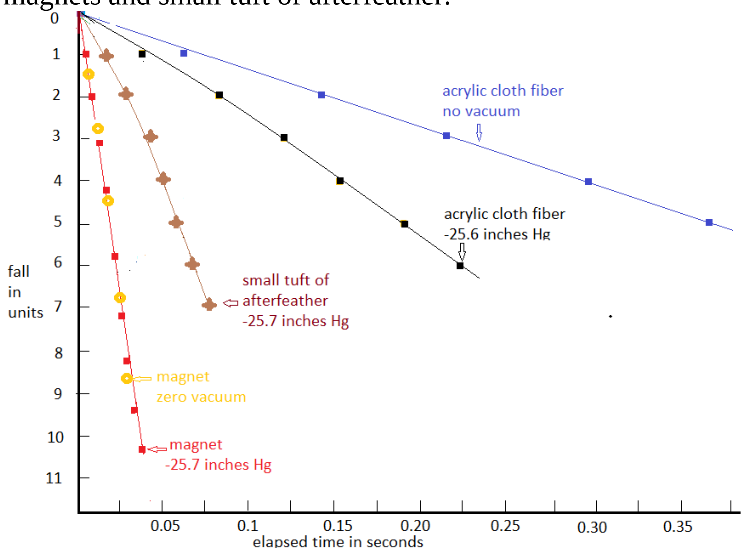
The fibers used in these experiments came from 100 percent acrylic yarn with a name of Serenity Chunky Premier Yarns: The Debra Norville Collection, actually manufactured in Turkey. The individual fibers are extremely small in diameter, invisible to the naked eye except when light bounces off their surface at just the right angle. I manage to catch one such fiber with the following snapshot:



I was never able to reuse the same fiber because it became entirely invisible in the bottom of the chamber. As you can see, the fibers are not straight; they constantly curve back and forth.

To begin a run, an individual fiber was teased from the yarn and placed between the two arms of the release mechanism. This is not exactly easy, but with patience, a good run can be accomplished. The fibers I used in the following experiments were approximately 3 cm long.

Once the fibers were in place, the plastic window sealed the inside of the chamber from the surrounding air, and after adjusting the two flashlights, tests were run with and without a vacuum. I discovered it paid to film at 240 frames per second, at least for the camera I was using. This gave greater clarity, which was desperately needed with the extremely small fibers. The experiments were repeated several times, but the results in the figure represent in each case just one single fiber. The same applies to the magnets and small tuft of afterfeather.



As can be seen, a single acrylic cloth fiber falls slower than a magnet or a tuft of afterfeather in a vacuum or with air in the chamber. What is quite amazing is the observation that air is not the most important factor that causes an acrylic cloth fiber to fall slowly in the chamber. There is some other more important factor in the space about us that acts to slow down the descent of the acrylic fiber. The graviton matrix comes to mind.

The fact that a single cloth fiber or a tuft of feather falls slower than a magnet (2.7 grams) after air has been removed from the chamber provides strong support for the idea that something other than air is responsible for the rate these light objects fall to Earth. This something has a greater influence upon the descent of a small fiber than air in the chamber.

Discussion:

The slow descent of a single cloth fiber in a vacuum and the slow descent of a small tuft of afterfeather in a vacuum can best be explained by the physical presence of some material in the air that cannot be seen with the naked eye. It must have physical properties to impede the fall of these light objects. To me, this means the material must be composed of matter. I believe the material in question is a dense concentration of gravitons that I refer to in this book as the graviton matrix. Numerous heretofore unexplainable observations can be explained by the presence of a vast number of gravitons if the gravitons are composed of matter. In fact, many of the 80+ conundrums solved by virtual elastic string theory are based on this fundamental finding.

It seems there are two possible ways that gravitons could impede the descent of a fiber or a tuft of feather: A dense concentration of graviton waves emanating from Earth would likely push against fiber and feather and impede their fall. Of course, these waves are composed of matter and have momentum. Also, it is envisioned that a dense concentration of gravitons running horizontal to Earth's surface would tend to physically support the cloth fibers and tufts of afterfeather and thereby impede their fall. This would be particular important for a relatively long fiber.

Conclusion:

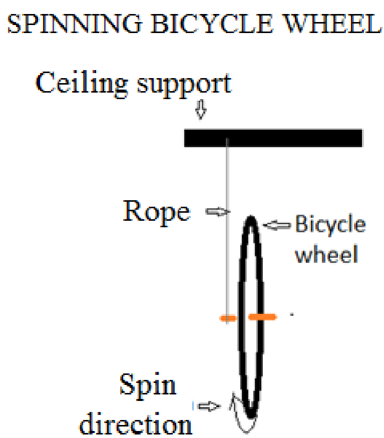
A single acrylic cloth fiber and a small tuft of afterfeather both fell slower in a vacuum than a ceramic magnet (2.7 grams). In addition, the acrylic cloth fiber fell slower in a vacuum than the small tuft of afterfeather. Fiber and feather both fell even slower when air was in the chamber. I believe the results can best be explained if fiber and feather meet resistance when falling in a vacuum because of a dense concentration of gravitons, the graviton matrix as explained in this text. A dense concentration of physical graviton waves emanating from Earth would impede the fall of these light objects, and a dense concentration of physical gravitons composed of matter and oriented horizontal to Earth's surface would provide a physical "blanket" that would also impede the fall of fiber and feather. In the case of the acrylic fiber, it appears that gravitons may be more important than air in slowing down their fall.

I did these experiment in my sunroom, and I must say I was pleased when the experiments went as planned, and even more exhilarated after I examined the results. Solid experiments that confirm your expectations is always a blessing in scientific research. Yes, I personally bought the camera and other equipment to do this research.

> Small light weight objects fall slower to Earth in a vacuum than heavier objects. This observation supports the evidence that gravitons are composed of matter, and it supports the evidence for a vast number of gravitons in the space about us—the graviton matrix.

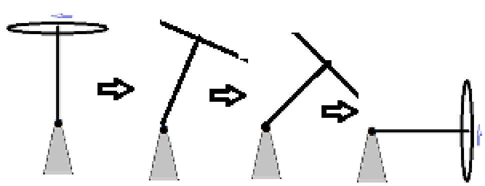
Chapter 13. Gyroscopes depend on Earth's gravity

A spinning gyroscope under proper conditions appears to have little or no weight. In the illustration below, a bicycle tire is suspended from the ceiling by a rope. The rope is attached to only one side of the axil, and when the tire is not spinning, the tire quickly falls over because of gravity. However, when the tire is spinning, it seems to defy gravity. It remains erect even though it is supported by only one side of the axil. This is a perfect example of a gyroscope.



Obviously, the gyroscope's spin angular momentum provides the energy to keep the gyroscope erect. What is not so obvious is how it is able to accomplish this task.

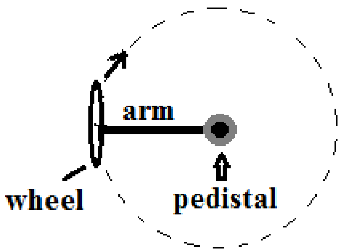
When a toy gyroscope is first set spinning on a pedestal, the surface of the wheel is horizontal and in the same plane as the surface of the Earth.



As it loses spin angular momentum, it tilts over until finally the wheel becomes vertical. At this point, the wheel is oriented directly towards the center of the Earth as shown in the illustration. Even in this position, after it has lost most of its spin angular momentum, it remains suspended in the air and continues to defy gravity. Finally, the spin angular momentum declines to a point where it can no longer support the wheel, and it falls to the ground. The impression is that the more the wheel is oriented towards the center of the Earth, the greater the ability of the wheel to remain erect.

The wheel also rotates around the pedestal as shown in the next illustration. This is called precession. The rate of precession increases as the wheel tilts over even though the wheel is losing momentum. In fact, it continues to rotate faster and faster around the pedestal until the wheel is directed towards the center of the Earth.

PRECESSION



Gyroscope wheel rotates around pedistal

These observations tell us there is something about the center of the Earth that enables the spinning wheel to convert part of its spin angular momentum into precession and lift. Of course, the most likely agent is gravity because Earth's strongest gravitational field emanates from Earth's greatest mass, which lies towards the center of the Earth. Gravitons must interact with the wheel in such a manner as to convert some of the wheels spin angular momentum into lift and precession.

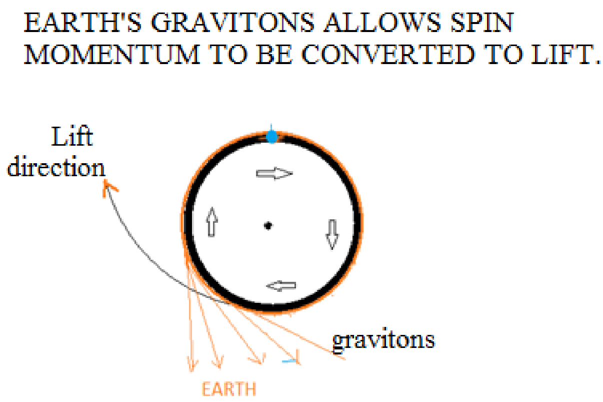
A good analogy is the propeller of an airplane. The spin angular momentum of the propeller provides the energy necessary to drive the airplane down the runway. However, this outcome is only possible if the spinning propeller is interacting with some other factor. Of course, we know in this case that factor X is air molecules. No matter how much the engine roars and no matter how much spin angular momentum is built up in the propeller, the airplane will not move one inch down the runway without air. Without air, the spin angular momentum of the propeller cannot be converted to linear momentum and force the plane down the runway. The same is true for the gyroscope. The spinning wheel in and of itself without the aid of a second factor cannot achieve lift, and it cannot achieve precession.

The question is what interacts with the spinning wheel to enable the wheel's spin angular momentum to be converted into lift and precession. Scientists have searched for an answer to this question for more than 100 years and have found little success. I believe virtual elastic string theory provides the solution.

As pointed out earlier, precession increases dramatically as the wheel becomes more oriented towards the center of the Earth even though it is losing momentum. Lift also supports the wheel when it is nearly out of momentum and completely out of balance as shown in the illustrations above. Precession and lift have their greatest effect with respect to the wheel's momentum when the wheel is oriented directly towards Earth's greatest mass and Earth's greatest gravitational field.

Gravitons at Earth's surface that emanate from the Earth number 10^{56} per cm^2, and the distance between these gravitons is only 10^{-61} meters as explained in Chapter 2. This vast number is necessary to satisfy the energy relationship between the Earth and the Sun, and it is necessary to satisfy the strong gravitational force of attraction between these two bodies. The concentration of Earth's gravitons at its surface is 1684 times more numerous than those that arrive here from the Sun and far more numerous than those from any other source, including the Milky Way Galaxy (10^{47} per cm^2).

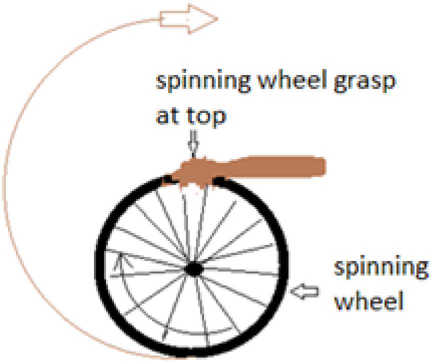
When Earth's gravitons penetrate the bicycle wheel, they become bound to the wheel. Now when the wheel spins, it winds the gravitons up on the wheel's surface. They do not slough off because they are held in place by a dense matrix of strings that are constantly being created. If the wheel spins twice per second, and if the graviton exists in space for one second, then those gravitons that are bound to the wheel will be wrapped around the wheel twice.



Because the gravitons wind up on the wheel, they only retract back to the Earth on one side of the wheel as shown in the illustration. This means one side of the wheel is essentially floating in space, and more importantly, it means gravitons are applying greater pressure at the top of the wheel.

I actually tested this conclusion by placing wax candles beneath a fishing line filament, then pulling the filament towards the Earth. The wax was indented along the top but not at the bottom of the wheel**. Pressure at the top causes lift and precession because the wheel attempts to rotate around the point of resistance.**

A spinning gyroscope made from a bicycle tire, as in the first illustration in this Chapter, can be made to show a violent lift by grasping the spinning wheel with your hand anywhere along its top. It also increases precession. This simple experiment demonstrates that resistance at the top causes lift and precession. Gravitons pulling down on one side create pressure at the top along with greater resistance. This causes the gyroscopes spin angular momentum to be converted to lift and precession,



When I grabbed the wheel anywhere along the top, the wheel attempted to rotate around my hand. This causes lift and precession.

CONCLUSION

A vast concentration of gravitons emanating from Earth become wrapped around the gyroscope wheel as it spins on its axis. They are held in place by the graviton matrix. Because the gravitons are retracting back to Earth, they apply pressure on the top of the wheel, which creates resistance at the top. The wheel attempts to rotate around the pressure point at the top, which causes lift and precession. This is the reason lift and precession increases as the wheel becomes oriented towards Earth even though the wheel's momentum has decreased. I invite you to try the simple experiments explained here. You will be impressed.

These experiments were done in my sunroom as witnessed by my movie on the subject that is found on my web site at www.vestheory.com. To watch the wheel attempt to revolve around my hand when I grasped it at the top was the clincher that met all expectations. This finding rivaled the observation that lift and precession increases as the wheels become oriented more directly with Earth's gravitational field.

Experiments with gyroscopes support the idea that Earth's gravitons are virtual elastic strings that are composed of matter and remain attached to their source. They support the concept of the graviton matrix.

Chapter 14. Satellite spin dictated by gravitons

The nature of our solar system provides striking evidence for VES theory. Here we find a number of important observations that heretofore have been impossible to reconcile with any other existing theory, including the general theory of relativity.

In this Chapter, I will use VES theory to analyze how a central body influences satellite spin and plane of orbit. The theory provides a rational explanation for Venus' slow spin rate.

For those not familiar with our solar system, I offer the following brief description along with what might be expected if gravitons are composed of matter.

Overview of our Solar System

It is convenient to think of planets spinning on their axes like tops spinning on a table. Looking down upon the table from above, we would see Earth spinning on its axis. We would also observe that Earth and all of the other planets in our solar system are rotating around the Sun in the same direction. An inspection of the Milky Way would confirm that the celestial bodies in our galaxy rotate around its center in the same manner. In the discussion that follows, I will continue to use spin in the same sense as a spinning top, and the term rotation to denote the movement of a satellite orbiting a central body.

One modern theory put forth to explain why the bodies in our solar system spin on their axes relates to how the solar system was created, Lang (2001, page 26). The broad outline of this theory is as follows. The solar system was created from particles of gas and dust in a solar nebula that was already rotating. The gas was composed primarily of hydrogen with far less amounts of helium and other elements. It is reasoned that the dust was primarily silicon and water. Under intense gravitational force, the cloud of particles condensed to form the Sun and planets, perhaps triggered by some cataclysmic event. During this process, the original angular momentum of the whirling dust and gasses was preserved as rotating planets spinning on their axes, which caused all the planets and the Sun to spin in the same direction.

Because angular momentum would be preserved during the formation of the solar system, scientists have estimated what the spin rates of the planets and Sun should be at the present time. The results of such studies show that the spin rates are much different than expected, which indicates that other forces have been acting on these spinning bodies since their creation. For example, at the present time, the Sun spins on its axis at the rate of 1,946 meters per second, which is 1000 times slower than expected, Lang (2001).

Scientists also believe the Earth once had a more rapid rate of spin. At the current time, the length of the day is increasing 0.002 seconds per century, Lang (2001). In this case, scientists think spin rate is slowing down because of tidal friction caused by the ebb and flow of the ocean's tides. Scientists believe the change in angular momentum of the Earth is being transferred to the Moon, which is causing the Moon to move away from the Earth at a rate of 0.0382 meters per year. However, scientists offer no physical explanation for momentum transfer, just that it happens. Some scientists believe the slow spin rate of Venus and Mercury can be explained by tidal interactions with the massive nearby Sun. According to Lang (2001), "These would be tides in the solid body of the planets, for there are no oceans on Mercury or Venus." This does not seem reasonable, and even if tides are created in solid bodies, there is no way to explain physically how transfer of angular momentum takes place. As we shall see, VES theory provides a physical explanation for angular momentum transfer, satellite migration, and spin rate for satellites in our solar system.

Scientists consider the spin of a planet on its axis to be normal (prograde) if the planet spins in the same direction it is rotating about the Sun. Venus is the only planet that spins in the opposite direction (retrograde). The spin of Uranus is also different from the other planets; its axis is tilted approximately 82 degrees and is oriented towards the Sun. Scientists believe that a catastrophic collision with another celestial body reoriented the axes of Venus and Uranus. David Nesvorny (2011), an astronomer who has been studying our solar system with computer simulation programs, concluded that another large gaseous planet once orbited our Sun just outside Jupiter. Fairly early in the history of our solar system, this planet came into alignment with Jupiter and the Sun. The increase in gravity caused the planet to migrate inward, and because of a sling shot effect, it was ousted from our solar system. This caused Uranus and Neptune to move outward where they assumed their present-day orbits. Perhaps something like this also flipped Venus on its axis.

It is insufficient to say angular momentum is preserved in any relationship between satellite and central body without providing a physical means of transferring momentum. For this reason, the present-day spin rate of the Sun and its planets is a conundrum. Let's see how this might be addressed by VES theory and regression analysis.

Satellites in our solar system all have unique rates they spin on their axes, and many of these satellites spin slower than predicted according to the models for the origin of our solar system (Lang 2001) In the case of our Sun, its spin rate is 1000 times slower. This has led scientists to believe there are factors, such as Earth's tides, that influence the rate satellites spin on their axes.

To determine whether the graviton matrix is responsible for the rate satellites spin on their axis, I ran a regression analysis In this regression analysis, the dependent variable became the actual spin velocities of all satellites in our solar system, which includes all the planets, our Sun, and all circular moons where there is sufficient data, with the minor exception of a few with retrograde spin or orbit. What I was interested in was the degree of correlation, if any, between the rate a satellite spins on its axis and three independent variables chosen because of the graviton matrix.

Title of this experiment:
Gravitons have a strong influence on satellite spin rate
Experiment by Kelland Terry

ABSTRACT:

The spin of satellites on their axis varies greatly in our solar system even among those who all orbit their central body in the same direction (prograde), which includes all the planets in our solar system. In addition, all planets spin on their axes in the same direction except Venus that has a retrograde spin.

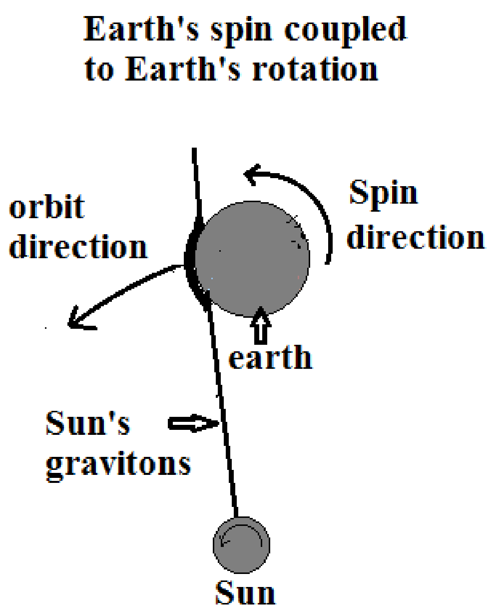
I ask this question, does the graviton matrix influence the rate satellites spin on their axes? My reasoning was simple. If gravitons are composed of matter and if they are present in space in vast concentration, it seems reasonable that gravitons might influence the rate satellite's spin on their axes.

To determine if this line of reasoning has any validity, I ran a regression analysis to determine the correlation between the rate 26 different satellites spin on their axis and the following three independent variables: satellite diameter, satellite momentum, and the gravitational force of attraction between satellite and central body.

The regression analysis revealed a 98% correlation (R square) between satellite spin and the three independent variates listed above. This correlation increases to 99% if Uranus is not included because of its strange orientation in orbit. This high correlation provides evidence that gravitons are linked to satellite spin, and it provides evidence that gravitons are composed of matter. This supports the concept of the graviton matrix. The graviton matrix also offers a rational explanation as to why Venus's retrograde spin induces a low spin velocity as explained in this experiment.

Introduction

According to VES theory, an onrushing planet must traverse through a vast concentration of tough, elastic graviton strings bound to the Sun, which bring predictable forces to bear on the planet as it reacts to this unseen barrier. The concentration of gravitons from the Sun would far outnumber those from other sources simply because the Sun is a very large body at relatively close range; however, gravitons from other sources would stiffen the graviton matrix and make it less penetrable by satellites in orbit. Because the gravitons remain bound to the Sun, there will be a tendency for release to be outward away from the Sun, which will enhance satellite spin rate.



According to VES theory, a planet should spin on its axis in the same direction it is rotating around the Sun because gravitons provide a coupling mechanism between orbital velocity and spin velocity. This is illustraed on the previous page.

The nearly circular pattern of a planet in its orbit causes the planet to constantly strike the Sun’s gravitons at an angle, which induces spin, just as a billiard ball begins spinning as it careens at an angle off the barrier formed by the cushion of the billiard table. This is only possible if gravitons remain bound to their source and are composed of matter that provides a physical barrier to the orbiting body as shown in the above illustration.

The coupling mechanism between orbit direction and spin is not absolute, and for this reason, spin velocity does not equal orbital velocity as in the case of two meshed gears. The table that follows shows that Saturn actually spins faster than its orbital velocity. This is possible because the connecting link between orbital velocity and spin velocity allows Saturn to free wheel, which allows it to spin faster than it rotates around the Sun. Jupiter's spin is only slightly slower than its orbital speed while the other planets all spin slower than the rate they orbit around the Sun. This is particularly evident for the inner solid planets. For example, Mercury has an orbital velocity of 47,880 meters per second, but its spin velocity is only 3 meters per second.

Table: Orbital speed versus spin rate

PLANET	ORBIT m/s	SPIN m/s
Mercury	47880	3.03
Venus*	35020	1.81
Earth	29790	463.8
Mars	24130	240.8
Jupiter	13070	12572
Saturn	9670	10279
Uranus**	6810	2492
Neptune	5450	2685

*Retrograde orbit. **Axis tilted 98 degrees

An examination of the moons that orbit planets will help us understand why Mercury spins so slowly on its axis. The moons in our solar system are in synchronous spin with respect to the planet they rotate around; this keeps the same side of the moon facing the planet. This is easy to relate to since this applies to our Moon that orbits the Earth. The demoted planet Pluto and its satellite, Charon, are both in synchronous spin such that the same face of the planet is always facing its moon and vice versa.

Ward (1975) stated that "Tides raised on the Moon by the Earth have de-spun the Moon to synchronous rotation." Although written in 1975, this is the same argument put forth at the close of the century to explain why Mercury and Venus have a slow spin rate, although we are dealing with solid bodies. I believe there is a better explanation for the rate satellites spin on their that applies to all satellites.

The following are the most likely independent variables that influence spin according to VES theory.

Diameter of satellite

A large diameter provides a strong positive feature encouraging satellite spin. A gas ball, like Saturn, with a large diameter would encounter many more gravitons than a smaller planet like Mercury. It would also provide a greater surface area for each graviton that it encounters. For these reasons, the diameter of a planet is a strong, positive factor that encourages an orbiting satellite to spin on its axis.

Momentum of satellite and spin velocity:

The momentum of an orbiting body affects its ability to react to the gravitons it encounters. The Sun's tremendous velocity approaches 120,000 meters per second, much greater than any planet in our solar system; in addition, it contains greater than 99 percent of the mass in our solar system. For this reason, the Sun's momentum (mass x velocity) is 17,413 times greater than Jupiter, our most massive planet, and its orbital angular momentum (mass x velocity x radius) is 6 x 10^{12} times that of Jupiter and 3 x 10^{17} times the orbital angular momentum of Pluto. We might imagine that such a huge mass traveling at great velocity would push aside the graviton barrier created by the galaxy and be less affected by the gravitons in its path than a mere planet. This suggests that coupling between the graviton matrix and the Sun will be less effective, which means over the years its spin rate will decrease.

It makes no difference in the regression analysis whether angular momentum is used (mass x velocity x radius) or just mass x velocity, which is presented here.

Gravitational force between satellite and central body:

The relationship between the strength of the gravitational force and spin rate is very complex. Gravity might be the ultimate force that prevents a moon from spinning rapidly on its axis in relation to the planet it orbits; yet VES theory states that gravitons also provide the coupling mechanism between a satellite's orbital velocity and the rate it spins on its axis. In fact, because gravitons couple spin velocity to orbital velocity, the force of gravity is more of a positive factor increasing spin than it is a negative factor.

The question I posed was this. What correlation exists between the rate a satellite spins on its axis and the three independent variables just discussed. The satellites used in this study and their spin rates are shown in the next table alongside the independent variables discussed.

Table: Data for regression analysis

Satellite System	Dependent variable	Independent variable	Independent variable	Independent variable
	Actual spin, m/s	Diameter, km	Momentum, Mass x speed	Gravity in newtons
Mercury-Sun	3.025	4879.4	1.581×10^{28}	1.307×10^{22}
Earth-Sun	463.83	12756.2	1.780×10^{29}	3.526×10^{22}
Mars-Sun	240.8	6794.4	1.549×10^{28}	1.633×10^{21}
Jupiter-Sun	13070	142984	2.483×10^{31}	4.168×10^{23}
Saturn-Sun	10279	120536	5.500×10^{30}	3.689×10^{22}
Uranus-Sun	2492	49584	3.191×10^{29}	1.397×10^{21}
Neptu-Sun	2685.3	49572	5.581×10^{29}	6.738×10^{20}
Pluto-Sun	13.22	2320	6.115×10^{25}	4.894×10^{16}
Sun-Galaxy	1946	1392000	4.324×10^{35}	3.670×10^{20}
Ariel-Uranus	0.016839	1167	7.110×10^{25}	5.739×10^{19}
Callistro-Jupiter	0.010502	4820	8.716×10^{27}	3.815×10^{22}
Dione-Saturn	0.015056	1118	1.053×10^{25}	2.797×10^{20}
Encelad-Saturn	0.013038	502	9.348×10^{23}	4.957×10^{19}
Europa-Jupiter	0.032132	3138	6.695×10^{27}	1.372×10^{23}
Ganymede-Jup	0.026812	5276	1.621×10^{27}	1.649×10^{22}
Iapetus-Saturn	0.000666	1448	6.301×10^{24}	5.773×10^{18}
Io-Jupiter	0.074654	3632	1.545×10^{28}	6.357×10^{23}
Mimas-Saturn	0.015918	394	5.383×10^{23}	4.144×10^{19}
Miranda-Uranus	0.012481	485	2.263×10^{23}	6.348×10^{18}
Oberon-Uranus	0.004197	1554	2.797×10^{24}	6.426×10^{18}
Rhea-Saturn	0.012347	1528	1.934×10^{25}	3.114×10^{20}
Tethys-Saturn	0.020056	1048	7.106×10^{24}	2.735×10^{20}
Titan-Saturn	0.011704	5150	1.432×10^{27}	9.383×10^{20}
Titania-Uranus	0.006724	1610	4.370×10^{24}	1.974×10^{19}
Umbriel-Uranus	0.01045	1191	3.552×10^{24}	3.350×10^{19}
Moon-Earth	0.004632	3480	7.106×10^{25}	1.987×10^{20}

REGRESSION STATISTICS

Multiple R	0.989531
R^2	0.979173
Adjusted R^2	0.976333
Standard E	492.81
Observations	26

	ddf	SS	MS	F	Significance F
Regression	3	$2.51\text{x } 10^{8}$	83732457	345	$1.22 \text{ x } 10^{-18}$
Residual	2	5342868	242857		
Total	5	$2.56\text{x } 10^{8}$			

Variable	Coefficient	Error	t-stat	P-value
Intercept	-42.821	111	-3.0867	0.00539
Diameter	0.0860789	0.00288	29.8186	$2.8 \text{ x } 10^{-19}$
Momentum	$-2.7 \text{ x } 10^{-31}$	$9.28 \text{ x } 10^{-33}$	-29.2822	$4.1 \text{ x } 10^{-19}$
Gravity	$8.03 \text{ x } 10^{-22}$	$7.20 \text{ x } 10^{-22}$	1.1166	0.2762

An examination of the tables reveals that the three independent variables do an excellent job of predicting the spin velocity of a satellite. The R squared value, which is an unbiased estimate for correlation, shows that 98 percent of the variation in spin rate is accounted for by its relationship with the force of gravity, diameter of the satellite, and its momentum.

If you omit Uranus that has an odd orientation in space, R square goes up to 99 percent.

Is the strong, 98 percent correlation due to chance? The F test carried out in this analysis answers this question. F in this test is 345 and the point of significance is essentially zero, which in itself shows that the strong correlation is very significant. Thus, we can reject the null hypothesis of no relationship between spin and the three variables. In fact, it seems certain that spin rate is strongly related to satellite diameter, gravitational force between central body and satellite, and satellite momentum. This is also borne out by the t tests, as shown in the regression statistics. The P values are all very small for the intercept, diameter, and momentum. They show us that the probability of getting more extreme values is minute. Because P value for gravity is high, I repeated the regression analysis with just two independent variables (momentum and diameter) and R square is still 0.978.

Table: Predicted satellite spin (three independent variables)

SATELLITE SYSTEM	Satellite's actual spin m/s	Predicted spin m/s
Mercury-Sun	3.0	87
Earth-Sun	463.8	784
Mars-Sun	240.8	243
Jupiter-Sun	13070	12293
Saturn-Sun	10279	10061
Uranus-Sun	2492	3926
Neptune-Sun	2685.3	3925
Pluto-Sun	13.22	-143
Sun-Galaxy	1946	1946
Ariel-Uranus	0.016839	-242
Callistro-Jupitor	0.010502	103
Dione-Saturn	0.015056	-246
Enceladus-Sat	0.013038	-300
Europa-Jupiter	0.032132	38
Ganymede-Jup	0.026812	125
Iapetus-Saturn	0.000666	-218
Io-Jupiter	0.074654	481
Mimas-Saturn	0.015918	-309
Miranda-Uranus	0.012481	-301
Oberon-Uranus	0.004197	-209
Rhea-Saturn	0.012347	-211
Tethys-Saturn	0.020056	-252
Titan-Saturn	0.011704	101
Titania-Uranus	0.006724	-204
Umbriel-Uranus	0.01045	-240
Moon-Earth	0.004632	-43

The contribution of diameter towards the spin rate of a satellite can be determined by multiplying the coefficient for diameter in the regression analysis by the diameter of the satellite. You quickly realize diameter is the most important variable affecting spin velocity for all satellites except the Sun where momentum becomes an almost equal but negative factor. The coefficient for diameter is positive as expected by VES theory for all prograde orbits.

The coefficient for the gravitational force of attraction between satellite and the body it orbits is also positive. This means that it may be contributing to spin velocity. However, the p-value suggests it may not be very significant. If the gravitational force between the bodies is multiplied by the coefficient, we find that it has only a minor, positive influence on spin rate.

Although gravitons must ultimately be responsible for holding a planet and moon in a synchronous relationship, gravitons also provide a barrier in space that couples spin velocity to orbital velocity as expected according to VES theory. For this reason, it is not possible to show that gravity prevents a moon from spinning with respect to the planet it orbits, although reasoning tells us it does. As you can see, gravity acts for and against spinning, which might explain the high p-value found for this variable. I left it in because of the very significant F value, as discussed in this paper. However, As mentioned if you only use momentum and diameter in the regression analysis, R square is still 0.978

My rational for using momentum as a factor came from the idea that a body with great momentum would push aside the barrier of gravitons in space and render the satellite less subject to coupling between orbital velocity and spin velocity. The negative coefficient for momentum in the regression analysis supports this contention. If we multiply the coefficient for momentum by the momentums of the various satellites, we quickly see that it most affects the spin velocity of our Sun. In this case, the value of this negative variable is very large and nearly equal to the positive influence of the Sun's diameter. Unfortunately, we have no examples between the Sun and our most massive planet, Jupiter, whose orbital angular momentum is 6×10^{12} times less than the Sun.

Sun's spin rate

According to the nebular model for the creation of our solar system, the Sun must have been spinning much faster than it is today. The evidence suggests that the Sun has a reduced spin rate for two reasons: First, its spin angular momentum has been passed to the planets for reasons to be discussed, and second, there is less coupling between the Sun's orbital velocity and spin velocity because of the Sun's great momentum. This is supported by the regression analysis, which suggests a massive body traveling at great velocity is less affected by the gravitons it encounters than a smaller, slower orbiting satellite.

It was gratifying to find that the three parameters used in the regression analysis predicted exactly the actual spin rate of the Sun. The same holds true if you omit gravity as one of the independent variables.

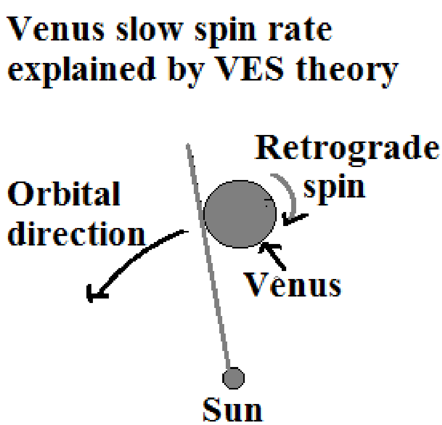
Moon spin

The close proximity of moon and planet results in a unique combination of diameter, momentum, and gravity that favors synchronous spin with the planet it orbits.

Planet spin rate

Most of the planets in our solar system spin in the same direction they orbit the Sun, just as predicted by VES theory. Uranus does not have a normal prograde spin, and at the present time, its spin is not coupled to its rotational velocity in the same manner as the other planets. Scientists believe this planet was knocked out of its normal position by some external force. If this planet is deleted from the regression analysis, the r value increases from 0.989 to 0.994 while the predicted spin of all the other satellites remain fairly close to those presented.

The spin of Venus on its axis also represents a special case because it spins in the opposite direction it rotates around the Sun. Some scientists believe a cataclysmic event caused Venus' retrograde spin, such as the collision of Venus with a large body that flipped Venus approximately 180 degrees on its axis. Venus spins on its axis slower than any other planet in our solar system. The spin rate of Venus is 1.81 meters per second, while Earth, its nearest neighbor and most like in diameter, spins at 463.8 meters per second. Venus' slow spin rate has puzzled scientists for many years, but it is predicted by VES theory.



Because Venus rotates around the Sun in the opposite direction that it spins on its axis, it causes the planet to grind against the gravitons in its path exactly opposite to all of the other planets. As it moves against the Sun's gravitons, there will be an attempt to reverse the direction that Venus is spinning. This provides a rational reason for Venus' slow spin rate. The figure above on this page illustrates this point. The slow spin rate of Venus supports my idea that the rate satellites spin on their axes is controlled in part by a vast number of gravitons in space that are composed of matter and remain bound to their source, just as predicted by VES theory. Einstein's general theory of relativity has no explanation for this observation.

> VES theory provides a compelling reason why satellites spin in the same direction that they orbit a central body. Spin is dependent upon a physical barrier created by gravitons emanating from the central body and other sources. When satellites strike this barrier, they roll and spin on its surface, which couples orbital velocity to spin velocity. The statistical analysis made in this Chapter confirms that factors predicted by VES theory are clearly important to spin velocity. It supports the concept of the graviton matrix.

Plane of satellite rotation about the central body

The planets in our solar system tend to rotate in a similar plane like tops on a table. VES theory states that planets are physically connected to the Sun by gravitons. This causes the planet's plane of orbit to resemble the situation that occurs when a tin can connected to a string is swung around the head. The tin can immediately assumes the plane and direction of the rotating hand. This explains why all satellites tend to assume the same plane about a spinning central body.

The spin of the Sun on its axis provides the force that pulls the planets into alignment. This is similar to the Sun pulling a planet forward in its orbit because gravitons make physical connections between planet and Sun. This is explained in more detail in the next section that deals with the transfer of angular momentum.

> The strong correlation between satellite spin and factors suggested by the concept of the graviton matrix should not be ignored. It adds to the overwhelming body of evidence that gravitons are composed of matter and are present in vast concentrations in the space about us. It supports the concept that all forcefields are composed of matter.

Chapter 15: Angular momentum and satellite migration

Introduction

Weissman, McFadden and Johnson (1999, page 6) explain that the orbital angular momentum (mass x orbital velocity x orbit radius) of a body increases if the satellite's orbit is normal (prograde), but loses angular momentum if its orbit is retrograde, such as Triton, a moon that orbits Neptune. When a satellite loses angular momentum, it migrates inward towards the body it is rotating around, and when it gains angular momentum, it moves outward away from the central body. In any system, the sum total of angular momentum is constant.

Earth once had a more rapid rate of spin. At the current time, the length of the day is increasing 0.002 seconds per century, Lang (2001, page 26). At the same time, the Moon is moving away from the Earth at a rate of 0.0382 meters per year. Scientists believe Earth's spin is slowing down because of tidal friction caused by the ebb and flow of the ocean's tides. The angular momentum lost is being transferred to the Moon. As the angular momentum of the Moon increases, it moves away from Earth. Some scientists believe the slow spin rate of Venus and Mercury can be explained by tidal interactions with the massive nearby Sun. According to Lang (2001), <u>"These would be tides in the solid body of the planets, for there are no oceans on Mercury or Venus."</u> How this is accomplished is unclear. In fact, it would seem impossible.

Scientists have offered no physical explanation how angular momentum is transferred between a central body and its satellites, just that it is transferred, and the total remains unchanged.

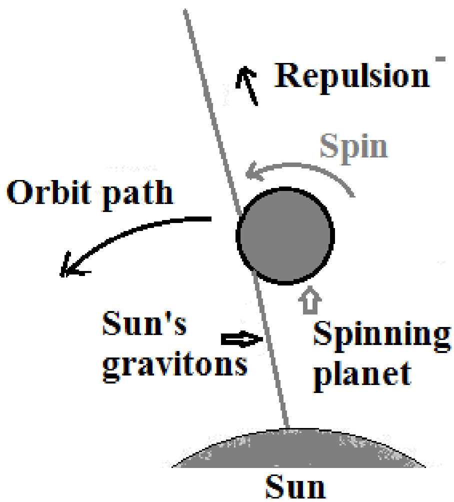
It is the thesis of this Chapter that angular momentum and satellite migration are strongly influenced by two factors: repulsion forces between central body and satellite and physical connections between these two bodies via gravitons.

Repulsion forces between satellites and the bodies they orbit

VES theory predicts that repulsion forces exist between a satellite and the central body it orbits. Repulsion forces are created because gravitons emanating from the central body remain attached to their source and form a barrier in space. The Sun's graviton barrier is greatly enhanced by strings arriving here from all the bodies in the Local Group of Galaxies, which makes up the graviton matrix. A satellite in orbit will constantly strike these gravitons at an angle and the angle is directed away from the central body. This encourages the satellite to glance off the graviton matrix and away from the central body.

Repulsion forces are magnified because the satellite is spinning on its axis, which causes the satellite to grind against the gravitons and move off in the direction it is spinning. This is analogous to a billiard ball that careens off the cushion of a billiard table in the direction it is moving but is modified by the direction it is spinning. In the case of celestial bodies, this is only possible because gravitons are firmly bound to the central body and have a physical presence in space. This concept is illustrated below.

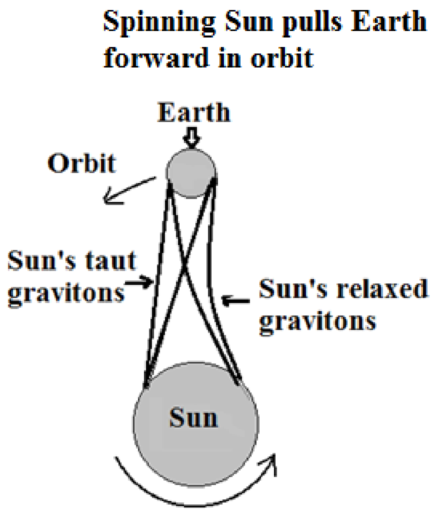
Repulsion force felt by planet



The concept of repulsion forces is strongly supported by anomalous satellite precession, planet tilt on axis, polar wobble of Earth on its axis, and transfer of momentum from central body to satellite.

Notice in the illustration above that the Sun’s gravitons will be impeded when they retract because they are physically rubbing against the planet. This will decrease the Sun’s spin angular momentum at the same time the satellites momentum is increasing as it moves away from the Sun. Thus, we see that VES theory provides a physical mechanism for the transfer of angular momentum from central body to satellite.

Physical connections between satellite and central body also cause transfer of angular momentum. The next figure illustrates how the Sun pulls Earth forward in its orbit.



All the planets in our solar system have a longer orbital period than the time it takes for the Sun to spin once on its axis (25.7 days), and for this reason, graviton connections between planet and Sun tend to pull the planet forward in orbit with a transfer of momentum from Sun to planet. In this process, the Sun's spin velocity decreases as the Sun' momentum is transferred to the planet.

Just as the Sun is influencing Earth's rotation, Earth spinning on its axis is attempting to increase the Sun's spin rate; however, the spin angular momentum of the Sun is 1.52 x 10^8 times greater than that of Earth. The great difference in magnitude explains why the Sun has more influence on the Earth than vice versa.

As the Sun attempts to drag Earth forward in its orbit, it transfers momentum from Sun to planet. This effect is only possible if a physical connection exists between Earth and Sun. What is true for Earth is also true for all the planets in our solar system because they all have longer orbital periods than the spin period of the Sun. Even our most massive planet, Jupiter, feels some effect of drag because its spin angular momentum is 1520 times less than that of the Sun.

Again, we see a physical reason for the transfer of angular momentum from central body to satellite. In this case, gravitons pulling the Earth forward in its orbit increase the planet's velocity of rotation, and to the same extent inhibit the Sun's spin angular momentum.

Einstein predicted that a drag effect takes place between a spinning central body and its satellite. He referred to it as frame-dragging in his general theory of relativity. VES theory views it as a drag induced by gravitons that act as physical connections between central body and satellite as just discussed. In 2004, NASA confirmed Frame-dragging by launching two satellites in space especially designed to measure this phenomenon.

The repulsion forces discussed and the force of attraction that pulls satellites forward in orbit are responsible for several observations in our solar system.

Satellites with normal spin and orbital patterns

VES theory predicts that Earth with normal spin and normal orbit will tend to migrate away from the Sun because of repulsion forces and because the Sun is pulling Earth forward in its orbit. The result is an increase in Earth's angular momentum. However, the total angular momentum for the Earth-Sun system as a whole remains constant because the Sun's gravitons are inhibited during retraction, which decreases the Sun's angular momentum. This in turn decreases the spin rate of the Sun.

Moons with normal orbital patterns

A moon orbiting a planet is subjected to a repulsion force as it glances off the graviton barrier emanating from the planet. This collision causes the satellite to migrate away from the planet as already discussed.

The planet in this situation loses angular momentum because the retraction of its gravitons is impeded as they rub against the surface of the moon. In the same manner, those gravitons dragging the moon forward in its orbit are impeded in their retraction back to the planet. The net result is a decrease in the planet's angular momentum, which is transferred to the moon. This explains why our Moon is slowly moving away from us at the rate of 3.8 centimeters per year and why the length of an Earth day is growing longer.

Scientists have long maintained that tides here on Earth have acted as a braking system causing the Earth to spin at a slower rate. I fail to understand how the effects of tides here on Earth can be physically transferred to our Moon. Perhaps it is accomplished via graviton connections. As Lang (2001) pointed out, it is difficult to understand how migration is accomplished for Mercury and Venus. There are no tides in the solid bodies of these planets and there are no oceans. I suspect that a dose of denial helps.

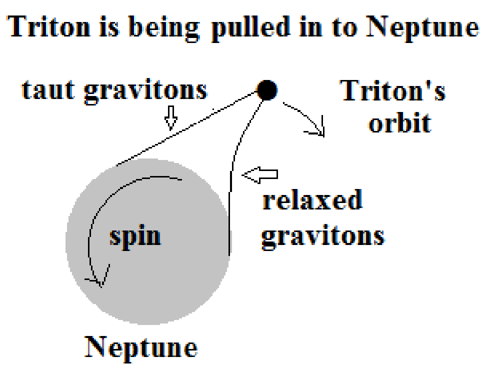
Normal rotation with retrograde spin

Venus spins in the opposite direction it rotates around the Sun. As mentioned previously, this retrograde spin may have been brought about by some cataclysmic event that flipped Venus close to 180 degrees on its axis. VES theory cannot predict whether this planet should be migrating inward towards the Sun or away from it; however, it does predict that Venus will have less tendency to migrate away from the Sun than does Earth

As discussed previously, a repulsion force is set up as an orbiting planet glances off the Sun's gravitons, just as a cue ball bounces off the cushion of a billiard table. However, how the ball careens off the cushion can be modified by its spin. In this case, a retrograde spin will oppose the tendency for Venus to careen into outer space. Perhaps this explains why Venus is closer to the Sun than Earth even though its specific gravity is less.

Retrograde orbit about the central body

Triton, a moon of Neptune, is one of the few moons in our solar system with a retrograde orbit. Triton is migrating inward towards Neptune at a noticeable rate. This is a conundrum.

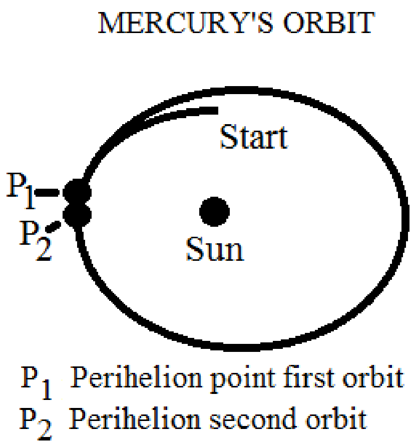


Currently, scientists' reason that the tides on Neptune cause Triton to spiral inward toward the planet. However, VES theory provides a more reasonable explanation. Triton is rotating at 25,765 m/s in the opposite direction that Neptune is spinning on its axis at 2,685 m/s. Because of its large size and great mass, the spin angular momentum of Neptune is 34.6 times greater than the orbital angular momentum of Triton. Graviton connections, as shown in the illustration, allow Neptune to drag Triton inward towards Neptune.

The concepts developed in this Chapter add to the growing body of evidence for the graviton matrix and graviton strings composed of matter. The graviton matrix is the key that explains much about our solar system.

Chapter 16. Mercury’s anomalous satellite precession

Because its orbital pattern cannot be explained by the Universal Law of Gravitation and the laws governing orbiting satellites, Mercury’s orbit has held a special interest for those who study the solar system. Mercury’s orbit is constantly changing. After one complete rotation, the perihelion point (that point nearest the Sun), as shown in the figure below, is advanced and the elliptical flight pattern has changed. This is referred to as precession.



Every one-hundred years, the perihelion point of Mercury advances approximately 5,600 arc seconds. The large majority of this advance is due to the gravitational attraction with other satellites; however, there are 43 arc seconds precession per 100 years (0.103 arc seconds per orbit) that cannot be explained in this manner. The discrepancy is referred to as anomalous precession.

Mercury has the distinction of being the innermost planet with the most elliptical orbit of any planet. This small planet is 46.5 x 10^6 km from the Sun at perihelion and 69.8 x 10^6 km at aphelion. Mercury has greater anomalous precession than any other planet in our solar system.

Repulsion force necessary to explain Mercury’s anomalous precession

According to Coleman (1958), Mercury’s anomalous precession can be explained if the force of attraction between Sun and planet does not follow the universal law of gravitation. It's as if the force of attraction between the two bodies is less than expected during perihelion.

$$F_c = \frac{G\, M_s \times M_m}{d^{2.00000016}} \qquad F = \frac{G\, M_s \times M_m}{d^2}$$

Fc = force according to Coleman

Using the average distance between Mercury and Sun, the difference between these two equations is 5.18×10^{16} newtons. Although this force is substantial, it represents just 0.00000396 of the gravitational force of attraction between Mercury and Sun. Coleman's equation can be explained if there are repulsion forces at work, and if the ratio between repulsion force and gravitational force of attraction is greater at perihelion than aphelion.

A small force of repulsion between the Sun and Mercury can be expected because of the graviton matrix as discussed in the previous chapter.

Repulsion forces affecting Mercury's orbit

Graviton concentration

Repulsion can be expected to increase as the graviton barrier created by the Sun becomes denser. Thus, the closer the planet is to the Sun the greater the repulsion force.

My calculations show that the concentration of the Sun's gravitons surrounding Mercury as it rounds perihelion is 2.25 times greater than at aphelion. This will increase repulsion forces at perihelion.

We are dealing with far more than the Sun's gravitons. It is important to note that the repulsion forces created by the Sun's gravitons are magnified by the dense graviton matrix provided by other sources that weave the Sun's gravitons into a fabric in space. This makes it far more reasonable that the graviton matrix forms a barrier in space that satellites must plow through.

Satellites strike graviton barrier at an angle

One of the most important factors causing repulsion is the elliptical orbit that causes the satellite to constantly strike the graviton barrier at an angle. This is the primary reason that the graviton barrier is able to create a force of repulsion. As you can imagine, the more acute the angle, the easier it would be to eject the planet away from the Sun. A planet like

Mercury would be more affected because it is the closest planet to the Sun. This effect is magnified because the concentration of gravitons bound to the Sun also increases as the planet approaches the Sun.

In general, it can be expected that repulsion force per graviton will increase as distance between planet and Sun decreases because the angle of displacement increases. This is an important concept that helps to explain anomalous precession, the tilt of a planet on its axis, and Earth's polar wobble on its axis.

Consider a circle whose radius is the distance between Mercury and the Sun at perihelion. We can divide its circumference into 360 degrees to get degree change per meter traveled. We can also do the same for the planet at aphelion. The ratio between the two shows that the displacement angle for Mercury is 1.5 times greater at perihelion than aphelion.

Because repulsion forces will push Mercury away from the Sun a tad more than expected as it rounds perihelion, the perihelion point will shift forward. The opposite occurs as Mercury rounds aphelion. Here the force of repulsion is lower with respect to the gravitational force of attraction. This allows gravity to pull the planet slightly closer to the Sun than expected. After one complete orbit, Mercury will be outside its originally starting point and the perihelion point will be advanced.

This reasoning completely explains Coleman's equation and Mercury's precession. There is good evidence for this explanation of anomalous precession that can be explored by regression analysis.

Title of paper: Mercury's anomalous satellite precession is created by the graviton matrix.

Experiments by Kelland Terry

ABSTRACT

I used regression analyses to determine the correlation between satellite anomalous precession and those independent variables dictated by the graviton matrix. I propose that the graviton matrix creates a minor repulsion force against satellites during their elliptical orbit, which is much more profound during perihelion when closer to the Sun than during aphelion when further from the Sun. Secondly, the graviton matrix dictates that precession will increase if the satellite has a larger diameter. These two factors favor a repulsion force that push satellites away from the central body. In contrast, the greater the momentum, the less the satellite will be influenced by the gravitons it meets in flight. I combined these

two parameters into one independent variable by dividing the number of gravitons striking the satellite by the momentum of the satellite. The greater the value of this ratio, the greater the precession.

The second independent variable used in the analysis was degree of curvature as the satellite rounds perihelion; i.e., the greater the curvature in flight the easier it is for the graviton matrix to repulse the satellite.

Results: The orbit angle the satellite must negotiate as it rounds perihelion had 91 percent correlation with precession for seven different satellites, and the ratio described above had a 96 percent correlation with precession. When the two variables were used in the same regression analysis, correlation increased to 99 percent. The r square values in the analysis are unbiased estimates of correlation. There are two conclusions we can reach from this study. First, they provide a rational physical basis for precession, and secondly, they confirm the existence of the graviton matrix. They provide important evidence that gravitons are composed of matter and are present in space in vast numbers.

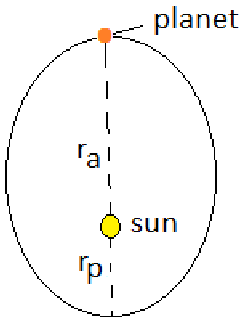
INTRODUCTION:

The observed anomalous precession for most satellites is unknown, or at least difficult to find on the Internet. In addition, some observed precession rates do not follow Einstein's equation for precession for reasons I will take up later in this Chapter. To clarify the terminology, I should mention that anomalous precession is also referred to in the literature as perihelion precession, relativistic precession, and apsidal precession. In this book, I use at times relativistic precession when referring to anomalous precession as calculated using Einstein's equation.

In the studies that follow, I first compare the correlation between relativistic precession and those factors that I believe are responsible for anomalous precession.

The equation for relativistic precession derived by Einstein uses the time it takes for the satellite to make one complete orbit, its semi major axis, and its eccentricity. He also uses the velocity of light as a constant; this gives him two constants in the same equation. I'll come back to this point later in this Chapter.

A planet in an elliptical orbit about the Sun is shown in the next illustration.



The eccentricity (e) of a planet in orbit is calculated as follows:

$$e = 1 - \frac{2}{\frac{r_a}{r_p} + 1}$$

Ra is the aphelion distance and Rp the perihelion distance. Einstein used the planets eccentricity along with its semi major axis, and its orbital period in seconds to calculate the planet's anomalous precession.

$$\text{radians per orbit} = \frac{24\ \text{Pi}^3\ (\text{semi major axis})2}{(\text{orbit length seconds})^2\ c^2\ \ 1\text{-}e^2}$$

Where c is the velocity of light and e is the eccentricity of the orbit. The semi major axis is half of the total distance at widest orbit (perihelion + aphelion divided by 2). Radians times 206265 converts radians to arc seconds, which is that part of a circle expressed in seconds. I used this equation to calculate relativistic precession.

My theory for precession is based on two ideas: Repulsion is created because satellites strike the graviton barrier at an angle. Secondly, repulsion per graviton increases the closer the satellite is to the Sun because the displacement angle increases as well as graviton concentration. From this I conclude that we should find correlation between relativistic precession and those factors that can be expected to cause repulsion. I have approached this question using regression analysis.

The following independent variables were considered:

1. The orbital angle change per meter traveled at perihelion and aphelion.
2. The diameter of the satellite.
3. The momentum of the satellite.
4. Graviton concentration at perihelion and aphelion.

It is my theory that all four variables affect satellite repulsion. In addition, the spin of the satellite on its axis may also be involved. A brief discussion of these variables follows:

The angle of displacement varies among satellites because of their elliptical orbits and because of the variation in distance from the Sun. As explained previously, the angles of displacement are central to understanding why a graviton barrier would cause repulsion and anomalous precession. It is central to understanding why repulsion per graviton increases the closer the satellite is to the Sun.

The diameter of the planet is also critical to anomalous precession. A planet with a large diameter would meet a greater repulsion force than a planet with a smaller diameter. Diameter was also used to help explain the relationship between satellite spin and satellite rotation as discussed in a previous Chapter.

A satellite with large angular momentum would yield less to the graviton matrix in its path than a satellite with less momentum. Angular momentum must be taken into consideration to explain the differences in anomalous precession. Momentum was also used to help explain the relationship between satellite spin and satellite rotation as discussed in a previous Chapter.

The number of gravitons the planet strikes at aphelion and perihelion would be different for every planet. This reflects both the diameter of the planet and the density of gravitons at perihelion and aphelion.

Regression analysis for anomalous precession

It is difficult to examine the differences between values at perihelion versus aphelion. You tend to end up with a ratio that merely reflects perihelion divided by aphelion. For this reason, my regression analyses only involve the values found for the satellites at perihelion. I will begin this discussion by examining the correlation between anomalous precession and the displacement angle at perihelion.

I have few satellites with known anomalous precession, and for this reason I have compared the displacement angle at perihelion with

Einstein's relativistic values for precession. In this study, I used all the planets and Ceres, a large asteroid with a spherical shape. An asteroid named Eris, which is slightly larger than Pluto, was not analyzed in this study (not known at the time). Pluto, Eris, and Ceres are designated as minor planets.

The variables used in the regression analysis are found in the next table.

	Einstein precession per 100 years	Angle change in degrees at perihelion per meter traveled
Mercury	42.936371	1.2455×10^{-9}
Venus	8.6244467	5.33098×10^{-10}
Earth	3.8336188	3.89507×10^{-10}
Mars	1.350303	2.773×10^{-10}
Ceres	0.3028884	1.49746×10^{-10}
Saturn	0.0433987	7.73692×10^{-11}
Jupiter	0.0009371	4.23613×10^{-11}
Uranus	0.00007	2.08956×10^{-11}
Neptune	0.000028	1.28466×10^{-11}
Pluto	0.00043552	1.29×10^{-11}

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.9553
R Square	0.9125
Adjusted R Square	0.9016
Standard Error	4.1935
Observations	10

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1467.9	1467.9	83.47	0.0000166
Residual	8	140.69	17.59		
Total	9	1608.6			

	Coefficients	Standard Error	t Stat	P-value
Intercept	-3.456	1.66	-2.08	0.0713
Variable	3.32×10^{10}	3.63×10^{9}	9.14	0.0000166

The adjusted R square in this study is 0.90, which tells us there is very high correlation between precession and angle change per meter traveled. The point of significance for F is extremely low and the P-value for the angle variable is equally low. For these reasons, we can reject the null hypothesis that no correlation exists between precession values and angle change per meter traveled at perihelion. In fact, we can be highly confident that the angle change is a strong factor for inducing precession.

The angle change per meter is not the only factor causing repulsion and precession. We still must take into consideration the size of the satellite, the number of gravitons interacting with the satellite, and its orbital angular momentum. To accomplish this task, I envisioned the following ratio.

$$\frac{\text{Gravitons encountered by the satellite at perihelion}}{\text{Angular momentum of the satellite at perihelion}}$$

The numerator in this ratio takes into consideration two factors: The concentration of the Sun's gravitons per square meter at perihelion, and the size of the satellite expressed as a cross section in square meters through its middle. When we multiple these two factors together, we arrive at an estimate of the number of gravitons encountered by the satellite that favors repulsion and anomalous precession. The denominator is the angular momentum of the satellite. As stated, the larger the momentum of the satellite the more it resists repulsion and decreases precession. By dividing the number of gravitons interacting with the satellite by its angular momentum, we arrive at a ratio that reflects both parameters. The larger this ratio is the greater the precession. The question becomes is there any correlation with precession calculated using Einstein's equation and this ratio.

The concentration of the Sun's gravitons at perihelion for a given satellite was determined as explained in Chapter 2. The angular momentum of the satellite at perihelion was determined by multiplying its mass in kg times its velocity at the perihelion point. It was discovered that orbital angular momentum at perihelion (mass x velocity x distance from sun) was more highly correlated with precession than simple momentum (mass x velocity).

The values used in this regression analysis are found in the next table. The independent variable came from values found at perihelion.

Satellite	Einstein precession per 100 years	gravitons/ angular momentum Independent variable
Mercury	42.93637	2.16×10^{32}
Venus	8.624447	1.18×10^{31}
Earth	3.833619	4.82×10^{30}
Mars	1.350303	5.19×10^{30}
Ceres	0.302888	1.5×10^{31}
Saturn	0.043399	3.17×10^{28}
Jupiter	0.000937	1.62×10^{28}
Uranus	0.000070	3.36×10^{27}
Neptune	0.0000284	8.33×10^{26}
Pluto	0.00043552	1.39×10^{28}

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.9840
R Square	0.9682
Adjusted R Square	0.9643
Standard Error	2.53
Observations	10

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	1557.48	1557.48	243.9	0.000000282

Residual	8	51.09	6.39		
Total	9	1608.57			

	Coefficients	Standard Error	t Stat	P-value
Intercept	0.7450	0.860	0.866	0.411
Ratio Variable	1.96×10^{-31}	1.25×10^{-32}	15.62	0.000000282

This analysis shows a profound correlation between the ratio created, as explained, and Einstein's relativistic precession. The adjusted R square is 0.968. The extremely low significant F point and the equally low P-value tells us that the correlation between the ratio and anomalous precession is not due to chance. In fact, we can be very confident that the gravitons encountered by a satellite at perihelion and the satellite's angular momentum are both involved in creating anomalous precession.

One additional question needs to be explored. Does the orbital angle change at perihelion and the ratio variable complement each other as predicted by my theory that both are involved in causing anomalous precession? This is examined in the next regression analysis.

	Einstein precession per 100 years	Gravitons encountered/ angular momentum	Angle change at perihelion
Mercury	42.93637	2.16×10^{32}	1.24×10^{-9}
Venus	8.624447	1.175×10^{31}	5.33×10^{-10}
Earth	3.833619	4.818×10^{30}	3.9×10^{-10}
Mars	1.350303	5.217×10^{30}	2.77×10^{-10}
Ceres	0.302888	1.578×10^{31}	1.5×10^{-10}
Saturn	0.043399	3.173×10^{28}	7.74×10^{-11}
Jupiter	0.000937	1.619×10^{28}	4.24×10^{-11}
Uranus	7×10^{-5}	3.356×10^{27}	2.09×10^{-11}
Neptune	2.84×10^{-5}	8.330×10^{26}	1.28×10^{-11}
Pluto	0.00043552	1.388×10^{28}	1.29×10^{-11}

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.9954
R Square	0.9908
Adjusted R Square	0.9882
Standard Error	1.453
Observations	10

ANOVA					
	df	SS	MS	F	Significance F
Regression	2	1593.79	796.9	377.4	0.0000000744
Residual	7	14.78	2.11		
Total	9	1608.57			

	Coefficients	Standard Error	t Stat	P-value
Intercept	-1.04032	0.656	-1.59	0.159
#1 Variable	1.32×10^{-31}	1.71×10^{-32}	7.72	0.000114
#2 Variable	1.23×10^{10}	2.98×10^{9}	4.14	0.004311

It is incredible that Einstein's relativistic values for anomalous precession have a 0.99 correlation with the two independent variables used in the analysis. And we know this relationship is not due to chance because the F point of significance is extremely small (0.0000000744). Furthermore, we know that both independent variables are contributing to this relationship because of their low P-values. We can conclude with absolute confidence that anomalous satellite precession is largely dictated by the angle the satellite must negotiate as it rounds perihelion and by inference aphelion, and by the concentration of the graviton matrix, the diameter of the satellite, and by the angular momentum of the satellite.

As you might imagine, the regression analysis predicts with fair accuracy the precession values for the individual satellites. This is shown in the next table.

Predicted precession compared to calculated

Satellite	Relativistic precession	Predicted Y
Mercury	42.94	42.78
Venus	8.62	7.09
Earth	3.83	4.41
Mars	1.36	3.07
Ceres	0.3029	2.89
Saturn	0.0434	-0.08
Jupiter	0.0009	-0.515
Uranus	0.00007	-0.782
Neptune	0.000028	-0.882
Pluto	0.000435	-0.879

Perfect prediction was not expected because there are other physical factors that might affect anomalous precession such as the spin rate of the planet on its axis. In addition, there may be errors in using relativistic precession values. I'll come back to this point shortly.

I find it absolutely amazing that the predicted values for anomalous precession calculated in the regression analysis are so close to the relativistic values calculated using Einstein's equation. I say this because Einstein used the velocity of light as one part of his equation, while I approached the problem in an entirely different manner using nothing but physical parameters concerning the satellite and its orbit.

Apparently, the large outer planets, Jupiter, Uranus, and Neptune, show little or no observable anomalous precession, which likely explains why I have not been able to find their observable precession on the Internet. The same applies to Pluto. Saturn, on the other hand, may actually have a small negative precession as discussed below.

Observed anomalous precession

From a recent search on the Internet, I was able to find the degree of anomalous precession for four planets and one asteroid. I have placed these in the table below along with the relativistic values calculated using Einstein's equation.

Iorio (2009) arXiv;0811.0756 reported a negative anomalous precession value for Saturn, which does not fit relativistic expectations. Scientists are leaning towards the idea that a yet to be discovered planet affects the calculation for the precession of this planet, but since then I have seen another study that suggests the planet does not have a negative anomalous precession.

Table: Anomalous precession values

Planet or asteroid	Anomalous precession observed Arc sec. per 100 years	Einstein's relativistic precession. Arc. Sec. per 100 y
Mercury	43.1	42.94
Venus	8.4	8.62
Earth	5.0	3.83
Saturn	-0.006?	0.04
Icarus (asteroid)	9.8	10.05

J. J. Gilvarry (1953) published the anomalous precession values for Icarus, but the value for Icarus is difficult to predict by my theory because it is not spherical. However, if you run a regression analysis using the other three observed anomalous precession values and the ratio of gravitons/momentum, you get the following results.

Planet	Observed Anomalous Precession Arc sec. per 100 years	Ratio of gravitons connecting with satellite / momentum
Mercury	43.1	2.16×10^{32}
Venus	8.4	1.175×10^{31}
Earth	5.0	4.818×10^{30}

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.998659
R Square	0.997321
Adjusted R Square	0.994642
Standard Error	1.5434

Observations	3

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	886.71	886.70	372.24	0.032967
Residual	1	2.38	2.38		
Total	2	889.09			

	Coefficients	Standard Error	t Stat	P-value
Intercept	5.226	1.136	4.60	0.136
X Var	1.76×10^{-31}	9.11×10^{-33}	19.29	0.033

	observed	predicted
	precession	precession
Mercury	43.1	43.136
Venus	8.4	7.291
Earth	5	6.073

I dislike having so few examples, but this regression analysis shows a 99 percent correlation between observed anomalous precession and the ratio obtained by dividing gravitons striking the planet by the planet's orbital angular momentum. An equally high correlation exists between observed precession and the degree change per meter at perihelion.

These findings are supported by my studies that show a 99 percent correlation between the tilt of a planet on its axis and its distance from the Sun, and it explains the annual polar wobble of Earth on its axis as covered in the next chapter. These studies provide strong evidence for the role of repulsion forces created by the graviton matrix in anomalous precession, planet tilt, and polar wobble.

If Einstein's equation is not entangled with relativity calculations, it simple means that the velocity of light is not involved, and the equation is reduced to the following with just one constant:

$$\text{radians per orbit} = \frac{8.26 \times 10^{-15} \ (\text{semi major axis})^2}{(\text{orbital length in seconds})^2 \ 1 - e^2}$$

I believe we should be more critical of this equation. It is far from perfect with respect to known anomalous precession; for example, it misses the value for Earth by 30 percent. In addition, astrophysicists have made extensive studies of perihelion precession of eccentric eclipsing binary stars. The anomalous precession observed in the four systems I discuss in Chapter 42 do not agree with Einstein's equations for precession. The authors view this as a serious problem for general relativity.

A few important points as a way of summation.

Repulsion of orbiting satellites at perihelion is created for two reasons. First, the graviton matrix is denser at perihelion because the satellite is closer to the Sun. Secondly, the angle change per meter traveled will increase at perihelion, which means repulsion forces per graviton will increase. There is a 90 percent correlation between angle change per meter traveled and anomalous precession. There is a 96 percent correlation between precession and the number of gravitons striking the satellite divided by its orbital angular momentum. And when you combine these two independent variables in one regression analysis, there is a 99 percent correlation with satellite precession.

The evidence for repulsion forces acting on satellites in orbit is strong, in fact, almost overwhelming. How else can you explain a 99 percent correlation between satellite anomalous precession and those physical factors believed to cause repulsion. How else can you explain a 99 percent correlation between planet tilt and distance from Sun, and finally, how else do you explain why Earth's polar wobble on axis is related to its distance from the Sun at perihelion and aphelion.

Conclusions

Because the force of repulsion created by the graviton matrix increases more than the force of attraction at perihelion, the satellite is pushed away from the Sun a tad; this advances the perihelion point. The opposite occurs at aphelion because the force of repulsion decreases faster than the force of attraction as the distance between objects increases. This allows the force of attraction to pull the planet in slightly more than expected at aphelion, which also changes the elliptical orbit. This completely explains anomalous precession and Coleman's equation for Mercury: ($F = G\ m_1m_2/d^{2.00000016}$).

These conclusions are strongly supported by regression analysis.

The analysis of Mercury's anomalous precession by regression analysis provides strong evidence that supports the concept of the graviton matrix.

Of course, it also provides a reasonable solution to anomalous precession that does not require a four-dimensional world.

Chapter 17: Planet tilt and wobble on axis

In addition to Mercury's changing orbital pattern, planet tilt and the annual polar wobble of Earth on its axis can be explained by the interaction between repulsion forces created by the graviton matrix and the gravitational force of attraction.

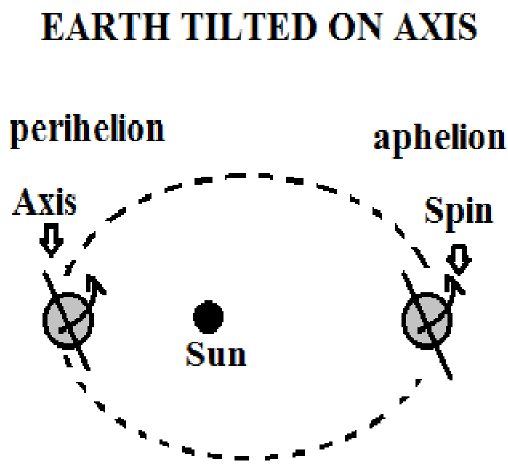
Although the planets in our solar system tend to spin on their axes much like tops spinning on a table, most of the planets are tilted, meaning their axes are not vertical with respect to the plane of the table. In fact, all the planets are tilted somewhat except for Mercury, and each planet has its own unique degree of tilt as shown in the table below.

The forces that determine the degree of tilt must be complex; however, the question arose, are repulsion and attraction forces important factors in determining tilt?

Table: Axis tilt

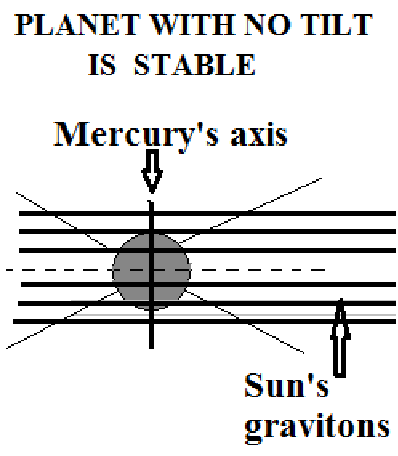
	Degree of Tilt
Mercury	0
Venus	177.36 or 2.64
Earth	23.45
Mars	25.19
Jupiter	3.13
Saturn	25.33
Uranus	97.86 or 7.86
Neptune	28.31
Pluto	122.52 or 57.48

When Earth is closest to the Sun, its Northern Hemisphere is pointed away from the Sun, and when it is farthest from the Sun, the Northern Hemisphere is pointed towards the Sun as shown in the next illustration. This is the same situation for three other planets: Mars, Saturn, and Neptune. In contrast, Pluto has a 57.48-degree tilt in the opposite direction.



Planets with Little or No Tilt are Stable

Mercury has no tilt on its axis, and a planet with no tilt is very stable because repulsion forces and attraction forces are in balance with respect to the axis of the planet.



Besides Mercury, there are three other planets that have a very low degree of tilt: Jupiter, Uranus, and Venus. I will discuss each of these later in this Chapter.

Planets with a pronounced tilt on axes

When the axis of a planet is tilted approximately 23 to 57 degrees, it also results in a stable orientation; in fact, this is the most common situation in our solar system. The evidence I will present shows that tilt is influenced by the shape of the planet, distance from the Sun, and the nature of the gravitational and repulsion forces acting on the planet along its axis.

Equatorial Diameter versus Polar Diameter

Although the gravitational force attempts to maintain planets as perfect orbs, the spin of a planet on its axis tends to force the planet to bulge at the equator. For this reason, most planets have a larger equatorial diameter than polar diameter, and most planets are tilted on their axes. These parameters along with degree of tilt are shown in the following table.

Table: Axis tilt as it relates to diameters and radius of orbit

Planet	Equatorial Diameter in km	Polar Diameter in km	Orbit radius in km	Degree of Tilt
Mercury	4879.4	4879.4	57,910,000	0
Venus	12104	12104	108,200,000	2.64
Earth	12756.3	12712	149,597,870	23.45
Mars	6794.4	6759	227,940,000	25.19
Jupiter	142984	133717	778,330,000	3.13
Saturn	120536	107566	1,429,400,000	25.33
Uranus	51118	49584	2,870,990,000	7.86
Neptune	49572	48283	4,504,300,000	28.31
Pluto	2320	?	34,739,583,333	57.48

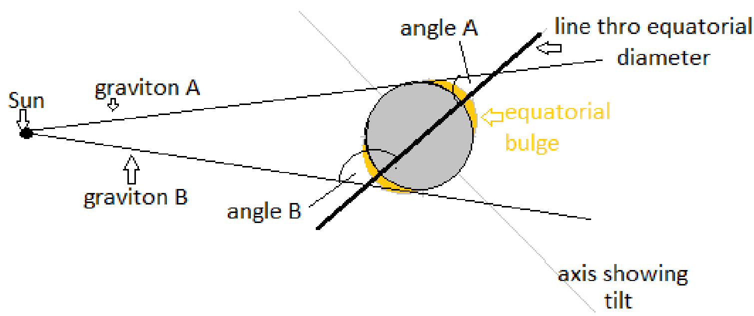
The equatorial diameter is the same as the polar diameter for Mercury and Venus, and they both have a very low degree of tilt. Jupiter and Uranus appear to be exceptions; however, as discussed, a planet with a low degree of tilt is stable. In addition, the axis of Uranus is pointed towards the Sun, which means the dynamics between planet and Sun is different than for the other planets. As mentioned, scientists believe the orientation of Uranus was induced by some cataclysmic event. I could find no data on the equatorial diameter of Pluto versus its polar diameter. As we shall see, however, Pluto’s degree of tilt strongly suggests at least a minor difference.

Recently NASA received images from New Horizon, their spacecraft that just flew by Pluto. Although the planet appears to have little or no equatorial bulge, it does have huge mountains that are 11000 feet high and 10s of miles wide. Perhaps these mountains are sufficient to act as an equatorial bulge. The jury is still out on this question.

The reason why I believe a larger equatorial diameter versus polar diameter is important to tilt relates to a planet's orientation in space as it rounds perihelion and aphelion. The equatorial bulge of a planet is directed 90 degrees to the axis of the planet. Because the axis of Earth leans in towards the Sun at aphelion and away during perihelion, the equatorial bulge is not directed towards the Sun as it rounds these two points. The unique orientation of the bulge allows the gravitons to grab the planet in a unique manner. It causes the forces of repulsion and attraction to form a gradient along the axis of the planet. Let's see how the gravitational force is influenced by the equatorial bulge.

Gravitational Force Favors Tilt

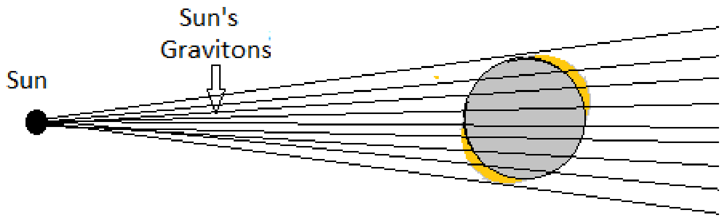
The following figure is an illustration of Earth as it rounds aphelion.



Graviton A form the Sun, in the illustration, grazes the top portion of the planet and graviton B grazes the lower portion of the planet. Because of the unique orientation of the planet at aphelion, graviton A pulling through the upper portion of the planet is pulling at a more acute angle than graviton B pulling through the lower portion of the planet. This causes gravitons retracting through the top to increase tilt. This relationship is also true as the planet rounds perihelion. The gravitational force of attraction favors tilt if the planet has an equatorial bulge and if it has tilt. Notice that the gravitational force creates a gradient along the axis going from a position on the planet where it inhibits tilt (at bottom) to a position where it favors tilt (top portion). However, more of the gradient is in favor of tilt.

The graviton barrier presented by the Sun favors no tilt

As illustrated in the following figure, the repulsion forces acting on a tilted body are just the reverse of the gravitational force.



The matrix of gravitons in front of the rotating planet will attempt to orient the leading edge of the equatorial bulge until it is aligned with least resistance to the Sun's gravitons. This causes tilt to decrease.

The retracting gravitons at aphelion and perihelion work to increase tilt, and the physical presence of the Sun's gravitons that form a barrier work to decrease tilt. The farther the planet is away from the Sun the greater the degree of tilt primarily because repulsion forces per graviton decrease more rapidly than the force of attraction with distance. This suggested to me that tilt should be correlated with distance from the Sun. This relationship was analyzed statistically using a regression analysis. The question ask was this: Is the degree of tilt correlated with the distance between planet and Sun as predicted by VES theory.

Several planets were excluded from the analysis. Mercury and Venus were omitted because their equatorial diameters and polar diameters are the same. Mercury has no tilt and Venus is tilted only slightly on its axis. In addition, Venus has a retrograde spin. Jupiter was excluded because of its low degree of tilt even though its equatorial diameter is larger than its polar diameter. A low degree of tilt is stable. It is entirely possible that Jupiter would come to equilibrium with a tilt approaching 25 degrees if some cataclysmic event jostled the planet out of its present day position. Uranus was excluded because its axis points towards the Sun, which makes the repulsion forces entirely different for this planet. In addition, Uranus has a low degree of tilt and is therefore relatively stable in its current position. The five remaining planets have a tilt of 23 to 57 degrees. This includes Pluto (asteroid), which has a tilt of 57.48 degrees in the opposite direction to that of Earth. Recently, it has been shown that Pluto has an extensive mountain range that might serve to induce tilt.

I tested the concepts developed above with regression analysis. It was predicted that planet tilt would be correlated with the distance the planet is from the sun.

REGRESSION ANALYSIS

Title to study: Planet tilt and wobble on axis determined by the distance the planet is from the Sun

Abstract:

From my study of planet tilt, I predicted that the degree of planet tilt at perihelion and aphelion is dependent upon the planet's equatorial bulge and the interaction of repulsion forces and the gravitational force of attraction between planet and Sun.

My analysis predicts that repulsion forces favor no tilt while the force of attraction between planet and sun favors tilt. Some planets were eliminated from this analysis because of the reasons explained in the text. Because repulsion forces acting on a planet decrease faster than the gravitational force of attraction, it was predicted that the degree of tilt would increase with distance between planet and sun. For Earth, Mars, Saturn, Neptune, and Pluto (asteroid), there is virtually a 100 percent correlation between degree of planet tilt and distance from the Sun. This analysis suggested an annual, actually semiannual, polar wobble of Earth on its axis that the author was not aware of at the time. It was an exciting moment for me to discover this prediction was true.

REGRESSION DATA

The variables used in this regression analysis are shown in the following table.

Table: Values used for regression analysis

	Independent variable	Dependent variable
Planet	Distance from Sun, km	Actual tilt in degrees
Earth	149,597,810	23.45
Mars	227,940,000	25.19
Saturn	1,429,400,000	25.33
Neptune	4,504,300,000	28.31
Pluto	34,739,583,333	57.48

REGRESSION ANALYSIS

Summary Output					
Regression Statistics					
R value			0.9991436		
Adj. R squared			0.9977172		
Standard Error			0.6869096		
Observations			5		
ANOVA	df	SS	MS	F	Significance F
Regression	1	825.4	825.3	1749	3.01×10^{-5}
Residual	3	1.41	0.472		
Total	4	826.8			

	Coefficient	Standard Error	t stat	P-value
Intercept	24.06	0.3606	66.7	0.0000074
Independent	9.6×10^{-10}	2.2997	41.8	0.0000301

The adjusted R squared is 0.997. It is an unbiased estimate of the very high correlation between tilt and distance from Sun. The significant point for F is extremely small, which tells us the strong correlation found is not due to chance. This means we can reject the null hypothesis of no relationship between tilt and distance. In fact, we can be almost certain that the degree of tilt for these planets is determined primarily by factors that vary with the distance between planet and Sun. This is also borne out by the t tests, as shown in the regression statistics. The P values are all very small.

The values of tilt predicted by the regression analysis are compared to actual tilt in the next table.

Table: Predicted tit versus actual tilt

Planet	Distance from Sun, km	Actual tilt in degrees	Predicted degree of tilt
Earth	149,597,810	23.45	24.26
Mars	227,940,000	25.19	24.34
Saturn	1,429,400,000	25.33	25.35
Neptune	4,504,300,000	28.31	28.32
Pluto	34,739,583,333	57.48	57.47

This analysis strongly supports the idea that distance between planet and Sun is very important in determining degree of tilt. It seems likely that the difference between predicted and observed for the Earth is due to the influence of the Moon, as long thought by scientists. This might also explain the less than perfect predicted difference for Mars because the regression analysis attempts to find the line that best fits the data. For the other three planets, predicted values are almost identical to actual values.

The ratio between polar diameter and equatorial diameter is poorly related to tilt. Even a small difference might be sufficient to maintain tilt. Perhaps even the mountains just discovered on Pluto suffice to maintain tilt.

Conclusions

The equatorial bulge of a planet allows repulsion forces and attraction forces to form a unique equilibrium along its axis. Attraction forces favor tilt and repulsion forces favor no tilt. Because the repulsion forces decrease with distance faster than the force of attraction, tilt increases with distance. The correlation between tilt and distance is very high ($R = 0.9991$).

While analyzing tilt, I realized that if my theory were correct there should be an annual polar wobble of Earth's axis. A review of the literature on the Internet found this to be true. This was an exciting day for me.

Annual Polar Wobble of Earth's Axis

Earth wobbles as it spins on its axis. This is like the tendency of a child's top to wobble as it spins on a floor. The annual polar wobble of Earth's axis occurs because the tilt of the axis changes as it rotates around the Sun.

Wilson and Haubrich (1976) attempted to explain the Earth's annual polar wobble as "seasonal variations in the oceans and atmosphere that force the Earth's annual wobble." However, Chao (1983) depicts it as "rather stationary over the years both in amplitude and in phase." This finding is significant because it suggests weather patterns are not responsible for the wobble. Markov and Sinitsyn (2002) published a paper in which they conclude that "the annual wobbles of Earth's axis are induced by the solar gravitational moment, by the orbital motion of the rotating Earth, and by the diurnal tides of the Earth's mantle." VES theory predicts it is due to an elliptical orbit that changes the relationship between the repulsion forces and attraction force acting on the planet.

I have already discussed how repulsion and attraction forces between planet and Sun influence the degree of tilt. The evidence clearly shows that the degree of tilt increases with distance from Sun.

At perihelion, where the force of repulsion is greatest with respect to gravitation, tilt will decrease slightly, and the planet will leave this area slightly more erect. At aphelion, where the gravitational force of attraction is now greater with respect to the repulsion forces, tilt will increase. The net result is an annual wobble (actually semiannual) in Earth's axis. Markov and Sinitsyn (2002) report that the wobble is 0.07 to 0.08 arc seconds.

VES Theory and Our Solar System

Few observations in our solar system make sense unless gravitons are composed of matter, make physical connections between bodies, and create physical barriers to onrushing satellites. Only then is it possible to understand how gravitons couple spin velocity to orbital velocity. Only then can we see how gravitons transfer angular momentum between satellite and central body. Only then can we appreciate how gravitons, by virtue of the repulsion forces they generate and the unique connections they make between planet and Sun, cause anomalous precession of Mercury's orbit, planet tilt, and polar wobble of Earth on its axis. There is a reverse side to this coin: Common observations in our Solar System provide strong, eloquent testimony to the correctness of VES theory. They provide strong evidence that gravitons are composed of matter and are present in space in vast quantities.

> Note, this study is yet another source of evidence that gravitons are composed of matter and are present in space in vast concentrations.

Chapter 18: Let reason prevail without passion.

According to Aristotle, the laws we live by should be created and interpreted free of passion. In other words, our laws should not be influenced by personal desire or prejudice. Of course, this also applies to modern science—hypotheses and theories should be based on careful observation and rigorous experimentation—free of passion and personal prejudice.

Socrates, who died in 399 BC, 15 years before Aristotle was born, is given credit for the Socratic method—a method of eliminating false hypotheses by steadily identifying and eliminating those that lead to contradictions. Once again, we do this in science by careful experimentation and observation.

The natural forces of nature—gravity, electricity, magnetism, and the nuclear forces—have remained a mystery for thousands of years. Even now the fundamental mechanism by which they create a force of attraction between two objects remains a mystery. In the same manner, there is no hypothesis that can explain how electricity and magnetism can create repulsion forces between two objects.

My experiments detailed in the previous sixteen chapters allows us to use the Socratic method and eliminate those hypotheses that do not recognize that forcefields are composed of matter and have strong elastic properties. Of course, we can only apply the Socratic method if we follow Aristotle's advice and view the evidence with free of passion—free of personal desires and prejudice.

In the previous 17 chapters, I discussed numerous observations and experiments that plainly demonstrate that forcefields are composed of matter and have strong elastic properties. These two attributes of forcefields are of paramount importance, not necessarily because they are predicted by VES theory, but because if true they force us to abandon conventional wisdom for the forces of nature along with Einstein's theories of relativity. They force us to seek a new theory based on these two properties, and they force us to look for new answers to those observations that heretofore can only be explained by relativity.

There is a third element to this discussion that should not be ignored. If all forcefields are composed of matter with strong elastic properties, it tells us that electricity, magnetism, gravity, and the nuclear forces have much in common. The forces of attraction they exhibit must spring from their elastic properties, and their elastic properties must spring from the fact they are composed of matter. Let me take a moment and briefly review the evidence—after all, if true, they force us to rethink the forces of nature and relativity.

Do forcefields have perfect elasticity just like the atoms they spring from?

Nuclear physicists essentially settled this question when they studied the forces holding quarks together. They named the entity responsible for the force of attraction between quarks gluons. Gluons are responsible for the strong nuclear force that prevents atoms from being blow apart by electric repulsion forces arising from inside the atom. These scientists demonstrated that the potential energy stored in a gluon increases the further they are stretched. They behave as though they are elastic strings.

Perhaps you as a naysayer don't even believe in quarks and the work of nuclear physicists, or you don't believe the strong nuclear forcefield has any bearing on the other forces of nature. As a naysayer you easily ignore gluons and nuclear physicists. Denial is strong, it entraps us all. Rubber bands are a little different—they can't be denied.

What allows a rubber band to snap back into its original shape when stretched between your two hands? Ah, the naysayer says, the atoms in a rubber band become realigned when the band is stretched, then simple return to their original positions when the rubber is released. True, but what drives this realignment. There must be some structure in the rubber band that stores potential energy when stretched. We know this is true because the rubber band is capable of doing work when stretched and released. Even a naysayer must admit that a source of energy is needed for the stretched rubber band to retract back into its original shape—retraction requires a source of energy.

The question is where is the potential energy stored when the rubber band is stretched? If you ponder this for a moment, you are led to the conclusion that the potential energy necessary to retract the band must be stored in the electric bonds holding the atoms together—there is no other rational, easy answer. How do you, a naysayer, explain rubber bands if you ignore the electric bonds that hold atoms together? Electric bonds must have elastic properties.

Scientists tell us the movement of waves along a rope is due to the rope's elastic properties as explained by Halliday and Resnick in their famous textbook. Sound reasoning tells us this elastic property exhibited by waves resides in the electric bonds that hold atoms together. Doesn't this tell us electric bonds have elastic properties? We are almost forced to believe that a moving transverse wave owes its properties to the electric bonds that stretch and store potential energy.

Notice, gluons and the electric forces can only create a force of attraction if they remain attached to the atoms that create them. This is an important consideration to remember because electricity, magnetism, gravity and the nuclear forces all create a force of attraction between particles. They are all dependent upon bonds that stretch and thereby store potential energy that drives the force of attraction. This is also true for the gravitational force of attraction.

It has been known for many decades that the fast-moving stars in the outer boundaries of the Milky Way Galaxy are traveling too fast to remain in orbit according to the universal law of gravitation. Scientists attempt to explain this by assuming that most of the matter in the universe is in a form that cannot be detected by any known means, including telescopes, x-rays, etc. For this reason, they call it dark matter, and dark matter would have to make up a large percent of our universe to explain the increase in gravity needed to keep fast-moving stars in orbit.

If gravitons are like electricity and the strong nuclear force, all that is needed is for the potential energy of the graviton to double when stretched across a galaxy; yet this increase in the gravitational force of attraction is too small to be noticed in our tiny solar system. The elasticity of gravitons also explains why the stars past 2.9×10^{20} meters from the center of the Milky Way Galaxy travel at the same velocity and yet remain in different orbits (Chapter 4). By the way, the search for dark matter has been relentless and fruitless for almost 90 years.

Gluons have elastic properties, electric bonds have elastic properties, and the evidence tells us gravitons have elastic properties just like the atoms they spring from that have perfect elasticity. If the forces of nature have elastic properties, we can easily conclude they have mass. In fact, elastic properties and matter go hand in hand; however, we don’t have to merely assume this is true because there is a great deal of evidence to show us forcefields are composed of matter. Let’s review this data briefly.

Evidence force fields have mass

In Chapter 6, I discuss the strong evidence physicists have accumulated that demonstrates electrons are deflected by magnetic fields; yet the magnetic fields supply no energy to the deflected electron. No one can deny this well-established observation. It is far easier to explain how a magnetic field deflects electrons if they are composed of matter.

In Chapter 7, I discuss the evidence that Earth's magnetic field creates a physical shield surrounding Earth that deflects incoming electrons and protons that make up the solar wind. This is supported by the observation that much of Earth's magnetic field is blasted to the far side of Earth by the solar wind. In both cases, it speaks to the evidence that magnetic fields are composed of matter.

In Chapter 8, I report my experiments that demonstrate table tennis balls curve more when shot though a magnetic field. The little plastic balls are not attracted to the north or south poles of a magnet, yet the little spinning balls curve more when they strike a magnetic field. One can easily conclude that magnetic forcefields are composed of matter. What other rational explanation is there? The little plastic balls have no magnetic attraction to either pole of the magnet.

The observations with magnetic forcefields is supported by numerous experiments that deal with gravitons and what I call the graviton matrix—a term that denotes the vast number of gravitons in space that arrive here from objects in our solar system and from the 30 or more galaxies that make up our Local Group of galaxies as explained in Chapter 2.

The concept of the graviton matrix suggests spinning balls in flight might react to a dense concentration of gravitons in space. In Chapter 9, I report my experiments wherein I measured curvature of table tennis balls in flight at four different altitudes beginning in Death Valley and ending at Kolob Mountain in Utah. I discovered that air concentration decreases faster than curvature of spinning table tennis balls in flight. Conclusion: Spinning table tennis balls in flight are induced to curve because of the graviton matrix as well as by air molecules.

In Chapter 10, I explored this concept even further. I demonstrated spinning table tennis balls continue to curve even inside a chamber under a high vacuum. Conclusion: Spinning table tennis balls are induced to curve by the graviton matrix even without the presence of air molecules. Gravitons are composed of matter. Table tennis balls are induced to curve to the right with clockwise spin and to the left with counterclockwise spin. This mimics the curvature of table tennis balls shot through a magnetic field as explained in Chapter 8.

In Chapter 11, I presented my experiments that compare AM radio photons traveling due north versus those going due west. I demonstrated that AM radio photons traveling north are pushed westward while those going due west travel in a straight line. Conclusion: Graviton virtual particles and graviton waves become oriented in a more westerly direction as Earth spins east on its axis, and for this reason, they push AM radio photons traveling north to the west, but they have no effect on AM photons traveling west. FM radio photons were unaffected for reasons explained in the text. This also explains the C. Hafele and R. Keating (1971) experiment that demonstrated atomic clocks traveling east tick slower than atomic clocks flying west. Conclusion: gravitons and their waves have mass.

If there exists a graviton matrix as described in Chapter 2, I concluded that ultra-light weight objects would fall shower than expected in a vacuum. I report my experiments on this subject in Chapter 12. I demonstrated ultra-lightweight tuffs of after-feathers and acrylic fibers fall far slower in a near total vacuum than an object weighing 2.2 grams. And as expected, the acrylic fibers fell slower than tuffs of after feathers. In fact, the evidence suggests the graviton matrix slows down the fall of acrylic fibers to a greater extent than air molecules. Conclusion: The graviton matrix forms a barrier to the fall of acrylic fibers and tuffs of afterfeathers in a vacuum, perhaps augmented by a dense concentration of gravitons and their waves emanating from Earth. Conclusion: Gravitons and their waves have mass and are present in space in vast numbers—the graviton matrix is not a figment of our imaginations.

In Chapter 13, I explain my experiments that deal with gyroscopes. These experiments show how earth's gravitons interact with a spinning wheel to convert the wheel's angular momentum into lift and precession. If you observe a spinning wheel closely, you will observe the strongest lift and precession occurs when the wheel is oriented directly to the center of Earth where the gravity is greatest. This suggests Earth's gravitons are involved in creating gyroscopes.

My physical experiments and observations are not the only evidence that forcefields are composed of matter. My studies presented in chapter 14 through 16 are based on regression analysis using data found in the literature for our solar system, and for this reason can easily be verified.

In Chapter 14, I used regression analysis to show that factors predicted by the graviton matrix have a 98 percent correlation with the spin of satellites in our solar system, including the moons, planets, and the sun. This study provides a rational explanation for the spin rate of satellites including Venus's slow spin rate, which has mystified scientists for centuries. Conclusion: Gravitons have mass; gravitons are long strings that remain connected to their sources.

In Chapter 15, I explained how virtual elastic strings composed of matter are responsible for satellite migration between central body and satellite. It does so equally well in those systems that have no tidal waves to invoke a change in momentum.

In Chapter 16, I present my study on Mercury's strange orbit and anomalous precession. Regression analysis demonstrates a 98 percent correlation exists between anomalous precession in our solar system and those independent variables dictated by the graviton matrix. This study provides a rational explanation for anomalous precession—gravitons have mass.

In Chapter 17, I used regression analysis to show that planet tilt has a 99 percent correlation with distance from the Sun that can be explained by the properties of the graviton matrix and the orientation of satellites in orbit. From this I predicted the semiannual wobble of Earth on its axis, which proved to be true. Once more the strong correlation shown in this study is only possible if gravitons have mass.

As you will discover in the chapters that follow, there is a great deal more evidence that virtual particles and virtual elastic strings are composed of matter. For example, scientists have a technique that physically demonstrates electric forcefields in action as they push bits of thread in an oil bath. The manner in which the force fields push the bits of thread suggests electric force fields are composed of matter with strong elastic properties. This is discussed in Chapter 20. The same type of experiment has been carried out for magnetic forcefields and with the same results. This is discussed in Chapter 21.

In Chapter 20, I present my model for the repulsion forces between electrons. This model is based on the idea virtual particles have momentum, and it is the momentum of these particles that push electrons apart. It easily explains why repulsion forces and attraction forces can be calculated using the same equation. The same is true for magnetic repulsion forces that I examine in Chapter 21.

VES theory states that virtual elastic strings are composed of matter and have strong elastic properties. This fundamental tenet forms the backbone of virtual elastic string theory, yet no doubt there will be those who deny that forcefields are composed of matter and have strong elastic properties because all humans exist in some state of denial. It is a characteristic of the human mind that is difficult to overcome. It likely has a genetic component because it protects our egos and calms our minds. Unfortunately, it allows us to have unhealthy habits but remain serene, and it allows us to have irrational, blind faith in some ideology or idea. We all know denial can be extremely powerful and all-consuming, even to the point of death. I can only hope that scientists follow the admonitions of Aristotle and view the evidence without prejudice and passion.

What does a three-dimensional world tell us?

A three-dimensional world dictates that forcefields are composed of matter. To believe otherwise leaves scientists with a void they have not been able to fill for more than 2000 years.

I have briefly summarized the evidence that forcefields have elastic properties and are composed of matter to emphasize these facts because they are of paramount importance to our understanding of the forces of nature and numerous conundrums that have existed in physics for hundreds of years.

Please note, virtual elastic string theory provides a solution to forcefields, including self-induction of forcefields, and more than 80 other conundrums of physics that have remained elusive for centuries. By the way, it also provides a rational explanation for those observations used to support the concept of relativity.

In the balance of this book, you will find that every subject discussed adds additional evidence and support for the veracity of virtual elastic string theory as well as the underlying premise that forcefields are composed of matter and have strong elastic properties. I invite you to read it with an open mind.

The evidence I have accumulated and discussed in the preceding chapters shows without doubt that the forcefields associated with electricity, magnetism, gravity, and the nuclear forces are composed of matter and have perfect elasticity. just like the parent atoms they spring from. These findings demand a new approach to the forces of nature.

What follows is my interpretation of one such theory that explains the forces of nature and scores of conundrums. Let me know what you think! Please write. kterry@chater.net.

Chapter 19: Basic elements of virtual elastic string theory

The basis of all my thought comes from four ideas. (1) We live in a three-dimensional world, which means weird math is not permitted; (2) All matter is composed of normal atoms and normal subatomic particles like protons, electrons, photons, and quarks, which means that my theory does not require some mysterious substance yet to be discovered; (3) "Action at a distance" as proposed by early mathematicians is impossible without some intervening medium to carry out the action; (4) Forcefields are composed of matter and have strong elastic properties, which means electricity, magnetism, gravity, and the nuclear forces all share the same basic, fundamental property.

Using these restrictions, we are forced to believe that the connecting links that cause a force of attraction between two bodies must be a substance composed of some part of the subatomic particle that created it. In addition, this matter must have strong elastic properties. Only in this manner can connecting links retract and create a force of attraction just like the elastic band you stretch with your fingers. With these thoughts in mind, let's examine the properties of the virtual elastic strings that are basic to my theory.

Basic properties of virtual elastic strings

Virtual elastic strings have two fundamental properties. First, they are composed of matter that has perfect elasticity as discussed in the previous sections of this book. This is not a new concept. In fact, scientists use this attribute of matter to explain why air molecules collide and bound away from each other without loss of energy; atoms are said to have perfect elasticity. Secondly, virtual elastic strings have perfect cohesion. This attribute has its origin in the accepted fact that matter cannot be destroyed. All scientists hold to this fundamental precept. In addition, it must be kept in mind that perfect elasticity gives rise to, in fact demands, perfect cohesion.

Perfect elasticity and perfect cohesion explain how a graviton, the string responsible for the gravitational force, can extend itself across the Milky Way Galaxy and on to the Andromeda Galaxy and remain intact—it does so because it has perfect cohesion. And it retracts back to its source with great velocity because it has perfect elasticity. And if by chance the string becomes bound to the North Star, it will pull this star towards Earth. How easy and wonderful is that?

It is reasonable that perfect elasticity and perfect cohesion stem from the same fundamental property of matter. In fact, we might say, perfect cohesion is the direct result of perfect elasticity.

To believe that forcefields are not composed of matter invites theories that must rely on action at a distance with no intervening physical field or they must suppose that forcefields are composed of something yet to be discovered. In contrast, virtual elastic string theory relies on known tenets of physics, including the properties ascribed to matter. It relishes experimentation, and it can be applied to a host of conundrums found in almost every field of physics. VES theory provides strong testimony that all forcefields share a fundamental property: They are all composed of matter that has perfect elasticity and perfect cohesion just like the parent atoms that create forcefields.

Forcefields

Gravity, magnetism, electricity, and the nuclear forces all create fields composed of virtual elastic strings. They are referred to as forcefields, and each force has its own unique string that is dictated by its size.

My theory is simple; it is direct; it requires no metaphysical event; no hedging and no denial of some observation or experiment; and no force of nature that cannot be explained in a reasonable, rational manner.

Subatomic particles that create the forces of nature

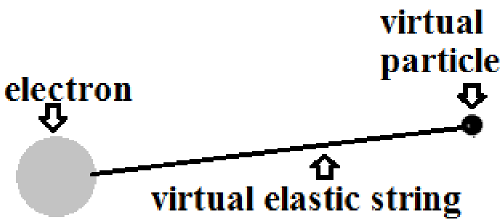
Photons, electrons, and quarks are the three subatomic particles that are known to create the forcefields. I will discuss each particle in detail in the chapters that follow.

Elastic strings have virtual properties

All forcefields are composed of elastic strings that have virtual properties. By this I mean all virtual elastic strings are constantly being made and retracted back to their source. This includes the gravitational forcefield that emanates from Earth. I will have much more to say about this property throughout this book.

Virtual particles

All virtual elastic strings begin as virtual particles that are ejected from photons, electrons, and quarks with great velocity.



Because a virtual particle remains attached to its source, a virtual elastic string is created in its wake as the virtual particle careens through space. The virtual particle is traveling at immense velocity. It is composed of matter, and it has momentum, which means it pulls on the elastic string and stretches it out through space. The farther the virtual particle travels the greater the stress on the string and the greater the potential energy stored in the string.

Virtual particles

A virtual particle is ejected into space with great velocity. Because it remains attached to its source, a virtual elastic string develops in its wake.

The virtual particle has mass and momentum, which causes it to pull and stretch the string. In this manner, the string develops potential energy that allows it to retract back to its source, and when connected to some object, it allows the string to do work.

Force of attraction

All forcefields behave much like a common rubber band. When you stretch a rubber band, it stores potential energy, and this allows it to retract back to its original shape. Moreover, when stretched and attached to two objects, a rubber band can pull the objects together. Viola, now we have a force of attraction. This is precisely how virtual elastic strings create the force of attraction that is responsible for gravity, electricity, magnetism, and the nuclear forces. Each forcefield has its own unique elastic strings that depends only upon its size. What we are witnessing in the case of the rubber band is the electric forcefields in action. When the rubber band is stretched, it stores potential energy in the stretched elastic strings and this energy can be used to perform work.

Perhaps you are thinking: ‘Okay, but what about repulsion forces between electrons?’ Fortunately, for VES theory, there is a simple, rational explanation that you will find pleasing, and it will be easy to explain after I discuss electricity.

VES theory is based on hundreds of scientific observations and experiments from many different sources. I used every fact that I became aware of that dealt with the forces of nature and related topics to weave a consistent all-encompassing picture. In addition, I personally carried out many experiments as previously reported in this book. I am pleased to announce that every experiment, and every fact I uncovered added to and strengthened virtual elastic string theory.

This book reminds me of a giant gig saw puzzle where every piece has its place and every piece adds to the whole composition; however, there is one important exception. In my book, one piece of the puzzle had to fit in and add to more than one subject, often many subjects, which makes my book much more complex than a simple gig saw puzzle. To enjoy and appreciate my theories, you must read the whole book because only then can you see and appreciate how the facts intermesh and strengthen the whole.

I will begin this discussion by examining electric forcefields.

Chapter 20: VES Theory and the electric forces

It wasn't until I began to explore the electric and magnetic forces that I discovered that Michael Faraday (1791-1867) believed these forces could be explained if the fields pushed and pulled each other to create the electric forces of repulsion and attraction. This man was a brilliant experimental scientist who made numerous contributions to chemistry and physics during the 19th century. He is given a great deal of credit by one of our greatest scientists, James Maxwell (1873, page ix). According to Maxwell "Faraday saw lines of force traversing all space where the mathematicians saw centres of force attracting at a distance: Faraday saw a medium where they saw nothing but distance: Faraday sought the seat of the phenomena in real actions going on in the medium, they were satisfied that they had found it in a power of action at a distance impressed on the electric fluids.". Maxwell "…found that several of the most fertile methods of research discovered by mathematicians could be expressed much better in terms of ideas derived from Faraday than in their original form."

I was pleased to discover that Michael Faraday with his great knowledge of electricity and magnetism had reconciled in his mind that the electric forces and magnetic forces could be explained if forcefields have physical properties that enabled them to push and pull to create the forces of electricity and magnetism. I was also pleased to find that Maxwell had high praise for Faraday's research and ideas particularly with regard to the concept of forcefields developed by Faraday.

I will begin my discussion of electricity by examining its dual nature. There is a force of attraction between positively charged protons and negatively charged electrons, but there is also a force of repulsion when two electrons come in close proximity or when two positively charged protons oppose each other. Let's first see how VES theory explains the electric force of attraction.

Since electric forcefields come in two forms, positive and negative, there must be two kinds of elons. I refer to them as n-elon for the negative forcefield and p-elon for the positive forcefield. When these two strings bond and retract, they cause a force of attraction between two particles. For this reason, I refer to this pair as **complementary strings**.

Virtual elastic strings that create the electric forcefields.

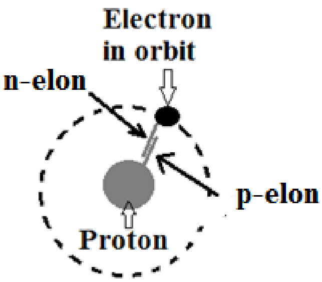
elon: A general term for both electric forcefields
n-elon: Creates negative electric forcefield
p-elon: Creates positive electric forcefield.

The two elons complete a complementary pair.

The electric force of attraction binds electrons to protons within the atom; it is also responsible for electron-proton bonds between atoms that form molecules, compounds, and the objects of our world. By convention, the proton is said to have a positive electric charge and the electron a negative electric charge, and the two charged subatomic particles are attracted to each other. According to VES theory, one unit of negative charge specifies one unit of n-elons, but of unknown number, and one unit of positive charge specifies one unit of p-elons, which is equivalent to one unit of n-elons.

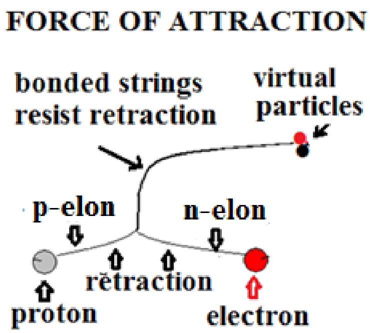
The illustration that follows is a simplistic picture of the hydrogen atom, which illustrates how an electron is held in orbit by an electric force of attraction between the negatively charged electron and the positively charged proton.

HYDROGEN ATOM



VES theory states that the electric force of attraction is due to two different but equal in strength virtual elastic strings. The electron is creating an excess number of negative n-elons that become entangled with an equal number of positive p-elons emanating from the proton. I refer to them collectively as elons.

When the two elastic strings become bonded and then retract back to their sources, they pull the two particles toward each other. I refer to the two interacting strings that cause the force of attraction as complementary strings.



When two complementary strings come together, I believe they become entangled, which creates resistance when they retract back to their respective sources. I discuss this in more detail in Chapter 45 after I have presented some other relevant, background information.

Neutralizing strings

The electron in the hydrogen atom is creating n-elons that become bound to the proton's p-elons. This neutralizes the strings. The two charges are equal, and the hydrogen atom is completely neutralized. This is also true for atoms that are more complex. For example, the sodium atom has 11 protons; the inner first 10 electrons of the sodium atom only allow sufficient positive charge to escape to hold the 11th electron in orbit in the outer shell. When the sodium atom loses this electron, the resulting ion with 11 protons and 10 electrons has a positive charge. When this positive ion combines with a chlorine ion with a negative charge, they form a molecule of sodium chloride, or table salt, that has no net charge.

In addition to electric bonds between electrically charged ions, electric bonds can also form between two neutral atoms or molecules. In this case, the outer electrons of two atoms are shared as valence electrons, and a very strong electric bond (covalent chemical bond) is formed between two elements who share their electrons, and consequently their elons. As we shall see when we examine the strong nuclear force, strong bonds are formed between protons and neutrons even though these nucleons are neutral with respect to the strong nuclear force. In this case, they are sharing their gluons.

Scientists have shown the electric field emanating from quarks is quite complex as discussed in the next section.

Quarks and their electric forcefields

The positive electric field emanating from the proton has its beginning in two types of subatomic particles called quarks. Quarks make up less than 2% of the proton, but they are very important little particles. The up quark is about five times larger than an electron and the down quark is twice the size of the up quark. Neutrons and protons within the nucleus of an atom contain positively charged up quarks and negatively charged down quarks. The proton (uud) has one unit of positive charge because it contains two up quarks, each with 2/3 positive charge (2/3 + 2/3 = 1 1/3 positive charge), and one down quark with 1/3 negative charge. The 1/3 negative charge of the down quark effectively neutralizes the same amount of positive charge leaving the proton with one unit of positive charge. The neutron has one up quark and two down quarks, which makes it electrically neutral. The quarks can have a fraction of a total charge because we are dealing with virtual elastic strings.

Electron charge

Electric charge refers to the magnitude of the forcefield created by electrons and protons (originating from quarks).

> According to VES theory, electric charge refers to the concentration of e-elons emanating from electrons or the concentration of p-elons emanating from protons.

Coulomb's law is used to calculate the force in newtons between two charges:

$$\textbf{force} = \frac{k\, q_1 \times q_2}{d^2}$$

The variable q is called the coulomb; it has a value of 1.6 x 10^{-19} C for one electron or one proton. The product of the two charges is divided by the square of the distance d, between charges. This means the electric force between q_1 and q_2 follows the inverse square law in the same manner as gravity. The constant k converts the force to newtons. It has a value of 9.0 x 10^9 N.m^2/C^2.

The charge of an electron is often pictured by physicists as a cloud that encircles the electron. According to modern quantum theory, the space surrounding an electron is filled with **virtual particles** (the term they use and the one I've been using for several years) that are continually created and then disappear, just as predicted by VES theory

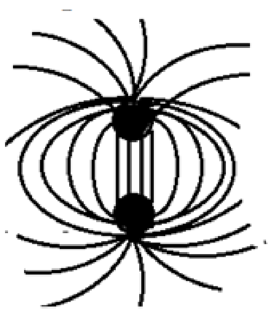
The positive electric field emanating from the proton and the negative electric field emanating from the electron can be viewed directly as explained in the next section.

Viewing electric lines of force

Representations of the electric lines of force can be seen by examining the orientation of bits of thread suspended in an oil bath. Under these conditions, the bits of thread line up along the lines of force between positive and negative poles, as shown in the next illustration.

Electric lines of force

p-elons



n-elons

The impression is that elons going at an angle away from the two electric poles connect, and then when they retract, they force the threads floating in the medium towards the centerline just as you would expect if elons are elastic strings composed of matter. Obviously, the force of retraction is not strong enough to move the threads into complete alignment directly between the two electric poles.

There are two important conclusions that can be made from this experiment. First, it clearly indicates that p-elons from the positive pole are connecting with n-elons from the negative pole. Second, it shows that the retracting elons are able to rearrange and push the bits of thread into the curvatures shown because they are composed of matter and have elastic properties. In fact, this observation provides strong additional evidence that forcefields are composed of matter. How else could the forcefields push the bits of thread into the alignment shown?

The mechanical connection between complementary strings accounts for the resistance created when the individual strings retract back to their sources, which is necessary to create the electric force of attraction. The potential energy in the stretched string comes from the momentum of the virtual particle as emphasized in the next section.

Putting stretch on the string

A virtual elastic string begins as a virtual particle that is ejected from an electron, photon, or quark. The virtual particle remains attached to the particle that created it. This causes an elastic string to develop in its wake as it proceeds through space with great velocity. The farther the virtual particle travels the greater the stretch placed on the string, and the greater the potential energy available to form a force of attraction when it retracts back to its source where it is re-absorbed. For this reason, it is the momentum of the virtual particle that is responsible for the potential energy that develops in the string and the force of attraction when it retracts.

VES THEORY REVIEW

Two different but equal in strength virtual elastic strings cause the electric force of attraction

p-elon: A virtual elastic string generated by a proton that causes a positive electric field (from up quarks).

n-elon: A virtual elastic string generated by either an electron or down quark that causes a negative electric field.

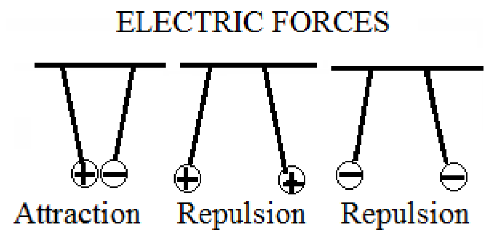
elon: A word used when referring to both p-elons and n-elons.

complementary strings: String pairs that become neutralized when they bond and cause a force of attraction, n-elon and p-elon.

free string: A string not bound to its complementary string.

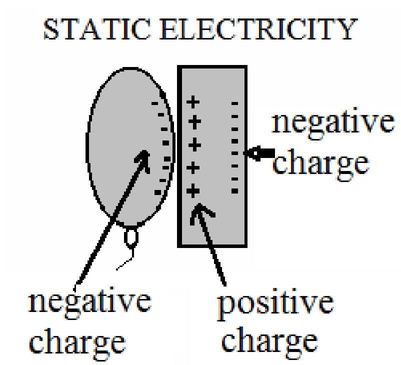
Electric force of repulsion

In addition to the electric force of attraction, there is also a repulsion force between like charges; i.e., electrons repel other electrons and protons repel other protons.



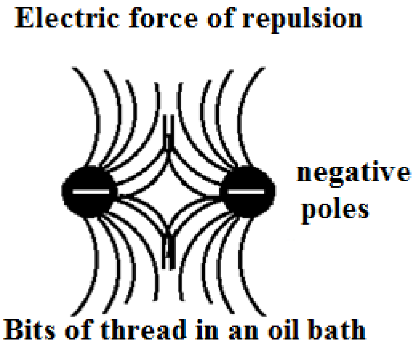
Flowing electrons

An electric charge can be induced in a substance because electrons are often free to move about. This means that electrons can accumulate in excess number in relation to the number of fixed protons, and in this case, the material takes on a negative charge, and the material they move from takes on a positive charge. For example, when a rubber balloon is rubbed against clothing, it strips electrons from the cloth. At this point the balloon has an excess number of electrons and takes on a net negative charge. If this balloon touches the ceiling, it tends to be attracted to it because the balloon's excess number of electrons repulse the electrons near the surface of the wallboard and bind to the free protons near the board's surface.



In contrast, if two balloons with a net negative charge are brought close to each other, a force of repulsion pushes them apart, just as the large negative charge in the balloon forces the electrons in the wallboard away from the surface.

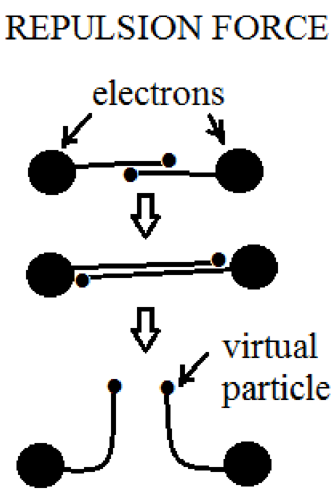
Two electrons repel each other just as two protons repel each other. We can observe the repulsion forcefields by suspending bits of thread in an oil bath in the same manner as used to visualize the electric force of attraction; however, in this case, we use two negative poles. In such experiments, the lines of force seem to be pushing against each other, as shown in the following illustration.



However, just as in the case of the force of attraction, the strongest repulsion would have to occur when strings are directed along the shortest distance between particles. Only in this manner can the force of repulsion follow the inverse square law, and only in this manner can we use the same equation to calculate repulsion and attraction.

VES theory explanation for force of repulsion

The repulsion force between two electrons is created when virtual particles slam into the opposing electrons, which drive the two electrons apart. In this manner, the virtual particles become battering rams.



The virtual particle is traveling at tremendous velocity and it has mass. When the virtual particle crashes into the electron, its momentum pushes the electron away; this causes the force of repulsion, and it causes the virtual particles to ricochet away from the electron as shown above. This model is based on the idea that virtual particles and virtual elastic strings have mass.

The force of repulsion and the force attraction can both be calculated using the same equation because both forces rely on the momentum of the virtual particle. The force of attraction depends on the momentum of the virtual particle to stretch out the string, which dictates the force it can muster when it retracts. The force of repulsion depends on the momentum of the virtual particle to act as a battering ram, which pushes two electrons apart. This explains why the two forces can be calculated using the same equation.

Electric currents

In a wire carrying electric current, electricity seems almost instantaneous. We throw the switch on the light bulb comes to life even though the source of the current may be a great distance away. This is true even though scientists have shown that electrons move through an electric wire rather slowly, about quarter of a millimeter **per second**. The conclusion is some force moves at great velocity through the wire that causes all the electrons up and down the wire to begin moving at approximately the same time when the switch is thrown.

A light bulb creates light when electrons flow through the filament of the bulb where they meet resistance. Under the crowded conditions within the filament, the tungsten atoms heat up and emit photons that we see as light. The question is, what causes the electrons in the filament to move as soon as the switch is thrown

Let’s consider a wire carrying a DC current. At one end, the generator is creating a negative electric current. The other end of the wire is grounded. I believe all electrons in the wire begin moving almost simultaneously for two reasons. First there is a high density of electrons set in motion by the generator. They emit n-elons, which we measure as a negative electric current. The n-elons move through the wire at great velocity, and as they do so, they push other electrons toward ground. This repulsion force causes electrons to move from an area of high density to an area of low density. In the same manner, n-elons reaching ground push electrons away, just as the negatively charged balloon pushes the electrons in the wallboard away. This creates an excess of protons at ground that send p-elons back through the wire as a positive current. This sets up a force of attraction between protons at ground and electrons in the wire. When the virtual elastic strings retract, they pull free electrons in the wire towards the stationary protons at ground, just as the protons in the wallboard pull on the electrons in the balloon. For this reason, two different but related phenomena cause the forward motion of electrons towards ground.

The strength of the electric current is measured by determining the number of electrons flowing past a point in a wire. It is measured in amperes. One ampere is the flow of 6.25×10^{18} electrons per second.

In an AC current, the electric field is constantly reversed. The negative current traveling down the wire is composed of n-elons attached to electrons, and the positive current flowing in the opposite direction is composed of p-elons attached to protons. The pulsating n-elons and p-elons cause the electrons in the wire to move back and forth, which raises the energy of the tungsten atom and it emits light.

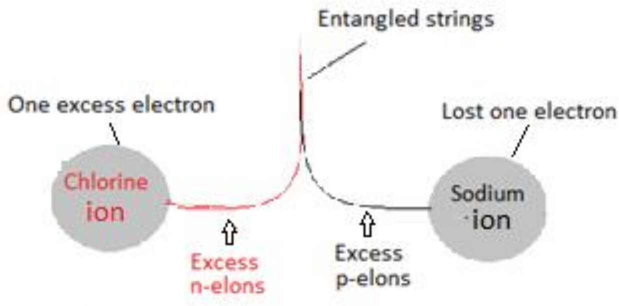
This solves what causes all electrons in a wire to begin moving at the same time, and it solves positive currents, and negative electric currents.

The electric attraction and repulsion forces are attributed to electric charge by physicists without defining how it takes place. In this Chapter, we see that attraction and repulsion are caused by virtual elastic strings and their virtual particles.

Chemical bonds

Chemical bonds between atoms are composed of elons that bond atoms into the molecules and compounds that we see in the world about us. There are two major electric bonds that form between atoms. One is referred to as an ionic chemical bond. This type of bond requires the two atoms involved to have different electric charges. Normally, an atom is neutral because the number of electrons with a negative charge is the same as the number of protons with a positive charge. However, some atoms are capable of gaining or losing an electron, and for this reason carry a net negative or positive charge. They are spoken of as ions.

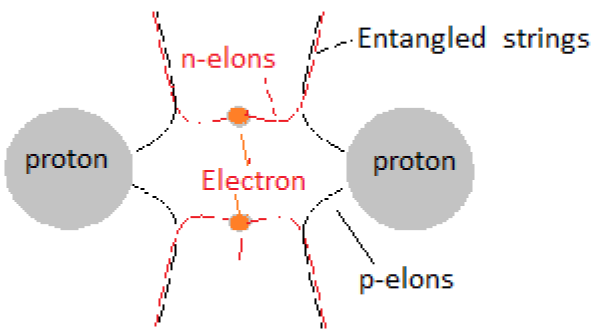
In the example given below, a sodium ion has lost an electron and for this reason has a net positive charge. In contrast, the chlorine ion has gained an additional electron and it carries a net negative charge. These two ions readily bond together to form table salt.



In ionic bonding, the two atoms are sharing elons.

The chlorine ion has 17 protons and 18 electrons and the sodium ion 11 protons and 10 electrons. The additional n-elons created by the chlorine atom are available in equal numbers to the excess p-elons created by the sodium atom (quarks) that is missing one electron. The two atoms are neutralized when they bond to make table salt. It is well to remember there are a vast number of strings making this connection. It is visualized that the two elons bond together as shown, perhaps by entanglement.

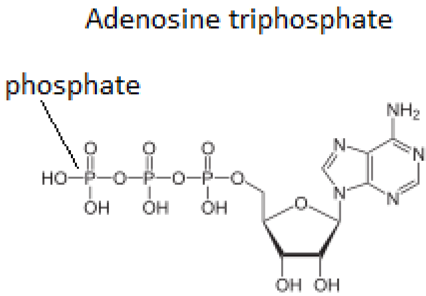
Ionic bonding between atoms is weaker than the covalent bonds between two atoms. Covalent bonds are formed between two atoms who share their electrons, and for this reason there is no need for either atom to have an overall electric charge. A common example occurs when two hydrogen atoms combine to form molecular hydrogen.



Covalent bonds between two hydrogen atoms to make molecular hydrogen

When two atoms share their electrons, we must imagine that a huge number of n-elons bond with an equal number p-elons to form a very strong electrical connections between atoms. It is this form of bonding that is mostly responsible for the molecules and compounds that create the objects in the world around us, including we humans.

A source of energy is often needed to form covalent bonds between two molecules. But once formed, the compounds created are stable. The source of energy for most biochemical reactions in plants and animals is adenosine triphosphate, including those involved with muscle movement.



If you are curious about this compound and its structure, the Internet contains numerous articles on ATP. Suffice it to say here, scientists have shown the energy of the phosphate bonds are frequently used in chemical reactions that need a source of energy.

As you can appreciate, the creation and rupture of covalent bonds is very complex, but it is apparent that the energy associated with these bonds comes from the virtual elastic strings that are stretched and store potential energy.

The source of energy to move our muscles is perhaps the most dramatic use of ATP by our bodies. The use of ATP for muscle movement results in a loss of 40 percent of the energy as heat, which accounts for the heat released during exercise.

The food we eat supplies the energy to regenerate ATP from ADP, and this cycle is so ubiquitous that scientists believe the weight of ATP recycled each day approaches the weight of the human body.

In plants, light from the Sun during photosynthesis is used to convert ADP to ATP, and these high energy bonds furnish the energy needed for plant growth, the stuff we eat, as well as numerous other chemical reactions that require a source of energy. In humans we use the energy of the covalent bonds created by plants to create ATP from ADP.

Velocity of elon virtual particles

The speed of the electric current in the wire is just one reason to believe that virtual particles travel at immense velocity. We can gain some appreciation of their velocity by examining the oscillation frequency of photons and electrons that create them. For example, a gamma photon can create and retract its strings 10^{18} times per second. During one brief cycle, the elons and magnons must be ejected into space and retract back to the gamma photon. Electrons also oscillate at very high frequency. Magnetic fields extend several Earth diameters in space, which means the magnon virtual particles are ejected that distance and return to their source during just one self-induction cycle. This means that virtual particles must travel at speeds approaching 10^{23} meters per second. As it turns out, this is the speed expected for gravitons as well.

Electron particle-wave duality

Electrons are known to be particles with a mass of 9.11 x 10^{-11} kg. However, in 1924, Louis de Broglie suggested that electrons have wave properties in the same manner as photons. The wave nature of electrons has been shown by using refraction and diffraction techniques as discussed in Chapter 27. In 1929, Louis de Broglie received a Nobel Prize in physics for discovering the wave nature of electrons.

According to VES theory, the wave nature of an electron is due to its elastic strings, which are ejected at a 90-degree angle to the electron's flight path, just as it explains the wave nature of photons. The wavelength of an electron has nothing to do with the physical length of the electron. It merely reflects the distance traveled while the electron goes through its self-induction cycle. The frequency of oscillation is entirely explained by the creation and re-absorption of the electron's elastic strings.

$$\text{wavelength} = \frac{\text{velocity}}{\text{frequency}}$$

An electron is always a particle, and its wave properties merely reflect the properties of its elastic strings. I refer you to Chapter 26 that explains refraction, diffraction, reflection, and interference in terms of virtual elastic string theory.

A brief summary of some important points

The electric force of attraction is created when p-elons emanating from protons become entangled with n-elons emanating from electrons. The two coiled intertwined strings resist being separated when the virtual elastic strings retract back to their respective sources. This causes a force of attraction.

The electric force of repulsion between two electrons (or two protons) is created when the virtual particles slam into the opposing electrons and drive them apart.

The force of attraction and force of repulsion can both be calculated using the same equation because they are both dependent upon the momentum of the virtual particles.

N-elons are responsible for negative electric currents and p-elons are responsible for positive electric currents. N-elons are responsible for the repulsion forces that push electrons through a wire, and p-elons bound to n-elons are responsible for the force of attraction pulling electrons towards ground in a wire. In both cases, we see the forces are moving electrons from an area of high density to an area of low density.

The chemical bonds between atoms that are responsible for the molecules and compounds that make up our world are created by elons that bind electrons to protons.

Ionic bonds are formed between two atoms when one has lost an electron, and for this reason creates an excess of p-elons, and the other atom has gained an extra electron and for this reason creates an excess number of n-elons.

Strong covalent bonds are formed between two atoms with a neutral charge when they share their electrons.

Chapter 21: VES Theory and the magnetic forces

The magnetic force has been recognized since ancient times. Today, most of us are familiar with the strong forces generated by magnets, and we can't help being impressed by an electromagnet that is able to lift an automobile. Just as impressive is the strength of attraction or repulsion between two small toy magnets held in the hands.

A bar magnet has a north pole and south pole, and a force of attraction exists between them. In contrast, a force of repulsion is set up when two north poles are brought together or when two south poles are brought together.

If a bar magnet is broken into pieces, we find that the electron is a magnet with a north and south pole. For this reason, they are called dipoles. This is in contrast to electricity where the electron is a monopole with a negative charge and the proton is a monopole with a positive charge.

Magnetic virtual elastic strings

Two different but equal in strength virtual elastic strings cause the magnetic force of attraction

s-magnon: A virtual elastic string generated by the south pole of an electron that causes the south pole magnetic field.

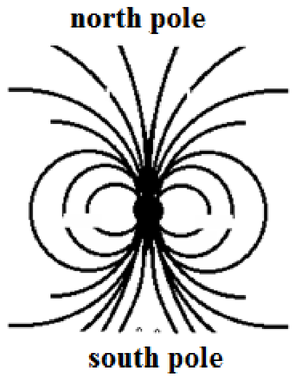
n-magnon: A virtual elastic string generated by the north pole of an electron that causes the north pole magnetic field.

magnon: A word used when referring to both s-magnons and n-magnons.

complementary strings: String pairs that become neutralized when they bond and cause a force of attraction, s-magnon and n-magnon.

free string: A string not bound to its complementary string.

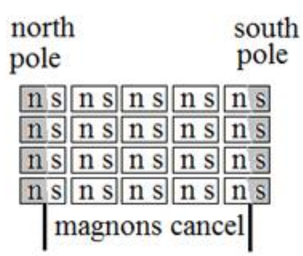
Electron's magnetic fields



Because the electron is a magnetic dipole, it gives this particle a spatial arrangement with an axis as shown in the illustration above. The north pole is emitting n-magnons and the south pole s-magnons. The two strings are complementary and when they bond, the magnons are neutralized, and at the same time, they cause a force of attraction as they retract back against the electron. This is an important consideration when constructing a model for self-induction.

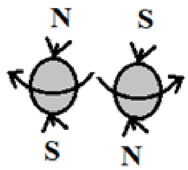
Scientists explain that in a bar magnet, the magnetic lines of force in the center of the magnet cancel each other out, and the electrons at the end of the magnet create the north and south poles as shown below. The north and south ends of a magnet have equal strength, which shows very clearly that the north and south poles of the electron have equal magnetic fields.

BAR MAGNET



Scientists have shown that electrons spin on their axes, and because of this property, it gives them a spatial orientation that affects their magnetic fields. The spin of an electron may be clockwise or counterclockwise with respect to its north pole. When two electrons with opposite spin are paired up, they cancel each other's magnetic field as shown in the next illustration.

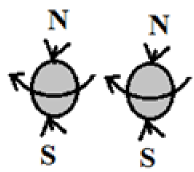
Magnons cancel



Electron pair

When paired electrons are spinning in the same direction, the forcefields are reinforced as shown in the next illustration.

Electron pair



Magnons reinforce

In most atoms, there are an equal number of electrons that spin clockwise and counterclockwise, and for this reason, most atoms are non-magnetic. Iron is unique in that it has four electrons with the same spin motion. Several other metals have magnetic properties as well. In most cases, a piece of iron is not magnetic because the electrons are oriented at random and their magnetic fields cancel each other out. However, when iron is placed in a magnetic field, the four unpaired electrons in iron become oriented in the same direction, and the piece of iron becomes a magnet.

The properties of magnets and the magnetic forces can be explained by virtual elastic string theory.

VES Theory

The dipole nature of the electron's magnetic fields can be explained if two different, but equal in strength, virtual elastic strings are responsible for the magnetic force. The virtual elastic string generated by the south pole of the electron is called an s-magnon, and its counterpart, also generated by the electron, is called an n-magnon.

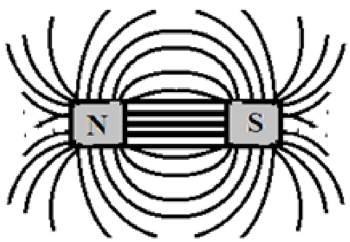
When s-magnons encounter n-magnons, they bond, and when the strings retract back to their respective sources, they create a magnetic force of attraction in the same manner as explained for the electric force of attraction. A force of repulsion arises between two south poles of a magnet or between two north poles of a magnet because the virtual magnon particles slam into the opposing electrons and drive the two poles apart, just as explained for the electric force of repulsion.

Virtual elastic strings explain the dipole nature of electrons and magnets, the magnetic force of attraction, and the magnetic force of repulsion.

Viewing magnetic lines of force

Magnetic lines of force can be viewed directly by placing iron filings on a piece of paper in the presence of magnets. As shown in the illustration below, the iron filings quickly align themselves along the magnetic lines of force.

Force of_attraction

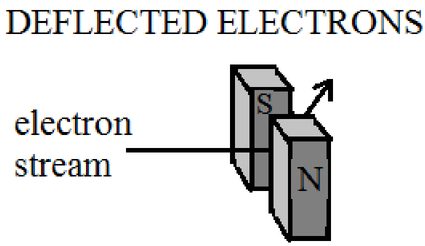


Iron filings in a magnetic field

As in the case of electricity, the magnetic lines of attraction between north and south poles tend to merge as if they are pulling on each other. This observation is identical to elons. The orientation of the iron filings created by the magnons is exactly what we might if magnons are composed of matter with strong elastic properties. There is no other interaction shown between the retracting magnons and the iron filings except the strings physically push the bits of thread into the orientation shown as they retract back to their sources. This is, of course, dramatic evidence that magnons are composed of matter with strong elastic properties.

Magnetic fields deflect electrons

Scientists have shown that electrons are deflected when they move between the north and south poles of a permanent magnet. This is shown in the next illustration. They are either deflected up or down depending on the orientation of the magnet's north and south poles and the direction the electrons are spinning.



A stream of electrons passing between the poles of a magnet will be affected in several ways. First, the magnetic field will orient the electrons such that their north poles will be pointed towards the south pole of the permanent magnet and their south poles towards the north pole of the permanent magnet.

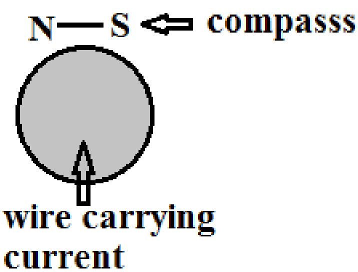
According to VES theory, a permanent magnet has billions of virtual elastic strings (n-magnons and s-magnons) stretched between the two poles of the magnet that form a barrier to the onrushing electrons. When the electrons meet this physical barrier, they will tend to either move up or down the barrier depending upon their spin direction.

Scientists have shown that the magnitude of the force created by the deflected electrons is directly proportional to the velocity of the electron and the strength of the magnetic field (the number of virtual elastic strings that form the magnon barrier). If the external magnetic field is at a 90-degree angle to the moving electrons, the force exerted by the deflected electrons is given by: $F = qvB$, where q is the charge (number of electrons), v their velocity, and B is the strength of the magnetic field (number of magnons) between the poles of the stationary magnet.

The deflection of electrons by magnetic fields suggested to me that the fields have physical properties with mass. If true, magnetic fields might deflect other spinning objects. I tested the effect of magnetic fields on spinning table tennis balls and found, indeed, that these small balls with low mass are deflected when spinning through a magnetic field. My experiments are reported in Chapter 7. I concluded from these experiments that magnons have physical properties, which supports my theory that they are composed of matter and have weight.

Electrons flowing through a wire

In 1820, a Dutch scientist by the name of Hans Christian Oersted discovered that an electric current flowing through a wire creates a magnetic field on the outside of the wire directed at ninety degrees to the direction of current flow. Oersted discover this magnetic field with a compass. This means that the orientation of the electrons in the wire cannot be at random; otherwise, the magnetic fields would cancel each other out, and there would be no magnetic field surrounding the wire. The electrons flowing through the wire act very much like a bar magnet. This means that all the electrons in the wire carrying current are all spinning in the same direction with respect to their axes.

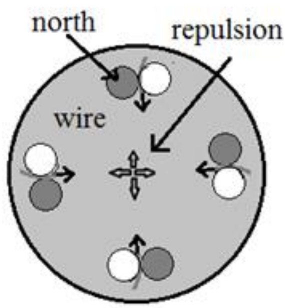


Electrons are likely composed of two spheres

As discussed in more detail in the next chapter, electrons, photons, and quarks are likely composed of two spheres. This property is essential to explain self-induction and several other important observations concerning these particles. I introduce it here to illustrate electron flow in a wire although two spheres are not essential to explain their movement.

When there is flow of electrons through a wire, I believe it can safely be assumed that there will be a tendency for the electrons to move from the center of the wire to the wire's perimeter because of repulsion forces. Because electrons have two spheres, they align themselves along the outer surface in a manner that facilitates rolling in the direction of electron flow. Thus, they become oriented as shown in the next illustration.

ELECTRON FLOW

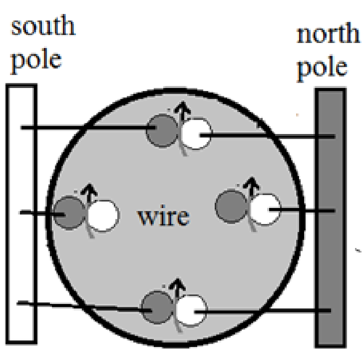


Electrons spinning and
rolling along edge of wire
going away from viewer.

If electron spin and flow are as illustrated above, it would facilitate electron movement from the center of the wire and their forward motion through the wire. If you place a compass on top of the wire, its north and south poles will be opposite to a compass placed under the wire.

The next illustration shows electrons flowing through a wire in a magnetic field. As you can see, the orientation of the electrons in the wire changes when they pass through a magnetic field.

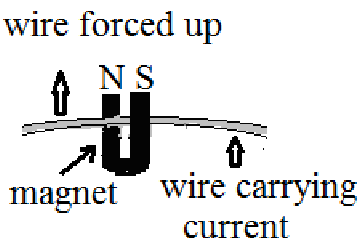
ELECTRON FLOW
IN MAGNETIC FIELD



Electrons moving away
from viewer all spinning
in the same direction.

When a wire carrying an electric current is placed between the poles of a stationary magnet, the electrons moving through the wire all become oriented in the same direction as shown in the illustration above. When the electrons strike the magnon barrier, they will either be deflected up or down depending on spin direction.

If the electrons move upward, they bang into the atoms in the wire and force the wire up as shown in the next illustration.



The magnet is passive; it provides no energy to the deflected electron or to the movement of the wire. According to VES theory, it provides a means of orienting the electrons already moving through the wire, and it provides a physical barrier that deflects the electrons. These principles can be used to explain electric motors and electric generators.

An electric motor converts the energy of moving electrons to mechanical energy by using the principles already examined. Namely, a barrier of virtual elastic strings provided by a magnet deflects the electrons moving through the wire, and the deflected electrons cause the wire to move physically. The movement of the wire is used to rotate a shaft in the motor, which can be used to rotate a wheel, etc. The permanent magnet departs no energy to the system. What we see here can work in the reverse direction, and we call this an electric generator.

Mechanical energy can be used to create electric currents in a wire just by mechanically forcing the wire down through a magnetic field. This causes the downward moving electrons to strike the magnon barrier and move off in the direction they are spinning, which causes the electrons to begin flowing through the wire. The magnet is passive; it provides no energy to the moving electrons. All the energy comes from the mechanical device that forces the electrons down through the magnetic field.

MAGNETISM

N-magnons arise at the north pole of the electron and s-magnons from the south pole. When these two complementary strings bond and retract, it causes a force of attraction.

A force of repulsion is created when two like poles face each other. In this case, the virtual particles act as battering rams, forcing the two magnets apart just as described for the electric force.

A wire carrying an electric current creates a magnetic field on the outside of the wire because the electrons all spin in the same direction. This orients the n-magnons and s-magnons that pass to the exterior of the wire, which allows them to have the properties of a bar magnetic.

The electrons flowing through a wire are deflected when they pass through a magnetic field because the electrons are spinning against a physical barrier created by magnons. All the electrons are deflected in the same direction because they are oriented by the magnetic field.

When magnons deflect the electrons flowing through a wire, it causes the wire to move up physically because the electrons collide with the atoms in their path. This movement can be used to turn a shaft in an electric motor, or the reverse can be used to convert mechanical energy into electric energy.

Magnetism and electricity owe their properties to entirely different virtual elastic strings.

Chapter 22: Self-induction of forcefields

The solutions reached in this chapter are based entirely on the idea that forcefields consist of virtual elastic strings that are composed of matter with perfect elasticity—without these properties there is no self-induction. In addition, the theories presented here solve several thorny problems in physics, including forcefield symmetry, a reasonable physical reason why different forcefield strings have different sizes, and why gravitons are neutral meaning they don't bind to each other. And perhaps just as important, it solves the source of energy that drives self-induction.

The focus of this chapter will be to design a theoretical model for the structure of an electron and explain how an electron creates and retracts its strings—a continuous, self-inducing process. I will also point out some minor differences between electron and photon self-induction cycles. In Chapter 39, I use this model to explain some important properties of electrons in orbit.

Electrons create both positive and negative forcefields

I have already discussed the fact that electrons create both north and south pole magnetic fields that emanate from the poles of the electron. In addition. they create gravitational fields and electric fields. Koltick and others (1997), at the Japanese Laboratory for High Energy Physics, have found evidence that an electron also creates positive virtual particles. According to their data, there exists a cloud around the electron that is composed of virtual particles that wink in and out of existence. Those particles closer to the center of the electron consist of pairs of positively charged and negatively charged particles that cancel each other out leaving an electron with one unit of negative charge. They have no effect on the overall negative charge of the electron. This is a very important finding because it accounts for one important aspect of my model. It provides for complementary elons to bond and cause pressure on the electron in the same manner as the bound n-magnons and s-magnons.

Electron's force fields

The electron creates both north and south pole magnetic fields and it creates both positive and negative electric fields. VES theory states they also create two forms of gravitons that will be discussed in this chapter.

These fields are self-inducing; namely, the creation and retraction of the elastic strings that make up these fields continually cause new fields to form as old fields disappear. It is a cyclical process that mirrors the oscillation period of an electron.

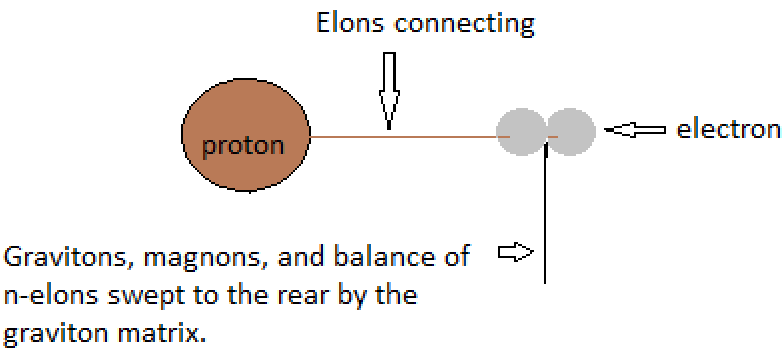
The differences among strings can be accounted for with just two different properties. The size of the string determines whether the string is an elon, magnon, gluon, or graviton, and the differences in their composition or structure in space accounts for the differences between complementary strings that allows them to bond, perhaps by entanglement. And I am happy to report, it also accounts for two different gravitons: There is an n-graviton and an s-graviton that pair up and form the neutral string that we call a graviton.

A summary of the evidence that electrons are composed of two spheres

It is far easier to understand how strings can differ if the electron is composed of two spheres. For example, it is virtually impossible for an electron to be composed of only one sphere if it is creating both negative and positive electric fields that are ejected from the same area of the electron. In fact, I believe we can safely save, it is impossible.

I will briefly review the evidence that electrons are composed of two spheres and leave you to explore this issue as I discuss it in the chapters ahead.

One clear piece of evidence that electrons are composed of two spheres comes from the fact scientists have shown electrons in orbit only spin up or down and in no other direction.



Because n-elons only arise from one sphere of the electron, the electron in orbit becomes bound to the proton as shown. As you can see, an electron in orbit will be forced to either spin up or down and in no other direction. This is excellent evidence that the electron is composed of two spheres.

Scientists tell us that electrons can occupy the same orbital if they are spinning in opposite direction. This suggests the virtual particles and the strings they create become oriented either up or down depending on spin direction, which means the strings come to occupy different orbits when they are swept to the rear by the graviton matrix. Perhaps they become separated by the width of the electron. This allows electrons spinning in the opposite direction to occupy the same orbit without running into each other's strings. This will become clearer in Chapter 39.

The precise separation of the various wavelengths of visible light by a prism seems miraculous, but it can be explained if photons are composed of two spheres. In fact, the behavior of photons during refraction and reflection is almost totally dependent upon a photon composed of two spheres. For example, it accounts for the polarization of light shining off the surface of a lake. This is examined in more detail in Chapter 27.

The much higher velocity of photons compared to electrons can be explained if these two particles are composed of two spheres; otherwise, it is difficult, if not impossible, to explain why a gamma photon with the same mass as an electron should travel much faster than an electron in the fast-solar wind. This is explained in Chapter 31

The difference in velocity of electrons in orbit compared to velocities in the solar wind can best be explained if electrons are composed of two spheres as discussed in Chapters 31 and 39.

The structure and specificity of gravitons and other strings is virtually dependent upon the electron having two spheres as discussed in this chapter.

Self-induction of forcefields, as envisioned in this chapter, is impossible unless n-elons and p-elons arise from two different spheres of the electron. This also applies to gravitons and magnons. I examine why this is true in this chapter.

Grossman (2018) reports that David DeMille at Yale University and his colleagues believe their research shows the electron is perfectly round. I would like to point out that they were investigated the idea an electron was pear shaped with the idea that it would tip over under the right conditions. They found no evidence for a pear-shaped electron. Of course, if I'm correct, the electron is not pear shaped, but rather composed of two spheres that may be perfectly round, although its physical size varies as it goes through its self-induction cycle. I believe the pear shape idea came about because the electron creates two units of n-elons and only one unit of p-elons. Notice the concept of two spheres solves this puzzle. We only need to assume that one sphere of the electron is slightly smaller than the other sphere.

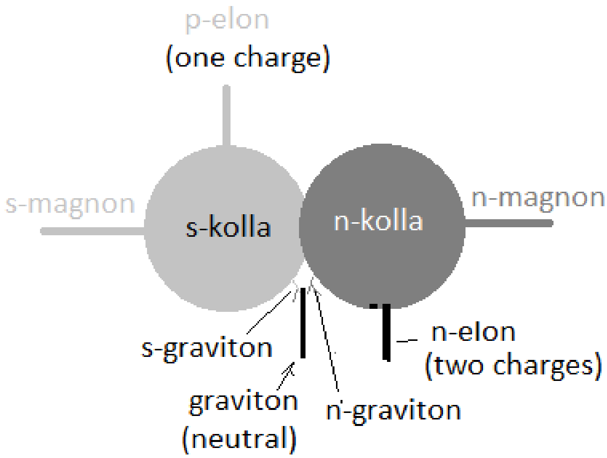
Structure of the electron

I use the word kolla, a Greek word, to mean a substance with perfect elasticity and perfect cohesion that is used by electrons, photons, and quarks to make virtual elastic strings. Kolla is part of the internal fabric of the electron, and it may well be that it differs depending on the sphere, but it seems entirely possible that all kolla is identical, and complementary strings only differ in structure when they are ejected into space. For now, I will simply say that I believe the force of attraction requires entanglement between complementary pairs that creates resistance when the strings retract back to their source. And in the case of identical strings, there is no such entanglement, or perhaps a different type of interaction that leaves the virtual elon particles free to crash into the opposing electron and cause a force of repulsion.

Obviously, I don't know what causes complementary strings to pair up and resist retraction, and obviously, it may be an injustice to show two types of kolla as shown here; but pair up they do, and this explains how an electron is able to achieve the self-induction of forcefields.

The following illustration shows the two spheres of the electron and the virtual elastic strings emanating from this particle, including both negative and positive electric fields as shown in the illustration.

From James Maxwell's equations discussed in Chapter 26, we know that the electric field of a photon is composed of many more strings than the magnetic field; however, the energy density of the two fields is identical. I assume that electrons are similar. If this is true, there are 3 x 10^8 elons created for every magnon.



Scientists have shown that the electron is a magnetic dipole and the magnetic field loops back on the outside of the electron forming a closed system. VES theory proposes that the north pole of the electron emits n-magnons and the south pole emits s-magnons, and when the two meet and bond, they form a closed loop.

When a small compass is placed in a magnetic field, it spins until it is aligned in the same direction as the magnetic field. It is this principle that allows scientists to measure the magnitude and direction of the magnetic field. The greater the magnetic field the greater the torque applied on the magnetic dipole (compass) placed in the field.

When n-magnons located at the north pole of the electron bond to s-magnons at the south pole of the electron, they exert an inward pressure on the surface of the electron as they retract back to their sources. The same applies to the electron's p-elons that bond to the electron's n-elons. When they bond and retract, they exert pressure on the outside of the electron.

For bonding to occur, it is necessary for the complementary strings to come in contact before they retract. This occurs because the electron is constantly moving, and this forces the electron to fly through a dense concentration of gravitons—the graviton matrix. This forces the magnons to the rear where they meet and bond before retraction. This solves how magnetic fields emanating from the two poles of an electron meet and bond, forming a loop from north pole to south pole. It also explains why the magnetic fields of a single electron are neutralized.

In the case of elons, there are two charges of n-elons created by one sphere and one charge of p-elons created by the other sphere, and for this reason, one sphere may be slightly smaller than the other. When the electron is not in orbit about a proton, the strings are swept to the rear by the graviton matrix where they bond, leaving the electron with one charge of n-elons, which is of course a negative charge.

When the electron is in orbit about a proton, one charge of n-elons from the electron becomes bound to one charge of p-elons emanating from the proton prior to the time the strings interact with the graviton matrix. This is reasonable because elons are ejected into space with great velocity, some 10^{23} m/s. This leaves one charge of n-elons from one sphere free to bond with one charge of p-elons from the other sphere when swept to the rear by the graviton matrix. Now when these strings retract back to their respective spheres, they create an inward pressure on the electron in the same manner as magnons that bond and retract.

With these thoughts in mind, let's examine the different stages of the electron's self-induction cycle.

Stages of the electron's self-induction cycle

Electrons, photons, and quarks all possess an oscillation frequency. This suggests there is a cyclical nature to the creation of strings that causes oscillation. There must be a period when no strings are being created and another period in which strings retract back to their sources. This can be viewed in stages, and I have let the first stage encompass the retraction of the strings back to their source.

Stage One: Retraction of strings. This stage begins when there are a maximum number of strings surrounding the electron. In terms of the oscillation period, we are at the crest of the wave. Billions of gravitons, elons, and magnons surround the particle and are in the process of being retracted and reabsorbed back into the interior of the electron. The elastic properties of the strings coupled with a spinning electron provide the energy for the retraction and re-absorption process.

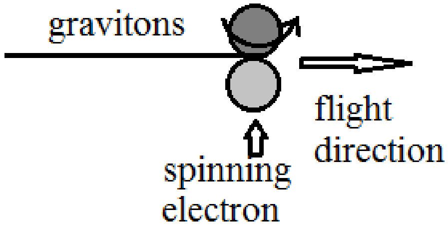
It is theorized the strings are being reabsorbed back inside the electron through portals. Portals are openings into the electron through which the virtual particles are ejected, and the strings are retracted. The nature of these portals will be discussed shortly. All strings influence the self-inducing process, and each has a story to tell. I will begin with gravitons retracting back to source.

Gravitons retracting

I theorize that the portals for gravitons are close to the marriage line between the two spheres. This allows n-gravitons to immediately bond to s-gravitons and create a neutral string we call a graviton. This explains why gravitons, which are actually composed of two strings, do not bond to other gravitons,

It must be that gravitons remain in space much longer than any of the other strings. This seems reasonable because they are ejected across galaxies. Thus, it is visualized that gravitons remain in space for approximately one second, which corresponds to billions of electron oscillation periods. This helps to account for the vast number of gravitons in space because more are added to their numbers during every oscillation period, as many as 10^{14} times per second. This means there can be a great number of gravitons connected to every electron even though graviton portals may be much smaller in number than elon portals.

As gravitons retract because of their elastic properties, they also wind up on the mass of the spinning electron like a fishing line winds onto a reel. This is possible because the electrons are spinning and have spin angular momentum, and the graviton persist through more than 10^{14} electron self-induction cycles (frequency depends on the atoms and molecules).



In this scenario, the gravitons are being reabsorbed back inside the electron, but they are also winding up on the electron as illustrated. It follows that gravitons act as a cinch, pulling the mass of the particle into an ever-smaller space, and at the same time, they are causing a division in the electron. This division remains in place during all phases of the electron because a single graviton exists for billions of self-induction cycles.

<u>Magnons retracting</u>

The portals for n-magnons and s-magnons are at the poles of the two spheres as shown by scientists. Magnons meet and bond as complementary pairs when they are swept to the rear of the particle by the graviton matrix. Now when they retract, they will be pulled up tight against the surface of the electron. Because the electron is spinning, it will cause the magnons to be spaced evenly around the particle's surface. The force they exert as they retract is inward towards the center of the mass. This constricts the electron into an ever-smaller particle. Perhaps there are some 100 pairs of magnons created per electron per self-induction cycle even though the number of portals is only one at each pole.

<u>Elons retracting</u>

From Maxwell's equation, we know that the number of elons retracting back to source far outnumber the number of magnons (I assume that electrons and photons share this feature), which means there are billions of elons that bond and retract against the surface of the electron. In fact, the ratio of elons to magnons may be the same as for photons as discussed in Chapter 26—some 300 million to one. This means the elon strings cover the electron like an orange rind.

The electron is creating p-elons on one sphere and n-elons on the other sphere. Because the portals are on opposite spheres, the complementary strings bond and create an inward pressure on the electron in the same manner as bonded, complementary magnons.

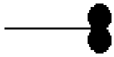
There are untold billions of gravitons, elons and magnons retracting against the surface of the electron. They create an extremely dense, impenetrable layer of strings as they squeeze the electron into an ever-smaller particle. The electron becomes greatly reduced in size as the strings retract against its surface. The strings inside the electron change their physical structure. They metamorphose under great pressure to become the generic, primordial n-kolla or s-kolla for the creation of new strings. This brings us to stage two.

KOLLA DEFINED

Kolla is a Greek word that gave rise to the word collagen. I use the term Kolla to refer to the substance used to create strings. It comes in two forms, n-kolla and s-kolla, at least when it is in the form of an elastic string. It has perfect elasticity and perfect cohesion.

Stage Two: Maximum pressure reached

By the end of stage one, gravitons, bonded magnons, and bonded elons have created maximum pressure on the electron. The electron in this condition is very dense.



This stage exists for a very brief period because the electron immediately begins making new strings.

Stage three: Creation of new strings.

When the pressure inside the electron reaches a critical point, all the portals open and fire off a single round of virtual particles—just one virtual particle per portal per round. Thus, the number of strings is controlled by the number of portals. The portals then snap shut and remain closed until retracting strings again create sufficient internal pressure to fire off another round. New rounds continue in this manner until the field of magnons and elons are at a maximum. We are now at the crest of the wave. During this process, the portals are constantly being forced open and closed as the virtual particles spew forth from the electron.

Following the ejection of virtual particles, the internal mass and pressure of the electron is sharply reduced. Finally, a point is reached where the internal pressure is insufficient to fire off another round. At this time, a maximum number of strings surround the electron and stage one has been reached. The old strings surrounding the electron are reabsorbed and the new strings begin applying pressure.

Rock cycle versus self-induction cycle

Thus far, this whole scenario is analogous to the rock cycle. As rock becomes buried along our oceans' shores by massive sediments from above, the rock under pressure metamorphoses and in the process, changes its internal structure. For example, shells in the ocean become limestone, limestone becomes marble, and finally marble melts to form magnum. Under sufficient pressure, the Earth's crust opens, and lava is forced up from deep inside the Earth. The chemical and physical structure of the rock created depends on the location and depth of the cone on the surface of the Earth.

In the case of an electron, the external pressure on the electron causes the reabsorbed strings to metamorphose into dense, primordial, elastic kolla for the creation of new strings. Like lava, the property that makes a string unique depends upon the location of the portal and its size; and it depends on the sphere that ejects the virtual particle, and the string's final structure after being ejected into space.

Portals are unique

Portals are the openings through which virtual particles are ejected and the strings created are withdrawn. The portals are unique for several reasons:

1. The size of the portal differs for elons, magnons, and gravitons, and this controls the size of the virtual particle ejected through them.
2. The portals are uniquely arranged on the electron: magnon portals are found at the poles, graviton portals near the marriage line between the two spheres, and elon portals at the center of each sphere.
    - Magnon virtual particles are ejected from the poles of the electron where the density of strings is least, where we might expect to find the largest portal openings.
    - Elon virtual particles are ejected from the main body of each sphere where the strings encasing the electron are very dense, and where we might expect to find smaller portals than those at the poles. Also, this larger area can accommodate a vast number of minute portals.
    - Gravitons are ejected near the marriage line between the two spheres. This area has the densest concentration of strings pressing inward on the electron, and we might expect the portals located in this area to be much smaller just as predicted because graviton virtual particles are the smallest in size.

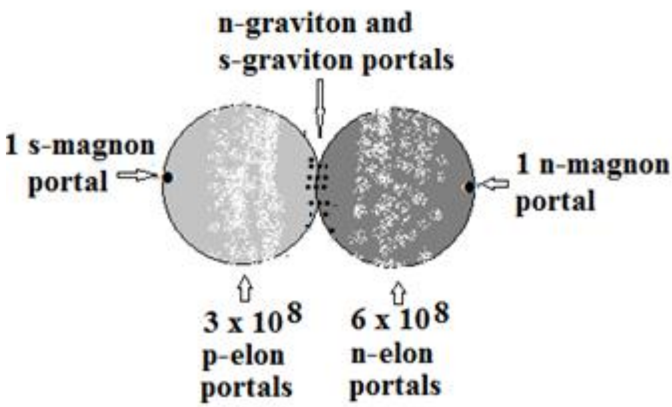
      There doesn't need to be a large number of portals for gravitons because once created they exist and accumulate through a large number of self-induction cycles. Just one portal has the potential to create and accumulate about 10^{15} gravitons if they exist for one second—that's approximately how often an electron oscillates per second. Of course, the oscillation rate of the electron depends on the atom and molecule.

3. All the portals fire off at the same time when a round of virtual particles is shot from the electron. Perhaps there are 100 rounds fired during one self-induction cycle. This means the number of portals controls the number of magnons, elons, and gravitons created.

It seems likely that the number of n-elons created by the electron might be twice the number of p-elons. This would allow one charge of n-elons to be free to bond with one charge of p-elons from the proton, and one charge to bond with the p-elons emanating from the electron. It would also account for the repulsion forces between two electrons.

From my analysis of photons and Maxwell's equations, I believe the <u>minimum</u> number of portals for an electron might be something like that shown in the following figure.

MINIMUM PORTALS



It seems likely that one sphere is slightly smaller than the other because it creates only half the number elons.

It may be that each portal makes 100 strings per self-induction cycle. Once the virtual particle is ejected into space the string remaining in the portal is minute compared to the portal size necessary to accommodate the virtual particle. It also seems likely that a retracting string no longer has a virtual particle, and for this reason easily passes back inside the electron when retraction of the string takes place.

The size of an elon portal is minute compared to the surface area of an electron. Thus, billions of elon portals need only take up a small percentage of the electron's surface.

Weak nuclear force

I said I would not mention the weak nuclear force again, but notice if this force is created by electrons, the portals for these strings could easily be accommodated between the elon portals and the magnon portal, and if true, they would aid self-induction in the same manner as the other forcefields. In fact, the space between elon portals and magnon portal strongly suggests a different virtual particle is ejected from this area. This suggests the virtual elastic strings that make up the weak force may be larger and more robust than elons, but less than magnons.

PORTAL DEFINED

A portal is visualized as an opening that allows access in and out of the interior of electrons, photons, and quarks. Virtual particles are ejected through portals.

Portal size is linked to specific areas of the electron's surface that correspond to the expected density of the retracting strings in that area. **In the case of magnons and elons, the areas are exactly as envisioned by physicists.**

Source of energy for self-inducing forces

One conundrum that has puzzled scientists for many years is where the energy comes from to achieve self-induction. My model explains this easily:

First, the energy to eject virtual particles in space comes from the forcefields squeezing on the exterior of the electron and the extremely condensed elastic kolla created during self-induction. This causes virtual particles composed of extremely dense kolla to be ejected into space with tremendous velocity

Second, the energy from the retracting strings that surround the electron is transferred to the kinetic energy of the virtual particles hurled through space—energy derived because they are mass in motion.

Third, the virtual particles transfer their kinetic energy to the virtual elastic strings that they stretch through space. The stretched elastic strings store this energy as potential energy.

Fourth, the potential energy of the stretched string is not lost. Most of the retracting strings apply pressure on the outside of the electron and condense the kolla to begin a new round of strings, while other strings become bound to other objects and transfer energy to these objects as they pull them through space.

The transfer of energy to other systems tells us the self-inducting process needs another source of energy to continue. This comes from the spin angular momentum of the electron that winds up gravitons like a fishing line coils up on a reel. This induces pressure on the electron, and it aids in the retraction of gravitons. Scientists theorize that spin angular momentum may be involved in self-induction of forcefields; however, they also believe that the energy associated with spin is insufficient to account for self-induction of all the forces. My model suggests that most of the energy required for the self-induction cycle comes from the conservation of energy in the stretched strings as explained above.

The combined action of retracting elons, magnons, and gravitons work synergistically to promote self-induction. It seems reasonable to me that elons and magnons are equally important in applying pressure to the outside of the electron. My model also explains why spin angular momentum is important to self-induction.

The model for self-induction by photon's and quarks must be similar but these structures are more complex.

A few of the correlations between standard scientific thought and self-induction proposed here.

<u>Magnetic forcefields</u>

Scientists have shown the electron is a magnetic dipole with magnetic forcefields that arise at the two poles of the electron. In addition, they view the magnetic fields as folding back over the surface of the electron.

This is precisely how VES theory views the electron's magnetic forcefields. VES theory goes one step further. It states that n-magnons become bonded to s-magnons, then retract back against the surface of the electron, and by doing so exert pressure on the electron, which initiates self-induction. This becomes a major source of energy that drives the self-induction of forcefields.

Scientists have long believed the magnetic force is stronger per unit than the electric force. This correlates well with VES theory that states the individual magnon strings are larger and therefore more robust than the elons that create the electric forcefields. This fits nicely with the fact that the larger magnons are ejected at the poles where the density of retracting strings surrounding the electron are least—and for this reason the portals are larger.

Electric forcefields

Scientists have shown that the electron creates negative and positive electric fields; furthermore, they have shown that the positive field bonds to a portion of the electron's negative field. Because the negative electric field is larger than the positive field, the electron is left with one charge of negative field that can bind with one charge of positive field emanating from the proton.

Furthermore, scientists have shown that the electric field arises from the main body of the electron where we can expect to find a greater density of retracting strings, as well as greater surface area to accommodate a large number of small portals.

My model for the electron shows that it consists of two spheres. This is essential because otherwise the negative and positive electric fields would arise from the same area of the electron if it consisted of only one sphere.

Graviton forcefields.

Scientists have shown that electric fields and magnetic fields show symmetry in that they both create two different forcefields. This is not true for gravity. Gravitons are neutral; there is only one forcefield. The model I propose tells us why. The graviton is created near the marriage line between the two spheres where n-gravitons can readily bond to s-gravitons to produce the neutral string we call a graviton. This provides symmetry to all three forcefields. This also explains why gravitons do not bond to other gravitons. This is only possible if the electron is composed of two spheres.

There may be a relatively small number of portals for gravitons because new strings are created with every oscillation cycle; however, once created, the strings last for 10^{15} or so cycles. This explains why there are a vast number of gravitons in space just as predicted to create the graviton matrix.

It is necessary that the electron is composed of two spheres if it is making two kinds of forcefields for electricity, as well as other forcefields. My model states that the electron in part exists as two spheres because gravitons wind up around the marriage line like a fishing line winds up on a reel. This model for graviton retraction also helps to explain why the graviton creates the same force of attraction over distances large and small, and this is vital to explain electrons in orbits as explained in Chapter 39.

Scientists have long believed that the electron's spin angular momentum provides part of the energy necessary for self-induction, and the way gravitons wind up on the electron explains this correlation. Of course, the primary energy source for self-induction are the stretched elastic strings.

Because forcefields are composed of matter and have strong elastic properties, it allows us to develop a physical model for self-induction.

I propose that magnons, elons, and gravitons apply an inward pressure on the electron as they retract back to their source. This condenses the electron into an ever-smaller mass until it expels virtual particles through its portals.

The portals determine the number and size of the virtual particles created.

Perhaps the electron ejects all virtual particles in 100 rounds per oscillation period.

The virtual particles are ejected at great velocity—10^{23} m/s.

An elastic string is created because the virtual particles remain attached to their source.

The size of the portal determines the size of the virtual particle. The size of the portal is dictated by its location on the electron. This fits the location for magnons and elons determined by scientists.

Perhaps there is only one n-magnon portal and one s-magnon portal but $1x10^8$ p-elon portals and $2x10^8$ n-elon portals. N-graviton portals and s-graviton portals may be relatively few in number because gravitons exist through billions of self-induction cycles, which allows the accumulation of a vast number of gravitons bound to every electron.

Because gravitons wind up at the marriage line of the two spheres and because gravitons are present throughout the oscillation period, they maintain the electron as two spheres.

What is said here also applies to photons and quarks, although these two structures and the strings they create are more complex.

The source of energy for self-induction comes from the stretched elastic strings and from the spin angular momentum of the electron as it helps to retract gravitons.

Chapter 23: Graviton properties.

Graviton is the name physicists have given to the ‘entity that carries the force of gravity’. Just what this means is a complete enigma if we follow Einstein’s general theory of relativity. His theory can assign no physical properties to gravitons. However, VES theory defines a graviton as the virtual elastic string that connects two bodies and is responsible for the gravitational force of attraction.

It is instructive, and somewhat startling, to examine what size of steel cable would be necessary to hold Earth in orbit about the Sun. A good steel cable with a diameter of 5.08 cm is able to support approximately 3.4×10^5 kg dead weight (750,000 lb.). It would take 1×10^{16} such cables to hold Earth in its orbit about the Sun, and their combined cross-sectional area would be more than twice the area of the United States (an incredible 16% of a cross section through earth) [note 3]. How is this possible? It is argued that gravitons can only compete with a massive steel cable if they are long strings that are capable of maintaining their highly energetic force of attraction over great distances. In addition, there must be a vast number of such strings forming the connection.

This leads us to the conclusion that a single graviton is capable of forming a physical bridge across galaxies. This is, of course, an utterly mind-boggling thought; however, there is a great deal of evidence that supports this theory beginning with my regression analyses discussed in the first part of this book.

The general view of cosmologists is that galaxies are associated in groups and clusters, with clusters being the largest structures in the universe under the influence of their own internal gravity. Ferris (1997, page 149), who champions the Big Bang and relativity, explains that within clusters gravity prevents galaxies from expanding apart, but the space between galaxies is expanding.

Inside the individual clusters, most of the stars are found within five million lightyears from its center. It is reasonable that this is the extent that gravitons extend in space. This observation provides welcome evidence that gravitons have a finite length just as you would expect for a string composed of matter.

Velocity of the graviton’s virtual particle

If we assume the graviton extends five million lightyears, we can estimate how fast the virtual particle would have to travel to this distance and return back to its source. Because light travels 3 x 10^8 meters per second; it means a photon travels about 1 x 10^{16} meters in one year. If the graviton exists for one second, it would have to travel some 10^{23} meters per second to travel 5 million lightyears and return back to its source. This is a good reason to believe that gravitons exist in the neighborhood of one second, which encompasses billions of electron self-induction cycles.

Einstein overcame the distance problem for gravity in another way. In his general theory of relativity, he proposed we live in a four-dimensional world., and time is a fourth dimension that interacts with our three dimensions of space: width, depth, and length. He believed a four-dimensional world explains why gravity exerts its effect instantly over vast distances. In his view, the movement of my hands upon the keyboard results in a distortion of space and time that is felt instantly across our universe.

It is difficult to understand how Einstein's concept of warped space confines the gravitational force of attraction to a cluster, and in fact cause a tendency for the stars to bunch up within five million lightyears from its center. Does this require some sense of denial?

The model I propose relies on a three-dimensional world where time and space are not distorted. My model is only possible if a graviton is composed of matter and travels through space with a velocity billions of times faster than the speed of light. Is this possible? The answer to this question is an emphatic yes.

No matter what Einstein said, there is strong evidence that photons are not the fastest thing in the universe, not even close. For example, when a photon is split into two photons and sent off in different directions, modification of one photon <u>instantly modifies</u> the other photon. This is sometimes referred to as "quantum weirdness"; however, it is real, and it has been investigated numerous times. More recently this phenomenon is referred to as entanglement. I review this subject and show how it can be explained by VES theory in Chapter 48. It can be explained if the photons are connected by virtual elastic strings that have tremendous velocity as proposed by VES theory.

In other experiments reviewed by Weiss (2000, vol.157, page 375), information encoded in photons arrives at the measuring device at speeds that exceed the velocity of light.

The fact that entanglement exists, and the very fact that light travels at such a phenomenal speed, lends credibility to the idea that gravitons travel at speeds billions of times faster than light.

How was entanglement viewed by Einstein? He viewed it as a form of communication, which doesn't need to be explained. It simply does not count as the velocity of anything tangible because it doesn't fit the special theory of relativity. This is a classic case of denial.

> VELOCITY OF GRAVITONS
>
> Light travels at the immense speed of 3×10^8 meters per second.
>
> Entanglement provides strong evidence that strings travel almost instantaneously over large distances, far faster than the speed of light.
>
> There is no reason to assume that gravitons cannot travel 10^{23} meters/second.

In the next section, I will explain how a neutral graviton is able to achieve a force of attraction.

Resistance to graviton retraction

Gravitons, being virtual strings, are constantly being made and retracted back to source. During the generation phase, the virtual particles are ejected some 5 million lightyears in space. The virtual particles are extremely small and extremely dense, and they pass through any object that they encounter. It seems likely that the virtual particle has decreased in size after 5 million lightyears—perhaps even disappears.

Gravitons, like all the other forces of nature, can only achieve a force of attraction if the graviton becomes bound to the object it penetrates. Resistance boils down to two possibilities. Either gravitons bond to other strings or friction is created by some other means.

My model for the creation of strings shows that the string we call a graviton is composed of two complementary strings: n-graviton and s-graviton. This causes the neutralization of the two strings, which means the resulting graviton cannot bind with other gravitons and create a force of attraction. Of course, this is exactly what scientists have shown beginning with Newton and his universal law of gravity.

It is unlikely that simple friction can account for the resistance created by the object the gravitons retracts through; however, my model for self-induction does present a reasonable solution to the problem. The retracting strings that surround and constrict electrons, quarks, and photon during self-induction provides a mechanism for grabbing and holding onto gravitons. The gravitons would only need to penetrate the retracting strings. This would allow the elons and magnons to hold the gravitons against the subatomic particle during the self-induction process. It would provide for multiple points of temporary attachment for any object the graviton penetrated. The ability of retracting elons and magnons to trap gravitons might be aided by graviton waves, mere pulses that would act as nodules composed of matter.

Graviton resistance to retraction

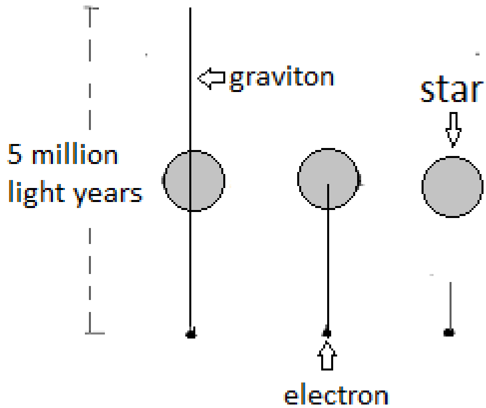
The rubber band stretched between your two hands attempts to pull your hands together. This force of attraction is due to the potential energy stored in the string, and the inherent properties of the rubber that seeks to retract back to its relaxed state. Of course, the force of attraction between your two hands is only possible if both hands are bound to the rubber band when stretched.

In the same manner, the graviton can only create a force of attraction between two objects if it is bound to the object it penetrates as well as the subatomic particle that created it. Only in this manner can the potential energy of the stretched string create a force pulling the two objects together.

It is proposed that gravitons become bound to the object it penetrates when the graviton strings are trapped beneath the magnon and elon strings wrapped around subatomic particles during self-induction. The graviton would be bound and released approximately every 10^{-14} seconds. And in any one atom or molecule the self-induction cycles tend to be synchronized, which would allow quarks and electrons to release the graviton in unison.

Sequence of events

My model states the graviton exists for about one second. This is the time it takes for the graviton to travel 5 million lightyears and return to its source. To accomplish this feat, it must travel some 10^{23} m/s. Depicted below is a graviton emanating from an electron, perhaps one on Earth. Potential energy is stored in the string as it is pulled through space by the graviton virtual particle. If it passes through a star or some other object it becomes bound to that object. but it continues on its journey. The graviton in this situation exerts a force of attraction between electron and star because of the stretch placed on the string, in the same manner as a common rubber band.



1. The graviton takes about one second to travel the 5 million lightyears and retract back to its source.
2. The graviton ultimately retracts for the same reason that a rubber band retracts after being stretched. It is composed of matter with perfect elasticity.
3. The graviton begins retraction at the free end. At this point in time, the graviton virtual particle may no longer exist.
4. A graviton may have multiple points of attachment to any object it penetrates because they become bound to electrons, quarks, and photons as they go through their self-induction cycles. The total time for hold and release by each subatomic particle would be very fleeting, about 10^{-14} seconds.
5. For anyone atom, all self-induction cycles are in synchrony, and for that reason release will be simultaneous.
6. Photons, electrons, and quarks may have the opportunity to bind and release the same graviton every time they go through their self-induction cycle; however, the most secure binding may need the presence of graviton waves

While sitting here at my computer, the graviton from Earth that penetrates my body also becomes bound to the building above me, and it may become bound to a moon, or distant star. Because the graviton, begins retracting at the free end first, it becomes disconnected from the star, then the moon, roof of the building and finally me in that order. I always weight the same because every graviton that first penetrated my body one second ago has retracted back through my body without interference from the building above me or some other object.

In the next section, I will examine some equations that allow us to compute the gravitational force between objects, and at the same time, it will give us some feel for a newton, which is a unit of force.

Calculating the gravitational force of attraction

If you have had the misfortune to fall even from a modest height, you felt the dramatic result of the gravitational force as your body was literal jerked to the ground. Such practical experience teaches us that gravity is a very strong force.

For most people, we quickly equate mass with something that has weight, which can be measured in pounds or kilograms. This is a correct assumption because mass is a unit of matter generally expressed in kilograms. Scientists also define mass by a mathematical equation:

$$\text{mass} = \frac{\text{force}}{\text{acceleration}}$$

Acceleration is the change of a particle's speed per unit of time.
The definition of force is also found by rearranging this same equation: **Force = mass x acceleration.**

The force acting on a body is usually expressed in newtons. It takes 1 newton force to accelerate 1 kg to 1 meter per second beginning at dead rest. The gravitational force of attraction between two objects can be calculated in a second way.

Universal Law of Gravitation

Isaac Newton worked out the basic principals in the 17th century. He published his famous "Philosophiae Naturalis Principia Mathematica" in 1687. The natural laws and mathematical equations he derived have stood the test of time:

$$\text{Force in Newtons} = \frac{(G)(\text{Mass}_1)(\text{Mass}_2)}{(\text{distance})^2}$$

From this equation, we see that the gravitational force of attraction between two bodies is equal to G (constant) times the product of the two masses in kg divided by the square of the distance between them in meters. G is a constant that converts the value found to the force in newtons. The value of G was actually measured by Henry Cavendish using a torsion balance more than a century after Newton published his theory of gravity. Newton was able to ignore this value because he worked with ratios.

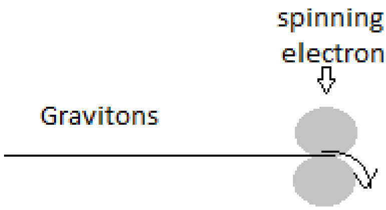
For example, the gravitational force of attraction between a very large 1 kg apple and the Earth is 9.8 newtons [note 1]. Compare this force to the huge force of attraction between the Earth and Sun [note 2]. The value in newtons is 35.4×10^{21} or 35,400,000,000,000,000,000,000. Seeing this force written with all its zeros perhaps highlights with greater emphasis the strong attraction between these two bodies even though they are separated by 5×10^{11} meters.

How does distance between objects influence the gravitational force created by a single graviton?

Although the distance between objects affects the number of gravitons making connections, as previously discussed, it has little effect on the ability of a single graviton to create a force of attraction between two objects in our solar system. The distance between our Sun and Neptune, our most distant planet, is about 4×10^{12} meters whereas the graviton stretches 5 million lightyears or 5×10^{22} meters. Thus, the distances in our solar system represents only a minute fraction (9×10^{-11}) of the total distance the graviton is stretched through space. This helps to explain why the gravitational force of attraction created in our solar system per graviton is independent of the distance between objects.

However, as explained in Chapter 4, when the graviton's force of attraction is measured between objects at great distance in our Milky Way galaxy, we find the gravitational force of attraction per graviton does increase two-fold. Here we are talking about a radius of 5×10^{20} m for the Milky Way versus 4×10^{12} meters in our solar system. Let me stress this point: The additional elastic effect created across great distances is too small to be observed in our tiny solar system.

Obviously, the main source of stretch placed on the graviton string is the momentum of the virtual particle that stretches the graviton some 5 million lightyears. However, there is one other factor that needs to be considered—the spin angular momentum of the subatomic particle that creates the virtual particle. The graviton is created at the marriage line of the electron, and for this reason the graviton is constantly winding up on the electron as it spins on its axis.



Since the graviton exists for one second and more than 10^{15} self-induction cycles, it means the angular momentum of the spinning electron is adding to the stretch on the string. When two objects are at close range, spin angular momentum is more important to stretch. As the distance between two particles increases, the influence of the electron's spin angular momentum decreases. This may help to explain why the force created per graviton is constant regardless of the distance between objects in our solar system.

A graviton extends from its source 5 million lightyears, which explains why stars in a cluster of galaxies tend to be found within 5 million lightyears from its center. This supports the idea that a graviton is composed of matter with a finite length.

In order for a graviton to extend 5 million lightyears and return in one second, its velocity has to be about 1 x 10^{23} m/s. It should be noted that I have no hard evidence for the one second interval, but such a time is essential for discussion.

The graviton becomes temporarily bound to electrons, quarks, and photons during self-induction. This provides the source of resistance necessary for a force of attraction between two objects.

The graviton begins retracting back to its source beginning at its free end. This allows small objects to free fall towards earth because more distal objects become unbound first.

The distance between objects in our tiny solar system does not affect the force of attraction created by a single graviton.

The universal law of gravitation dictates that the force of attraction between two objects is shared equally.

The momentum of the graviton virtual particle is responsible for the lion share of the potential energy stored in the graviton. However, the manner in which gravitons wind up on the electron adds to the stretch placed on the string especially at close range as inside the atom. .

Chapter 24: Gravity depends on object's density and size.

I began my thoughts on the density and distance through an object because of the lack of shielding created by gravitons. For example, the Sun's gravitons do not neutralize Earth's gravitons; otherwise, Earth's gravitons would not be available to form a force of attraction with our Moon: The attraction force between Earth and Moon would no longer obey the universal law of gravitation. To help elucidate the interaction between two bodies, I examined how the density of an object affects the force of gravitation.

Keep in mind the comparison does not require that the estimated number of gravitons is the actual amount, only that we are consistent. As we saw in Chapter 2, my method of calculating the number of gravitons seems to be in the ballpark if the energy of a graviton approaches Planck's constant.

Density and Force per Graviton

An examination of the universal law of gravitation shows that the

$$\text{Force in Newtons} = \frac{G \ \text{Mass}_1 \ \text{Mass}_2}{(\text{distance})^2}$$

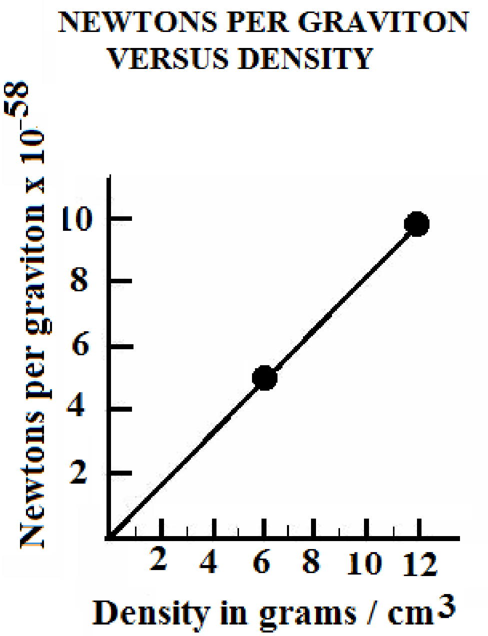
force between two bodies is a product of the two masses (gravitons are not simply added to obtain force) divided by the square of the distance. This suggests that a relationship exists between the density of the two bodies and the gravitational force between them. Simply put, if a graviton retracts through iron, it should meet more resistance versus its retraction through water.

To examine this relationship, I calculated the force of a single graviton as it retracts through a body of known density. By varying the density but keeping the distance and size of the two bodies the same, we can examine the effect density has on the force exerted by a graviton.

The force in newtons between two balls of known density was calculated using the universal law of gravitation. Then the total number of gravitons making a connection between the two balls was determined.

Finally, total newton force divided by total gravitons striking the object yields newton force per graviton for a given density.

To make the calculations, I assumed two balls with 2 cm radius were 10 meters apart (center to center). In one calculation, the mass of each ball was 0.2 kg. Using these parameters, I calculated newtons per graviton (4.85×10^{-58}) and the density of the two balls (5.968 grams/cm^3)[note 13]. In a second calculation, each ball was assumed to have a mass of 0.4 kilograms. Again, newtons per graviton (9.7×10^{-58}) and density of the two balls (11.94 grams per cm^3) were determined [note 13]. The data are presented in the next figure.



In this defined system, newtons per graviton increase in direct proportion to the density of the objects being pulled by gravity. This seems in retrospect a somewhat trivial experiment; still it has its rewards. The results are exactly what we should expect if gravitons are being held by electrons and quarks as they go through their self-induction cycles because the greater the density the greater the number of these subatomic particles. Also, it is telling us there are multiple points of resistance.

Shared Attraction, Unequal Force per Graviton

After I began using this method of comparing the force generated per graviton, it became evident that this method allowed me a different way of calculating the force of attraction. It quickly became evident that two bodies share equally in the force of attraction between them. A reexamination of the universal law of gravitation explains why this is true. I only provide this insight into my thinking because it has been frequently true throughout this book that my theory dictated some logical explanation long before I found out that scientists had long since proven it to be true.

Because the two masses are multiplied together, the universal law of gravitation dictates that the force of attraction is shared equally by two bodies:

The force of the Sun pulling on Earth = (gravitons striking Earth generated by Sun) x (average length of retraction through Earth) x (density of Earth).

In the same manner, the force of the Earth pulling the Sun = (gravitons striking Sun generated by Earth) x (average length of retraction through Sun) x (density of Sun).

The force of attraction between Earth and Sun is 35.1 x 10^{21} newtons as calculating by the universal law of gravitation [note 2]. Each body contributes half of this force (17.52 x 10^{21} newtons). The number of gravitons emanating from Earth that connect with the Sun is 4.52 x 10^{69} [note 19]. The average force exerted by each graviton becomes:

$$\textbf{newtons per graviton} = \frac{17.52 \times 10^{21} \text{ newtons}}{4.52 \times 10^{69} \text{ gravitons}}$$

$$= 3.876 \times 10^{-48}$$

The number of gravitons emanating from the Sun that connect with the Earth is 1.2 x 10^{71} [note 12]. The average force per graviton for a Sun's graviton pulling through Earth is:

$$\textbf{newtons per graviton} = \frac{17.52 \times 10^{21} \text{ newtons}}{1.2 \times 10^{71} \text{ gravitons}}$$

$$= 1.43 \times 10^{-49}$$

$$\textbf{ratio} = \frac{3.876 \times 10^{-48}}{1.43 \times 10^{-49}} = 27.1$$

The ratio between these two shows that the average graviton from Earth pulling the Sun exerts 27.1 times more force than a graviton from the Sun pulling the Earth. The reason this is true is that the average length through the Sun is far greater than the average length through the Earth. This makes up for the fact that the average density of the Earth is greater than the Sun.

This is in some respects a very amazing finding because it shows us that the force a single graviton can exert is directly proportional to the resistance it meets when it retracts. Secondly, it tells us that the resistance felt by the graviton is dependent upon the density of the object and the length of the pathway through an object, just as predicted by VES theory.

It should be noted that gravitons retracting through the Earth or Sun develop about 10^{10} greater force of attraction per graviton than gravitons retracting through the small balls in the first experiment (10^{-48} versus 10^{-58}).

SHARED ATTRACTION

Gravitational force between two bodies is shared equally by the two bodies regardless of their respective masses. A drop of water in the ocean pulls the moon with the same force the moon pulls on the drop of water. VES theory explains how this is accomplished at the graviton level.

VES theory and Newton's third law of motion

Newton 's third law of motion states that whenever one object exerts a force on another object, the second object exerts an equal and opposite force on the first. Because of the manner in which gravitons find resistance and create a force of attraction when they retract, we can see why they obey Newton's third law of motion.

Newton's Universal Law of gravitation supports VES theory

VES theory explains why two bodies share equally in the force of attraction between them as dictated by the universal law of gravitation. It explains why the force created by individual gravitons is directly proportional to the resistance applied when they retract. Thus, the equation for the universal law of gravitation supports VES theory.

VES theory explains why the density of an object is important to the gravitational force of attraction, and it explains why two objects share equally in the force of attraction between them.

FORCE OF A SINGLE GRAVITON

The force a graviton can exert on an object is directly proportional to the density of the object and length of its pathway through the object. It depends upon multiple points of resistance provided by photons, electrons, and quarks as they go through their self-induction cycles.

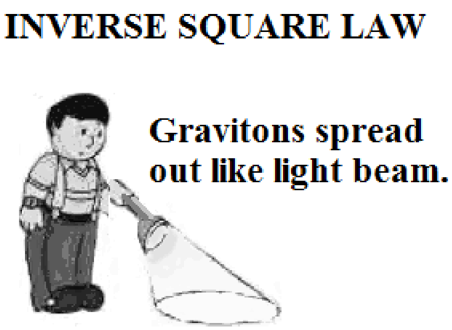
This model explains why photons are able to create a force of attraction with stars and other objects.

Chapter 25: Gravity depends on angles of a 3-D world

As the distance between two bodies increases, the gravitational force between them decreases because there are fewer gravitons making connections. The universal law of gravitation takes this into account by dividing the numerator of the equation by the square of the distance between the two objects.

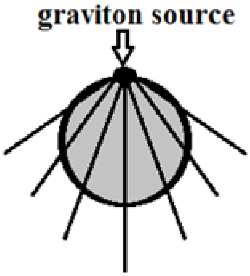
$$\text{Force in newtons} = \frac{G\ \text{Mass}_1\ \text{Mass}_2}{(\text{distance})^2}$$

Dividing by the square of the distance is known as the inverse square law. Gravitons spread out as a function of distance. This is the nuts and bolts of the law.

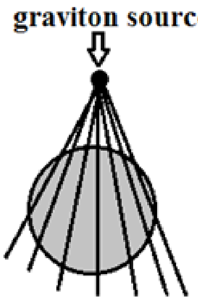


Because the area surrounding a body increases the farther we are from its center, it means fewer and fewer virtual elastic strings will connect two bodies as they are separated in space. One very obvious result of dividing the equation by the distance squared is that it corrects for the number of gravitons making a connection. However, the situation is far more complex. Just how gravitons penetrate a mass depends upon the distance between bodies. This is illustrated in the next three figures.

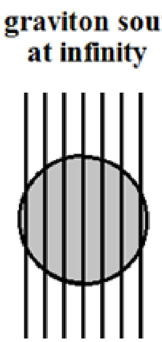
When the source of gravitons is on the surface of a sphere, as shown in the figure below, the average graviton pathway through the sphere is shorter and the average angle greater than when there is more separation between source and object.



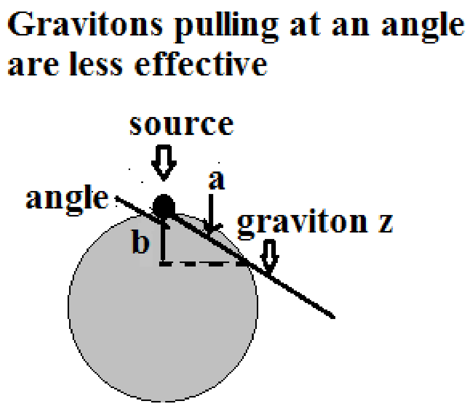
When the source is father away from the object, as shown below, the gravitons enter with less angle and their pathways through the object are on average longer.



When the source of gravitons is a great distance away, the gravitons arrive in parallel as shown in the last diagram.



If the force a graviton can exert is dependent upon a mechanical bond between the graviton and the object it is retracting through, then the force generated depends not only on the length of through a body, but also the angle through which it is pulling. This concept is illustrated below.



Simply put, if you are standing on the surface of the Earth, the gravitons pulling you towards Earth's center will have a greater effect on your weight than those gravitons pulling off at an angle.

> According to VES theory, the force that can be achieved by a single graviton depends on three factors: the resistance created by the object, the angle it pulls through the object, and the stretch placed on the elastic string. The third factor only becomes relevant when the graviton virtual particle travels more than 31,000 lightyears in the Milky Way Galaxy as explained in Chapter 4.

In the previous chapter, I developed the idea that the force between a body and another object can be calculated by multiplying the distance the graviton retracts through the object times its density, times the number of gravitons traversing the object. Now we see this is an oversimplification. The graviton's length of retraction through an object must be corrected to take into consideration the angle through which it retracts.

a = distance graviton takes through sphere

b = effective distance

$$\text{ratio} = \frac{\text{distance b}}{\text{distance a}} = \text{cosine of angle}$$

distance b = cosine x distance a

It is the sum of all these individual lengths times their cosines that gives us the average corrected distance through a sphere. Thus, the force of gravitation can be computed as follows: Force = (density) x (average corrected length through sphere) x (number of gravitons striking sphere). By multiplying these three quantities together, we should arrive at the same gravitational force between two bodies as that computed using the universal law of gravitation, provided the density is uniform. I set up an experiment and made these calculations in Excel where thousands of computations can be made quickly.

Experiment to Show Importance of Angles and Distances

In this experiment, a ball with a diameter of 450 meters and mass of 2×10^{11} kg is placed at various distances from a point mass of 1 kg. The gravitational force of attraction exerted by the point mass (1/2 of total force between the two bodies) was calculated using the universal law of gravitation. The results are found in the next two tables. I also calculated the force of gravitation exerted by the point mass on the ball using VES theory: Force = (density) x (average corrected length through 450 meter sphere) x (number of gravitons striking sphere). The calculations are described in note 32.

The question is do both methods give the same values for the force between objects? To answer that question, I calculated the average distance through the ball without correcting for angle, and I calculated the corrected distance through the ball using the cosine of the angles. These values are found in the next table.

Table: Average corrected distance through a mass depends on distance from ball.

Distance between objects, m	Distance through ball w/o correction	Corrected distance through ball
1×10^{-9}	225.0000	150.0000
0.01	227.0326	151.4134
10	263.6073	193.2903
10,000	299.9927	299.9636
100,000	299.9998	299.9996
1,000,000	299.9999	299.9999
10,000,000	300.0000	300.0000*

*Average distance through the ball at such a great distance is 2/3 its diameter (300/450) because the gravitons are arriving in parallel [note 24]. The corrected distance is the same because there are no angles to be corrected.

The values for VES theory calculated force are averages and are only this precise because I corrected the value at greatest distance to the value using the universal law of gravitation. This same correction was used to modify all the remaining values.

Table: Comparison of forces calculated

Total gravitons striking ball	VES calculation of force per graviton in newtons	Force per graviton using universal law of gravitation
6.88621×10^{49}	0.000131753	0.000131753
6.8213×10^{49}	0.000131741	0.000131741
4.89879×10^{49}	0.000120778	0.000120779
1.66741×10^{46}	6.3797×10^{-8}	6.37968×10^{-8}
1.73526×10^{44}	6.64009×10^{-10}	6.64×10^{-10}
1.74229×10^{42}	6.6670×10^{-12}	6.667×10^{-12}
1.743×10^{40}	6.66972×10^{-14}	6.6697×10^{-14}

As shown in above table, the calculated force of gravitation by both methods is identical for all distances between point source and the 450-meter ball. Thus, the inverse square law strongly supports the idea that the force a graviton can exert is dependent upon the angles and lengths through a sphere. This is easiest to explain if the bond between graviton and the 450-meter ball is due to friction created by mechanical bonds. How else do you explain the stunning relationship between the average corrected distance through the ball and the resulting gravitational force between bodies?

It should be noted that the average pathway through the sphere that is not corrected for the angle has no direct relationship with the force of gravitation.

Another way to examine this set of data is to measure the increase in force per graviton as the point source of gravitons is separated from the 450-meter ball. The results are shown in the following table.

Table: Increasing newtons per graviton with distance

Meters above 450 m ball	Newtons per graviton		Meters above 450 m ball	Newtons per graviton
1×10^{-9}	7.65890×10^{-55}		1×10^{4}	15.3159×10^{-55}
1×10^{-2}	7.73108×10^{-55}		1×10^{5}	15.3177×10^{-55}
1×10^{1}	9.86930×10^{-55}		1×10^{6}	15.3177×10^{-55}
1×10^{2}	13.1855×10^{-55}		1×10^{7}	15.3177×10^{-55}
1×10^{3}	15.1875×10^{-55}			

In this table, the total number of gravitons created by the ball was calculated as in Note 9. The proportion of the total gravitons striking the 450-meter ball was determined by using cone volumes as described in Note 10.

The results found in the above table clearly show that the angles are important in determining the force that each graviton can make. The greater the distance between the source of gravitons and the ball the more the gravitons are arriving in parallel and the greater the force per graviton.

Physicists know the force of gravitation is a vector force meaning that the angle through which the force is pulling is important to its effectiveness. The results of this little study were as predicted. Thus, it was not necessary to do these calculations to show that gravitons depend upon the angles and distances of a three-dimensional world; however, it does emphasize their importance. I could find no reference to this relationship in the literature, perhaps because you cannot explain it by using Einstein's general theory of relativity. In fact, his theory wants us to believe that distances and angles are warped because we live in a four-dimensional world.

Force of Gravitons Retracting through Sun

If the average corrected distance through a spherical mass increases with distance, then gravitons from the various planets retracting through the Sun should reflect this change: Force per graviton should increase as distance between planet and Sun increases. The results found in the next table show this is true. Although the Sun is the same object for all planets, gravitons from Mercury retracting through the Sun are able to muster less force per graviton than do those from any of the other planets.

The number of gravitons created by each planet was calculated as in Note 9. The proportion of these gravitons that connect with the Sun was determined by using the volume of a cone as explained in Note 10.

Table: Newtons per graviton for each planet*

Planet	Newtons per graviton	Planet/ Mercury
Mercury	3.982533×10^{-48}	1.000000
Venus	3.982635×10^{-48}	1.00002573
Earth	3.982655×10^{-48}	1.00003066
Mars	3.982667×10^{-48}	1.00003374
Jupiter	3.982675×10^{-48}	1.00003586
Saturn	3.982676×10^{-48}	1.00003600
Uranus	3.982676×10^{-48}	1.00003605
Neptune	3.982676×10^{-48}	1.00003604
Pluto	3.982676×10^{-48}	1.00003604

* Planet's gravitons retracting through the Sun

The calculations show that force per graviton increases the farther the planet is from the Sun until we reach Uranus. The force per graviton levels off after Uranus because the gravitons are arriving in parallel. The increase in force per graviton as the distance between Sun and planet increases is attributed to the change in the pathway through the Sun. Any component of this increase that may be due to an elastic effect is negligible because force per graviton levels off from Uranus through Pluto.

The distances within our solar system are too small to show that the force of a single graviton increases as it is stretched over a greater distance. However, in Chapter 4, I presented strong evidence that the force of attraction created by a single graviton increases twofold when stretched across the Milky Wave Galaxy where distances are so immense, they are measured in lightyears.

> The force of attraction created by a graviton when it penetrates a body is dependent upon the angle traversed and the length of pathway. The universal law of gravitation dictates this conclusion. How can you explain this observation?
>
> The most logical conclusion is that strings, composed of matter, are creating a force of attraction at an angle. The angles reduce their pulling power.

Force of Gravitation is ruled by a Three-Dimensional World

The universal law of gravitation shows very plainly that the force of gravitation depends upon the true distances and true angles of a three-dimensional world. Physicists know that gravity is a vector force, meaning the angles are important. I find it difficult to understand how a four-dimensional world, where time and space are warped, could account for this fact. Einstein completely ignored this fundamental property ascribed to the gravitational force of attraction. This is the obvious reason that this concept is ignored in physics textbooks.

There is one last point I want to cover before I leave this subject—falling objects in Earth's gravitational field.

Tumbling objects in space

If virtual strings emanating from a source hit or miss targets at random in accordance with the inverse-square law, how is it possible that a sheet of metal falling towards Earth in a vacuum falls at the same rate irrespective of its orientation in space? For example, the number of Earth's gravitons striking a falling 10 cm x 10 cm x 1 cm metal sheet would be 10 times greater when it is horizontal versus perpendicular to earth's surface, yet its rate of fall is unaffected by orientation. VES theory provides a simple solution to this puzzle. It predicts that total force is a product of the number of gravitons per unit area in space x the object's density x height x width x depth. In the example given, the number of Earth's gravitons striking the sheet of metal would be 10 times greater if it were horizontal rather than vertical to earth's surface; however, when it is vertical the density times height factor would be 10 times greater, which would increase the effectiveness of each graviton 10-fold. These compensating factors explain why the inverse-square law applies although objects falling towards earth seem to defy it. Once more, it illustrates that a retracting graviton engages multiple points of resistance when it retracts.

> Gravitational force is dependent upon the true distances and true angles of a three-dimensional world. Einstein's warped four-dimensional world cannot explain these facts.

Chapter 26: Photons emit virtual elastic strings

The light rays streaming from the Sun are composed of particles. If you were to hitch a ride on these particles, you would be traveling almost 300 million meters per second. In just eight minutes, you would travel from the Sun to the Earth.

The particles of light are called photons, from a Greek word meaning light, which first came into use in 1926. In this book, I make a point of using the word photon rather than electromagnetic radiation and other common usages simply because it keeps my mind, and hopefully your mind, on track—photons are particles not waves.

Sir Isaac Newton was one of the first to suggest that light was composed of particles, inspired by his experiments with prisms. That was in the 1600s. Since that time, many famous scientists have put their minds and experimental expertise to use to prove beyond doubt that photons are particles. We will have occasion to examine their work in the chapters that follow.

Besides visible light photons, there are many other photons that form a continuous array of electromagnetic particles. Many of these photons are familiar to us: radio waves, microwaves, visible light, UV light, x-rays, and gamma rays. A gamma photon can have the energy of an electron, and at the other end of the spectrum, there are radio photons that are trillions of times less energetic. In all cases, these particles are creating electric and magnetic fields composed of virtual elastic strings. Photons are also creating and retracting gravitons. I believe the photon creates and retracts its gravitons in the same manner as the electron (Chapter 22).

As a photon travels through space, there is a time when it is creating strings and a time when it is not creating strings. In other words, there are self-induction cycles that corresponds to the creation and reabsorption of the electric and magnetic fields.

Below, I have summarized the names of the virtual elastic strings for a quick reminder.

Virtual elastic strings

graviton: Gravitation fields

- n-graviton
- s-graviton
- graviton—bonded n-graviton s-graviton that creates the gravitational force of attraction.

elon: Electric fields

- n-elon: negative electric field
- p-elon: positive electric field

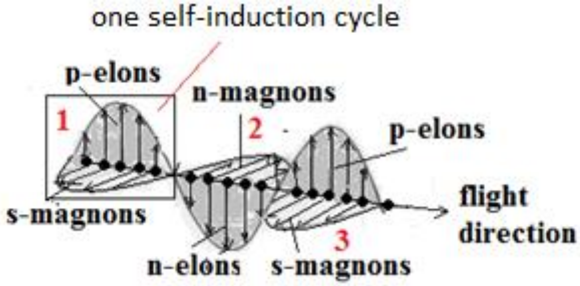
magnon: Magnetic fields

- n-magnon: north pole magnetic field
- s-magnon: south pole magnetic field

Photon's virtual elastic strings

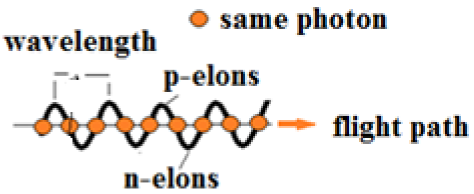
Photons are referred to as electromagnetic radiation for a good reason. They are constantly creating electric and magnetic fields as they travel through space. However, the fields created change continuously. There are two self-induction cycles: In one cycle, the photon creates a positive electric field (p-elons), and south pole magnetic field (s-magnons), and in the second cycle, it creates a negative electric field (n-elons) and north pole magnetic field (n-magnons). There is no overlap between the two self-induction cycles. As we shall see in the next chapter, there is strong evidence that photons create both negative and positive electric fields.

I don't know whether p-elons are associated with north pole magnetic fields or south pole magnetic fields, but this has no bearing on my theory. The illustration below follows a single photon as it travels through space.



The illustration shows three self-induction cycles although the 3rd cycle is the same as the first: There are only two different self-induction cycles that constantly repeat themselves as the photon continues on its journey. The positive p-elons created in one cycle are never found in the same time-frame as the negative n-elons that are created in the next self-induction cycle, and in the same manner, north pole n-magnons are never found in the same time-frame as south pole s-magnons. For this reason, n-elons in one cycle never bind with the p-elons in the next cycle. The same is true for the magnons: They never bind with their complementary twin.

If we examine only the electric forcefields, we get this picture of a single photon in flight. As you can see from this illustration, what physicists call wavelength for a photon is the distance the photon travels while going through two self-induction cycles.



The distance between the crests of the waves is the wavelength, and the number of crests that pass a given point per second is its oscillation frequency, a term commonly used by physicists. By convention, the photon's wavelength and oscillation frequency encompass two self-induction cycles.

The frequency photons carryout self-induction varies a great deal for different photons. This means wavelengths also differ.

The relationship between wavelength and oscillation frequency is a function of the velocity of light, and all photons travel at the same velocity, which is slightly less than 300 million meters per second, or in scientific notation, slightly less than 3×10^8 m/s

$$\textbf{wavelength} = \frac{\textbf{velocity of photon m/s}}{\textbf{oscillations per second}}$$

If we divide the velocity of the photon by the number of oscillations per second, we find its wavelength. Scientists have shown this relationship: The greater the mass of the photon, and therefore its spin angular momentum, the faster the photon goes through self-induction.

VES theory states that wavelength is merely the distance the photon travels at 3×10^8 m/s while it changes its electric and magnetic fields. It is the distance it travels while going through its two self-induction cycles.

Different types of photons all have different rates they go through self-induction, and there is a continuous array of frequencies beginning with radio photons and ending with gamma photons. Some representative examples are shown in the following table.

Table: Photon frequency and wavelength

Name	Oscillations per second	Wavelength, in meters
Radio photon AM*	8×10^5	375
Radio photon FM*	1×10^8	3
Microwave photon	1×10^{10}	0.03
Infrared photon	1×10^{12}	0.0003
Red visible light	4×10^{14}	7.5×10^{-7}
UV light photon	8×10^{14}	3.75×10^{-7}
x-ray photon	1×10^{17}	3×10^{-9}
Gamma photon	1×10^{19}	3×10^{-11}

*Of course, every AM and FM station has slightly different wavelengths, just as each of the named photons come in a continuous array of frequencies.

From this discussion, it becomes evident that the greater the energy and mass of the photon the faster its self-induction cycles. A small radio photon travels 375 meters while it goes through its two repeating self-induction cycles while the infrared photon only travels 0.0003 meters and the gamma photon 3×10^{-11} meters. This shows the rate of self-induction is strongly influenced by the photon's spin angular momentum.

The magnons and elons created by photons have a strong influence on the photon's velocity. This is discussed in the next section.

Magnons and elons have a super role to play

An astounding relationship exists between the electric and magnetic properties of light and the velocity of light that was elucidated by James Clerk Maxwell, an astute British physicist. His work was summarized and published in his book entitled "A treatise on electricity & magnetism" in 1873. During his research, Maxwell discovered that he could calculate the velocity of light, **C,** using its electric and magnetic properties.

$$c = \frac{1}{\sqrt{\mu_0 \varepsilon_0}} = 299{,}395{,}293 \text{ meters/second}$$

Today, we know the measured velocity of light is exactly 299,792,458.000 m/s. Let's examine how Maxwell arrived at this relationship.

1. Energy density of the electric field = ½ ε_o E^2 where ε is the electric constant with a value of 8.854 x 10^{-12} F/m, and E is a vector force that represents the electric field. The value of the electric constant was determined in the laboratory by experimentation. This made it possible for Maxwell to calculate the velocity of light.

2. Energy density of the magnetic field = ½ β/υ_o where υ_o is the magnetic constant with a value of 4pi x 10^{-7} H/m, and β is a vector force representing the magnetic field. The magnetic constant is a value derived mathematically to satisfy the requirement that the energy of the magnetic field was equal to the energy of the electric field.

The energy density of the electric field = energy density of the magnetic field. Thus: ½ ε_o E^2 = ½ β^2/υ_o

Because the energy density of the electric field and magnetic field are equal, we can combine the two equations and show the following relationship:

$$\cancel{\tfrac{1}{2}}\,\varepsilon_0 E^2 = \cancel{\tfrac{1}{2}}\,\frac{\beta^2}{\mu_0} \quad \rightarrow \quad \frac{\beta^2}{E^2} = \mu_0 \varepsilon_0$$

taking the square root and rearranging

$$\frac{E}{\beta} = \frac{1}{\sqrt{\mu_0 \varepsilon_0}} = c$$

This shows very clearly why both of these equations equal the velocity of light, or **C**.

Vector Force

The magnitude of a vector force depends on the number of virtual elastic strings pulling two objects together, and on the direction, they are pulling. To pull a wagon down the road with greatest efficiency, you don't get off to the side and pull at an angle. All forcefields are vector forces just as you would expect if forcefields are composed of virtual elastic strings.

The electric field E is a vector force and the value of E is proportional to the lines of electric force, which is proportional to the number of elons creating this field. In the same manner, the magnetic field is a vector force and the value of β is proportional to the lines of magnetic force, which is proportional to the number of magnons creating this field. This is a very important concept because it allows us to get a handle on the electric and magnetic strings emanating from a photon. It leads to the conclusion that the number of elons we measure divided by the number of magnons we measure is equal to the velocity of light, C.

$$c = \frac{\mathbf{E}}{\mathbf{B}} = \frac{\textbf{number of elons}}{\textbf{number of magnons}}$$

The measured velocity of light is known today with great precision: 299,792,458.000 m/s, which is very satisfying because elons and magnons are whole entities. This explains why the ratio can be a whole number.

If the energy of the electric field and the energy of the magnetic field are equal, and if the ratio of elons to magnons is 3 x 10^8, then we also arrive at this relationship:

(3 x 10^8 elons) x (energy of one elon) = (one magnon) x (3 x 10^8)

It is reasonable that the mass of these strings is proportional to their energies. Thus, I assume the mass of 3 x 10^8 elons = mass of 1 magnon.

MASS DEFINED

Mass is a quantity of matter normally expressed in kilograms. When dealing with photons, electrons, and other subatomic particles, mass also reflects the idea that we are dealing with a coherent body of matter; for example, a whole photon.

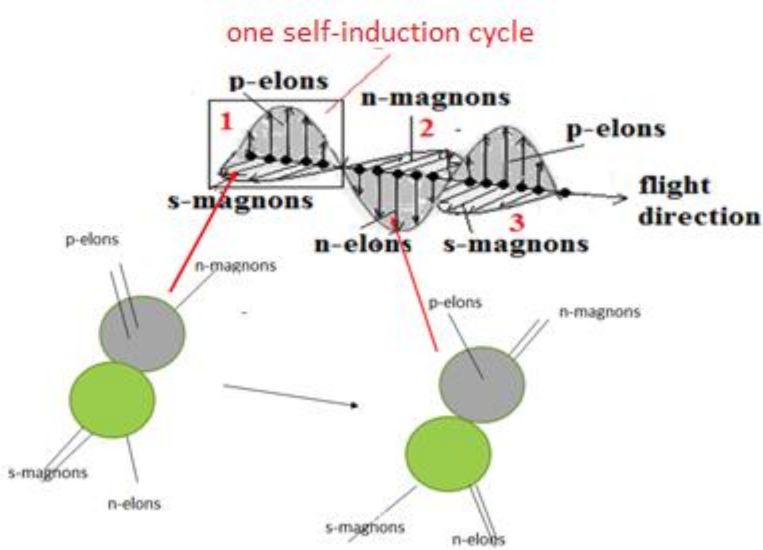
Of course, the ratio between magnons and elons tells us very little about their actual numbers. We can only say that for every magnon there are 3 x 10^8 elons, but the energy of the fields and the mass of the two are identical. If the number of magnons is 100 per photon, then the number of elons becomes 30 billion.

Because it is possible to calculate the velocity of light using its electric and magnetic properties, it tells us that the photon's elons and magnons have a profound influence on the photon's velocity. This concept becomes very important when attempting to understand photons and electrons in flight. In addition, this observation is central to understanding the experiments dealing with relativity, as explained in detail in the chapters that follow.

Einstein completely missed the implications of Maxwell's equations**.** In fact, one of his major postulates of special relativity states that the velocity of light needs no explanation beyond the isotropy of space. I have to believe a good CSI detective would post Maxwell's findings front and center in an attempt to understand the velocity of light and leave no stone unturned in an attempt to connect the dots; however, Einstein completely ignored and denied Maxwell's findings because he could not reconcile them with his special theory of relativity. Dr. Daniel Kahneman's statement concerning we humans certainly rings loud and clear: "We can be blind to the obvious, and we are also blind to our blindness."

Photon self-induction cycles

It is proposed that self-induction by photons takes place in the same manner as that for the electron; however, by convention, the photon goes through two self-induction cycles during every oscillation period. As shown in the illustration below, the photon is making an excess number of p-elons and s-magnons (both free strings) in one cycle, and in the next cycle it is making an excess number of free n-elons and n-magnons that scientists measure with their instruments. From Maxwell's equations, we know the energy density of the electric and magnetic fields are the same. What is being measured by our instruments are free strings that never bind to their complementary twin.



Maxwell proposed that the electric field induces the creation of the magnetic field and vice versa. In contrast, VES theory proposes that the photon is creating complementary strings that cannot be detected by our instruments because they bond and neutralize each other. This is completely analogous to the positive virtual particles emanating from the electron as shown by scientists. This means in one self-induction cycle there are two units of n-elons and one unit of p-elons created and in the next cycle there is one unit of n-elons and two units of p-elons. The same considerations hold for magnons. The photon's electric fields that bond and cannot be detected by our instruments resemble the photon's strings that cannot be detected because of interference, as discussed in Chapter 27.

Notice, the two spheres of the photon are in complete balance, and they remain in balance after the complementary strings bond. This is true because the mass of one unit of magnons is equal to the mass of one unit of elons. The fact that the photon's two spheres are always in balance becomes very important in understanding the velocity of photons. It explains why a photon travels at 300 million meters per second while an unbalanced electron in the solar wind travels at 750,000 thousand meters per second even though they may both have the same mass. I explain this in greater detail in Chapter 31.

Electrons and positrons are known to combine and create two large gamma photons of the same mass. It is possible that the mass of the electron and positron do not fuse completely, and from this, you get two different self-induction cycles from the same photon.

In the case of electrons, two units of n-elons are created on one sphere and one unit of p-elons on the other sphere. In the case of positrons, there are two units of p-elons created on one sphere and one unit of n-elons on the other sphere. When these two subatomic particles meet and fuse to form two photons of equal mass, the photons created act like electrons in one self-induction cycle and positrons in the next cycle. This would explain why the photon creates excess n-elons in one cycle and excess p-elons in the next cycle. In contrast to eons, the fusion of electron and positron may result in the creation of magnons that differ from those of the electron or positron.

The balance of the self-induction process is the same as for an electron. The bonded complementary strings that arise from opposite spheres encase the photon with billions of retracting strings. Gravitons retracted back to the photon are also applying pressure. This analysis suggests that gravitons, magnons and elons work synergistically to create pressure and store potential elastic energy inside the photon. Thus, creation of the forcefields occurs because of self-induction, although different than envisioned by Maxwell.

The length of the self-induction cycle is directly correlated with the mass of the photon, which shows us the importance of spin angular momentum to self-induction just as explained for electrons.

Chapter 27: Photon properties dictated by elastic strings

The concept of particle wave duality has been a source of debate in physics for more than three hundred years. On the one hand, photons behave as particles, and on the other hand, they appear to be waves. In this Chapter, we see that photons are always particles, and their wave properties come from their virtual elastic strings that are composed of matter.

The photon's magnetic fields are composed of magnons that are ejected at right angles to the photon's line of flight, and the electric fields are composed of elons that are also ejected at right angles to the photon's line of flight. It is also true that magnons and elons are ejected at right angles to each other.

In order to explain self-induction, refraction, and reflection, I propose that photons, electrons, and quarks are composed of two spheres as discussed elsewhere. See Chapter 22 for a brief review of this subject.

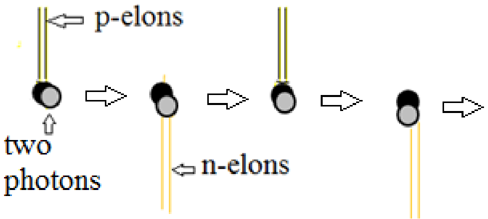
I assume the magnon strings are ejected from the poles as shown for electrons, and I assume the electric fields emanate from the centers. And I assume gravitons are emitted near the marriage line of the two spheres just as proposed for electrons.

Photons in flight are either spinning up or down, and they are traveling at 300 million meters per second. Notice, one sphere cannot be ahead of the other sphere because this would cause the photon to tumble through space. I take up this subject again when I discuss photon velocity.

The cause of reinforcement

When photons of the same wavelength are brought into proximity, they may either reinforce the electric fields or cancel these fields. When they are in complete synchrony, the strengths of the fields increase because they are both contributing to the same free electric fields in the same time frame.

Reinforcement

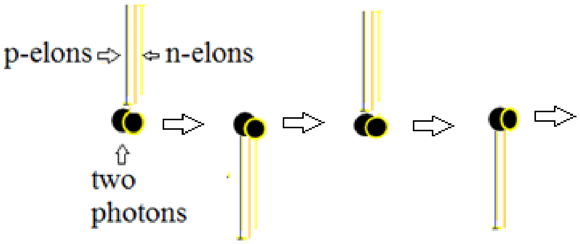


The manner in which elons reinforce the electric forces emanating from photons meets that expected if the photon is making p-elons and n-elons. The fact both forcefields are created by a photon finds even greater support because of interference.

The cause of interference

When photons are completely out of synchrony, the p-elons on one photon bind to the n-elons on the other photon. Cancellation occurs because our instruments cannot detect positive fields bonded to negative fields. Of course, partial cancellation occurs if the two photons are only partly out of synchrony.

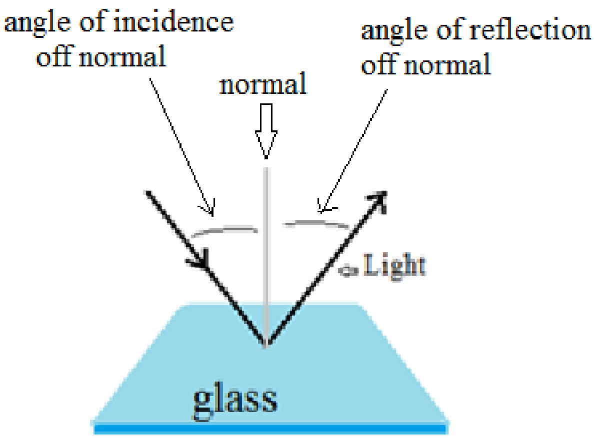
Interference



When in this configuration, our instruments can detect no electric fields. It is difficult if not impossible to explain interference unless you concede that photons create both positive and negative electric fields.

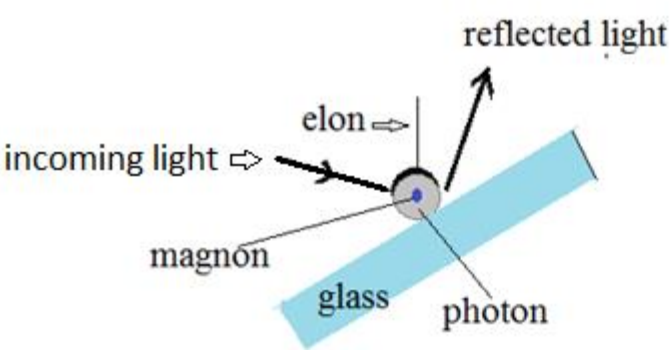
This observation meets that expected if a photon creates a positive electric field in one self-induction cycle and negative electric field in the next self-induction cycle. It provides strong evidence that bonded complementary strings cannot be detected by our instruments. This is a very important observation.

Reflection



Photons that bounce off a shiny surface obey the law of reflection. This law states that the angle of reflection from normal and angle of incidence from normal are always the same. The reference point “normal” is always 90 degrees from the plane of the glass as shown in the above illustration.

It is my theory that the photon’s electric fields are responsible for reflection and refraction. When light strikes glass at an angle, photons may either bounce off its surface or pass through it depending on the orientation of the photon’s electric fields. If the elons are directed away from the glass at time of impact, it reflects. This is the source of reflected light.

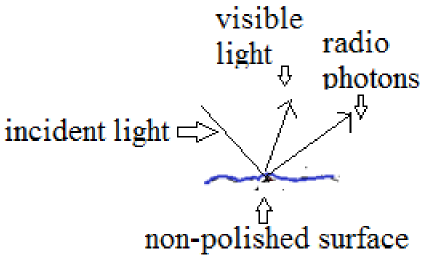


As you can see, those photons reflected will tend to have their elons and magnons in the same plane. When light strikes the surface of a lake at an angle, the light reflected off the surface tends to be polarized. This tells us that the reflected photons glanced off the water when their electric strings were extended in space. It also tells us photons tend to dive into the lake if their electric stings are ejected into the water.

Mirrors reflect perfect images because the atoms are all in the smooth plane; however, most materials have a rough surface or irregular atom placement and they reflect light in all conceivable directions. This diffuse reflection accounts for most of the reflected light we see about us.

I could not help showing this photo of Mount Hood I found on the Internet. Unfortunately, I do not know the person who took this photo.

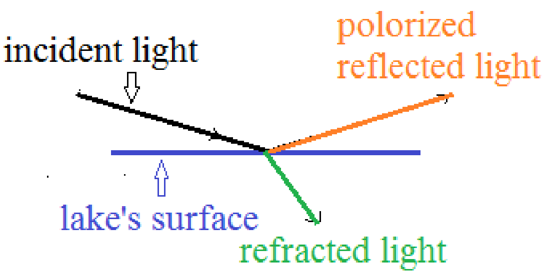
As discussed in the previous section, the momentum of a visible light photon is 100 billion times greater than a radio photon. For this reason, a visible light photon striking a hard, non-polished surface will react more to the immediate angle it encounters rather than the total surface angle. In contrast, because of its small mass, the radio photon will be influenced more by its magnons that are spread across the surface of the rough surface. For this reason, the angle of reflection for the radio photon will be more nearly like the plane of the whole surface.



Polarization

If the electric forcefields about the photons are all oriented in the same direction, light is said to be polarized. This can be accomplished by shining light through a crystal whose crystal lattice is oriented in the correct direction. Polarization can be so complete that when a second crystal is oriented 90 degrees to the first, the polarized light cannot pass through the second crystal. From this, we can conclude that polarization results when all photons emit elons in the same direction.

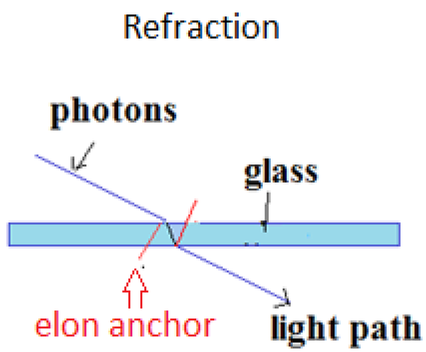
Light reflected off the surface of a lake tends to be polarized as discussed in the previous section. The light that enters the water bends because the photons enter a denser medium. This is called refraction.



Refraction

VES theory tells us that photons enter a denser medium when their elons are ejected into the medium while those photons with their elons oriented in the air are reflected.

When a photon leaves the air and enters a denser medium at an angle, the flight path of the photon changes direction. This is called refraction. A fish at the bottom of a pool is deeper than it appears, and in the same manner, light that enters or exits glass at an angle curves. This is depicted in the following illustration.

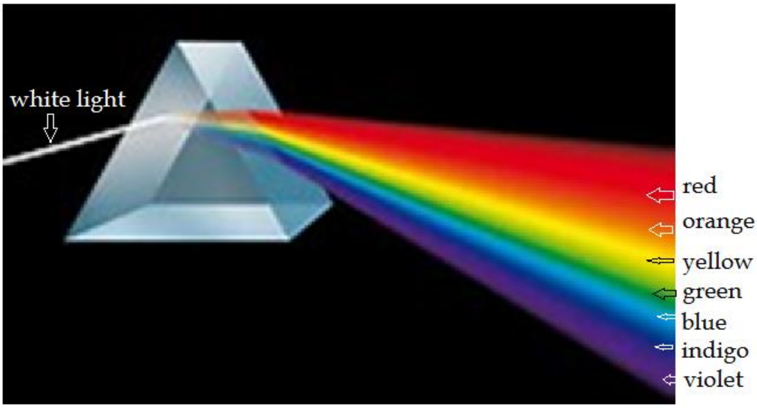


Here we see that the photon does not change its direction until it contacts the glass, and it changes direction again at the moment it exits the glass, and in between, it is traveling in what appears to be a straight line.

A photon changes its flight path because its elons are ejected into the denser medium at 90 degrees to its line of flight. Those electric strings that penetrate the glass act as anchors, which causes the photon to pivot and change its flight direction. They act as anchors because there is resistance to their retraction back to the photon. Presumably there is some bonding between the photon's elons and the elons created by the mediums subatomic particles as they go thought their self-induction cycles. For this reason, p-elons and n-elons can both act as anchors.

In the same manner, photons that bounce off the surface of a lake tend to have their electric fields oriented out of the water, and for this reason the light tends to be polarized. This provides strong evidence that photons plunge into the water because their electric fields are directed down into the water. Elons are the source of refraction.

We can learn a great deal about refraction, by examining prisms. When white light is passed through a prism, the photons separate into the various colors as shown in the next illustration obtained from Wikipedia.



To understand why red light separates from violet light in a prism, we must keep in mind every elon acts as an anchor forcing the photon to curve. A photon with a longer self-induction cycle, such as red light, travels a greater distance to create all of its virtual elastic strings. This means, red light will curve more slowly, and for this reason, it will become separated from those that curve more sharply. Curvature depends on the length of the self-induction cycle.

My model for refraction and reflection states the following:

1. The electric strings are responsible for refraction because they meet resistance when they retract in anything denser than a vacuum.
2. The denser the medium, the greater the refraction because the elons meet greater resistance during retraction.
3. The positive and negative electric strings are equally responsible for refraction.
4. If the photon ejects its elons into the glass, it will enter the glass and bend as shown in the diagram.
5. If the photon ejects its elons away from the glass, it will be reflected.
6. The photon bends after it enters the glass because its elons directed into the glass meet resistance when they retract. They act as anchors.
7. Red light changes direction slower when it enters glass because it takes longer for it to make a full complement of anchors, its elons.

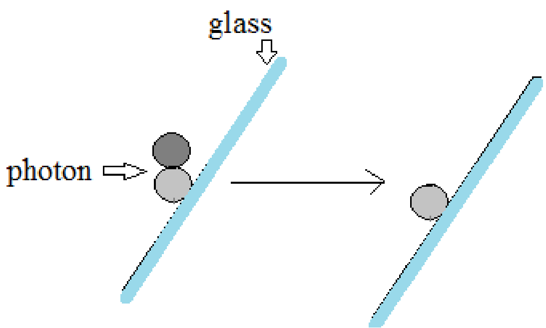
8. A photon is composed of two spheres, and this causes a photon to realign itself when it first contacts the glass. This is discussed in the next section.

Reorientation of photons when they strike the glass

In this section, we see one reason why it is likely that photons are composed of two different spheres. It provides a reasonable explanation for the reorientation of photons when they strike a glass surface.

White light from the sun consists of many different photons whose electric and magnetic fields are oriented in various directions. However, when white light strikes a prism, the photons all become oriented in the same plane, which allows them to all be refracted or reflected in the same manner.

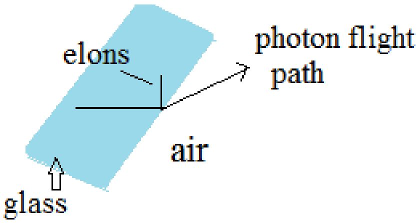
The reorientation of the two spheres of the photon at the moment of impact with the glass sends the photon's magnons right or left and the elons up or down, that is in or out of the glass. For this reason, it is the photon's electric strings that act as anchors and force the photon to go off in different directions just as found for photons that reflect off the surface of water.



If the photon strikes the glass with its spheres oriented as shown above, it will reorient itself because the sphere that strikes the glass first is spinning on its axis. Spin will cause the photon to swing either left or right depending on its spin direction.   In either event, the electric strings will either be directed down into the glass or up away from the glass. Those photons with their strings directed into the glass will enter the glass and refract. Those photons whose elons are directed out of the glass will be reflected. In addition, the photon's magnons will become oriented along the surface of the glass, and for this reason they do not influence whether a photon enters the glass or is reflected. As mentioned, one sphere of the photon can never be in front of the other because a photon does not tumble through space.

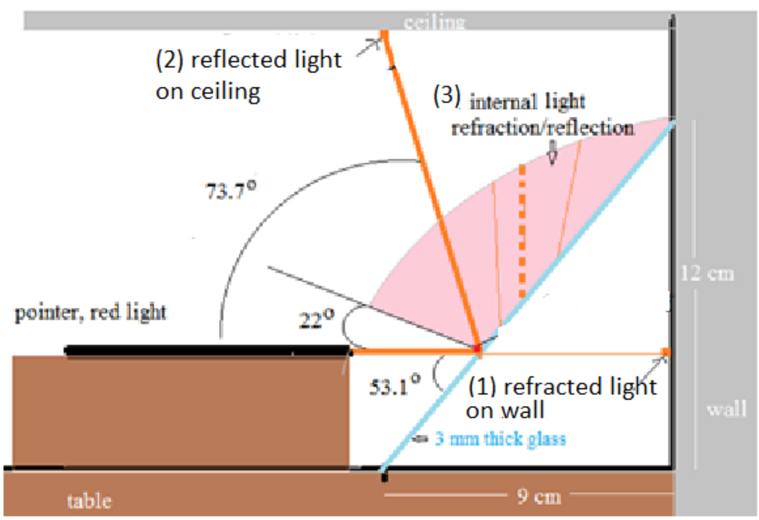
When photons exit glass

Photons that enter glass do so with their electric strings directed down into the glass; otherwise, they are reflected. However, when they approach the other side, their elons may be directed up or down at the air glass interface.



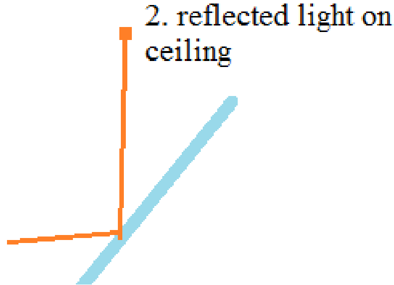
In this illustration, the elons directed upward will have a more dramatic effect than elons directed downward out of the glass, and for this reason photons will tend to bend as shown. However, the self-induction cycles will vary as the photon approaches the edge of the glass. This explains why many photons do not refract as shown above.

I used an inexpensive red pointer light to determine the outcome when this light is directed against a 3 mm glass pane set at a 53-degree angle as shown below.



I have numbered the lights that are reflected and/or refracted when they strike the glass. Light (1) refers to the refracted light that passed through the glass and struck the wall. This is a bright light. The refracted light (1) entered the glass and bent because its electric strings were directed into the glass where they acted as anchors. They bent as they exited the glass at the back because of the orientation of the elons as shown previously.

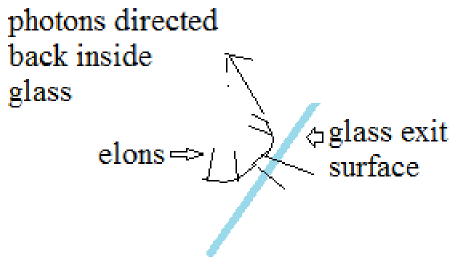
Number (2) refers to the light that reflected off the front of the glass and struck the ceiling. It is also a bright light.



According to theory, the light is reflected off the surface of the glass because its electric strings were directed away from the glass at the time of impact.

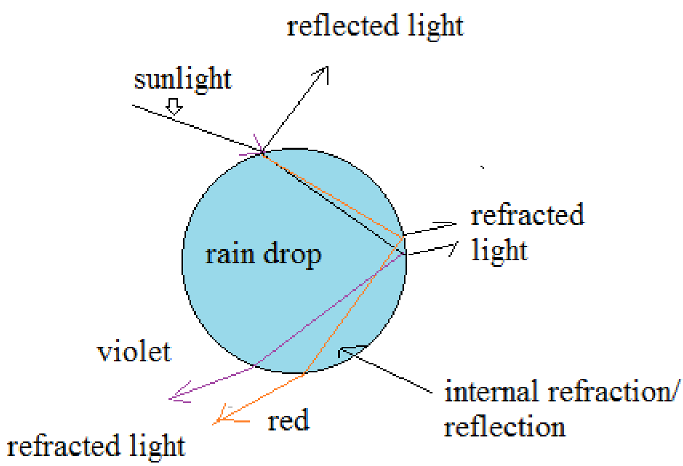
Finally, we come to the light that enters the glass but never passes through it. I have labeled this number (3). I proved this light did not pass through the glass by taping the back side of the glass, which had no effect on this internally reflected/refracted light. In addition, when I blocked the reflected light on the ceiling or the refracted light that passed through the glass, they had no effect on the diffuse light labeled number (3).

When my eye was more than 22 degrees above the original pen light beam, the diffuse number (3) light could be seen from all other angles, including left and right as well as up and down. This light is dimmer than any of the others, but we might imagine that this light in aggregate would constitute as much light as the others. This light does not exit the back side of the glass because the elons directed into the glass provide stronger anchor points than those elons directed out of the glass as shown in the next illustration.



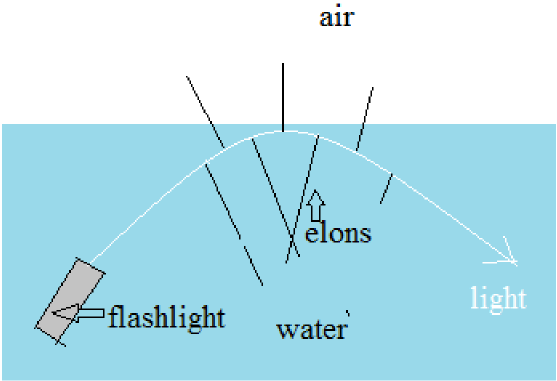
This diffuse number (3) light is often labeled as being due to reflection; however, it is a form of refraction because the elons act as anchors and pull the photons back inside the glass.

A drop of water does essentially the same thing when it disperses white light to make a rainbow.



The photons labeled internal refraction/reflected in the diagram do not exit the back side of the water because their electric fields are directed into the drop of water at the interface as explained previously.

This also explains the properties of a flashlight in a bathtub filled with water. When the light is directed up out of the water, very little if any of the light escapes into the air if the angle is greater than 48 degrees from normal.



In this illustration, the elons directed out of the water will act as anchors with far less force than those that are directed back into the water, and for this reason, the photons are unable to escape into the air.

What is not known is the distance the elons must be injected into the denser medium to achieve maximum resistance when they retract. The distance is likely greater than a small drop of water, which produces poor rainbows, and perhaps shorter than a large drop of water that produces a good rainbow.

Photons travel slower in a denser medium.

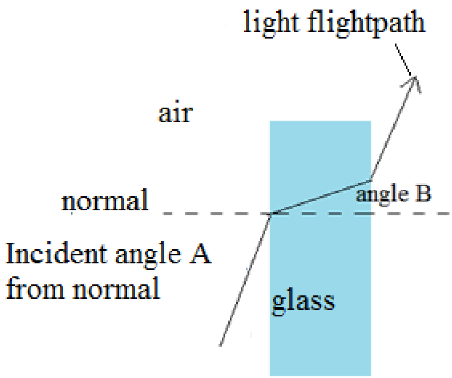
If a photon's virtual elastic strings meet with resistance when they retract, it means that photons must travel slower in a denser medium. This is the case. The velocity of photons in a vacuum divided by the velocity of photons in a denser medium is known as the refractive index. The greater the refractive index the slower the photon travels in the denser medium and the more it curves when it enters the medium. In the following table, I have listed the refractive index provided by scientists for different materials. Even adding sugar to water increases its refractive index and its ability to curve photons.

Refractive Index

Medium	
Air	1.00029
Water (20^0 C)	1.33
Sugar solution (30%)	1.38
Sugar solution (80%)	1.49
Typical glass	1.52
Heavy flint glass	1.65

The knowledge that photons slow down in a denser medium is exactly what you would expect if the electric fields created by the photon find resistance when they retract back to their source.

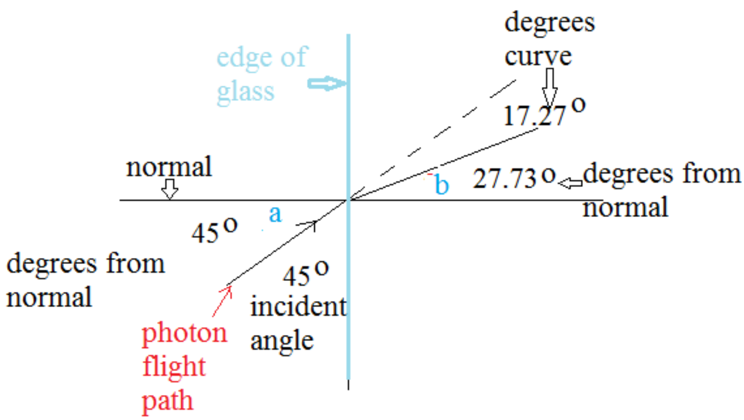
Angle of incidence dictates the degree of refraction



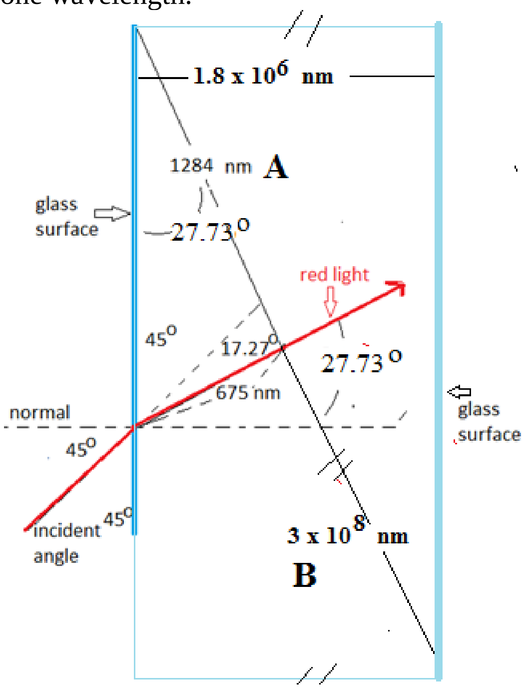
The incident angle A is the angle used by W. Snell in 1631 to calculate the amount of curvature. If the angle from normal (angle A) is known, it is possible to calculate angle B if the refractive indexes, n, are known.

sine A n1 = sine B n2,

For example, if we are dealing with photons passing from air into glass, the following applies for a 45-degree angle from normal: The sine for 45 degrees is 0.7071; thus, 0.7071 x 1.00029 = sine B x 1.52 for air to glass. This yields a sine of 0.4653 for sine B, which corresponds to an angle of 27.73 degrees.



The angle of 27.73 can be used to calculate the distance to the edge of the glass after one wavelength.



As can be seen in the illustration above, elons ejected to the left of the photon will meet with air over a much shorter distance than elons ejected at right angles to the right. If the glass is 1.8 mm thick, distance A is 1284 nanometers, and distance B is 3×10^8 nanometers. The ratio becomes:

$$\frac{\mathbf{A}}{\mathbf{B}} = \frac{\mathbf{1284\ nm}}{\mathbf{3 \times 10^8}} = \boxed{0.00033193}$$

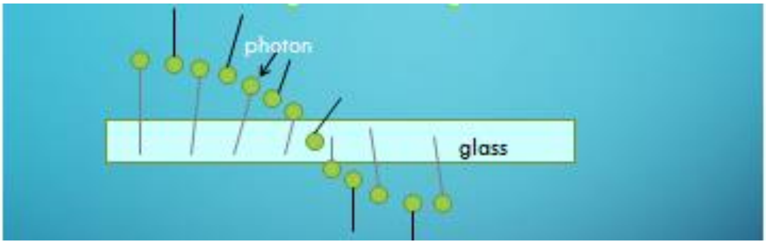
These are only crude estimations of the actual events taking place, but they reinforce the point that elons ejected to the left in the diagram will meet with far less resistance when they retract than elons ejected to the right.

I am assuming that in the first self-induction cycle after contacting the glass, elons were directed down into the glass; otherwise, the light would have been reflected away from the glass. In the second self-induction cycle, the strings would be directed in the opposite direction, which corresponds to **A** in the example. Just how many self-induction cycles are necessary to accomplish the total deflection is unknown.

When the incident angle from normal is very large, distance A to the side of the glass is very small, which allows the photon to curve more sharply. When the incident angle is small, the distance to the edge of the glass, both right and left are relatively large and the photon will curve very little.

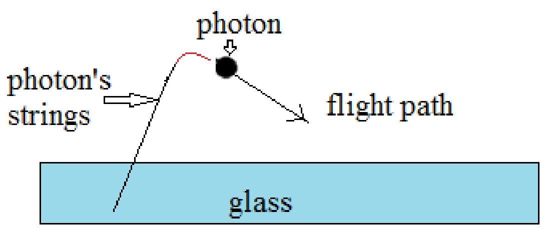
Why doesn't the photon curve before it enters the glass? No doubt this is the big question!

As shown in the next illustration, if there were no other forces acting on the photon as it approaches the glass, the photon would begin curving before it hits the glass and continue to curve after it exits the glass because of the electric fields. This doesn't happen because of the graviton matrix.



This doesn't happen

A dense graviton matrix brushes the photon's elastic strings to the rear as the photon travels through space. This causes drag to the rear and not into the glass. This prevents the early deflection of the photon as shown in the next illustration.



The drag to the rear continues to dominate the effect of the electric fields until the photon comes in contact with the glass. At this point, the elon strings will penetrate the glass and become anchors.

Scientists have shown that a photon passing by a dense medium only curve when the photon is less than one wavelength from the medium. Diffraction is the term used for this observation. I'll come back to diffraction shortly.

It seems likely to me that the reason physicists have not championed the electric fields as the cause of refraction and reflection is because forcefields were not thought to be composed of matter. This has made it impossible to conceive of the graviton matrix, and the potential effect of a vast concentration of gravitons. Without the graviton matrix it is difficult if not impossible for photons not to curve before they come in contact with the glass.

Passage of a photon through a dense medium

Although the photon seems to travel in a straight line once it enters a denser medium, it seems likely that it actually curves in a slightly different direction with every self-induction cycle because the p-elons and n-elons act as anchors in opposite direction. However, during one oscillation cycle it is pulled to the same extent in the opposite direction and for this reason continues on in a straight line. Once again it tells us, the positive and negative electric strings find equal resistance when they retract. According to this model, the photon's n-elons and p-elons are likely binding in some limited way with their complementary strings emanating from protons and electrons.

It is doubtful the photon's magnons are a significant source of resistance, otherwise the manner in which photons exit glass would show a less definitive pathway.

Summation of some major points

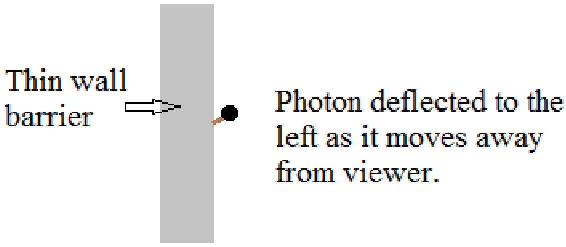
- First, we know from interference and reinforcement experiments that photons create both negative and positive electric fields.
- Scientists have shown that the electric fields are ejected at right angles to the photons flight path. In addition, the negative and positive fields are ejected in opposite directions to each other. The two fields alternate and are never found in the same time frame for a single photon.
- A photon composed of two spheres explains how photons become oriented in the same plane when they contact glass at an angle. This explains the uniform dispersion by a prism. It also explains why the electric fields are ejected into or out of the denser medium at the moment of impact, while its magnetic fields are ejected in the same plane as the surface of the medium.
- Photons tend to be polarized when they are reflected off water because their electric fields are ejected into the air at the time of impact.
- The dispersion of white light by a prism is exactly what can be expected if elons are responsible for refraction. Red light curves more slowly than violet light because it creates its elons over a longer time period. This causes separation between the two photons; however, red light will finally curve almost to the same degree as violet light because it eventually creates a full complement of strings, possibly the same number of elons as blue light, and each elon is responsible for its share of refraction.
- The degree of refraction is dependent upon the incident angle because this dictates the distance the strings travel inside the medium before they pass into the air.
- The photon’s electric fields meet more resistance when they retract in a denser medium. This can be expected if the photon’s electric fields interact with the electrons and quarks, which allows them to act as anchors.
- Although a photon likely begins its penetration into glass with its elons directed down into the medium, the photon’s self-induction cycle may be in any stage when it comes near the exit point. This explains why some of the photons are refracted when they leave the glass while other photons are reflected/refracted back inside the glass to finally exit out the front at some other point.
- A photon does not curve as it approaches glass because its virtual elastic strings are swept to the rear by the graviton matrix. Any

drag created is to the rear and not towards the glass. This solves a crucial problem.

Diffraction

The observation that photons bend around solid objects is called diffraction. It was first observed by Grimaldi, an Italian scientist, in 1665. This bending of light occurs without the photon ever entering the object

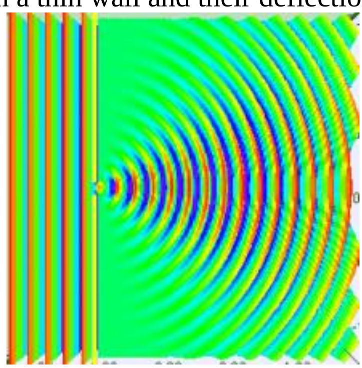
Imagine a photon traveling past a thin wall as shown in the following illustration.



It seems likely that diffraction is primarily caused when the photon's elons are injected into the barrier. These electric strings meet with resistance when they retract, which causes them to act as anchors and cause the photon to pivot around the barrier. It is noteworthy that diffraction only occurs if the photon is closer than one wavelength from the dense object because of the graviton matrix.

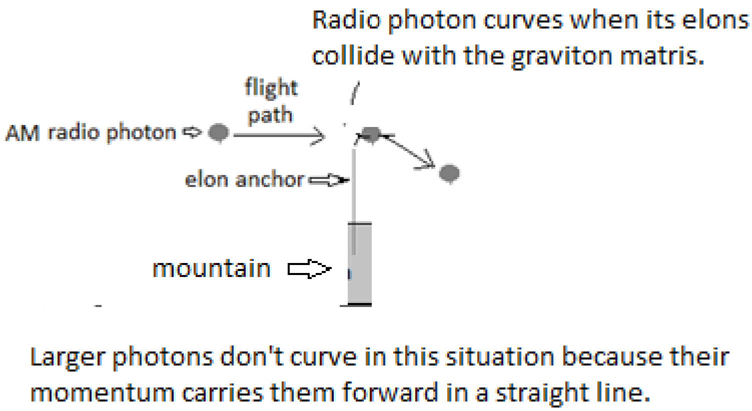
There is also the possibility that a photon will eject its strings alongside a barrier, which would cause the photon to pivot, but I expect this has less effect than the elons that are injected into the thin wall barrier where they act as anchors..

In the following picture taken from Wikipedia, photons were directed through a slit in a thin wall and their deflection was recorded.



In this single slit experiment, those photons that pass near the left wall are diverted left because of its strings, and those photons that pass near the barrier on the right are diverted right. The degree of diversion depends on the position of the photon with respect to the two walls and timing. If the photon passes directly through the middle, there is less tendency for the photon to curve because of the graviton matrix coupled with distance from the barrier.

AM radio photons are known to curve around buildings, mountains and other barriers. This is possible because AM radio photons have a very small mass and consequently very small momentum. They will curve in space when they pass a barrier, even at some distance from the barrier, because the graviton matrix will enhance the effect of the barrier. The barrier causes resistance to retraction, which causes the small photon to pivot in the graviton matrix.



FM radio photons are about 1000 times more massive than AM photons. Because their momentums are about 1000 times greater, they will be less affected by the barrier they pass. Visible light photons are even less affected because even a photon of red light has 5 x 10^8 greater momentum than an AM radio photon. Their higher momentum will tend to propel them onward in a straight line; however, diffraction of visible light does take place when the distance between photon and barrier is very small.

Diffraction occurs because virtual elastic strings composed of matter either collide with or penetrate the thin wall barrier, which causes the photon in flight with mass to swing around the pivot point and change the flight direction. When Einstein denied all the evidence that plainly shows photons have mass while in flight, he made it impossible to recognize that photons are deflected by diffraction because they have mass. He must have been in a deep state of denial when he studied these experiments. The only way that Einstein could justify his position was to assume that mass and energy were equivalent to get rid of mass, but at the same time, he had to assume that energy had weight and momentum to satisfy numerous experiments including diffraction. The duplicity of thought here is staggering. I take this up in detail when I discuss energy in Chapter 37.

Refraction and diffraction experiments led to the concept of particle-wave duality; namely, photons and electrons are particles that behave like waves. Now we see that the wave properties of photons and electrons are created by virtual elastic strings that are ejected at right angles to their flight path. And the wavelength of a photon is nothing more than the distance the particle travel as it goes through two self-induction cycles.

Diffraction

Visible light photons curve when passing by a thin wall barrier either because their elons penetrate the barrier and act as anchors, or because their strings, ejected at right angles to the photon's flight path, collide with the barrier. The first scenario seems far more likely

Chapter 28: Photons are composed of matter

Astrophysicist Arthur Eddington is said to have written the following verse after witnessing the curvature of light around the Sun during a solar eclipse in 1919. He was obviously thinking about Omar Khayyam's poetry, but he is also stating what he believes is a fundamental property of light: photons have weight.

"Oh leave the Wise our measures to collate
One thing at least is certain, LIGHT has WEIGHT
One thing is certain, and the rest debate
Light-rays, when near the Sun, do not go straight."

Virtual elastic string theory tells us that photons are composed of matter and have weight just as stated by Eddington. It is impossible to explain my experiments that show table tennis balls are deflected in a magnetic field unless magnons (strings that create the magnetic field) are composed of matter, with physical properties. And if magnons have mass, then surely photons that create magnons must also have mass. But again, this is merely the tip of the iceberg. There are numerous experiments and observations that demonstrate unequivocally that photons have mass. In fact, you have to hide your head in the sand and deny the evidence to believe otherwise. Here is the unvarnished truth: The only reason to believe photons do not have mass is Einstein's special theory of relativity, not the numerous experiments and observations that provide unequivocal evidence that photons have mass.

Einstein became trapped by his own theory, which plainly states 'nothing with mass can travel at the velocity of light, not even light itself.' He was forced to conclude that light particles have no mass and deny all the evidence to the contrary. It was a huge mistake that has led to a host of errors in scientific thought. It is the single most important reason that progress in physics has been put on hold.

A photon in flight is defined by this simple equation, which James Clerk Maxwell derived in the 19th century:

$$\text{Energy} = \text{mass } c^2$$

Where c is the velocity of light and mass is the quantity of matter for one photon measured in kilograms. The equation could be written as:

Energy (joules) = matter (kg) x $(3 \times 10^8)^2$ m/s

As a way of getting around his dilemma, Einstein proposed that mass and energy are equivalent; he believed the mass of a photon in flight is converted to energy.

Einstein was forced to believe that energy with weight could travel at any speed it wanted, even the speed of light, but matter with weight was relegated to velocities with lower speed. As we shall see shortly, he also had to believe that energy had momentum, and he had to believe that energy had a gravitational force of attraction with other bodies, just as explained in Eddington's rhyme. In other words, he had to assume that energy had all the properties of matter, but at the same time, he had to believe that energy with weight still allowed the photon to travel on its merry way at the speed of light. How convenient is that? Isn't a kilogram a kilogram under any name?

After Einstein proposed that photons become pure energy in flight, it became impossible to understand energy; even today, a hundred years later, relativity holds sway and energy remains a conundrum. However, VES theory gives us a simple explanation for energy as discussed in Chapter 35.

I will briefly list the lines of evidence that show photons have mass and then examine each one in turn.

1. The mathematical equations developed by Maxwell, prior to Einstein, plainly show us that photons have mass.
2. There is abundant evidence that shows photons are particles.
3. During fusion on the Sun, photons are created from existing mass.
4. There are several indisputable experiments that show photons have momentum and therefore have mass.
5. Gravitational force of attraction shows us that photons have mass.
6. The strings that emanate from photons have mass. This means the whole photon has mass.
7. The oscillation frequencies of photons can best be explained if photons have mass.
8. Self-induction of forcefields by photons shows us photons have mass.
9. The wave properties of photons are explained by their elastic strings. These experiments show us photons and their strings have physical properties.

Calculating the mass of a photon

James Clerk Maxwell, one of the most respected physicists in history, provided us with this equation for momentum of a photon: **momentum = E/c** and this equation is exactly equivalent to **E = mc²**.

Because **momentum = m c,** we arrive at the following:

$$\textbf{momentum} = \frac{\textbf{E}}{\textbf{c}}$$

$$\textbf{m c} = \frac{\textbf{E}}{\textbf{c}}$$

$$\textbf{E} = \textbf{m c}^{\textbf{2}}$$

Obviously, physicists were well aware that $E = mc^2$ long before Einstein popularized this equation in 1905 when he made the assumption that mass could be converted to pure energy or vice versa. By the way, what this glob of energy is is a complete mystery to modern scientists.

Obviously, Maxwell believed that photons have mass; otherwise, the equations he derived made no sense.

De Broglia also provided an equation that physicists use to calculate the momentum of photons:

$$\textbf{momentum} = \frac{\textbf{h}}{\textbf{wavelength}}$$

Where h equals Planck's constant and momentum equals mass times velocity.

I have already introduced the equation that shows the relationship between wavelength, velocity, and frequency of light:

$$\textbf{wavelength} = \frac{\textbf{velocity}}{\textbf{frequency}}$$

Combinations of this equation and those above can be used to derive any of the other equations including $E = mc^2$. This is not a mysterious equation when thought of in this way. This equation simply says that the mass of a photon has energy. It has energy because there is mass in motion and because it is creating virtual elastic strings whose waves are in motion. The only tangible, physical quantity here is mass because it is simply a quantity of matter expressed in kilograms. E is merely the product of two numbers that expresses the capacity of the moving mass to do work, and c expresses how fast the photon can get from one point to the next.

Mass and momentum of different photons

All photons travel at the same velocity, but all photons do not have the same mass, and for this reason, they do not have the same linear momentum. Let us look at a couple of examples. The mass of a small radio photon with a frequency of 1×10^4 per second can be calculated in the following way: First, it is necessary to determine its energy in joules. The energy of a photon is equal to its frequency times Planck's constant (6.6×10^{-34} j.s.). Once the energy in joules is known, we can calculate its mass using $E = mc^2$.

Radio photon mass

energy = hf

$$E = 6.6 \times 10^{-34} \text{ j.s } (1 \times 10^4) = 6.6 \times 10^{-30} \text{ joules}$$

$$E = mc^2 \text{ or mass } = \frac{E}{c^2}$$

$$\text{mass} = \frac{6.6 \times 10^{-30}}{(3 \times 10^8)^2} = 7.3 \times 10^{-47} \text{ kg}$$

Where f = frequency

The mass of the radio photon just calculated is 100 trillion times smaller than the mass of a gamma photon. The mass of a gamma photon with a frequency of 1×10^{18} becomes 7.3×10^{-33} kg. This is of course a tremendous difference. Since both photons are traveling at the same velocity, the momentum of the gamma photon is 1×10^{14} times greater than the radio photon. Because the photons are spinning, it means the spin angular momentum of the gamma photon is much greater than the spin angular momentum of the radio photon. As we shall see, this difference helps to explain why the gamma photon goes through its self-induction cycle faster than the radio photon.

It is well to keep in mind that all photons, whether they have small mass or large mass, create virtual elastic strings: elons, magnons, and gravitons. Moreover, it seems likely they all create the same number of strings in one self-induction cycle; it's just that a photon with small mass takes longer to accomplish this task. We know this is true because $E=mc^2$ for all photons, large and small. This is discussed in detail in Chapter 34.

Photons are particles

From Newton's 17^{th} century study of prisms and the properties of light, he proposed that light was composed of particles, but many scientists rejected the idea because photons also have wave properties. In 1898, Max Planck came to realize that light emitted by a glowing iron rod placed in a fire could only be explained mathematically if light was composed of particles, each with a tiny quantum of energy. He reasoned that the iron rod was receiving energy from the fire, and then reemitting this energy as tiny particles of light.

Cavity radiation experiments enabled Max Planck to arrive at his radiation law and give us Planck's constant. This work was published in 1900. Cavity radiation is created when an empty box is heated. A small hole into the box allows the photons to escape where they can be analyzed. The wavelength and frequency of the photons emitted by the walls of the box is dependent upon temperature: the higher the temperature the higher the rate of photon emission. The frequency of the photons emitted is independent of the size and shape of the cavity. In Chapter 33, we find that every kind of atom emits different photons.

Planck assumed that the atoms that make up the cavity walls were electromagnetic oscillators. The atoms were emitting photons of a particular wavelength that depended upon their oscillation period, and oscillation was controlled by temperature. When temperature is raised, the atoms in the wall oscillate at a higher frequency, and the photons they emit also have higher frequency.

Planck discovered that the energy of the photon divided by its frequency yields a constant that was true for all photons:

$$\mathbf{h} = \frac{\textbf{Energy in joules}}{\textbf{oscillation frequency}}$$

The value of Plank's constant, **h** = 6.626 x 10^{-34} joule·second.

The total energy of all the photons being emitted becomes: E = nhf, where f is frequency and n is the number of photons emitted. Thus, the quantum theory was born.

The idea that light is composed of particles has since been proven correct in a variety of ways. For example, photographic film provides visual evidence that photons are particles. The brief exposure of a light sensitive emulsion allows scientists to see visually where each photon strikes the film because each photon shows up as a tiny dot. It is only after millions of photons strike the film does the image take shape.

Another example is the photoelectric effect. When light shines on a metal plate, it ejects electrons into space. Einstein received a noble prize in part because he recognized in 1905 that the photoelectric effect could only be explained if the photon particles strike the electrons in the metal plate and knock them free into space. Only photons with large mass can accomplish this feat. The photon had to be a particle with momentum.

In the discussion that follows, we will see other experiments that show photons are particles. If photons are particles with mass, it suggests that photons are created from existing mass.

Photons are created from existing mass during fusion.

Let's first examine the nuclear reactions that take place on the Sun where hydrogen ions (protons) are converted to helium ions with the release of energy in the form of electromagnetic radiation (photons). In the interior of the Sun, under intense gravitational force, there is great pressure and high temperatures that convert hydrogen into helium. In the first reaction, two protons fuse to form deuterium (1 proton and 1 neutron combined) plus a positron and neutrino. The positron (antiparticle to the electron) with a positive electric forcefield combines with an electron and the two are converted into two gamma photons of the same mass and energy. Thus, the electron with mass and the positron with mass are converted into two photons of equal mass.

In the second reaction, a proton + deuterium combines and release another gamma photon plus an intermediate that goes on to form helium. Thus, in the creation of helium, a portion of the mass of the hydrogen atom is released as gamma photons, which are equivalent to millions of photons of lesser mass and energy, some of which eventually make their way to Earth. There seems to be no doubt that the photons created in a nuclear reaction begin as normal everyday matter. Of course, this is not the only source of photons emitted by the Sun. Every atom spontaneously emits photons if its temperature is above absolute zero. This is called photon emission, which I discuss in detail in Chapter 33.

Direct experimental evidence that photons have mass

There is other more direct evidence that photons have mass. Physicists have shown that photons have linear momentum just as predicted by Maxwell's equations. Recall that linear momentum is calculated as mass x velocity. According to this equation, if a photon has momentum, then it must have mass. In every experiment explored below, the magnitude of momentum measured in the experiment exactly matched Maxwell's prediction for the mass of the photons used in the experiment.

Torsion balance experiment

The linear momentum of light is discussed by Halliday and Resnick (1981, page 670). According to these physicists "electromagnetic waves transport linear momentum." According to Maxwell's prediction, if the light is completely absorbed by a blackbody the momentum of the photons becomes:

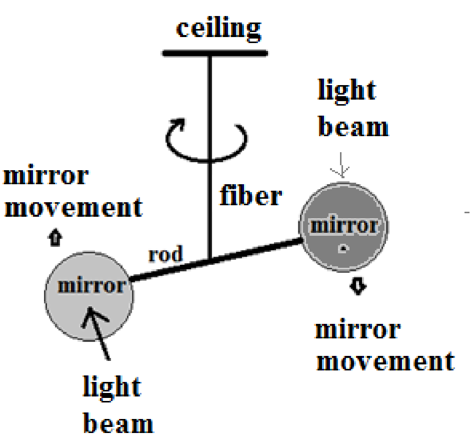
Momentum = Energy / velocity of photon
$mc = E/c$ or $E = mc^2$

He also predicted that the momentum of the light is doubled if it is reflected off a mirror: Momentum = 2E/c. I believe it is doubled because the photon has perfect elasticity, and it bounces off the mirror in a billiard ball like collision just as proposed by Compton to explain his experiments, to be discussed shortly.

The first measurement of momentum was achieved by Nichols and Hull at Dartmouth College and by Lebedev in Russia very soon after the turn of the century (1900).

The experimental procedure made use of a torsion balance as shown in the next figure.

TORSION BALANCE

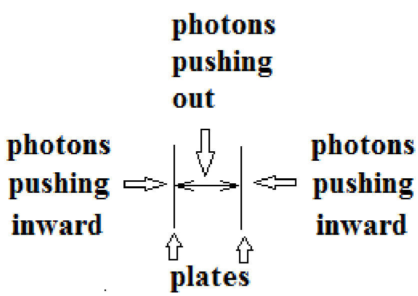


Light of known intensity and wavelength is directed against the mirrors as shown above. The light causes the mirrors to move away from the light beams, which causes the fiber to twist. The amount of twist is a measure of the force applied, which can be compared to Maxwell's equation for momentum and energy. In this experiment and others, Nichols and Hull confirmed both of Maxwell's equations for the momentum of photons. The momentum measured by the torsion balance and by other means is as predicted using the calculated mass of the photon and its known velocity. This means if Einstein is correct and the mass of the photon in flight is converted into energy, it still can be measured in kilograms just as proven in this experiment.

Torsion balance experiments demonstrate unequivocally that photons have linear momentum, which means the photon has mass. It makes no sense to say that the photon gains mass after it strikes the mirror because momentum can only be achieved by a moving mass. It makes no sense to believe that energy with weight, even if true, is different than matter with weight; yet this is what Einstein had to believe to protect his theory. Kilograms are kilograms no matter what the source. Einstein had to deny the most obvious implications of these experiments; otherwise, it would have disproved his theory of relativity: Nothing with mass can travel at the speed of light, not even light itself.

Casimir Effect

The Casimir effect proves photons have momentum in a completely different way. The Casimir effect results when two mirrors in a vacuum are brought in close proximity to each other. Under these circumstances many of the photons between the two mirrors are ejected because they are out of resonance (have different self-induction cycles). For this reason, there are many more photons bombarding the outside of the plates, driving the two plates together, than those striking outward against the interior surfaces. This imbalance creates a force pushing the two plates toward each other.



The force applied comes from the momentum of the photons. Henfrich Casimer predicted this effect in 1948, and it has since been proven by a number of different scientists. Does this differ significantly from a car slamming into a power pole where the damage results from the momentum of the car? It is mass in motion. Once again, if photons have momentum, then surely they have mass just like the automobile. The Casimir experiment is presented in more detail in Chapter 41 because it shows very clearly several properties of photons that are predicted by VES theory.

Photoelectric Effect

Prior to the turn of the century (1900), scientists determined that photons directed against a metal plate caused electrons to be ejected from the plate. This was an immediate effect that did not need the metal to change temperature. Photons with greater mass and momentum (UV or violet light) were found to be more effective than those with less mass and momentum (red light). In 1905, Einstein analyzed these results and came to the conclusion that light had to be composed of particles to have this effect.

VES theory states that photons with mass traveling at 300 million meters per second collide with the electrons and eject them from the metal plate. I believe the collisions are billiard ball like interactions just as theorized by Compton to explain his experiments that are discussed below.

Once again, we find an experiment that provides strong evidence that photons are particles that have momentum and therefore have mass; yet, Einstein denied this obvious conclusion. He denied that the mass of the photon had anything to do with the billiard ball like collisions between particles. He obviously believed that energy could be measured as kilograms, which is impossible according to VES theory as explained in Chapter 31.

Compton Effect

Arthur Compton (1923) received a Nobel Prize for physics for his experiments that examined the collision of x-ray photons with graphite. Compton's experiments caused him to conclude that x-ray photons directed against the graphite were the result of billiard ball like collisions between photons and electrons. This is only possible if the particles have physical properties with weight in kilograms, just like billiard balls on a billiard table. This classic experiment is explained in detail in Chapter 42.

Einstein had to deny the implications of Compton's billiard ball like collisions to maintain his theory that no moving particle with mass can travel at the speed of light. He had to believe that energy has all the properties of matter including gravity and momentum (kg x velocity) and create billiard ball collisions, yet in his mind, allow energy with kilograms of weight to travel at the speed of light. This conclusion makes no sense unless you realize that Einstein was protecting his theory of relativity.

Photons have spin angular momentum:

Beth, R. (1936) proved experimentally that photons have spin angular momentum. He demonstrated that a quartz plate twists when circularly polarized light is passed through it. In this case, the electric field of the photon interacts with the quartz plate to cause it to twist. This is only possible if the photon has mass and spin angular momentum. This must mean, according to Einstein, that energy creates spin angular momentum, as ridiculous as that sounds.

Diffraction

Diffraction clearly demonstrates that photons and their virtual elastic strings are composed of matter and have mass. The photon's elastic strings, which are ejected at right angles to the photon's line of flight, either collide or penetrate a barrier on one side, which causes the photon to pivot and change directions as explained in Chapter 27. For the strings to divert the photon particle, they must be composed of matter and have physical properties, and in order for the photon to pivot, it must have momentum and therefore mass. Einstein had to deny the implications of these very important experiments. Einstein's special theory of relativity had another major consequence. It left Einstein, and everyone else, in a position where it was impossible to understand and explain particle wave duality, which can only be explained if forcefields and photon particles have mass.

Refraction

When light passes into a denser medium, it curves. This is somewhat similar to diffraction except in this case the photon enters a denser medium where it pivots and changes direction because its strings meet resistance when they retract. The only way you can make any sense out of this observation is to assume that photons and their strings have mass. Once more, Einstein had to deny the implications of these experiments.

Photon mass shown by gravitational force of attraction

Gravity provides another line of evidence that shows photons have mass. Physicists have shown that photons are attracted to the stars they pass on their flight to Earth. They refer to this as gravitational lensing, which I suppose is a euphemism to explain without explaining the attraction of photons to stars because they both have mass.

The gravitational force of attraction between two bodies is computed using the universal law of gravitation. In this equation, the mass of the photon must be multiplied with the mass of the star. It is then divided by the square of the distance between the two bodies. G is a constant that converts the force to newtons.

$$\text{Force} = \frac{\text{G (photon mass in kg) (star mass in kg)}}{(\text{ distance in meters})^2}$$

If we choose to believe in Newton's universal law of gravitation, and if there is a gravitational force of attraction between star and photon, then we are forced to believe that a photon in flight is composed of matter and has mass. Like momentum, the gravitational force of attraction between photon and star shows us photons have mass while in flight.

Einstein denied these conclusions. He had to quietly tell himself that a photon is a blob of energy that has linear momentum, angular momentum, electric fields, magnetic fields, measurable kilograms, velocity, and a gravitational force of attraction with another body—the known properties of a particle with mass; yet, he called it a blob of energy, a substance that nobody on Earth can fathom.

Einstein had to assume that energy had all the properties of mass; however, and here is the incredulous part, in his mind, the photon could travel at the speed of light because the measurable kilograms resided as a blob of energy rather than a blob of mass. He must have convinced himself of this conclusion even though the properties of his blob of energy are identical with the properties of mass, including kilograms of weight as used in his equations.

The impossibility of Einstein's conclusions will become even clearer after reading Chapter 37 that explains what energy truly is: As you will see, energy is nothing more than a mathematical concept that tells us how much work can be created by a moving mass. It's not a blob of anything.

We all know that denial allows a person to come to almost any decision regardless of the evidence; it may even lead to suicide or to some stranger's death just to protect some glaringly inane, almost totally insane idea. Denial grips every living person in some way or the other; it is no respecter of intelligence. And reflect, Einstein's relativity was not glaringly inane nor was it an insane idea. This made Einstein's denial of the facts easier and more credible, but still in error.

Photons have mass if their virtual elastic strings have mass.

Photons are electromagnetic particles. They create electric and magnetic fields and they create gravitons. We have no reason to believe a photon's magnetic fields are any different than the magnetic fields created by electrons. It is my theory the fields are created by the same strings, which I refer to as magnons. If this is true, I have almost irrefutable evidence that photons have mass. I have been able to prove that spinning table tennis balls in flight are deflected by a magnetic field. This is a very repeatable experiment that depends on spin direction. When the ball is given clockwise spin, the magnetic field makes it curve more to the right, and when the ball is given counterclockwise spin, the magnetic field causes the ball to curve more to the left. There is no overlap with the controls. This is true even though the plastic table tennis balls are not attracted to the magnet. This is direct evidence that magnons have mass.

It is unreasonable and nonsensical to assume that photons with no mass create magnons with mass, and it makes no sense to believe that a photon particle with no mass can remain attached to virtual elastic strings with mass. Long before I did my experiments with spinning balls, other scientists had discovered magnon excitations that wink in and out of existence, as well as collide and exchange momentum. I discuss this in Chapter 5. Some are called magnons because they are believed to be magnetic waves. Are these the same as the magnon strings described in this book? It seems highly possible. If so, it means there is direct confirmation that virtual elastic strings have mass.

Magnons are not the only strings that have mass. The influence of gravitons (strings that create the gravitational force) on satellites in our solar system provides eloquent testimony that gravitons have mass. In fact, there is no other way to explain a large number of different observations in our solar system as discussed in another section of this book. The easiest interpretation is that gravitons have mass. If virtual elastic strings have mass and if strings are part of the photon, then it is reasonable to believe that the photon's main body also has mass.

My experiments with spinning table tennis balls shows there is something in the vacuum of space that encourages spinning balls to curve even after all the air is removed in a vacuum chamber. I believe this 'something' is a vast concentration of gravitons.

Photon mass required to explain self-induction

Finally, I refer you to the previous chapters where I discussed self-induction of force fields. Of course, it is impossible to explain self-induction of forcefields if photons are composed of pure energy. Think about it, how in heavens name does a photon go through its self-induction cycle where it creates electric, magnetic, and gravitational forcefields if it is composed of nothing but pure energy.

ABUNDANT EVIDENCE THAT PHOTONS HAVE MASS

1. Mathematics developed by physicists show us photons have mass.
2. Photons have been proven to be small discrete particles.
3. During fusion of electrons and positrons, photons are created from the mass of these particles, and the mass of the photons created are exactly the same as the original mass of the positron and electron that combine to make photons.
4. Torsion balance experiments prove photons have momentum that matches the mass and velocity predicted by Maxwell's equations.
5. The gravitational force between photons and stars shows us photons have mass.
6. Casimir effect can be explained if photons have mass.
7. Cavity radiation experiments show photons are particles.
8. Compton effect shows us photons have billiard ball like collisions with electrons.
9. Photoelectric effect proves that photons are particles with mass that create billiard ball like collisions between photon and electron.
10. Scientists have proven that photons have spin angular momentum and therefore have mass.
11. Diffraction and refraction of light can be explained if photons and their strings have mass.

IF STRINGS HAVE MASS, PHOTONS HAVE MASS

A few observations

1. Diffraction experiments prove strings have mass.
2. Spinning table tennis balls and electrons are both deflected by magnetic fields, showing us magnons have mass.
3. Spinning table tennis balls continue to curve even in a vacuum showing us gravitons have mass.
3. Particle-wave duality can be explained if strings have mass.
4. Mercury's orbit can be explained if gravitons have mass.
5. Earth's polar wobble can be explained if gravitons have mass.
8. Planet tilt can be explained if gravitons have mass.
9. Venus' slow spin rate and the rate that other planets spin on their axes can be explained if gravitons have mass.
10. Transfer of momentum from inner body to satellite can be explained if strings have mass.

If strings have mass, then the main particle that creates and holds onto these strings must also have mass.

In addition to the evidence cited above showing us photons have mass, there are many other observations explained by VES theory that are dependent upon the mass of photons and their strings. We will discuss these in detail in the Chapters that follow.

Why did Einstein believe photons do not have mass?

The reason Einstein said photons do not have mass lies in his special theory of relativity. According to this theory, a photon in flight cannot have mass because its mass under these conditions would be inconceivably large.

$$\text{flight mass in kg} = \frac{\text{rest mass in kg}}{\sqrt{1 - \left(\frac{v}{c}\right)^2}}$$

In this equation, **v** is the velocity of the particle and **c** is the velocity of light. If **v** equals **c,** then mass is divided by zero as shown. This means its flight mass is infinite. This means the mass of a photon in flight would have to be infinite. Of course, this makes no sense; therefore, the photon in flight can have no mass according to Einstein and his special theory of relativity.

By the way, Einstein did not derive the equation shown here, although he used it to explain flight mass and other properties of relativity. This equation is known as the Lorentz contraction, and it was derived by Hendrick Lorentz in 1892 to explain the Michelson-Morley experiment. I deal with this equation in detail later in this book.

Because special relativity does not allow a photon to have mass while traveling at the speed of light, Einstein proposed that a photon in flight is pure energy, which means it has no mass. If energy can be measured in kilograms, and if it has billiard ball like collisions with electrons, and if it has a gravitational force of attraction with matter, and if it has spin angular momentum, why didn't Einstein think the following equation was pertinent?

$$\text{kg photons in flight} = \frac{\text{kg photons at rest}}{\sqrt{1 - \left(\frac{v}{c}\right)^2}} = \frac{\text{kg at rest}}{0}$$

This equation tells us if velocity, v, of the photon in flight is equal to c, then kilograms of the photon inflight is infinite. Surely this is a no-no.

> I have never encountered a single argument that can explain how a photon composed of energy can create electric fields, magnetic fields, have linear momentum and spin angular momentum, nor can anyone explain how a photon composed of pure energy with no mass creates a gravitational force of attraction with a star. Newton would turn over in his grave.

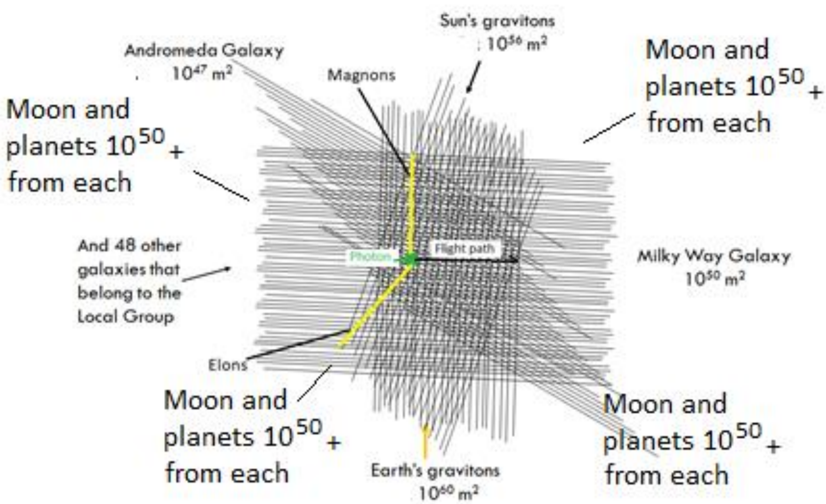
In reference to relativity: “Finally, some conjectures are made on how so wrong a theory could have been accepted by so many for so long.” R. Schock (1981), Department of Math, Royal Institute of Technology, Stockholm, Sweden.

Chapter 29: Introduction to VES Ether Theory

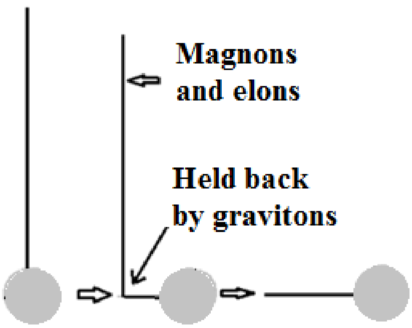
For ease of writing, I sometimes use the term VES ether theory to refer to my ether model, as in the title to this chapter, but in reality, no modification of the standard VES theory needs to be made.

For several hundred years there have been scientists who believed that photons are aided in their flight through space by waves in the ether, giving rise to what is known as ether theory. Albert Einstein was <u>not</u> one of these scientists. He believed that the velocity of light needed no explanation—it was always constant as long as there was isotropy of space. In contrast, VES theory states that a source of energy is needed to propel photons and electrons through space because they meet great resistance created by the graviton matrix.

The graviton matrix provides a formidable barrier to photons and electrons because they eject their elons and magnons into the graviton matrix at right angles to their line of flight. The matrix acts to hold the strings back and sweep them to the rear where complementary strings meet and bond. This is shown in the next two illustrations. This creates tremendous drag, and if it were not for waves in the ether pushing the particles and their strings forward, they would come to a sudden halt.



Graviton concentrations surrounding Earth except it' should be shown in three dimensions.



Waves in the ether

The great resistance created by the graviton matrix demands a sea of waves to push photons through space. The evidence is clear and very persuasive: There are waves that proceed along gravitons that literally push photons and electrons through space. For this reason, we can expect gravitons to influence self-induction cycles as well as the velocity of photons and electrons. Let's examine the evidence.

Gravitons influence self-induction cycles

There are several important observations that show gravitational fields influence photons, atomic clocks, and radioactive particles. I will briefly summarize these observations here, and then take them up in more detail in the chapters that follow.

Photons received here on Earth from dense stars with high gravitational fields, such as white dwarfs, have lower oscillation frequencies than expected. Physicists refer to this as a **gravitation redshift** because red is the lowest frequency of visible light. The oscillation frequency is merely a reflection of the photon's self-induction cycle.

Physicists have shown that cesium atomic clocks tick slower in stronger gravitational fields; thus, the oscillation frequency of the atom slows down, which is a reflection of self-induction rate. Physicists refer to this as a **gravitational frequency shift**.

Physicists have shown that radioactive particles emit less radiation in stronger gravitational fields. This can be accounted for if the rate of self-induction slows down, which influences the energy of the particle.

Physicists have shown that the energy of the photons we receive from outer space is influenced by gravitational fields while in flight. For example, Earth's gravitons cause photons to redshift as they approach Earth, while gravitons directed towards Earth tend to cause less redshift, or even a blueshift.

These observations prove dramatically that gravitons influence the creation of photons and modify their self-induction cycle frequencies. These experiments also demonstrate that gravitons influence the emission of radioactive particles and the rate cesium clocks tick per second. These observations can all be accounted for if gravitons and their waves influence the self-induction cycles of electrons and photons.

In addition to the effect of gravitational fields on self-induction, there are many other important observations related to this subject that I will simply list here:

- The speed of photons appears to be invariant.
- It requires more energy than expected to increase the velocity of electrons in particle accelerators.
- Radioactive particles in particle accelerators emit less radiation than expected.
- Cesium atomic clocks run slower when moving.

- Maxwell calculated the speed of light using its electric and magnetic properties.
- Electrons in orbit never spiral into protons.

It is obvious that a unique source of energy is needed to account for these observations.

- The energy source must account for the behavior of electrons and radioactive particles in particle accelerators.
- The energy source much act in concert with magnons and elons to satisfy Maxwell's equations.
- The energy source must be capable of modifying atomic clocks.
- The energy source must be capable of modifying radioactive particle emission.
- The energy source must be associated with gravitons because gravitational fields influence (1) self-induction cycles of photons in flight, (2) emission by radioactive particles, (3) time kept by atomic clocks, and (4) the size of the photon created by atoms.

Not long after I realized that gravitons and their waves might modulate the velocity of light, I discovered that many scientists over many decades have insisted that an ether theory (also spelled aether) would replace the need to believe that relativity is due to a four-dimensional world. It was apparent that this portion of VES theory forms the basis for an ether theory. The following is a brief review of ether theory as visualized by other scientists.

A Short History of Ether Theory

According to modern day ether theory, there are waves in the space that surrounds us that affect the velocity and energy of light. According to Asimov (1966), scientists originally thought that ether waves were longitudinal waves, like a gas, but later drastically changed their view. The substance carrying the wave "...had to be a solid to carry transverse light waves; it had to be a substance in which all parts were fixed firmly in place." In other words, ether waves cannot be made of a gas composed of many different parts. It must be one unit and it 'must be solid'. A graviton as defined in this paper meets these criteria: It is composed of matter with all of its parts connected together as one fundamental unit, an elastic string.

Over the decades, many individuals have published articles insisting that ether theory completely replaces the need to believe in the special theory of relativity. I will briefly review some of this work.

I found it interesting that Lorentz, according to Kox (1986), believed in an ether theory. In other words, he felt there were waves in the ether that maintained the velocity of light at 3×10^8 meters per second, not shrinkage of the interferometer as used in the Michelson-Morley experiment.

P. Cornille (1996) published a paper in the *Hadronic Journal* entitled: "Does the ether exist?" He sums up his views as follows: "In this paper we review several experiments, including the Michelson-Morley experiment, in order to show that contrary to the usual textbook presentation of special relativity all these experiments are consistent with the existence of randomly fluctuating stationary ether." VES theory fulfills this condition. Our galaxy is filled with a vast number of gravitons whose waves are traveling more or less at random in all directions.

F. Goy (1996), in *Foundations of Physics Letters*, stated: "In the last two decades, theories explaining the same experiments as well as special relativity does, were developed by using different synchronization procedures. All of them are ether-like theories. Most authors believe these theories to be equivalent to special relativity".

H.P. Dart (1971) had this to say about the various theories concerning light. "The ether-wave theory of light, suitably modified, is fully supported by all known evidence. Further observation and analysis will be required to determine which of its several forms accurately represents reality. On the other hand….the special theory of relativity is not supported by the evidence."

Selleri (1994) in *Frontiers of Fundamental Physics,* Proceedings of an international Conference, summed up the situation this way: "In particular it will be shown that any modification of the coefficients of the Lorentz transformations, however small, gives rise to an ether theory…". VES theory needs no modification of the Lorentz equation.

J. Chappell Jr. (1979), stated his belief that there is "...inherent inconsistency between the two postulates of special relativity, which are equivalent to A and non-A. Such an illogical theory can never be confirmed by experiment, and so purported evidence for special relativity must be able to be reinterpreted." "Both sets of evidence are consistent with a new theory of light motion involving a gaseous ether." His interpretation of ether is likely wrong according to Asimov if he was using gaseous ether in the sense it is composed of many parts.

D. McCarthy (1993) pointed out the inconsistency between quantum electrodynamics and special relativity. Winterberg (1988), proposed "…ether is the cause of all relativistic effects, and for this reason is assumed to obey a nonrelativistic equation of motion…" Sundman (1981) concluded the following: "It is shown that the interaction between particles in a perfectly continuous space (called ether) should obey special relativity and quantum mechanical principles." Spavieri (1988) pointed out "The origin of the equilibrium paradoxes of special relativity is analyzed." "…inconsistency justifies the search for alternative theories such as the modern ether theories." Cherepkov (1980), in discussing spin polarization of photoelectrons ejected from outer subshells stated in the *Journal of Physics B* that "…in most cases the non-relativistic theory is capable of describing the polarization phenomena." Nedved (1992) stated: "The relativistic answer is insufficient because of the inconsistency between the Doppler relations and the LT relations." LT is a reference to the Lorentz transformation.

In an article in the *Hadronic Journal* by B. Neganov (1991) entitled "On the principle of relativity and its violation in the case of a spin precession of moving charge articles," Neganov states: "It is found that in the case of a spin precession of particles moving along a curvilinear trajectory, the principle of relativity is violated up to the first order over the parameter v/c."

R. M. Santilli (1996) pointed out that "The inapplicability of both the special and general relativities for interior dynamical problems is beyond credible doubts, because of a truly impressive amount of physical evidence, such as: the impossibility of representing locally varying speeds of light, the inability to treat highly nonlinear, nonlocal and nonalgrangian systems, the transparent impossibility of representing interior orbits with continuously decaying angular momentum, gross inconsistencies occurring even in simple physical media…".

Hayden (1995) stated: "There is abundant evidence to show that SRT (special relativity theory) must, at the very least, engage in tortuous reasoning to explain some experimental results, among them stellar aberration (which in SRT depends upon relative velocity of Earth and star); the Sagnac and Michelson-Gale experiments; the Allen around-the-world Sagnac experiment; the Hafele-Keating experiment; the Brillet-Hall experiment; and the Champeney-Moon experiment."

Stellar aberration of light occurs when two observers in motion on the Earth see a distant star from two different locations with respect to the line of motion. It was first described by Bradley in 1729 and is the oldest proof that Earth rotates around the Sun. C. Whitney (1994), at Tufts University, pointed out that "Stellar aberration has been the subject of recent critiques of special relativity theory because of its apparent inconsistency with Doppler shifts. Careful analysis can remove this conflict. But the analysis requires unwelcome recourse to an unwanted coordinate frame reminiscent of absolute space. So even if reconciled with Doppler shifts, stellar aberration remains an embarrassment to special relativity theory." P. Naur (1999) explained that prior to Einstein's special theory of relativity, stellar aberration was explained by "waves in the ether."

Jefimenko (1998) had this to say in his article that appeared in Z. Naturforsch: "The calculations presented in this paper show that some of the experiments allegedly proving the reality of length contraction and time dilation can be unambiguously interpreted as manifestations of velocity-dependent dynamical interactions taking place within the systems involved in the experiments rather than as manifestations of length contraction or time dilation."

There are many other physicists who have expressed their disbelief in relativity that are not reported here, as well as those who believe in an ether theory. Some of these individuals are mentioned in the discussions that follow.

I found no discussion in the literature that gravitons might form the basis of an ether theory. I suspect this idea has not been rigorously examined because scientists in general do not consider that gravitons are physical entities that remain attached to the objects that create them. However, if gravitons have mass and remain connected to their source, then it becomes entirely possible that traveling transverse waves originating at source move along the strings at high velocity. This forms the basis of VES ether theory that I develop in the upcoming chapters.

Chapter 30: Attributes of VES Ether Theory

VES ether theory is dependent upon a vast number of gravitons that permeate the space about us as discussed in the previous Chapters. I have referred to this as the graviton matrix. It also depends upon other virtual elastic strings that remain attached to the particles that generate them.

When a graviton is propagated into space, it becomes stretched over a great distance but always remains connected to its source, an electron, photon, or quark. This provides a means for transfer of energy from the particle to the string in the form of waves. The model states that transverse waves move along all virtual elastic strings with great velocity.

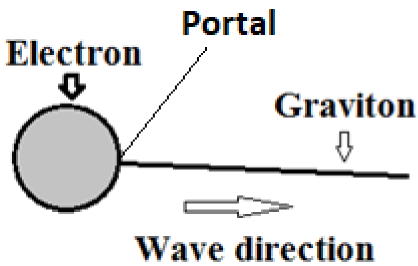
Source of moving transverse waves

Virtual particles are ejected through portals and every portal is responsible for creating many strings. Thus, at any one time, a portal may hold many strings. This means every time the portal opens and closes it will create a physical disturbance that will cause a wave with small amplitude to travel along the strings.

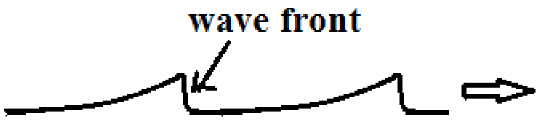
The shape of string waves

Halliday and Resnick (1981, page 294) provide drawings of traveling transverse waves for a common string. **They point out the waves are only possible because of the elastic properties of all strings.** By the way, this elastic property comes from the virtual elastic strings that create electrical bonds, the elons.

The pulse created is similar to that shown in the next two illustrations.



A physical disturbance caused by the opening and closing of portals sends moving transverse waves along the graviton. The waves have small amplitude and move with great velocity.



Moving graviton waves

Experiments with common cotton strings have shown that the pulse does not change its shape as it moves along the string, and it will continue indefinitely if there are no internal frictional losses. This is exactly what we should expect for gravitons because gravitons have perfect elasticity and perfect cohesion.

There is another major consideration. How do these waves interact with photons and electrons to push them through space? Maxwell gave us the answer to that question when he proved mathematically that the velocity of the photon could be calculated using its electric and magnetic properties. This means that graviton waves must be pushing on the photon's elon waves and magnon waves and by doing so propel the photon through space. The same consideration applies to electrons. In this chapter, I will provide a model for the interaction of graviton waves with elon and magnon waves that is responsible for the speed of these particles in flight.

String wave frequency

Graviton waves are small physical pulsations created by the opening and closing of portals that hold the string. The pulses created move along the string at great velocity. The same situation must exist for magnons and elons. Their waves are also caused by the opening and closing of portals. This means wave frequency is the same for all strings, and their frequency is much greater than self-induction frequency because the portals open and close perhaps a hundred times during one self-induction cycle. Obviously, the waves are spaced a very short distance apart because the electron oscillation frequency is in the neighbor of 10^{15} times per second, somewhat depending on the atom and molecule.

Virtual particles shot into space at great velocity

In Chapter 45, I analyze the velocity that gravitons, elons, and magnons are generated into space. I was pleased to discover, using two different lines of reasoning, that all strings may be generated into space at nearly the same velocity, somewhere in the neighborhood of 10^{23} m/s. However, the velocity of the string waves differs depending on the string in question.

Velocity of graviton waves

The relative velocity of the elon waves and magnon waves versus graviton waves is central to understanding relativity. Although it isn't necessary to know their absolute velocities, a guesstimate eases discussion.

There are two lines of reasoning that convince me that graviton waves travel at enormous velocity. First, my ether model requires that the velocity of graviton waves has to be almost as fast as the speed of the graviton as it is generated into space (10^{23} m/s). Why this must be true comes from the observation that stars in our local cluster of galaxies influence the photons they emit for their entire journey to Earth. For example, the Andromeda galaxy is 2.5 million lightyears away (about 2 x 10^{22} meters), and the light we receive from this galaxy has higher energy than expected.

If the small blueshift is created by gravitons emanating from Andromeda, then graviton waves must travel at least 2 x 10^{22} meters before the graviton is retracted. Even if the graviton existed for one full second, the waves would have to travel more than 2 x 10^{22} meters per second.

There is another line of reasoning that supports the idea that graviton waves travel at very high velocity. This comes from the equation provided by physicists that explains the velocity of waves along a common string.

$$\textbf{wave speed} = \sqrt{\frac{\mathbf{F}}{\textbf{mass (kg/meter)}}}$$

In this equation, F is the restoring force that snaps the string back in place. It is also the force conducted along the string. It is expressed in newtons. Two other elements used in the equation are mass per unit length (kg/m) and the velocity of the waves in meters per second. Notice, if the mass of the string is extremely small, especially when expressed as kg/meter, then wave speed must be very large. The mass of a graviton might be as little as 10^{-79} kg, as explained in Chapter 45, which would mean its mass per meter might be as little as 10^{-102} kg because it is stretched over 5 million lightyears. This explains why the speed of the wave traveling along the string has great velocity.

This equation holds if the amplitude of the wave is small. This is certainly true for waves contemplated here because they are nothing more than tiny pulses created by snapping portals. For sake of argument, I will assume that graviton waves travel along the string at 10^{23} m/s, and I refer you to Chapter 45 where I discuss this in more detail.

Velocity of magnon and elon waves

An analysis of the equation that computes wave velocity tells us that the velocity of magnon and elon waves is much less than graviton waves.

$$\text{wave speed} = \sqrt{\frac{F}{\text{mass (kg/meter)}}}$$

This is true because the theory holds that elons and magnons have much greater masses than gravitons, and their masses are spread over a relatively short distances in our solar system, not across galaxies as is the case for gravitons. This means kg/m is much higher for elons and magnons, which will make their wave speed much slower. This is an important point because my model dictates that the velocity of graviton waves is much greater than elon and magnon waves.

Because photons eject the same mass of elons as compared to magnons with every self-induction cycle, it suggests they are ejected the same distance in space. This means elons and magnons would have the same wave velocity. I refer you to the equation given for wave velocity. From my analysis of elon wave velocity and magnon wave velocity in Chapter 45, I believe a reasonable estimate for wave velocity for these strings is 10^{15} meters per second, but the important point is this, elon and magnon wave velocity can be expected to be must less than graviton wave velocity.

Graviton waves are a formidable force

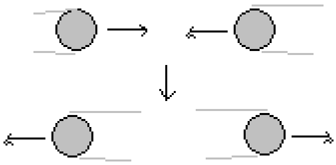
Gravitons exist through billions of self-induction cycles, which makes it likely that gravitons are in much greater concentration than elons and magnons. In addition, they arrive here from every portion of the solar system, the Milky Way Galaxy, and from all of the other galaxies in the Local Group. In contrast, elons and magnons only exit through one self-induction cycle, and they are emitted much shorter distances into space.

In Chapter 2, I concluded that Earth creates as many as 10^{60} gravitons per square meters, along with a vast number of gravitons from numerous other sources. This means there is a sea of graviton waves traveling in all directions that are in intimate contact with the elons and magnons associated with photons and electrons.

Collision between balls with perfect elasticity

Before continuing on with the theory, I should point out that physicists have shown that momentum is always conserved when there is collision between particles with perfect elasticity.

In the case of two identical balls with perfect elasticity that meet head on, they bound away in the opposite direction without loss of velocity or momentum.



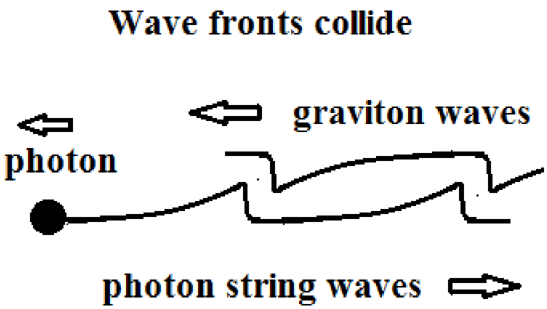
Since virtual elastic strings have perfect elasticity, we can expect two waves that crash into each other to bound away with perfect elasticity.

A sea of graviton waves

The reality is that a sea of graviton waves is traveling with and against the flight of a photon or electron, and the forward progress of these particles depends upon the equilibrium between these waves. I refer to those graviton waves that push photons and electrons forward in space as positive graviton waves, and those that impede flight as negative graviton waves. Let's first examine positive graviton waves.

Positive graviton waves

An examination of the illustration below shows that the orientation of graviton waves and photon (or electron) string waves is such that maximum force can be applied when graviton waves and particle string waves are traveling in the opposite direction.

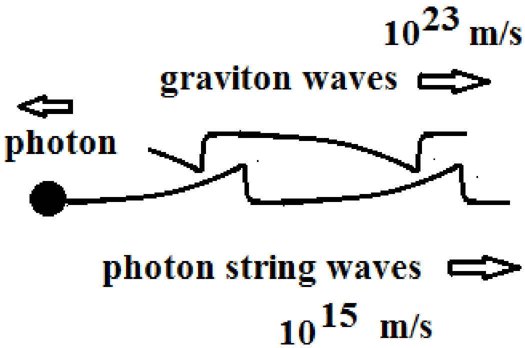


In this situation, the blunt fronts of the waves are crashing into each other. However, they do not halt and die like two colliding cars, rather they bounce away from each other because they have perfect elasticity. Momentum is always preserved in any collision. This allows them to nudge the strings and particle ahead when waves collide. For this reason, I speak of them as positive graviton waves.

Graviton's traveling in the same direction as the photon will be nudging the photon's string waves towards the particle as discussed. This will tend to shorten the self-induction cycle. However, the elasticity of the string has much more to do with retraction. We have this situation: Graviton waves traveling in the same direction as the photon or electron will have more influence on velocity than on self-induction cycles.

Negative graviton waves

Graviton waves traveling in the same direction as the particle's string waves tend to be traveling opposite to the flight of the particle. Graviton waves are traveling 10^{23} m/s and magnon and elon string waves are traveling at 10^{15} m/s. This is illustrated below.



This means the much greater velocity of the graviton waves will cause a collision between waves. This will serve to impede string retraction and self-induction cycles. It will also slow the particle down. For this reason, I refer to them as negative graviton waves. Negative graviton string waves are at a disadvantage versus positive waves for two reasons: First, their wave fronts are oriented in the same direction, and secondly, all waves are traveling in the same direction. This means there will be less energy transferred during collision.

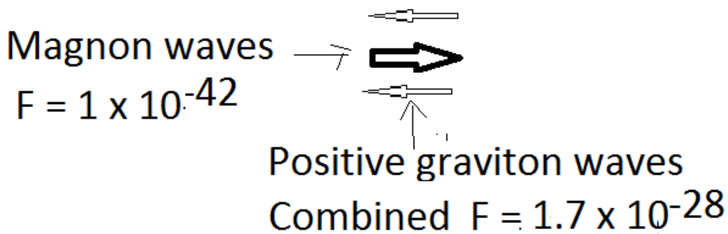
Comparison of waves

It is obvious from the illustrations that the shape of the waves dictates that graviton waves going opposite to the magnon and elon waves will collide with greater force. In addition, when two waves meet head on, the force of the collision is greater than when both waves are going in the same direction. These two factors explain why positive graviton waves nudge the photon forward at the speed of light. However, the final velocity of light and self-induction rate is determined by the dynamics between negative and positive waves. These considerations also apply to electrons.

Comparison of the forces conducted along the strings

If we assume the velocity of the graviton waves is 10^{23} m/s and magnon and elon waves are 10^{15} m/s, and if we assume the mass of gravitons in intimate contact with the elons and magnons approaches their mass, then the total momentum of the graviton waves becomes 10^{8} times greater than the elon or magnon waves ($10^{23}/10^{15}$).

It is of interest to compare the force of positive graviton waves pushing on magnon waves versus the force of the magnon waves going in the opposite direction. I made these assumptions: The number of graviton waves pushing against one magnon is equal to the ration of their masses per meter as discussed in Chapter 45.

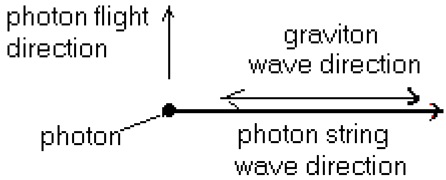


The ratio of masses per meter is $1.7 \times 10^{-74}/2.8 \times 10^{-102} = 6 \times 10^{27}$. The forces conducted along the strings is also discussed in Chapter 45. For magnons, the force is 1×10^{-42} newtons and gravitons wave force is 2.8×10^{-56} newtons, but there are 6×10^{27} gravitons versus one magnon, and 6×10^{27} times 2.8×10^{-56} newtons equals $1.7\text{x } 10^{-28}$ total newton force being conducted along the combined strings. The ratio of $1.7 \times 10^{-28}/ 1 \text{ x}10^{-42}$ is a whopping $1\text{x } 10^{14}$. This certainly helps to explain how positive graviton waves push photons and electrons through the graviton matrix even though the matrix creates strong resistance to the flight of these particles.

By the way, when I was making my movies, I calculated the difference between magnon force conducted along the string verses the combined graviton wave force, and I came out close to the same ratio (10^{15} times greater for positive graviton waves). In these calculations I used the concentration of gravitons in space to estimate the actual diameter of the gravitons, which allowed me to estimate the number surrounding a magnon. These are of course sketchy estimates, but they serve their purpose. They tell us that the forces conducted along graviton strings are more than sufficient to push photons and electrons through the graviton matrix.

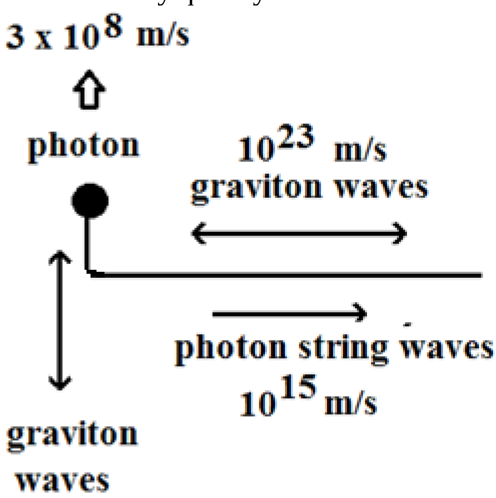
Self-induction Cycle and Wave Interaction

Elons and magnons are ejected from photons at right angles to their direction of flight and at right angles to each other. Thus, immediately after the virtual particle is ejected from the photon, we find this situation.



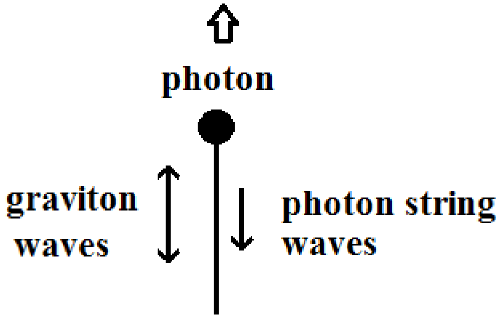
Even at this point in time, negative and positive graviton waves affect both self-induction cycle and velocity of the particle. In order, for the photon to continue on its flight path, it must pull its strings through space. Positive waves push the elon and magnon string waves towards the photon, which aids its flight through space. Negative graviton waves have the opposite effect.

In the next instant, a portion of the photon's strings are swept to the rear by the graviton matrix. An electron or photon only travels a short distance during its self-induction cycle; even so it likely travels some 10^{12} times its diameter during this period. This means a portion of the string becomes oriented to the rear very quickly.



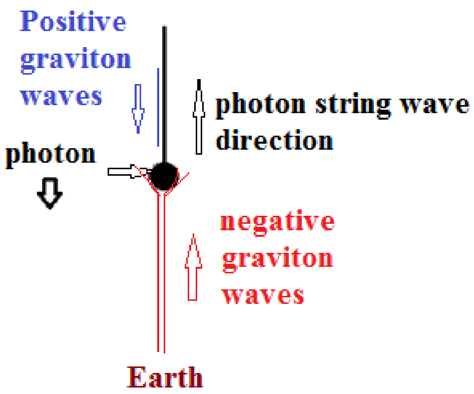
At this point in time, graviton waves traveling in both directions influence the velocity of the particle and its self-induction cycle.

In the last stages of the self-induction cycle, all the particle's strings are directed toward the rear. Now all the graviton waves affecting the particle are directly in line with the photon's flight path. It is likely that graviton waves also interact with strings that have bonded as complementary strings because gravitons that transport waves are composed of n-gravitons and s-gravitons.



There is one other important interaction that explains why positive graviton waves are able to outcompete negative graviton waves. This factor is the photon particle.

A photon particle tends to shield its strings from negative graviton waves



The photon particle in flight separates the negative graviton waves and prevents them from interacting with the photons string waves for a short distance as shown in the illustration. This is another reason that positive graviton waves outcompete negative graviton waves. The evidence for this comes from the redshift created by Earth, which is best left until Chapters 42 and 43 that discuss redshift and blueshift.

What is said here about the interaction of photon string waves and graviton string waves applies equally well to electrons. However, there are differences between the two particles that explain why they travel at different velocities, which I discuss in the next Chapter.

Thus far we have arrived at the following rules that govern how gravitons interact with elons and magnons to control the velocity of electromagnetic particles and self-induction cycles. I will summarize these rules.

Tenets of VES ether theory

A sea of graviton waves that tend to go in the same direction as the particle increase the particle's velocity and shorten the length of its self-induction cycle. They are positive graviton waves that provide a positive force.

A sea of graviton waves that tend to go in the opposite direction as the particle decrease the length of the particle's self-induction cycle and decrease its velocity. Negative string waves provide a negative force with regard to velocity and rate of the self-induction cycle.

The equilibrium between positive and negative graviton string waves are responsible for the ultimate velocity of the photon or electron; however, the graviton matrix provides strong resistance to the flight of any particle creating elons and magnons at right angles to their flight path, and for this reason, the matrix modifies the dynamics between the positive and negative graviton strings and the particles they push through space. The source of gravitons that make up the graviton matrix is vast because they arise from all the stars and planets in our Local Group of Galaxies.
Of course, gravitons from the Milky Way and the other galaxies arrive at our doorstep traveling in all conceivable directions.

The three most important reasons that the graviton matrix is an integral part of VES ether theory are listed below. I examine them in detail in the Chapters that follow: (1) The denser the graviton matrix, the more difficult it is for the photon and electron to pull and retract their elons and magnons. For this reason, the denser the concentration of the graviton matrix, the slower the self-induction cycle rate. (2) The faster the electron flies through the graviton matrix the greater the resistance to flight and the slower the self-induction cycles. This is somewhat analogous to wind resistance against moving objects that goes up as the square of the velocity. This becomes of particular importance when analyzing the flight of particles in particle accelerators. (3) When there is a preponderance of graviton waves traveling against the flight of a photon, it slows down the photon's self-induction rate and the velocity of the photon. When there is a preponderance of graviton waves traveling in the same direction as the photon, it speeds up the photon's self-induction rate; it also affects the particle's velocity.

A photon traveling along the surface of the Earth has nearly the same number of graviton waves traveling with it as against it, and for this reason it has the normal speed of light and normal self-induction cycles. Thus, we see in this situation that the properties of space are equal; or as special relativity puts it, there is "isotropy of space."

Thus far, I have established an ether model, and in the ensuing Chapters, we will see what observations and experiments this model can satisfy.

Chapter 31: Velocity of photons and electrons

The velocity of light has intrigued scientists for centuries. According to Halliday and Resnick (1981, page 674), one of the first estimates of the velocity of light was made by a Frenchman named Roemer. In 1676, he estimated the velocity of light at 214,000,000 meters/second by examining the moons of Jupiter. Other scientists using the aberration of light or special toothed wheels found values over 300,000,000 m/s. In 1862, just two years before Maxwell calculated the velocity of light, a Frenchman named Foucault using a rotating mirror came up with 299,000,000 meters per second. The development of laser beams has enabled scientists to make measurements that are very precise because it is possible to determine the laser beam's wavelength and frequency. Knowing these two values the velocity of light can be calculated: c = wavelength x frequency. The velocity of light is exactly 299,792,458.000 meters per second.

Maxwell calculated the velocity of light using its electric and magnetic quantities, and I assume he knew this was true because of the work of Foucault and others. Maxwell's discovery is essential to understanding how gravitons influence the velocity and self-induction cycles of electrons and photons. Let's examine this proposition in a little more detail.

From Maxwell's work, we know the energy density of the electric field = energy density of the magnetic field. Thus: $\frac{1}{2}\,\varepsilon_o E^2 = \frac{1}{2}\,\beta^2/\upsilon_o$. I used this relationship previously to show that

$$\frac{E}{\beta} = 299{,}792{,}458.000 \text{ meters/second}$$

Thus, the electric field of a photon divided by its magnetic field is equal to the velocity of light. This was covered in more detail in Chapter 26.

According to VES theory, the fields are a direct reflection of the number of strings creating the fields. In this respect, it is most gratifying to see that the ratio is an even number out to at least three decimal points, which is only possible if we are dealing with a discrete number of strings. This leads to the conclusion that the number of free elons divided by the number of free magnons is equal to the velocity of light.

$$c = \frac{E}{\beta} = \frac{\text{number of electons}}{\text{number of magnetons}} = 299{,}792{,}458.000$$

Maxwell discovered this relationship because elons and magnons interact with graviton waves. They are the strings responsible for the velocity of light.

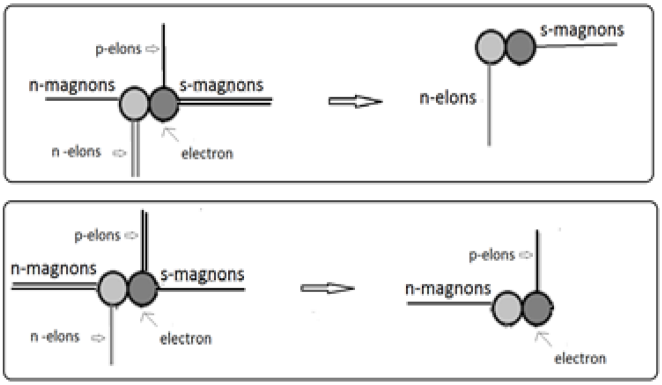
My model for the photon shows it is divided into two spheres. Both spheres develop the same pressure during self-induction, and for this reason eject the same string mass. This means 3×10^8 elons are created by one sphere for every magnon on the other sphere during the same time frame.

The force of 3×10^8 gravitons pushing on 3×10^8 elons located on one sphere = force of 3×10^8 gravitons pushing on 1 magnon located on the other sphere. Thus, the two spheres are being pushed equally through space. It encourages the photon to spin in the same direction it is moving, just as it prevents the photon from tumbling through space. As I note elsewhere, the number of gravitons pushing on one magnon may be much higher, but the ratio between those pushing on elons and magnons remains the same.

There is one other point that needs to be made. Positive and negative graviton waves travel along bonded graviton strings. This suggests that bonded elons and bonded magnons also contribute to the waves of a photon or electron that interact with graviton waves.

The photon goes through two self-induction cycles, but it is always in balance before and after complementary strings bond, which allows graviton waves to push photons smoothly through space.

Photon alternates these two string cycles



Photon before strings swept to the rear where complementary strings bond

Photon after complementary strings bond.

Gravitons push equally on one unit of elons and one unit of magnons and for this reason, the photon is always in balance before and after complementary strings bond.

Now let's consider what would happen, if the ratio is changed slightly, even by one elon. Now the photon would not travel smoothly through space. It would definitely slow the photon down, and it may well upset the ratio of strings being created by the photon.

We know that elons and magnons work in conjunction with gravitons to achieve the final velocity of light. This means each elon is responsible for a fraction of the final velocity of the photon, and each magnon is responsible for this same factor multiplied by 3 x 10^8. If we follow this line of reasoning to its logical conclusion, we are left with the idea that the number of strings dictates the velocity of light just as Maxwell's equations suggest. We don't know the contribution of each because we don't know how many strings are involved. We only know the total contribution yields the normal velocity of light.

A major tenet of the special theory of relativity is that the speed of light needs no explanation beyond the isotropy of space. However, Maxwell's equations and elastic string theory shows us that the speed of light does have a physical basis, and it does involve relativity. It depends upon the relative velocity of the photon and its magnon and elon waves in comparison to graviton waves traveling with and against the flight path of the photon. It also depends upon the graviton matrix that creates resistance to the flight of these particles.

I have ignored the gravitons created by photons and electrons. However, gravitons are continuously present in vast numbers, and they are streaming to the rear of the particles as they make their way through space. It is likely that positive and negative gravitons waves do interact with the particle's gravitons to help push photons and electrons through space, but it would seem that their contribution to the flight of the photon is less than the interaction between gravitons and elons and gravitons and magnons. My thought here resides with Maxwell's discovery that the velocity of light is equal to its elon field divided by its magnon field. Even so there may be a strong interaction between positive and negative graviton waves and the photon's graviton waves. They may indeed help positive gravitons push photons and electrons through space.

In the balance of this Chapter, I will explain why electrons and photons have different velocities even though they are both being pushed through space by graviton waves. We shall also meet up with the flight of protons in the solar wind.

Electron velocity and the solar wind

The solar wind streaming away from the Sun is composed primarily of positively charged protons and negatively charged electrons that are traveling at great velocity, as much as 750,000 m/s. This in itself is a conundrum that cannot be solved by any existing theory. I take up the velocity of electrons in orbit in Chapter 39.

The solar wind can be divided into two main subgroups according to their density and velocity. The fast-solar wind has low density and is traveling at approximately 750,000 m/s, and the slow-solar wind has high density and is traveling at approximately 300,000 to 500,000 m/s. This begs the question, how is it possible for these particles to be traveling at different velocities, a second conundrum that cannot be solved by existing theories. The two solar winds arise from different areas of the Sun, but both are primarily composed of protons and electrons that appear in equal portions.

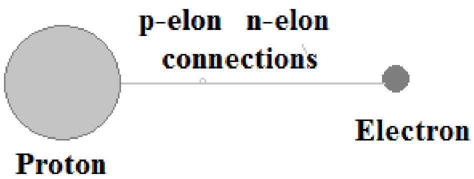
Although I have not discussed protons previously in connection with graviton waves, it is evident that protons create elons and magnons in the same manner as electrons, which allow graviton waves to push these particles through space.

Protons and electrons are normally bound together to form hydrogen, but the one-million-degree temperature of the Sun's corona layer strips the electrons from the hydrogen protons and creates the plasma. A portion of this plasma layer is ejected from the sun as solar wind.

The corona and the solar wind are under the influence of an extremely strong gravitational force of attraction created by the gravitons emanating from the Sun. Scientists have calculated that the solar wind must achieve a high velocity to escape the Sun's gravitational field. Obviously, if there is a strong gravitational field, there must be a vast number of gravitons that are creating waves traveling away from the Sun. My calculations show that the Sun creates 4 x 10^{80} gravitons per second, and in the corona, there must be 10^{57} gravitons per square centimeter streaming away from the Sun. They outnumber other gravitons traveling in the opposite direction three billion-fold. This allows graviton waves to elevate the velocity of the electrons and protons to their escape velocity. This explains why electrons and protons have a high velocity in the solar wind.

The difference in high velocity and low velocity solar wind comes from their known densities. The low velocity solar wind has a high density (10.7 per cm^3) and the high velocity solar wind has a low density (2.3 per cm^3). The two winds originate from different locations on the Sun, which gives rise to their different densities.

Where there is high density, there is bonding between electrons and protons, which slow the velocity of the particles down. In contrast, where there is low density and little bonding between electron and proton, the electrons travel at a much faster velocity. VES theory states that the graviton matrix is the culprit in question. When there is bonding between electron and proton, the connecting links collide with the graviton matrix, which causes resistance to flight.

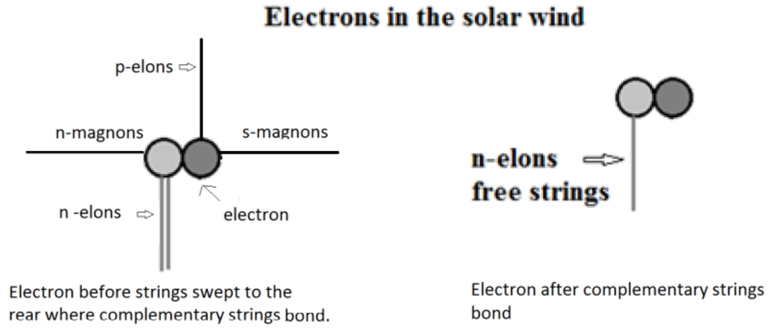


It is also reasonable that the two particles are not being pushed through space at the same velocity, and for that reason may be tumbling in flight.

This explains why electrons and protons travel at slow velocities when the density of the field is greater. The composition of the solar wind was primarily obtained from an article by Schwenn (2001), but there are numerous articles on the Internet that describe the solar wind.

There is one other question that needs to be addressed. Why do photons travel faster than electrons in the solar wind even through gamma photons rival the mass of electrons?

I explained earlier that the strings emanating from the two spheres of a photon are always in balance, and for this reason, graviton waves push photons smoothly through space. This is not true for electrons. The two spheres of the electron are always out of balance as shown in the next slide.



The elons and magnons ejected from an electron are always out of balance before and after complementary strings bond. This will cause the gravitons to push unequally on the two spheres and for this reason, the electron in the solar wind likely tumbles while in flight; however, it should also be noted that the photon creates six units of elons and magnons before complementary strings bond, and two free units after bonding. As you can see, it is possible that the electron creates fewer free strings at all stages; this too may help explain why photons travel faster than electrons in the solar wind.

The graviton matrix creates great resistance to the flight of electrons and photons because these two particles eject their virtual elastic strings into the graviton matrix at right angles to their flight path.

Photons overcome greater resistance to flight than electrons primarily because the two spheres of the photon are always in balance, which allows graviton waves to push them smoothly through space—they do not tumble.

In contrast, the virtual elastic strings emanating from the two spheres of the electron are always out of balance, which causes graviton waves to push unequally on the two spheres. This causes the electron to tumble through space.

Electrons in orbit are even more complex. I take this subject up in Chapter 39.

Normal velocity of electrons and photons

The graviton matrix creates great resistance to the flight of electrons and photons because these two particles eject their virtual elastic strings into the graviton matrix at right angles to their flight path.

The resistance created by the graviton matrix is overcome by graviton waves that push these particles through space. The dynamics between graviton waves and a photon's elon and magnon string waves dictate the velocity of a photon. This explains why Maxwell could calculate the velocity of light using the magnetic and electric properties of the photon.

Photons overcome greater resistance to flight than electrons primarily because the two spheres of the photon are always in balance with respect to its elons and magnons, which allows graviton waves to push the photon smoothly through space at 3×10^8 m/s—they do not tumble.

In contrast, the virtual elastic strings emanating from the two spheres of the electron are always out of balance, which causes graviton waves to push unequally on the two spheres. This causes the electron to tumble through space. The free electrons in the fast-solar wind travel at 750,000 m/s, which is 4000 times less than the velocity of photons even gamma photon can match electrons in mass.

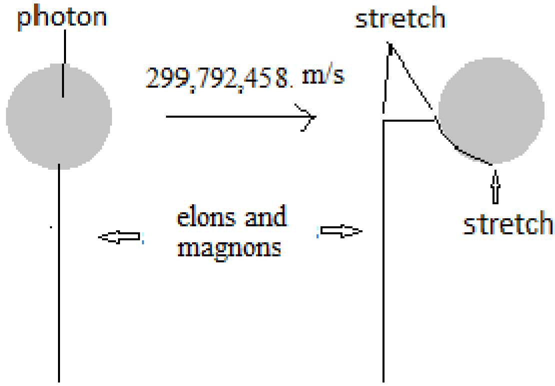
The electrons and protons in the fast-solar wind are less dense, which allows them to be pushed through space not bound to protons. In contrast, the electrons in the denser slow-solar wind become bound to protons, which greatly increases the resistance provided by the graviton matrix, and for this reason electrons travel much slower.

All photons have the same velocity

Photons come in many different masses and their self-induction cycle rates also differ greatly; yet all photons travel at the same velocity. It seems likely that the tremendous increase in resistance met by photons traveling at the speed of light through the graviton matrix provides an upper limit to their velocity. Essentially, all photons meet a brick wall when they reach 3 x 10^8 m/s regardless of their mass. This means a small photon reaches the same upper limit for velocity as a gamma photon even though the radio photon has 100 trillion times less mass.

The resistance created by the graviton matrix may be due to simple friction, perhaps much like wind resistance against a moving object that goes up as the square of the velocity. However, there may be a defining moment when resistance created by the graviton matrix creates an upper limit of 3 x 10^8 m/s.

The photon's elons and magnons are ejected at right angles to the photons flight path, but the graviton matrix forces them to the rear. The elons and magnons will make three sharp bends because of the matrix, as shown in the next illustration. This means the elons and magnons will be forced against the gravitons in the matrix as it forces them to the rear. This may inhibit magnon and elon waves from moving past these points for two reasons. There may be a profound stretch on the strings at the 90-degree bends that discourage wave movement along the strings, and the gravitons may simply act as a physical obstruction that inhibits wave moment.



Magnons and elons shown together for simplicity.

The photon's elon and magnon waves are crucial to the flight of the photon because they provide the physical nodules that graviton waves push against to propel photons at 299, 792, 458 m/s. Obstruction to wave moment may be the ultimate reason that all photons big and small reach the same maximum velocity. It may also be the reason that the velocity of electrons in a particle accelerator cannot be forced past the speed of light.

Invariant nature of the speed of light

The ultimate velocity of a photon is determined by the dynamics between graviton waves that push the photon's elon and magnon strings through space and the concentration of the graviton matrix that provides strong resistance to the flight of these particles.

The resistance created by the graviton matrix increases as the velocity of the photon increases. The resistance becomes profound at 3×10^8 meters per second, which holds all photons, large and small, to this maximum velocity.

It is likely that no small subatomic particle that creates electric and magnetic fields can travel faster than the speed of light because of the tremendous resistance created when these fields are injected into the graviton matrix.

A vast number of neutrinos strike the Earth every second. They are generated by the Sun and other stars during fusion. They are neutral particles with small mass that do not create electric and magnetic fields. Once in motion they should stay in motion at nearly the same velocity because the graviton matrix will offer very little resistance to their flight.

Chapter 32: Solving relativity in a 3-D world

One of the most perplexing problem for any ether theory involves the behavior of electrons in particle accelerators where it has been shown that it is almost impossible, if not impossible, to raise the velocity of an electron to the speed of light.

The velocity of electrons in the solar wind is 750,000 m/s, and to increase the velocity of these particles beyond this point requires a source of energy. When energy is applied to force the electron to a higher speed in the particle accelerator, its speed does increase but not in a linear fashion. It takes far more energy that expected to increase its velocity.

To understand why this is true, it is first necessary to take a step backwards and examine the Michelson-Morley experiment.

In 1881, Albert Michelson and E. W. Morley demonstrated experimentally that the velocity of light is the same whether it is traveling in the same direction of Earth's orbit or at 90-degree angle to its orbit.

The Irish physicist G. Fitzgerald (1889) suggested that the velocity of light is modified by Earth's velocity, but it cannot be detected in the Michelson-Morley experiment because the length of the instrument shrinks in the direction it is moving.

A Dutch physicist by the name of Hendrik Lorentz (1892) derived an equation that makes it possible to calculate the shrinkage. Where V is the velocity of the instrument and C is the velocity of light. This equation is known as the Lorentz contraction.

$$\textbf{Length in motion} = \textbf{length at rest} \sqrt{1 - \frac{v^2}{c^2}}$$

According to Kox (1986), Lorentz always believed the Michelson-Morley experiment could be explained by an ether theory not by shrinkage of the instrument, and I'll come back to this point later when I discuss the Michelson-Morley experiment and the Lorentz contraction in detail in Chapter 34

The Lorentz contraction became the basis of Einstein's theory of relativity. He used it to explain several important observations, including the velocity of electrons in particle accelerators, radioactive decay in particle accelerators, and the concept that particle accelerators shrink when in use. I will explore these observations, as well as others, in the chapters that follow.

With these thoughts in mind, let's continue with the results obtained with electron accelerators. The critical point is this: Scientists have shown that it takes far more energy than expected to increase the velocity of an electron to a point slightly less than the velocity of a photon.

According to Halliday and Resnick (1981, page 124), Einstein proposed in his special theory of relativity that the mass of the electron increases with increasing speed, and this explains why it takes more energy to accelerate the electron to the speed of light. The increase is calculated using the Lorentz contraction.

$$\textbf{mass in motion} = \frac{\textbf{mass at rest}}{\sqrt{1 - \frac{v^2}{c^2}}}$$

If the Stanford Linear Accelerator increases the velocity of the electron, **v**, until it is 0.9999999997 of the velocity of light, **c**, the ratio between mass in motion divided by mass at rest becomes 40,000. In other words, according to relativity, the mass of the electron is 40,000-fold greater when it is traveling near the speed of light.

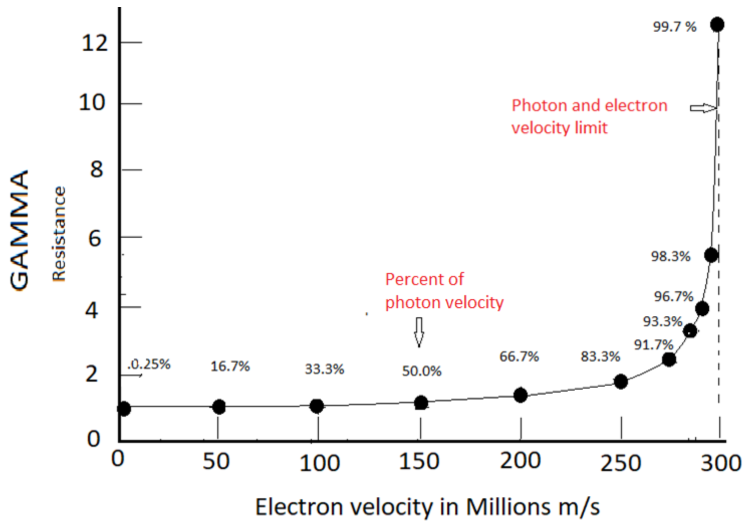
According to Hewitt (1998, page 657), the change in mass can also be thought of as a change in momentum, which is calculated using gamma. Gamma is the reciprocal of the Lorentz factor:

$$\textbf{gamma} = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$$

Relative momentum = normal momentum x gamma

As gamma increases, the mass of the electron increases along with its momentum. The concept of ***relative momentum*** has no meaning other than in relation to Einstein's special theory of relativity.

The relationship between gamma and electron velocity is shown in the following figure. Here we see there is a non-linear increase in gamma with a change in electron velocity that becomes particularly dramatic as the electron approaches the speed of light.



What is gamma measuring?

Gamma reflects the additional energy required to raise the electron to a specified velocity. According to Einstein's special theory of relativity, additional energy is required beyond that expected because increasing the electron's velocity causes the electron's mass to increase.

Einstein: mass of the electron in motion = mass at rest x gamma

This means greater energy than expected is needed to pull the electron at higher velocity because its mass increases.

According to VES ether theory, gamma is a measure of the resistance to flight created by the graviton matrix that increases with electron velocity.

VES theory: Energy required to accelerate the electron = energy required without resistance x gamma (resistance)

Source of resistance

I have already discussed the source of resistance to the flight of electrons and photons. It comes about because electrons and photons are creating virtual elastic strings with mass that are ejected at right angles to their line of flight into the graviton matrix. This creates tremendous drag because the particle's strings resist being pulled through this matrix. Even under normal conditions in the solar wind, the electron would quickly come to a halt if it were not for graviton waves pushing it through space.

This suggests that electrons in a particle accelerator reach a maximum velocity near 3 x 10^8 meters per second because of the resistance of the graviton matrix that becomes prohibitive beyond this velocity just as explained for photons in the previous chapter (Chapter 31).

In many ways, the graviton matrix is fundamental to understanding VES theory. For more than 100 years, scientists have attempted to devise an ether theory that could explain the velocity of light, the velocity of electrons, and the effect of particle accelerators on electrons and radioactive particles. VES ether theory shows us that this endeavor is likely impossible without using virtual elastic string theory and the resistance created by the graviton matrix.

The speed of the electron depends on the resistance created by the graviton matrix and the dynamics between positive and negative graviton waves pushing the electron through space. It accounts for the normal velocity of electrons in flight in the solar wind (750,000 m/s).

As the speed of the electron increases in a particle accelerator, the resistance created by the graviton matrix increases in a nonlinear fashion, perhaps much like wind resistance that increases as the square of the velocity.

Gamma is a measure of the resistance created by the graviton matrix that can be calculated using the Lorentz contraction. Gamma increases dramatically as the speed of the electron increases. As the electron approaches the speed of light, the resistance created by the graviton matrix becomes prohibitive, which prevents the accelerator from raising the velocity of an electron beyond that of a photon.

Chapter 33: Radioactive particles in accelerators

Radioactive particles that emit radiation are extremely sensitive indicators of time because they decay at a precise rate. The emission of radiation by an excited nucleus (higher energy) is analogous to the emission of photons by atoms. They are energy dependent reactions. Thus, any action that lowers the radioactive particle's energy can be expected to lower its rate of decay.

Scientists have shown that the decay rate of radioactive particles in an accelerator do slow down as the particle's speed increases. The rate of decay follows gamma in the same manner as the electron's velocity.

$$\text{gamma} = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$$

According to Einstein, gamma is **now** a measure of the change in the length of a unit of time for an object in motion versus the length of the same unit of time at rest. It is referred to as time dilation.

This interpretation says that a moving radioactive particle has less decay because time slows down while the particle is moving at a higher speed. The closer the speed of the particle is to the speed of light, the greater gamma becomes. Thus, **according to Einstein:**

Relativistic time in motion = gamma x expected time.

Time between clock ticks while in motion = gamma x time between clock ticks at rest.

Time between decay excitations in motion = gamma x time between decay excitations at rest.

According to VES theory, gamma has not changed. It is still a measure of the resistance created by the graviton matrix that increases with velocity. This resistance slows down the retraction of the radioactive particle's virtual elastic strings, which decreases self-induction cycles and decay rate:

VES theory: Time for one self-induction cycle in motion = initial self-induction cycle time x gamma.

Another way to state this is as follows:

Decay rate in motion = initial decay rate / gamma.

VES theory tells us the radioactive particle's elons and magnons associated with the radioactive atoms are being ejected into the graviton matrix, which slows down their retraction during self-induction. The resistance of the matrix increases in a nonlinear fashion, which can be calculated using gamma as discussed in the previous chapters

According to VES ether theory, gamma always reflects the resistance created by the graviton matrix. It decreases strings cycles and the velocity of electromagnetic particles. We don't have to assume that gamma has three different meanings. We don't have to assume that the particle accelerator shrinks while in use, nor do we have to assume that the length of a second can vary, nor do we have to assume that the mass of an object increases while in motion.

> The decay rate of a radioactive particle in an accelerator is slower at high speeds because the self-induction cycle is slower. This lowers the energy state of the radioactive particle and it emits less radiation.
>
> The acceleration of electrons in a particle accelerator and the decay rate of radioactive particles in an accelerator both follow gamma because gamma is a measure of the resistance created by the graviton matrix that slows down the retraction of strings and the velocity of the electron.

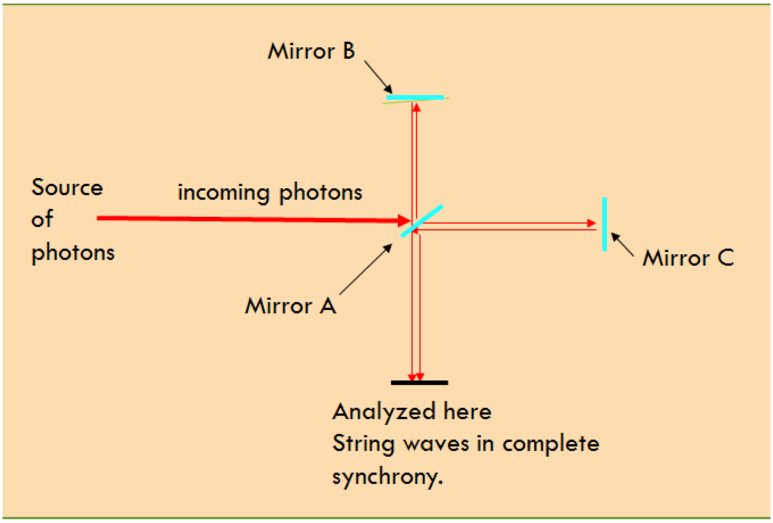
Chapter 34: Michaelson-Morley experiment and Einstein's equations

Scientists have long thought that photons require a source of energy to push them through space. For example, photons travel through glass only 66 percent as fast as they do in a vacuum, yet they immediately regain their normal velocity when they pass from the glass into a vacuum. Where does this energy come from? What is its source? These were the questions that plagued scientists long before relativity was proposed by Einstein.

Because photons have wave properties, scientist's thought it reasonable that a dense concentration of waves in space were pushing on the photon's waves, and in this manner, they were able to push photons through space. For lack of a better theory, it was thought the vibrating waves were somehow attached to space, and for this reason they became known as ether waves. This, of course, leads to a very strange concept: Space itself had to have some sort of structure that enables vibrating waves to attach to it, although the nature of space with structure was a complete mystery, as well as the source and structure of the vibrating waves attached to it. This concept of ether waves is difficult to envision, but scientists thought that such waves might exist.

In 1887, A. Michaelson and E. Morley undertook an experiment to determine whether ether waves existed. They reasoned if vibrating waves were attached to the space surrounding Earth, that earth in orbit would disturb the wave-space continuum, which in turn would disturb the velocity of photons traveling through it. For this reason, they expected photons to travel slower when moving in the same direction Earth orbits the sun at 30,000 meters per second.

To test this idea, they constructed a special interferometer that compared the velocity of photons traveling in the same direction earth rotates with photons traveling at a 90-degree angle to its rotation. A diagram of their apparatus is shown below.

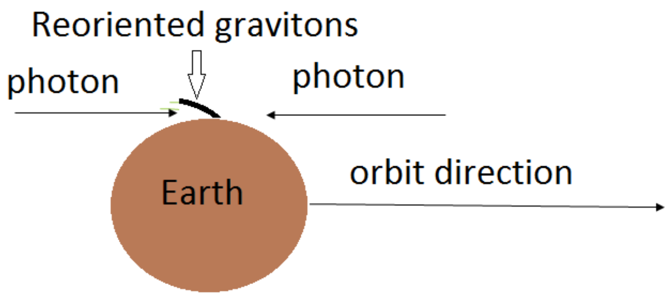


As shown, a source of monochromatic light was split at mirror A. Half of the light was reflected to mirror B and half passed through Mirror A and struck Mirror C. This instrument was constructed on a heavy block of sandstone that rested on a bed of mercury. This made it simple to reorient the instrument in any direction without jostling its parts. Once calibrated, it made no difference how they turned the instrument the two split beams arrived at the measuring device at the same time. Obviously, Earth's orbit had no effect on velocity of the photons. For this reason, most scientists stopped believing that photons were pushed through space by ether waves.

VES ether theory is completely unlike the original theory that depended on vibrating waves attached to space. According to VES theory, space is nothing more than a vacuum; it has no defined structure that can be disturbed by Earth passing through it. Secondly, gravitons that skim along the surface of Earth begin their journey from stars and planets found in the Milky Way galaxy and all of the other galaxies that make up our Local Group. Thirdly, gravitons that transport transverse waves are ephemeral, lasting no more than a second before new strings take their place. Finally, gravitons are composed of matter with perfect elasticity that makes them unique for transporting transverse waves over great distances without loss of energy. Finally, VES ether theory is a complete theory that includes the source of all waves, their size, speed, frequency and many other attributes as discussed in this book. It is far more reasonable that ephemeral gravitons attached to stars at great distance from Earth are less likely to be influenced by Earth's motion than waves attached to the space surrounding earth. The Michaelson-Morley experiment does not disprove VES ether theory.

However, photons travelling along Earth's surface are not completely independent of Earth's rotation for two reasons. The photon's strings that are directed at right angles to the photon's flight path may connect with the earth in some manner, which means Earth in motion will influence the photon in flight, but any effects on photon motion in the Michaelson-Morley experiment will cancel each other because the photon travels in both directions in one run.

The second potential problem comes from Earth's gravitons as shown in the next figure. Earth is a large body close at hand, and for this reason, it creates more gravitons per unit area than any other body.



This is relevant because Earth's gravitons will be swept to the rear by the graviton matrix and Earth's spin on its axis. This leaves Earth's gravitons at least partially in a position to act as negative and positive graviton waves. However, since the photon travels in both directions in one experimental run, the two effects cancel each other, and the photon's average velocity remains normal.

This was tested almost 100 years later by J.C. Hafele and R. Keating (1971) who flew atomic clocks around the world in commercial jets. Two clocks were flown east and two west. After deducting out necessary corrections, the clocks flown east ran 107 nanoseconds slower and the clocks flown west ran 107 nanoseconds faster than the stationary cesium-beam reference clocks at the U.S. Naval Observatory.

VES theory states these results are expected because of the reorientation of Earth's gravitons that enhance the effects of the graviton matrix and the dynamics between positive and negative graviton waves.

Of course, in the Michelson-Morley experiment, the photons traveled in both directions in the same run, which cancelled out these effects.

From this discussion, we can safely come to this conclusion: The Michelson-Morley experiment does not rule out VES ether wave theory. However, in 1887, with no other wave theory at hand, there were scientists who were convinced that waves attached to space was the most logical source of the energy that pushed photons through space. A scientist from Ireland by the name of George Fitzgerald came to the conclusion that the Michelson-Morley experiment could be reconciled with ether waves attached to space if the Michelson-Morley interferometer shrunk in the direction it was moving. This seems like a rather wild idea, but wild or not, a second scientist by the name of Hendrick Lorentz derived an equation that calculated how much the Michelson-Morley apparatus would have to shrink while running to give the results shown. It became known as the Lorentz contraction.

$$\text{gamma} = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$$

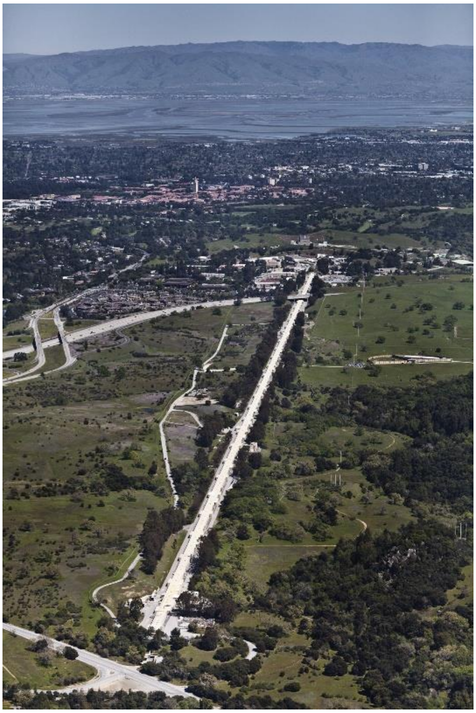
$$\text{Length of instrument in motion} = \frac{\text{length of instrument at rest}}{\text{gamma}}$$

Notice, gamma is the same factor used by Einstein to explain length contraction, time dilation, and the conversion of energy to mass in a particle accelerator that are summarized below.

Einstein's length contraction

Scientists soon discovered that the length of a particle accelerator had to be much longer than expected to raise the velocity of an electron to that near the velocity of light. Einstein concluded the particle accelerator had to be made longer than expected because it shrinks while in use.

Einstein: Length of accelerator in use = length of accelerator/gamma



The Stanford Linear Accelerator shown in the photon is 3,200 meters long, but according to Einstein, it contracts to 3.2 meters when in use near the speed of light.

Einstein's thinking here closely followed that of Fitzgeral and Lorentz:

Length of their interferometer in motion = length at rest/gamma.

VES theory gives us another perspective.

VES theory: The length of the accelerator must be made longer than expected because of the resistance created by the graviton matrix.

Length of particle accelerator needed without taking resistance into account x gamma (resistance factor) = length to build accelerator.

Einstein's conversion of energy to matter

Einstein: Mass of the electron in motion = mass at rest x gamma

VES theory: Energy needed to accelerate electron = energy expected without resistance x gamma (resistance).

Einstein's time dilation factor

Einstein: Time between ticks for a radioactive clock in motion = time between ticks at rest x gamma, because time dilates for a particle in motion.

VES theory: Time between ticks in motion = time between ticks at rest x gamma (resistance factor that holds back virtual elastic strings and slows down self-induction cycles).

Notice, Einstein gives gamma three different interpretations: 1. Accelerator contracts to a shorter size when in use; 2. the particle being accelerated increases in mass; and 3, a second expands to occupy more time for the particle being accelerated. Do all of three happen at the same time? Is this even mathematically feasible? Does this actually make sense to you? Please email me at kterrry@charter.net.

VES theory only places one interpretation on gamma. Gamma is a measure of the resistance created by the graviton matrix that slows down self-induction cycles and the velocity of electrons traveling through the matrix. This interpretation relieves the need to believe the electron in motion grows more massive, and it relieves any need to believe in time dilation, and accelerator contraction, and of course all three conclusions made by Einstein boggle the imagination in part because they must all occur at the same time in a particle accelerator.

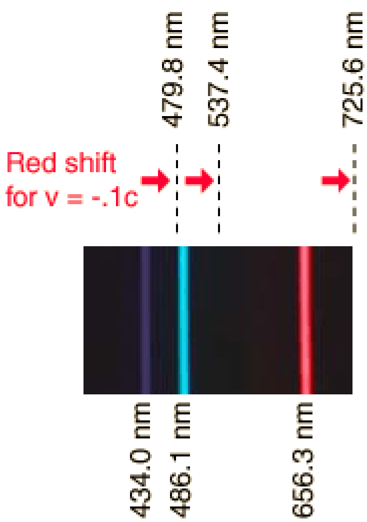
In the next Chapter, I explain how the graviton matrix solves many other curious observations that have been previously explained by some form of relativity.

Chapter 35: Photons in unequal gravitational fields

A photon has the normal speed of light and normal self-induction cycles when the concentration of graviton waves traveling with the photon is the same as those opposed to it. In this Chapter, I will discuss several experiments and observations that can be explained if there is a preponderance of graviton waves going in one direction. These experiments are very important when it comes to understanding the properties of photons we receive from distant galaxies covered in Chapter 42.

All atoms are constantly creating photons. Scientists call this photon emission. The wavelengths of the photons emitted are unique for every kind of atom. The exact spectral patterns have been established in the laboratory for elements in a hot gaseous state using a spectroscope that was invented more than 200 years ago. This instrument separates the light we see with a prism.

If the light we receive from a source has a longer wavelength than the standard, it is referred to as a redshift because red light has the longest wavelength for visible light. An example of redshift for the visible spectrum of the hydrogen atom is shown in
the next illustration.



The wavelengths are given in nanometers, which is one billionth of a meter. If you plug in ‘emission spectrum’ in your search engine for the

Internet, you will find many sources that give the spectral patters for elements. The source for this redshift was found at hyperphysics.phy- astr.gsu.edu/hbase/astro/redshf.html

The degree of redshift is measured as a z value, which is the ratio of the change in wavelength divided by the expected wavelength:

$$z = \frac{\textbf{expected wavelength - observed wavelength}}{\textbf{expected wavelength}}$$

The expected wavelength is the wavelength of the spectral band measured in the laboratory for hydrogen. In the example given, the Z value for the redshifted red band becomes:

$$Z = (656.3 - 725.6)/656.3 = -.106$$

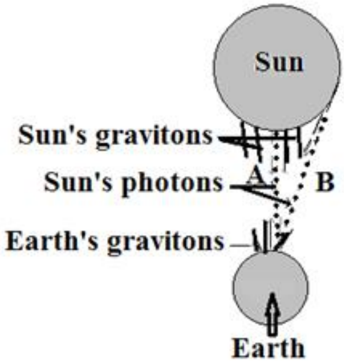
The red band is shifted 69.3 nm, the blue band 51.3 nm, and the violet band 45.8 nm, but the proportionality with the expected is the same, which means all three bands yield the same Z value.

In addition to redshift, the photons may have shorter wavelengths than expected. This is referred to as a blueshift because blue light has a shorter wavelength. The evidence shows that gravitons are directly involved in both redshifts and blueshifts. In this Chapter, I will confine the discussion to redshifts found in the photos we receive from our Sun and from the visible stars we see in the Milky Way Galaxy. I will take up blueshifts in another chapter.

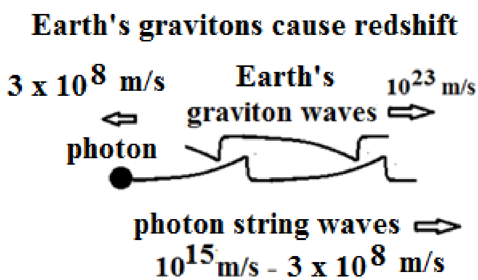
Gravitational fields influence frequency of incoming photons.

Samain (1991) reports that light we receive here from our Sun becomes redshifted in flight; namely, the wavelengths are longer than expected. Other scientists have shown that photons arriving here on Earth from bright areas of the sky have less redshift than photons arriving here from dim areas. Four independent labs have reached this conclusion, Cowen (2003).

Samain reports that light from the Sun reaching Earth has greater redshift than predicted after taking into consideration the original gravitational redshift due to the Sun. Also, photons emanating from the edge of the Sun show a greater redshift on their way to Earth than those coming from the center of the Sun. Photon A in the illustration below shows less redshift when it reaches Earth than photon B.

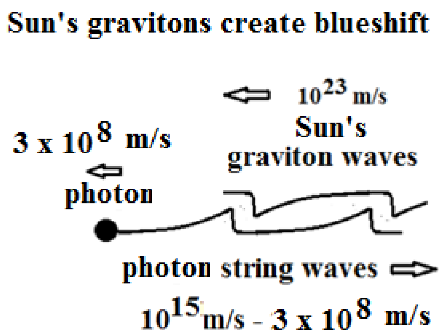


VES ether theory explains these results as follows: Earth's gravitons going against the flow of the photons, as shown in the illustration below, will push the photon's string waves to the rear and extend their self-induction cycles. The photons will be redshifted.



The redshift is temporary, meaning it does not depend upon a change in the mass of the photon; however, the change in the rate of self-induction is sufficient to fool the spectroscope.

When a photon leaves the Sun, it is surrounded by a much greater concentration of the Sun's gravitons than those emanating from Earth. These gravitons push the elon and magnon strings forward as shown in the next figure. For this reason, gravitons from the Sun will tend to increase or maintain the rate of the photon's self-induction cycles until graviton waves from Earth become predominate.



At 257,000 km above Earth, the concentration of gravitons from Earth and Sun are equal; this is shown in the next table. At this point, graviton waves traveling with and against the photon should be equal, and the wavelengths should be more nearly normal.

Table: graviton concentration emanating from Earth and Sun

Location	Sun's gravitons per cm^2	Earth's gravitons per cm^2
Sun's surface	9.7×10^{57}	
257,000 km from Earth	9.6×10^{52}	9.6×10^{52}
Earth's surface	9.5×10^{52}	1.6×10^{56}

At Earth's surface, Earth's gravitons will outnumber the Sun's gravitons by a ratio of 1684 to one. This will create the observed redshift. What we are witnessing here is a minor tweaking of the overall self-induction cycle.

A photon emanating from the center of the Sun will be surrounded with a greater number of the Sun's gravitons than a photon leaving the Sun's periphery. The photon from the center of the Sun shows less redshift when analyzed here on Earth. This same analysis explains why photons received from bright areas of the sky show less redshift on their journey to Earth.

We know a high concentration of gravitons in general slowdown self-induction cycles. This gives rise to the gravitational frequency shift, the gravitational redshift, and the slowing down of radioactive emission in a strong gravitational field. It isn't strange at all that Earth's negative graviton waves slow down the self-induction cycles of the photons we receive from the Sun and other sources; however, there are other factors involved that are better left for Chapter 42 when I take up blueshifts and redshifts as observed in our Local Group of Galaxies.

Velocity of the photon is affected by imbalance of gravitons

VES ether theory predicts that a photon will be impeded if traveling against a preponderate stream of graviton waves traveling in the opposite direction. In this situation, graviton waves are stretching the particle's strings to the rear. This extends the particle's self-induction cycle and decreases its velocity.

Shapiro (1964) reported that a radar signal between Mars and Earth is delayed if the signal passes near the Sun. The delay amounted to 0.00025 seconds out of the total 45-minute round trip. When the photon is moving towards the Sun, it will be flying into a preponderance of graviton waves directed against it. Thus, the trip from Mars to the Sun is slower than the normal speed of light.

After the photon passes the Sun, the Sun's graviton waves will still dominate. They will tend to push the photon towards Earth; however, the photon can never exceed the normal velocity of light, which means it will take longer than expected for a photon leaving Mars to reach Earth. The same considerations apply when the photon is traveling from Earth to Mars. Even so, the delay in the round trip only amounted to a very small fraction of the total time (9×10^{-8}).

Chapter 36: VES Ether Theory and atoms

The observations we are going to encounter in this Chapter can be explained by the graviton matrix and the influence of graviton waves on the self-induction cycles of electrons and quarks found within atoms. This interaction accounts for all the experiments with cesium-based atomic clocks and the effect of strong gravitational fields on the creation of photons. It also explains the effect of gravitational fields on radioactive particles.

Stationary atoms in a static gravitational field

In this section, we will examine what happens to an atom and its subatomic particles when exposed to gravitational fields of different strength. These observations provide strong evidence that gravitons influence self-induction cycles just as proposed by VES ether theory.

Inside the atom, the electron self-induction cycles and quark self-induction cycles become synchronized because their n-elons and p-elons bond as they go through their individual cycles. This forces them into synchrony. The rate they go through their self-induction cycles is dependent upon the strength of the gravitational field. It is referred to as gravitational frequency shift.

Gravitational frequency shift

A cesium-beam atomic clock is the most accurate device ever made to measure time. It has an accuracy of one second in 1,400,000 years. It has been shown that an atomic clock slows down when placed in a stronger gravitational field. This is referred to as the gravitational frequency shift. Clocks here on Earth run slower at lower altitudes where the gravitational force is greater. Even a clock placed at the bottom of a skyscraper runs slower than a clock at the top of the skyscraper. Sexl (1976) reported that clocks in the Northern Hemisphere during the winter, when closer to the Sun, run slower than clocks at the same location during the summer. It should be appreciated that a good Cesium clock only has an error of 5 $x10^{-14}$ nanoseconds per day.

According to VES ether theory, an increase in graviton concentration will increase the length of self-induction cycles because the graviton matrix resists the retraction and movement of the atom's elons and magnons that are ejected into the graviton matrix as discussed previously.

When the atomic clock is moved closer to the Earth, its electron self-induction cycles and quark self-induction cycles are in synchrony but at a lower frequency, and the clock will tick fewer times per second. This completely explains the effect of the gravitational fields on atomic clocks. It provides strong evidence that gravitons influence self-induction cycle rates.

It is worth noting that the number of graviton waves extending through a single atom is theorized to be vast, while the effect on vibration is relatively small. For example, atomic clocks aboard satellites must be corrected for the gravitational frequency shift; otherwise, the lower density of gravitons in outer space would cause the clocks to run faster. The correction is only one part in 10^{14}.

Scientists have shown that the magnitude of the gravitational frequency shift is directly related to Earth's potential gravitational energy. Where G is the gravitational constant, M_E the mass of the Earth, and r is the distance to Earth's center.

$$\textbf{Earth's potential gravitational energy} = \frac{G\,M_E}{r}$$

According to VES ether theory, this is a reflection of the concentration of gravitons penetrating the atomic clock. The very fact that Earth's potential gravitational energy is used to calculate the gravitational frequency shift gives strong support to the idea that gravitons interact with elons and magnons just as predicted to explain the velocity of light and Maxwell's equations.

Gravitational frequency shift
When the concentration of gravitons penetrating an atom increase, it causes a slowdown in the oscillation frequency of the atom, which causes the atomic clock to tick fewer times per second.

By the way, no theory of relativity is required to calculate Earth's potential gravitational energy.

Strong gravitational fields and gravitational redshift

All atoms have a different number of electrons orbiting about their nuclei as well as a different number of protons and neutrons, and the photons they emit when in an exited state are characteristic for that particular atom. This provides a method of identifying different elements by their spectral lines, their “cosmic bar code”.

Photons emitted by atoms in a strong gravitational field have lower frequencies than expected; their bar codes have been shifted. It was first measured in the light we receive from massive stars called white dwarfs. It is frequently offered as proof for the general theory of relativity. As the name implies, the gravitational redshift is known by scientists to be the result of strong gravitational fields.

According to VES ether theory, a dense concentration of graviton decreases self-induction cycles just as explained above for the gravitational frequency shift. This lowers the energy of the atom and it emits photons with less mass and longer wavelengths; the photons created will show a redshift. This redshift occurs during photon emission and it is permanent. By this I mean, the redshifted photon has less mass and longer wavelength than normal. This concept is supported by Max Planck’s work on photon emission.

Planck established that the faster the atoms oscillated the higher the energy of the photon emitted. This work demonstrated that the rate of the atom’s self-induction cycles determines the size of the photon emitted. For this reason, photons emitted by atoms in a strong gravitational field have less mass and longer wavelengths.

Electricity is used to control the size of the photons emitted by a transmitting radio antenna. In this situation, the antenna is receiving pulses of n-elons then p-elons that are controlled by an oscillator. This brings the atom’s self-induction cycle rate (oscillation frequency) to some desired value, which in turn controls the mass and wavelengths of the photons emitted. In the same manner, photons emitted by atoms in a strong gravitational field have lower frequencies because the atoms that emit the photons have longer self-induction cycles and lower energy.

Gravitational Redshift

Atoms in a stronger gravitational field oscillate fewer times per second, and atoms with slower oscillation cycles emit photons with less mass and slower self-induction cycles.

Decay rate of radioactive particles in gravitational fields

Physicists have shown that the decay rate of radioactive particles is slower when Earth is closer to the Sun. This subject has been reviewed and the findings supported by the efforts of Jenkins, J. H. et al (2008). This observation is predicted by VES ether theory: The greater the concentration of gravitons, the slower the self-induction cycle. This in turn decreases the energy of the particle and the rate it decays. Thus, there is a seasonal variation in the rate of decay of radioactive particles here on Earth, which according to the authors, is not determined by the fluctuation of temperature. Rather they believe it is determined by some field of the Sun; according to VES theory, this field is composed of gravitons whose concentration varies with distance between Earth and Sun.

Atoms in motion

The theory of relativity states that time slows down for a moving object. This is referred to as time dilation:

Relativistic time = normal time x **gamma**.

VES theory does not support this contention, but it does provide an explanation for the behavior of atoms in motion. Simply put, the faster an atom travels through the graviton matrix the greater the resistance met by the atom's virtual elastic strings as they retract back to source and/or pulled through space because of the graviton matrix. For this reason, movement of an atom through the graviton matrix slows down the atom's the self-induction cycles, which in turn decreases radioactive decay, and for the same reason, an atomic clock in motion ticks fewer times per second.

Atomic clocks placed in satellites in orbit must be preset to adjust for this factor as well as the gravitational frequency shift to keep them correct with Earth based clocks, Ashby (2003). To make this correction, the clock's velocity as well as the strength of the Earth's potential gravitational energy must be taken into consideration. The speed of the satellite and its distance from Earth determines the correction to be made. It is proportional to the Earth's gravitons in space, and the velocity of the clock as it moves through the graviton matrix.

The faster the clock is moving, the greater the retardation of its self-induction cycles just as we saw for radioactive particles in particle accelerators. VES theory states this is analogous to resistance created by wind which increases as the square of the velocity.

Cesium clocks in airplanes

J.C. Hafele and R. Keating (1971) tested time dilation by flying atomic clocks around the world in commercial jets. Two clocks were flown east and two west. After deducting out necessary corrections, the clocks flown east ran 107 nanoseconds slower and the clocks flown west ran 107 nanoseconds faster than the stationary cesium-beam reference clocks at the U.S. Naval Observatory.

According to the authors, this is what you would expect because of relativistic time dilation. This opinion is not shared with some physicists. D. McCarthy (1997) stated his belief that "…not only did Hafele-Keating invalidate the reference frames of all the clocks and observers in the experiment, but they also discounted the predictions from all non-rotating, non-orbiting reference frames of the solar system. It is simply impossible to claim these non-orbiting reference frames are less valid (according to special relativity) than one that is orbiting around the Sun." The title of an article by McCausland (1999) was: "On the consistency or inconsistency of special relativity." And in his abstract he stated: "Einstein's argument for the relativity of synchronization is criticized and rejected. It is concluded that either the theory is inconsistent or Einstein's theorem about the time interval shown by a round-trip clock does not follow from the theory."

In the Hafele and Keating experiment, the concentration of gravitons in space cannot explain why clocks flown east should run slower than those flown west. Even the number of gravitons encountered in flight would be approximately the same because all the planes were traveling at approximately the same speed at the same elevation. The obvious variable in this equation is the direction Earth is spinning on its axis. When flying east, the plane is flying in the same direction Earth is spinning on its axis, and the opposite is true when flying west.

I believe this experiment can be explained by a shift in the graviton matrix that surrounds the Earth. Earth spinning on its axis will tend to shift the matrix and orient Earth's gravitons and their waves to the west. This means a plane flying east will be flying against graviton waves reoriented in a westerly direction. This will lengthen the clock's self-induction cycles and oscillation frequency. The clock will tick fewer times per second. In contrast, clocks flown west will be flying with a greater concentration of graviton waves moving in the same direction. This will increase the number of ticks per second for the atomic clocks going west.

We need to remember the effect on the clocks is very small. The ratio between clocks onboard aircraft compared to ground-based clocks is 10^{-13}. Like many of the observations involving relativity, our measuring devises are extremely sensitive, which makes it possible to detect even the smallest changes.

I have examined a large number of observations that can be explained if we assume that magnons and elons interact with gravitons. They include Maxwell's equations, the velocity of light, and the effect of gravitons on subatomic particles in motion or stationery in space. The same interaction between particle strings and gravitons explains the Hafele and Keating experiment. Only in this case we find, not too surprisingly, that if a majority of graviton waves are directed against the atomic clock, it decreases oscillation frequency while the opposite occurs if the majority of graviton waves and atom are going in the same direction.

Some of the authors experiments concerning the graviton matrix

If atomic clocks traveling west tick faster than normal because of the shift in orientation of the graviton matrix, it occurred to me that they may also influence the flight path of small photons traveling either north or south, but not east or west. I tested this possibility and found it to be true. These experiments are explained in detail in Chapter 11. My experiments show AM radio photons traveling northward are pushed to the west when traveling from Fresno, Ca area to Carson City, Nevada, but AM radio photons traveling west from Nephi, Utah area to Carson City travel in a straight line. I believe AM radio photons curve when traveling northward because they are pushed to the west by Earth's graviton waves that become reoriented because of Earth's spin on its axis.

If the graviton matrix influences atomic clocks and photons in flight, it seemed to the author that it might also influence the fall of small, lightweight objects as they descend towards Earth under the influence of Earth's gravitational field. To examine this possibility, I carried out some experiments with tufts of feather and acrylic fibers. I created an apparatus that enabled me to measure the rate of fall of these lightweight objects in a vacuum and in air with no vacuum. I was excited to find that these objects fell much slower in a vacuum than expected. These experiments are explained in detail in Chapter 12.

I believe these ultra-lightweight objects fell slower than expected because of the immense concentration of gravitons that act as a net to hold these small objects in space, and secondly by the force of graviton waves rising from Earth that penetrate these objects and push them upward.

I also reasoned that a dense concentration of gravitons might influence the flight of spinning Ping-Pong balls. My experiments explained in Chapter 10 show that spinning table tennis balls continue to curve even in a complete vacuum. This is in contrast to conventional thought that air is necessary for a spinning ball to curve in space. Once again, I believe the small plastic balls continue to curve in a vacuum because they are influenced by the graviton matrix.

The effect of Earth's movement on atomic clocks

Stationary clocks on the surface of Earth are obviously in motion as Earth spins on its axis. However, Earth spins faster near the equator than it does near one of the poles, and for this reason, clock speed should depend upon where the clock is located. It should also depend upon Earth's potential gravitational energy.

As we leave the equator, and its equatorial bulge, the gravitational forcefield increases because we are closer to the center of Earth's mass. This means there will be a greater number of Earth's gravitons available to penetrate the clock and decrease clock speed (gravitational frequency shift). At the same time, the surface speed of Earth decreases as we approach either the north or south pole, which means the clock should speed up. These two factors offset each other, Giannoni and Gron (1979).

Venema and colleagues (1992) have presented evidence that nuclear spin of mercury atoms is coupled to the Earth's rotation, which is additional evidence that gravitons attached to the Earth affect the energy of the atoms they encounter.

The higher the concentration of gravitons that penetrate an atom the slower its self-induction cycles.

Atomic clocks tick fewer times per second in strong gravitational fields because they have slower self-induction cycles. This explains gravitational frequency shift.

Atoms exposed to high gravitational fields emit photons with less mass and longer self-induction cycles (redshifted) because the atoms have slower self-induction cycle. This explains gravitational redshift.

The decay rate of radioactive particles decreases in strong gravitational fields because a high concentration of gravitons decreases the atom's self-induction cycle rate.

The faster an atom travels through the graviton matrix, the greater the resistance factor that retards self-induction cycles.

This explains why atomic clocks aboard satellites have to be adjusted according to their velocity as well as the concentration of gravitons in space.

Chapter 37: Energy

Energy is a very important but poorly understood concept in physics. Richard Feynman (1964), a well-respected theoretical physicist, put it this way: "It is important to realize that in physics today, we have no knowledge what energy is. **We <u>do not</u> have a picture that energy comes in little blobs of a definite amount".**

This is precisely the opposite of Einstein's idea; Einstein believed a photon in flight is a little blob of energy.

Energy is defined mathematically as the amount of work that can be achieved by a moving mass. For this reason, the energy of a system diminishes in direct proportion to the work done by the system. This of course does not tell us what causes a mass to move and therefore have energy and the capacity to do work. In this Chapter, I will discuss how virtual elastic strings and virtual particles are directly responsible for movement of all objects, and for this reason, they are directly responsible for the energy of any system. I will begin this discussion by analyzing the close association between work and energy, which are both measured in joules.

Work, potential energy, and kinetic energy

Everyone agrees that energy comes in two forms. There is potential energy and there is kinetic energy. An object that has potential energy can be converted into an object with kinetic energy when the object is set in motion, once in motion it has the capacity to do work. For example, a boulder on the mountainside has potential energy because it has the potential of being pulled downhill by gravity. If the boulder is dislodged, gravity will pull it downhill, and once moving, it now has kinetic energy with the ability to do work. If it crashes into the farmer's wooden fence and breaks it down, it has done work. Water in a reservoir has potential energy with respect to the Earth's gravitational field. If it is allowed to flow downstream, it now has kinetic energy, and it has the capacity to do work. If a waterwheel is placed in the stream, the moving water will cause the waterwheel to turn. The moving water has done work.

Work performed by matter in motion is often expressed in joules and is calculated by this equation:

Work in joules = force in newtons x distance in meters.

If a force of one newton moves an object one meter it has accomplished one joule of work. Time is not a factor. The work can be done fast or slow but the amount of effort measured in joules remains the same. Notice, work is only accomplished when an object is moved.

Gravitational energy compared with work done

On Earth's surface, the total gravitational force of attraction between a one-kilogram object, maybe a large apple, and Earth is 9.8 newtons. It is calculated using the universal law of gravity.

$$F_g = G\frac{m_1 m_2}{r^2} = \frac{(6.67 \times 10^{-11}\ \mathrm{N.m^2/kg^2})\,(1\ \mathrm{kg})\ (5.98 \times 10^{24}\ \mathrm{kg})}{(6.37 \times 10^{6}\ \mathrm{m})^2}$$

$$= 9.8 \text{ newtons}$$

G = gravitational constant $\quad m_1$ = mass of apple

r = radius of Earth $\quad m_2$ = mass of Earth

The force of 9.8 newtons is frequently designated by the letter g.

The gravitational potential energy to the center of the Earth is very large, but the potential energy of a body is positional. If the object is 10 meters above the Earth, the most energy we can get out of this object is limited to its fall of 10 meters because at that point it comes to a dead halt as it dives into the dirt. If a one-kilogram ball is 10 meters above the Earth, its potential energy is calculated in this manner:

Potential energy in joules = weight x height x g

Potential energy = 1 kg x 10 meters x 9.8 newtons = 98 joules

The work done in lifting the one kilogram ball up 10 meters is equal to force x distance:

Work = Force x distance = 9.8 newtons x 10 meters = 98 joules.

As you can see, the potential energy of an object in a gravitational field is exactly equal to the work done in lifting the object. The potential energy of the one-kilogram ball is doubled if it is raised 20 meters and the work in joules to lift it to the greater height also doubles.

What we have seen here applies in principle to all the forces of nature. Energy simply tells us the amount of work a moving object can create. For this reason, it is a mathematical concept; There is no blob of energy.

Conversion of potential energy to kinetic energy

When a one-kilogram ball is dropped from a position 10 meters above ground, it loses 98 joules of potential energy by the time it has fallen 10 meters. The moving ball now has 98 joules of kinetic energy, and the gravitons responsible for pulling the ball towards earth did 98 joules of work.

Work = force x distance = 9.8 newtons x 10 meters = 98 joules.
Kinetic energy of the moving ball = ½ mass v^2 = 98 joules.

We can show that the work performed in joules by gravity is equal to the kinetic energy of the moving ball (½ mass v^2). First, we have to calculate the time it takes for the ball to fall 10 meters.

The time it takes for an object to fall 10 meters can be computed by rearranging this equation: free fall distance = $1/2gt^2$

$t^2 = 2\ d/g = 2x10/9.8 = 2.0408$ and $t = 1.429$ seconds

Velocity = g (Time) = 9.8 x 1.429 = 14 meters/second

Kinetic energy = ½ x 1 kg x $(14\ m/s)^2$ = 98 joules = work done by the retracting gravitons.

The work performed when a 1 kg ball is lifted 10 meters is 98 joules. The potential energy of a 1 kg ball lifted 10 meters is 98 joules. The kinetic energy of the moving 1 kg ball after falling 10 meters is 98 joules. After falling 10 meters, the moving 1 kg ball has the capacity to do 98 joules of work. The gravitons that pulled the ball towards Earth did 98 joules of work.

> From this little study, we see that work, potential energy, and kinetic energy are merely names that express work already done or work that can be done by a mass in motion. This explains why work and energy are both measured in joules.

Now we only need to understand what causes any mass to move, which brings us to virtual elastic strings and virtual particles.

VES theory applied to the concept of energy

All virtual elastic strings are composed of matter that has perfect elasticity, and a material with perfect elasticity gains potential energy when stretched. When a material with perfect elasticity retracts, it becomes mass in motion with kinetic energy and the potential to do work. Let's examine some examples of virtual elastic strings in action.

Let's return to the waterwheel. Water rushing downstream can force a waterwheel to turn, and in this manner, the moving water does work. We say the water has kinetic energy, which is just another way of saying that moving water has the capacity to do work because there is matter in motion. There is nothing mysterious here. The formula that calculates the kinetic energy of the moving water merely indicates how much work the moving water can perform. Now we have only to define what causes the water to move. The obvious answer is the gravitational force of attraction that forces the water downhill. Gravitons are stretched by their virtual particles when they are ejected into space, and for this reason, they gain potential energy. When gravitons connect water molecules and Earth together, they retract and pull the water downhill. The retracting gravitons do the work and the work performed is accounted for by the water in motion. The water is said to have energy because it is mass in motion, and the amount of energy calculated is a statement of how much work can be performed by the moving mass.

When a common rubber band is stretched, it stores potential energy, and if the rubber band is attached to objects at both ends, it pulls the objects toward each other, which we measure as work. In this example, we are witnessing the action of the virtual elastic strings that make up the electric forcefields that bind electrons to protons. When we stretch the atoms apart, the elons are stretched over a greater distance—they gain potential energy, and when they retract, they pull the atoms back into their original shape and by doing so they perform work.

In the same manner, when quarks are forced apart, the force of attraction between quarks increases because the potential energy of the gluons increase the farther the gluons are stretched, and when they retract, they pull the quarks back together; they perform work. This defines strong nuclear energy.

Magnetic energy results from the same principle as just explained for the other forces. When the north pole of a toy magnet comes close to the south pole of another toy magnet the two magnets are pulled together, and in this manner, do work. The magnets accomplish this feat because the n-magnons and s-magnons are stretched by their virtual particles when they are ejected into space. Now when they attach to each other, then retract, they bond and pull the two magnets together.

There can also be a force of repulsion between two electrons when they oppose each other. In this case, the virtual particles from one electron slam into the opposing electron and drive them apart. The same is true for two particles with a positive charge.

If we push our chair across the floor, we have used adenosine triphosphate (ATP) as a source of chemical energy in our muscles, and the work performed is a reflection of the force applied times the distance the chair is moved. The chemical energy in this case results from electric bonds (elon virtual elastic strings).

What we have seen in this discussion is that electric energy, nuclear energy, magnetic energy, and gravitational energy all result from the action of virtual elastic strings, and or their virtual particles. When the strings retract, they have the ability to set objects in motion, and the objects set in motion have kinetic energy and the capacity to do work. When the virtual particles slam into opposing electrons, it sets them in motion, and we see this as a force of repulsion.

We can define this in greater detail by examining the self-induction cycle in terms of energy.

Energy relationships during self-induction

The energy relationships during self-induction are the same for photons and electrons.

The energy of the electron when it is in its most condensed state resides in the condensed elastic kolla and in its complementary strings that surround and apply pressure against the electron. The energy of the electron is passed to the virtual particles that are ejected into space with great velocity. The virtual particles have mass, and a moving mass has energy and the capacity to do work. The kinetic energy of the virtual particle is passed to the virtual elastic string that it stretches through space. The potential energy of the stretched string becomes kinetic energy when the string retracts. The string has mass and when retracting it is mass in motion with the capacity to do work.

When the electron’s complementary strings bond and retract against the surface of the electron, they transfer part of their energy to the condensed electron and its kolla. They may also bond to some other object and pull that object through space and in this manner transfer energy to the moving object.

Another source of energy possessed by the virtual elastic strings resides in the transverse waves streaming away from the electron creating the string. The energy of these moving waves comes from the snapping portals and the elastic strings surrounding the electron that force the portals to first open and then close after a virtual particle is released.

The photon's elon and magnon strings are in intimate contact with gravitons from a host of other sources, and there is energy transfer taking place between waves; work is being done. The photon is being pushed through space at the velocity of light by graviton waves, and the electron is being pushed through space in the solar wind. In a sense then, the kinetic energy of the photon or electron, and in a like manner all moving mass, is a form of stored energy that can be used to do work.

The conservation of energy in this situation involves all the stars and other structures in the Local Group of Galaxies because energy is being passed around by virtual elastic strings that are interacting with each other from all these sources. The energy in a vacuum that scientists speak of is in the form of virtual elastic strings and their waves.

The conservation of energy as envisioned for self-inducing forces and the self-induction cycle is insufficient to account for all the energy expended by photons and electrons during their self-induction cycles. As explained in Chapter 22, part of the energy that drives the self-induction cycle comes from spin angular momentum.

Is the mass of a photon really converted to energy as stated by Einstein? This question leads to another question. What is $E = mc^2$ really telling us? Let's examine this concept in a little more detail.

E = mass c^2

The energy of a photon in flight is given by this equation: $E = mc^2$. According to VES theory, the quantity E is a mathematical number without form or substance. It is merely the product of two other numbers: mass x velocity squared. It merely informs us of the capacity of the photon to do work. Striking evidence for this assertion has been proven by torsion balance experiments as discussed in Chapter 28.

E = mc^2 describes the energy of a photon in flight. It can be used to calculate the work done when photons strike a blackbody where they are absorbed.

When photons strike a black body, they cause it to move, and in this manner, they do work. The equation for momentum, mc = E/c, has been proven to be true by torsion balance experiments. The photon's mass in kilograms is exactly as predicted by Maxwell's equation for momentum.

The energy of a moving photon, E = mc^2, is greater than the kinetic energy of larger objects: kinetic energy = ½ mv^2. However, the momentum of the photon is still mass times velocity: **mc** = E/c; and in the same manner, the momentum of the larger object is still mass times velocity: **mv** = 2E/v. However, the energy of the photon in flight is twice as great as kinetic energy of large objects. This suggests that the energy of the photon is composed of two sources: kinetic energy of the main body of the photon in flight, and the kinetic energy of the photon's electric and magnetic fields, and of course, the energy of elons and magnons come from mass in motion.

Mass is a horse of a different color than either energy or velocity. Mass is a quantity of matter that can be measured in kilograms, and matter can be touched, burned, frozen, probed, dissolved, shot into space, condensed, expanded, stretched, be attracted by gravity, have momentum, be molded into various shapes, felt lovingly with your fingertips, and punished with your fists, but it cannot be destroyed. Energy can do none of these things. Energy, as calculated, quantifies the work that can be done by a moving body, and the source of all movement is explained by VES theory, which is supported by all the facts.

We know why Einstein chose to believe that the mass of a photon becomes pure energy in flight, and it is almost a moot point how Einstein justified this conclusion. Matter and energy had to be interchangeable to defuse the evidence showing that photons in flight have mass. We can sympathize with Einstein because energy was not well understood, and he was deep in denial. If he thought photons have no weight, then he had to deny the facts because photons have momentum and a gravitational force of attraction with other bodies. Obviously, he got past this point and concluded that the kilograms of weight in a photon existed as kilograms of energy, which he maintained would still allow the photon to travel at the speed of light. This too seems like a denial of the obvious. To make this assumption, he had to conclude that the energy of the photon in flight possessed the two most important properties of matter: weight in kilograms, and a force of attraction with other bodies. If this is true, has anything really changed? How can something absolutely proven to have the properties of matter not be counted as something going too fast when traveling at the speed of light? 'A kilogram is a kilogram under any name,' and the Lorentz equation used by Einstein uses kilograms to express the photon in flight.

$$\textbf{moving kg} = \frac{\textbf{resting kg}}{\sqrt{1 - \left(\frac{v}{c}\right)^2}}$$

In this equation, the kilograms of the moving body become infinite if the velocity of the particle, **v**, is equal to the velocity of light, **c**. Of course, I have taken the liberty of using kg in place of the word mass, although the equation is correct as written because mass is expressed in kilograms and photons have kilograms of weight that has been proven by numerous experiments.

Let's revisit the quote from Richard Tedlow (2010, page 3) "Denial is the unconscious calculus that if an unpleasant reality were true, it would be too terrible, so therefore it cannot be true. It is what Sigmund Freud described as the combination of 'knowing with not knowing.' It is, in George Orwell's blunt formulation, 'protective stupidity'." It is also worth repeating Dr. Daniel Kahneman (2011). There are "….two important facts about our minds: we can be blind to the obvious, and we are also blind to our blindness."

ENERGY

A photon is not a little blob of energy because energy is strictly a mathematical concept that defines how much work can be done by a body in motion.

Energy and work have their roots in virtual elastic strings and the entities that create these strings through self-induction. This includes the energy associated with electricity, magnetism, gravity, and the nuclear forces. It also includes mechanical energy and chemical energy that result from one of the above forces.

When a virtual particle is ejected into space, it has kinetic energy because it is mass in motion. The virtual particle transfers potential energy to the elastic string that it stretches, and the potential energy of the stretched elastic string is available to do work because when it retracts it is mass in motion.

The transverse waves that move along virtual elastic strings are a source of energy because they are mass in motion. They account for the energy in a vacuum and the work accomplished by gravitons that push photons and electrons through space.

Repulsion forces are also created by mass in motion; for example, virtual n-elon particles in motion drive electrons apart.

ENERGY AND MATTER

It is irrational to believe that the mass of a photon can be converted into energy because energy is nothing more than a mathematical concept that quantifies the work than can be performed by a moving mass. Witness: the energy of a body decreases in exact proportion to the amount of work performed.

It is irrational to believe that photons have all the properties of photons with mass, yet believe photons are composed of pure energy. Reflect: photons have proven weight in kilograms that exactly matches Maxwell's equations, create billiard ball like collisions with electrons, have spin angular momentum and linear momentum, develop a gravitational force of attraction with other masses, create forcefields just like electrons and quarks <u>that have mass</u>, and they have the ability to do work because they consist of kilograms in motion.

It is irrational to believe that photons have no mass if they create forcefields with physical properties that deflect moving objects.

It is irrational to believe that photons qualify as having kilograms of weight in numerous equations dealing with linear momentum, spin angular momentum, gravitational force of attraction between stars and photons, as well as other phenomenon, but don't qualify as having kilograms of weight when expressed in Einstein's equations dealing with relativity. A rose is a rose under any name and so is a kilogram.

Einstein's concept of energy is irrational, and one has to be in a deep state of denial to believe otherwise.

Chapter 38: Quarks, and the strong nuclear force

A proton is a subatomic particle that creates a positive electric forcefield that binds to a negatively charged electron to create the hydrogen atom. Every atom has a different number of protons and electrons. A proton has a mass of 1.6726 x 10-27 kg, while the electron's mass is only $9.10938356 \times 10^{-31}$ kg, which makes the proton 1840 times larger than an electron.

In Chapter 20, I discussed the observation that protons in the solar wind travel at high velocity because the proton emits virtual elastic strings that interact with graviton waves. The virtual elastic strings emanating from the protons come from quarks. Scientists tell us that protons contain quarks and antiquarks, some of which seem to bond together and decay. I will discuss this observation after I discuss the stable quarks that bind together to produce a triad of quarks and the strong nuclear force. The stable quarks are known as up quarks and down quarks. These quarks are slightly larger than electrons and more complex. In addition to making elons, magnons and gravitons, they also make several kinds of gluons that are responsible for the strong nuclear force.

The p-elons emanating from a proton are the result of the interaction between up quarks and down quarks. The up quark self-induction cycle produces a 2/3 positive electric charge, and there are two up quarks per proton, which combined yields 4/3 positive electric charge. The down quark self-induction cycle produces a 1/3 negative electric charge, and there is one per proton. Thus, a proton with a combination of two up quarks and one down quark produces one unit of positive charge, which equals the one unit of negative charge created by the electron. The neutron has two down quarks and one up quark, and for this reason it has no electric charge.

The strong nuclear force

Particle physicists have developed the Standard Model for the structure of atoms. It is backed by decades of research. This is an active field of research and scientists are still discovering new information about quarks and their associations.

Scientists have discovered that the strong nuclear force comes in three different types of charges in contrast to the electric force that has two. The three different types are known collectively as color charges, and they are frequently designated as red, blue, and green.

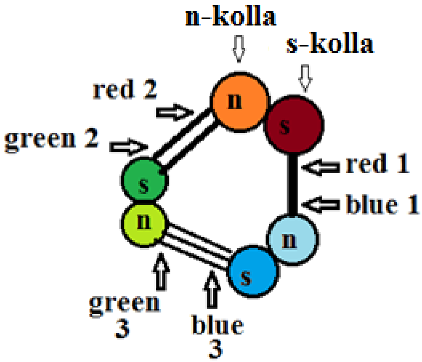
Thus far, scientists have identified six quarks, but as far as is known only two are implicated in creating the forces of nature, and they are known as up quarks and down quarks. An up quark has a mass of about 4.3×10^{-30} kg and a down quark has twice this mass. Either type of quark can be thought of as red, blue, or green, but the three quarks within the proton must all be of a different color. This is true for neutrons as well. When the three quarks bind together, it makes this triad of quarks color neutral, just as a proton-electron combination is electrically neutral.

Color charges are shared by protons and neutrons even though each is color neutral. This allows protons and neutrons to bond together within the nucleus of an atom. This is similar to the sharing of electrons by two different atoms to make compounds. According to VES theory, they are sharing strings.

Types of gluons

VES theory predicts that gluons are the most massive virtual elastic strings. It also predicts that gluons come in three different masses and are either n-kolla or s-kolla. This means there are six different kinds of gluons. Just how the six gluons might interact with three quarks is shown in the illustration below.

My model states that the relative mass of the string is shown by its number, which can be 1, 2, or 3. A number 1 string has twice the mass of a number 2 string and three times the mass of a number 3 string. This means every sphere creates the same string mass. Like elons and magnons, there is a force of attraction between two strings if they have the same mass but opposite kolla. For example, there is a force of attraction between green3 gluons and blue3 gluons because they both have the same mass but opposite kolla.

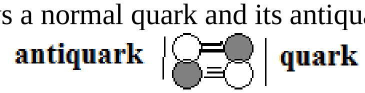


Gluons created by the north sphere of the red quark would have no attraction with the gluons emitted by the south sphere of the red quark. The reason being they are made from different kolla and they have different masses. For much the same reason, two normal quarks never pair up and neutralize each other. There are always free strings remaining that bond to other quarks making a triad of quarks that are color neutral.

There are no repulsion forces between quarks because no two spheres make identical strings.

What I have illustrated here is only the ratio between quark pairings. How many strings are involved is a different question. The number might be small wherein each string produces a great deal of force. In this case, a single pair of gluon strings retracting might produce 60 times more force than one magnon or 3 x 10^8 bound elons. On the other hand, it may take a larger number of gluon strings to produce the same force.

The color charge on an antiquark is opposite to the normal quark, which allows a normal quark and its antiquark to pair up.



Same mass different kolla allows them to pair up

These two may seem to decay and then reappear as they go through their self-induction cycles. There is also the possibility of some weak interaction between these quarks and the stable up and down quarks.

The model proposed allows three different quarks to combine into stable groups of three. Moreover, it suggests how color neutral protons and neutrons might be attracted to each other to form stable nuclei.

VES theory does not suggest any reason why a proton should decay. It is composed of matter, and the virtual elastic strings it creates always retract back to the quarks that create them.

I believe the creation of strings by quarks is driven by the same self-inducing forces that drive the electron's self-induction cycle. Quarks create electric and magnetic fields, which means they will be influenced by graviton waves. In addition, up quarks are connected to electrons by strings. This means they are physically connected to a fast-moving particle that will attempt to pull the quark around in the same circular orbit as the electron. Researchers at the Jefferson National Accelerator Facility in Virginia (2003) have found evidence that the two up quarks do indeed spin in parallel with proton spin. I believe that ultimately the spin of electrons, photons, and quarks is created by graviton waves.

Neutrons

Protons are made of two Up and one Down **quark**. The **neutron** is made of two Down and one Up **quark**. The Up **quarks** have a 2/3 positive charge and the Down has a 1/3 negative charge. This leaves the proton with one positive charge and the neutron in a neutral state.

Chapter 39: Electrons in orbit

In this Chapter, I will apply virtual elastic string theory to the behavior of electrons in orbit. I will begin this discussion by briefly examining Bohr's model of the atom and the force that holds electrons in orbit.

In 1913, Niels Bohr concluded that electrons orbit the nucleus of the atom much like planets orbit around the Sun. The orbital patterns of electrons are very complex, but the concept of negative electrons orbiting around positively charged protons is known to be a correct interpretation.

Because electrons are particles with mass, they cannot remain in rotation around protons unless there is an electric force of attraction between the two particles; otherwise, the electrons would fly off on a tangent and never return. Physicists calculate the electric force of attraction between electron and proton using Coulomb's equation.

Force in newtons = $k\, q\, q/r^2$ where k is a constant to convert the force to newtons, q is the charge of an electron and proton, and r is the radius of orbit.

The force necessary to keep the electron in orbit is known as the centripetal force. It is calculated as follows:

Force in newtons = mv^2/r: where m is the mass of the electron, v its velocity, and r the radius.

The electric force of attraction between electron and proton must be equal to the centripetal force in order for the electron to stay in orbit. Thus, $Kq^2/r^2 = mv^2/r$ or the electron will stray away or crash into the proton. Notice, as the radius of orbit increases, Coulomb's equation decreases faster than the centripetal force because it is divided by the square of the radius. This means the only way these two equations can stay equal is if the electron's velocity decreases in an outer orbit.

When Niels Bohr published his theory of the atom and electrons in orbit, he calculated a velocity and radius that fit what might be expected if the force of attraction expressed by Coulomb's equation is the same as the centripetal force necessary to keep the electron in orbit when n =1 and the hydrogen atom is in its ground state.

If the radius of the electron in orbit in the hydrogen atom is 5.3×10^{-11} meters, as assumed by Bohr, the electric force of attraction in newtons between electron and proton according to Coulomb's equation becomes:

$$\text{Force} = \frac{(9 \times 10^{9}\ \text{N m}^2/\text{c}^2)\ (1.6 \times 10^{-19}\ \text{C})^2}{(5.3 \times 10^{-11}\text{m})^2}$$

$$\text{Force} = 8.2 \times 10^{-8}\ \text{newtons}$$

Using this same radius and the velocity used by Bohr (2.2 x 10^6 m/s), we can determine the force attempting to eject this electron, the centripetal force:

Force = electron mass v^2/r

$$\text{Force} = 9.109 \times 10^{-31}\ \text{kg}\ \frac{(2.2 \times 10^{6}\ \text{m/s})^2}{5.3 \times 10^{-11}\ \text{m}} = 8.3 \times 10^{-8}\ \text{newtons}$$

As you can see, Bohr derived his velocity and radius to fit the expectation that the two equations would yield the same force when n = 1, and the electron is in its ground state. In order for the electron to remain in orbit at even greater distances from the proton, Bohr proposed the velocity of the electron decreases as it moves away from the proton.

Properties of electrons in orbit

VES theory tells us electrons in flight are always being pushed through space by graviton waves, but the graviton matrix inhibits flight for two reasons. First, electrons are constantly going through self-induction, which means they are ejecting their virtual elastic strings into the graviton matrix at right angles to their line of flight. This slows down the flight of electrons and photons as explained in Chapter 31. In addition, electron velocity decreases even more when they become bonded to protons. Electron's in the fast-solar wind are free particles traveling at 750,000 m/s, while those in the slow-solar wind where the density of electrons and protons are higher, travel 300,000 to 500,000 m/s. The higher density of electrons and protons in the slow-solar wind encourages bonding between these particles which intensifies the resistance created by the graviton matrix. In addition, the electrons will likely be pushed faster than protons, which may well cause the pair to twirl through space.

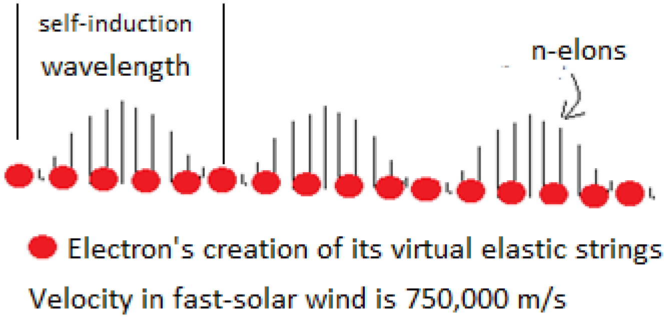
Now we come to electrons in orbit. They are still being pushed through space by graviton waves, but scientists have shown that electrons in outer orbits travel slower than those near the nucleus of the atom as proposed by Bohr. In addition, scientists have found it difficult to follow the orbiting electron. To understand electrons in orbit, there are several major factors that need to be considered:

1. The electron is always being pushed through space by graviton waves, but it is constantly being held in check by the graviton matrix.
2. Electrons in orbit are traveling several million meters per second, which is faster than in the solar wind.
3. The wavelengths and velocity of the electrons in orbit vary in different atoms. The greater the number of protons the more tightly the electrons are held to the nucleus.
4. The velocity of electrons in orbit may be influenced by the protons they orbit for the same reason planets in orbit are influenced by the central body, the Sun.
5. The electron is constantly going through self-induction as explained in Chapter 22. Just how this may affect the pathway and velocity of the electron's orbit needs to be considered.

Self-induction cycles

I will start this discussion by examining electrons in flight in terms of the electron's self-induction cycle. We know there is a time when the electron is creating its force fields, its virtual elastic strings, and a time it retracts these strings back to their source to begin a new cycle as explained in detail in Chapter 22.

A simplistic drawing of what we might expect for an electron in the fast-solar wind when not bonded to a proton is shown in the next diagram.



We can expect this cycle to occur endlessly for electrons in orbit as well as in the solar wind, and for this reason, we can be certain it is affecting the pathway of the orbit, it not the overall time it takes to complete one orbit.

In all atoms, with the exception of hydrogen, there are always two electrons in the first orbit. This orbit is referred to as n = 1. The circumference of this orbit must accommodate two electrons. In terms of self-induction, it must accommodate two self-induction cycles. This means the distance traveled during one self-induction cycle is equal to one-half of the circumference. This relationship breaks down at some point in outer orbits but is still useful.

$$\text{distance traveled during one self-induction cycle} = \frac{\text{circumference of orbit}}{\text{number of electrons}}$$

Traditionally physicists view this as follows:

$$\text{wavelength} = \frac{\text{circumference of orbit}}{\text{number of electrons}}$$

As you can see one wavelength in meters equals the distance the electron travels during one self-induction cycle.

It follows if we know the velocity of the electron, we can calculate its frequency:

$$\text{Frequency of self-induction} = \frac{\text{Electron velocity m/s}}{\text{Distance traveled during self-induction (meters)}}$$

Traditionally scientists view this same relationship as follows:

$$\text{oscillation frequency per second} = \frac{\text{velocity of the electron m/s}}{\text{wavelength meters}}$$

We can also calculate the time it takes for the electron to complete one self-induction cycle:

$$\text{seconds to complete one self-induction cycle} = \frac{\text{wavelength in meters}}{\text{electron velocity m/s}}$$

Hydrogen is viewed as having only one self-induction cycle. The distance the electron travels during one self-induction cycle is equal to its circumference. Niels Bohr provided us with the radius and velocity for this electron as explained in the introduction to this chapter.

Self-induction cycles in complex atoms

We know the rate electrons go through self-induction is the same for all electrons in the same atom because the protons' p-elons become bound to every electron in orbit. This forces all electrons and quarks to have the same oscillation frequency for a given atom regardless of the size of their orbit. For this reason, the time it takes a given atom to go through self-induction is the same for all electrons in an atom regardless of their orbits. This explains why there is just one oscillation frequency for diatomic molecules and one frequency for the complex molecules we use as atomic clocks.

Because self-induction cycles are in synchrony in complex atoms, we know the frequency of self-induction and the length of time for self-induction are identical for all electrons in a given atom, but of course this parameter varies from atom to atom.

Calculating radius of orbit when n = 1

All atoms except hydrogen have more than one proton, and in every case the first orbit holds two electrons, but the distance they orbit from the nucleus is directly tied to the number of protons in the nucleus. The greater the number of protons the less distance between proton and electron when n = 1. Perhaps then, there is a simple relationship between the number of protons and the radius of orbit when n = 1. After all the number of protons in the nucleus is a strong parameter for the electric force of attraction between electron and proton. After playing with this for a while, I discovered that the square root of the number of protons divided into the radius of orbit for hydrogen with just one proton, fits what we might expect for n = 1 radii for all atoms examined. This is shown for the following eight elements.

Atom	Protons	Square root	Hydrogen Radius meters	n = 1 radii meters
Hydrogen	*1*	1	5.29×10^{-11}	5.29×10^{-11}
Helium	*2*	1.414	5.29×10^{-11}	3.74×10^{-11}
Lithium	*3*	1.732	5.29×10^{-11}	3.05×10^{-11}
Beryllium	*4*	2	5.29×10^{-11}	2.64×10^{-11}
Neon	*10*	3.162	5.29×10^{-11}	1.67×10^{-11}
Sodium	*11*	3.317	5.29×10^{-11}	1.60×10^{-11}
Magnesium	*12*	3.464	5.29×10^{-11}	1.53×10^{-11}
Mercury	*80*	8.944	5.29×10^{-11}	0.59×10^{-11}

The n = 1 orbit values I calculated for these atoms closely follow those drawn to scale for these same atoms by Dr. Harvey White in his textbook, “Descriptive College Physics,” third edition published in 1966 page 319. Dr. White was a well know theoretical physicist who was professor at the University of California, Berkeley. Paul G. Hewitt thought enough of the dimensions of orbit calculated by White that he included them in his physics book, “Conceptual Physics, eight edition, copyright 1998.

Dr. White did not obtain his radii for n = 1 by using the square root of the atomic number, and I did not attempt to sleuth out how he calculated the radii he reported. However, I was pleased to find his values for radius of orbit are fairly close to those I calculated as shown in the next table.

Radius of orbit in meters when n = 1

Atom	White’s method	Square root method	Ratio
Hydrogen	5.29×10^{-11}	5.29×10^{-11}	1
Helium	4.05×10^{-11}	3.74×10^{-11}	.92
Lithium	3.39×10^{-11}	3.05×10^{-11}	0.90
Beryllium	2.42×10^{-11}	2.65×10^{-11}	1.09
Neon	1.71×10^{-11}	1.67×10^{-11}	.98
Sodium	1.07×10^{-11}	1.60×10^{-11}	1.49
Magnesium	1.26×10^{-11}	1.53×10^{-11}	1.21
Mercury	0.51×10^{-11}	0.36×10^{-11}	1.15

If you look carefully at White’s drawings you find that the radius for sodium when n = 1 is smaller than for magnesium, which indicates there is something wrong with his illustration. This is also reflected in this table. The radius of orbit for sodium’s two electrons when n = 1, should fall midway between those for neon and magnesium, but the radius is less than either one. In fact, it was this error that got me thinking about the problem.

My method for calculating the radius of orbit when n is greater than one is explained as follows.

Calculating radii when n = 2 or greater

Physicists have demonstrated that the number of electrons in orbit follows this general pattern, $2(n)^2$ where n is orbital number; namely n = 1 for the first orbit and so on. This pattern does not apply to some outer orbits, but for the most part this is way past what I intend to cover in this chapter.

We know these facts:

- Radii continue to increase with increasing orbits in the same atom.
- The electric force of attraction must equal the centripetal force in every orbit.
- The self-induction cycle is the same for all electrons in the same atom.
- The frequency of self-induction follows this equation for all orbits in the same atom:

$$\text{Frequency of self-induction} = \frac{\text{Electron velocity m/s}}{\text{Distance traveled during self-induction (meters)}}$$

- The time it takes the electron to carry out one self-induction cycle equals this equation for all orbits in the same atom:

$$\text{seconds to complete one self-induction cycle} = \frac{\text{Distance traveled during self-induction (meters)}}{\text{electron velocity m/s}}$$

Using these facts, I set up the following interconnected equations to determine the radii beyond n = 1.

$$\begin{array}{ccccccccc} & \text{Coulomb's equation} & & & \text{centripetal} & & & \\ \Uparrow \text{ radius} & \dfrac{(9 \times 10^9\ \mathrm{N\ m^2/c^2})\,(1.6 \times 10^{-19}\ \mathrm{C})^2}{(\text{radius})^2} & = & \text{Force} = & \dfrac{(\text{mass})\ \mathrm{V}^2}{\text{radius}} & \dfrac{\mathrm{C}}{\mathrm{NE}} & \dfrac{\mathrm{Dsic}}{\mathrm{V}} & \dfrac{\mathrm{V}}{\mathrm{Dsic}} \end{array}$$

mass = electron mass
NE = number of electrons
C = circumference

$\frac{C}{NE}$ = Dsic = distance traveled during one self-induction cycle
Dsic = wavelength

$\frac{V}{Dsic}$ = Fsic = frequency of self induction cycle

$\frac{Dsic}{V}$ = Tsic = time to complete one self-induction cycle

Every element in this series of equations were interconnected in Excel such that a small increase in radius immediately gave me the frequency of self-induction and the seconds to complete one self-induction. And these two parameters have to be identical to those computed for n = 1. I merely inserted the correct number of electrons in the equation and increased the radius in small increments until frequency of self-induction and seconds to complete one self-induction were identical with those for n = 1. Some interpolation was necessary towards the end to speed up the process.

Once the correct frequency of self-induction was found for n =2 with eight electrons, I recorded the radius, velocity, wavelength, and the force in newtons for this orbit.

After finding the parameters for n = 2 with eight electrons, the number of electrons was increased to 18 for n = 3, and the radius was again increased by small increments until I arrived at the same frequency of self-induction and the same seconds to complete one self-induction as found when n = 1. Once again, I recorded the radius, velocity, wavelength, and the force in newtons for this orbit. This procedure was continued for the remainder of the orbits. The data calculated are found in the next table.

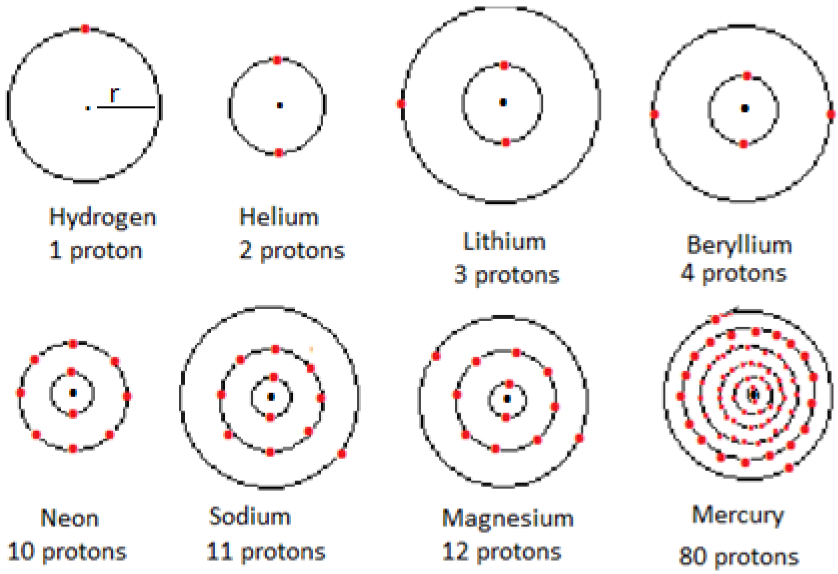
Data for electrons in orbit

Atom and n	E	*Dsic x $1\text{x}10^{-11}$ meters	Radius x $1\text{x}10^{-11}$ meters	Velocity x $1 \text{ x } 10^{6}$ m/s	*Fsic x $1 \text{ x } 10^{16}$ frequency	*Tsic x $1\text{x}10^{-17}$ seconds	Force x $1 \text{ x } 10^{-8}$ newtons
H 1	1	33.7	5.29	2.19	0.65	15.20	8.23
He 1	2	11.8	3.74	2.60	2.21	4.52	16.47
Li 1	2	9.6	3.05	2.88	3.00	3.33	24.70
Li 2	1	6.0	7.59	1.80	3.00	3.33	3.90
Be 1	2	8.31	2.65	3.09	3.72	2.69	32.93
Be 2	2	5.24	6.67	1.95	3.72	2.69	5.18
Ne 1	2	5.26	1.67	3.89	7.40	1.35	82.33
Ne 2	6	3.38	4.24	2.50	7.40	1.35	13.43
Na 1	2	5.01	1.6	3.98	7.95	1.26	90.57
Na 2	8	3.16	4.03	2.51	7.95	1.26	14.22
Na 3	1	2.4	6.91	1.91	7.95	1.26	4.83
Mg 1	2	4.8	1.53	4.07	8.48	1.18	98.80
Mg 2	8	3.02	3.85	2.56	8.48	1.18	15.13
Mg 3	2	2.31	6.60	1.96	8.48	1.18	5.27
Hg 1	2	1.86	0.59	6.54	35.2	0.28	1831.8
Hg 2	8	1.17	1.49	4.12	35.2	0.28	287.9
Hg 3	18	0.89	2.52	3.14	35.2	0.28	97.83
Hg 4	32	0.74	3.76	2.60	35.2	0.28	45.32
Hg 5	18	0.64	5.01	2.24	35.2	0.28	9.01
Hg 6	2	0.56	6.45	1.98	35.2	0.28	5.54

*Defined previous page.

Not all atoms have eight electrons in orbit 2, but I calculated the n = 2 orbit as if there were eight electrons in this orbit. This same reasoning was applied for higher orbits with less than a full number of electrons in that orbit. For example, sodium's third orbit that has just one electron was treated as if it had 18 electrons. As you will see, the data calculated seems to fit what we might expect for these orbits.

If the radius for n = 1 is correct, then I believe it is likely the radii for the other orbits are correct, perhaps except for those orbits not filled with the full number of electrons. I have plotted all orbits to scale for these atoms as shown in the following figure.



I doubt very much that electrons are red, and protons, small center black dot, are 1836 times more massive than electrons. However, the size of the orbits is to scale.

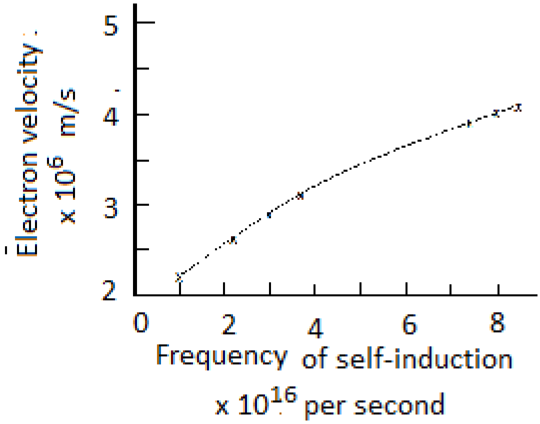
Examination of the data for electrons in orbit

Differences between atoms

If we examine the data for different atoms when n = 1, we discover the following along with my interpretations:

- Radii decrease in larger atoms because there are greater electric forces that pull the electrons into tighter orbits.
- Velocity increases in larger atoms because the radius for a given orbit is smaller, which means there is less resistance created by the graviton matrix.

- The time it takes to go through self-induction is faster in larger atoms presumably because the velocity of the electron increases. Perhaps this is embodied in the greater energy of a faster moving electron.



The frequency of self-induction definitely increases as the velocity of the electron increases when n =1 for the atoms studied. I did not include mercury because it was off the chart; however, it appeared to show the same slight curve.

Different orbits in the same atom

We meet a new set of conditions if we examine the different orbits of the same atom because the self-induction cycles for all electrons are in synchrony. An examination of the data for the orbits of the same atom reveals the following:

- The time to complete one self-induction cycle is the same for all electrons in orbit. This is also true for the frequency of the self-induction cycle because every electron in the atom is connected to every proton in the nucleus as discussed previously.
- Electron velocity decreases in outer orbits in the same atom because resistance created by the graviton matrix depends on distance between electron and proton. The greater the distance the greater the resistance.
- The frequency of self-induction and the amount of time required to complete self-induction remains the same in all orbits eventhough electron velocity decreases in outer orbits. This is in sharp contrast to the increase in frequency that

accompanies an increase in velocity when comparing n = 1 orbits among atoms. It occurs because all electrons in the same atom are controlled by electron synchrony.

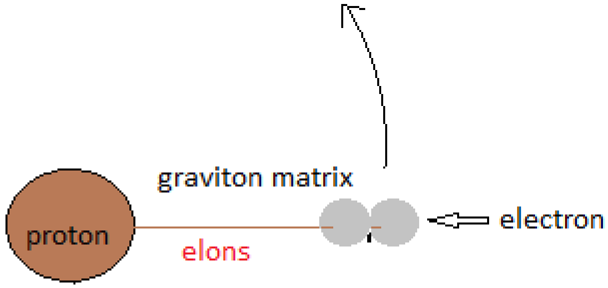
- The 32 electrons in mercury's n = 4 orbit have the same velocity and radius of orbit as the two electrons in helium's orbit, which suggests that self-induction cycles has no influence on these two parameters; however, it must be remembered that self-induction requires the same amount of time for all orbits in the same atom because of self-induction synchrony. Otherwise there is no doubt in my mind that self-induction slows down the velocity of the electron.
  - The time it takes to complete one self-induction cycle follows that achieved by the electrons in n = 1.

I believe the latter occurs because the electric force of attraction is far greater between electron and proton for the innermost orbit, and the electric force of attraction dictates velocity and the time it takes to go through one self-induction cycle as shown by the equations used to compute these values. For this reason, the parameters for self-induction when n = 1 come to dominate self-induction cycles in the same atom.

Graviton waves and the velocity of electrons in orbit.

The electrons in the atoms studied have velocities greater than two million meters per second (2.2 to 6.4), while electrons in the fast-solar wind travel at 750,000 meters per second; yet both are being pushed through space by graviton waves.

The first question that comes to mind is this. Can graviton waves cause an electron in orbit to travel faster than in the solar wind?



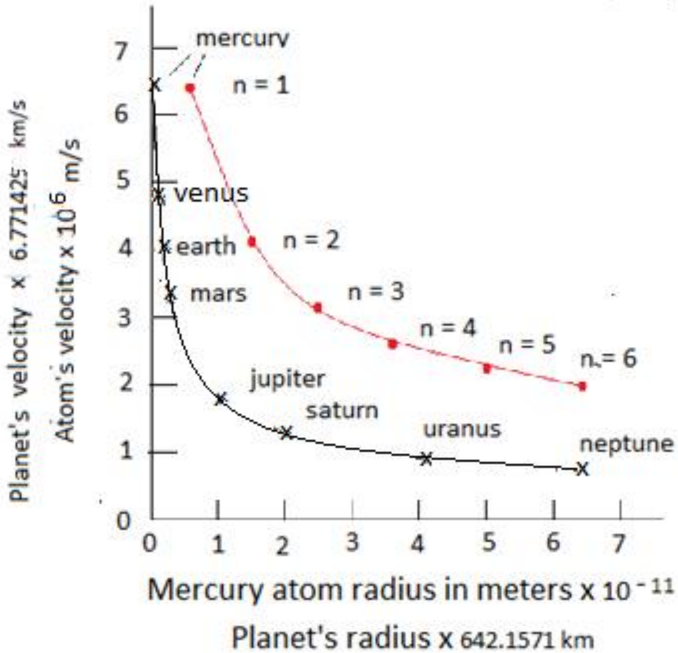
It is obvious from this illustration a bonded electron in orbit comes to occupy an orientation that causes it to travel smoothly through space. This likely explains why electrons in orbit travel a few million meters per second while those tumbling in the fast-solar wind are held to 750,000 m/s. Electrons in orbit are still extremely slow compared to 300 million m/s for photons.

Secondly, we can expect the velocity to decrease in outer orbits because of the graviton matrix. In the case of the solar wind, electron velocity decreases from 750,000 to a range between 300,000 to 500,000 m/s when proton and electron are bonded. It seems logical that not all electrons are bonded to protons in this situation, which would explain the large range in measurements.

Graviton waves and the graviton matrix easily explains the velocity and orbits of electrons, but there is one other thought that needs to be explored.

Does the proton’s spin angular momentum dictate the velocity of electrons in orbit just as it does for the planets in our solar system?

Physicists have shown that the velocity and radius of orbit for planets in our solar system are in response to the sun’s spin angular momentum that pulls the planets through space (Chapter 15). If protons in the nucleus of the atom act in the same manner as the sun, it suggests that a plot of velocity versus radius for the planets should resemble a plot of velocity versus radius for the electrons in orbit. These plots are shown in the next figure for the planets and the mercury atom.



The major difference in the two curves is the much steeper decline in velocity with distance in the sun-planet system. This tells us the forces responsible for planet velocity and orbit are fundamentally different than those responsible for electron velocity and orbit. This is expected because electrons are always being pushed through space by graviton waves while the velocity of planets are dictated by the spin angular momentum of the sun as explained in Chapter 15. This dissimilarity reinforces the idea that electron velocity is dictated by graviton waves and the graviton matrix and not by the spin angular momentum of the proton.

However, to further examine this analysis, I calculated the spin angular momentum of the sun and proton. In both cases I used the published results for mass, radius, and spin velocity provided by physicists to make the calculation shown in note 34. The spin angular momentum of the sun versus its most massive target Jupiter is 7.0×10^{43} to 1.9×10^{27} or a ratio of 3.7×10^{16}. In contrast the spin angular momentum of a proton is only 3.8×10^{-34}, which is less than the mass of the electron, 9.1×10^{-31}. This analysis supports the idea that proton spin angular momentum adds little if any to the velocity of the electron. It reinforces the idea that velocity of electrons in orbit is due to graviton waves that decrease in outer orbits because of the graviton matrix.

Self-induction cycle vs circumference of orbit

The combined length traveled during self-induction for the two electrons in orbit 1 are equal to the circumference of this orbit, and in orbit 2, the combined length traveled during self-induction of its eight electrons is the same as the circumference of this orbit just as proposed in1923 by Louis de Broglie, only he referred to the distance the electron travels as wavelength, and I'm referring to this same distance as the distance the electron travels while completing one self-induction cycle.

In 1926, Erwin Schrodinger proposed the electron particle exists as a physical wave that equals its wavelength. It seems Schrodinger proposed the mass of the electron is spread over one wavelength, and for this reason, it would explain de Broglie's findings. It also ushered in a new concept for wavelength that has now been proven false by David DeMille and his colleagues who have shown the electron is a perfectly round particle; it can't even be pear shaped (Grossman (2018)). It seems very unlikely for the mass of this particle to be spread around the nucleus of the atom.

VES theory shares Schrodinger's idea that the physical properties of the electron help to determine the size of the orbit, but it explains how this is accomplished in an entirely different way. What appear to be Schrodinger's physical waves are the electron's virtual elastic strings that are composed of matter. Let's see how this works.

The electron ejects its magnons and elons into the graviton matrix at right angles to its flight path. These virtual elastic strings are composed of matter, and they are super long strings that extend great distances in space, while the distance the electron travels as it orbits the nucleus of an atom is minute. Even so, the long elon and magnon strings must be ejected and retracted in one self-induction cycle, which is indeed a very brief period, approximately 10^{-17} seconds.

An electron in orbit blazes a trail though the graviton matrix while traveling a few million meters per second, and its magnons and elons come to occupy the same trail when they are swept to the rear by the graviton matrix. Because the elons and magnons are created in increments, perhaps 100 such bursts per one self-induction cycle, it tells us the trailing strings become denser with time. It is proposed, they interfere with the flight of a trailing electron unless the circumference can accommodate the self-induction cycle for all electrons in the same orbit. This means it must accommodate two self-induction cycles where n = 1 and eight self-induction cycles for n = 2, etc.

If the circumference is too short to accommodate the number of self-induction cycles, the electrons will be forced into a slightly larger orbit otherwise they will ram into the virtual elastic strings associated with the electron preceding it. For this reason, electron orbits are in part dictated by self-induction as well as by the centripetal force of repulsion and electric force of attraction that must equal each other to keep the electron perpetually in the same orbit. This explains Schrodinger’s idea and the findings of Louis de Broglie.

In contrast to magnons and elons, gravitons do not form a barrier to the electron because the vast majority of these strings remain spread at great distance from the electron. In addition, a magnon may be 10^{14} times more massive than a graviton, and the elon many thousand times more massive as well (see Chapter 45). This means relatively little graviton mass compared to magnon and elon mass will be present to form a barrier to the progress of the electron.

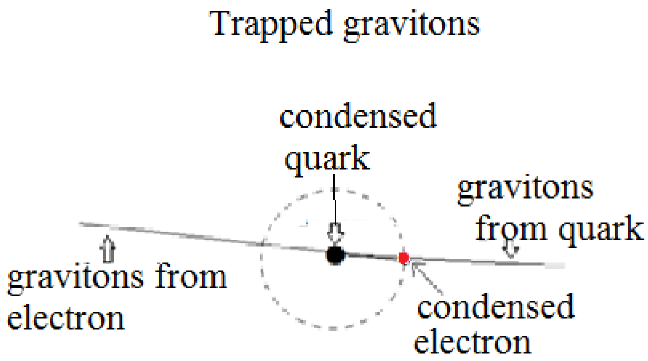
Orbital paths dictated by the self-induction cycle

The electric fields wax and wane during the self-induction cycle, and for this reason, we can expect the distance between proton and electron to vary as well. When there are maximum connections between electron and proton, the electron will be pulled into a tighter orbit, but this doesn’t last long because the electric fields soon decrease, which allows the electron to stray from the proton—the state of self-induction is constantly changing.

There is one other curious fact: At one point in the self-induction cycle, we can expect all elons to be retracted back to the electrons and quarks, which means there will be a brief period when there is little or no electric bonds between electron and proton. In the case of sodium, all eleven electrons will attempt to escape the atom at the same time. The question is what prevents this catastrophe?

The gravitational force of attraction between proton and electron in the hydrogen atom is only 3.6×10^{-47} newtons compared to 8.2×10^{-8} newtons for the electric force (Note 20 and 21). This suggests that the gravitational force of attraction should have a minimal effect on orbital patterns. However, at one point in the self-induction cycle, I believe it saves the day.

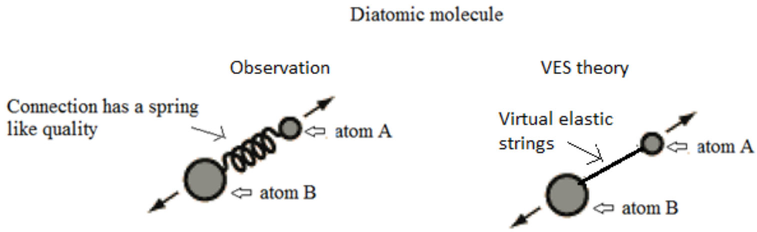
At the precise time the electric force disappears during self-induction, there is maximum gravitational force of attraction between quark and electron. This gravitational force is made possible because electrons and quarks trap gravitons as they go through their self-induction cycles. It occurs when gravitons are trapped beneath the electron’s elons and magnons as they retract against the electron’s surface during self-induction. This provides the resistance to retraction for gravitons as discussed in Chapter 23.



Gravitons from quarks are held firmly beneath the bonded elons and magnons pressing in on the electron, and gravitons from the electron are bound to the condensed quark in the same manner. At any one time, there may be a very large number of gravitons connecting these two subatomic particles that accumulate during self-induction. The gravitons may stretch but they cannot be broken, and when they are securely trapped by a quark or electron, the strength of the bonds between the two particles keeps the electron in orbit. The gravitons will continue to bind proton and electron together until released as the electron and quark continue through their self-induction cycles.

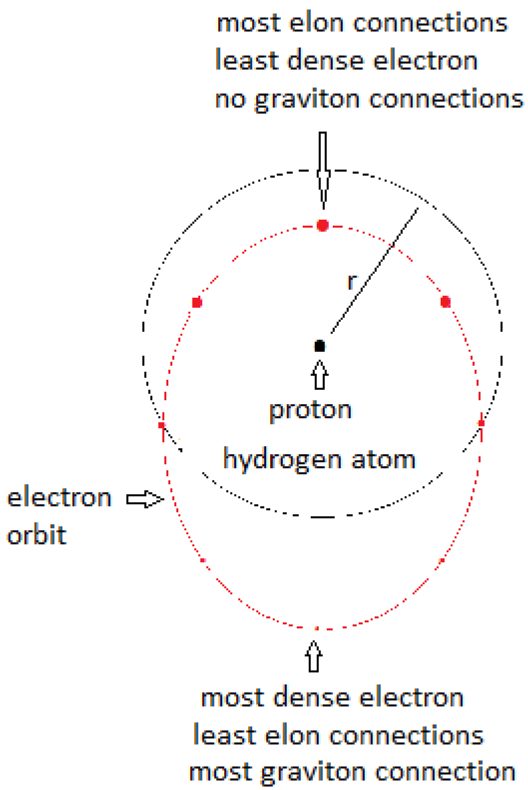
The electric force and gravitational force both wax and wane during the self-induction cycle. When the electron and quark are at their most dense phase, when they have no elons or magnons in space, the gravitational force of attraction is at its height because gravitons are securely bound to these particles at that time. As the electron and quark continue their self-induction cycles, the gravitons are released, and there is no gravitational force between the particles; however, now there are numerous elons creating a force of attraction between electron and proton. This scenario is supported by diatomic molecules.

It has been shown that a diatomic molecule has just one vibration frequency, which varies from 10^{12} to 10^{15} vibrations per second, depending on the diatomic molecule. Scientists believe the two atoms are connected to each other with bonds that behave as though they are springs. VES theory tells us that the spring-like property is due to virtual elastic strings and the self-induction cycle just discussed. I would like to give credit to the person who provided the following illustration, but I can't locate the site on the Internet.



The behavior of diatomic molecules demonstrates that the gravitational force of attraction has sufficient strength to hold the two atoms together when the electric force wanes, but it does allow them to separate to a greater distance. The electric force of attraction pulls the two atoms back closer together when elons connect the electrons and quarks, and of course, when elons connection are maximum, there is no gravitation force between the two atoms.

Because electrons and quarks are going through self-induction in unison, there will be a time when there is maximum attraction to the proton and at other times minimum attraction. This explains why the electron in the hydrogen atom likely has an oval pathway, perhaps much like that shown in the next illustration.



Atom	$1x10^{-11}$ Radius meters	1×10^{6} Velocity m/s	1×10^{16} Frequency Self-induction	$1x10^{-17}$ Seconds Self-induction	1×10^{-8} Electric force newtons
H	5.29	2.19	0.65	15.20	8.23

Let's think about the electron's path in terms of self-induction. When the electron is most distant from the proton, bottom in the diagram, it is in its most dense phase and now ready to begin ejecting a new round of virtual elastic strings (Chapter 22 for details). At this point in the cycle, there are few elons still making a connection between proton and electron. However, the gravitational force is at maximum, which prevents the electron from escaping.

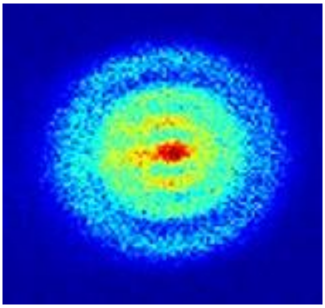
As the electron continues its self-induction cycle, it begins ejecting virtual elastic strings, and the number of elons making a connection between proton and electron continue to increase until maximum—we are now at the top of the diagram. At this point, there is no gravitational force of attraction between particles, but there is maximum electrical force of attraction between electron and proton, and the distance between these two particles is least. As the self-induction cycle continues, the newly created strings encase and condense the electron until ready for a new self-induction cycle. We are now back at the bottom of the orbit where once more the dense, constricted electron begins ejecting virtual elastic strings.

The distance around the oval orbit is the same as the distance of the circular orbit, but the velocity of the electron along the oval orbit varies continuously. It is traveling faster near the proton because the radius is less, and for this reason there is less resistance created by the graviton matrix. The opposite is true when the electron is more distant from the proton; however, the average velocity and the time it takes to make one self-induction cycle is the same as that computed for a circle.

The diameter of the circle is close to if not identical to the oval's long axis plus its short axis divided by two, and the circumference of the oval is pi times this diameter. For this reason. the distance around the oval is the same as the distance around the circle.

Notice in the diagram. the electron is traveling a longer distance inside the circle than outside, but it has a higher velocity, which allows it to traverse this distance in approximately the same time as it does when moving slower outside the circle.

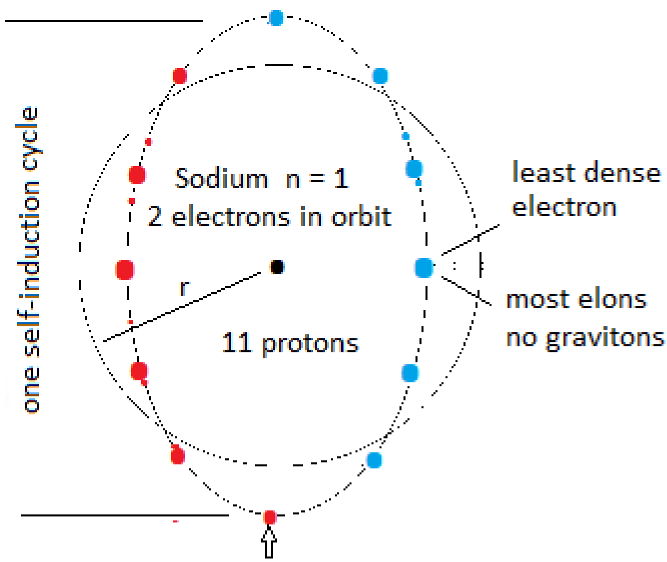
Scientists have evidence that the electron appears to be moving in a circular pathway around the proton as shown in the next illustration found on the Internet: (https://physicsworld.com/a/quantum-microscope-peers-into-the-hydrogen-atom/.) Because the proton is spinning at great velocity, roughly 10^{22} times per second, perhaps it induces the electron to continually change its orientation, but not the oval pathway, which explains this image.



More complex atoms

When there is more than one electron in orbit, such as in the sodium atom, the first orbit always holds two electrons and n =1. The circumference of this orbit accommodates two self-induction cycles, which means each cycle takes place over one half of this distance.

My interpretation of this orbit is shown in the next diagram. This figure is not drawn to scale because I don't actually know the dimensions of the oval pathway. However, its height plus width dived by two equals the diameter of the circle, which gives the oval and circular pathway the same circumference.



Atom	$1x10^{-11}$ Radius meters	1×10^{6} Average velocity m/s	1×10^{16} Frequency Self-induction	$1x10^{-17}$ Seconds Self-induction	1×10^{-8} Electric force newtons
Na	1.6	3.98	7.95	1.26	90.57

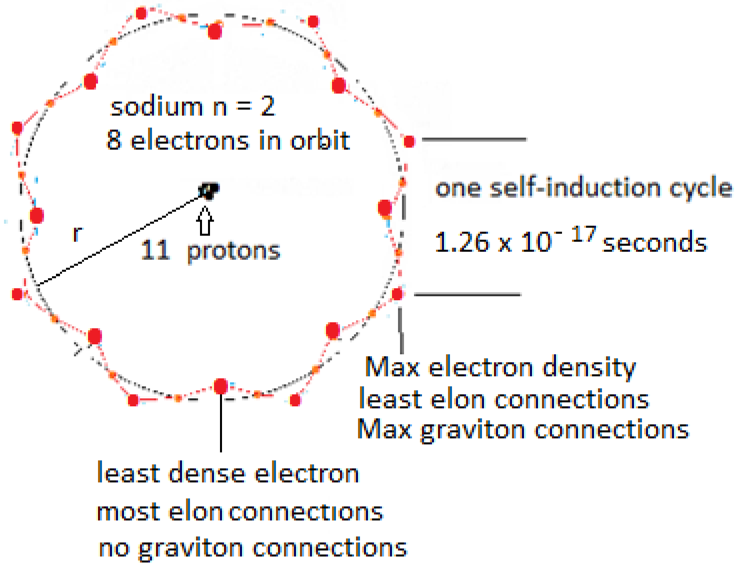
When the red electron is most distant from the proton, bottom in the diagram, it is in its most dense constricted phase, and it is now ready to begin ejecting its virtual elastic strings. At this time the gravitational force between electron and proton is maximum. The same is true for the blue electron, and they begin ejecting strings at the same time. They continue to eject strings until maximum forcefields are created. At this point, the electric force of attraction is greatest, and both electrons are nearest to the protons. The electrons now have their least dense mass and there is no gravitational force between particles. As they continue in their clockwise orbit, the strings surrounding the electron retract and apply pressure to the outside of the electron, which condenses it until it is ready once more to eject its strings. The red electron is now at the top of the diagram, and the blue electron has gone through the same phases and now resides at the bottom of the diagram. Even with no elon connections, the electrons are prevented from escaping because now the gravitational force is maximum. At this point, a new self-induction cycle will begin.

The time it takes for self-induction is the same for the oval pathway and the circle, and it remains the same for all orbits in a given atom—approximately 1.26×10^{-17} seconds for the sodium atom.

Since all electrons in a given atom are in synchrony with each other and the quarks that hold them in orbit, the elapsed time for self-induction is the same for all orbits. The velocity of orbit decreases in outer orbits, but the distance the electron travels during self-induction also decreases by the same proportion.

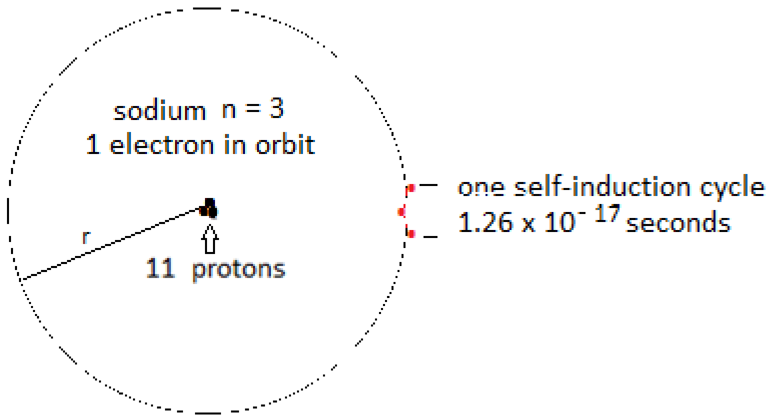
Notice in the diagram, the electron when inside the circle travels a longer distance than when outside the circle; however, it has a higher velocity inside the circle. It seems possible the elapsed time inside the circle is equal to outside the circle, and in any event, the two combined intervals for sodium is equal to1.26×10^{-17} seconds.

When there are 10 or more electrons in an atom, there are two in the first orbit, and 8 in the second orbit, n = 2. How I interpret the orbital pathways for second orbit is shown in the next diagram.



The centripetal force and the electric force of attraction are always equal for every orbit; this allows the electrons to remain in orbit. Secondly the time it takes for the electrons to go through their cycles is the same as the two electrons when n = 1. The distance of orbit for the waggling eight electrons exactly matches the circumference of the circle. As with the other orbits described, the electron when closer to the proton is traveling faster than when farther away, but the average velocity and distance traveled matches that expected for a circle.

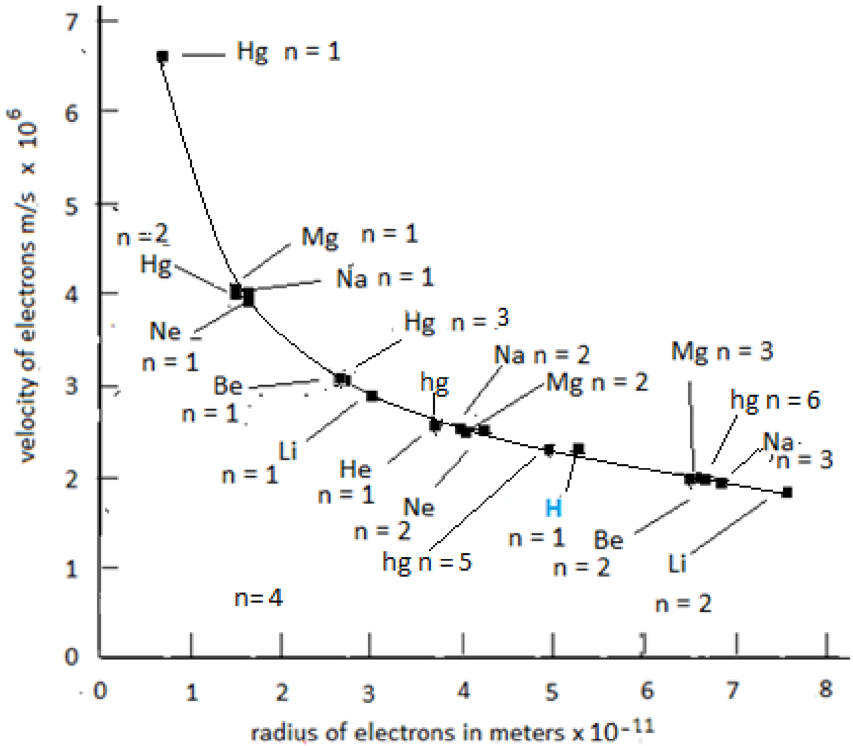
Sodium has 11 protons and 11 electrons: two electrons in the first orbit, eight in the second orbit, and one electron where n = 3. This electron is spoken of as a valence electron.



The valence electron is going through self-induction at the same rate as the other electrons in the sodium atom, and the time it takes to complete one self-induction cycle remains 1.26 x 10^{-17} seconds.

Plot of velocity versus radius for all electrons in the eight atoms studied.

It is perhaps just a curious fact, but velocity versus radius of orbit for all electrons in all orbits creates just one continuous curve. I like to think it adds one source of evidence that suggests my method of calculating radius and velocity of orbit might be correct.



A few essential points

Computing orbits

The square root of the atomic number divided into the radius of hydrogen's orbit provides the radius of orbit for all other atoms when n = 1. This is not a complete surprise because the number of protons is proportional to the electric force of attraction between electron and proton, and it is the electric force of attraction that governs much about electrons in orbit.

Knowing the parameters for orbits when n = 1, it is possible to calculate the radius and velocity of the electrons in outer orbits of the same atom because all electrons are in synchrony. This means we know one important additional fact: The time it takes to go through self-induction in outer orbits is the same as that computed for n = 1.

Electron velocity

Graviton waves are responsible for maintaining the velocity of electrons in or out of orbit.

The graviton matrix slows down the velocity of electrons when they eject their virtual elastic strings into the matrix. Even greater resistance is created when electrons are bonded to protons. This means the greater the radius the greater the resistance created by the graviton matrix.

Because the graviton matrix slows electrons down in outer orbits, it allows the electric force of attraction and the centripetal force to remain in balance.

Because the electron in orbit is connected to protons by physical elons, it orients the electron's two spheres such that it does not tumble through space. For this reason, its velocity is a few million m/s per second rather than 750,00 m/s as in the fast-solar wind.

Electron self-induction

What physicists refer to as wavelength is the distance the electron travels during one self-induction cycle.

The force of attraction between electron and proton waxes and wanes during self-induction, which continually modifies the path the electron takes in orbit. When n = 1, it seems likely that orbits are oval for all atoms because of the self-induction cycle, and in outer orbits of more complex atoms, it is more likely the electrons travel close to a circle, but dodge in and out in accordance to the self-induction cycle.

The rate of self-induction when n = 1 increases as velocity increases in different atoms, but it remains constant in outer orbits of the same atom because self-induction cycles in the same atom are in synchrony. This also means the time it takes to complete one self-induction cycle remains constant for all orbits in the same atom. It seems likely these two properties are identical to those of n = 1 for a given atom because all electrons are in a sense bound to n= 1 electrons. N = 1 electrons are held fast to protons with by far the greatest electric force of attraction, and the electric force of attraction is the primary factor governing electron orbits.

Self-induction and orbit size

The circumference of orbit must accommodate the distance traveled during self-induction for all the electrons in that orbit, otherwise the electrons collide with each other's virtual elastic strings. This explains de Broglie's and Schrodinger's concept of electron orbits.

There is likely a time during self-induction when there are few if any elon connections between proton and electron. One would think this would allow the electron to escape the atom. This does not occur because the gravitational force is maximum when there is no electric force of attraction between proton and electron. Gravitons may stretch, but they cannot be broken.

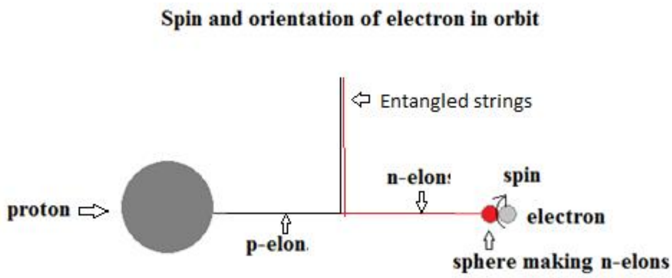
A few miscellaneous observations involving electrons in orbit

Electrons do not spiral into protons

The electron owes its velocity to the graviton waves pushing it through space. This is the principal reason that electrons do not spiral into protons. During the brief period of time when the electron has retracted its elons and magnons, it is no longer being pushed through space by graviton waves (except perhaps against the electron's gravitons trailing to the rear), but at this same time, there is very little resistance to flight because no strings are being ejected into the graviton matrix. This allows the electron to keep most of its momentum and velocity. The energy of an electron is not lost when it ejects a photon as envisioned by Bohr because photons are created by Quarks as explained in the next chapter.

Electrons in orbit only spin up or down

Scientists have shown that an electron in orbit can either spin up or down but in no other direction. VES theory explains this conundrum as follows: According to my model, the electron is composed of two spheres. Only one of these spheres is creating negative virtual elastic strings (n-elons) that become bound to the proton's positive virtual elastic strings (p-elons). The force of attraction between the sphere making n-elons and the proton pulls the electron into the alignment shown in the illustration below. For this reason, the electron can spin up or down and in no other direction. In nature, there is an even mix of the two.



This observation provides important evidence that electrons are composed of two spheres and owe their spinning properties to the fact that only one of the spheres is connected to the proton.

Electrons with opposite spin

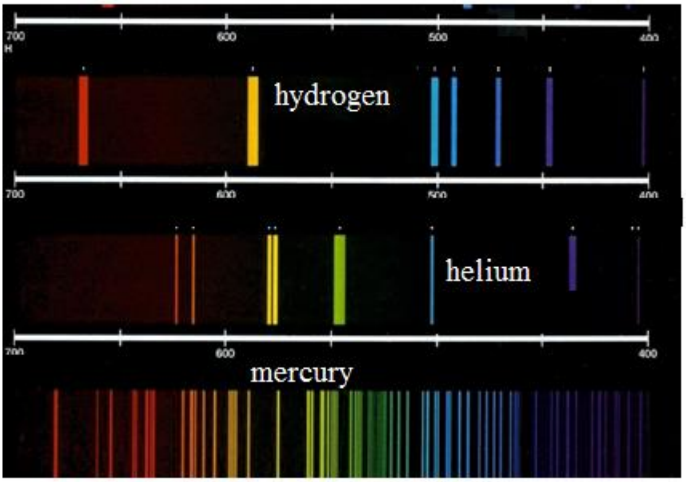
Scientists have shown that two electrons with opposite spin can occupy the same orbit. This suggests the strings ejected by the two electrons come to occupy a slightly different pathway when they are swept to the rear by the graviton matrix. Just how this takes place is unknown. Perhaps the elons are ejected up if the front edge of the electron is spinning up or vice versa. In this manner, the strings of one electron will not interfere with the orbit of another electron in the same shell.

Chapter 40: Photon emission and absorption

All atoms spontaneously create photons if their temperatures are greater than absolute zero, and when heated, they create an even greater number of photons. This amazing phenomenon is called photon emission. Every atom has a distinct emission pattern which suggests the whole atom is involved, not just electrons.

Emission has been studied for individual elements, as well as for more complex bodies such as stars. The main instrument used is the spectroscope, which was invented by Jososef von Fraunhofer (1787-1826). The spectroscope focuses light on a triangular glass prism, which spreads the photons apart depending on their frequency. Gustav Kirchhoff (1824-87) discovered that the photons created by atoms vary according to the element; each element produces its own pattern of photons of different frequency.

The emission spectrum recorded looks very much like the Universal Product Code or bar code we see on everything we buy. Some people like to refer to the spectrum lines as the cosmic bar code. It allows for identification of the atoms that make up our Sun and other stars at great distance from Earth. It is paramount to keep in mind that it is the total atom that dictates the unique frequencies of the light emitted. A few examples are shown in the next illustration.



Max Planck used cavity radiation experiments to establish that the energy of the photons emitted was directly related to their oscillation frequency. This gave rise to Planck's constant that he established in 1900:

$$h = \frac{\text{energy}}{\text{frequency}} = 6.6 \times 10^{-34}$$

The total energy emitted by **n** number of photons with **f** frequency becomes: $E = nhf$

In a cavity radiation experiment, a box with a central cavity is heated to different temperatures. The photons created are allowed to escape through a small hole. The photons emitted are measured with regard to their frequency, their energy, and the rate of emission for different frequencies.

If the temperature is doubled, the average frequency of the photons emitted is doubled, but there is a sixteen-fold increase in the rate of emission. The rate corresponds to the fourth power of its Kelvin temperature.

It is worth noting that the outside of the box creates photons with greater frequency than the inside of the box. I will come back to this concept later in this chapter.

From this discussion, we see that atoms are like little factories that are constantly creating photons that escape into the space about us. Atoms also absorb photons. Niels Bohr gave us his theory of the atom and photon emission that is still very much in vogue today, although scientists acknowledge that it is difficult to extend Bohr's model from hydrogen to more complex atoms.

Niels Bohr published his model for photon emission in 1913. It was based on the idea that electrons are the source of the photons emitted by atoms. It was his theory that electrons in orbit have discrete energy levels depending on the radius of the orbit. Bohr reasoned that electrons emitted photons when they fell from an orbit of higher energy to an orbit of lower energy. The jump could be made in one leap, so to speak, and the photon emitted would have greater energy; or the jump could be made in steps and each step would have less energy. Bohr's model for emission fits the hydrogen atom's emission pattern, its spectral emission, but it doesn't apply equally well to more complex atoms.

Bohr's model for photon emission relied heavily on Einstein's theory that a photon was pure energy, which was published a few years before Bohr made his analysis of the hydrogen atom. Bohr reasoned that the energy absorbed by the atom becomes associated with the electrons, and the accumulation of energy forces the electron into a new orbit. The new orbit is unstable, and the electron immediately emits a photon. This theory clearly states that the photon is created from pure energy. Of course, this is completely unlike how a photon is created during fusion.

During fusion on the Sun, hydrogen is converted to helium and in the process a portion of the hydrogen atom becomes photons; for example, during fusion, photons are created when a positron and electron combine to form two gamma photons with the same mass and energy as the original positron and electron. In this case, the photons are created from existing mass just as dictated by VES theory. It seems reasonable that all photons are created from existing mass, including the photons created by the tungsten atom in the electric light bulb. This suggests that Bohr's model for photon emission is incorrect.

In the case of tungsten light bulbs, electric current flowing through the small tungsten filament causes the electrons in the filament to crowd together and bang into the atoms in their path. This raises the temperature of the filament to more than 2000 degrees C, and it causes the tungsten atom to emit photons at a very high rate.

The free electrons moving through the wire do not emit photons even though they are being jostled about. The photons emitted come from the tungsten atom. We know this is true because the light being emitted fits the spectral emission pattern for tungsten. This is also true for the fluorescent light bulb. The electrons boiling off the electrodes inside the tube jostle the mercury atoms causing them to emit UV photons. Electrons associated with phosphor chemicals that line the glass tube capture the UV photons and re-emit them as visible light photons. However, the free electrons entering the fluorescent tube do not emit photons. In a similar manner, different neon lights emit different colors according to the kind of gas inside the bulb; for example, if argon is the gas, the bulb gives off a red light. The electrons that enter the tube because of the electric current do not directly create light even though they are jostled back and forth by the AC current.

The aurora borealis is a great example showing that electrons traveling at high speeds do not by themselves create photons. Photons are created when electrons travelling at high velocity in the solar wind collide with various atoms. If the gas is oxygen it produces photons in the greenish-white range, and if the gas is nitrogen it produces red violet, and if the nitrogen is missing an electron, it produces a blue-violet color.

Photon emission only occurs if the nucleus of the atom is involved. It does not occur from electrons alone even when they are being jostled about in a fluorescent tube or moving at great velocity through space as in the solar wind. This tells us that the energy of an electron cannot be converted into a photon. And this is exactly what we should expect if the whole atom is responsible for the emission spectrum. It is well to keep in mind that photons are always composed of matter; they are never composed of pure energy.

Where does the mass come from to make a photon?

To account for all the photons created by a tungsten light bulb, each electron in the filament would have to make millions of photons per second. Even if an electron orbiting the tungsten nucleus made only 10,000 visible light photons, not millions, it would retain just 90 percent of its mass. We will have to look for other sources if photons are created from a mass that already preexists inside the tungsten filament. This leaves us with quarks and the nucleus of the atom. Of course, this is the obvious answer anyway because photon emission involves the whole atom and is distinct for each atom.

Quarks and electrons exchange photons

Physicists R. Michael Barnett, Helen R. Quinn, and Henry Muhry (2000, page 73) state, “Interactions between electrically charged particles can be viewed as being due to the exchange of photons between them. Photons can be absorbed or radiated by electrically charged particles.” Although VES theory does not agree with the idea that photons are the carriers of force between quarks and electrons, I was pleased to find that physicists believe that quarks inside the nucleus emit photons that are captured by the electrons in orbit.

The mass of the quarks is difficult to determine; however, physicists Manohar and Sachrajda (2012) conclude that the u**p quark** has a mass of about 4.3 x 10^{-30} kg and a **down quark** has about twice this mass. This is roughly what other scientists have concluded in the past. The slightly greater mass of quarks compared to electrons cannot explain where the mass comes from to make billions of photons. However, unlike electrons, quarks exist inside the nucleus of an atom where there is plenty of mass to make all the photons needed to explain excitation in a tungsten filament.

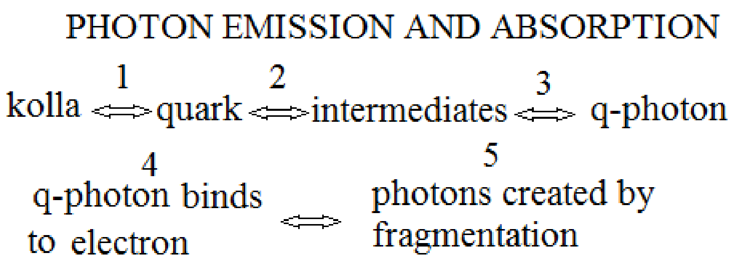
I theorize that spinning quarks incorporate mass from the nucleus and use it to manufacture photons. These photons are passed on to the electrons surrounding the nucleus that reemit them as visible light and other photons. The electrons must be involved; otherwise, it is difficult to explain spectral emission patterns.

This brings us to my model for photon emission and photon absorption.

VES theory model for photon emission and absorption

According to VES theory, photons are always composed of matter and are created from existing mass, not from energy. The only mass of any consequence in the atom that could account for photon emission is the mass of the proton and neutron.

My model states that photons are creating by quarks using the mass of the protons and neutrons that make up atoms, and like a chemical reaction, it is a completely reversible process that allows the mass of the atom to remain stable. The overall sequence of events is shown in the following illustration.



From the illustration, we see there are five main steps for the creation of a photon beginning with the kolla that surrounds quarks inside protons and neutrons. All steps are reversible.

Step 1: A quark absorbs undifferentiated kolla from the proton or neutron. This seems likely to occur when the quark has its strings extended. When they retract during self-induction, they bring bits of kolla with them.

Step 2: The undifferentiated kolla becomes incorporated into the quark. At this point it is no longer undifferentiated. As part of the quark, it is now going through a self-induction cycle and making virtual elastic strings. Each sphere of the quark differs. For example, one sphere of the quark is making n-elons and the other p-elons; the same applies to other forcefields. When the quark reaches a dense state during self-induction, it ejects a photon intermediate from each sphere, prior to the time it ejects virtual particles. One sphere of the quark ejects an intermediate creating p-elons, and the other sphere ejects an intermediate making n-elon.

Step 3: The two intermediates immediately fuse, much like a positron and electron, to make a q-photon. A q-photon is identical to any other photon, but the designation facilitates ease in discussion. It is simply a large photon created by a quark.

Step 4: The q-photon crashes against an electron in orbit at the velocity of light, likely directed there by elon bonds that bind electron and photon together. The acquisition of the additional mass increases the electron's orbital angular momentum and its spin angular momentum as well.

Step 5: The additional momentum causes the electron to immediately shed itself of fragmented photons. Fragmentation may occur because of the initial collision between photon and electron, or the photon may simple be ripped apart because a portion of it is bound more securely to the electron than the balance. In either case the reaction is reversible because the fragments can bind to the electron, then fuse to create the original q-photon, which can be passed to a quark.

As we shall see when we take up larger atoms, photon recombination is a normal process, which helps to explain many of the patterns for photon emission, and of course it is necessary for the absorption of photons.

In most cases, the q-photon that escapes the nucleus is captured by an electron. However, according to Hewitt (2006, page 580), scientists believe that some photons arise not from electrons but directly from the nucleus of the atom. If some photons are created by protons and neutrons, common sense tells us all photons are created by nucleons. And of course, this fits the observation that the whole atom is responsible for the emission patterns. Of course, the latter is true because different atoms have different spectral patterns.

The effect of temperature

The higher the temperature the faster the quark goes through its self-induction cycle and the faster it creates q-photons. It must also be true that a quark rakes in more kolla when the self-induction cycle is faster, which allows the quark to eject larger q-photons when it has greater momentum and is plump with kolla.

In the discussion that follows, I will apply this model to the emission pattern of the hydrogen atom since it consists of just one electron and one proton.

Emission pattern for the hydrogen atom

Scientists have been studying the emission pattern of the hydrogen atom since the 19th century. They have discovered that the photons created by hydrogen follow six major series. Each series creates five basic photon wavelengths. They are shown in the next table.

Table: Wavelengths for photon series, hydrogen atom

Lyman, nm*	Balmer, nm	Pashen, nm	Brackett, nm	Pfund, nm	Hunphreys, nm
93.8	397	954	1820	3040	4670
95	410	1005	1940	3300	5130
97.3	434	1090	2160	3740	5910
103	486	1280	2620	4650	7500
122	656	1870	4050	7460	12400

*Multiply nanometers by 1 x 10^{-9} to convert to meters.

According to my model, quarks create a different q-photon for each series. Where do these six different q-photons come from in the atom? Up quarks and down quarks have color charges and each quark has the potential of being red, blue, or green. This allows the up quarks to make three different q-photons, and down quarks to also make three different q-photons, bringing the total to six. Nuclear physicists tell us there are six different kinds of quarks; however, it seems likely that the other quarks are not involved in photon emission. For example, the t quark is 180 times heavier than a proton.

Four of the photons emitted in the Balmer series are visible to the human eye. They make up the visible photons observed with the spectroscope.

410 434 486 656

Nanometer wavelengths

Balmer discovered this series in 1885. The other series were discovered in the early 1900s, and none of them are in the visible range.

I converted the wavelengths to mass for the five basic photons in the six series and computed their total mass. My model states that the sum of the masses for a series is the mass of the q-photon that is responsible for this series. The mass, frequency, and wavelength for the q-photons calculated in this manner are found in the next table.

Table: Q-photon masses, frequency, and wavelengths for the hydrogen atom's original series

Series	Mass, kg	Frequency	Wavelength meters
Lyman	1.09 x 10^{-34}	1.48 x 10^{16}	2.03 x 10^{-8}
Balmer	2.40 x 10^{-35}	3.25 x 10^{15}	9.22 x 10^{-8}

Pashen	9.45×10^{-36}	1.28×10^{15}	2.34×10^{-7}
Brackett	4.74×10^{-36}	6.47×10^{14}	4.64×10^{-7}
Pfund	2.76×10^{-36}	3.75×10^{14}	8.01×10^{-7}
Humphreys	1.75×10^{-36}	2.38×10^{14}	1.26×10^{-6}

Up quarks and down quarks create red, blue, and green forcefields; for this reason, up quarks create three different q-photons; the same is true for down quarks. This gives rise to six different q-photons.

Each q-photon has a different mass, and when it smashes into the hydrogen's electron, it fragments into uniquely different masses, which gives rise to the six different series.

The sum of all the photon masses in a series gives us the mass of the original q-photon.

Higher temperatures increase the size of the q-photons.

When the temperature of the hydrogen atom is raised, the quarks continue to make the same original six q-photons; however, they also begin creating photons of even greater mass and frequency.

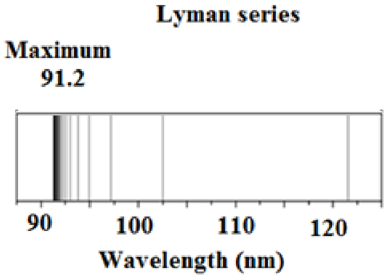
The way photons increase or decrease in wavelength suggests there is a mathematical pattern. Balmer worked this out for the Balmer series, and it has since been modified slightly by Rydberg to calculate wavelengths for all the series.

I used the Rydberg equation to calculate the shortest possible wavelength for each of the series. These are compared to the shortest wavelength of the original series in the following table.

Table: Shortest theoretical wavelength for each series

Series	Theoretical shortest wavelength, nm	Shortest wavelength of the original series, nm
Lyman	91.2	93.8
Balmar	365	397
Pashen	820	954
Brackett	1460	1820
Pfund	2280	2040
Humphreys	3280	4670

As you can see from examining the table, the theoretical shortest wavelength is not that much different than the shortest wavelength of the original series; however, the equation tells us there is the possibility of many photons of various sizes in between. This is shown for the Lyman series in the next illustration.



I interpret this as follows: The quark responsible for the Lyman series creates q-photons of different mass depending on the temperature. The higher the temperature, the greater the mass of the q-photon. When the more massive q-photon strikes the electron, it is fragmented. This fragmentation yields some photons of greater mass than the original series, but the original smaller photons in the Lyman series always remain the same. What causes fragmentation is unknown. Perhaps the q-photon is ripped apart because the spin angular momentum of the electron increases.

According to this model, the electron likely ejects the largest photon fragment first. The mass of the electron decreases by this amount, but its momentum remains high, and it continues to eject photons until all the extra mass has been ejected, including those basic photons in the original series.

It is also possible that a photon becomes fragmented when it crashes into the electron at 300 million meters per second; however, this seems less likely because larger atoms recombine photons to create other photons in a very orderly precise manner.

Photon emission is more intense if the atom has greater size. This conundrum is easily solved by VES theory because a large dense atom has more protons and neutrons, which means it has a greater concentration of quarks. And of course, the number of quarks dictates the number of photons emitted per unit time.

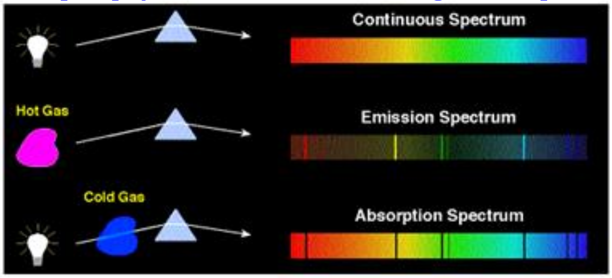
The emission of photons by a solid object results in photons with less mass and longer wavelengths. In this case, we can imagine that the photons created within matter interact with the electrons in other atoms, and in the process, they are fragmented into smaller photons. In the same manner, photons created inside the box in the cavity radiation experiment have less mass than those created by the exterior of the box because the photons reverberate around inside the box where they are fragmented into smaller photons.

The model states that photon emission is reversible as discussed below.

Photon absorption

When a gas is heated it emits light of a known spectral pattern. When this gas is cold, it absorbs these same photons. White light is composed of photons of different mass and frequency, but when it is passed through a cold gas, then analyzed in a spectroscope, it lacks all of the bands present in the original spectral series. The illustration below was found on the Internet at:

http://csep10.phys.utk.edu/astr162/lect/light/absorption.html



Conventional wisdom explains this observation in the following way: It is believed that the electrons in the cold gas absorb the photons and then emit them at random, which removes them from the stream of photons analyzed by the spectroscope.

My model for emission and absorption states that the electrons in the gas absorb those photons in the white light that match photon emission and route the photons to the atom's protons and neutrons, eventually its quarks, in the reverse of emission. The photons contributed by the white light drives the pathways in the opposite direction just as an excess of chemicals on one side of a chemical reaction drives the chemical reaction in one direction. It is through this process that atoms makeup any lost mass. This does not mean that the atoms of the gas continue to grow in mass indefinitely. At some point, equilibrium would be reached even in a cold gas. When the cold gas is in equilibrium, scattering would take place as explained above.

During the day, the Earth's atoms absorb the photons it receives from the Sun; its absorption rate is faster than emission rate and the protons and neutrons store additional mass. At night, the opposite occurs. Now the Earth continues to emit infrared and microwaves until it is in equilibrium with incoming photons.

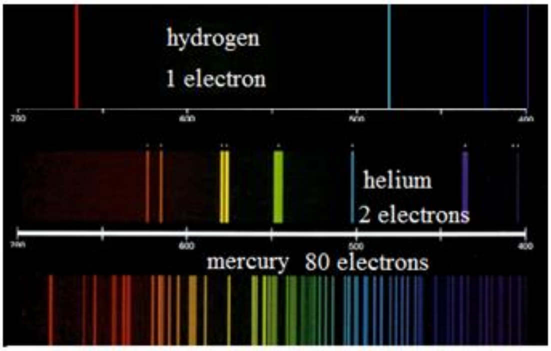
VES theory makes some very specific predictions for photon emission by atoms of different complexity. In contrast, Bohr's theory for emission is very difficult to apply to complex atoms.

Complex atoms and their spectral patterns

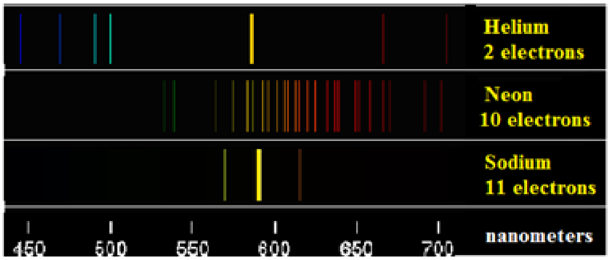
In a complex atom, those electrons closest to the nucleus are the first to capture and modify the q-photons emitted by the quarks. The fragmented photons are passed to other electrons in orbit, who in turn either fragment or recombine photons. This process continues until the photons escape the atom. My model predicts the following:

1. Atoms with many electrons will emit a more diverse array of photons.
2. When there is only one electron in the outer orbit, it tends to recombine and eject photons, which gives this atom a simpler pattern than that predicted by the number of electrons in orbit.

The effect of increasing the number of electrons can be observed by comparing the spectral pattern of hydrogen, helium, and mercury. Hydrogen has just one electron and one proton, and helium has two protons and two electrons in orbit. We can expect at least some of the time that one helium electron will capture and modify photons emitted by the other electron. This means its spectral pattern will differ from that of hydrogen, but we can expect it to be less complex than an atom with many electrons, such as mercury. This is the observed pattern for emission as shown below.

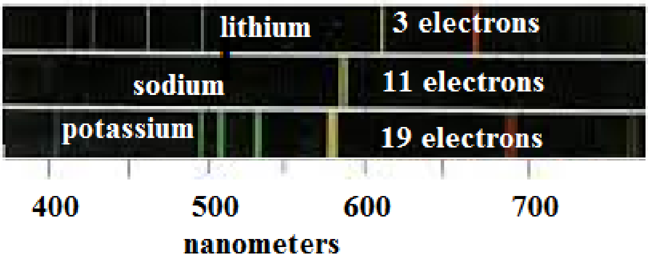


The effect of a single electron in the outer shell can be seen by comparing sodium with 11 electrons to neon with 10 electrons.



The spectral pattern for neon with 8 electrons in its outer shell is much different than sodium with just one electron in its outer shell. It appears that the outer electron of the sodium atom captures and recombines photons emitted by the 10 electrons closer to the nucleus. This is not easy to explain using Bohr's model of photon emission, which is based on Einstein's theory that photons are composed of pure energy.

In the same manner, lithium with three electrons and potassium with 19 electrons have a pattern quite similar to sodium because they have only one electron in the outer shell.



In an atom such as Mercury with 80 electrons and four different shells, the six-original q-photons are captured and modified in a cascading effect as the photons escape the nucleus. This will create a plethora of different photons of different mass and energy. However, it is all reversible, and the atom regains its mass overtime. Atoms live in a sea of photons that constantly bathe and modify the atoms; however, it does seem reasonable that atoms lose their capacity to make photons if their mass is reduced to some lower limit, just as we can expect them to stop adding additional mass at some point during conditions that encourage absorption.

The model suggests lines of research that will either disprove or help to solidify its value. For example, a computer simulation program might help to identify how photons are fragmented or recombined in more complex atoms.

Mutable atoms

I suspect that most scientists do not want to believe that the mass of an atom can vary, but if photons are created from a preexisting mass, then we have no other alternative. Why hasn’t this been observed? How much mass are we talking about?

A 40-watt light bulb uses 40 joules of energy per second. The lifetime of a tungsten light bulb is approximately 1000 hours, which means it uses up 1.44×10^8 joules of energy during its lifetime. In terms of photons, we know E = mass c^2; therefore, we can calculate the mass of the photons created. If 100 percent of the energy supplied by the current went towards making photons, the mass of all these photons would be 0.0016 milligrams. The weight of a tungsten filament in a 40-watt light bulb is approximately 7.2 mg (by actual measurement, note 33). The ratio of 0.0016 / 7.2 becomes 0.000222. This loss of mass is far too small to be measured.

The photons created by a tungsten light bulb are an extreme case of photon emission. For example, the photons emitted by a burning log are far less than the light put out by a 40-watt globe burning for 1000 hours.

All observations point to one conclusion: Quarks are responsible for photon emission. The mass they use to manufacture photons comes from the nucleus. This line of reasoning leads to the conclusion that the mass of an atom can vary slightly under specified conditions. However, the atom would over time regain its mass by the absorption of photons from some exogenous source. Photon emission and absorption are reversible processes completely analogous to a chemical reaction.

Quarks acquire mass from the protons and neutrons and eject this mass as photons (q-photons) that are passed to the surrounding electrons.

The model suggests there is a unique q-photon created for each type of quark: Three are created by up quarks that can be red, blue or green, and three by down quarks that can be red, blue, or green. The hydrogen atom creates six different spectral series that correspond to the six different quarks. As temperature rises, the size of the q-photons increases and each series is extended, but the original photons in the series always remain the same. Higher temperatures also increase the rate of emission.

It is likely that q-photons are created and ejected from quarks in a process that resembles the creation of virtual particles and virtual elastic strings.

The q-photons captured by the electrons are fragmented to create the spectral series. In more complex atoms, the fragmented photons have the possibility of being captured by other electrons, and either be recombined to make other photons, or be fragmented still more.

The fragmented photons created, or combined, are soon released by the electron because of an increase in the electron’s spin angular momentum. The model suggests that the largest photon is always ejected first, and the process continues until all the photons have been ejected by the electron.

The process is completely reversible in the same manner as a chemical reaction that depends on the quantity of its substrates on both sides of the equation. In this manner, the atom remains in equilibrium.

Large UV photons from some exogenous source are fragmented when captured by electrons. On the other hand, small radio photons are never fragmented when captured by electrons in the ionosphere.

Chapter 41: The structure of our universe

VES theory helps to explain the structure of our universe better than the big bang theory, which depends upon the general theory of relativity and a four-dimensional world where space and time are warped. In this Chapter, we will see how a graviton of finite length helps to explain the distribution of galaxies within clusters, and the distribution of clusters in superclusters, and in the universe.

Introduction

It was once thought that if we viewed a large swath of the sky, we would see approximately the same concentration of matter in all directions as predicted by the big bang theory, Ferris (1997, page 18). However, as you will see in Chapter 28, recent studies find this is not true. And of course, nearby in the range of our own eyes and our telescopes, we find the universe is anything but homogeneous; instead matter is concentrated in stars and planets and other structures, which in turn are associated in galaxies, groups of galaxies, clusters, and superclusters with vast voids that measure some 1.8 billion lightyears across. An illustration of a vast void is shown on the next page.

We Earthlings reside in the Milky Way Galaxy that contains 200 to 400 billion stars and is about 100,000 lightyears across (1×10^{21} meters). The stars in the heavens about us that we can see with our naked eye belong to the Milky Way Galaxy except for Andromeda, a galaxy 2.5 million lightyears away. Many galaxies are smaller than the Milky Way, but others are much larger and contain trillions of stars.

Galaxies are in turn associated in groups and clusters about 10 to 20 million lightyears across, Ferris (1998, page 149). The galaxies that make up a group or cluster are bound together by gravity. This explains why all regular clusters have a concentrated mass at their centers and are spherical in shape. Scientists characterize clusters by the number of galaxies found within roughly 5 million lightyears from its center. Some clusters have thousands of galaxies in this region. Let's see how VES theory might help to explain the distribution of matter in our universe.

VES theory

VES theory holds that the graviton is composed of matter and has a finite length. The graviton would not have to extend completely across a cluster to bind a group of galaxies together because galaxies would be holding hands so to speak. Perhaps this might be accomplished if the graviton extends as little as 5 million light-years from its source, which would help us to understand why most galaxies are found within five million lightyears from the center of the cluster. We know the graviton must extend at least 2.5 million lightyears because gravitons emanating from Andromeda cause a blueshift of the photons we receive from this galaxy. I will return to this subject in the next Chapter.

The Milky Way Galaxy is part of the Local Group that is composed of about 50 galaxies. The Milky Way and Andromeda are the two largest galaxies in the Local Group, and the center of gravity for this group is found somewhere between these two massive spiral galaxies. The Local Group is about 10 million lightyears across.

The Local group is part of the Local Supercluster, which is sometimes referred to as the Virgo Supercluster, not to be confused with the Virgo Cluster at its center. The Local Group is towards the outskirts of the Local Supercluster and about 50 million lightyears from the Virgo cluster.

The Local Supercluster includes some 100 smaller clusters. It is about 110 million lightyears across. There are millions of superclusters in the observable universe, as well as vast voids from 80 to one billion lightyears across where few if any clusters exist. In fact, most of space seems to be vast voids broken up by superclusters that exist like tendrils, sometimes in contact with each other.

A supercluster seems to exist because a gravitational force loosely holds clusters together. This does not mean that a graviton has to extend more than few million lightyears to make this possible because there are 100 clusters inside the Local Supercluster that is only 110 lightyears across. This suggests there is a tug of war between clusters, which keeps them from joining other clusters. This conclusion finds support from the observation that clusters within superclusters are spread about with no great concentration at the center. However, cluster density does decrease as you go outward. This too might be expected if there is a slight force of gravitation between clusters.

The distance from the Local Group to its nearest group neighbors is rather small. M81 galaxy cluster is only 11 million lightyears from us. Likewise, the Centaurus **A** (M83) Group is a complex group of galaxies outside the Local Group and it is only 12 million lightyears away. The Whirlpool Group lies about 23 million lightyears from us, and at its center lies the Whirlpool Galaxy. The Pinwheel Galaxy (also known as Messier 101) is huge spiral galaxy, much larger than the Milky Way. The cluster this galaxy belongs to is about 21 million lightyears away.

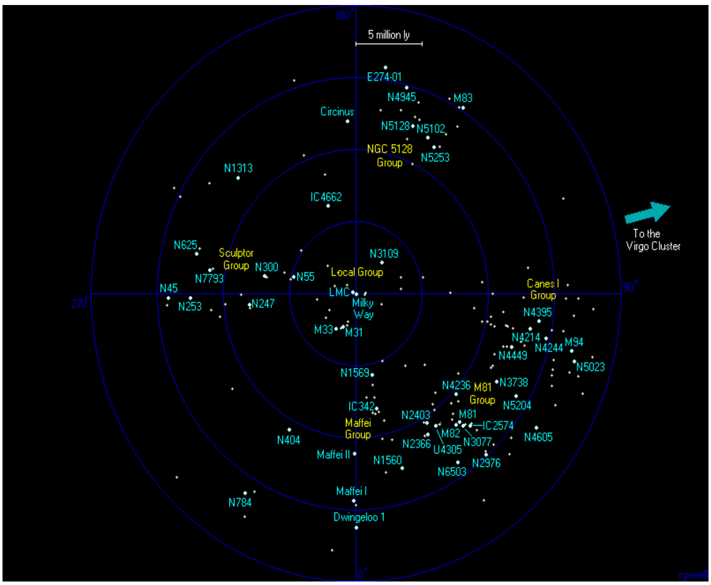
Because M81 and M83 are only 11 to 12 million lightyears from us, and yet form distinct clusters outside the Local Group, shows the graviton is limited to a rather short distance. This reinforces the idea that a graviton may only extend some 5 million lightyears where most galaxies are found within a cluster. My attempts to find the overall size of M81 group and M83 group met with frustration. If we knew these values, it might give us some additional idea about the length of a graviton.

If the graviton is limited to 5 million lightyears, it would still allow a large cluster some 20 million lightyears across to share a gravitational force of attraction and bind the galaxies into one cohesive unit. It also allows for a smaller force of attraction between clusters, which would encourage clusters to form superclusters.

A computer simulation program using the huge amount of data available should yield limits for the length of a graviton.

From this analysis, I don’t pretend to understand how the universe began, but it does show that gravitons composed of matter with a finite length explain much about the present distribution of stars.

If Einstein’s general theory of relativity is wrong, then our universe is not necessarily curled up in some neat package. It may be flat, or it may be spherical, but in either case, it is likely finite simply because the graviton only extends some 5 million lightyears in space. A finite graviton leaves ample opportunity for the universe to come to an end, but at the same time, it leaves open the possibility that other universes many billions of years away might also exist, separated from us by a huge void in space. The great void between universes would preclude our universe from being bathed by their light; except, perhaps, a faint star in the heavens may actually be another universe more than 100 billion lightyears away. The image below is from Wikipedia: http://en.wikipedia.org/wiki/Virgo_Supercluster



The galaxies found within a cluster are bound together by gravity. The Milky Way Galaxy belongs to the Local Group, which is approximately 10 million lightyears across. Most galaxies within a cluster are found within 5 million lightyears from its center. The size of clusters and the distribution of the galaxies within clusters suggest the graviton extends about 5 million lightyears in space. The distance between clusters also suggests the graviton has a rather short length. In the same manner, the distribution of clusters within a super cluster suggests that the graviton has a finite length.

A graviton with a finite length does a better job of explaining the distribution of matter in the universe than the big bang and the general theory of relativity as explained in the Chapters that follow.

Chapter 42. Photon redshift and blueshift

Scientists have shown that photons coming to us from our Local Group of Galaxies can be redshifted or blueshifted. E. P. Hubble was the first to suggest that star light shows a redshift if the star is moving away from us and a blueshift if it is moving towards us. He likened this to a Doppler Effect. Let's examine this thought.

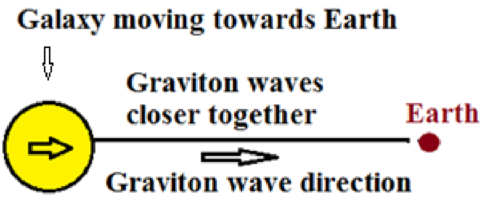
The siren on a car changes its pitch as it moves away from us. Each sound wave is spaced a little farther apart and our ears recognize this as a lower pitch. This is known as the Doppler Effect. The opposite occurs when an ambulance is coming towards us with its siren blaring. In this case, each sound wave begins a little closer to us, which causes the waves to be bunched up. Our ears perceive the closely spaced waves as a higher pitch. Air molecules are responsible for transmitting sound. The variation in sound is caused by a variation in the concentration of air molecules per unit time. The air molecules behave like waves in the ocean, and like water molecules the individual air molecules are not modified to create waves.

In the case of redshifted or blueshifted light, however, the opposite is true. For example, the photons we receive from the Andromeda Galaxy that are blueshifted have shorter self-induction cycles than expected, but the photons are not arranged in waves. The same is true for photons that are redshifted. Their self-induction cycles are longer than expected but the individual photons are not arranged in waves. Some other factor must be causing the Doppler Effect.

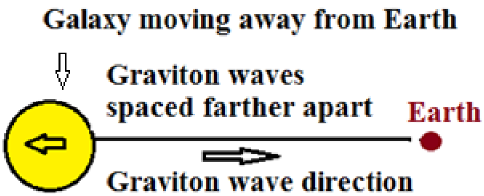
It is unlikely that redshifts within our Local Group can be explained by an expanding universe. Cosmologists tell us that the space within clusters is not expanding because of the strong gravitational force of attraction holding galaxies together. In addition, an expanding universe cannot cause both redshifts and blueshifts. There must be some other factor at work that causes the Doppler Effect promoted by Hubble. VES theory tells us the answer lies in graviton waves that modify self-induction cycles as well as push photons through space.

Graviton wave redshift and blueshift

We can expect a graviton's waves to show a true Doppler Effect when they are emanating from a moving source. When a distant star is moving towards us, the graviton waves traveling towards Earth will be bunched up. I speak of this as graviton wave blueshift. This is possible because we are dealing with elastic strings. They become bunched up because each wave is started a little closer to the wave before it.



The opposite occurs when a galaxy is moving away from us; graviton waves will be spread farther apart. This causes a graviton wave redshift.

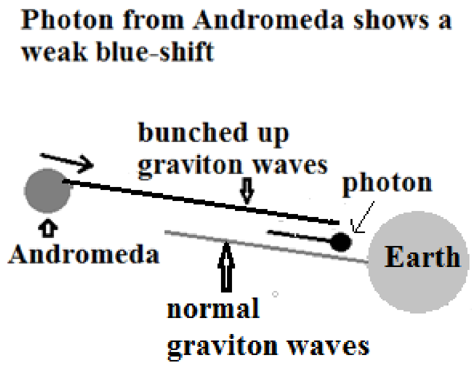


In this case, the star is pulling the graviton strings in the opposite direction to the movement of their graviton waves. This spreads out the distance between graviton waves, which causes a true graviton wave redshift; a true Doppler Effect.

It is also possible that blueshifted graviton waves travel faster because they are ejected from a fast-moving object.

According to VES ether theory, photons that are being pushed by gravitons with a blueshift will have shorter self-induction cycles; namely, they will be blueshifted. In contrast, photons that are being pushed by gravitons with a redshift will have longer self-induction cycles; namely, they will be redshifted. This type of redshift or blueshift is not a result of a permanent change in the photon. Its mass remains the same; however, the change in self-induction rate is sufficient to fool our spectroscopes.

Andromeda is a galaxy that belongs to our Local Group. It is about 2.5 million lightyears away. The photons we receive from this galaxy show a small blueshift because Andromeda is moving towards us at 300,000 meters per second. This causes a graviton wave blueshift. The individual photons we receive here from Andromeda have shorter self-induction cycles because the graviton waves pushing them forward are spaced closer together. It is also possible that graviton waves from Andromeda are traveling at an elevated speed because they are ejected from a moving mass traveling towards Earth.



The same reasoning only in reverse shows why a local galaxy moving away from us shows a redshift.

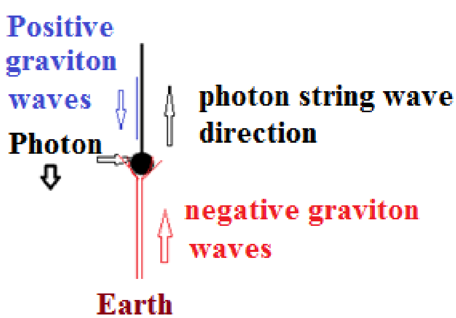
Blueshifts and redshifts within the Local Group of Galaxies that are caused by a moving source are true Doppler Effects created by graviton waves that may be bunched up or spread out, completely analogous to air waves. The degree of blueshift or redshift is relative to the frequency of the graviton waves versus photon string waves. For this reason, relativity comes in to play, although not because of a four-dimensional world.

The model presented here is dependent upon graviton waves that travel at immense velocities otherwise they would not be able to travel millions of lightyears before the graviton ceases to exist. Andromeda is 2.5 million lightyears away (about 2 x 10^{22} meters), and the light we receive from this galaxy shows a small blueshift. This means the graviton waves must travel 2 x 10^{22} meters before the graviton is retracted. To make the Andromeda blueshift feasible, graviton string waves must be traveling nearly 10^{23} m/s or as fast as the virtual particle is generated in space. In Chapter 45, I present some mathematical considerations that make it seem highly possible that graviton waves could indeed travel from Andromeda to Earth in less than one second.

In addition to graviton wave redshift, there are other factors that cause photons to be redshifted in our Local Group of Galaxies. One involves an actual change in the mass of the photon. This occurs when the photon is created in a large, dense body with a strong gravitational field. Physicists refer to this as gravitational redshift. VES theory states it occurs because the graviton matrix slows down self-induction cycles: the denser the field the greater the redshift. Planck demonstrated that atoms with slow oscillation periods create photons with less mass, longer wavelengths, and lower vibration frequency. Massive neutron stars, quasars, white dwarfs, and Cepheids can all be expected to create photons with less mass. Even our Sun shows this type of redshift.

A second type of redshift that does not involve a change in the mass of the photon occurs when there are a preponderance of graviton waves traveling in one direction. Earth's graviton waves directed against incoming photons cause a redshift because Earth's gravitons outnumber all incoming gravitons more than a thousand-fold. Earth's photons cause a redshift as explained in Chapter 35. The photons from the Sun are redshifted by Earth's gravitons. In this situation, redshift is more nearly a reflection of the relative concentration of gravitons because the Sun's graviton waves, and the Earth's graviton waves directed toward each other are not redshifted or blueshifted. The final photon redshift is determined by the equilibrium established between graviton waves traveling with and against the photon's string waves. This includes waves coming in at 90 degrees to the line of flight.

However, Earth's gravitons outnumber Andromeda's gravitons at Earth's surface by a factor of 10^{13}. This means that some other factor must be at work in order for Andromeda's blueshifted gravitons to blueshift the photons all the way to our instruments here on Earth. This leads me to believe that blueshifted graviton waves not only have a greater frequency, but they travel at greater velocity than Earth's graviton waves directed against the incoming photons. There is one other thought that should be considered. The photon particle must act as barrier that pushes Earth's gravitons aside as shown in the next illustration.



Because the photon particle displaces Earth's negative graviton waves at least for a brief period, it allows Andromeda's graviton blue shifted waves to have a greater effect.

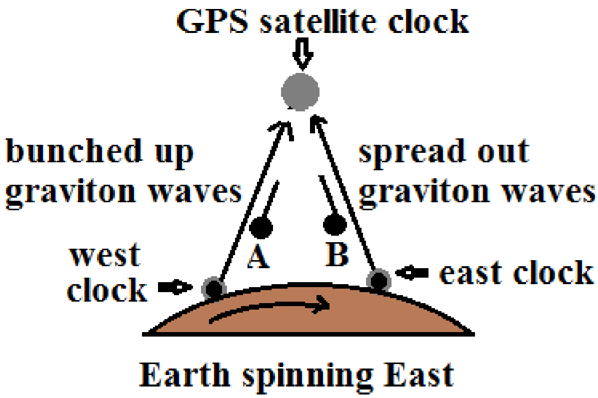
A spiral galaxy in the Local Group whose stars are spinning around its center may have half of its stars going away from us and half coming towards us. Those coming towards us are blueshifted and those going away are redshifted; these shifts are true Doppler effects created by graviton wave blueshift and redshift.

VES ether theory completely explains Doppler redshifts and blueshifts observed in the Local Group, which cannot be explained by any other means.

There is direct experimental evidence for graviton wave redshift and blueshift as explained in the next section.

Around-the-world Sagnac Experiment

Allan and his colleagues (1985) examined the effect of Earth's spin on signals received from Global Positioning Satellites (GPS). When a signal from the GPS clock aboard the satellite communicates with a ground based clock to the west, the west Earth based clock seems to be running faster. This is true even after taking into consideration multiple factors, such as the velocity of the satellite, distance between clocks, Earth's atmosphere, etc. It is as though the signal from the satellite takes longer to get to earth than expected. Because there is a delay, the earth based clock appears to be running too fast. The opposite is true when the satellite signal is sent to an Earth based clock east of the satellite. Now the Earth based clock seems to be running too slow or the signal from the satellite is arriving faster than expected. A Doppler effect involving graviton waves can explain the results of this experiment.



Because Earth is spinning east on its axis, graviton waves emanating from the west will have a shorter wavelength than those emanating from the east. This means photon A from the GPS satellite will run into gravitons with shorter wave lengths. This will slow the photon down, and the west based clock will appear to be running faster than normal. The opposite is true for photon signals from the GPS clock that are directed to the east based Earth clock. Photon B will encounter graviton strings with longer wavelengths coming against it. In this case, the photon will be impeded less than normal and the signal will arrive at the Earth based clock faster than expected. The Earth based east clock will seem to be running too slow.

This phenomenon was studied over a 90-day period for clocks situated in Germany, the United States, and Japan. The fact that Earth's rotational velocity has to be used in the calculations suggests the possibility of a Doppler Effect.

Perfect communication between GPS satellite clock and earth-based clock requires that the Doppler Effect be taken into consideration. This is usually corrected by the Earth based clock. The correction is relative to the position of the clock on Earth and the position of the satellite overhead.

Diurnal star light aberration

The light we receive from known sources differs slightly when viewed from the east versus the west side of the planet. I believe this aberration can be explained by the Doppler Effect as shown in the above illustration. This is a very small aberration in the light we see from distant sources. The aberration is greater at the equator than at the poles because Earth's spin rate at the equator is greater.

According to VES theory, photon redshifts and blueshifts in our Local Group of Galaxies are caused by three different phenomena:

Gravitational redshifted photons: These photons are created by large bodies with strong gravitational fields that slow down self-induction cycles. Atoms with slower self-induction cycles create photons with less mass, and for this reason, the redshift is permanent.

Bodies that create more pronounced gravitational redshift include neutron stars, quasars, Cepheids, and white dwarfs. However even our planets and our sun create redshifts. As you can see, gravitational redshift is created by discrete bodies not whole galaxies.

Graviton wave redshift and blue shift: Graviton waves can either be redshifted or blue shifted. This is a true Doppler effect: Graviton waves emanating from an object moving away from us are spaced further apart, while graviton waves emanating from an object moving towards us are spaced closer together. These waves modify photon self-induction cycles; they cause temporary photon redshifts and blueshifts, but they do not change the mass of the photon.

Relative concentration of opposing graviton waves: When there are a preponderance of graviton waves traveling in one direction, the photon self-induction cycle is modified. Earth's graviton waves at Earth's surface outnumber all other sources. The final photon redshift depends on the relative concentration of Earth's graviton waves versus those traveling in the opposite direction. In this case, the mass of the photon is not affected.

Chapter 43: The Big Bang and cosmic redshift

The big bang theory rests on Einstein's general theory of relativity, which means it cannot be a true if Einstein's theory of relativity is false. For example, the big bang cannot be true if the photon is composed of matter. I suppose I could end this discussion here without further ado, but let's examine the evidence for the big bang, which centers around the following three phenomena: (1) The distribution of matter in our universe, including the cosmic microwave background; (2) The temperature or energy of the cosmic microwave background; and (3) Cosmic photon redshift. A vast amount of research around the world has centered on these three subjects. As you will see, the three observations thought to support the big bang are based on nebulous grounds. In fact, it is becoming increasingly clear that the big bang never occurred. I will begin this discussion with cosmic redshift.

Introduction

A photon is said to be redshifted if its self-induction cycle is slower than normal and is said to be blueshifted if faster than normal. The rate of the self-induction cycle is primarily due to the properties of the elastic string; however, it is modified by the graviton matrix and graviton waves. The gravitons we are talking about here are those that originate inside our Local Group of galaxies. In fact, they can't be influenced by those gravitons originating in some other cluster because gravitons only travel 5 million lightyears in space.

Gravitons in the Local Group modify a photon' self-induction cycles by three different means as discussed in the previous chapter: Gravitational redshift, graviton wave redshift and blueshift, and the concentration of graviton waves surrounding the photon at the time we measure it with our instruments.

In this Chapter, we will be dealing with photons that originate outside the Local Group of Galaxies. This is referred to as cosmic redshift.

Cosmic redshift

Cosmologists believe that the light we receive from outside the Local Group shows only a redshift. The degree of redshift seems to be correlated with the distance between the object and Earth: the greater the distance the greater the redshift. Many cosmologists believe this type of redshift is caused by an expanding universe created by the big bang.

Cosmologist like to think of the universe as a large balloon that is constantly getting bigger. All the clusters are on the surface of the balloon, which means they are constantly growing farther apart as the balloon expands. This expansion of the universe is thought to be a true observation because of the big bang theory. According to this theory, the universe began as one extremely hot, dense ball that exploded, sending matter away from the central point. Over time, the matter condensed to form stars, planets, and galaxies that we observed today. This theory holds that the radius of the balloon is about 15 billion lightyears, although as you will see this figure is in dispute. Much of this theory rests on Einstein's general theory of relativity. It also rests on the idea that photons are composed of pure energy.

Those who believe in an inflationary universe take this concept one-step further. If redshift is used as a measure of the velocity of the galaxies moving away from us, it means the speed of distant galaxies approaches or exceeds the speed of light. Cosmologists would like to believe this is possible if there is a source of energy driving clusters apart. It is referred to as dark energy because its source and nature are unknown.

It is estimated that the Virgo cluster, which is about 50 million lightyears away, is moving away from us at slightly greater than 1 million meters per second; whereas, galaxies that are some 5 billion lightyears away are moving away from us at 145 million meters per second (slightly less than ½ the velocity of light). At some point, it appears that galaxies are separating from us at speeds greater than the speed of light. It should be appreciated that the light we see from the Virgo Cluster began 50 million years ago, and the light we see from something 5 billion lightyears away began 5 billion years ago. This means we are looking into the past as well as dealing with the present when we view faraway objects.

Measuring distances in the cosmos

The methods of measuring distances in space is not easy, but over a period of many years, scientists have perfected various ways of solving this problem, which viewed as a whole make the distances more reliable; however, as we shall see there is no agreement between some groups. I will briefly mention a few of these techniques.

The method of determining distances between Earth and nearby stars began by using triangulation. Angles were measured between a nearby star and reference stars at great distance from Earth. Measurements were taken 6 months apart, which gave the astronomers the distance along one leg of the triangle; namely, the diameter of Earth's orbit. Using this distance and the angles measured, they were able to work out the distance to the nearby star. This work has been completed for thousands of nearby stars in the Milky Way Galaxy.

The distance to faraway galaxies was greatly improved by using Cepheid variables. Cepheid stars pulsate, and the rate they cycle between bright and dim is a measure of their inherent brightness. The difference between expected brightness and observed brightness can be used to calculate their distance from Earth because a star grows dimmer the farther it is away from us according to the square of the distance. Cepheids are detected up to 60 million lightyears away using the Hubble telescope. However, there are some complications here because there are several types of Cepheids. Even classical Cepheids can be 2 to 20 times more massive than the Sun, and up to 100,000 times more luminous.

Wikipedia: RS Puppis is one of the brightest known Cepheid variable stars in the Milky Way galaxy; image, Hubble Space Telescope

Supernovae are exploding stars that give off tremendous light. Supernovae have been used to determine even greater distances in the universe, but according to Ferris (1996, page 58), they are less reliable than Cepheids because their inherent brightness is variable.

The brightness of whole galaxies is also used to estimate distances. The galaxy may be too far away to observe individual stars, but relative brightness of the galaxy gives an estimate of its distance from Earth. Of course, galaxies vary greatly in the number of stars and the size of its blackhole, which makes this measurement much more complicated and less reliable.

Gravitational lensing is used to estimate distances in the cosmos. It is reasoned that light from a source becomes bent around a galaxy in its path because of gravity. If the distance light travels around one side is greater than the other, the two beams will not arrive at the same time here on Earth. The difference can be used to estimate the distance to the source.

Hubble's law

In 1929, E. P. Hubble concluded that the more distant a galaxy is from us the greater the degree of redshift. This became known as Hubble's law. Overtime, the degree of redshift became the guiding light that was used by cosmologists to determine the distance to galaxies. By 1970, the distances to thousands of galaxies had been determined by using redshift. As you can see this leads to a perfect correlation between redshift and distance in the universe. However, in 1994 a team of scientists using the Hubble telescope found that the Hubble constant did not match the distances to Cephid variables in the Virgo Cluster (Ferris, 1995, page 56).

Based on the big bang the Hubble constant, Ho, is a measure of the rate that galactic space is expanding. A Ho value of 50, means that every 3.26 million lightyears that one travels away from Earth, objects encountered are separating from us at 50 kilometers per second faster. Extrapolating from this, cosmologists estimate that Earth is about 15 billion years old; namely, this is the time it would take to get from the point of the big bang explosion to our present position on the balloon. Other scientists claim the Hubble constant is closer to 70 or 80, and the age of the universe since the big bang is only 10 billion years old, Ferris (1996, page 63). He goes on to say that for either group to be wrong, it means that all their estimates of redshift and distances have to be wrong. This discrepancy was still a source of controversy in 2006. The Virgo cluster has been at the center of this debate. An article on this subject by A. Sandage and G. Tmmann (2006) can be found on the Internet at

http://arxiv.org/ftp/astro-ph/papers/0608/0608677.pdf

Their findings show the Virgo cluster core has a Hubble constant of about 56. They go on to say "The TF modulus of Virgo determined here cannot be reconciled with the recent high value of Ho = 72 from Freedman et al."

If we relate these findings to the meaning of galaxy redshift, we are left with the uneasy feeling that we really don't know the relationship between redshift and distance in the cosmos.

Contending theories for Cosmic Redshift

Big bang theory

According to the big bang theory, the universe is not expanding into existing space; rather space itself is stretching out following the big bang. This leads to the idea that the expansion of space itself causes the cosmic redshift. As Ferris (1995, page 32) explains it, the frequency of the photon is stretched out along with space. What this means is unclear, especially if you consider that the photon is composed of matter. However, according to the big bang theory, the redshift accumulates gradually because the farther the photon travels in expanding space, the greater the redshift.

If we consider photons are composed of matter and have mass, it changes our interpretation of cosmic redshift as required by the big bang theory. Now we see that redshift caused by an expanding universe requires a physical change in the structure of the photon; it must lose mass if there is a permanent redshift. This is a much more difficult proposition to wrap our minds around than the thought that redshift results because the frequency of the photon is stretched out by an expanding universe, although actually this statement has no meaning.

Now if you are in a state of denial, with a beautiful theory at hand that explains how the universe came about, you can dismiss the evidence that shows photons have mass; you can dismiss the evidence that energy is a mathematical concept; you can embrace the idea that a photon is a little blob of energy; you can believe the little blob of energy dribbles away in an expanding universe.

Tired light theory

Walther Nernst, who received a Nobel Prize for chemistry in 1920 for his third law of thermodynamics, proposed in 1937 what became known as the tired light model to explain cosmic redshift. He proposed that cosmic redshift was caused by the absorption of radiation by 'luminiferous ether'. This reduced the energy and frequency of galactic light. It would seem that this theory has about the same probability of being correct as space expansion, and it suffers from the same flaws: nobody can explain how a permanent change to photon frequency can be achieved by this model because no one can define the object that the mass and energy is transferred to. Luminiferous ether might be graviton waves, but it seems very unlikely that photon mass could be transferred to graviton waves.

Compton Effect and photon fragmentation

Some individuals have proposed that a redshift is induced by the Compton Effect. I direct you to John Kierein who supports this theory:

http://www.angelfire.com/az/BIGBANGisWRONG/

Compton (1923) directed a source of x-rays against a block of graphite and measured the wavelength of the photons that were scattered by the graphite. He was able to show that approximately half of the scattered photons had longer wavelengths than the original x-ray photons. Compton found some main peak wavelengths, but in addition there was considerable heterogeneity among the wavelengths that could not be attributed to experimental error. The Compton experiments are discussed in detail in Chapter 42. The photons created by fragmentation in Compton's experiment might be interpreted as redshifted photons. Also, photons captured by electrons in dust clouds and gasses might lead to fragmentation. Perhaps under the right conditions, some of these photons might have the right frequency to be interpreted as redshift. In either case, the change in the photon's mass would be permanent and persist after entering the Local Group of Galaxies.

VES theory and cosmic redshift

Cosmic redshift refers to the photons that reach Earth that were created in a cluster of galaxies far distance from our Local Group of galaxies where we nest in the Milky Way.

In the previous chapter, I explained that redshift in our Local Group of galaxies is determined by gravitons that originate inside the Local Group. This means once a cosmic photon enters our Local Group, it is treated no differently than photons created in our cluster. It will be modified by graviton waves traveling with or against the photon, and it will be modified by the relative concentration of Earth's graviton waves directed against the incoming photon versus those traveling with the photon. This does not involve a change in the mass of the photon, but rather a temporary change in the photon's self-induction cycles we measure with our instruments.

The lone exception to this scenario is gravitational redshift—this was discussed in the previous chapter. Scientists have shown that photons emanating from objects with a strong gravitational field show a redshift. VES theory tells us this redshift is created because strong gravitational fields slow down the atom's self-induction cycles, and for this reason, they create photons with slightly less mass—they are redshifted. According to Samain (1991), even our sun creates some gravitational redshift. Of course, there are many objects with much stronger gravitational fields that can be expected to create a plethora of photons with even greater redshift. In this category, we find white dwarfs, neutron stars, Cepheids, and quasars.

Gravitational redshift is permanent because the photon has slightly less mass, which means it will retain its redshift after it leaves the cluster of galaxies where it was created, and it will remain redshifted after it enters our Local Group of galaxies. Obviously, this type of redshift has nothing to do with the distance from Earth to the object that created the photon.

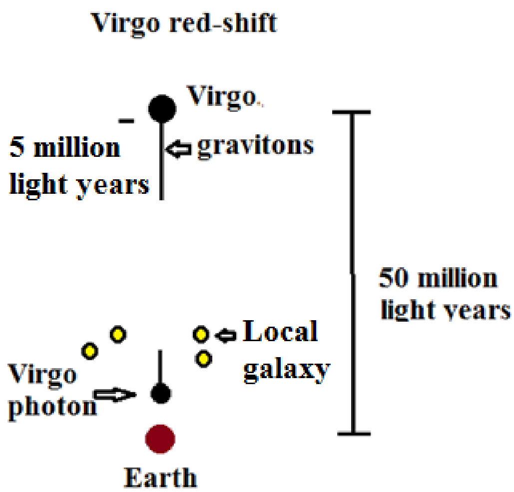
One such group of objects that will produce photons that are permanently redshift are Cepheids. These pulsating stars can be 2 to 20 times more massive than our Sun and up to 100,000 times more luminous. Because of the difference in their masses, we can expect Cepheids to vary widely in the redshifted photons they produce because of gravitational redshift.

We can expect neutron stars and quasars to create photons with even less mass and stronger redshift because they are huge objects with ultra-strong gravitational fields. A quasar is thought to have a mass equivalent to the Milky Way Galaxy, and for this reason, it will produce photons with even greater redshift.

This interpretation tells us that whole galaxies are not the source of gravitational redshift, rather it comes from discrete objects in the galaxy with strong gravitational fields.

The Virgo Cluster is thought to be 50 million lightyears away from Earth, far outside our Local Group. Let's follow a photon leaving the Virgo Cluster. This photon is being pushed through space by graviton waves emanating from Virgo for 5 million lightyears. At some point in the great distance between Earth and Virgo, the photon may travel through an area that has few gravitons; however, it will continue on its journey because its flight will not be impeded by a graviton matrix. If it passes through another galaxy, we can expect gravitons from this galaxy to both assist and resist the photon on its flight, but this will have no bearing on final redshift of these photons that we measure here on Earth.

Once the photon enters the Local Group of galaxies, it will be influenced by a rich source of graviton waves going in all directions. At this point, the photon's self-induction cycles will depend upon graviton wave redshift or blueshift, and the concentration, direction, and frequency of these waves versus Earth's graviton waves directed against the incoming photon. In this case, we are not looking at a permanent change in the mass of the photon, but only on its self-induction rate that is detected by our instruments.



VES theory states cosmic photon redshift comes from at least three sources: First, there may be a permanent photon redshift that results in a photon with smaller mass and slower self-induction cycle—the so-called gravitational redshift. This occurs before the photon reaches the Local Group, and it has nothing to do with distance from Earth.

Second, we can expect a temporary redshift or even blueshift in the frequency of photons once they reach the Local Group of Galaxies. This shift is caused by local graviton waves that interact with the photon's elons and magnons. If the graviton waves are redshifted or blueshifted, they will pass this Doppler Effect onto the photons that pass through these fields. This temporary redshift or blueshift will be detected because the photon's self-induction cycle is altered at the time it passes through our spectrometers even though the mass of the photon is unchanged.

Third, Earth's graviton waves directed against incoming photons will be the main cause of temporary redshift because they outnumber all other graviton waves near Earth's surface. In this case, the degree of redshift is determined by the concentration of graviton waves traveling with the photon as opposed to the concentration of Earth's graviton waves directed against the incoming photon.

The photons we receive from distant clusters are like any other photon once they reach the Local Group. Photons that pass through the Andromeda Galaxies from some distant galaxy will show less redshift, or perhaps even a small blueshift, while those that pass through a portion of a galaxy creating redshifted graviton waves will show greater redshift. And when there is a great void around the photon there will be a more pronounced redshift because Earth's graviton waves will be less opposed.

This helps to explain why we only see microwaves and radio waves arriving here from some voids.

We actually have evidence for this interpretation of redshift. The light received from the sky where there is a greater concentration of stars shows less redshift than light received from areas of the sky with fewer stars. This is also true for the light we receive from our Sun. In this case, the light from the center of the Sun shows less redshift than light from its perimeter even after taking into consideration the gravitational redshift caused by the Sun.

According to the big bang theory, the universe is not expanding into existing space; rather space itself is stretching out following the big bang. This leads to the idea that the expansion of space itself stretches out the self-induction cycle, (1995, page 32). This makes no sense if the photon is a particle with finite mass, and it makes no sense when you consider that photon frequency relates to the frequency of the photon's self-induction cycles.

Cosmic redshift

Those who champion the Big Bang have long used the photon's oscillation frequency to determine the distance from Earth to some far away object—the greater the redshift the greater the distance to the photon's source. The basic assumption has been that photons become redshifted as they travel over vast distances between clusters because the universe is expanding in this area, which causes the photon's self-induction cycle to essentially expand and become slower. Why this might be true is a complete mystery. Afterall we are dealing with photon self-induction cycles.

VES theory tells us, it is very difficult to interpret the meaning of the redshifted photons we receive from outside the Local Group of galaxies because redshift and blueshift may be induced by graviton waves closer to home. In fact, once the photon enters the Local Group of galaxies, its self-induction cycle is modified no differently than photons created in the Local Group. Here the frequency will be determined by the graviton matrix and graviton waves that modify self-induction cycles, including Earth that induces a redshift to incoming photons.

In addition, we can expect massive neutron stars, white dwarfs, Cepheids, and quasars in faraway clusters to create a vast number of photons with less mass that are permanently redshifted. Of course, it has nothing to do with distance to Earth.

For these reasons, cosmic redshift remains elusive and virtually impossible to correlate with distance between Earth and some far away star, just as has been shown by cosmologists who study redshift induced by Cepheids.

I will now turn your attention to photons of less energy that permeates the space around us. It is referred to as the cosmic microwave background. We will primarily be concerned with its distribution in space and its source because both relate to the big bang theory and the general theory of relativity.

Cosmic Microwave Background

Cosmologists have put a great deal of effort researching and pondering over the photons we find in interstellar space. This work began in the 1800s and continues today. We now know much about the cosmic background radiation, including concentration, wavelengths, and distribution in the universe. This work picked up emphasis in the last 50 years or so because scientists began to believe that photons found in interstellar space today may have been created billions of years ago shortly after the initial big bang event.

Visible light represents only a small portion of the total photons in space; the great majority is microwave photons with much longer wavelengths. The Cosmic Microwave Background (CMB) has an oscillation frequency in the range of 3×10^{8} to 3×10^{11} times per second with a peak frequency of 1.6×10^{11}. These frequencies lie in the microwave and infrared region of the spectrum that overlap each other.

Many cosmologists believe cosmic microwaves had their beginning shortly after the big bang. According to this theory, a vast number of gamma photons were created when matter and antimatter collided following the initial big bang event. Following this period, the gamma photons became photons with less energy as predicted by big bang theory.

According to Ferris (1997, page 32), the “primordial plasma” thinned out enough that photons created during the big bang were set free to roam the universe. According to him, “Cosmic expansion would have stretched them out, increasing their wavelength from those of light to the wavelengths we call microwave radio.” Is this possible? No, not if you believe photons are particles composed of matter, and not if you believe in the conservation of mass and energy; in fact, this scenario is in trouble for multiple reasons.

Current sources of microwaves

Big bang theorists would like us to believe that cosmic background radiation was created by the big bang billions of years ago; however, even now at the present time, microwaves are constantly being created by a variety of sources. And obviously they arrive here in the space about us from throughout the universe even if it took them billions of years to arrive at our doorstep.

All objects with a temperature above absolute zero (-273.15° Celsius) are radiating photons to their surrounding environment. The Sun emits 44 percent of its energy in the form of visible light and 7 percent in the ultraviolet range. Almost all the remaining photons emitted, some 48 percent, are composed of infrared, microwaves, and radio waves. A body with higher temperature emits more energy than a body with lower temperature, and the peak frequency of photons emanating from a hot body is also higher. For example, the peak wavelength of the photons emitted by the Sun is 0.5 micrometers (visible light) and Earth 10 micrometers (infrared). And the Sun of course emits a great deal more energy in the form of photons than does Earth, some 1.17×10^{41} ergs per year. If we take 48 percent of 1.17×10^{41} ergs and convert this to microwaves, we arrive at 10^{48} microwave photons from the Sun per second. Now think of all the stars in the Milky Way Galaxy that are creating microwaves, and all the stars from other galaxies that must be creating microwaves, even those from galaxies billions lightyears away; namely throughout the universe.

Some objects in the cosmos create more radiant energy than others; this includes quasars. In addition, some galaxies emit many more photons than others because they are in the process of colliding with other galaxies or in a hot region of the universe where galaxies are building. Dust found in galaxies also emit microwaves, and in greater quantities than expected (http://astro.berkeley.edu/~marc/dust/cmb/cmb.html). Perhaps photons of higher energy are fragmented when they create billiard ball like collisions between photons and electrons in dust just as shown by Compton.

From this short discussion, we can easily conclude that the source of cosmic microwave background in the observable universe comes from a combination of different events that have taken place at different times, some current, and others billions of years ago but only now arrive at our shores.

There is direct experimental evidence that the big bang is not the source of cosmic background radiation. This is explained by Janice Karin (2010) in her article on the Internet.

http://thefutureofthings.com/news/8710/the-source-of-cosmic-microwave-background.html.

Karin was reporting on "The Source of Cosmic Microwave Background" as revealed by the Max Planck Institute and I quote: "Researches at Max Planck Institute for Extraterrestrial Physics and other institutions have used data from the Herschel Space Telescope to resolve a portion of the Cosmic Microwave Background (CMB) into **its constituent sources.** When focused on Ursa Major**, it found individual sources of radiation instead of aggregate radiation."** Obviously, the source of microwaves discovered had nothing to do with a big bang.

Distribution of the CMB in the universe is disturbing to big bang theory

Another major tenant of the big bang theory states that the explosive event would have sent matter off in space equally in all directions. It should have created a homogenous universe. Of course, we know it is not homogeneous when we examine the concentration of matter in planets, stars, groups, clusters and superclusters with giant voids with no galaxies. Even so, it has long been held that if we look at larger areas of the sky, we should find the same concentration of matter, including microwaves. Cosmologists who believe in the big bang theory have every reason to be disturbed by the Max Planck cosmic microwave background study that is in progress. A recent update 21 March 2013 is found on the Internet: http://sci.esa.int/science-e/www/object/index.cfm?fobjectid=51551

And I quote: "…the extraordinary quality of the Planck data reveals the presence of subtle anomalies in the CMB pattern that might challenge the very foundations of cosmology. The more serious anomaly is a deficit in the signal at large angular scales on the sky, which is about ten percent weaker than the standard model would like it to be. Other anomalous traits that had been hinted at in the past – a significant discrepancy of the CMB signal as observed in the two opposite hemispheres of the sky and an abnormally large 'cold spot' – are confirmed with high confidence. Planck's new image of the CMB suggest that some aspects of the standard model of cosmology may need a rethink, raising the possibility that the fabric of the cosmos, on the largest scales of the observable universe, might be more complex than we think." Or I might add, less complex than a big bang.

Concentration of cosmic microwave background

Cosmologists like to point out that the concentration of microwave background is theoretically what is expected if it was created shortly after the big bang. They report this in terms of temperature, and the figure they use is about 2.7 degrees Kelvin. Parenthetically, I should mention that cosmologists have been expressing the energy of photons in space in terms of temperature rather than joules or ergs since the 19th century.

There have been several studies that confirm experimentally that the temperature of space is close 2.7 degrees Kelvin. Does this support the Big bang theory? Not so much, this same temperature was calculated by several individuals beginning in the 19th century long before cosmic expansion and the Big bang became a dream. These calculations only depend on existing sources not on a single event that occurred billions of years ago.

In 1870, Stefan found that the energy (F) of a radiating body is equal to this equation: $F = \text{gamma}\ T^4$, where gamma is a constant equal to 5.67 x 10^{-8}, and T is its temperature in Kelvin degrees. A theoretical basis for this equation was published by Boltzmann in 1884. It is now known as the Stefan-Boltzmann equation.

Guillaume is given credit for the earliest estimation of the temperature of space. He published this study in 1896. To read about this study and the others on this subject, I refer you to "History of the 2.7 K Temperature Prior to Penzias and Wilson" written in 1995 by A. Assis and M. Neves, two physicists from Brazil. This thoughtful and well researched article can be found on the Internet at

http://redshift.vif.com/JournalFiles/Pre2001/V02NO3PDF/V02N3ASS.PDF The article is in English.

In their abstract they state: "We show that the models based on a universe in dynamical equilibrium without expansion predicted the 2.7K temperature prior to and better than models based on the big bang".

Guillaume estimated the energy of the Sun to be 15,200,000 greater than the energy of the stars. After deducting out the Sun's energy, he calculated that the temperature of space due only to the stars would be 5.6 degrees absolute (Kelvin). Other galaxies were not known to exist at that time.

Arthur Eddington, a well-known astrophysicist, applied his expertise to this problem. He published his studies in 1926 (also quoted on the Internet at the site referenced above). Eddington is quoted as follows: "Accordingly, **the total radiation of the stars** has an energy-density …7.67 x 10^{-13} ergs/cm3. By the formula $E = \sigma T^4$, the effective temperature corresponding to this density is 3.18 degrees absolute. In a region of space not in the neighborhood of any star this constitutes the whole field of radiation, and a black body, e.g. a black bulb thermometer, will there take up a temperature of 3.18º, so that its emission may balance the radiation falling on it and absorbed by it. This is sometimes called the 'temperature of interstellar space."

In 1933, E. Regener published a paper (quoted by Assis and Nevi, as referenced above) in which he calculated the temperature of intergalactic space without using the big bang theory. He obtained a value of 2.8K.

The evidence that the universe is expanding into new space is based on cosmic photon redshift. VES theory tells us we need to reexamine this proposition.

VES theory shows us that cosmic redshift has more to do with the graviton matrix and graviton waves in our Local Group of Galaxies than on permanent redshifts of photons induced outside the Local Group. Furthermore, permanent cosmic redshift induced in photons outside the Local Group can be explained by gravitational redshift. Gravitational redshift can be expected to be significant because of the vast number of photons created by quasars, Cepheids, white dwarfs, and other massive neutron stars.

Cosmic background radiation comes from existing sources, which explains why the Max Planck Institute discovered individual sources of microwaves from the Ursa Major constellation. We have a whole universe creating microwave photons. It isn’t necessary to propose they were created by the Big Bang.

The Max Planck institute has shown that the Cosmic Background Radiation is not uniform. It has confirmed vast voids in the sky with no cosmic radiation, and it has confirmed the two hemispheres of the sky do not have an equal concentration of background photons. Finally, the concentration of background radiation in general is less than expected according to the big bang theory.

The uneven distribution of stars in clusters and superclusters can best be explained by gravitons that have a finite length, not from a big bang.

Photons are composed of matter, which means there is no way to explain how photons become redshifted by cosmic expansion. This fact alone provides a death nail to the big bang theory that depends on Einstein's idea that the photon is pure energy.

Perhaps then, we don't know as yet the extent of the universe nor its age, nor its beginning, and hardly its destiny. Perhaps we only know at this moment that it is dynamic and ever changing.

"The tension, if not outright inconsistency, between quantum physics and general relativity is one of the great problems facing physics at the turn of the millennium." A quote from C. Barcelo and M. Visser (2002), Institute of Cosmology & Gravitation, Portsmouth Univ., UK.

Chapter 44: The general theory of relativity

In 1905, Albert Einstein proposed his special theory of relativity that deals with electrons and photons. In 1916, he proposed his general theory of relativity that explains gravity in terms of a four-dimensional world in which time and the geometry of space are warped. However, particle physicists explain the strong and weak nuclear forces in terms of the Standard Model developed by experimentation at the quantum level. These two methods of approaching the natural forces of nature have never been reconciled. What some physicists would like to believe is that a truly fundamental theory of gravity must have a physical basis in a three-dimensional world.

In beginning of this book, I analyzed numerous observations that provides strong, undeniable evidence that gravitons and other forcefields are composed of matter with strong elastic properties. This in itself is sufficient reason to discard any belief in Einstein's general theory of relativity.

In addition, my analysis of gravitational forcefields in previous chapters shows the gravitational force of attraction is dependent upon the true distances and angles of a three-dimensional world, just as you would expect for a vector force. This is in direct conflict with a world where space and time are warped.

I also explained why the distribution of matter in the universe appears to be the result of a graviton with a finite length. This property describes the distribution of matter in our universe better than the big bang and warped space-time.

The idea that forcefields are composed of matter has made it possible to understand gravity in a three-dimensional world. It has allowed me to explain a host of observations in our solar system, including satellite spin and plane of rotation, satellite angular momentum and migration, anomalous satellite precession, planet tilt and wobble on axis. It has also allowed me to explain many other observations that involve photons, electrons, and atoms, including refraction, diffraction, velocity of photons and electrons, the bases of special relativity, Maxwell's equations, particle-wave duality, etc.

There are other observations that have been cited specifically as evidence for the general theory of relativity that can be explained by virtual elastic string theory. They are discussed as follows.

Gravitational Redshift

Gravitational redshift is one of the first observations used as evidence for general relativity. In previous chapters, I explained how a strong concentration of gravitons decreases the rate of self-induction, including atoms, which results in the creation of photons with lower frequencies than expected.

Planet Mercury's anomalous precession

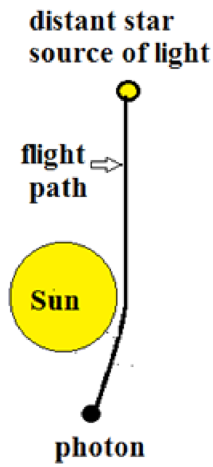
Mercury's orbit about the Sun is often cited as one of the great proofs of the general theory of relativity. However, in Chapter 16, I discuss how Mercury's elliptical orbit causes anomalous precession. My theory is strongly supported by regression analysis. It is also supported by a number of other observations in our solar system, including the tilt of a planet on its axis and the annual polar wobble of Earth on its axis, which cannot be explained by general relativity.

Frame Dragging

Recently scientists have confirmed that the spin of Earth on its axis affects the velocity of artificial satellites in space. Einstein proposed this could be explained by his general theory of relativity. In Chapter 15, I discussed how VES theory accounts for frame dragging in a three-dimensional world.

Photons curve in strong gravitational fields

Light curves as it passes near the Sun as shown in the next illustration.



Einstein predicted this result based on his general theory of relativity. If actual curvature is more than predicted by gravitation alone, it is easily explainable by VES theory: The photon is constantly ejecting its gravitons, elons and magnons at right angles to its flight path. Those that are ejected towards the Sun will act as an anchor to cause the photon to pivot and move towards the Sun by refraction. There are several reasons why this might be true.

The concentration of the solar wind between Sun and photon will be denser and the graviton matrix will also be denser; however, I believe those strings that penetrate the Sun will have the greatest effect. This includes gravitons that act as anchors. They will cause the photon to pivot inward towards the Sun because of refraction.

Eccentric Eclipsing Binary Stars Do Not Support General Relativity

Astrophysicists believe that eccentric eclipsing binary stars provide an important test of general relativity. Maloney, Guinan, and Boyd (1989) reported on the apsidal motion of AS Camelopardalis, which is an eclipsing binary with an eccentric orbit of 0.17 and an orbital period of 3.43 days. They state that “the observed apsidal motion for AS Cam is about one-third that expected from the combined relativity and classical effects.” They conclude “there may be problems with general relativity in its present form.” Apsidal motion is another name for perihelion precession.

These authors also state that in 1985 they reported on the apsidal motion of HI Herculis, another eccentric eclipsing binary star system that has been studied extensively over many years. They state that the value for the observed apsidal motion "is in stark contrast to the combined classical and relativistic apsidal motion components theoretically expected. The observed precession of HI Herculis is far smaller than expected.

V541 Cygni is a detached eclipsing binary consisting of a pair of B9.5 V stars with an eccentric orbit (e=0.474) and an orbital period of 15.34 days. This binary has been studied extensively. Studies published by Guinan, Malev, and Marshall (1996) confirm that "V541 Cyg has an observed rate of apsidal motion that is significantly less than the theoretically expected apsidal motion;" namely, the motion is smaller than predicted by general relativity.

The results of study of EW Orionis, a binary with an eccentricity of (e = .08) and orbital period of 6.94 days, was reported by Wolf, Sarounova, Kozyreva, and Pogrocheva (1997). They concluded that "the apsidal motion rate in this system could be smaller than expected from theory."

Even in our solar system, the anomalous precession rate for Earth is 30 percent different than calculated using Einstein's equation as discussed in Chapter 16.

Einstein's equation for anomalous precession does not fit the data for eccentric eclipsing binary stars. In addition, all the other observations that have been used to support general relativity can be explained by other means as discussed in this Chapter.

Chapter 45: Some string comparisons

If strings are composed of matter and bond in some manner, we must ask this difficult question, what physical properties distinguish one string from another? What properties cause some strings to bond and create a force of attraction, while others create a force of repulsion? I believe all of this can be accomplished if strings have two different properties. I will review it here.

The size of the string

The size and nature of the portal likely determines the ultimate size of the string, and portal size is correlated with position on the electron and the density of the retracting strings retracting against the electron's surface. Size difference is the factor that determines whether the string will be an elon, magnon, graviton, or one of the strings that create the nuclear forces.

Because the strong nuclear force is stronger than any of the others, I assume the virtual elastic strings that create this force are larger and therefore more robust. In a previous Chapter, I theorized that gluons come in three different sizes and degrees of robustness. I have already discussed in detail that a magnon is 3×10^8 times more energetic than an elon. It is reasonable their masses show the same proportional differences. In the same manner, we might expect the weak nuclear force, which is some 10^{-7} times smaller than the strong nuclear force, to have relatively smaller strings. Finally, a graviton is likely to be the smallest string, which would help explain how it is ejected millions of lightyears into space at enormous velocity.

According to this model, two strings with different mass do not form bonds with each other. When they meet, they neither create a force of attraction nor a force of repulsion between them. Thus, elons do not interact with magnons, and as far is known, they do not interact with gluons that have even larger masses. In the same manner, gluons of different size never form a force of repulsion or attraction between them.

Gravitons are composed of two strings that have bonded to create a neutral string. Thus, we have n-gravitons that bond to s-gravitons and form the neutral string we call a graviton.

Entanglement

I theorize that bonding between complementary pairs may be caused by entanglement. This is explained as follows. The ejection of virtual particles through portals induces particle spin, which in turn causes the elastic string to twirl tightly in space. I propose two spinning complementary strings become entangled because they are twirling in opposite directions and/or planes.

I carried out some simple experiments with elastic strings. My experiments show that it doesn't matter whether the elastic strings are crossed like a normal hair braid, or simply wound around each other, strong resistance is created when you try to pull them apart. The conclusion is that twisting, entangled strings could create the source of mechanical bonding and resistance that allows two complementary strings to create a force of attraction when they retract.

In contrast to complementary strings, two identical strings do not become entangled. For example, the electron's n-elons brushed to the rear by the graviton matrix do not bond. This is also true for n-elons that meet when two electrons face each other and create a force of repulsion. It is possible that identical strings are spinning in the same plane and/or direction, and for this reason they do not become entangled when they meet. Perhaps too, the physical structure of the string differs depending on the sphere, n-kolla or s-kolla, and this, too, has a hand in determining entanglement. The same considerations apply to magnons and the nuclear forces.

The theory holds that n-elons and p-elons from the same electron meet and bond when they are brushed to the rear by the graviton matrix. This allows these virtual elastic strings to exert pressure on the surface of the electron when they retract. My model for self-induction states that the electron makes two charges of n-elons and one charge of p-elons with every self-induction cycle. Half of the n-elons become entangled with p-elons emanating from the proton, and the other half become entangled with p-elons emanating from the electron. It is visualized that n-elons and p-elons from the same electron are brought in contact because the graviton matrix forces all strings to the rear of the electron as it travels through space. This allows them to meet and become entangled.

Electrons in flight show no overall magnetic field because the n-magnons and s-magnons are swept to the rear by the graviton matrix where they meet, bond, and neutralize each other.

In this scenario, magnons and elons do not interact and cause a force of repulsion nor do they interact and cause a force of attraction because of the difference in their masses.

Because the electrons in larger atoms are bound more tightly to the nucleus and have smaller radii than expected, there is the possibility that more than one n-elon can be bound to one p-elon or vice versa, which means the interaction between p-elons and n-elons is very complex.

Gravitons are a different matter because they are neutral strings composed of a n-graviton and s-graviton that intertwine immediately at the time they are generated in space. The neutral graviton meets resistance when it retracts because it becomes bound by electrons, quarks, and photons as they go through their self-induction cycles.

Scientists have long thought that all forcefields should show symmetry. There are negative and positive electric fields, north and south pole magnetic fields, and now we see that gravity has symmetry. There is an s-graviton and an n-graviton that bond to form the neutral graviton that is responsible for the gravitational field. There is also symmetry for gluons. Symmetry is created because the forcefields arise from two different spheres.

Velocity of virtual particles

Velocity of graviton virtual particles

If we assume a graviton can only extend 5 million lightyears in space, then a round trip becomes 10 million lightyears. Since light travels about 1×10^{16} meters per year, a round trip of 10 million lightyears is equivalent to about 1×10^{23} meters. If a graviton is able to complete this trip in one second, its velocity becomes 1×10^{23} meters per second. The one second interval allows the graviton to remain in orbit through billions of self-induction cycles. Because the graviton is created near the marriage line between two spheres, and because it exists through billions of self-induction cycles, it winds up the spinning electron or photon like a fishing line winds up on a reel. This is helpful in explaining the structure of electrons, photons and quarks that have two spheres, and it is necessary to explain how electrons remain in orbit at that time when the electric force is absent. A one second period, or some reasonable portion of it, is also necessary to explain such observations as the Hafele-Keating experiment and gyroscopes.

Velocity of magnon and elon virtual particles

The theory is that elons and magnons are created and retracted once during every self-induction cycle. This corresponds to approximately 10^{14}

times per second for an electron. The magnetic field surrounding Earth is thought to extend some 200 Earth radii into space.

(http://en.wikipedia.org/wiki/Magnetosphere). This translates into 7.9 x 10^8 meters, which means the magnons make a round trip approximately 10^{14} times every second. Which means the magnon must travel in the neighborhood of 10^{23}m/s. Of course, we really don't know the velocity, but it has to be exceedingly fast.

String mass

Arriving at the mass of any string seems an impossible task; however, if we assume that gravitons have an energy level close to Planck's constant, which is 6.63 x 10^{-34}, and if we assume, their velocity is 1 x 10^{-23} m/s, we can arrive at an estimate of its mass using this equation, $E = ½mv^2$. If this equation holds true for gravitons, it means the energy of the string is a function of its mass and velocity when being propelled through space. Actually, this seems reasonable. Plugging in the values and solving for mass, yields a mass of 1.3 x 10^{-79} kg for a graviton. If this is true, and if the Sun creates 2.7 x 10^{80} gravitons per second, the total mass of all the gravitons emanating from the Sun at any one time is only 35.1 kilograms. Of these, 1.2 x 10^{71} connects with Earth and their total mass is only 1.56 x 10^{-8} kg. One graviton from the Sun connecting with Earth has a mass of only 1.3 x 10^{-79} kg and creates a force of only 3.876 x 10^{-48} newtons, but working together, in aggregate, they create 17.52 x 10^{21} newtons, which, along with Earth's gravitons, keeps Earth in orbit. The total mass of gravitons at Earth's surface per cubic meter would weigh less than an electron and most of that mass would come from Earth's gravitons.

Perhaps this method of arriving at the mass of a graviton is totally wrong, yet isn't this exactly what we should expect, an infinitesimally small mass that we cannot sense with our own bodies in the space about us. At the same time, it allows us to predict a dense graviton matrix that will influence large orbiting bodies and small subatomic particles that eject their strings into this matrix as discussed throughout this book. The strings emanating from Earth would only be spaced 10^{-61} meters apart at Earth's surface.

Originally, I conceived that the mass of the virtual particle is related to the distance it is ejected into space. Using the estimate of $7.9\text{x}10^8$ meters for the distance magnons are ejected into space and 1 x 10^{23} meters for gravitons, the mass of the magnon becomes $1.3\text{x}10^{-79}$ x 1 x $10^{23}/7.9\text{x}10^8$ = 1.7 x 10^{-65} kg for a magnon.

As explained in Chapter 2, Maxwell's equations suggest that the mass of an elon is less than a magnon by 3×10^{8}. Using this ratio, the mass of an elon becomes 5.6×10^{-74} kg.

I believe these guesstimates provide at least a feeling for the mass of virtual elastic strings.

Velocity of string waves and their restoring forces

My hypothesis requires that the waves proceed along the graviton billions of times faster than light. In fact, their velocity has to be almost as great as the speed of the graviton virtual particle as it is generated into space. The equation provided by physicists to calculate wave velocity is as follows:

$$\text{wave speed} = \sqrt{\frac{F}{\text{mass (kg,m)}}}$$

Rearranging, we can solve for F, a force in newtons that is a measure of the tension of the string and its elastic restoring force.

$F = (\text{velocity m/s})^2 \times (\text{mass kg/m})$

Let's assume the velocity of the graviton wave is the same as the velocity the particle as it is generated into space or 1×10^{23} meters per second, and the mass of the string is 1.3×10^{-79} kg. Using these values, we can calculate the restoring force for a graviton wave. I calculated previously that the distance a graviton travels before it retracts is about 1×10^{23} m. Thus, kg per meter becomes 1.3×10^{-79} kg / 1×10^{23} meters or 1.3×10^{-102} kg/meter. Substituting these values into the equation given:

$F = (\text{velocity m/s})^2 \times (\text{mass kg/meter})$

$F = (1 \times 10^{23} \text{ m/s})^2 \times 1.3 \times 10^{-102} = 1.3 \times 10^{-56}$ newtons

The restoring force is also the force conducted along the string. An examination of this equation shows magnons and elons would have proportionally larger restoring forces because mass per meter would be that much greater. It also means the waves moving along these strings would be that much slower.

The value of F can also be obtained by multiplying the velocity of the graviton with its mass. Thus, 1×10^{23} m/s $(1.3 \times 10^{-79}$ kg$) = 1.3 \times 10^{-56}$. I used this relationship to calculate the restoring force for magnons and elons, and the velocity of the waves that travel along these strings. I placed the data in the following table.

Table: Restoring forces for waves

String	Velocity generated into space (m/s)	Mass (kg)	Tension on string or restoring Force (newtons)
Graviton	1 x 10^{23}	1.3 x 10^{-79}	1.3 x 10^{-56}
Elon	1 x 10^{23}	5.6 x 10^{-74}	5.6 x 10^{-51}
Magnon	1 x 10^{23}	1.7 x 10^{-65}	1.7 x 10^{-42}

The data in this table are fraught with perplexities; however, it is useful for comparing wave velocities of gravitons, magnons and elons associated with photons. Graviton wave velocity was already examined, but I will show it here for sake of comparison with magnon wave velocity.

$$\text{graviton wave velocity} = \sqrt{\frac{1.3 \text{ x } 10^{-56} \text{ newtons}}{1.3 \text{ x } 10^{-79} \text{ kg} / 1 \text{ x } 10^{23} \text{ m}}} = 1 \text{ x } 10^{23} \text{ m/s}$$

And for magnons

$$\text{magnon wave velocity} = \sqrt{\frac{1.7 \text{ x } 10^{-42} \text{ newtons}}{1.7 \text{ x } 10\ {-65} \text{ kg} / \ 7.9 \text{ x } 10^{8} \text{ m}}} = 8.9 \text{ x } 10^{15} \text{ m/s}$$

The photon’s elon wave velocity would be the same as the photon’s magnon wave velocity if their virtual particles were ejected the same distance in space. I believe this might be true for photons because in each case the same amount of mass is ejected.

$$\text{elon wave velocity} = \sqrt{\frac{5.6 \text{ x } 10^{-51} \text{ newtons}}{5.6 \text{ x } 10^{-74} \text{ kg} / \ 7.9 \text{ x } 10^{8} \text{ m}}} = 8.9 \text{ x } 10^{15} \text{ m/s}$$

The purpose of this analysis is to show that graviton wave velocity is likely much greater than the velocity of the magnon waves and elon waves created by photons. The analysis also suggests that the photon's magnon and elon waves have the same velocity.

Comparison of electric force and gravitational force

There is a great difference in the magnitude between the force of gravitation and the electric force of attraction between proton and electron. The electric force of attraction between electron and proton in a hydrogen atom is 8.2 x 10^{-8} newtons [note 20], while the gravitational force between these two bodies at the same distance is 3.6 x 10^{-47} newtons [note 21]. In this example, the electric force appears to be 2 x 10^{39} greater than the gravitational force.

During the course of this book, I have examined three different characteristics that help define the magnitude of the force of attraction between bodies. They likely apply to all the forces of nature. These are:

1. The nature of the resistance between a string and the object it pulls on.
2. The mass of the string, its degree of robustness.
3. The number of strings making a connection.

The resistance met by a graviton retracting through a proton is likely small compared to the resistance met by a graviton retracting through a large body where there are many points of bonding

I calculated force per graviton and joules per graviton in various systems and placed them in the following table.

Table: Newtons and joules per graviton for different systems

System	Distance between in meters	Mass of body graviton is retracting through in Kg	Newtons per **graviton**	Joules per graviton
Proton-proton	5.3 x 10^{-11}	1.7 x 10^{-27}	10^{-57}	3 x 10^{-67}
Saturn thro Sun	1.4 x 10^{12}	2 x 10^{30}	10^{-48}	5.7 x 10^{-36}
*Saturn thro sun_2	1.4 x 10^{12}	2.6 x 10^{32}	10^{-45}	6.6 x 10^{-34}

*A sun with 115.56 times the mass of our Sun but with the same diameter and distance from Saturn.

I used Saturn to calculate the values found in the preceding table because Saturn's gravitons penetrate the Sun in parallel. If we use a theoretical sun with 115 times the mass of our Sun, but with the same diameter and distance, joules per graviton are the same as Planck's constant. Force in newtons per graviton in this situation becomes 9.2 x 10^{-46}. This value is an approximation of the maximum joules per graviton that can be achieved in our solar system. Any greater resistance to attraction that might result because of a more massive star would not increase force per graviton.

These calculations show us that graviton resistance is a strong factor in determining the graviton's force of attraction. It goes up by a factor of 10^{12} in the examples given. It seems reasonable that elon connections between electron and proton create far greater resistance to retraction than the resistance met by gravitons; this likely explains a large share of the difference in these forces.

The number of graviton strings making a connection between electron and proton is likely dependent upon the size of the proton and electron in relation to the total area surrounding these particles. In other words, the number making a connection is small compared to the number of gravitons created by these structures. In contrast all elons connecting proton and electron are neutralized, which means that all the strings become involved in the force of attraction. However, we know the electric force of retraction is mainly dependent upon those strings that connect directly between the two particles because of the inverse square law, which applies to the electric force as well as the gravitational force.

The mass of a graviton is likely much smaller and less robust than elons, which likely accounts for goodly portion of the disparity between forces.

From this discussion, it is apparent that the great difference between the electric force and gravitational force as seen between electron and proton is due to multiple factors. It likely includes resistance to retraction (a major factor), size of the string (a major factor), and the difference in proportion of elons and gravitons making a connection between electron and proton.

Chapter 46: Casimir effect

In my attempt to determine whether virtual elastic string theory has any validity, I have applied the theory to many of the conundrums that have puzzled scientists, in some cases for hundreds of years. This Chapter deals with the Casimir effect in detail because it illustrates several important properties of photons and their virtual elastic strings.

The Casimir effect results when two mirrors in a vacuum are brought in close proximity to each other. Under these circumstances many of the photons between the two mirrors are ejected because they are out of resonance. For this reason, there are many more photons bombarding the outside of the plates, driving the two plates together, than those striking outward against the interior surfaces. This imbalance creates a force pushing the two plates toward each other. The force applied comes from the momentum of the photons.

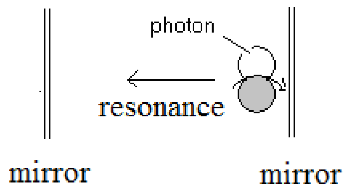
The Casimir effect was first predicted in 1948 by a Dutch physicist named Hendrick Casimir and for that reason it bears his name. It has since been proven in the laboratory by a number of different scientists, Lambrecht (2002).

To understand the Casimir effect, it is necessary to understand why some photons between the two mirrors can be out of resonance while others are not. Astrid Lambrecht (2002) points out that the Casimir effect is related to one half the wavelength of the photon. This is a large clue that points directly to the photons elastic self-induction cycle. In Chapter 26, I explained that for every oscillation cycle there are two self-induction cycles, which means one half of a wavelength corresponds to the distance the photon travels while it goes through one self-induction cycle. In one cycle, it is producing an excess negative electric field (n-elons) and in the next cycle it is producing an excess positive electric field (p-elons). N-magnons and s-magnons also form repeating patterns in the same manner.

From this discussion, we can see that the Casimir effect more precisely relates to the distance the photon travels as it goes through one self-induction cycle, or some multiple of it. For the photon to continue bouncing back and forth between the two plates, the distance between the two mirrors must be some multiple of the distance a photon travels during one self-induction cycle. All other photons are ejected.

This suggests that a photon in resonance is either striking the plate when strings are at a maximum or when there are no strings present. I believe the latter is true. The lack of strings allows the photon to do a true 180 and bounce directly back to the other mirror, as shown in the next illustration.

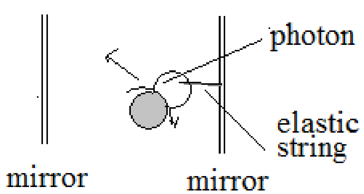
Photon in resonance



This photon bounces off the mirror at a true 180 degrees, and completes exactly one full self-induction cycle, or some multiple of it, before it strikes the other mirror. This allows it to remain bouncing back and forth between the two mirrors.

In contrast those photons out of sync will be creating virtual elastic strings at the time they strike the glass plate. Because in one self-induction cycle there are an excess number of n-elons made and in the next self-induction cycle, there are an excess of p-elons made, the elons on one sphere will tend to act as anchors, which will cause the photon to enter the mirror where they bounce off the coating on the back side of the mirror, or reflect off at an angle as shown in the next slide. Those photons not doing a complete 180-degree turn are very quickly eliminated from the space between the mirrors.

Photon out of resonance



This experiment is wonderful confirmation that the photon consists of two spheres and has two self-induction cycles per wavelength. It also supports my contention that strings emanating from photons interact with other matter, which helps to explain refraction. Finally, it supports a great deal of other evidence that photons have momentum and therefore have mass. Notice that the photons have billiard ball like collisions with the mirror.

VES theory explains why the Casimir effect is related to one half the oscillation cycle of the photon, an easy solution to another conundrum.

Two experimental particle physicists by the name of Steven Reucroft and John Swain (1998) use the term photon pressure rather than momentum, but the concept is the same. Air pressure relates to the mass of air above an area, and water pressure relates to the mass of water above the point being measured. In the case of photons, the pressure exerted by photons is due to their momentum because they are composed of matter.

Chapter 47: Compton effect and radio photons

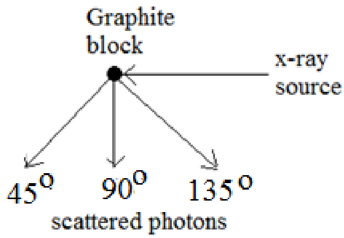
Arthur Compton (1923) directed x-rays against graphite and measured the wavelengths of the photons scattered by the graphite. He discovered that more than 50 percent of the photons leaving the scattering block had longer wavelengths than the original incident x-rays. Because the scattered photons would have the same velocity as the normal velocity of light, it means the only variable that could cause the longer wavelengths would be a smaller mass: The smaller the mass, the lower the energy and frequency of the photon and the longer its wavelength: $E = mc^2$ still applies.

The fact that more than half of the x-ray photons were split into smaller photons might be expected. This is a known property of electrons that capture large photons. It resembles what happens in a fluorescent light bulb when the mercury atoms give off relatively large UV photons that are captured by electrons associated with the phosphors that line the tube. The large UV photons are fragmented into smaller visible light photons—viola, we have white light, which is composed of many different photon sizes.

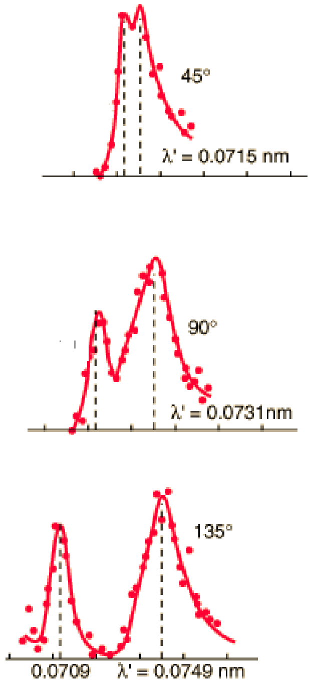
The total mass of the photons ejected by the graphite scattering block will ultimately equal the mass of the incident x-rays.

Another exciting part of Compton's experiment that helped him earn the Nobel Prize for physics was this: He demonstrated that the wavelength of the scattered photons depended upon the direction they left the graphite block.

At all angles measured, he found two main wavelengths. One wavelength was the same as the original x-ray striking the graphite, while the other was longer, showing that some photons were split into two or more photons. Except for the unaltered photons, those photons directed back more towards the original x-ray path had longer wavelengths than those with less angle of deflection.



The photon distribution at the various angles is shown below.



In addition to the two main wavelengths, there were other wavelengths showing considerable heterogeneity in the scattered photons. Compton concluded that the heterogeneity was not due to experimental error. The photons he measured were all in the x-ray category with frequencies of 3.9 x 10^{18} or higher. However, there may have been other photons of lower mass created.

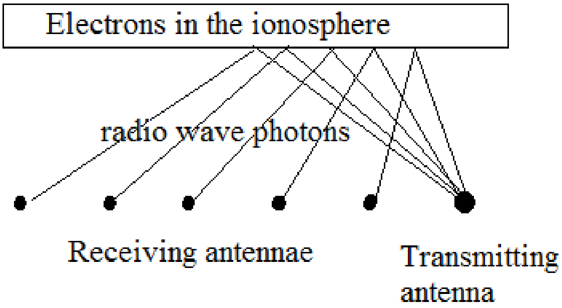
Compton came to believe that electrons and photons experience billiard ball like collisions when the photons strike the electrons in the graphite. Direct hits would cause the photons to bounce back towards the source. Indirect hits would cause them to scatter as shown. The question is what caused the photons to be fragmented into smaller photons, and what caused the photons that made more direct hits fragment into smaller photons than those that made glancing blows.

It may be a photon traveling at 300 million meters per second is fragmented into smaller photons simply by the collision between electron and photon, which would explain why those that make direct hits result in smaller photons. Perhaps fragmentation is aided by the electric bonds between electron and photon. In this scenario, the photon might be ripped apart because a portion is held more tightly than another portion. In either scenario, the photon may be fragmented.

Because we are dealing with a billiard ball like collision between particles, the more direct the hit, the more the path of the ejected photon is back towards the path of the incident x-rays. And the more direct the hit, the more likely the photon will fragment into smaller photons.

It is well to keep in mind that photons captured by an electron can recombine to create a larger photon. This means the mechanics of fragmentation or recombination is complex.; for example, consider the photons created by the sodium atom with one electron in its outer shell versus other atoms with several electrons in the outer shell as discussed in Chapter 40. A single electron in an outer shell is more likely to recombine photons than fragment photons.

AM radio photons that strike electrons in the ionosphere are deflected back to Earth. The incident angle of the radio photons dictates the direction the emitted photons travel back to Earth just as described by Compton. This is shown in the next illustration.



If we compare how x-rays are scattered by electrons in graphite with radio photons scattered by electrons in the ionosphere, we can reach two interesting conclusions: In both cases, the incident angle of the photons dictates the angle of deflection suggesting billiard ball like collisions. Secondly, if the electrons in the ionosphere are dense enough, virtually 100 percent of the radio photons are directed back to Earth without change in frequency. From this I conclude that small AM radio photons are unlikely to recombine or be fragmented, while larger, more massive photons, such as x-rays and UV, are much more likely to be fragmented into smaller photons when captured by electrons.

> The interaction between photons and electrons is very complex. Large photons like x-rays and UV light are more likely to fragment when they make billiard ball like collisions with electrons; visible light photons can either fragment or recombine during photon emission and absorption (Chapter 40), and small AM radio photons apparently neither fragment nor recombine when they strike electrons in the ionosphere.

Apparently, FM radio photons, which are larger, tend not to bounce back to Earth. It has long been thought that they pass through the ionosphere; however, perhaps some recombine or fragment rather than pass through the ionosphere.

Chapter 48: Entanglement

One of the spookiest known facts in physics is often referred to as quantum weirdness or in more recent vernacular as quantum entanglement. The root of this spooky unreality is the observation that when a photon is split and the two objects are sent even kilometers apart, modification of one of the photons also modifies its sister photon at virtually the same time. This action at a distance is extremely rapid, much faster than the speed of light. The underlying cause of entanglement is a conundrum that has baffled physicists for several decades. Thus far, photons are the only particles that have been shown to exhibit entanglement.

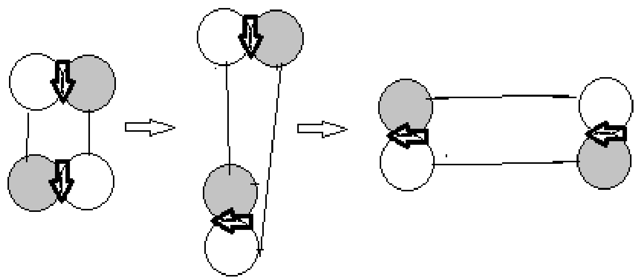
To account for a number of properties exhibited by electrons and photons, it is prudent to believe that these particles are composed of two spheres. In the case of photons, one sphere creates an excess number of p-elons in one self-induction cycle, and in the next cycle, the second sphere creates excess n-elons. The two cycles are seen as one complete wavelength in an oscilloscope.

A laser creates a stream of photons that are all polarized in the same plane. According to VES theory, polarization occurs because the elastic strings are shot off into space in the same plane. Sanders (2010) explains that when a laser beam is directed through a crystal, it splits some photons into two photons that combined have the same energy as the original photon. These two photons are now entangled even when they are sent off in different pathways. If the polarization of one photon is altered, the polarization of the sister photon will be altered at the same time even though they are now kilometers apart.

Let's assume for a moment that entanglement is caused by the interaction of the elastic strings emanating from the two photons. This solves one immediate problem. According to VES theory, elons created by a photon travel at 10^{23} meters per second., much, much faster than the speed of light. Thus, a change in the polarization of one photon almost immediately affects the second photon because they are connected by their elastic strings.

The interaction of elastic strings also provides an explanation for the cause of entanglement. N-elons emanating from one photon become bound to p-elons of the other photon. As the photon goes through its se;f-induction cycles, the strings are constantly being retracted back to source, but new strings are being created which continue to connect the two photons. Magnons may also be involved. In this case, s-magnons from one photon may be binding to n-magnons emanating from the other photon.

Sanders goes on to explain that in 1982, Alain Aspect and his colleagues examined the polarization properties of twin photons emanating from calcium atoms. They were able to demonstrate that modifying the polarity of one photon modified the polarity of the sister photon if the two detectors were aligned in the same way. If we assume that the two had the same initial polarization, the sequence of events might look something like this



.

When the polarization of the bottom photon is altered it pulls the other photon into the same alignment because they are physically connected by virtual elastic strings that travel at immense velocity. As you can imagine, a situation might arise where one photon maintains a vertical polarization at the same time the other photon has a horizontal polarization. In this case changing one from vertical to horizontal polarization automatically changes the other in the opposite direction.

Scientists would not be calling this phenomenon entanglement unless they realized that somehow the connecting links are somewhat permanent. We know from interference experiments that p-elons on one photon can bind to n-elons on another photon. When this happens, the electric fields are neutralized. Entanglement suggests that two strings bound to each other through entanglement might exist long enough to direct other strings to the sister photon.

More recently scientists have shown entanglement between more than two photons. However, the model presented here would certainly suggest this possibility.

Entanglement experiments are only possible because virtual elastic strings have great velocity and because we are dealing with strings that are composed of matter.

It seems highly likely that bonds formed between two sister photons might easily be broken. This suggests an experiment to determine whether the bonds formed have electric or magnetic properties. For example, what type of shielding causes photon entanglement to cease?

Chapter 49: The theory of everything

I gave my book a subtitle, The Theory of Everything, because it solves forcefields for electricity, magnetism, gravity, and the strong nuclear force, and because it solves scores of conundrums that have remained intractable for centuries. By the way, it is the only theory based on the observation that forcefields are composed of matter with perfect elasticity.

In my quest to prove or disprove VES theory, I carried out numerous experiments that now encompass a major portion of my book—some sixteen different chapters and almost as many experiments. All the results point to the same conclusion: Forcefields are composed of matter that has strong elastic properties. Because of the large number of experiments that lead to the same conclusion, there is no room for equivocation, confusion, or hedging your bet. Forcefields have physical properties. They are composed of matter with strong elastic properties.

There is a second element that should not be ignored. I also turned my attention to the numerous conundrums found in physics. The results speak for themselves: Every experiment and every conundrum examined testifies to the validity of virtual elastic string theory—more than 80 conundrums in all.

I would like to emphasize an additional point. This book covers many topics concerning the forces of nature, and every chapter and every subject relates to every other subject in every other chapter in this book. It is only when you view the whole composition do you fully appreciate the validity of virtual elastic string theory.

> The greatest attribute of virtual elastic string theory comes from the common threads that connect conundrums, known facts, experiments, and observations into one cohesive, all-encompassing idea, a concept made more powerful by its simplicity, and its purity of thought—no hedging.
>
> Perhaps I like it best of all because it embraces analysis by experimentation.

Why don't you apply this theory to your own conundrums and in this manner test it? Perhaps you can prove me wrong; however, I am confident this will not happen. It is much more likely that your efforts will add to the list of conundrums solved by virtual elastic string theory, and through your efforts, the theory will bubble to the surface and escape the tyranny of denial that enslaves us all.

NOTES

Note 1: The equation for the universal law of gravitation is used to calculate the force in newtons between Earth and a 1 kg apple as follows:

$$F_g = G\frac{m_1 m_2}{r^2} = \frac{(6.67 \times 10^{-11}\ N.m^2/kg^2)\ (1\ kg)\ (5.98 \times 10^{24}\ kg)}{(6.37 \times 10^6\ m)^2}$$

$$= 9.8 \text{ newtons}$$

G = gravitational constant m_1 = mass of apple
r = radius of Earth m_2 = mass of Earth

Note 2: The equation for the universal law of gravitation is used to calculate the force in newtons between Earth and Sun as follows:

$$F_g = G\frac{m_1 m_2}{d^2} = \frac{(6.67 \times 10^{-11}\ N.m^2/kg^2)\ (1.99 \times 10^{30}\ kg)\ (5.98 \times 10^{24}\ kg)}{(1.5 \times 10^{11}\ m)^2}$$

$$= 35.4 \times 10^{21} \text{ newtons}$$

G = gravitational constant m_1 = mass of Sun m_2 = mass of Earth
d = distance between Earth and Sun

The joules in energy between Earth and Sun is calculated in the same manner except the denominator (distance between bodies) is not squared.

Note 3: The size of a cable sufficient to hold Earth in orbit around the Sun is calculated as follows:

A cable holding 3.4×10^5 kg is resisting a gravitational force:

$$F = G\frac{m_1 m_2}{r^2} = \frac{(6.67 \times 10^{-11}\ N.m^2/kg^2)\ (3.4 \times 105\ kg)\ (5.98 \times 10^{24}\ kg)}{(6.37 \times 10^6\ m)^2}$$

$$= 3.33 \times 10^6 \text{ newtons}$$

G = gravitational constant m_1 = mass of weight m_2 = mass of Earth
r = radius of Earth

From note 2 we see that force between Earth and Sun is 35.4×10^{21} newtons; therefore the number of cables to hold the Earth in orbit is

$35.4 \times 10^{21} / 3.33 \times 10^6 = 1 \times 10^{16}$

Area of 5.04 cm steel cable is given by Pi r^2 or $(3.14)(2.52)^2 = 19.94$ cm^2

$= 1.99 \times 10^{-3}\ m^2$

Area of 1×10^{16} cables becomes $(1 \times 10^{16})(1.99 \times 10^{-3}\ m^2) = 1.99 \times 10^{13}\ m^2$

Area of a cross section through Earth is Pi r^2 or $(3.14)(6.37 \times 10^6\ m)^2$

$= 12.7 \times 10^{13}\ m^2$

Percentage of Earth's cross section for 1×10^{16} cables

$= (100)(1.99 \times 10^{13}\ m^2)(12.7 \times 10^{13}\ m^2) = 16$ percent

Note 4: A cluster of galaxies may be as much as 20 million lightyears across. This is the distance in meters that light can travel in 20 million years. The velocity of light is 3×10^8 meters per second. Distance light will travel in one year becomes $(3 \times 10^8\ m/s)$ (365.2422 days)(24 hours)(60 minutes)(60 seconds) $= 9.389 \times 10^{15}$ meters. Distance light will travel in 20 million years becomes $(9.389 \times 10^{15})(20 \times 10^6) = 187.78 \times 10^{21}$ meters.

Note 5: The ratio of the distance between Earth and Sun (1.5×10^{11} meters) to the size of a cluster of galaxies 20 million years across (note 4: 187.78×10^{21} meters) becomes 1.5×10^{11} meters/1.9×10^{21} meters $= 7.9 \times 10^{-11}$.

Note 6: Classical equation for wavelength: wavelength = velocity / frequency

Note 7: De Broglie's equation for wavelength is:

Wavelength = h/momentum

Where h = Planck's constant $= 6.63 \times 10^{-34}$ j.s

Momentum = (mass) (velocity).

Note 8: Theoretically, a proton oscillates at a very high frequency.

$$\text{Frequency} = \frac{(\text{mass})\ c^2}{h} = \frac{(1.67 \times 10^{-27}\ kg)(3 \times 10^8)^2}{(6.63 \times 10^{-34}\ J.s)}$$

$$= 2.3 \times 10^{23} \text{ vibrations per second}$$

mass = mass of proton   h is Planck's constant

c is the velocity of light

This equation can be derived by combining equations given in note 6 and note 7 and solving for frequency.

Note 9: Gravitons generated by Sun and gravitons generated by Earth. The assumption is that a proton generates gravitons at the same frequency it vibrates [note 8].

$$\text{Sun's gravitons} = \frac{(\text{mass}_s)(\text{frequency})}{\text{mass}_p} = \frac{(1.99 \times 10^{30}\,\text{kg})(2.3 \times 10^{23})}{1.67 \times 10^{-27}\,\text{kg}}$$

$$= 2.7 \times 10^{80}\ \text{gravitons}$$

mass_s = mass of sun mass_p = mass of proton

frequency = oscillation frequency of proton

$$\text{Earth's gravitons} = \frac{(\text{mass}_e)(\text{frequency})}{\text{mass}_p} = \frac{(5.976 \times 10^{24}\,\text{kg})(2.3 \times 10^{23})}{1.67 \times 10^{-27}\,\text{kg}}$$

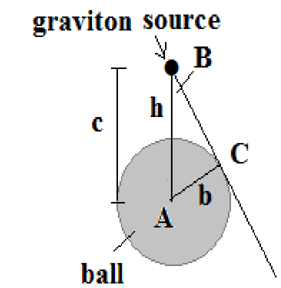
$$= 8.23 \times 10^{74}\ \text{gravitons}$$

mass_e = mass of Earth mass_p = mass of proton

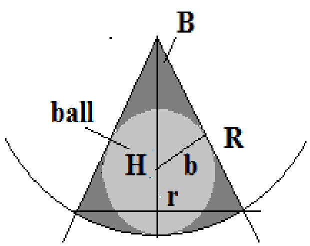
frequency = oscillation frequency of proton

Note 10: The method for calculating the proportion of gravitons striking a ball from a source at some specified distance above its surface is shown below. It makes use of volume ratios.

The example below calculates the volume of a section of a sphere given that the graviton source is 11 units from the surface of a ball with a radius of 10. The volume of the section of the sphere is then divided by the total volume of the sphere. This gives the proportion of gravitons from source that strikes the ball.



angle C = 90 degrees
b = ball radius = 10
h = distance from ball = 11
c = h + b = 11 + 10 = 21
sin B = b/c = 10/21 = 0.47619
R = radius of sphere = c + b
R = 31
r = radius of cone = sin B x R
r = 0.47619 x 31 = 14.7619
H = height of cone
$R^2 = H^2 + r^2$
H = 27.25961



$$\text{Volume of section of sphere} = Vs = \frac{2\,\text{pi}\,R^2\,(R-H)}{3}$$

And using the values given, we get this for the volume of the section

$$Vs = \frac{2\,\text{pi} \times 31 \times 31\,(31 - 27.26)}{3} = 7528.34$$

Sphere volume: Vt = 4/3 Pi R^3 = 124788.2

$$\text{Ratio} = \frac{Vs}{Vt} = .06033$$ Ratio equals that portion of gravitons from source that strike the ball.

Note 11: Calculation of the approximate number of the Sun's gravitons per meter square on Earth's surface. See note 10 for method. The total gravitons striking Earth [note 12] = 1.2 x 10^{71}. Radius of Earth = 6378140 m. Cross section through Earth = pir2 = 1.27 x 10^{14} m^2. Number striking Earth / cross section through earth = 1.2 x 10^{71} / 1.27 x 10^{14} m^2 = 9.5 x 10^{56} gravitons/m^2. The gravitons per centimeter square = 9.5 x 10^{56} / 1 x 10^4 = 9.5 x 10^{52} gravitons/cm^2.

Note 12: Calculation of Sun's gravitons striking Earth:

Total Sun's gravitons = 2.7 x 10^{80} [note 9]. Radius of Earth = 6378140 m. Distance between Earth and Sun = 1.496 x 10^{11}m. Partial volume of the sphere encompassing Earth is 6.37 x 10^{24} m^3 [note 10]. Total volume of the sphere surrounding the Sun and encompassing Earth

= 1.4 x 10^{34} m^3. The ratio of volumes = 4.55 x 10^{-10}. Sun's gravitons striking Earth = Sun's total gravitons x ratio = (4.55 x 10^{-10})(2.7 x 10^{80}) = 1.2 x 10^{71}

Note 13: Density versus force per graviton between two balls.

Density of balls:

Radius of balls = 2 cm

Volume of balls = 4/3 pi (2 cm) ^{3} = 33.51 cm^3.

Density of 0.2kg ball = 200 grams/33.51 = 5.968 grams/cm3

Density of 0.4kg ball = 400 grams/33.51 = 11.94 grams/cm^3

Force between balls:

Calculate force using universal law of gravitation as in note 2, where distance from center to center is 10 meters:

Force between 0.2 kg balls = G $(0.2\ kg)^2$ / $(10m)^2$ = 2.668 x 10^{-14} newtons

Force between 0.4 kg balls = G $(0.4\ kg)^2$ / $(10m)^2$ = 1.067 x 10^{-13} newtons

Total gravitons created by balls:

Calculate total number of gravitons emanating per ball as in note 9:

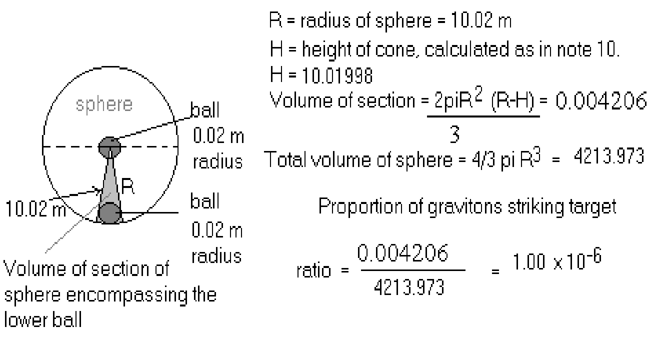
Gravitons per 0.2kg ball = (2.3 x 10^{23} vibrations per sec) (0.2 kg) / 1.67 x 10^{-27} kg =

2.74955 x 10^{49}

Gravitons per 0.4kg ball = 5.509 x 10^{49}

<u>Proportion of gravitons connecting with the other ball:</u>

Calculate proportion of gravitons striking ball as in note 10. Distance center to center is 10 cm. Calculate volume of a section of sphere and express as proportion of sphere.



<u>Newtons per graviton:</u>

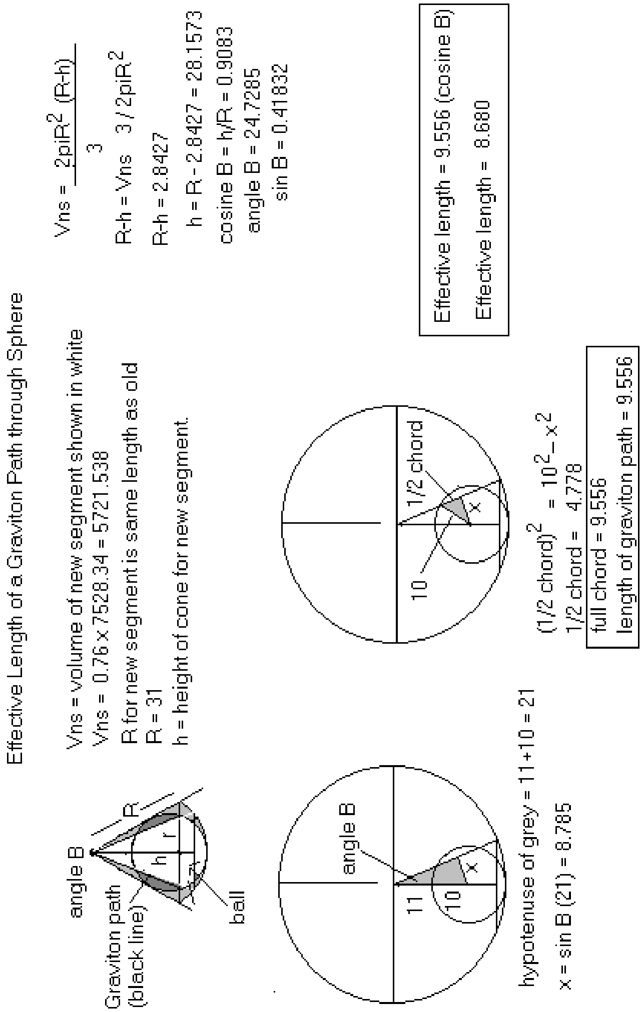
Gravitons from 0.2 kg ball striking the other ball = 2.75 x 10^{49} (1 x 10^{-6}) = 2.75 x 10^{43} (gravitons from both balls = 5.5 x 10^{43})

Gravitons from 0.4 kg ball striking the other ball = 5.509×10^{49} (1×10^{-6}) = 5.509×10^{43} (gravitons from both balls = 1.1×10^{43})

Newtons/graviton 0.2kg balls = 2.668×10^{-14} newtons / 5.5×10^{43} = 4.85×10^{-58}

Newtons/graviton 0.4kg balls = 1.067×10^{-13} newtons / 1.1×10^{43} = 9.7×10^{-58}

Note 14: The following method was used to determine the length and angle of an individual graviton through a sphere. The example shown here makes use of the information and example used in note 10. The graviton pathway and angle is determined below where 76% of all pathways are longer and 24% of the pathways are shorter. This situation is described by a new segment of the sphere. The volume of this segment is 0.76 of the original section volume encompassing the ball. The new section volume is 0.76 x 7528.34 = 5721.538. The balance of the calculations are as follows. The following example uses a ball with a diameter of 20 units where the point mass is 11 units above the surface of the ball.



The author set these calculations up in Excel and took the average of 1000 equal divisions per half to arrive at the average effective length through a ball for a given separation between a source of gravitons and the ball.

Note 19: Calculation of Earth's gravitons striking Sun.

Total Earth's gravitons = 8.23×10^{74}. [note 9]. Radius of Sun is 6.96×10^{8}m and the distance between Earth and Sun is 1.496×10^{11}m. Partial volume of the sphere encompassing Sun (calculated as explained in note 10) = 7.72×10^{28} m^3. Total volume of sphere surrounding Earth whose radius is the distance from Earth to Sun is = 1.4×10^{34} m^3. Ratio = partial volume / total volume = 5.5×10^{-6}. Earth's gravitons striking Sun = $(8.23 \times 10^{74})(5.5 \times 10^{-6}) = 4.52 \times 10^{69}$

Note 20: Electric force between proton and electron in a hydrogen atom

$$k = 9.0 \times 10^{9}\ \mathrm{N.m^2/C^2}$$

Distance between proton and electron = 5.3×10^{-11} meters.

The unit of charge q is called the coulomb and it has a value of 1.6×10^{-19} C for one proton or one electron.

$$\text{Force} = \frac{(9.0 \times 10^{9}\ \mathrm{N \cdot m^2/C^2})(1.6 \times 10^{-19}\,\mathrm{C})^2}{(5.3 \times 10^{-11}\,\mathrm{m})^2} = 8.2 \times 10^{-8}\ \text{newtons}$$

Note 21: Gravitational force of attraction between electron and proton.

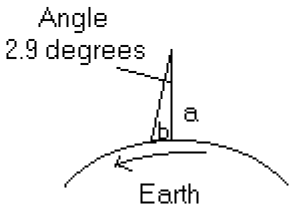
$$F_g = G\frac{m_1 m_2}{d^2} = \frac{(6.67 \times 10^{-11}\ \mathrm{N.m^2/kg^2})(9.11 \times 10^{-31}\,\mathrm{kg})(1.67 \times 10^{-27}\,\mathrm{kg})}{(5.3 \times 10^{-11}\,\mathrm{m})^2}$$

$$= 3.6 \times 10^{-47}\ \text{newtons}$$

G = gravitational constant m_1 = mass of proton m_2 = mass of electron

d = distance between proton and electron in hydrogen atom

Note 22: The angle created at 9144 meters above Earth's surface after one second spin on axis at rate of 463.8 meters per second. The Earth is moving but the position in space is stationary. A tangent of 0.051 is equivalent to an angle of 2.9 degrees.



$$\tan = \frac{\text{length b}}{\text{length a}}$$

$$\tan = \frac{463.8\ \text{m}}{9144\ \text{m}} = 0.051$$

Note 23: Nanoseconds elapsed in a journey around the world in a commercial jet. A nanosecond is 1 billionth of a second. The distance around the world at 9144 meters above Earth's surface is 40081344 meters (Pi2r, where r is 6379144 meters). A jet flying at 223 meters per second would take 179357 seconds to fly around the world (6379144/223), which is equivalent to 1.8×10^{14} nanoseconds (179357×10^{9}).

Note 24: When the distance between a sphere and a source of gravitons is infinite, then the gravitons arrive in parallel. The average path length through the sphere can be expressed in terms of its diameter. If we imagine a ball in a cylinder that has the same height and width as the

$$\textbf{ratio} = \frac{\textbf{volume of sphere}}{\textbf{volume of cylinder}}$$

$$\textbf{ratio} = \frac{\dfrac{4\,\cancel{\text{pi}}\,\cancel{r^3}}{3}}{\cancel{\text{pi}}\,\cancel{r^2}\,2\cancel{r}} = \frac{\dfrac{4}{3}}{2} = \frac{2}{3}$$

diameter of the ball, then the volume of the ball divided by the volume of the cylinder gives the ratio of average distance through the ball versus diameter of the ball, which is 2/3.

Note 25: The average force a graviton from Earth exerts when it retracts through our Sun is 3.9×10^{-48} newtons [note 14]. If we increase the mass of our Sun from 2×10^{30} kg to 2×10^{57} kg, but keep its size and its distance from Earth the same, we can calculate the new force per Earth's graviton created when it retracts through the more massive sun.

$$F_g = G\frac{m_1 m_2}{d^2} = \frac{(6.67 \times 10^{-11}\ N.m^2/kg2)\,(1.99 \times 10^{57}\ kg)\,(5.98 \times 10^{24}\ kg)}{(1.5 \times 10^{11}\ m)^2}$$

$$= 35.4 \times 10^{48} \text{ newtons}$$

G = gravitational constant m_1 = mass of sun m_2 = mass of Earth
d = distance between Earth and sun

Earth contributes ½ the force or 17.7 x 10^{48} newtons
Earth's gravitons striking Sun [note 12] = 4.43 x 10^{69}.
Therefore newtons per graviton = 17.7 x 10^{48} / 4.43 x 10^{69} = 4 x 10^{-21}

Note 26: The gravitational force of attraction between two protons with a separation of 5.3 x 10^{-11} m

$$F_g = G\frac{m_1 m_2}{d^2} = \frac{(6.67 \times 10^{-11}\ N.m^2/kg2)\,(1.67 \times 10^{-27}\ kg)\,(1.67 \times 10^{-27}\ kg)}{(5.3 \times 10^{-11}\ m)^2}$$

$$= 6.6 \times 10^{-44} \text{ newtons}$$

G = gravitational constant m_1 = mass of proton m_2 = mass of electron

d = distance between proton and electron in hydrogen atom

Note 27: Number of gravitons connecting between two protons

radius of proton = 1×10^{-15} m
proton's cross section = pi r2 = pi $(1 \times 10^{-15}\ m)^2$ = $3.17 \times 10^{-30}\ m^2$.

distance between protons = 5.3×10^{-11} m
area of sphere with a radius of 5.3×10^{-11} meters = 4pi r^2 = $3.5 \times 10^{-20}\ m^2$.

$$\text{ratio of cross section to sphere area} = \frac{3.17 \times 10^{-30}\ m^2}{3.5 \times 10^{-20}\ m^2} = 8.9 \times 10^{-11}$$

gravitons per proton per second = 2.3×10^{23} (oscillation frequency of proton)
gravitons making a connection = $2.3 \times 10^{23} \times 8.9 \times 10^{-11} = 2 \times 10^{13}$/ second

Note 28: Newton forces per graviton between two protons: Total force between two protons separated by 5.3 x 10^{-11} m = 6.6 x 10^{-44} newtons (note 26). The number of gravitons making a connection by one of these protons is 2 x 10^{13} per second (note 27).

Newtons per graviton = $3.3 \times 10^{-44} / 2 \times 10^{13} = 1.6 \times 10^{-57}$

Note 29: Newton forces per elon between two protons: Total force between two protons separated by 5.3×10^{-11} m = 8.2×10^{-8} newtons (note 20). The number of elons making a connection by one of these protons is assumed to be the same as the number of gravitons making a connection: 2×10^{13} per second (note 27).

Newtons per graviton = $4.1 \times 10^{-8} / 2 \times 10^{13} = 2 \times 10^{-21}$

Note 31: Number of times a photon spins on its axis while going through one oscillation cycle was computed. A visible light photon with a frequency of 1×10^{15} was used for this calculation. It was assumed that the photon has the density of water (density completely unknown) and that its surface velocity is the speed of light.

frequency of visible light = 1×10^{15}.

$E = 1 \times 10^{15} \times 6.6 \times 10^{-34} = 6.6 \times 10^{-19}$ joules

$E = \text{mass } c^2$

$$\text{mass} = \frac{6.6 \times 10^{-19}}{(3 \times 10^{8})^2} = 7.3 \times 10^{-36} \text{ kg} \quad \text{or } 7.3 \times 10^{-33} \text{ grams}$$

7.3×10^{-33} grams is eauivalent to 7.3×10^{-33} cm^3 if it has the density of water.

4/3 pi r3 = volume of sphere = 4/3 pi 7.3×10^{-33}

$r^3 = 1.7 \times 10^{-32}$ and the cube root or $r = 3 \times 10^{11}$ cm or 3×10^{-13} meters.

The circumference = 2r pi = 1.88×10^{-12} meters

If the photon is spinning at the same rate it is traveling through space, then its spin rate will be $3 \times 10^{8} / 1.88 \times 10^{-12} = 1.6 \times 10^{20}$ times per second. Spins per oscillation becomes: $1.6 \times 10^{20} / 1 \times 10^{15}$ = 31,800 times per oscillation.

Note 32: The data found in Table 8.1 was obtained by assuming a point mass of 1 kg situated at various distances from a ball 450 meters in diameter, with a mass of 2×10^{11} kg. The force this point mass exerts on the 450 meter ball was determined using VES theory by multiplying the following components:

Force in newtons = (average effective length, meters) (total gravitons striking ball) (density in grams/cm^3) (conversion factor)

The total number of gravitons emitted by the 1 kg point mass is:

$$\text{Total gravitons} = \frac{1\ \text{kg}\ \ (2.3 \times 10^{23}\ \text{vibrations/s})}{1.67 \times 10^{-27}\ \text{kg proton mass}} = 1.38 \times 10^{50}$$

The portion of these gravitons striking the ball was calculated using ratios as shown in note 10.

The effective distance each graviton takes through a sphere is calculated using the methodology outlined in note 14. In this case, the actual length each graviton takes through a sphere is multiplied by its unique cosine of the angle. The sum of all unique lengths times cosines is used to compute an average effective distance through the ball.

Of course it is impossible to calculate the average effective length for all the gravitons striking the ball. To make the estimate, 1000 pathways equal distance apart through ½ of the sphere were analyzed. Excel was used to handle the thousands of calculations to arrive at the desired estimates for each pathway. The pathways were then averaged to find the average effective length for all the gravitons striking the ball.

The density of the 450 diameter ball was calculated using its known size, 450 meter diameter, and is known mass, 2×10^{11} kg.

A conversion factor is used to convert the raw data to a known force (newtons). It was calculated using the data for the 1×10^{-9} meter separation between the 1 kg point mass and the 450 meter ball. The conversion factor was set up to yield a newton force identical to the universal law of gravitation when the two bodies are separated by 1×10^{-9} meters.

$$\text{Factor} = \frac{\text{Force in Newtons}}{(\text{effective length})\ (\text{number of gravitons})\ (\text{density})}$$

$$\text{Factor} = \frac{0.000131753}{(150)\ (6.88621 \times 10^{49})\ (4.19173)} = 3.04295 \times 10^{-57}$$

Note 33: I found no source for the weight of a filament in a light bulb. The 7.2 mg measurement came about from one 40 watt light bulb. A tile shop was kind enough to carefully saw off the glass bulb, and after extracting the filament, it was weighed in a laboratory by Dr. Robert Renden.

Note 34: Spin angular momentum of the sun versus a proton.

Calculations for the proton-electron system were computed using the same measurements as those used for the sun-planet system as provided by physicists. Spin angular momentum = mass x radius x spin velocity

Protons spin at a very rapid rate. 2 x 10^{-23} seconds to spin once.
Proton radius: 8.55 x 10^{-16} meters or circumference of 5.37 x 10^{-15} meters.
Velocity = 5.4 x 10^{-15} m / 2 x 10^{-23} sec = 2.69 x 10^{8} m/s.

Data used to determine spin angular momentum

System	Mass kg	Radius meters	Spin velocity m/s	Spin angular momentum
Sun	1.99x10^{30}	6.96 x 10^{8}	5.06 x 10^{4}	7.0 x10^{43}
Proton	1.67x10^{-27}	8.55x 10^{-16}	2.69 x 10^{8}	3.8 x10^{-34}

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GLOSSARY

acceleration The rate of velocity change with time.
amplitude The maximum point that a wave either rises or falls.
attraction force A force that pulls two objects toward each other.
bound string A string bound to its complementary twin. In this state it is neutralized.
complementary string A string that binds to another complementary string, its twin. When two complementary strings bond then retract, it causes a force of attraction between two particles.
down quark This quark is a fundamental particle found within protons and neutrons. It makes an excess negative electric field (n-elons) that neutralizes a portion of the positive electric field (p-elons) emanating from up quarks.
elastic strings The elastic properties of strings allows them to retract back to source and create a force of attraction.
electric charge Electric forcefields are attributed to electric charge by physicists without defining what the fields are composed of or how they bring about a force of attraction or repulsion. I use the term charge to indicate the presence of virtual elastic strings emanating from subatomic particles such as electrons.
elon A general term for strings responsible for the electric force. Elons come in two varieties: n-elon and p-elon.
n-elon The string responsible for the negative electric force. It is created by electrons, quarks, and photons. It is responsible for negative electric currents and the forcefields about quarks, electrons, and photons. When n-elons bond to p-elons it causes a force of attraction. When n-elons contact other n-elons it causes a force of repulsion.
electron A subatomic particle that creates n-elons, p-elons, n-magnons, s-magnons, and gravitons. It creates n-elons in excess which are equivalent to one unit of negative charge. A hydrogen atom is composed of one electron bound to one proton. Although electrons bind to protons, they can also move from place to place under proper conditions.
energy The capacity to do work. It is mass in motion.
free string A strings that is not bound to its complementary twin. It is free to bond to other strings, which means it can be detected by our instruments.

forcefields Forcefields are compose of virtual elastic strings. For example, the quantity of the negative electric field is determined by the number of n-elons present.

gluon A general term for strings responsible for the strong nuclear force. VES theory suggests there are six different kinds of gluons.

graviton matrix A term that refers to the vast number of gravitons that exist in the space about us that crisscross in all directions forming a sea of gravitons.

kolla Kolla is the substance inside quarks, electrons, and photons that is used to create strings. It comes in two forms, n-kolla and s-kolla. It has strong elastic qualities. When compressed during the self-induction cycle, it stores potential energy that can be used to eject photons and strings.

graviton The string responsible for the force of gravitation. It comes in only one form. There is no complementary string.

graviton matrix A dense concentration of graviton strings that permeates space. There are at least 10^{47} per square centimeter.

magnon A general term for strings responsible for the magnetic force. Magnons come in two varieties: n-magnons and s-magnons.

mass Mass is a quantity of matter normally expressed in kilograms. When dealing with photons, electrons, and other subatomic particles, mass also reflects the idea that we are dealing with a coherent body of matter; for example, a whole photon.

matter The tangible material in the universe than has physical properties.

n-magnon The string responsible for the magnetic force created at the north pole of electrons, photons, and quarks. When n-magnons bond to s-magnons it causes a force of attraction. When n-magnons contact other n-magnons it causes a force of repulsion.

neutron The neutron is found in all elements except hydrogen. It is slightly larger than a proton. It contains two down quarks and one up quark and has no electric charge.

oscillation frequency The appearance and disappearance of the electric and magnetic fields of electrons, photons, and quarks are cyclical. According to VES theory, self-induction cycles are responsible for oscillation.

p-elon The string responsible for the positive electric force. It is created by electrons, quarks, and photons. It is responsible for positive electric currents. When p-elons bond to n-elons it causes a force of attraction. When p-elons contact other p-elons it causes a force of repulsion.

portal An opening that allows string particles to be ejected from electrons, quarks, and photons. It controls the pressure necessary to eject a string. It likely controls the size of the particle ejected.

q-photon A photon created by the quark from the mass of a proton or neutron.

quark A subatomic particle found within protons and neutrons. They are slightly larger than electrons. Quarks create p-elons, n-elons, n-magnons, s-magnons, gravitons, and gluons that are responsible for the strong nuclear force. They also create the strings responsible for the weak nuclear force.

repulsion When two identical strings come in contact, they create a force of repulsion. This pushes two objects apart.

s-magnon The string responsible for the magnetic force created at the south pole of electrons, photons, and quarks.

string cycle Refers to the self-induction cycle.

string A string is a fundamental unit responsible for a force of nature. All forces have their own unique strings. They are composed of matter, have mass, and have strong elastic properties. They are virtual because they wink in and out of existence.

string waves Because strings remain bound to their source, transverse waves are sent along the string. These traveling waves are capable of doing work. They can provide a source of energy to objects.

up quark An up quark is a subatomic particle found in protons and neutrons (see quarks). The up quark creates an excess number p-elons that the electron binds to as it whirls about the proton.

virtual particles A particle ejected from photons, electrons, and quarks that give rise to virtual elastic strings. A virtual particle only exists a brief period of time.

virtual strings Elastic strings are said to have virtual properties because they are constantly being created and reabsorbed.

weight A property of matter that shows there is a gravitational force of attraction between it and some other object.

ABOUT THE AUTHOR

Photo taken while filming a short movie on gyroscopes, 2013.

Most of my undergraduate work was done at what is now known as Southern Utah University. During this period, I was offered a scholarship in the arts, in drama, and pursued this side of life for a year. However, I returned to the sciences, and with the help of a grant, obtained a Ph.D. from the University of Utah in genetics and biochemistry. I was in research at the University of California at San Diego for several years and from there I joined the faculty at the University of Kansas. I am the author of a number of publications in peer review science journals. In particular, I researched and wrote articles on Hurler's syndrome in humans, genetics of a suppressor mutation in neurospora, transcription and translation of RNA in neurospora, and on the "Biologic Effects of Supernovae" with Dr. Wallace Tucker. This article was published in Science. It gained a good deal of interest in the scientific community because it dealt with mass extinctions.

Eventually I became a businessman, retired early, took up tennis and golf, and other pursuits including writing a full-length musical with Kent Monson. "What's in a tail?" was presented at the Carson City community center in 1984. Apparently, I couldn't get the arts out of my mind since I had been writing and producing short musicals for many years in a competitive setting. I was fortunate to win several first-place awards.

During this period, I also taught statistics at Western Nevada Community College.

Being computer illiterate but curious about computers and computer programming, I picked up a book on the c++ language and eventually wrote a large, complex, windows' based computer program to play the game of bridge, which I sold around the world on the Internet as "Let's Play Bridge". In addition to playing with one or more humans with multiple bidding systems to choose from, I also programed it to play with linked computers and phones with the appropriate hands always being hidden. Little did I understand what it would take to write the tens of thousands of lines of code necessary to complete this endeavor; otherwise I would have stuck to golf. However, I believe it did hone my mind for my next project.

In 2001, still curious and in good health, I turned my attention to physics. I ask this simple question, if we live in a three-dimensional world what does this tell us about the forces of nature? My answer is found in this book. I hope you enjoy my ideas as much as I enjoyed the long hours it took me to develop the theory and present it in the form you find today.