

VES THEORY

And

The Forces of Nature

Second Edition Extended

Author: Kelland David Terry, Ph.D.

The first edition of this book was copyrighted by Kelland David Terry in 2004. This second edition includes the development of string cycle theory and VES ether theory.

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KELLAND DAVID TERRY
P.O. BOX 21289
CARSON CITY, NV 89721

vesttheory@gmail.com

An article on this subject was originally copyrighted by Kelland Terry, 2001. The title of this paper was *Virtual Elastic String Theory*

DEDICATION

It is with pleasure that I dedicate this book to my wife, Mary, who has patiently listened to my theories far longer, I suspect, than she would have liked.

ACKNOWLEDGMENTS

This book is based on the accumulated knowledge of many dedicated scientists who have researched and published for several centuries on the forces of nature. The number and complexity of their observations and experiments are almost overwhelming. If I omitted given credit to anyone in this book, it is due to my ignorance.

I thank Dr. Travis Hirschi, a lifelong friend, who asked me in an e-mail what I thought of an article on the Internet that dealt with gravity. I feel like I should apologize for the volumes of e-mail that I sent him on the subject.

I thank my good friend Dr. Wallace Tucker who attempted to keep me oriented correctly by suggesting books for me to read. Wallace, like Travis, has been assaulted by various renditions of my theories since the beginning.

My friends did not read and correct the text, and they are not responsible for any errors that may be found in this book.

Forward

In an e-mail I received from my friend Dr. Travis Hirschi, I was asked what I thought of an article on the Internet that dealt with the gravitational force and relativity. In this article was a reference to the work of Tom Van Flandern who came to the conclusion that the force of gravitation must act at least 24 billion times faster than the speed of light. This fired my imagination, and I began to think about gravity. This book is, in a sense, a response to my friend's initial query.

In the beginning, I told myself that if I were ever able to explain precession of Mercury's orbit in a three-dimensional world, then I would understand the gravitational force. For this reason, I spent inordinate time thinking about Mercury, but with little success. It was only when I decided to examine the greater issues of the gravitational force that I was finally able, after several false starts, to formulate a physical explanation for Mercury's orbit that is backed by simple mathematical ratios. I am satisfied that VES theory explains precession of Mercury while holding the universe to three-dimensions.

I am not a physicist, although like many science majors in college, I took high school and college physics. That was more than a half-century ago, which means by the time I undertook this project, I had forgotten the large majority of what I had learned. Although this gave me a decided disadvantage in my quest to understand the forces of nature, it also gave me an important advantage because my mind was free to roam over all possibilities without being fettered by established theories. I now see how the youth, who tackle a new field, are the ones most likely to come up with novel approaches and theories, right or wrong.

If I were to list all the twists and turns I took as I followed VES theory, you might be quite amazed how often the theory led me to a conclusion that upon further research proved to be an established fact. Annual polar wobble of Earth on its axis, the behavior of quarks, and frame-dragging (although by tangible connections) are three good examples.

VES theory is backed by the universal law of gravitation, the standard model of the atom (including the effect of distance upon the force of attraction between quarks), every established observation in our solar

system, the effect of gravity upon subatomic particles and electromagnetic radiation, and the interaction of the magnetic and electrical forces.

I always thought the underlying theory was so simple that hundreds of scientists, if not many thousands, must have considered it. Even so, in the beginning, it was a wholly novel idea, and I found no reference to it until I began studying the electromagnetic forces. Here I was excited to find that Michael Faraday, a renowned scientist, believed that the electrical and magnetic forces could be explained by physical connections via elastic filaments (my word). I believe one reason this theory has not received more attention is because only recently have scientists found important information that soundly supports the basic premise. Secondly, perhaps I am the only person who has put a face on gravitons by estimating their frequency in nature. This greatly eased the calculations and understanding that made this book possible. Finally, as already mentioned, scientists are programmed to believe in established theories, which make it difficult to explore options outside the box.

At one point in time, I did not work on VES ether theory for several years. Frankly, it appeared that too much work was involved and I wanted to spend my time playing golf. After all, I am retired. Finally in January of 2008, after taking an extended hiatus, I undertook to develop a model that would explain Maxwell's equations, VES ether theory, and a model for electrons and photons to explain how virtual elastic strings are created. This resolve proved to be of tremendous importance in understanding the relationship between the gravitational force, electric force, and magnetic force. It also provided an important link that unifies VES theory, Maxwell's equations, and the theory of relativity.

After you finish this book, I am convinced that you will continue to ponder over the forces of nature long after you set this book down. I will be pleased to hear from you!

Kelland David Terry
January 2009.

After you have read the book, please go to <http://vesttheory.blogspot.com> and join others who make their views known. Or email the author directly: vesttheory@gmail.com.

PROLOGUE

A quote from a physicist at the University of Nevada that appears on the Internet sums up some of the controversy in the field of physics. F. Winterberg states that Einstein's general theory of relativity "has led to a profound crisis in modern physics."

Winterberg likely was led to this conclusion because of a large number of inconsistencies in the general theory of relativity that has led to irrational thought. I'll give you one example. Currently, some physicists try to explain the forces of attraction as an exchange of particles between two bodies. Notice for a force of attraction to occur the particles have to circle around the body and pound against it from the opposite side. If you read this book, you will see that this explanation is virtually impossible because it flouts a number of important laws governing the forces of attraction. I suspect that 99.99 percent of all physicists find this to be a very unsatisfactory explanation for a force of attraction between two bodies.

Einstein's special theory of relativity is also being questioned around the world by a large group of people. They are the so-called dissidents who do not believe in relativity in any form.

Nuclear physicists and other empiricists are trying to explain the physical world in physical terms. Research on the atom and its subatomic particles has resulted in the Standard Model of the atom that has been successfully documented by numerous experiments. Relativity cannot be reconciled with this theory.

This is the state of affairs that exists now, just as it existed when I began thinking about the gravitational force. I started with the basic premise that we live in a normal, three dimensional world, which led to a simple theory. I have expanded this theory to all the forces of nature. You be the judge.

VES THEORY AND THE FORCES OF NATURE

2nd Edition

Author: Kelland David Terry

BOOK ABSTRACT

VES is an acronym for **v**irtual **e**lastic **s**trings, the physical, tangible filaments that I believe make up the force fields for all the forces of nature, including electricity, magnetism, gravitation, and the nuclear forces. My theory is that elastic strings emanate from source, and when they retract they pull on any object they become bound to. This induces a force of attraction between bodies. Repulsion forces can just as easily be explained by elastic strings as explained in the book. All the forces have their own unique elastic strings that are ephemeral (virtual) in nature; i.e., they are constantly being generated and then retracted back to source at a very rapid rate where they are re-absorbed.

My theory is strongly supported by nuclear physicists, who have proven through experimentation that strong nuclear force fields behave just as you would expect if they are composed of elastic strings. Scientists have shown that quarks, **the** small subatomic particles found in atoms, are held together by a strong force of attraction. When scientists separate these quarks, they find that the attraction force between them increases. In fact the farther they are separated the greater the force pulling them back together, just as expected if the strings connecting quarks have elastic properties. The same observation is true for the force of gravitation, it too appears to have elastic properties. In our Milky Way Galaxy, as well as other galaxies, the farther a star is from the galactic center the less it obeys Newton's Universal Law of Gravitation. The attraction force between a star and the galactic center can be as much as 10 times greater than expected if the star is found at great distance from the galactic center. This can be explained if the strings responsible for the force of gravitation have elastic properties.

My theory that strings have elastic properties is supported by the unique attribute of all atoms that they are nearly indestructible. Think of it this way. When an atom is subjected to fusion on the sun and fission during a nuclear explosion, it is exposed to extremely high temperatures and violent

physical bombardment, yet for the most part all the atoms remain intact. This important observation suggests that the material that makes up an atom has tremendously strong cohesiveness with strong, unique elastic properties that prevents the atom from being torn asunder. Doesn't it seem reasonable that this material can be stretched over vast distances and still remain intact allowing it to retract back to its source? Keep in mind that scientists have discovered that some matter actually grows in volume as it stretches, unlike the rubber band you stretch between your fingers.

I believe my theory is easier to accept than a world of four dimensions where time and space become warped. In addition, this theory explains a thousand times more than can be explained by a four-dimensional world.

The simple theory I propose explains all the forces of nature, including attraction and repulsion forces, and the natural laws developed by scientists, including the Universal Law of Gravitation and the Standard Model of the Atom. It also explains our very complex solar system, including the spin of our planets on their axes, why Venus spins more slowly than Earth, momentum transfer between satellites and central body, and repulsion forces between planet and sun, which is necessary to explain the degree of planet tilt, annual wobble of Earth on its axis, and precession of Mercury's orbit attributed to general relativity. VES theory explains at the most fundamental level how the gravitational force pulls two bodies toward each other. It demonstrates that the density and distance through a body is key to understanding gravity, it explains why gravitation obeys the distances and angles of a three dimensional world. It explains why the force of gravitation is much weaker than the other forces when measured between electron and proton, but not so much or none at all between massive bodies. Because the strings responsible for the force of gravitation have a finite length, it explains why galaxies are in clusters under the influenced of their own internal gravity, but not attracted to other clusters at greater distance.

It explains all the observations and experiments dealing with electricity and magnetism, including negative and positive electric currents and the interaction between electricity and magnetism necessary to convert mechanical energy to electric energy and vice-versa.

My theory explains why and how the energy inherent in the spin of small subatomic particles is the ultimate source of energy for all forces of nature. It provides a model for the creation and re-absorption of strings by spinning subatomic particles, and in the process explains why force fields are self inducing. It shows how a gravitational field affects string cycles and how this in turn affects the photon, the basic unit of light.

It completely explains away the observations used to support the general theory of relativity, and it explains how the gravitational force fields, magnetic force fields, and electric force fields interact to cause the special relativistic effects noted by Einstein and other scientists. It explains why the speed of small particles in a particle accelerator increases more than expected and why radioactive decay slows down in particle accelerators. Several chapters are devoted to explaining how the velocity of light is dependent upon its electric and magnetic properties, as dictated by Maxwell's equations, and how gravitational fields affect the creation of light and the velocity of light. It explains gravitational red shift, gravitational frequency shift, the behavior of cesium clocks in motion and in magnetic fields, and why the energy of incoming light depends upon its origin in the sky and its origin on the sun. It provides a model for the string cycle of a photon, which demonstrates why its magnetic and electric fields are self inducing. It enhances our understanding of the properties of photons, electrons, and quarks, the three spinning subatomic particles that are likely responsible for the all the forces of nature.

It shows how dark matter can be explained by the elastic behavior of the strings that make up the gravitational fields, and why it is unnecessary to believe in dark energy.

This short abstract only hints at the contents of this book and Virtual Elastic String Theory. I have in fact examined a very large number of observations, experiments, and theoretical considerations in multiple branches of physics, which are explained in the book, and in all instances they support my theory.

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CHAPTER I INTRODUCTION TO THE FORCES OF NATURE

The importance of the natural forces cannot be over emphasized. Without them, there would be no ground to walk on, no trees to gaze upon, no oceans to swim in, and no universe to explore. Chaos would reign because the natural forces of attraction and repulsion between particles provide the means by which subatomic particles become atoms, atoms become molecules, and molecules become mountains and the living objects of our world. They provide the glue that holds particles together, or the repulsion forces that push objects apart. They are ultimately responsible for all biological, chemical, and mechanical sources of energy. In short, they are responsible for our very existence and the universe around us.

The natural forces that shape our universe are common every day phenomena we often take for granted. Gravity is one such force. It accounts for the fall of Newton's apple from the tree, and it keeps us in orbit around the Sun. Without it, Earth would go spinning off into space. The gravitational force of attraction is remarkable, or perhaps even magical, because it works across vast distances and through a vacuum; yet, no one has ever isolated anything that connects two bodies in space.

Magnetism is another common force. Like gravity, the magnetic force of attraction works even when the force takes place at great distance across a vacuum with seemingly no known physical connection. There is also a force of repulsion between two magnets when either two north-seeking poles or two south-seeking poles are in close proximity with each other. It is almost impossible to hold two magnets in your hands without feeling a

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mysterious sense of wonder as the strong natural forces push or pull your hands.

Another force that we are familiar with is electricity. It is similar to gravity and magnetism in that the force of attraction between a positive charge and negative charge works across a vacuum under conditions in which there are no apparent physical connections. Electricity can also be a force of repulsion if the two charges are the same. In this respect, it resembles magnetism.

It should be noted in passing that many scientists believe that the magnetic force and electric force are one and the same force, which they referred to as the electromagnetic force. Although electrical and magnetic forces are closely related and interact with each other, I will treat them as different forces for reasons that will become self evident in later chapters.

The explosion of the first nuclear bomb brought another natural force dramatically to our attention. The awesome power released is only held in check by the nuclear forces that hold the subatomic particles together. These forces are referred to as the strong nuclear force and the weak nuclear force.

In every case, the forces of nature bring about attraction or repulsion between bodies across a vacuum with no known physical link connecting the two bodies.

NATURAL FORCES OF NATURE			
	Force Works Across a vacuum	Neutralizing Effects	Relative Strength
Gravity	yes	none	10^{-36}
Electric	yes	yes	1
Magnetic	yes	yes	1
Strong Nuclear	yes	yes	60
Weak Nuclear	yes	yes	10^{-7}

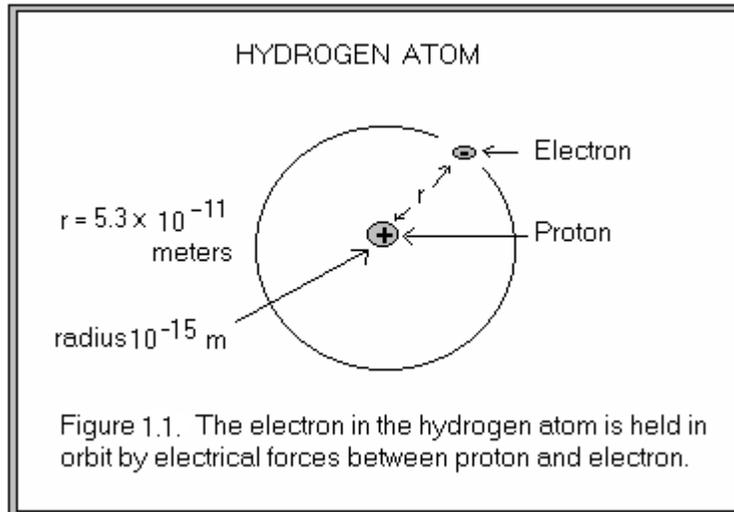
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Although there are similarities between all the forces, each force has its own set of characteristics that makes it unique. For example, nothing shields, insulates, or neutralizes the gravitational force. Even when the Moon is between the Earth and Sun, the gravitational force of attraction between Earth and Sun remains undiminished. In contrast, we know that the electric force can be isolated in an electric wire by coating it with a few millimeters of rubber insulation. In addition, an equal quantity of negative electric charge and positive electric charge neutralize one another. Unlike the electric force, the magnetic force passes through rubber insulation, but like the electric force, north and south seeking poles neutralize each other. Another striking difference is the relative strength between the forces. The force of magnets and electricity are at least 10^{36} times stronger than the gravitational force when measured between electron and proton, and the strong nuclear force is some 60 times stronger yet. For these and other reasons, it is difficult to devise a fundamental theory that applies to all the forces, yet their commonality suggests a mechanism basic to all.

We can gain a little useful background into the natural forces by examining their origin within the atom. Here we are dealing with matter at the quantum level where distances and masses are extremely small. As you shall see as we progress through this book, it is likely that all the forces of nature are created by just three types of particles: electrons, quarks, and photons.

A hydrogen atom is the least complex of all atoms (Figure 1.1). It is composed of just one electron and one proton. The hydrogen's electron orbits the proton somewhat like the Earth rotates around the Sun. An electron has a mass of 9.11×10^{-31} kg and one unit of negative electric charge. The mass of a proton is 1.67×10^{-27} kg and it contains one unit of positive electric charge. Thus the proton is about 2000 times larger than the electron, but the positive charge created by the proton exactly equals the negative charge created by the electron. The two opposite charges

completely neutralize one another. The attraction between electron and proton holds the electron in orbit.



In addition to the electric force, electrons and protons are also responsible for the force of gravitation and magnetism. Scientists have shown that the positive charge generated by the proton comes from quarks inside the proton. These subatomic particles are slightly larger than electrons and come in two forms: up quarks and down quarks.

A proton contains two up quarks and one down quark. The up quark has a mass of 5.3×10^{-30} kg and it carries a $2/3$ positive electric charge. The down quark has twice the mass of the up quark, and it carries a $1/3$ negative electric charge. This combination of quarks leaves the proton with one unit of positive electric charge, which neutralizes the one electron.

Atoms that are more complex have a greater number of electrons and protons. In addition, their nuclei contain neutrons, which contain one up quark and two down quarks making this triad of quarks electrically neutral.

Electrons and quarks generate the electric force that binds electrons to protons. This force is responsible for binding atoms into molecules and

molecules into compounds. Electrons and quarks are also responsible for the magnetic force. In addition, quarks are responsible for the nuclear forces that hold quarks, protons, and neutrons together within the nucleus of an atom. The gravitational force is thought to originate from these same subatomic particles.

Photons are the basic particles that make up light. They have electric and magnetic fields and are often referred to as electromagnetic radiation. It is likely they too create a gravitational force of attraction with other objects. Beside visible light, photons are also the basic particles that make up x-rays, radio waves, microwaves, and other electromagnetic radiation. This book largely revolves around how electrons, quarks, and photons create the force fields that are responsible for the forces of nature.

SOURCES OF THE FORCES OF NATURE

1. Electrons create electric fields, magnetic fields, and gravitational fields.
2. Quarks create electric fields, magnetic fields, gravitational fields and the fields responsible for the nuclear forces.
3. Photons create electric fields, magnetic fields, and gravitational fields.

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AN ATOM'S SUBATOMIC PARTICLES

Electron

Proton

Up quark (2 per proton)

Down quark (1 per proton)

Neutron

Up quark (1 per neutron)

Down quark (2 per neutron)

Atoms differ because each has a unique number of electrons, protons, and neutrons.

Later in this book, I will present a theoretical model that explains how the movement of spinning subatomic particles provides the energy necessary to create strings and the forces of nature. This is a fascinating story that explains why the forces are self inducing.

CHAPTER II

BASIC POSTULATES OF VES THEORY

For more than a thousand years people have been intrigued by the forces inherent in the matter around us. Yet, how one object pulls another object towards it, or in the case of repulsion, pushes objects apart, remains for the most part a dark, mysterious secret because no one has ever been able to isolate the connecting links. Nor has anyone ever devised a fundamental theory that unites and explains all the forces.

I have often read that the final solution to this puzzle is likely to be simple. On the other hand, it has to explain all the forces of nature, as well as all the observations accumulated for the past several hundred years that bear on these forces. For example, any theory that explains the gravitational force must explain our solar system, which is very complex.

I began my thoughts on the forces of nature by assuming that we live in a three dimensional world. This world is familiar to us. It has the normal coordinates of space: length, width, and depth. This is in contrast to the four dimensional world demanded by the theory of relativity. In Einstein's world, time becomes the fourth dimension that takes its place along with the three dimensions of space. Can the forces of nature be explained by a simple theory that adheres to a three dimensional world? That is the central question.

Let's make this a little easier. Let's assume that the natural force of attraction between two bodies requires a physical connection composed of

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matter. Actually this basic postulate is dictated by the first assumption that we live in a three dimensional world.

I call the connecting links strings. String theorists use the term in their attempt to understand gravity, but the strings they contemplate are all described by mathematical equations in four or more dimensions, not tangible matter that adheres to a three dimensional world.

According to VES theory, strings responsible for the gravitational force are composed of matter and have a physical presence in space even though we can not feel or see them. They connect the Earth to the Sun and the Sun to the Milky Way Galaxy, just as the lady bug crawling along a leaf is connected to all the matter that surrounds it including a proton in some far away star.

In the same manner, strings must connect protons to electrons, which we measure as an electric force, while other strings connect quarks within the nucleus of an atom, and still others connect the north and south poles of a magnet.

If strings hold the Earth in orbit about the Sun, what property must they possess to exert such a tremendous force between these two bodies? What is responsible for the force of attraction? If you think about this for a moment, you will come to the same conclusion that I did. The force of attraction between two bodies must be due to the elastic nature of the string. Only in this manner can the string retract back to its source.

BASIC POSTULATES OF VES THEORY

1. Our universe has three dimensions.
2. Strings that connect bodies are composed of matter
3. Strings have elastic properties that exert a force of attraction between bodies.

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Is this simple theory of any importance? This is a legitimate question, but one that can be answered. If it can explain all the forces of nature and all the experiments and observations that deal with these forces, then the answer to that question is an emphatic yes.

VES theory explains at the most fundamental level how the gravitational force pulls two bodies toward each other. It explains the universal law of gravitation and why the density and distance through a body is key to understanding gravity. It explains why the distances and angles of a three dimensional world must be used to explain the force of gravitation. It explains why the force of gravitation is much weaker than the other forces when measured between electron and proton.

In our solar system, it explains why the spin of a satellite is related to the satellite's rotation around the central body. And why Venus spins slower than Earth. It explains how planet rotation and plane of orbit is connected to a spinning Sun. It explains planet migration, tilt of a planet on its axis, Mercury's strange orbit thought due to relativity, and why there is a yearly polar wobble of Earth on its axis.

It explains electric currents, force fields, repulsion forces, and why mechanical energy can be converted to electric energy via the interaction of the magnetic force and electric force. It explains how the spin of an electron is coupled to its velocity. It explains why intrinsic spin of an electron is intimately associated with the forces of nature.

It completely explains away the observations used to support the general theory of relativity, and provides a compelling theory to explain the velocity and energy of light. It explains why the speed of small particles in a particle accelerator increases more than expected and why radioactive decay slows down in particle accelerators. It explains why the velocity of light is connected to its electric and magnetic properties. It explains the source of dark matter and any need to believe in dark energy.

Yes, there is even strong, direct evidence for elastic strings. Particle physicists have proven that quarks within the nucleus of an atom behave as if they are connected by elastic strings. The force of attraction between quarks increases when they are separated, just as you would expect if

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quarks are connected by elastic strings. In addition, there is equally strong evidence in our galaxy that the strings responsible for the gravitational force have elastic properties. The greater the distance between a star and the galactic center the greater the force necessary to hold the star in orbit. It is as though the stars are connected by elastic strings.

VES theory is deceptively simple. By this I mean that the fundamental mechanism is based on a simple premise, but it becomes very complex when it must take into account all of the diverse data for all the natural forces. I will begin my discussion by first exploring gravity. I will use this force to define VES theory and the major rules that govern how this theory works.

If you will permit me to take you step by step through all the evidence, I believe you will be absolutely amazed what VES theory adds to our understanding of the physical world.

CHAPTER III

MAGNITUDE OF THE GRAVITATIONAL FORCE

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 literally jerked to the floor. Such practical experience teaches us that gravity is a very strong force. In this chapter, we 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 the commonly used unit of force, the newton.

Relationship between Force, Mass, and Acceleration

As far as scientists know, a gravitational force of attraction exists between any two bodies that have mass. For most people, we quickly equate mass with something that has weight, which can be measured in pounds or kilograms here on Earth, and that is basically a correct assumption. However, scientists define it in terms that are more precise:

$$\text{mass} = \frac{\text{force}}{\text{acceleration}}$$

A 1 kilogram mass acted upon by 1 newton force will accelerate 1 meter / second².

The definition of force is also defined by rearranging this same equation: force = mass x acceleration. We will have occasion to use this method of determining force when we examine the Milky Way Galaxy.

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FORCE DEFINED

Force = mass x acceleration.

As an apple falls towards Earth, its velocity continues to increase at a constant rate because the force of gravity is unrelenting.

Acceleration is the change of a particle's speed per unit time. Thus acceleration can be defined as follows:

$$\text{acceleration} = \frac{\text{change in velocity}}{\text{time interval}}$$

All else being equal, the faster something accelerates the greater the force being applied. From the initial equation we see that

$$\text{acceleration} = \frac{\text{force}}{\text{mass}}$$

Universal Law of Gravitation

The universal law of gravitation defines the force of gravitation by using a different equation. Isaac Newton worked out the basic principals in the 18th century. The law and mathematical equations he derived have stood the test of time:

$$\text{Force in Newtons} = \frac{G \text{ Mass}_1 \text{ Mass}_2}{(\text{distance})^2}$$

We see that the gravitational force of attraction between two bodies is equal to the product of the two masses divided by the square of the distance between them. G is a constant that converts the value found to the force in newtons. The value of G was actually determined long after Newton

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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, which perhaps highlights with greater emphasis the strong attraction between these two bodies even though they are separated by 5×10^{11} meters.

What could possibly account for the great force between Earth and Sun considering that they are separated so far apart? There is a rational explanation that fits a three dimensional world, keep reading.

The properties of a graviton

CHAPTER IV BASIC PROPERTIES OF GRAVITONS

Because all the forces of nature have unique properties, the elastic strings must also differ. It will be well for us to assign names to them as we go. In this chapter, we will examine the string responsible for the gravitational force, but as we shall see, it shares many of its properties with the strings responsible for the other forces of nature.

Gravitons

Graviton is the name physicists have given to the ‘entity that carries the force of gravity’. Just what this means is somewhat of an enigma because the accepted general theory of relativity can assign no 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. I believe it is composed of matter and has elastic properties, and in the chapters that follow, I will present a great deal of evidence to support this belief.

Graviton

As used in this book, a graviton is the name of the string that connects two bodies and is responsible for the gravitational force of attraction between them

Virtual Strings

A virtual string is ephemeral in nature; i.e., it only exists for a brief period of time then disappears. VES theory states that a virtual string is generated, and then retracts back to its source where it is reabsorbed. A simple example will show why strings must have virtual properties. A

The properties of a graviton

rocket climbing into space continuously obeys the universal law of gravitation even though the distance between rocket and Earth is constantly changing. This means that the number of gravitons connecting rocket and Earth must be constantly changing. It also means that for a given altitude, nearly the same number of strings connect rocket and Earth whether the rocket is stationary or rapidly moving away from us. Furthermore, an object falling towards Earth in a vacuum accelerates at a constant rate. Both of these observations point to the virtual property of gravity; i.e., the gravitons connecting two bodies are constantly being broken and renewed, and the process itself must be fairly rapid.

This is illustrated most forcefully when we consider our own Milky Way Galaxy. Scientists know that objects in our galaxy are orbiting its center at approximately 225,000 meters per second. If the force of gravity has virtual properties, then to keep an object in orbit 100,000 light years from the galactic center, the force of gravity must be applied at speeds that are billions of times faster than the speed of light. A light year is the distance light travels in one year at 3×10^8 meters per second. Even more extreme is the realization that clusters of galaxies some 10 to 20 million light years apart are held together under their own internal gravity. Van Flandern (1998) estimates that the gravitational force must act at least 24 billion times faster than light. Cardone and Mignani (1999) agree with Van Flandern based on other considerations.

VIRTUAL PROPERTIES

A graviton is created, exerts its force of attraction, and then quickly disappears. All strings have virtual properties.

Velocity of Gravitons

Most physicists believe that nothing is faster than the speed of light as postulated by Einstein in his special theory of relativity. If this is true, how can gravity constantly correct the flight path of an object a hundred thousand light years away? In his general theory of relativity, which deals with gravity, Einstein proposed that time is a fourth dimension that interacts

The properties of a graviton

with our three dimensional space, and it is this property of our universe that allows gravity to exert its effect instantly over vast distances. In this view, the movement of my hands upon the keyboard results in a distortion of space and time that is felt instantly across the universe.

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 at least 24 billion times faster than the speed of light. Is this possible? The answer to this question is an emphatic yes

There is strong evidence that photons are not the fastest thing in the universe, not even close. Numerous experiments have been conducted over the decades that show information can be transmitted through space at speeds that greatly exceed the velocity of light. For example, when a photon or electron wave is split and one portion of the wave is modified, the sister wave is acted upon instantaneously even though separated by a large distance, Ferris (1997). It is as if some unknown wave traveling at immense velocity transmits and alters the state of small particles at distant locations. This is sometimes referred to as quantum weirdness; however, it is real and it has been investigated numerous times. 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 information can be transmitted almost instantaneously and the very fact that light travels at such a phenomenal speed lends credibility to the idea that gravitons might travel at speeds billions of times faster than light. In a later chapter, I will relate the velocity of gravitons to VES theory.

VELOCITY OF GRAVITONS

Light travels at the immense speed of 3×10^8 meters per second.

Information is transmitted almost instantaneously over large distances, far faster than the speed of light.

There is no reason to assume that gravitons cannot travel more than 24 billion times faster than the speed of light.

Gravitons are Highly Energetic

There are some restrictions to the virtual elastic string that mediates the gravitational force. First, we know that gravitons pass through living tissue. This means that the momentum of such a particle cannot be high or it would destroy life as we know it (momentum = mass x velocity). This means its mass must be extremely small if the particle has great velocity.

Second, the velocity and energy of such a particle (for its size) would have to be much greater than any particle known to exist if it is to explain the gravitational force. Is it possible that a particle with nearly infinite velocity, low mass, and great energy exists? Curiously enough, the equation $E = mv^2$ suggests this is possible. E stands for energy, m mass, and v velocity of object. It is almost sacrilegious to see this equation in any form but $E = mc^2$, where c is the velocity of light. However, if gravitons are billions of times faster than the speed of light, then the energy of a graviton must be related to its velocity rather than the velocity of a photon (unit of light). Notice, if the velocity is nearly instantaneous then the energy is great even with a minute mass. A mass we cannot detect in space. The momentum of this mass would be small even if its velocity was 12 billion times the velocity of light.

Gravitons are Long Strings

If the force of attraction between two bodies is due to a physical connection, then three possible mechanisms come to mind. First, it is possible that gravitons are short virtual strings that are connected together end to end to yield a string that reaches across galaxies. However, this adds to the complication of how they are connected end to end, and even more importantly how an instantaneous force can be applied. In addition, the energy required using this type of string is far too large.

The second possibility is that the void in space is filled with theoretical matter smaller than protons, which are interconnected via gravitons to form a 3-dimensional latticework in space. There is no evidence for such matter. In addition, a 3-dimensional latticework in space cannot explain the forces of attraction and repulsion between electrically charged particles. For example, if electrons were connected to this network there would be no rational basis for repulsion because electrons would be connected to each other. Finally, a static 3-dimensional latticework of space-particles cannot

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explain the almost instantaneous nature of gravity, nor can it easily explain the inverse square law.

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]. It should be born in mind, that the electric force holding the atoms of the steel cable together are 10^{36} times more powerful than the force of gravity, at least between electrons and protons. 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. Finally, their cross section and mass must be extremely small because we cannot detect them in space.

This leads us to the third hypothesis, that a single graviton is capable of forming a physical bridge across galaxies. This is of course an utterly mind-boggling thought. However, as we shall see in later chapters, there is a great deal of evidence that supports this theory.

GRAVITONS ARE LONG STRINGS

VES theory stipulates that a single graviton can stretch across a galaxy and beyond.

A long string would account for the virtual properties of gravity.

A long string would satisfy the energy requirements necessary for the gravitational force because it can exert the same force whether two bodies are separated by a few centimeters or from here to the Sun and beyond.

Gravitons do not bind to Other Gravitons

One of the most striking properties of gravity is its inability to be shielded in any way. I pointed out previously that even when the Moon is between the Earth and the Sun the effect of the Sun's gravity upon the Earth is undiminished. No amount of rock, lead, rubber, plastic or any other substance placed between two objects thwarts the gravitational force of attraction between them. This is in sharp contrast to magnetism and electricity. It is also in sharp contrast to the strong nuclear force, which is completely neutralized within the nucleus of an atom. From this, we can reach a very important conclusion. Gravitons do not bind to other gravitons; otherwise, it would create a shielding or neutralizing effect; and using the same reasoning, the virtual elastic strings of the other forces of attraction do form bonds between strings.

Nothing Shields, neutralizes, or forms an insulation barrier against the Force of Gravity.

Conclusion: Gravitons do not bind to other gravitons.

Virtual Elastic Strings have Elastic Properties

I will discuss the evidence for the elastic properties of gravitons in Chapter IX, but it is important to know up front that direct experimental evidence exists for elastic strings.

The strong nuclear force bears strong testimony for VES theory. When quarks are moved apart, a strong force of attraction develops between them, and the farther the quarks are separated the greater the force. They behave as though they are connected by elastic strings. This has been reviewed by Barnett, et. al. (2000) and Weiss (2000, vol.158, page136). There is also tantalizing research that suggests the electric force inside the atom increases with distance, Weiss (2001, vol. 159, page 277). In chapter IX, I will present very strong evidence that the gravitational force also increases with distance just as expected for strings with elastic properties.

CHAPTER V PHASES OF A GRAVITON

Thus far, I have presented my arguments that a physical connection between two objects accounts for the gravitational force of attraction between them and that the connections require long, virtual strings that do not bind to each other.

FUNDAMENTAL ASSUMPTIONS OF VES THEORY

1. Virtual elastic strings are a form of matter that has a physical presence in space.
2. The strings have elastic properties.
3. Virtual elastic strings are long strings that reach into outer space and beyond.
4. The strings have virtual properties; that is they are created quickly and then disappear as they wink in and out of existence.
5. There must be a vast number of strings to account for the force of gravity.
6. In the case of gravity, the strings (gravitons) do not bind to each other.

This brings us to three additional crucial elements to my model: First, a virtual elastic string must remain connected to its source in order to exert a pulling force. Second, the string must bind to the object it is pulling, which allows the elastic string to exert a force of attraction as it retracts back to

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source. Third, as the string retracts, it must be reabsorbed by the particle that created it.

Three Additional Elements to VES Theory

1. A virtual elastic string must remain connected to its source to exert a pulling force.
2. A virtual elastic string must bind mechanically to the object it is pulling, which provides a source of resistance.
3. The string must retract back to its source where it is reabsorbed.

Gravitons Remain Connected to Source

The evidence shows that gravitons are created by electrons, quarks, and photons (units of light). All three particles must create gravitons and they must reabsorb these strings to make this theory work. In the chapters that follow I will present abundant evidence for this conjecture along with a theory that explains how a particle's spin angular momentum is the basic source of energy that drives string cycles.

Source of Resistance during Retraction

It has become increasingly clear that all strings bind to other strings, which provides the source of resistance when they retract. In the case of gravitons, they form weak mechanical bonds with the strings that are responsible for the electric and magnetic forces. This allows the graviton to pull on the object it penetrates when it retracts back to source. Much of this book revolves around how gravitons interact with the strings that create the forces of electricity and magnetism. As we shall see, it provides an important link between gravitation, Maxwell's equations, the velocity of light, and the experiments and observations that explain the special theory of relativity.

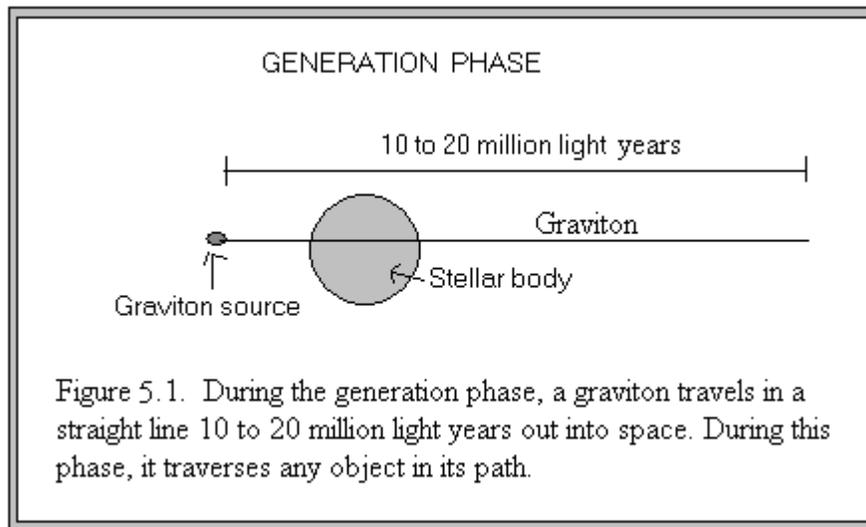
The properties of a graviton

The existence of a virtual elastic string can be broken down into its generation phase and retraction phase.

Gravitons—Generation Phase

The evidence shows that a graviton exits the electron, quark, or photon as a small particle that leaves a portion of itself in its wake as it speeds across the universe. The creation of the string only depends upon the initial momentum of the particle and the inherent cohesiveness of the string that allows it to remain intact as the particle speeds across the galaxy. Obviously, a string is not created by a stream of material that continues to extend itself into space.

The general view of scientists 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). The upper limit for a cluster size is 10 to 20 million light years. Super clusters, which are some 100 million light years across, are not thought to be held together by their own internal gravity. Scientists have also identified great regions of the universe that are voids, containing few if any galaxies. These voids measure some 300 million light years in diameter.



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If a cluster of galaxies some 10 to 20 million light years across is under the influence of its own internal gravity, we can conclude that a graviton must travel at least that distance from its source. At the same time, it provides strong evidence that gravitons have a finite length just as you would expect for a string composed of matter.

As scientists learn more about the universe, I believe it will become increasingly clear how the attributes of gravitons have helped shape our universe into galaxies and clusters of galaxies as observed.

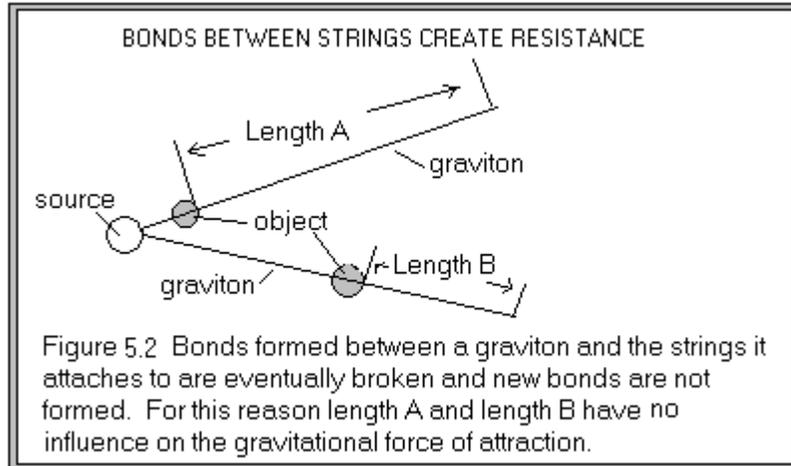
The energy that ejects a graviton in space must come from the subatomic particle that generates it. I will have much more to say about this subject in later chapters.

Gravitons—Retraction Phase

During the retraction phase, a graviton retracts back through the body it traversed during the generation phase. To generate a force of attraction, the graviton must bind to the object it is pulling. I will present evidence in the chapters that follow that gravitons form weak bonds with the strings responsible for the electric and magnetic forces. The resistance felt by the graviton is due to some sort of mechanical bond created between strings. In the same manner, all of the other forces of nature depend upon the interaction between strings.

When the graviton retracts, the bonds are eventually broken. At the same time, the structure of the graviton is changing as it relaxes. Perhaps it becomes more diffuse throughout its length. This prevents new bonds from forming during the retraction phase. Thus the gravitational force of attraction is not explained by the length of string retracting through the body. It only depends on the number of initial bonds formed. Thus if an object is only one meter away, the remainder of the string, some 10 to 20 million light years in length, has no influence on the force of attraction.

The properties of a graviton



The weak interaction between gravitons and other strings is a complex subject and will be dealt with at length in the coming chapters.

The properties of a graviton

CHAPTER VI NUMBER OF GRAVITONS GENERATED BY MATTER

In order to compare the force that a single graviton is able to exert under different conditions, it is useful to have some estimate of the number of gravitons generated by matter. The estimate does not have to be a true figure; it just has to be realistic and consistent for all masses.

At this time, it is impossible to know the number of gravitons generated per second by any mass; however, the number must be vast to account for the gravitational force of attraction. Second, because the energy of all subatomic particles is related to their oscillation frequency, I assume that the generation of gravitons is somehow related to such frequencies. Finally, as William Hiscock (2002), a professor of physics at Montana State University, points out, “Quantum gravitational effects are expected to become important when one reaches the Planck scale...”

For purposes of developing a theory, and to make the calculations easy, I have arbitrarily assumed that gravitons are created at the same frequency that protons oscillate, which is 2.3×10^{23} per second [note 8]. I believe this is a minimal number, and the true number might be billions of times this estimate. In addition, I might have used a combination of quarks and electrons since they are likely the principle source of gravitons. These particles also vibrate at a very high frequency. For example, an up quark theoretically oscillates at the rate of 7.19×10^{20} per second and the electron at 1.24×10^{20} per second. 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. Because of these complications, I have used the vibration frequency of a proton. I will conclude here by saying such vast numbers are necessary to satisfy VES theory, and it is necessary if the energy of a graviton is to approach Plank's

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constant. This complex subject is dealt with in more detail in Chapter XXIV.

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.

Comparing the Number of Gravitons Generated by the Sun and Earth

If we take the mass of the Sun (1.989×10^{30} kg) and divide it by the mass of a proton (1.673×10^{-27} kg), we find there are 1.189×10^{57} proton equivalents in the Sun. Assuming that each proton equivalent generates 2.3×10^{23} gravitons per second, then the number of gravitons generated by the Sun per second would be 2.7×10^{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 10^{53} gravitons per second from the Sun bearing down upon every square centimeter of Earth's surface [note 11]. In contrast, there are estimates of 10^{10} neutrinos striking Earth per cm^2 per second. Additional calculations are shown in Table 6.1.

TABLE 6.1
MINIMUM NUMBER OF GRAVITONS GENERATED BY OUR SUN

Location	Distance (meters)	Number per cm^2
Sun's Surface		10^{57}
Earth's surface	1.5×10^8	10^{53}
Center Milky Way	2.8×10^{20}	10^{34}
Nearest Galaxy	2×10^{22}	10^{30} *

*The equivalent of 200,000 per area of a proton (radius of 1.2×10^{-15} m).

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Even an area the size of a proton 20 million light years away would receive 2711 gravitons per second.

A total of 1.2×10^{71} gravitons from the Sun would strike Earth per second [note12]. 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 [note19]. The number of Earth's gravitons striking an area the size of a proton at Earth's surface would be 1.6×10^{30} per second. Although I do not know how many gravitons matter generates per second, the numbers presented here are what would be expected to satisfy VES theory.

Universal Law of Gravitation supports VES Theory

CHAPTER VII

GRAVITONS DEPEND ON DENSITY AND DISTANCE THROUGH AN OBJECT

Now that we have a method of estimating the number of gravitons generated per unit of mass, we can examine a number of interesting relationships. For example, how does the density of the object a graviton is retracting through affect the force exerted by a graviton? Keep in mind the comparison does not require that the estimated number of gravitons is the actual amount, only that we are consistent.

Density and Force per Graviton

An examination of the universal law of gravitation shows that the force

$$\text{Force in Newtons} = \frac{G \text{ Mass}_1 \text{ Mass}_2}{(\text{distance})^2}$$

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 than if it retracts through water.

To examine this relationship, I set up a mind experiment that enabled me to calculate the force of a single graviton as it retracts through a body of known density. By varying the density, but keeping the distance between two bodies the same, we can examine the effect density has on the force exerted by a graviton.

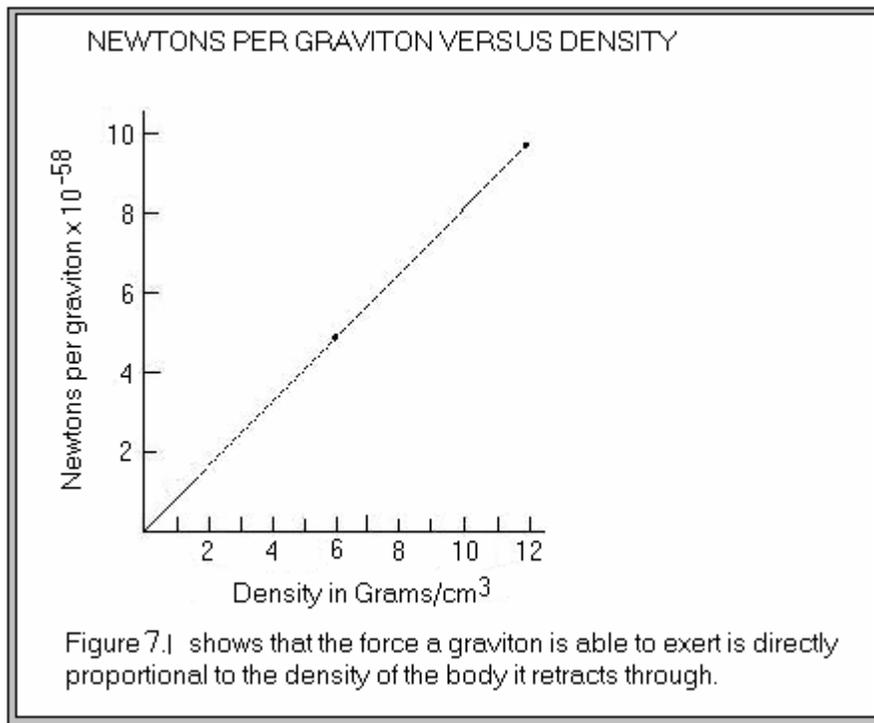
The force in newtons between two balls of known density was calculated using the universal law of gravitation. Then the total number of

Universal Law of Gravitation supports VES Theory

gravitons making a connection between the two balls was determined. Total newtons divided by total gravitons 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. From this was 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/cm^3) were determined [note 13]. The data are presented in Figure 7.1.

In this defined system, newtons per graviton increase in direct proportion to the density of the objects being pulled by gravity.



The graviton is dependent upon the resistance provided by the object when it retracts. The resistance is a function of density because the greater

Universal Law of Gravitation supports VES Theory

the density the greater the number of strings that are available to bond with gravitons. Thus, the greater the length of the pathway through the object, the greater opportunity for bonds between gravitons and the strings that mediate the electric and magnetic forces. From this we see that each graviton makes multiple connections. We know the bonds are extremely weak because the gravitation force of attraction between electron and proton is 10^{-49} times weaker than the electric force of attraction between these two particles. However, billions of connections are made per graviton when the graviton penetrates a large body. This allows each graviton to exert greater force.

The much greater resistance factor provided by the larger body explains why the size of the smaller mass has such a strong effect upon the total force of attraction between the two bodies.

FORCE OF A SINGLE GRAVITON

The force a graviton can exert on an object is directly proportional to the density of the object and the length of the mass through which the graviton retracts. It is directly proportional to the number of weak bonds formed between a single graviton and multiple strings that are responsible for the electric and magnetic forces.

I conclude that length x density through a object determines the resistance felt by a graviton as it retracts, and it is this factor that determines the force a graviton is able to exert, its pulling power.

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

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true throughout this book that my theory dictated some logical explanation long before I found out that scientists had 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. This means the force of the Sun pulling Earth = (gravitons striking Earth generated by Sun) x (average effective 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 effective length of retraction through Sun) x (density of Sun).

The force of attraction between Earth and Sun is 35.1×10^{21} newtons as calculating by the universal law of gravitation [note 2]. Each body contributes half of this force (17.52×10^{21} newtons). The number of gravitons emanating from Earth that connect with the Sun is 4.52×10^{69} [note 19]. The average force exerted by each graviton becomes

$$\text{newtons per graviton} = \frac{17.52 \times 10^{21} \text{ newtons}}{4.52 \times 10^{69} \text{ gravitons}} = 3.876 \times 10^{-48}$$

The number of gravitons emanating from the Sun that connect with the Earth is 1.2×10^{71} [note 12]. The average force per graviton for a Sun's graviton pulling through Earth is

$$\text{newtons per graviton} = \frac{17.52 \times 10^{21} \text{ newtons}}{1.2 \times 10^{71} \text{ gravitons}} = 1.43 \times 10^{-49}$$

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

$$\text{ratio} = \frac{3.87 \times 10^{-48}}{1.43 \times 10^{-49}} = 27.1$$

pulling 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 Earth is greater than the Sun.

Universal Law of Gravitation supports VES Theory

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.

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. Thus, the equation for the universal law of gravitation supports VES theory. It supports the idea that the density of an object and the distance through an object determines the force a graviton is able to exert as it retracts back to source. According to VES theory, the resistance is mechanical in nature and is caused by weak bonds between gravitons and the strings responsible for the electromagnetic forces.

In the next chapter, we shall see that the universal law of gravitation also supports the idea that the force of gravitation is dependent upon the angles and distances of a three dimensional world.

Universal Law of Gravitation supports VES Theory

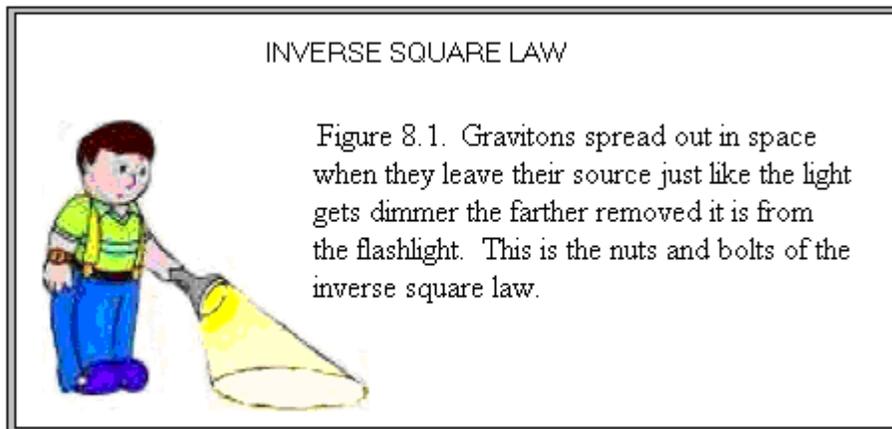
CHAPTER VIII

Gravitation Depends upon Angles and Distances of a Three Dimensional World

As the distance between two bodies increases, the gravitational force between them decreases. The universal law of gravitation takes this into account by dividing by the square of the distance between the two objects.

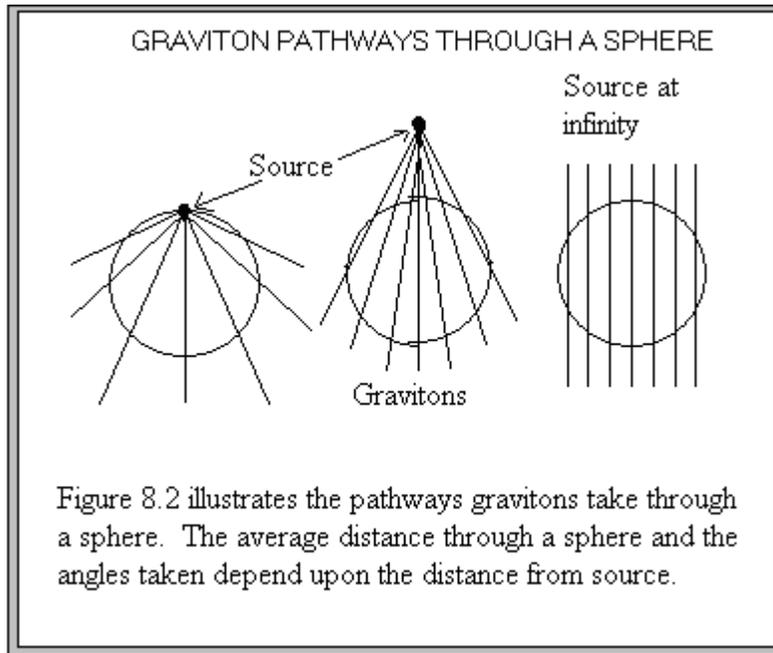
$$\text{Force in Newtons} = \frac{G \text{ Mass}_1 \text{ Mass}_2}{(\text{distance})^2}$$

Dividing by the square of the distance is known as the inverse square law.



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 Figure 8.2.

Universal Law of Gravitation supports VES Theory



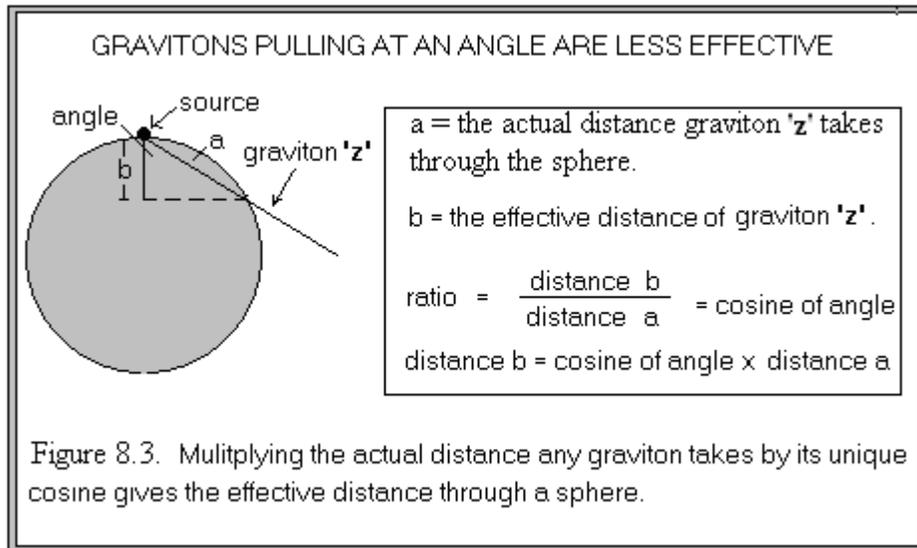
When the source of gravitons is on the surface of a sphere, the average graviton pathway through the sphere is shorter and the average angle greater than when there is more separation between source and object. When the source of gravitons is a great distance away, the gravitons arrive in parallel.

If the force a graviton is able to 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 retraction through a body, but also the angle through which it is pulling. This concept is illustrated in Figure 8.3. Simply put, when pulling something at an angle, you will not pull the object as much towards you as when pulling direct even though you supply the same force. Thus the inverse square law not only corrects for the number of gravitons pulling an object, but also the angles through which they pull.

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

Universal Law of Gravitation supports VES Theory

gravitons traversing the object. Now we see this is an oversimplification. The graviton's length of retraction through an object must be corrected to its effective length by taking into consideration the angle through which it retracts. The length for each graviton must be multiplied by its unique cosine of the angle as illustrated in Figure 8.3. It is the sum of all these individual lengths times their cosines that gives us the average effective distance through a sphere. Thus the force of gravitation can be computed as follows: Force = (density) x (average effective 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.



Mind 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 Table 8.1. I also calculated the force

Universal Law of Gravitation supports VES Theory

of gravitation exerted by the point mass on the ball using VES theory: Force = (density) x (average effective 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? The answer to this question is found in Table 8.1.

AVERAGE EFFECTIVE DISTANCE THROUGH A MASS AND FORCE OF GRAVITATION

Distance between in meters	Average distance through ball in meters	Average effective distance through ball in meters*	Total gravitons striking ball	VES calculation of Force in Newtons	Universal law of gravitation Force in Newtons
1×10^{-9}	225.0000	150.0000	6.88621×10^{49}	0.000131753	0.000131753
0.001	225.6590	150.4466	6.8657×10^{49}	0.000131752	0.000131752
0.01	227.0326	151.4134	6.8213×10^{49}	0.000131741	0.000131741
0.1	231.0445	154.4699	6.68099×10^{49}	0.000131636	0.000131636
1	241.6919	164.1544	6.23914×10^{49}	0.000130637	0.00013059
10	263.6073	193.2903	4.89879×10^{49}	0.000120778	0.000120779
100	290.0602	258.2401	1.91711×10^{49}	6.3148×10^{-5}	6.31479×10^{-5}
1,000	299.4846	297.4481	1.17153×10^{48}	4.44481×10^{-6}	4.44481×10^{-6}
10,000	299.9927	299.9636	1.66741×10^{46}	6.3797×10^{-8}	6.37968×10^{-8}
100,000	299.9998	299.9996	1.73526×10^{44}	6.64009×10^{-10}	6.64×10^{-10}
1,000,000	299.9999	299.9999	1.74229×10^{42}	6.6670×10^{-12}	6.667×10^{-12}
10,000,000	300.0000 *	300.0000	1.743×10^{40}	6.66972×10^{-14}	6.6697×10^{-14}

*Average distance through ball at such a great distance is 2/3 its diameter (300/450) because the gravitons are arriving in parallel [note 24]. The effective distance is the same because there are no angles to be corrected.

As shown in Table 8.1, 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 is able to 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

Universal Law of Gravitation supports VES Theory

else do you explain the stunning relationship between the average effective 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 by the angle has no direct relationship with the force of gravitation. For example, if we use the average pathway to compute a conversion factor (note 32), as was done for the average effective distance, then it predicts a force of 1.9762×10^{-16} for a separation of 10,000,000 meters, when the actual force computed is 6.6697×10^{-14} .

Physicists are well aware that 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 are 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 the general theory of relativity.

Force of Gravitons Retracting through Sun

If the average effective 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 planets and Sun increases. The results found in Table 8.2 show that this is true. Even though 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 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 average effective path length through the Sun. Any component of this increase that may be due to an elastic effect is negligible. However, in the next chapter, I will present strong evidence that gravitons do show elastic properties if the distance between bodies is much greater than the distances in our solar system.

Universal Law of Gravitation supports VES Theory

TABLE 8.2
NEWTONS PER GRAVITON INCREASE WITH DISTANCE
IN SOLAR SYSTEM

Planet	Planet's gravitons striking Sun	½ Newton force, contributed by planet	Newtons per graviton	Increase over Mercury
Mercury	1.64049×10^{69}	6.53329×10^{21}	3.982533×10^{-48}	
Venus	6.92700×10^{69}	2.75877×10^{22}	3.982635×10^{-48}	1.00002573
Earth	4.44752×10^{69}	1.77129×10^{22}	3.982655×10^{-48}	1.00003066
Mars	2.05835×10^{68}	8.1977×10^{20}	3.982667×10^{-48}	1.00003374
Jupiter	5.22374×10^{70}	2.08045×10^{23}	3.982675×10^{-48}	1.00003586
Saturn	4.63669×10^{69}	1.84664×10^{22}	3.982676×10^{-48}	1.00003600
Uranus	9.46879×10^{67}	3.77111×10^{20}	3.982676×10^{-48}	1.00003605
Neptune	8.40622×10^{67}	3.34793×10^{20}	3.982676×10^{-48}	1.00003604
Pluto	6.14403×10^{63}	2.44697×10^{16}	3.982676×10^{-48}	1.00003604

UNIVERSAL LAW OF GRAVITATION AND VES THEORY

The force exerted by a graviton as it retracts through 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 being pulled back through the body at an angle. The angles reduce their pulling power. The striking association between the effective distance through the body and the force created provides strong evidence that the mode of attachment to the object is by virtue of bonds between strings, which depends upon the length and direction through an object.

Force of Gravitation Ruled by a Three Dimensional World

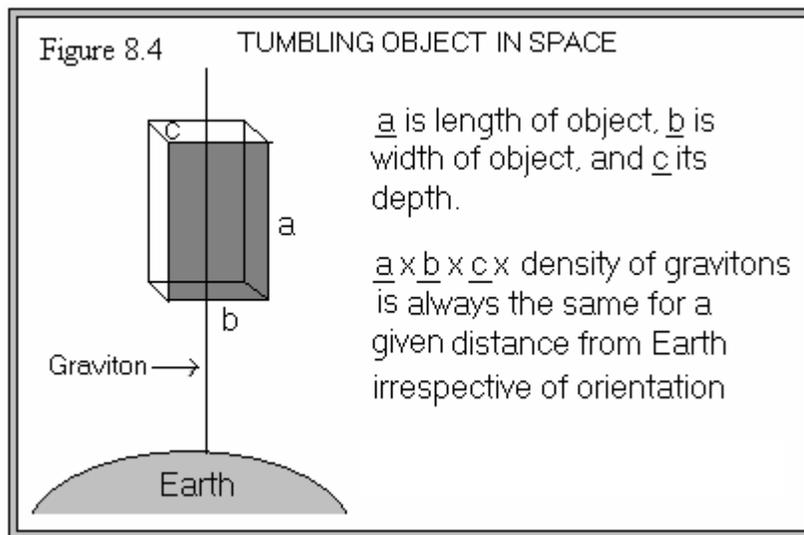
The universal law of gravitation shows very plainly that the force of gravitation is dependent upon the true distances and true angles of a three

Universal Law of Gravitation supports VES Theory

dimensional world. I find it difficult to understand how a four dimensional world, where time and space are warped, could account for this fact. Perhaps this is the reason that this concept is ignored in physics text books.

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

Universal Law of Gravitation supports VES Theory

compensating factors explain why the inverse-square law applies although objects falling towards earth seem to defy it (see Figure 8.4).

GRAVITONS IN OUR SOLAR SYSTEM

The attraction force a graviton is able to exert at relative short distances, as found in our solar system, is dependent upon three variables:

1. The length of the pathway through an object.
2. The angle created as it retracts back through an object.
3. The density of the object.

The universal law of gravitation strongly supports the idea that a graviton is composed of matter and exerts its force by pulling on the mass as it retracts back to its source. How else can you explain the three variables that dictate the force generated by a graviton?

Conclusions:

1. Gravitons are composed of matter.
2. Gravitons are elastic strings.
3. Gravitons retracting through an object are bound to it by friction.
4. Gravitational force is dependent upon the true distances and angles of a three dimensional world.

CHAPTER IX EVIDENCE FOR ELASTIC STRINGS

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 the strong nuclear force that binds quarks, protons, and neutrons together with the nucleus of the atom. If it were not for this strong force of attraction between quarks, the positive repulsion forces between quarks would cause the disintegration of the atom. It would fly apart. As we shall see in Chapter XXIII, quarks are normally found as triads, three quarks bound together by gluons. According to VES theory, gluons are the strings responsible for the strong nuclear force.

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 come to the conclusion that it is not possible to isolate free quarks.

As the quarks move apart, the potential energy between quarks increases just as the potential energy of an elastic band increases as 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

Direct Evidence for Elastic Strings

increases when the strings are forced apart. Gluons behave as if they are rubber bands.

What about the gravitational force? Is there good evidence that gravitons have elastic properties? The answer to that question is an emphatic yes. There is very strong evidence that gravitons exert greater force if stretched over a great distance as found in galaxies.

For more than 60 years scientists have been accumulating evidence that the manner in which stars rotate within galaxies cannot be explained by Newtonian gravitational force fields. The outermost stars in a galaxy are rotating at velocities far too fast to allow them to remain in orbit. Scientists hypothesize that the additional gravitational force necessary to hold stars in orbit comes from additional objects that can not 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. In fact, 90 percent of our galaxy would have to be dark matter to account for the rotation of the stellar bodies in the Milky Way.

This subject was reviewed by the Tuckers (1986) and the detection of dark matter has improved little since that time. Scientists have not been able to find significant hidden matter in our galaxy. My hypothesis is 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.

STARS ORBIT FASTER THAN EXPECTED

The stars in our galaxy 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.

Force Necessary to Hold Stars in Orbit

Scientists have established that objects held in the gravitational field of the Milky Way at distances greater than 31,000 light years from the galactic center, all orbit at approximately 225,000 meters per second, Krauss (2000). Recall that physicists define force as follows:

$$\text{Force} = \text{mass} \times \text{acceleration}$$

The acceleration of a body in orbit is defined by its distance from the central body (radius of orbit) and its velocity:

$$\text{Acceleration} = \frac{(\text{velocity})^2}{\text{radius}}$$

Thus the force in newtons for an orbiting body is

$$\text{Force in newtons} = \text{mass} \frac{(\text{velocity})^2}{\text{radius}}$$

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

Using this equation, the force in newtons was determined for a theoretical star with a mass and diameter similar to our Sun (1.99×10^{30} kg mass and 1.39×10^9 meters diameter) at different distances from the galactic center using a velocity of 225,000 meters per second [note 17]. Newton force was also calculated using the universal law of gravitation ($G m_1 m_2 / d^2$) [note 18]. A mass of 2.2×10^{41} kg was used for the galaxy (Halliday and Resnick, 1981). The results of these calculations are shown in Table 9.1.

Direct Evidence for Elastic Strings

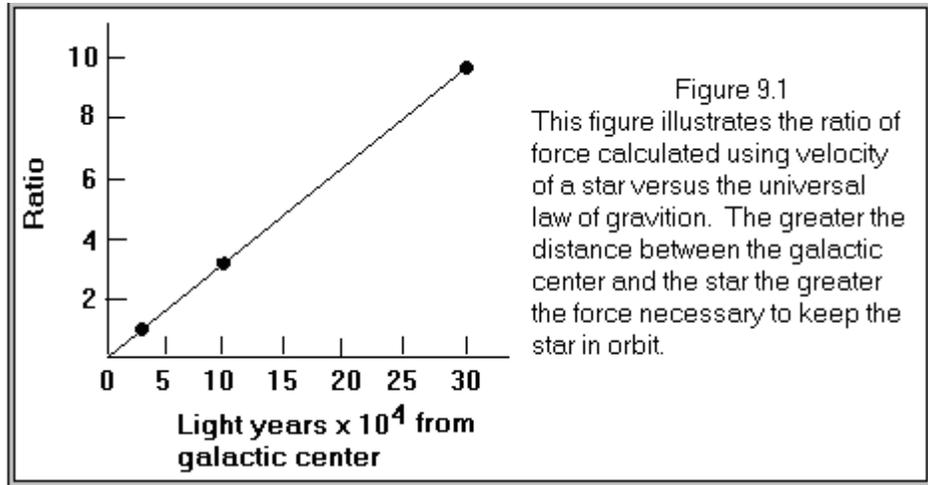
TABLE 9.1
GRAVITATIONAL FORCE IN THE MILKY WAY GALAXY

Distance from center of Milky Way Galaxy in Light years	Newton force calculated using universal law of gravitation	Newton force calculated using the orbital velocity of star	*Ratio
31,000	3.4592×10^{20}	3.4591×10^{20}	1.00
100,000	1.0723×10^{20}	3.3102×10^{19}	3.24
300,000	3.5745×10^{19}	3.6780×10^{18}	9.72

*Force calculated by using orbital velocity is divided by force calculated using the universal law of gravitation.

An examination of Table 9.1 shows that the force necessary to hold a star in orbit at 31,000 light years is approximately the same as that predicted by the universal law of gravitation. However, at 300,000 light years the force necessary to hold this star in orbit is 9.7 times that expected by the universal law of gravitation. Scientists in the field have reached similar conclusions, Krauss (2000).

The ratios calculated in Table 9.1 are shown in Figure 9.1. The data represents a straight line. What we are witnessing is a true increase in force above that predicted by Newton's law. For this reason scientists speculate that the additional attraction force is being supplied by matter that scientists can not detect (so called dark matter). According to VES theory, the increase is due to the elastic nature of gravitons.

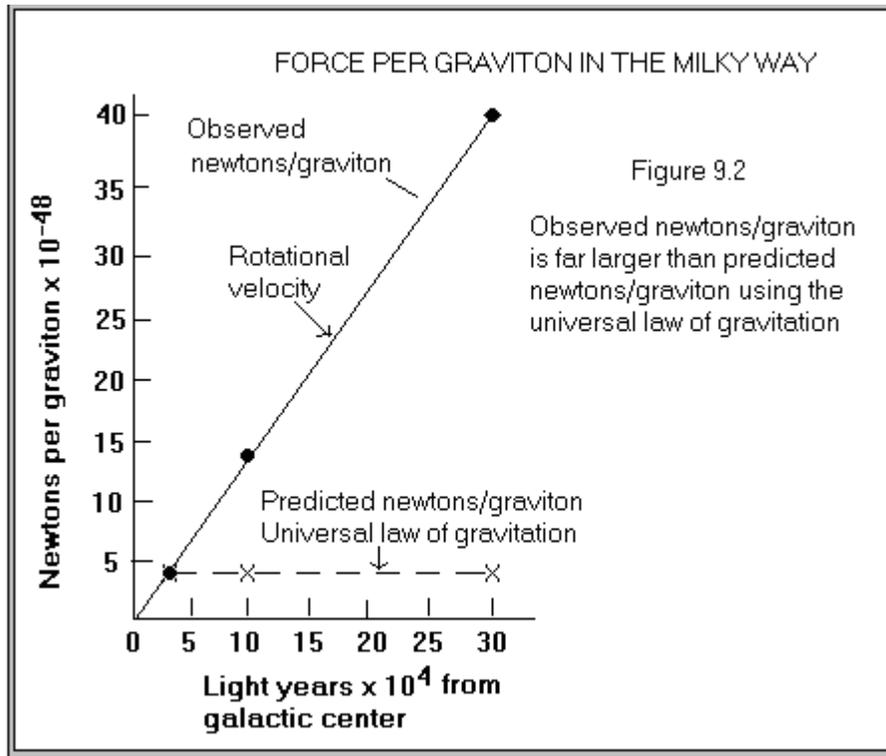


Force per Graviton Increases with Distance in the Milky Way Galaxy

As discussed in the previous chapter, force per graviton increases slightly with distance between objects at close range (within our solar system). We know this is due to the angles created when a graviton pierces a body at close range. This phenomenon can not account for any increase in newtons per graviton when bodies are separated by more than 31,000 light years because the gravitons traversing a body at great distance create no appreciable angles; i.e., they arrive in parallel.

In note 16, I calculate newtons per graviton for those gravitons emanating from the galaxy that connect with the theoretical sun at different distances from the center of the Milky Way. The results are plotted in Figure 9.2. As expected, force per graviton shows a steady increase out to 300,000 light years from the galactic center. Newtons per graviton are approximately 10 fold higher at 300,000 light, which is the same increase noted when comparing forces as shown in Table 9.1. On the other hand, the predicted force in newtons per graviton based on the universal law of gravitation is independent of distance as shown in Figure 9.2. Obviously, rotating stars defy this prediction. They rotate faster than expected with a concomitant increase in force per graviton.

Direct Evidence for Elastic Strings



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 change in force per meter of separation in the Milky Way Galaxy is actually very small. It amounts to only 3.45×10^{-21} newtons per meter. Thus, in our solar system, we can only expect a change of 5×10^{-10} newtons over the distance between Earth and Sun (149,600,000 km). This is an insignificant amount that is far too little to be measured.

Why does the Gravitational Force Increase with Greater Distance between Objects?

We are all familiar with a rubber band stretched between our fingers. The greater the distance it is stretched the greater the potential energy stored in the rubber band. One might think that all gravitons are fully stretched at the instant a string is created. However, it is more likely that the head of the string traveling at great velocity acts to pull the string forward as it races across the galaxy. Also the string itself would tend to retain some momentum, which would augment this effect. Thus the longer the string is in existence before it encounters an object in space the greater the degree of stretching.

Once the string is created it is free to bind to the electrons and magnetons that it encounters when the head of the string pierces an object in space; once bonds are formed no further stretching can take place. This explains why the elastic effect is extremely small compared to the length of the string. As mentioned, it is too small to be observed in our solar system.

ELASTIC GRAVITONS

Gravitons behave as though they are elastic strings when connecting bodies separated by more than 31,000 light years as found in our galaxy.

In the case of the strong nuclear force, the elastic effect is observed when quarks are forced apart by bombarding them with high energy particles. The experiments stretch the strings beyond norm, which results in a dramatic elastic effect. The strings for the strong nuclear force are discussed at length in Chapter XXIII.

Unexpected Elastic Properties of Matter

We are familiar with the observation that rubber bands become thinner and longer when stretched, but there are many other materials that stretch in an entirely different manner. For example, R. Baughman (2000) reports that the cross section of very low-density crystals of trapped ions actually

Direct Evidence for Elastic Strings

expand while stretching. Such unexpected, counterintuitive properties are found for other materials of both high and low density. For this reason, it becomes more believable that a novel state of matter exists that has the properties of virtual elastic strings. Do gravitons expand as they stretch across the galaxy? The work of Baughman makes this seem entirely possible. If so, a tiny mass may grow to a super long string while maintaining an extremely small diameter, a diameter we cannot detect in space.

The Cohesiveness of the Atom

The mass of the proton is 1.67×10^{-27} kg, while the mass of the three quarks inside the proton combined is 2.19×10^{-29} kg. If you divide the mass of the quarks by the mass of the proton, you find that quarks make up less than 2 percent of the mass of a proton (or neutron). Electrons are 2000 times less massive than a proton or neutron which means they too contribute little to the overall mass of an atom. What constitutes the other 98 percent of the matter that makes up an atom?

When an atom is subjected to fusion on the Sun and fission during a nuclear explosion, it is exposed to extreme high temperatures and violent physical bombardment, yet for the most part it remains intact. This is important evidence that the material that makes up an atom has tremendously strong cohesiveness and elastic properties that resists being torn asunder. Doesn't it seem reasonable that this material can be stretched over vast distances and still remain intact, allowing it to retract back to its source?

CHAPTER X

Satellite Spin and Plane of Rotation

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 general relativity.

There are a number of observations in our solar system that suggest a physical relationship between satellites and the bodies they orbit. Lense and Thirring (1918) published an article in which they concluded from mathematical considerations that the Sun somehow affects the motion of planets. VES theory provides a physical explanation for the Lense-Thirring effect as well as a number of very specific predictions concerning our solar system. These predictions are based on the idea that gravitons remain bound to their source and have a physical presence in space. It is also based on one other essential tenet of VES theory; i.e., a vast number of long strings are necessary to satisfy the energy requirements of the gravitational force.

As mentioned previously, the Sun may contribute as many as 10^{53} gravitons per square centimeter at Earth's surface. An onrushing planet plowing through such a vast number of tough elastic strings would be affected in a predictable way. In addition, a physical connection between a satellite and a central body leads to some very specific predictions.

An examination of our solar system supports my theory that gravitons are composed of matter and play a key role in planet rotation, plane of orbit, the manner in which a planet spins on its axis, the tilt of a planet on its axis, planet migration, annual wobble of Earth on its axis, and that portion of the precession of Mercury's orbit which has been attributed to relativity. In addition, I will show how gravitons induce energy transfer between a satellite and the central body it orbits.

In this chapter, I will analyze how a central body influences the spin and plane of orbit of its satellites.

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 around a central body. 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 than 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.

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. 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 lesser amounts of helium and other elements. It is reasoned that the dust grains were 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 such as a supernova. During this process, the original angular momentum of the whirling dust and gasses was conserved as rotating planets spinning on their axes, which caused all the planets and the Sun to spin in the same direction, Lang (2001).

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 speculate that the Sun might be connected by a magnetic force to the slowly rotating celestial bodies at the center of the galaxy, which acts as a braking system. They also speculate that frictional forces caused mass to move inwards from outlying areas in the solar system to the Sun while transporting angular momentum outward.

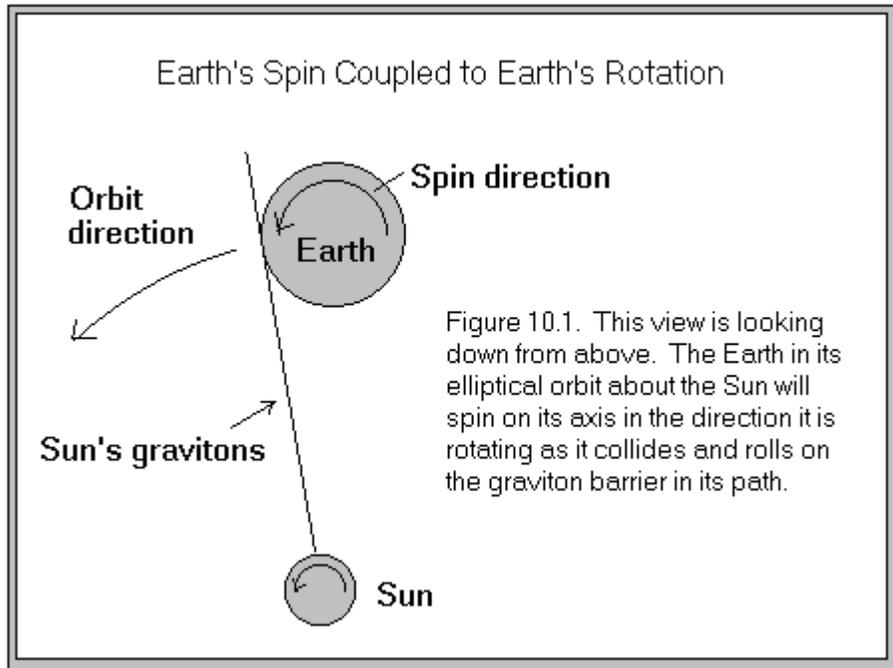
Scientists also believe the Earth once had a more rapid rate of spin. At the current time, the day is increasing 0.002 seconds per century, Lang (2001). In this case, scientists think it is slowing down because of tidal friction caused by the ebb and flow of the ocean's tides. Scientists believe the 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.

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." As we shall see, VES theory provides a physical explanation for angular momentum transfer, satellite migration, and spin rate for the planets in our solar system.

VES Theory and Satellite Spin

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. At the same time, the planet is generating gravitons that may also have an effect upon the system. According to VES theory, a planet should spin on its axis in the same direction it is rotating around the Sun because bound gravitons provide a coupling mechanism between orbital velocity and spin velocity. This is explained as follows.

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 are composed of some sort of matter that provides a physical barrier to the orbiting body (see Figure 10.1).



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. Table 10.1 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 10.1
RELATIONSHIP BETWEEN ORBITAL SPEED AND THE
RATE PLANETS SPIN ON THEIR AXES

PLANET	ORBITAL VELOCITY Meters/second	SPIN VELOCITY Meters/second
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

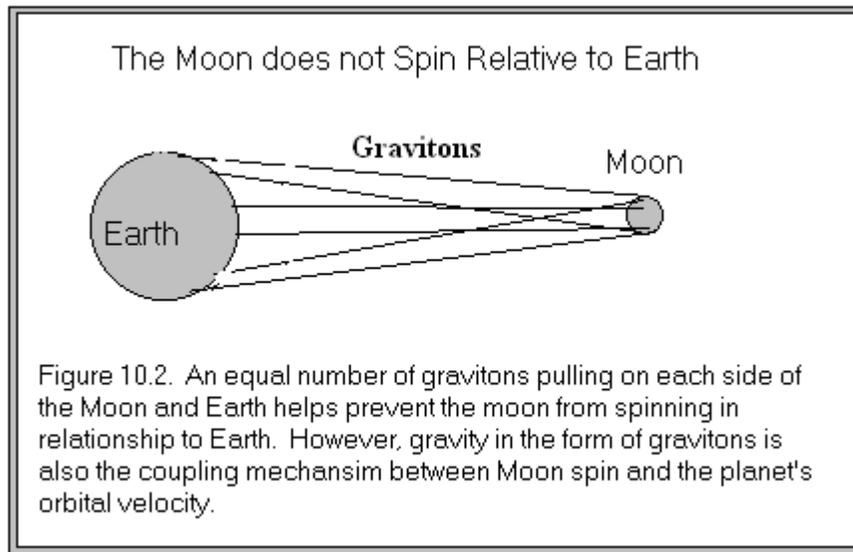
An examination of the moons that orbit planets will help us understand why Mercury spins so slowly on its axis. The moons in our solar system do not spin on their axis with respect to the planet they rotate around; this keeps the same side of the moon facing the planet. This is easy to relate to since this applies to our Moon that orbits the Earth. The 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 despun 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 a moon is held in its position for the same reason that a tight wire gymnast has better balance when carrying a long pole. Gravity is pulling the pole down equally on both sides of the wire, which causes a resistance in any up or down movement in the pole: the longer the pole the better. And by the same reasoning, the larger the diameter of the planet the easier it is for gravity to inhibit its spin. The most important factor that increases apparent diameter is the distance between the two bodies; namely,

Solar system supports VES theory

the closer the satellite is to the body it is revolving around, the greater the angle that can be achieved to prevent spinning. This concept is illustrated for the Earth Moon relationship in figures 10.2, and for the Sun Saturn relation in figure 10.3. In addition, the closer a satellite is to the body it orbits the stronger the gravitational force that can inhibit spin. I believe this is an important factor in achieving a synchronous spin between planet and moon; however, the evidence shows spin rate is much more complex.



Diameter of Satellite and Spin Velocity

The rate a satellite spins on its axis in relation to the diameter of the satellite is very complex. Not only does a large diameter help gravity decrease spin rate, as discussed, it also provides a very strong positive feature encouraging spin. A large 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, and secondarily a factor that tweaks the system as planet and moon come near synchronous orbit.

Solar system supports VES theory

years since the solar system was formed, has aided greatly in reducing its spin rate.

Regression Analysis

I ran a regression analysis to determine the relationship between satellite spin velocity and the three independent variables just discussed: gravitational force between satellite and central body, diameter of satellite, and momentum of satellite. 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 the three independent variables. 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 what is presented here.

All moons are held with the same face pointed towards the planet they rotate around. Thus they are not spinning on their axes. I acknowledge that I don't know whether some of the moons are close to the point of spinning while others are inhibited by forces that are more than adequate to prevent spinning. This may account for some of the variation in the analysis. The data used in the regression analysis is shown in Table 10.2, and the regression statistics are found in Table 10.3. The predicted spin velocities are found in Table 10.4 along with the actual spin velocities.

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 value multiplied by 100 shows that 98.953 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.

Solar system supports VES theory

TABLE 10.2
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 Newtons
Mercury-Sun	3.025	4879.4	1.58148×10^{28}	1.30711×10^{22}
Earth-Sun	463.83	12756.28	1.78025×10^{29}	3.52598×10^{22}
Mars-Sun	240.8	6794.4	1.54939×10^{28}	1.63296×10^{21}
Jupiter-Sun	13070	142984	2.4833×10^{31}	4.16802×10^{23}
Saturn-Sun	10279	120536	5.5003×10^{30}	3.68952×10^{22}
Uranus-Sun	2492	49584	3.19117×10^{29}	1.39658×10^{21}
Neptune-Sun	2685.3	49572	5.5808×10^{29}	6.73853×10^{20}
Pluto-Sun	13.22	2320	6.1146×10^{25}	4.89393×10^{16}
Sun-Galaxy	1946	1392000	4.32418×10^{35}	3.67049×10^{20}
Ariel-Uranus	0	1167	7.10999×10^{25}	5.73912×10^{19}
Callisto-Jupit	0	4820	8.71635×10^{27}	3.8151×10^{22}
Dione-Saturn	0	1118	1.05298×10^{25}	2.79656×10^{20}
Enceladus-Sat	0	502	9.34806×10^{23}	4.95553×10^{19}
Europa-Jupiter	0	3138	6.69495×10^{27}	1.37202×10^{23}
Ganymede-Jup	0	5276	1.62052×10^{27}	1.64929×10^{22}
Iapetus-Saturn	0	1448	6.30077×10^{24}	5.77332×10^{18}
Io-Jupiter	0	3632	1.54517×10^{28}	6.35694×10^{23}
Mimas-Saturn	0	394	5.38269×10^{23}	4.14469×10^{19}
Miranda-Uranus	0	485	2.26337×10^{23}	6.34754×10^{18}
Oberon-Uranus	0	1554	2.79726×10^{24}	6.42593×10^{18}
Rhea-Saturn	0	1528	1.9344×10^{25}	3.1141×10^{20}
Tethys-Saturn	0	1048	7.10567×10^{24}	2.73538×10^{20}
Titan-Saturn	0	5150	1.43205×10^{27}	9.38349×10^{20}
Titania-Uranus	0	1610	4.3695×10^{24}	1.97386×10^{19}
Umbriel-Uranus	0	1191	3.55151×10^{24}	3.34965×10^{19}
Moon-Earth	0	3480	7.10567×10^{25}	1.98673×10^{20}

Solar system supports VES theory

TABLE 10.3
REGRESSION STATISTICS

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

ANOVA

	df	SS	MS	F	Significance F
Regression	3	2.51x 10 ⁸	83732457	344.78	1.22 x 10 ⁻¹⁸
Residual	22	5342868	242857		
Total	25	2.56 x 10 ⁸			

Variable	Coefficient	Standard Error	t Stat	P-value
Intercept	-342.821	111.064	-3.0867	0.00539
Diameter	0.08607893	0.00288	29.8186	2.8 x 10 ⁻¹⁹
Momentum	-2.7 x 10 ⁻³¹	9.28 x 10 ⁻³³	-29.2822	4.1 x 10 ⁻¹⁹
Gravity	8.03 x 10 ⁻²²	7.20 x 10 ⁻²²	1.1166	0.2762

Is the strong, 99 percent correlation due to chance? The F test carried out in this analysis answers this question. F in this test is 345 and point of significance is essentially zero, which in itself shows that the strong correlation is 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 born out by the t tests, as shown in the regression statistics. The t values calculated are all higher than the P-values for the same variable. The t statistic for momentum and the intercept of the line are negative because the coefficients used to calculate the t statistics are negative; it has no bearing on their validity. Thus, all three independent variables are correlated with final spin velocity for the Sun, the planets, and all the moons in our solar system.

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TABLE 10.4
PREDICTED SATELLITE SPIN

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	-242
Callistro-Jupitor	0	103
Dione-Saturn	0	-246
Enceladus-Sat	0	-300
Europa-Jupiter	0	38
Ganymede-Jup	0	125
Iapetus-Saturn	0	-218
Io-Jupiter	0	481
Mimas-Saturn	0	-309
Miranda-Uranus	0	-301
Oberon-Uranus	0	-209
Rhea-Saturn	0	-211
Tethys-Saturn	0	-252
Titan-Saturn	0	101
Titania-Uranus	0	-204
Umbriel-Uranus	0	-240
Moon-Earth	0	-43

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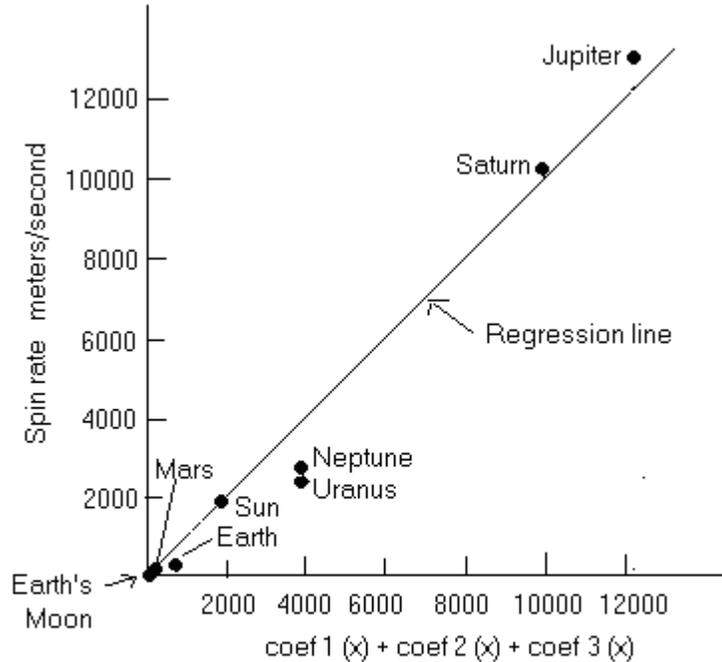


Figure 10.4. This is a plot of the predicted spin rate versus the statistic for the regression line. Since they are both equal, it yields a 45 degree line for the regression line. The figure shows the actual position of the satellites along the regression line.

Figure 10. 4 shows how the satellites are oriented about the regression line. All the moons are close to that of Earth's Moon.

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 this 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 is contributing to

Solar system supports VES theory

spin velocity. 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, wherein the moon does not spin in relationship to the planet it orbits, its most important role is to 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.

My rationale 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 this coefficient with momentum for 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 the most massive planet whose orbital angular momentum is 6×10^{12} times less.

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 de-spun 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. This shows that the Sun has reached equilibrium with these three factors.

Solar system supports VES theory

Moon Spin

The close proximity of moon and planet increases the effect of the gravitational force in preventing the moon from spinning, and the unique combination of diameter, momentum, and gravity favor no spin.

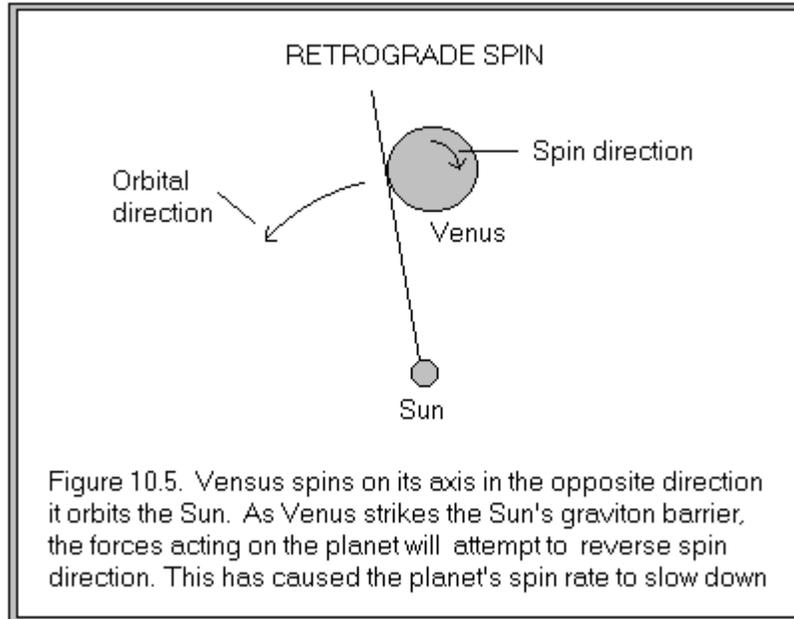
Planet Spin Rate

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 others remain fairly close to those presented.

Venus 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 rotates on its axis slower than any other planet in our solar system. This is predicted by VES theory. As Venus moves against the Sun's gravitons, its normal prograde orbit is attempting to convert Venus to a prograde spin. Figure 10.5 illustrates this point. This accounts for Venus' slow spin rate.

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Conclusions

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. 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.

As we shall see, electrons are also deflected when they collide with a barrier of virtual elastic strings emanating between the north and south poles of a stationary magnet. This is an important concept in understanding the relationship between the electric force and magnetic force.

Physical Connections and Plane of Rotation

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

Solar system supports VES theory

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 (see Figure 11.3).

CHAPTER XI ANGULAR MOMENTUM AND SATELLITE MIGRATION

Introduction

Weissman, McFadden and Johnson (1999) 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). 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), "These would be tides in the solid body of the planets, for there are no oceans on Mercury or Venus." How this is accomplished is unclear.

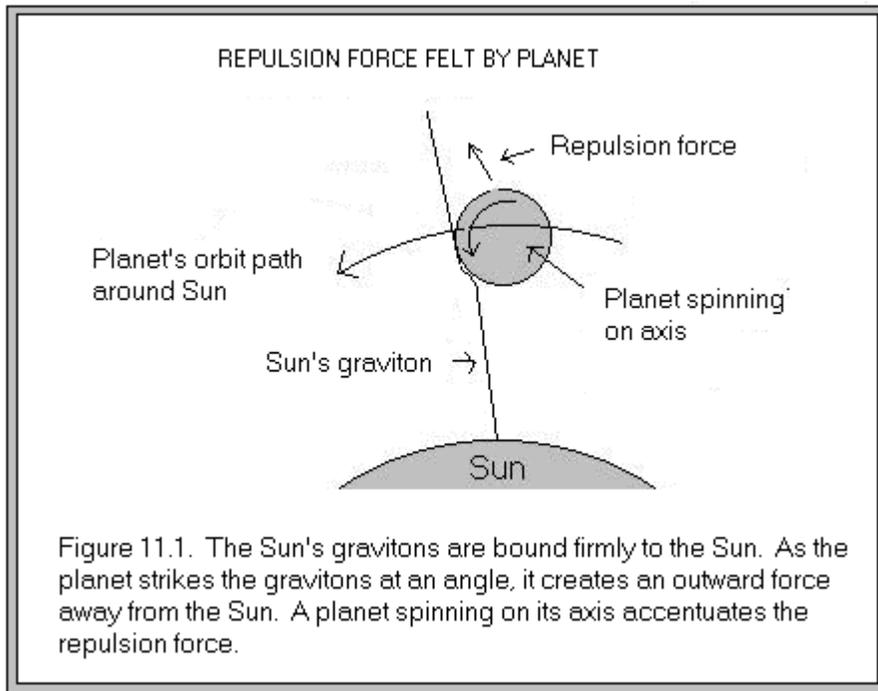
Scientists have offered no physical explanation how an inner body transfers angular momentum to a satellite, just that it is transferred and the sum total remains unchanged.

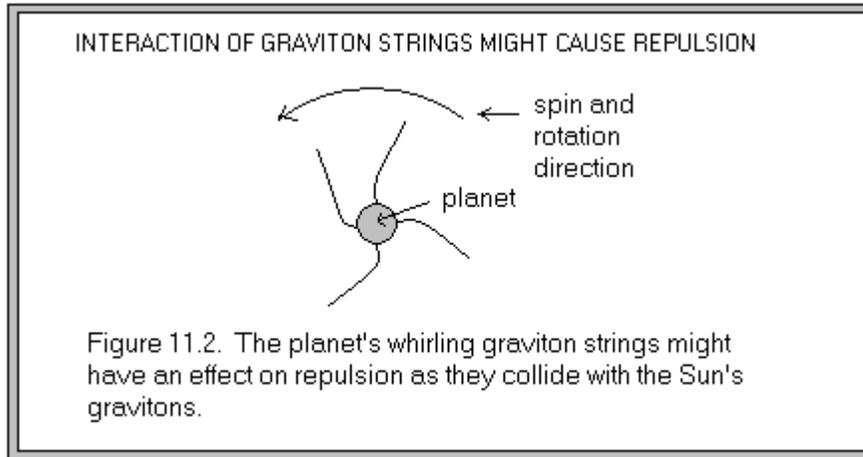
It is the thesis of this chapter that angular momentum and satellite migration are strongly influenced by two factors: repulsion forces between

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 form a barrier in space, and a satellite in orbit will tend to glance off this barrier. In addition, a spinning satellite will grind against the gravitons it encounters 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. Figure 11.1 illustrates these concepts.





It is also possible that a planet's gravitons interact with the Sun's gravitons to create a force of repulsion (Figure 11.2).

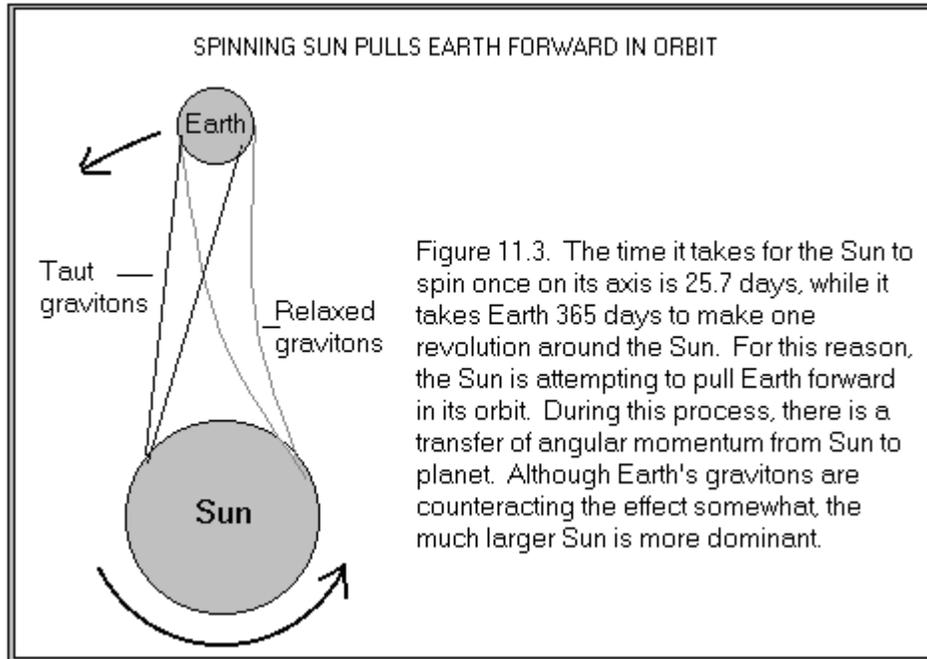
Although the repulsion force per graviton may be many thousands of times weaker than the gravitational force per graviton, given enough time repulsion forces will transfer significant momentum from a central body to its satellites.

Notice in this situation 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. 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

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, and the Sun's momentum is transferred to the planet. This is shown in Figure 11.3.

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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 1.52×10^8 times greater than that of Earth. The great difference in magnitude explains why the Sun has more effect 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 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 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.

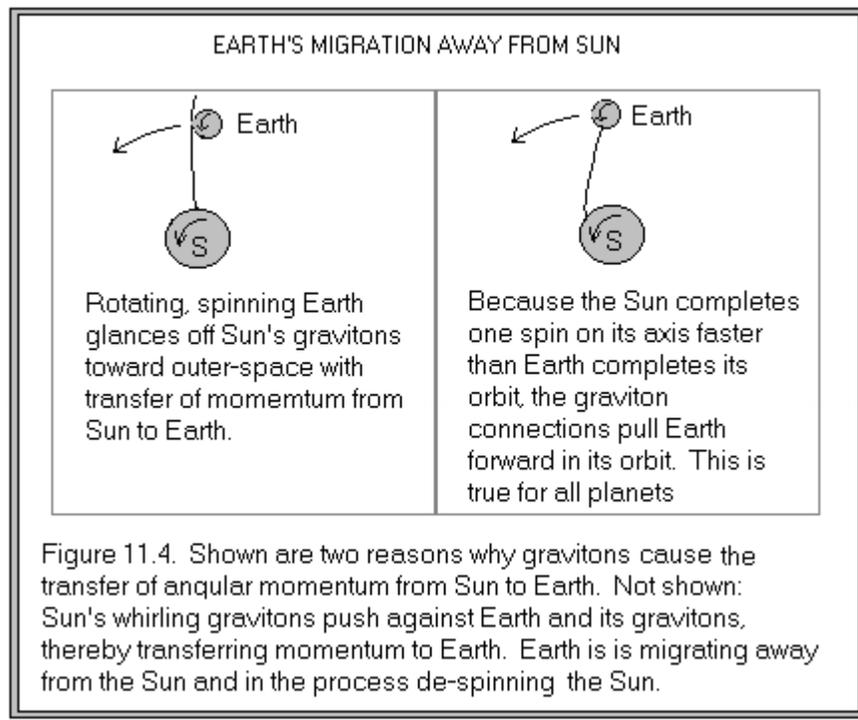
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Einstein predicted that a drag effect takes place between a spinning central body and its satellite. He referred to it as frame-dragging in his general theory of relativity. VES theory views it as a drag induced by gravitons that act as physical connections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

Interaction of Gravitational Force and Repulsion Forces

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

Satellites with Normal Spin and Normal Orbital Patterns

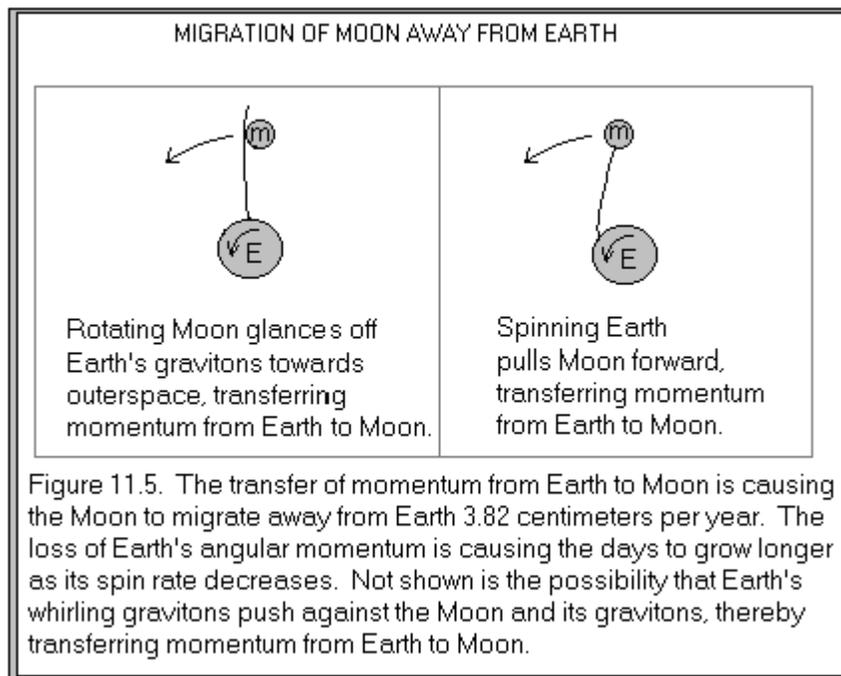


Solar system supports VES theory

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, angular momentum in the Earth-Sun system remains constant because the Sun's gravitons are inhibited during retraction, which decreases the Sun's angular momentum. This in turn de-spins the Sun. This is illustrated in Figure 11.4.

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

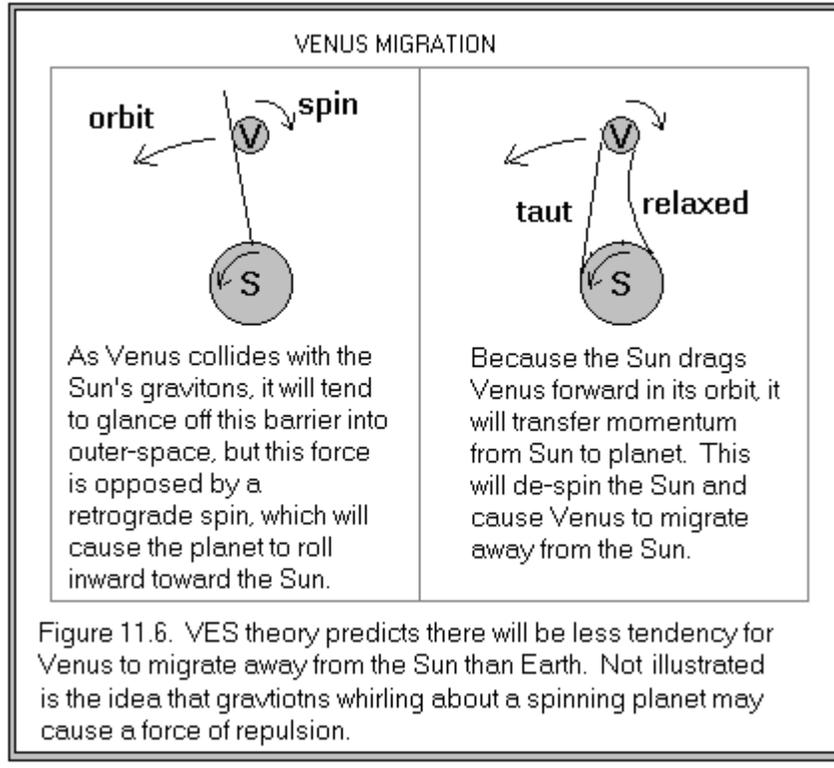
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moon. In the same manner, those dragging the moon forward in its orbit are impeded in their retraction back to the planet. The net result is a decrease in the planet's angular momentum, which is transferred to the moon. This explains why our Moon is 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. These forces are illustrated in the accompanying diagram, Figure 11.5.

Scientists have long maintained that tides here on Earth have acted as a braking system causing the Earth to spin at a slower rate. In any system, angular momentum between satellite and central body must be maintained. According to VES theory, the interaction between satellite and central body takes place via physical gravitons that are either acting as a repulsion force or a force of attraction. In this view, Earth's spin influences our Moon and our Sun because Earth is physically connected to both of these bodies by gravitons. I assume that the physical mechanism for the transfer of angular momentum because of tides occurs by the same processes.

Normal Rotation, 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. At this time, VES theory can not 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. The relationship between density and position of the planets in our solar system is discussed later in this chapter. How I view the competing forces affecting Venus is shown in Figure 11.6.

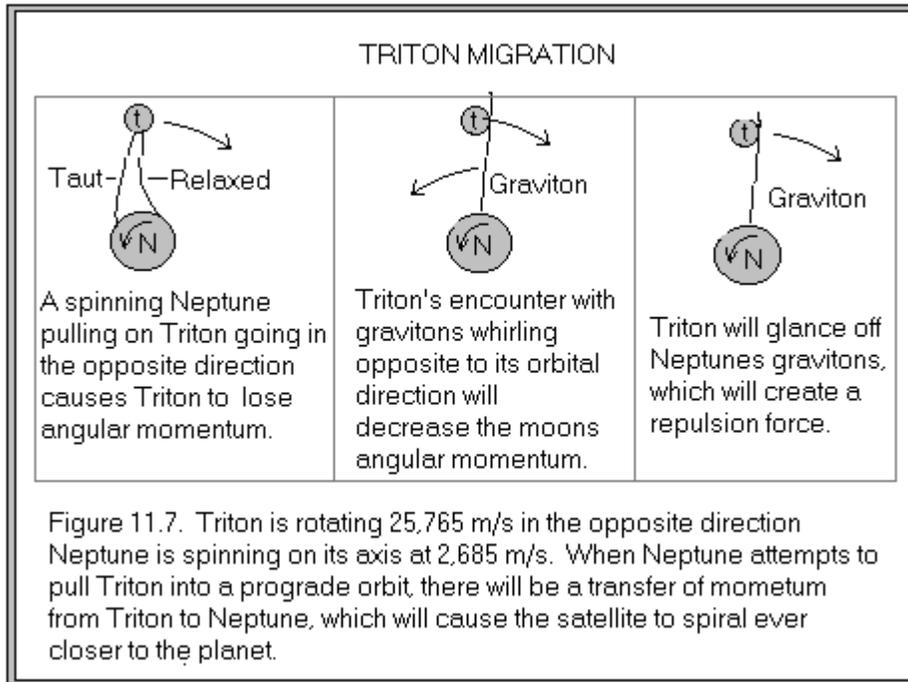


Retrograde Orbit about the Central Body:

Triton, a moon of Neptune, is one of the few moons in our solar system with a retrograde orbit. As is the case with the other moons in our solar system, it is not spinning on its axis with respect to the planet, but it does have a high orbital velocity around Neptune. Triton is migrating inward towards Neptune at a noticeable rate.

Currently scientists reason that tides on Neptune cause Triton to spiral inward toward the planet. However, I believe that VES theory provides a more reasonable explanation. According to VES theory, Neptune's gravitons are physically connected to Triton. As Neptune spins, it attempts to drag Triton in the same direction that Neptune is spinning, which is the opposite direction that Triton is rotating at a very rapid rate. This is causing

Triton to lose angular momentum and spiral inward towards the planet. The competing forces that affect Triton's orbit are illustrated in Figure 11.7



Density of Planet and Position in Solar System

Astrophysicists believe Jupiter may have migrated inward towards the Sun during the early formation of the solar system because of the ejection of mass from the planet that resulted in the loss of angular momentum. This phenomenon has been used to explain why several extra-solar systems have large Jupiter-like planets in close orbits around their stars. It is reasoned that these planets were created at distances near the ice line where it would be possible to accumulate gasses, then migrated inward via ejection of planetesimals, Quillen and Holman (2000). Closer to home, I am struck by the strong correlation between density and position of the planets in our solar system. This relationship is shown in Table 11.1. Does migration help explain why small solid planets are arranged according to their density,

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as well as most of the larger planets with low density? VES theory predicts that this might be the case. It is not difficult to visualize that a large gaseous planet would be subject to a greater force of repulsion than a solid small planet as these orbiting bodies collide with a barrier created by the Sun's gravitons.

TABLE 11.1
DISTANCE FROM SUN VERSUS DENSITY AND DIAMETER

PLANET	Density of planet, grams per cm ³	Diameter of planet, kilometers	Distance in kilometers
Mercury	6.08	4879	57,900
Venus	5.25	12104	108,000
Earth	5.52	12756	150,000
Mars	3.94	6794	228,000
Jupiter	1.33	142984	778,000
Saturn	0.69	120536	1,429,000
Uranus	1.29	51118	2,871,000
Neptune	1.67	49572	4,504,000

It is noteworthy that Venus is less dense than Earth, yet it orbits closer to the Sun than does Earth. I believe this is due to Venus' retrograde spin, which has kept the planet closer to the Sun as explained previously (see Figure 11.6). This observation gives credence to the idea that the forces of repulsion have an effect on the planets in our solar system.

Uranus and Neptune are the great anomalies: Uranus is tilted 83 degrees on its axis with respect to normal, both planets have slower than expected spin rates, and if migration helped arrange the position of the planets with respect to their distance from the Sun, then their densities are out of whack. This suggests that both of these planets have been affected by some cataclysmic event.

Current theory is that planets forming near the Sun would have lost their gasses because of heat, which would explain why the inner planets are completely solid; however, this does not explain the striking relationship between density and planet position.

CHAPTER XII MERCURY'S ORBIT, PLANET TILT, AND POLAR WOBBLE ON AXIS

Mercury's orbit, tilt of a planet on its axis, and the annual polar wobble of Earth on its axis can all be explained by an interaction between repulsion forces and the gravitational force of attraction between planet and Sun.

I have already discussed how gravitons cause repulsion forces between satellites and the bodies they orbit. 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. This means we can express repulsion force as repulsion force per graviton just as we express the gravitational force as gravitational force per graviton. This leads to a very interesting ratio:

$$\text{Force ratio} = R/A = \frac{\text{Repulsion force per graviton}}{\text{Attraction force per graviton}}$$

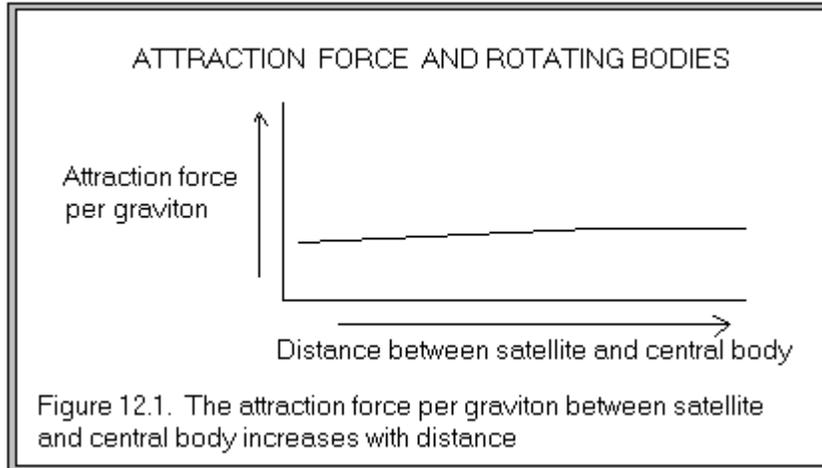
Earth's annual polar wobble, precession of Mercury's orbit, and the tilt of the planets on their axes support the idea that the magnitude of the force-ratio decreases as the distance between satellite and central body increases; namely, the attraction force per graviton increases with distance or the repulsion force per graviton decreases with distance or a combination of these two.

The Effect of Attraction Force on Force-Ratio

There is a tendency for the force of attraction per graviton to increase with distance between planet and Sun until that point where the gravitons

Solar system supports VES theory

are arriving in parallel, see Chapter VIII. For example, an average graviton from Saturn pulling through the Sun exerts more force than does the average graviton from Mercury pulling through the Sun (see Table 8.3). A graviton from Saturn is able to exert more force because the average effective length of a graviton from Saturn retracting through the Sun is greater than the average effective length of a graviton from Mercury retracting through the Sun. From this discussion, we see that the force of attraction causes R/A to decrease with distance because the attraction force per graviton increases with distance, at least until the gravitons arrive in parallel.



The Effect of Repulsion Forces on Force-ratio

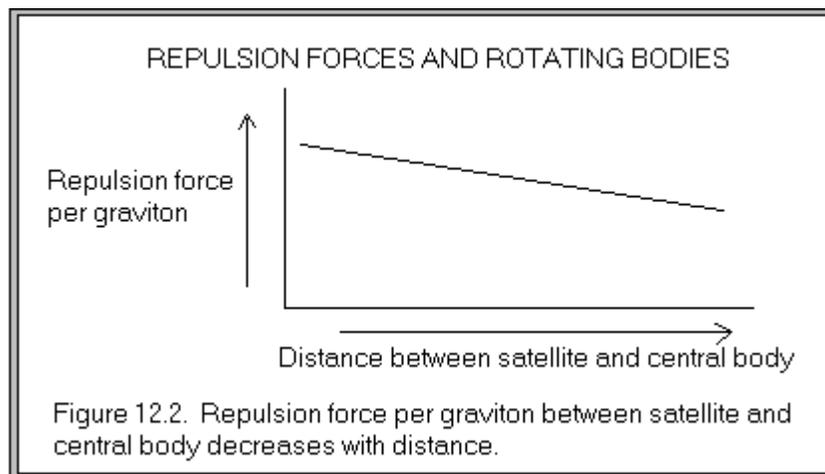
The relationship between repulsion forces and distance between bodies is entirely different. Here we are witnessing the repulsion force felt by a planet as it plows through a barrier of gravitons emanating from the Sun. The repulsion force that is attempting to move the planet away from the Sun is directly related to the concentration of the graviton barrier; namely, how close the planet is to the Sun. In the same manner, any repulsion forces that arise because of the interaction between the gravitons of the planet and those from the Sun are closely associated with graviton concentration. Thus, repulsion forces do not depend upon lengths and angles through a body, but rather on graviton concentration.

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There are a number of other factors that influence the magnitude of the repulsion force felt by a satellite. The most important factor is related to the planet's orbital pathway around the Sun. Because planets strike the Sun's gravitons at an angle, the degree of angle is important to repulsion. The more a planet strikes the graviton barrier at an angle, the easier it would be for the barrier to eject the planet away from the Sun. A planet like Mercury would be more affected because the angle of displacement necessary to keep Mercury in orbit is greater than a planet more distant from the Sun. In addition, Mercury would be more affected as it rounds perihelion where it is closest to the Sun because the angle of displacement is greater. See Figure 12.1. 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.

VES theory predicts that the spin of a planet also affects the force of repulsion. Venus is unusual because it is spinning in the opposite direction, which will oppose repulsion forces. The other planets have a normal prograde spin, which will increase repulsion.

Just as the size and momentum of a satellite affects the coupling between satellite spin and orbital velocity, so too size and momentum likely affect the repulsion forces acting on a satellite. The tilt of a planet on its axis may also influence repulsion forces.



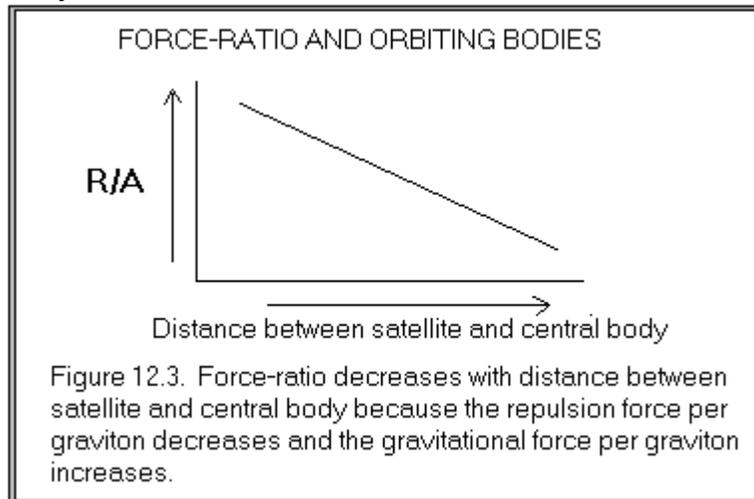
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Finally, there is the possibility that gravitons nearer to their source will contribute more repulsion force per graviton than gravitons more distal from the Sun. Simply put, they might present a slightly higher resistance per graviton, which would increase the repulsion force. This factor is likely small compared to the other repulsion forces mentioned.

From this brief discussion, it is apparent that the components of repulsion are very complex, but it seems clear that the closer a planet is to the Sun, the greater the repulsion force per graviton.

Expected Force-Ratio Change

We can conclude from the preceding discussions that repulsion force per graviton will decrease as the distance between Sun and planet increases, while the opposite is true for the force of attraction per graviton. Both of these factors point to the same conclusion: R/A will decrease as the distance between planet and Sun increases. Let's see how this affects precession of Mercury's orbit.



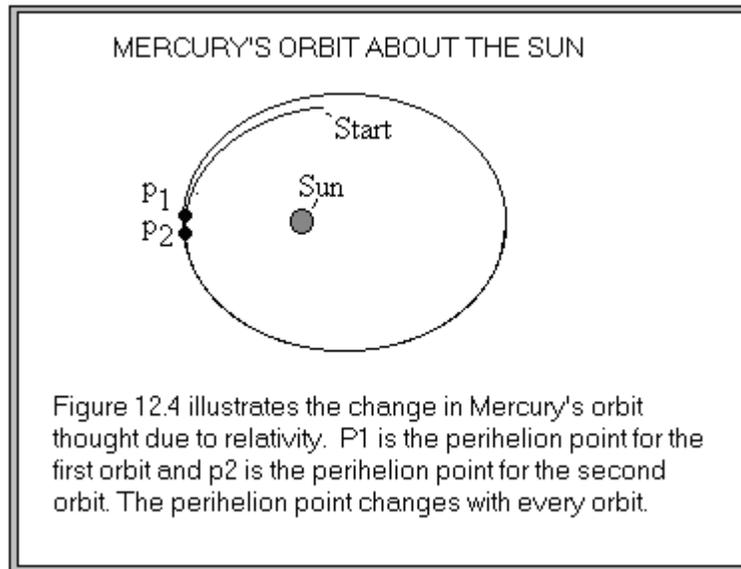
Precession of Mercury's Orbit

Mercury's orbit has held a special interest for those who study the solar system because its orbital pattern cannot be explained by the universal law of gravitation. For this reason, Albert Einstein used the general theory of

Solar system supports VES theory

relativity to explain Mercury's orbit. The evidence I present here shows that Mercury's orbit can be explained by VES theory in a three dimensional world.

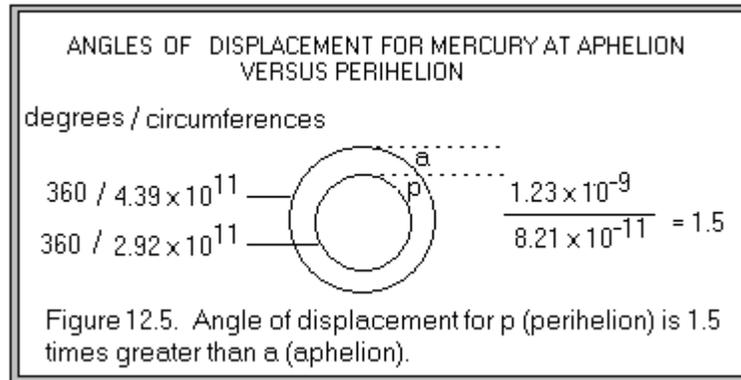
Every one hundred years, the perihelion point of Mercury advances approximately 5,600 arc seconds. The large majority of this is due to the gravitational attraction of the other satellites; however, there are 43 arc seconds precession per 100 years (0.103 arc seconds per orbit) that can not be explained in this manner, but has been attributed to relativity, Strom (1987). Mercury has the distinction of being the innermost planet with the most elliptical orbit of any planet except Pluto. This small planet is 46.5×10^6 km from the Sun at perihelion and 69.8×10^6 km at aphelion.



Mercury's orbit is constantly changing. After one complete rotation, the perihelion point, as shown in Figure 12.4, is advanced and the elliptical flight pattern has changed. This is known as precession. For the remainder of this chapter, when I use the word precession I am referring to the change in Mercury's orbit thought due to relativity.

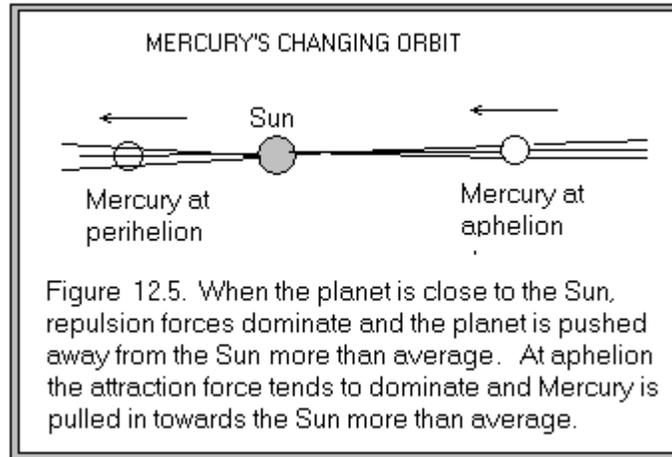
Change in Force-Ratio Explains Precession

The repulsion force per graviton is expected to be higher as the planet rounds perihelion because the angle of displacement is much higher than when the Mercury is farther from the Sun. 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 is 1.5 times greater at perihelion than when the planet is at aphelion [note 35]. This is illustrated in Figure 12.5.



For every one degree change in its flight path at aphelion, it will change 1.5 degrees at perihelion. This line of reasoning shows us that the force of repulsion per graviton will increase as the planet approaches the Sun. At the same time, the attraction force per graviton decreases. Thus the force-ratio favors repulsion at perihelion, just as it favors a force of attraction at aphelion.

Repulsion forces will push Mercury away from the Sun a tad more than expected as it rounds perihelion, which will cause the perihelion point to shift forward, as shown in Figure 12.4 and 12.5. The opposite occurs as Mercury rounds aphelion. This allows the force of gravitation 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 is illustrated in Figures 12.4.



Force Difference Necessary to Explain Precession

According to Coleman (1958), who at the time was a professor at UCLA, the general theory of relativity predicts that Mercury's precession can be explained if the difference in the force of attraction between aphelion and perihelion does not follow the universal law of gravitation.

$$F_C = \frac{G M_S \times M_M}{d^{2.00000016}} \quad F = \frac{G M_S \times M_M}{d^2}$$

Notice that F_C (force according to Coleman) will be smaller than F , the force according to the universal law of gravitation. This can be explained entirely if there are repulsion forces at work, and if the repulsion force per graviton is greater at perihelion than aphelion.

I calculated the gravitational force between Mercury and Sun using the universal law of gravitation, and I calculated the force using the equation supplied by Coleman. In both cases, d becomes the average radius of the elliptical orbit. The data are shown in Table 12.1.

TABLE 12.1
ACTUAL FORCE CHANGE NECESSARY TO EXPLAIN
PRECESSION

Universal Law Gravitation F in Newtons	Coleman modified F _C in Newtons	Magnitude of difference Force in Newtons
1.30665839x 10 ²²	1.30665321 x 10 ²²	5.18018 x 10 ¹⁶

The difference of 5.18018 x 10¹⁶ is the total force that explains precession. Although this force is substantial, it represents just 0.00000396 of the gravitational force between Mercury and Sun.

Force-ratio Change

To gain a better understanding how attraction forces affect the force-ratio, I calculated the force of gravitation between Mercury and the Sun at aphelion and perihelion. I also calculated the number of gravitons making connections between these two bodies. From this I was able to calculate force per graviton. The data are shown in Table 12.2.

TABLE 12.2
ATTRACTION FORCE PER GRAVITON

Mercury's position	Force in newtons between Sun and Mercury	Gravitons	Newtons per graviton
Aphelion	8.99 x 10 ²¹	8.46 x 10 ⁷⁰	1.0625942 x 10 ⁻⁴⁹
Perihelion	2.07 x 10 ²²	1.95 x 10 ⁷¹	1.0625938 x 10 ⁻⁴⁹

The average force per graviton is slightly higher at aphelion versus perihelion as expected. The ratio between perihelion and aphelion is as follows:

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$$\text{ratio} = \frac{\text{perihelion}}{\text{aphelion}} = \frac{1.0625938 \times 10^{-49}}{1.0625942 \times 10^{-49}} = 0.999999633$$

This fraction represents the change in newtons per graviton due to a change in the gravitational attraction force per graviton. How many newtons does this represent? We can get some idea as to the extent of this value by using the ratio calculated. We know the average total force between Mercury and Sun is equal to $1.30665839 \times 10^{22}$ newtons (Table 12.1). Since we used this average to compare the change according to Coleman, we can now use this average to compute the change due only to the force of attraction.

$$\begin{aligned}\text{Force change} &= (1.0 - 0.999999633) \times 1.30665839 \times 10^{22} \text{ newtons.} \\ \text{Force change} &= 4.80 \times 10^{15} \text{ newtons}\end{aligned}$$

Therefore, a change in the gravitational force of attraction per graviton can account for 4.8×10^{15} newtons out of the total. This represents only 9 percent of the total change in the force-ratio. Thus 91 percent of the change necessary to explain Mercury's orbit comes from an increase in repulsion force per graviton. The total change due to repulsion is 4.7×10^{16} newtons.

Conclusions

It is necessary that repulsion forces exist to explain the orbital pattern of Mercury. Acting alone, a shift in gravitational force per graviton does not account for a change as defined by Coleman ($F = G m_1 m_2 / d^{2.00000016}$). However, precession can be explained if repulsion forces exist, and if R/A changes during Mercury's orbit. The evidence shows that the force-ratio increases going from aphelion to perihelion, perhaps several fold. At aphelion gravity will pull the planet in more than expected and at perihelion repulsion forces will push it away more than expected. This alters the balance between the force of attraction and the force of repulsion per graviton throughout Mercury's orbit. It completely explains precession thought due to relativity.

Mercury has a relatively large precession rate because it is close to the Sun and because it has a highly eccentric orbit. One physicist told me that

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precession data for the other planets are not good, but I wonder if they were interpreted using VES theory what the data would reveal. I was unsuccessful in my efforts to find the precession rates for the other planets except as calculated using Einstein's equation for precession, Einstein (1953).

This explanation for precession eliminates any need to believe in a four dimensional world where the force of gravitation is explained by time warp and the distortion of the normal coordinates of space.

PLANET PRECESSION AND VES THEORY

During Mercury's orbit around the Sun, its leading edge encounters a vast number of gravitons attached to the Sun. This causes a force of repulsion.

As Mercury rounds perihelion, when it is closest to the Sun, the angle it strikes the graviton barrier in its path is more acute than when it rounds aphelion. This causes repulsion force per graviton to be higher at perihelion than aphelion. In addition, the force of attraction per graviton decreases as the planet approaches the Sun. For these reasons, repulsion forces push the planet away from the Sun and advance the perihelion point of Mercury.

As Mercury approaches aphelion, where it is farthest from the Sun, the force of attraction per graviton increases while the repulsion force per graviton decreases. This allows gravity to pull the flight path of Mercury nearer to the Sun. This also advances the perihelion point of Mercury.

Tilt of the Planets on Their Axes

In addition to Mercury's changing orbital pattern, there are two other observations in our solar system that are explained by a change in the equilibrium between repulsion force per graviton and attraction force per graviton, which I have referred to as the force-ratio. Tilt of planets on their

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axis and polar wobble both confirm that the force-ratio increases as the distance between bodies decrease.

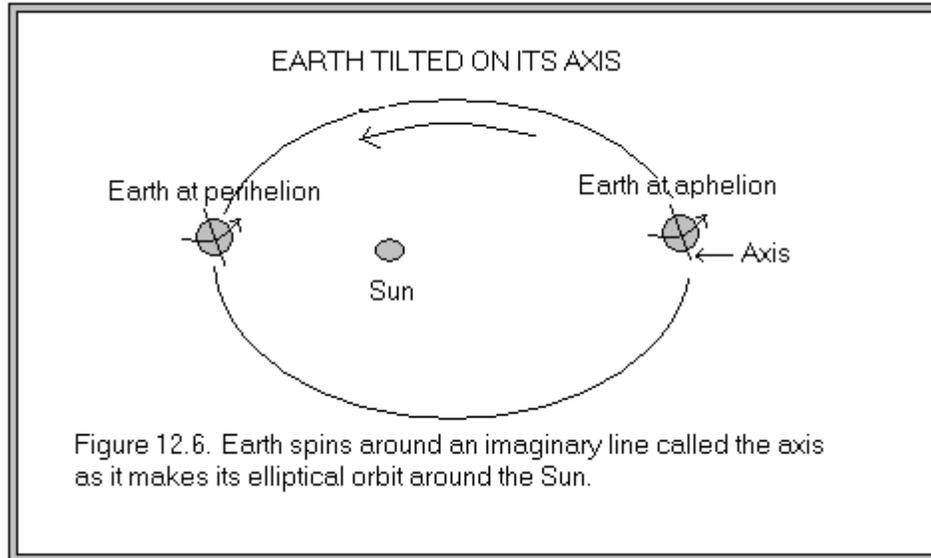
Although the planets in our solar system tend to spin on their axes much like tops spin on a table, most of the planets are tilted, meaning their axes are not vertical with respect to the plane of the table. In fact, all the planets are tilted somewhat except for Mercury, and each planet has its own unique degree of tilt (Table 12.5).

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 12.5
AXIS TILT FOR THE PLANETS IN OUR SOLAR SYSTEM

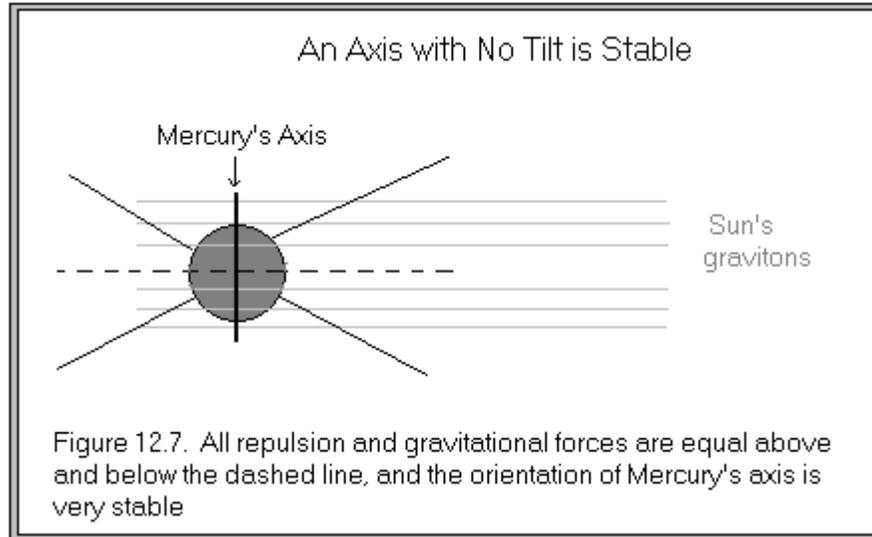
Planet	Degree of Tilt		Planet	Degree of Tilt
Mercury	0		Saturn	25.33
Venus	177.36 or 2.64		Uranus	97.86 or 7.86
Earth	23.45		Neptune	28.31
Mars	25.19		Pluto	122.52 or 57.48
Jupiter	3.13			

When planet Earth is closest to the Sun (perihelion), its Northern Hemisphere is pointed away from the Sun, and when it is farthest from the Sun (aphelion), the Northern Hemisphere is pointed towards the Sun. Just how the tilt of Earth's axis is related to its elliptical path about the Sun is shown in the accompanying illustration, Figure 12.6. This is the same situation for three other planets: Mars, Saturn, and Neptune, whereas Pluto has a 57.48 degree tilt in the opposite direction.



Planets with Little or No Tilt are Stable

Mercury has no tilt to its axis. 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, see Figure 12.7. Besides Mercury, there are three other planets that have a very low degree of tilt: Jupiter, Uranus, and Venus, Table 12.5. I will discuss each of these later in this section.



Planets with a Pronounced Tilt of their 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 forces 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 as shown in Table 12.6.

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 from the other planets. As mentioned, scientists believe the orientation of Uranus was induced by some cataclysmic event. I could find no data on the

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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.

TABLE 12.6
 AXIS TILT AS IT RELATES TO DIAMETERS
 AND RADIUS OF ORBIT

Planet	Equatorial Diameter in km	Polar Diameter in km	Radius of Orbit in km	Degree of Tilt
Mercury	4879.4	4879.4	57,910,000	0
Venus	12104	12104	108,200,000	2.64
Earth	12756.28	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	unknown	34,739,583,333	57.48

Just 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.

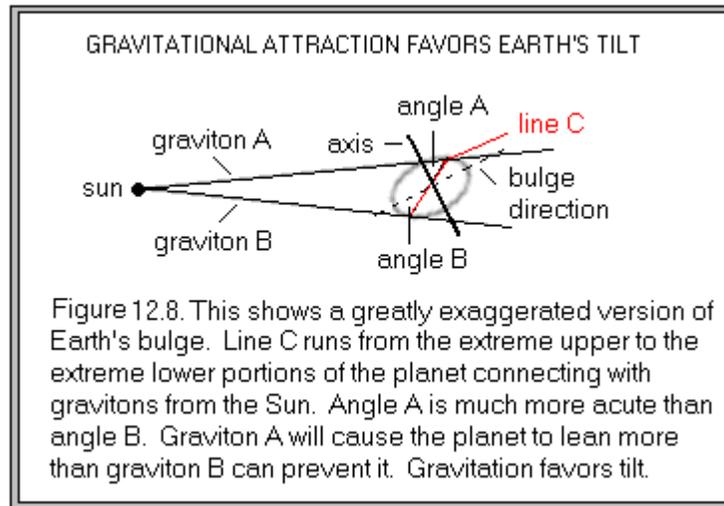
Gravitational Force Favors Tilt

Figure 12.8 is an illustration of Earth as it rounds aphelion. Graviton A from the Sun, in the illustration, grazes the top portion of the planet and graviton B grazes the lower portion of the planet. Line C runs from the extreme upper portion of the planet exposed to gravitons from the Sun to

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the extreme lower portion of the planet exposed to gravitons from the Sun. 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 move the planet further during retraction than gravitons pulling through the bottom of the planet. This relationship is also true as the planet rounds perihelion. What is true for gravitons A and B is true for all gravitons connecting Earth and Sun except those through the middle.

The gravitational force of attraction favors tilt if the planet has an equatorial bulge and if it has tilt.



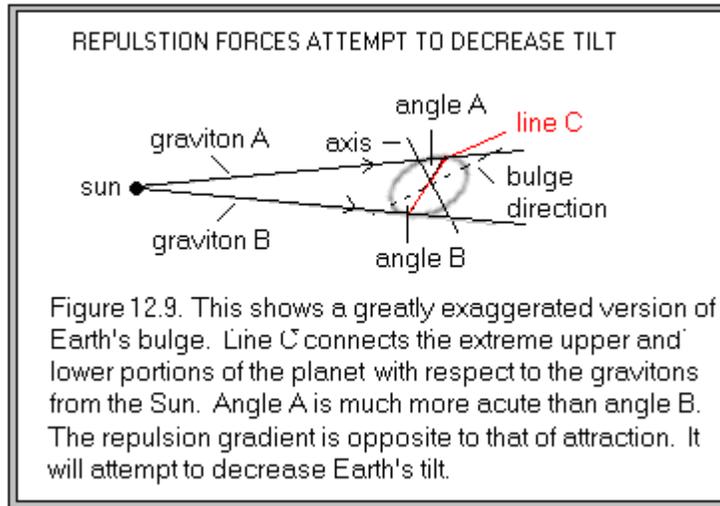
Notice that the gravitational force actually creates a gradient along the axis going from a position on the planet where it inhibits tilt (at bottom) to a position where it favors tilt (top portion). However, more of the gradient is in favor of tilt.

Repulsion forces inhibit tilt

As illustrated in Figure 12.9, the repulsion forces acting on a tilted body are just the reverse of the gravitational force. At one end of the axis, the force of repulsion favors tilt while at the other extreme it inhibits tilt

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because of the shape of the planet. In this case, however, force of repulsion is more in favor of inhibiting tilt.



Effect of Distance on Degree of Tilt

I have already shown how the relationship between the repulsion force per graviton and attraction force per graviton is dependent upon the distance between planet and Sun. As the distance increases between bodies, the gravitational force tends to dominate the repulsion forces because of a change in the force-ratio. Because the gravitational force favors tilt and repulsion forces work to decrease tilt, it is predicted that degree of tilt will increase with distance from the Sun. This relationship was analyzed statistically using a regression analysis.

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

Solar system supports VES theory

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, our most distant planet from the Sun, which has a tilt of 57.48 degrees in the opposite direction to that of Earth. I used a regression analysis to examine the relationship between tilt and average distance from the Sun for the five planets shown in Table 12.8. Also found in this table are the predicted values for tilt. The regression analysis is shown in Table 12.7.

The R value is 0.999, which shows a very high correlation between tilt and distance from Sun. The F test is much higher than the level of significance, which shows 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 born out by the t tests, as shown in the regression statistics. The t values for the slope of the line and for the dependent variable are much higher than their respective P-values.

This analysis strongly supports the idea that distance between planet and Sun is very important in determining degree of tilt. However, it is not perfect correlation. The predicted values for Earth and Mars differ from actual tilt. For example, it predicts that Earth has a tilt of 24.26 degrees while its actual tilt is 23.45 degrees. It seems likely that the difference between predicted and observed 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 best fitting line. For the other three planets, predicted values are almost identical to actual values.

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TABLE 12.7
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	825.39	825.39	1749.28	3.01 x 10 ⁻⁵	
Residual	3	1.41	0.472			
Total	4	826.80				
	Coefficients	Standard Error	t stat	P-value	Lower 95%	Upper 95%
Intercept	24.055	0.3606	66.71	0.0000074	22.91	25.20
Independent variable	9.618 x 10 ⁻¹⁰	2.2997	41.82	0.0000301	8.89 x 10 ⁻¹⁰	1.04 x 10 ⁻⁹

TABLE 12.8
PREDICTING AXIS TILT

Planet	Distance from Sun, km Independent Variable	Actual Tilt in degrees Dependent Variable	Predicted degree of tilt from regression analysis
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

Solar system supports VES theory

The ratio between polar diameter and equatorial diameter is poorly related to tilt. Even a small difference might be sufficient to maintain tilt. It has been estimated that Pluto has a diameter of 2,320,000 meters; however, to my knowledge, there is no estimate of polar versus equatorial diameter although the analysis presented here strongly suggests a difference.

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 less tilt. Because the attraction force per graviton tends to dominate repulsion force per graviton as the distance between bodies increase, 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.

Annual Polar Wobble of Earth's Axis

Earth wobbles as it spins on its axis. This is similar to 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 (see Figure 12.7).

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.

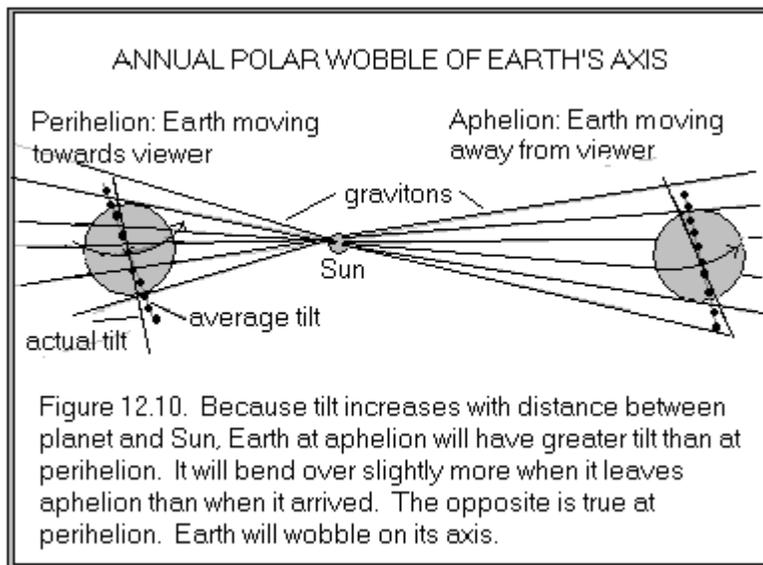
I have already discussed how repulsion and attraction forces between planet and Sun influence the degree of tilt. The evidence clearly shows that

Solar system supports VES theory

the degree of tilt is strongly correlated with distance between satellite and the body it orbits.

Because attraction force favors tilt and R/A decreases with distance from the Sun, VES theory predicts that Earth's axis will have a greater tilt at aphelion when it is most distant from the Sun, and less tilt at perihelion when it is closest to the Sun. That is, it will lean over a little more as it leaves aphelion than when it arrived, and it will be slightly more erect when it leaves perihelion than when it arrived. The net result is an annual wobble (actually semiannual) in Earth's axis. This is illustrated in Figure 12.7. Markov and Sinitsyn (2002) report that the wobble is 0.07 to 0.08 arc seconds.

Annual polar wobble confirms the statistical analysis showing that degree of tilt is associated with distance between bodies. This finding is as predicted by VES theory: It provides very important confirmation that the force-ratio varies with distance.



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 a physical barrier 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 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.

The Electromagnetic Forces

CHAPTER XIII

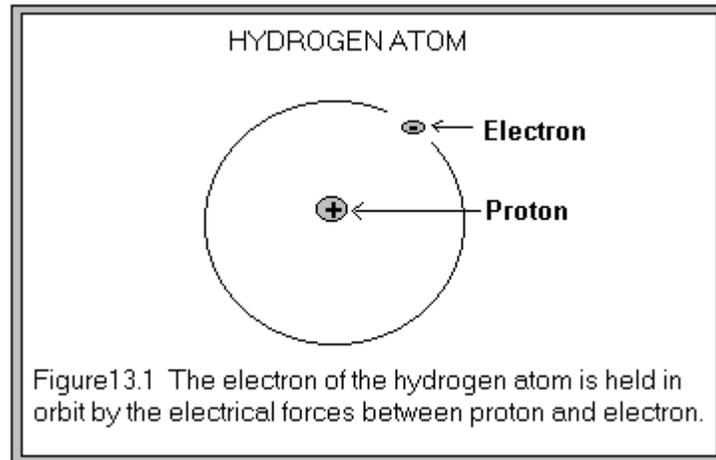
VES THEORY AND THE ELECTRIC FORCE

It wasn't until I began to explore the electric and magnetic forces that I discovered Michael Faraday believed these forces could be explained by lines of force acting like rubber bands. This man was a brilliant experimental scientist who made numerous contributions in chemistry and physics during the 19th century. Among other things, he compressed gasses until they liquefied, discovered benzene, produced stainless steel, established the laws of electrolysis, and more pertinent to this study, he established in 1831 how magnets can be used to induce (create) an electric current. Several key concepts in this area are attributed to him including field theory. I was pleased to discover an illustrious scientist with great knowledge of electricity and magnetism who had reconciled in his mind that the electric forces and magnetic forces could be explained by elastic "strings".

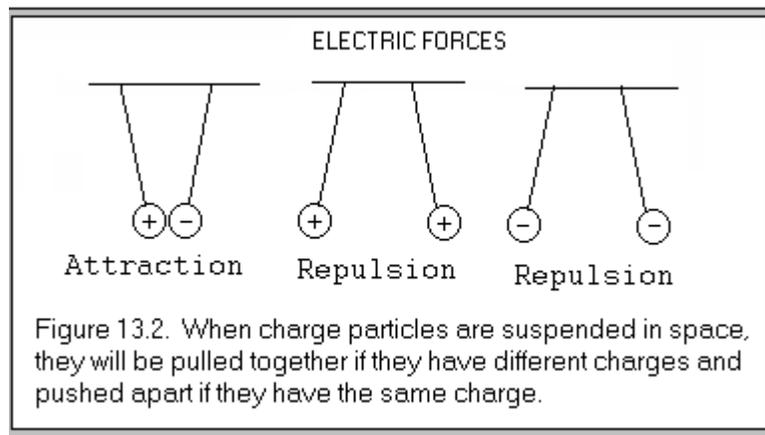
Basic Properties of the Electric Force

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. Figure 13.1 is a simplistic picture of the hydrogen atom, which illustrates how an electron is held in orbit by an electric force between the negatively charged electron and the positively charged proton.

The Electromagnetic Forces



In addition to the electric force of attraction, there is also a repulsion force between like charges; namely, electrons repel other electrons and protons repel other protons. This concept is illustrated in Figure 13.2



ELECTRIC FORCE OF ATTRACTION

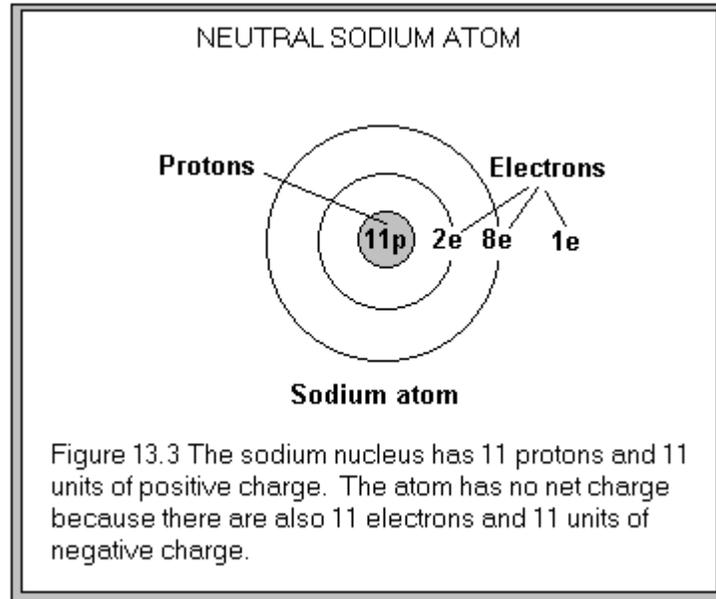
The electric force of attraction is a strong force that binds electrons to protons. An electron in one atom frequently forms a strong bond to a proton in another atom; this creates a multitude of molecules and compounds.

Neutralization

The positive charge generated by a proton completely neutralizes the negative charge generated by an electron. Thus when negative and positive charges are equal there is no net charge. The Earth and most of the matter in nature is electrically neutral because there are an equal number of protons and electrons.

Neutralization between electrons and protons is complete and rather dramatic. For example, the sodium atom has 11 protons; the inner first 10 electrons of the sodium atom allow only one unit of positive charge to escape, and when there is an 11th electron in the outer shell, the atom is neutral as shown in Figure 13.3. When the sodium atom loses this electron, the resulting ion with 11 protons and 10 electrons has one unit of positive charge. When this positive ion combines with a chlorine ion with one unit of 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. 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.



Quarks and Electric Forces

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, 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.

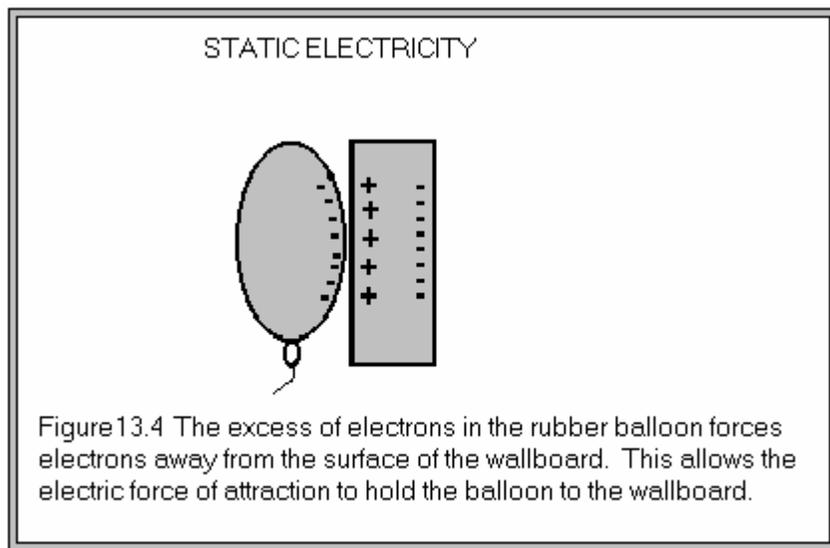
Flowing Electrons

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

The Electromagnetic Forces

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.



VES Theory and the Electric Force

VES theory states that the dual nature of the electric force is due to two different but equal in strength virtual elastic strings. In this paper, I call a string emanating from an electron or down quark an e-electron, and the one generated by a proton (actually an up quark), a p-electron. I refer to them collectively as electons.

I believe a force of attraction between proton and electron occurs when p-electons and e-electons come in contact with each other and form bonds. When the two strings 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 complementary strings.

DEFINITIONS AND VES THEORY

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

p-electron: A virtual elastic string generated by a proton that causes a positive electric field. Up quarks are responsible for p-electrons.

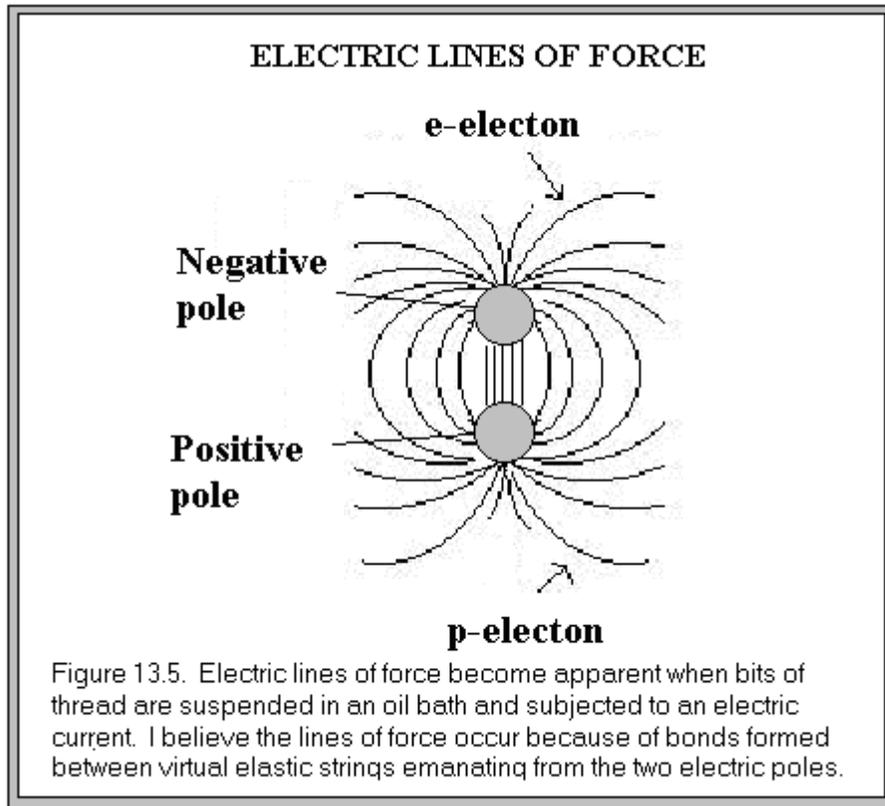
e-electron: A virtual elastic string generated by either an electron or down quark that causes a negative electric field.

complementary strings: String pairs that become neutralized when they interact. All the forces with the exception of gravity likely have complementary strings.

electron: A word used when referring to both p-electrons and e-electrons.

Viewing Electric Lines of Force

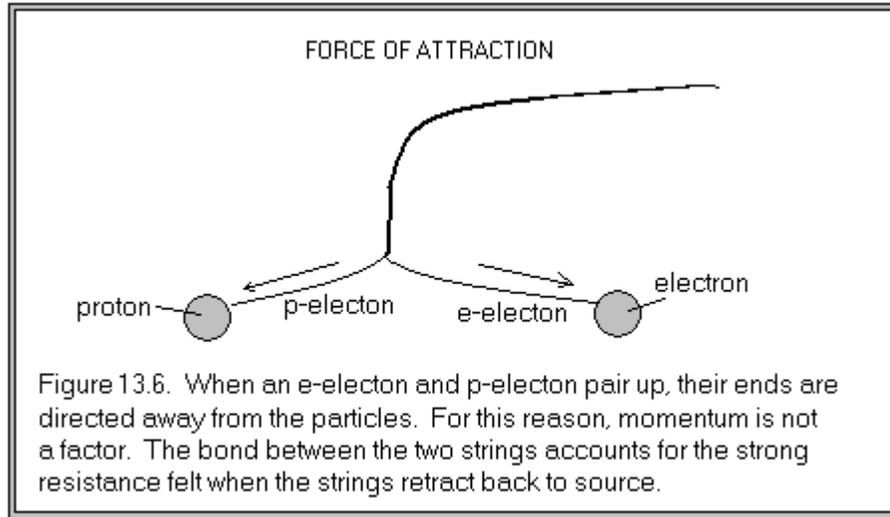
Representations of the electric lines of force can be viewed directly by examining the orientation of bits of thread suspended in an oil bath where the bits of thread line up along the lines of force between positive and negative poles, as shown in Figure 13.5. It should be kept in mind that untold billions of connections are being made between the two poles. The impression is that electrons going at an angle away from the two electric poles connect, and then when they retract, they are pulled towards the centerline just as you would expect if they were elastic strings. Obviously, the force of retraction is not strong enough to pull the threads into complete alignment directly between the two electric poles.



There are several conclusions that can be made from this experiment. First, it clearly indicates that p-electons from the positive pole are connecting with e-electons from the negative pole. Second, it shows that the bonds between electons are of sufficient strength and duration to pull the bits of thread into the alignments shown. Finally, the curvature of the strings suggests their elastic nature. The mechanical connection between complementary strings would account for the strong force of attraction generated by the electric force.

Force of Attraction

The force of attraction between electron and proton is caused when e-electrons and p-electrons bond then retract back to source.



I believe the two strings pair up because they have the same wave properties and because they are composed of different kinds of matter. Bonding might be as in Figure 13.6. String specificity and the nature of the bonds are discussed at length in Chapter XXIV.

Calculation of Electric Force between Two Charges

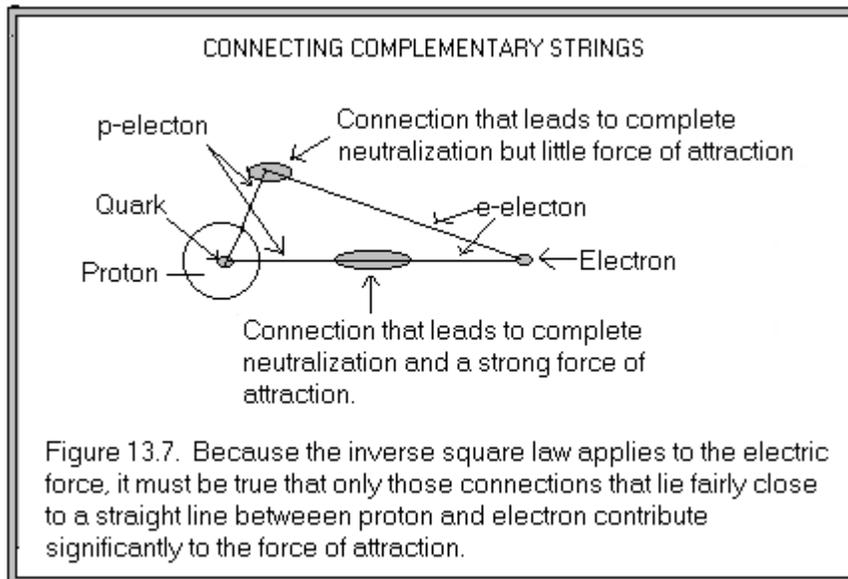
Coulomb's law is used to calculate the force in newtons between two charges: $\text{Force} = k q_1 q_2 / d^2$. It is similar to the equation for the universal law of gravitation.

The unit of charge q is called the coulomb and it has a value of 1.6×10^{19} C. One coulomb is approximately equivalent to the charge of 6.25 billion, billion electrons. The product of the two charges is divided by the square of the distance d , which 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 $9.0 \times 10^9 \text{ N}\cdot\text{m}^2/\text{C}^2$. The

force in newtons between the proton and electron in a hydrogen atom that are separated by 5.3×10^{-11} meters is 8.2×10^{-8} newtons [note 20].

The Electric Force and the Inverse Square Law

In the analysis of the gravitational force, I showed that the inverse square law corrects for the number of gravitons finding their target, and in addition, it accounts for the angles and distance a graviton takes as it retracts through a body.

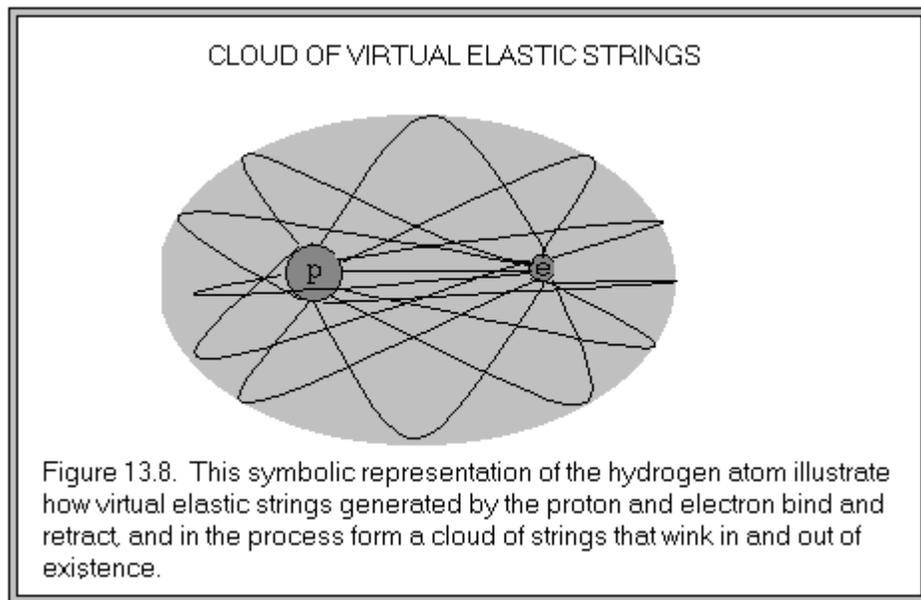


The electric force also follows the inverse square law. In this case, however, I believe we are dealing with mechanical bonds between complementary pairs of virtual elastic strings. The friction created by this bond pair allows a strong force of attraction to develop between electron and proton. To satisfy the inverse square law, those connections made at an angle would have to create weaker bonds between string pairs than those in a more direct line between electron and proton. This is illustrated in Figure 13.6. However, all connections would bring about neutralization. Thus, angles are also important for the electric force. This idea finds support from the manner in which tiny bits of thread line up in an oil bath subjected to

positive and negative poles. In these experiments, it would appear that p-electrons and e-electrons have joined then retracted to form the electric lines of force as shown in Figure 13.5.

Electron Clouds

The charge of an electron is often picture as a cloud that encircles the electron. According to modern quantum theory, the space surrounding an electron is filled with virtual particles that are continually created and then disappear, just as predicted by VES theory. According to VES theory, e-electrons emanating from an electron are the source of these virtual particles. In the hydrogen atom, where there is only one electron and one proton, scientists have shown that the cloud of negative electric charge tends to be a sphere surrounding the electron. In more complex atoms, the electron clouds have different patterns because of repulsion forces between electrons and because electrons have different orbital patterns (occupy different shells).

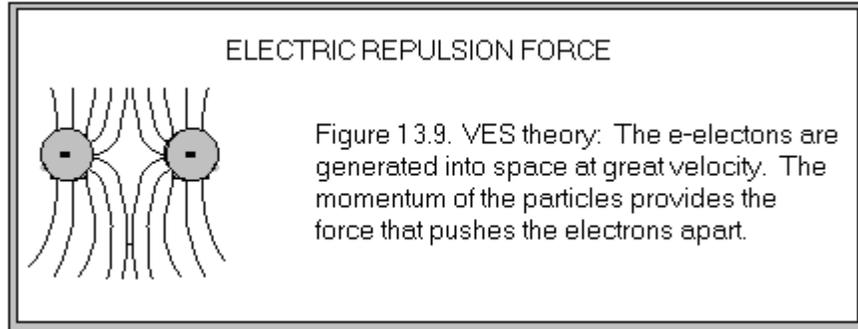


The Electromagnetic Forces

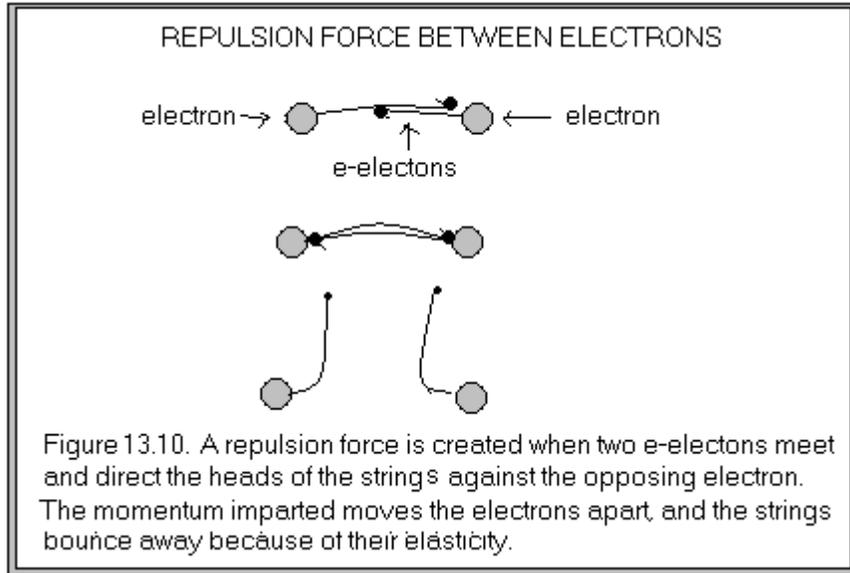
I assume the distribution of positive charge about the nucleus is similar, and because virtual all of the e-electons and p-electons become bound, they would in one sense define the outer boundary of the atom as shown in Figure 13.8.

Repulsion Forces

The repulsion force between two like charges is as strong as the force of attraction between to unlike charges, and repulsion is calculated in the same manner as the force of attraction. When bits of thread are suspended in an oil bath between two poles of like charges, they line up along the lines of force. In such experiments, the lines of force seem to be pushing against each other, as shown in Figure 13.9. 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 the repulsion force and attraction force have the same magnitude.



It seems possible that repulsion force between two electrons is created when their strings meet in space and bond. In this case, the heads of the strings are directed against the opposing electrons, which drive the two electrons apart. In this manner the full momentum of the string heads become battery rams. This is illustrated in Figure 13.10.



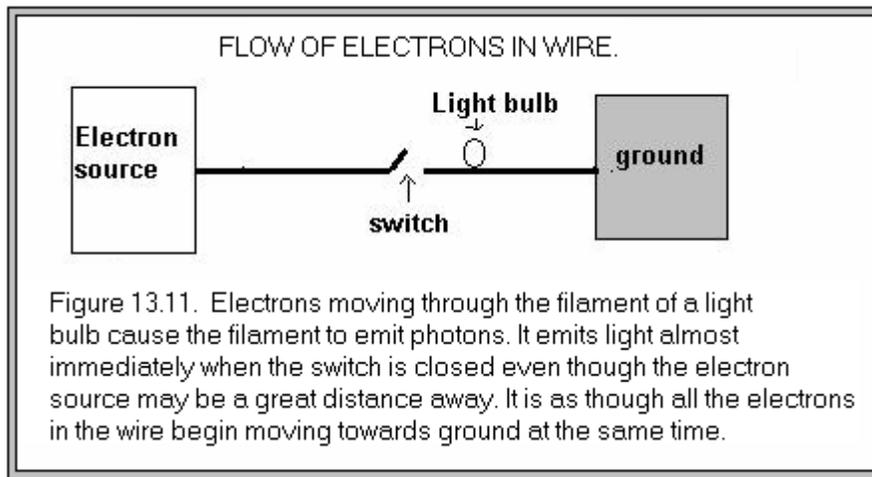
Because repulsion forces and attraction forces are identical, it leads me to believe that p-electons form strong attachments to e-electons. The bond must be strong enough for two complementary strings to fully utilize their potential elastic energy. This is in sharp contrast to gravity where the evidence suggests the force of attraction depends upon weak connections between gravitons and electrons and between gravitons and the strings that create the magnetic force. We will come back to this subject in Chapter XXIV after I have introduced magnetism and the evidence that shows gravitons form weak bonds with other strings.

REPULSION FORCE AND ATTRACTION FORCE

In the case of repulsion, I believe the heads of the strings are directed against the subatomic particles that create the complementary strings, while in the case of attraction, the heads of the strings are directed away from the particles that create them.

Electric Currents

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 electrons associated with the tungsten atoms become excited and emit photons we see as light.



In a wire carrying electric current, electricity seems almost instantaneous. We throw the switch on and the light bulb comes to life even though the source of the current may be a generator powered by water at the bottom of a dam a great distance away. This is true even though scientists have shown that electrons move through an electric wire quite slowly. The conclusion is that some force causes all the electrons up and down the wire to begin moving at approximately the same time when the switch is thrown. How this is related to VES theory is explained in Figure 13.12.

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 created by the generator. They emit e-electrons, which we measure as a negative electric current. The e-electrons move through the wire at great velocity, and as they

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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, e-electons reaching ground push electrons away, just as the negatively charged balloon pushes the electrons in the wall board away. This creates an excess of protons at ground that send p-electons 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.

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

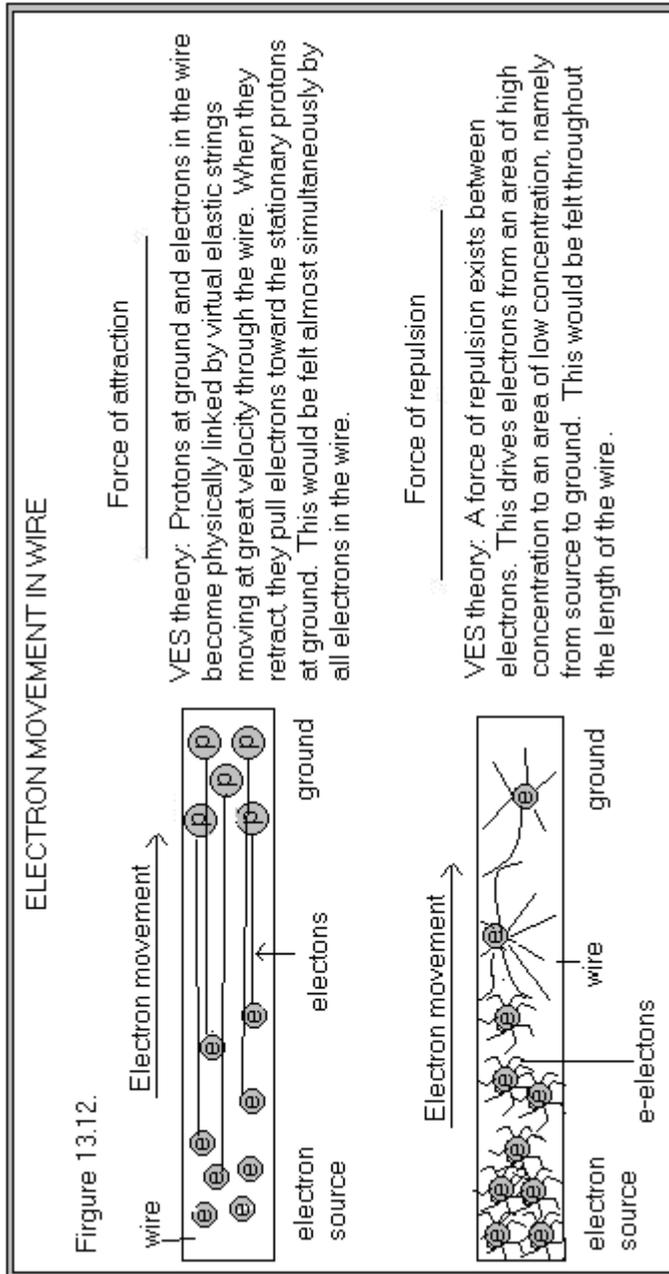


Figure 13.12.

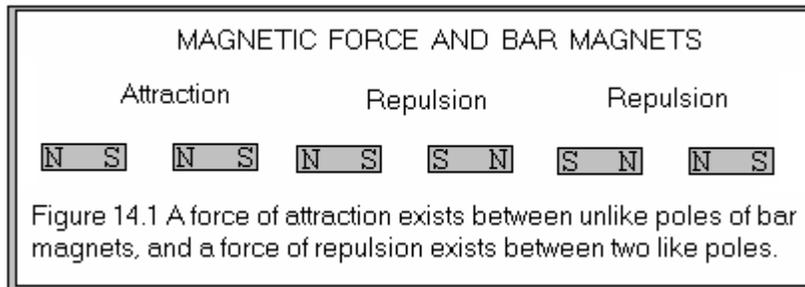
Proportion of Strings Involved in Electric Force

The Earth is radiating gravitons in all directions, and the proportion of Earth's gravitons striking the Sun is a function of the size of the Sun and the distance between the two bodies. The number of Earth's gravitons striking the Sun obeys the inverse square law. In the case of the electric force, however, we know all the strings make connections because there is complete neutralization. However, the electric force follows the inverse square law, which shows that the force generated by a string is related to the angle and distance the string travels before it encounters a complementary string. In reality, those strings that come close to a direct connection between two bodies would contribute far more to a force of attraction.

CHAPTER XIV VES THEORY AND THE MAGNETIC FORCE

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 magnets held in the hands. It should be pointed out that physicists in general believe that the magnetic force and electric force are different manifestations of the same force. VES theory states that they originate from the same spinning bodies, quarks, electrons and photons, but they have their own unique strings.

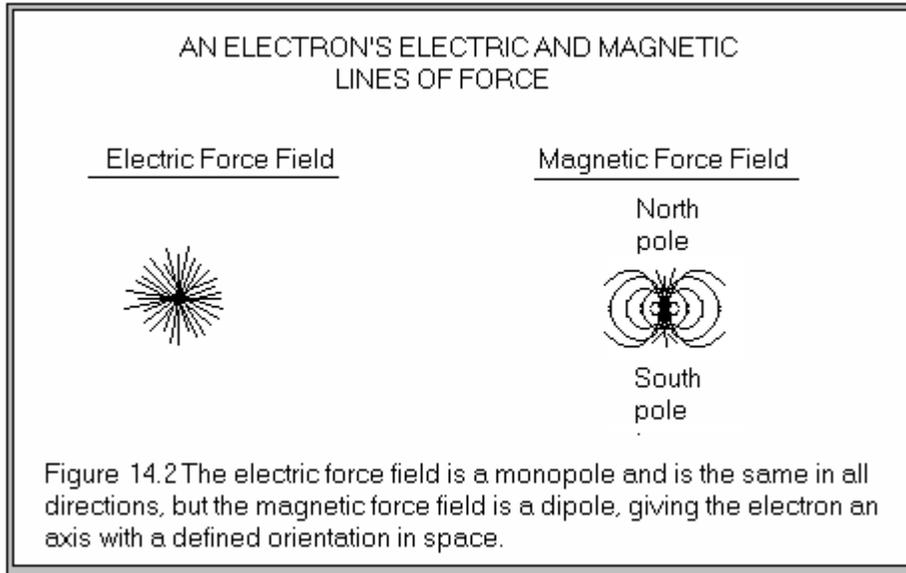
A bar magnet has a north pole and south pole, and a force of attraction exists between them. In contrast, a force of repulsion is set up when two north poles are brought together or when two south poles are brought together. In this regard, magnetism resembles electricity.



Electrons are Magnetic Dipoles

If a bar magnet is broken into pieces, all the pieces have a north and south pole. In fact, if a bar magnet is broken down into individual subatomic particles, all of the particles that carry an electric charge are tiny magnets. In all cases, they are dipoles and have both a north and south pole. 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. Because the electron is a magnetic dipole, it gives this particle a spatial arrangement with an axis as shown in Figure 14.2.



Electron Spin

The electron in an atom has two motions: an orbital motion about the nucleus and a spinning motion. Frequently, physicists draw an analogy between the intrinsic spin of an electron and a spinning top. The energy associated with an electron's spin is given in units of \hbar , which is the quantum unit of angular momentum, where $\hbar = h/2\pi = 6.58 \times 10^{-25}$ GeV = 1.05×10^{-34} js. (h is Planck's constant). Scientists believe that most of the magnetic force comes from the energy associated with the spin motion of the electron. I believe all the forces of nature have their roots in the linear motion and spin motion of subatomic particles. This is taken up in detail in the chapters that follow.

Although the elastic properties of a long string doubtlessly aid in the retraction of the string back to the subatomic particle that created it, I believe its retraction and re-absorption also requires an energy source. I present a theatrical model in Chapter XV that explains how spin angular

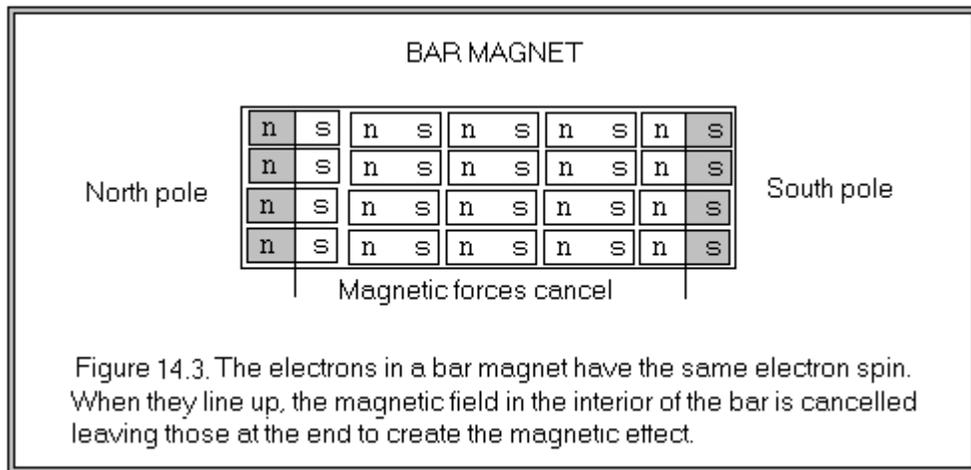
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momentum is essential for the creation and retraction of virtual elastic strings.

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.

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.

Scientists believe 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

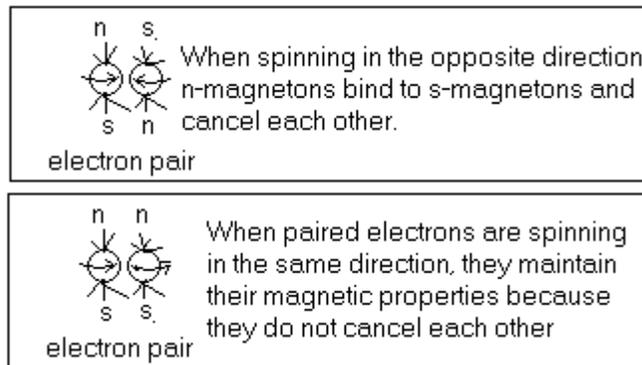


the magnet create the north and south poles as shown in Figure 14.3. The north and south ends of a magnet have equal strength, which shows very clearly that the north and south poles of the electron have equal magnetic fields.

VES Theory

The dipole nature of magnets 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 herein called an s-magneton, and its counterpart, also generated by the electron, is called an n-magneton.

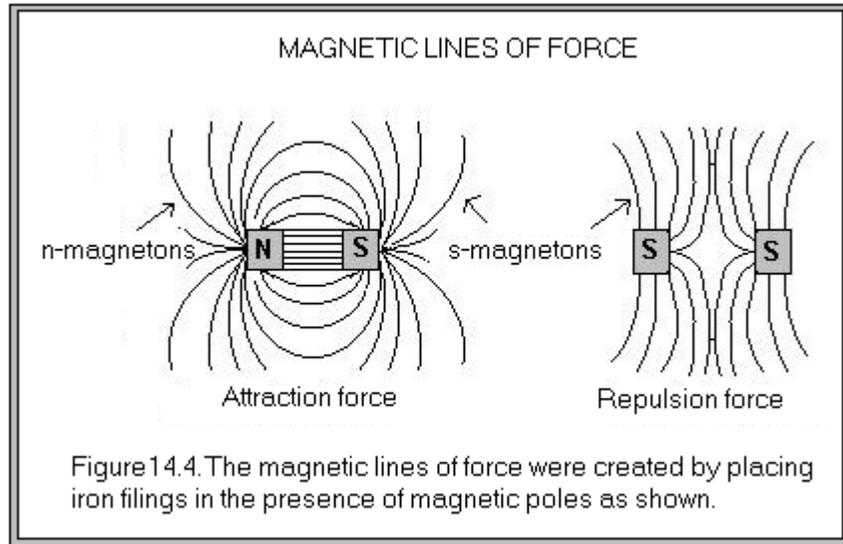
When s-magnetons come in contact with n-magnetons they bond. Now when the strings retract back to source they create a force of attraction. A force of repulsion arises when s-magnetons come in contact with other s-magnetons, or when n-magnetons collide with n-magnetons and transfer their momentum. This reasoning is the same as that discussed for the electric force.



Viewing Magnetic Lines of Force

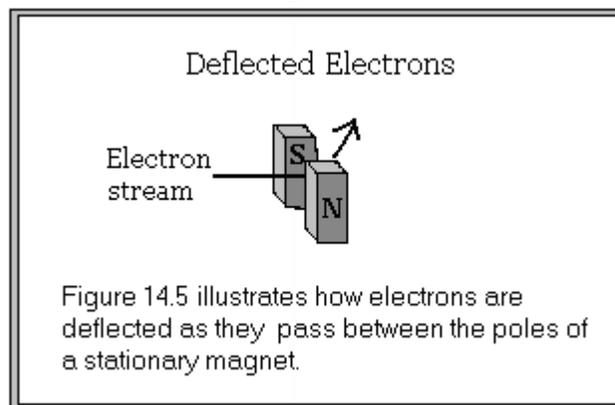
Magnetic lines of force can be viewed directly by placing iron filings on a piece of paper in the presence of magnets. As shown in Figure 14.4, the iron filings quickly align themselves along the magnetic lines of force.

As in the case of the electricity, the magnetic lines of attraction between north and south poles tend to merge as if they are pulling on each other, while the virtual elastic strings emanating from two like poles seem to repulse each other.



VES theory and the Deflection of Electrons in a Stationary Magnetic Field

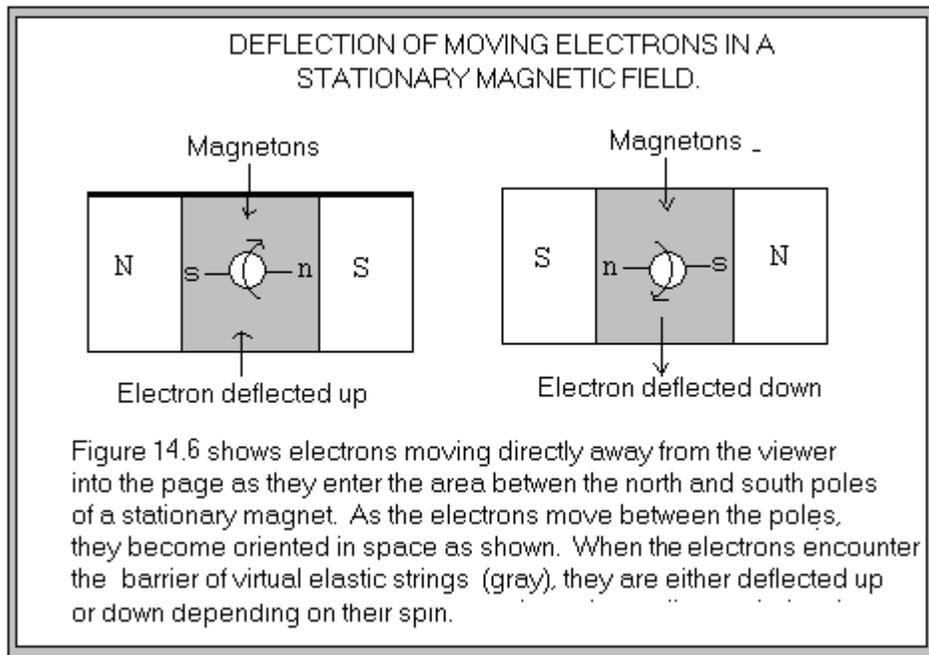
Scientists have shown that a stream of electrons is deflected when it moves between the north and south poles of a permanent magnet. This is shown in Figure 14.5. They are either deflected up or down depending on the orientation of the stationary magnet's north and south poles.



The Electromagnetic Forces

A stream of electrons passing between the poles of a magnet, as shown in Figure 14.5, 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. This will also orient their direction of spin. However, at this point it may be up or down unless some method has been used to select one form over the other. In Figure 14.5, the electrons are all spinning in the same direction with respect to their north and south poles.

According to VES theory, a permanent magnet has billions of virtual elastic strings (n-magnetons and s-magnetons) 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 the direction of their spin. This is the same as a billiard ball whose spin helps dictate the direction it careens off the cushion of a pool table.

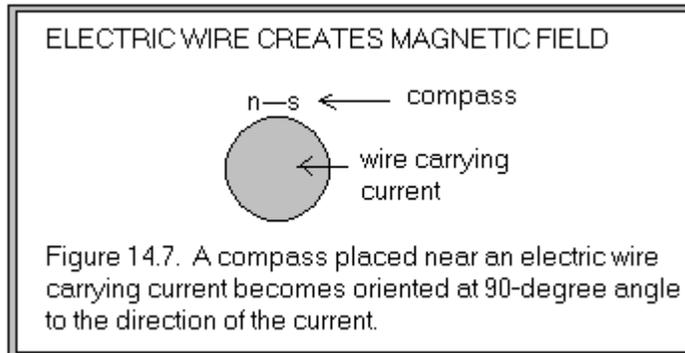


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Scientists have shown that the magnitude of the deflecting force is directly proportional to the velocity of the electron and the strength of the external magnetic field (the number of virtual elastic strings that form the barrier). If the external 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 field between the poles of the stationary magnet.

Electrons Flowing Through a Wire

When electrons flow through a wire they create a magnetic field around the wire. This means that the orientation of the electrons in the wire cannot be at random, otherwise they 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.

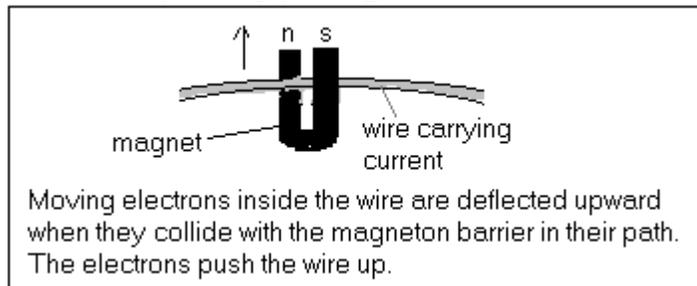


When a wire carrying an electric current is placed between the poles of a stationary magnet, the wire is deflected either up or down depending on the orientation of the magnetic poles and the direction of the current in the wire. This is completely analogous to the deflection of a stream of electrons passing through a magnetic field as explained above. According to VES theory, the electrons traveling through the wire encounter a barrier of magnetons connecting the two poles of the stationary magnet. When they enter this region, two things happen.

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First, the electrons become oriented in space with their north poles attracted to s-magnetons emanating from the south pole of the stationary magnetic, and their south poles connected to n-magnetons emanating from the north pole of the stationary magnet. Under these circumstances, all the electrons will tend to spin in the same direction because they have the same orientation in space.

Second, when the electrons strike the physical barrier of magnetons stretched between the two poles of the magnet, they either will be deflected up or down depending on their spin motion. If they are deflected up, they will push the wire up as they push against the atoms in the wire.



The magnetic force of the permanent 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 moving electrons in the direction they are spinning.

DEFLECTION OF ELECTRONS BY STATIONARY MAGNET

VES theory states that the magnetic poles of an electron become oriented as it moves between the poles of a stationary magnet. As the electron moves against the physical barrier created by the permanent magnet, it will move up or down depending on the direction it is spinning.

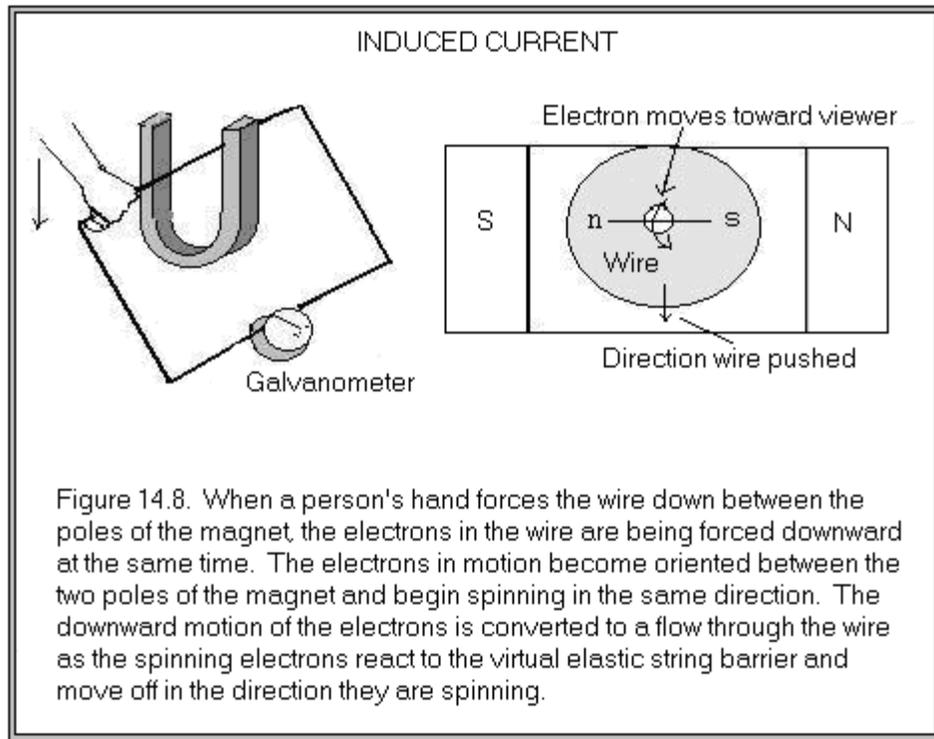
This explains why the electron's magnitude of deflection is dependent upon the strength of the magnetic field, the electron's direction in the field, and the velocity of the electron.

Electric Motors

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 a wire, and the deflected electrons cause the wire to move physically. The movement is used to rotate a rod, which can be used to rotate a wheel, etc. The permanent magnet departs no energy to the system.

Induction and Electric Generators

The creation of an electric current in a wire is known as induction. When a wire forms a complete circuit, an electric current can be induced in the wire by forcing the wire down between the poles of a permanent magnet. By placing a galvanometer in the line, we can show that a current was created; namely, electrons begin flowing through the wire. This is illustrated in Figure 14.7.



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As the wire is forced down mechanically by the hand, the electrons in the wire are moving downward, which cause them to collide with the barrier of virtual elastic strings stretched between the two poles of the magnet. This has two effects. First, it orients the electrons in space, which causes all the electrons to be spinning in the same direction. Secondly, because the strings have perfect elasticity, the electrons bounce off the strings with approximately the same velocity as the downward motion of the wire. The trajectory of the electrons will not be directly up but also in the direction the electrons are spinning, which in the example given is toward the viewer.

The magnet does not impart any energy into the system. The total energy that drives the electrons through the wire comes from the mechanical motion of the hand forcing the wire and its electrons down between the two poles of the magnet. If the wire and magnet are motionless, there is no electric current. If the hand pulls the wire in the opposite direction, then the flow of electrons is in the opposite direction because now the electrons are spinning in the opposite direction relative to the virtual elastic string barrier stretched in front of them. An electric generator is based on these principles, and it works in just the reverse of an electric motor.

Magnetons have Mass

When some gases and other particles are treated with extreme low temperatures, they form Bose-Einstein condensates. Scientists believe that ultra low temperatures cause particles to show their wavelike nature and form condensates when the waves overlap. At the root of this phenomenon are quasiparticles that wink in and out of existence, as well as collide and exchange momentum in the same manner that standard particles do. In other words they have mass.

According to Demokritov and his colleagues (2006) condensates form at room temperature when a thin film of yttrium iron garnet is treated with microwaves. They believe the quasiparticles formed are magnetic waves they call magnons. “Magnons are the quanta of magnetic excitations....” I believe it is entirely possible that magnons are identical to magneton strings as defined in this chapter. This means there is direct confirmation that virtual elastic strings have mass.

CHAPTER XV

THE ELECTRON AND ITS STRING CYCLE

It requires a source of energy to send a graviton racing across a galaxy, and I believe it takes a source of energy and some mechanical mechanism to re-incorporate a graviton back into the subatomic particle that created it. This must be true for all virtual elastic strings. The main focus of this chapter will be to construct a theoretical model for the structure of an electron and explain how electrons create and retract strings by using the energy associated with their spin angular momentum. The model will then be used to examine some important properties of electrons.

Electron's Electric Fields

Physicists are able to detect a cloud of virtual particles that surround the electron. Many of these particles are likely e-electons that become bound to p-electons emanating from the proton. However, Koltick and others (1997), at the Japanese Laboratory for High Energy Physics, have found evidence that an electron also creates a positive electric field. In this view, the electron is producing more than one negative charge, and the excess neutralizes the positive charge created by the electron.

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. This is a very important finding because it accounts for one important aspect of the model I am going to present.

Electron's Magnetic Fields

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-magnetons and the south pole emits s-magnetons. When the two meet and bond they form a closed loop

If 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. Notice in this relationship that the attraction of the magnet with the compass is caused by magnetons from each that bond and exert an attraction force between them. We can expect the same force is exerted when n-magnetons located at the north pole of the electron bond to s-magneton at the south pole of the electron. The force exerted will be inward upon the surface of the electron as they retract back to source.

Relationship between Electric and Magnetic Fields

The electron, photon, and quark (actually two kinds of quarks) all create strings. I will refer to them here as particles. The energy density of the electric and magnetic fields emanating from these particles is described in the following two equations:

1. Energy density of the electric field = $\frac{1}{2} \epsilon_0 E^2$ where ϵ_0 is the electric constant with a value of 8.854×10^{-12} F/m, and E is a vector force. The value of this constant was determined in the laboratory by experimentation.

2. Energy density of the magnetic field = $\frac{1}{2} \beta^2 / \mu_0$ where μ_0 is the magnetic constant with a value of $4\pi \times 10^{-7}$ H/m and β is a vector force. μ_0 is a value derived to satisfy the requirements of the energy of the magnetic field.

The energy density of the electric field = energy density of the magnetic field. Thus: $\frac{1}{2} \epsilon_0 E^2 = \frac{1}{2} \beta^2 / \mu_0$.

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In 1864 James Clerk Maxwell, an astute British physicist, saw there was a relationship between the electric and magnetic properties of light and the velocity of light when he derived the following equation:

where c = velocity of light.

$$c = \frac{1}{\sqrt{\mu_0 \epsilon_0}} = 299,395,293 \text{ meters/second}$$

The measured velocity of light is 299,792,458 m/s. Because this is close to 3×10^8 m/s, I will frequently use this shortened version. Note, the electric constant was established by experimentation. This explains why the calculated velocity of light using the two constants does not equal its actual velocity determined by careful experiments. We will come back to the velocity of light and its relationship with the magnetic and electric fields in a later chapter. For now I will continue to explore how the electric and magnetic fields help us understand the electron's string cycle.

Because the energy of the electric field and magnetic field are equal, we can combine the two equations and show the following relationship:

$$\frac{1}{2} \epsilon_0 E^2 = \frac{1}{2} \frac{\beta^2}{\mu_0} \rightarrow \frac{\beta^2}{E^2} = \mu_0 \epsilon_0$$

taking the square root and rearranging

$$\frac{E}{\beta} = \frac{1}{\sqrt{\mu_0 \epsilon_0}} = c$$

This shows very clearly why both of these ratios equal the velocity of light.

The electric field E is a vector force and the value of E is proportional to the lines of electric force. In the same manner, the magnetic field is a vector force and the value of β is proportional to the lines of magnetic force. This is a very important concept because it allows us to get a handle on the

electric and magnetic strings emanating from the electron. According to VES theory, the electric lines of force are created by electrons, and in the same manner the magnetic lines of force are created by magnetons. This leads to the conclusion that the number of electrons we measure divided by the number of magnetons we measure is equal to the velocity of light.

$$c = \frac{E}{\beta} = \frac{\text{measured e-electrons}}{\text{measured n-magnetons}} = 3 \times 10^8$$

According to VES theory, if the energy of the electric field and the energy of the magnetic field are equal, and if the ratio of electrons to magnetons is 3×10^8 , then we also arrive at this relationship:

$$(3 \times 10^8 \text{ electrons}) \times (\text{energy of one electron}) = (\text{one magneton}) \times (3 \times 10^8)$$

It is reasonable that the mass of these strings is proportional to their energies. Thus I assume the mass of 3×10^8 electrons = mass of 1 magneton.

Number of Electron and Mageton Strings

Because the ratio of electrons to magnetons is 3×10^8 to 1, the number of magnetons cannot be too large or the number of electrons becomes immense. On the other hand, our instruments show that the electric and magnetic fields provide smooth waves in our instruments. There are no quantum jumps as the strings are created. This means the number of magnetons must be large enough to create a smooth increase in the number of strings as the wave is created. This will be clearer when we take a closer look at the photon.

Perhaps, then, the electron makes 100 n-magnetons and 100 s-magnetons. This means the number of e-electrons that create one unit of electric force becomes 300×10^8 . Of course the number of magnetons might not be 100; a smooth line in our instruments might be created with a smaller number, and just as easily, the number of magnetons could be greater than 100. However, whatever the number of magnetons is the energy density of 3×10^8 e-electrons remains equal to the energy density of 1 magneton.

Scientists have shown that the electron makes a positive electric field (p-electrons) as well as a negative electric field (e-electrons). The p-electrons

created bond to e-electons. The remaining excess e-electons are the ones that create the negative electric field. They are the e-electons that have a ratio of 3×10^8 with magnetons. They are the e-electons we normally measure with our instruments. I will refer to them as free electrons.

Mechanical Considerations

An electron is a busy little particle. It orbits about the nucleus of an atom, oscillates at high frequency, spins on its axis, and according to VES theory, it creates gravitons, n-magnetons, s-magnetons, e-electons, and p-electons.

My model for the electron and the creation and re-absorption of virtual elastic strings is based on the following assumptions:

1. A subatomic particle in motion causes the particle to spin on its axis in the direction it is moving. This produces spin angular momentum.
2. Spin angular momentum creates internal pressure inside the electron, which is necessary for the creation and ejection of virtual elastic strings.
3. Spin angular momentum augments the re-absorption of the elastic string back into the internal structure of the electron.
4. The energy of the electron remains constant throughout its string cycle.
5. Electrons moving through an array of gravitons and other strings cause its electrons and magnetons to be swept to the rear of the particle where complementary pairs bond.
6. The electron must be composed of two spheres.

I will begin this discussion by examining the first assumption.

Moving Subatomic Particles Create Spin angular momentum

The simplest form of momentum is calculated by multiplying the mass of a particle by its velocity. We all know that it takes a country mile to stop a train because of its tremendous momentum. The spin of a particle also creates momentum. It is referred to as spin angular momentum. A large mass such as Earth spinning on its axis creates great spin angular

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momentum; however, even a subatomic particle with a minute mass can create significant spin angular momentum if it is spinning at great velocity. The electron's spin angular momentum is dependent upon spin rate, size of the electron, and its mass.

Photons in flight and electrons rotating about the nucleus of an atom spin in the direction they are moving. Scientists have long held that the energy associated with spin angular momentum explains most of the magnetic force associated with electrons. I believe spin angular momentum of electrons, quarks, and photons provide the major source of energy necessary to create all the forces of nature.

The fact that an electron has spin angular momentum can best be visualized if it exists as a particle.

In 1926, a physicist named Erwin Schrodinger put forth the idea that the wave properties of electrons explain their orbital patterns about the nucleus. In this case, the electrons are pictured as physical waves that surround the nucleus. A second school of thought was also put forth in the 1920's by a German physicist named Werner Heisenberg. Through a mathematical treatment of electrons in orbit, he came to the conclusion that electrons are particles that move from one orbital state to another because of their energy states, which become modified by the absorption and ejection of photons. This explanation fits nicely with my string theory. It is referred to as matrix mechanics because of the mathematical treatment. In 1964, the English physicist Paul Dirac demonstrated mathematically that matrix mechanics more accurately explains the electron's orbital patterns than wave mechanics (Asimov, 1966).

The idea that electrons surround the nucleus of an atom as waves makes it easy to visualize, but Heisenberg's idea that electrons are particles whose complicated orbits are a reflection of their energy states is superior mathematically.

An Electron must be moving to Create Spin

Scientists have long held that a subatomic particle must spin on its axis to create the forces of nature. They reason that the spin of a particle is somehow coupled to its linear velocity. VES theory shows us that a particle spins in the direction it is moving because it rubs against the gravitons

emanating from the proton. It spins in the direction it is moving for the same reason that Earth spins on its axis. This is discussed in more detail later in this chapter.

Electons and Magnetons are swept to the Rear of the Particle where Complementary Pairs Bond

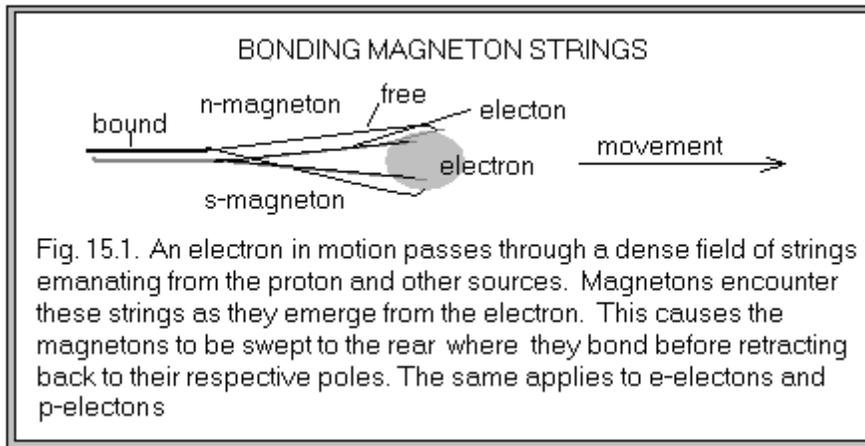


Fig. 15.1. An electron in motion passes through a dense field of strings emanating from the proton and other sources. Magnetons encounter these strings as they emerge from the electron. This causes the magnetons to be swept to the rear where they bond before retracting back to their respective poles. The same applies to e-electons and p-electons

Strings emerging from the electron are swept to the rear as the particle proceeds through a field of gravitons and other strings. This allows complementary magneton strings and complementary electron strings to bond before retracting back to the electron.

Energy of Strings Stored Inside Electron

The energy of the magnetic field and the energy of the electric field of a photon seem to disappear as it goes through its oscillation cycle. However, like mass, the energy of the system does not change. The same must be true for electrons. The string theory I will present shortly shows that the energy of the fields becomes stored as potential elastic energy within the electron as it goes through its string cycle. A small portion of the condensed elastic material becomes the tiny particles that are destined to become new strings, while the remainder provides the energy to eject the particles into space.

The Electron is divided into two Spheres

In order to account for the specificity of virtual strings there must be two degrees of specificity. I believe one is the size of the string and the other is its physical properties. It is easiest to understand the latter if the strings emanate from two spheres. Two spheres also help explain electron spin and the orientation of an electron in orbit.

If electrons consist of two spheres, then it must be true that all particles that make strings have this same configuration (quarks and photons). In the case of photons, it helps explain why the electric fields and magnetic fields are correlated with their velocity.

Electron String Cycle

Electrons, photons, and quarks all possess a vibration frequency. This suggests there is a cyclical nature to the creation of strings that causes oscillation. There must be a period where no strings are being created and another period in which strings are being ejected into space.

From a mechanistic standpoint, it is reasonable to assume that the ejection of a photon or virtual elastic string from an electron must require a build up of great internal pressure within the electron. How else might an electron eject a photon? How else might an electron eject a graviton across a galaxy at tremendous velocity? Before we delve into my model for the electron and its string cycle, I will list some basic facts and premises that the model must take into account, some of which we have already examined.

1. Spin angular momentum provides the energy for the electron's string cycle.
2. Electrons (also quarks and photons) must be moving to create spin.
3. Spin angular momentum creates great pressure inside the electron, which is essential for the ejection of strings and photons.
4. Spin angular momentum aids in the retraction of strings.
5. The electron creates a graviton that shows little tendency to bind to itself. It only creates a force of attraction.
6. There must be at least two degrees of specificity to account for the differences between strings. This is taken up in detail in Chapter XXIV. I believe one difference is the size of the string and the

other is its physical properties, which means strings must come from two different sources.

7. Strings (forces of nature) are self inducing: When bound magnetons, bound electrons, and gravitons retract, they create internal pressure inside the electron, which induces the creation of new strings. During the string cycle, sufficient potential energy must be stored inside the electron to eject photons as well as new strings.
8. The string cycle creates the electron's frequency of oscillation.
9. Scientists are able to detect billions of virtual particles surrounding the electron. The virtual particles are associated with the electric and magnetic fields of the electron.
10. The work of Koltick (1997) shows us that a large number of p-electrons are bound to e-electrons during the string cycle.

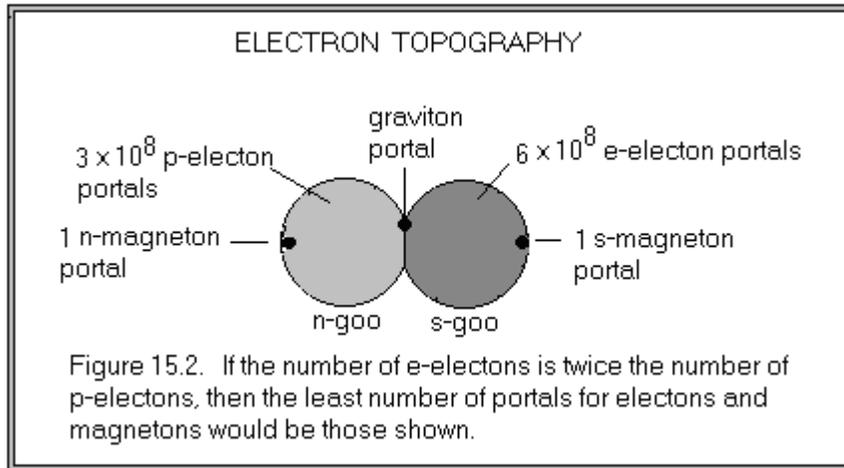
The Ejection and Absorption of Strings Require Unique Portals

Portals are pores, possibly with ducts leading into the interior of the electron. They are the openings through which strings are ejected and withdrawn. The photon makes 3×10^8 electrons in the same time frame as one magneton, and both spheres are in balance with regard to the string mass created. However, the evidence suggests that the electron is unbalanced with more string mass being created from one sphere than the other. This suggests that portals only open and fire a string into space when the pressure inside the electron reaches a specific threshold. It then closes and remains closed until the pressure inside the particle suffices to eject another string. This must be true for quarks, photons, and electrons.

A minimum number of portals might be like that shown in Figure 15.2. Each portal creates the same number of strings in the same time frame, and each portal likely makes 50 or more strings.

PORTAL DEFINED

A portal is visualized as a pore with a duct that extends into electrons, photons, and quarks.



Once the string particle is ejected into space the string remaining in the portal is minute compared to the portal size. Thus, one hundred strings in one portal do not materially change the remaining space of the portal. This is taken up in more detail when I discuss photons.

The size of an electron portal is minute compared to the surface area of an electron. Thus billions of electron portals need only take up a small percentage of the electron's surface. I will reserve my reasoning behind this statement until I examine the photon in another chapter.

Stages of the String Cycle

Stage One: Retraction and absorption 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. At this time, the electron's internal pressure has been reduced to its lowest point, and it lacks the ability to eject a string into space. However, it is spinning and it has angular momentum.

Billions of gravitons, electrons, and magnetons surround the particle and are in the process of being retracted and reabsorbed back through their portals into the interior of the electron. The elastic properties of the strings

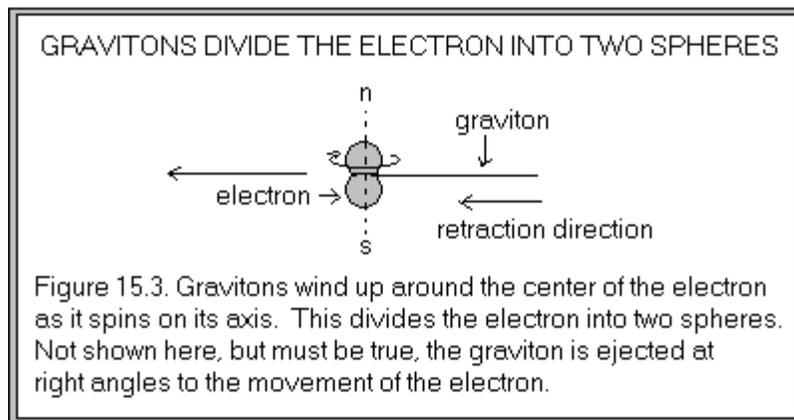
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coupled with a spinning electron provide the energy for the retraction and re-absorption process.

As the retraction continues, we quickly lose the capacity to detect these strings because they become neutralized as complementary strings pair up or as they wind up on the electron leaving no free string available for our instruments. And we have no way of measuring the number of gravitons still retracting from outer space.

Gravitons retracting

The magnetic properties of an electron give it a north and south pole. I theorize the portals for gravitons are midway between the two poles. As the gravitons retract because of their elastic properties, they wind up on the mass of the spinning electron like a fishing line winds onto a reel. It follows that gravitons act as a cinch, pulling the mass of the particle into an ever-smaller space, and at the same time causing a division in the electron. 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 many oscillation periods.



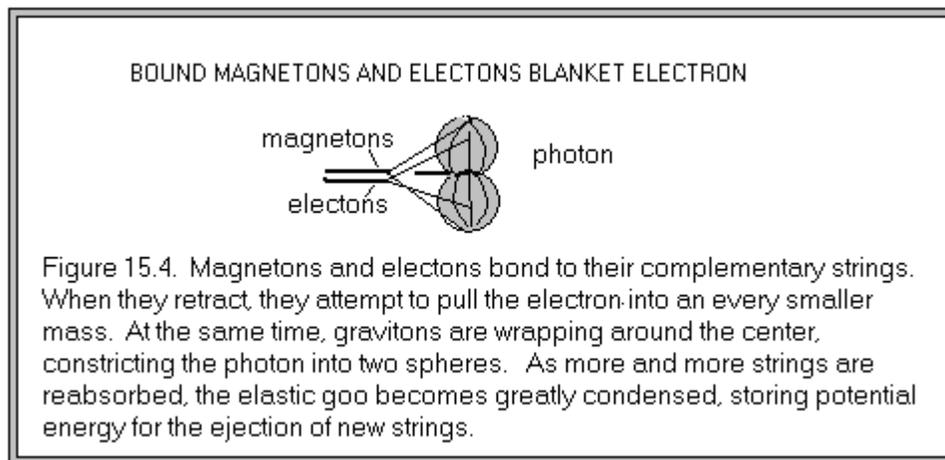
Magnetons retracting

The portals for n-magnetons and s-magnetons are at the poles of the two spheres. Magnetons meet and bond as complementary pairs when they are

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swept to the rear of the particle. 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 magnetons to be spaced evenly around the particle's surface. The force they exert as they retract is inward towards the center of the mass. As the process continues they will be pulled to their respective poles.

The analysis I made at the beginning of this chapter suggests that a few hundred magnetons meet and bond; whereas, the number of electons reaches into the billions.



Electons retracting

It may simply be that the number of p-electons is one-half that of e-electons. The easiest way to view this is to assume that there are twice as many portals for e-electons as p-electons with each portal making the same number of strings. Because the portals are on opposite spheres, the complementary strings that bond create an inward pressure on the electron in somewhat the same manner as bound, complementary magnetons. In this case, there are billions of electons that bond and retract against the surface of the electron. Because the electons are swept to the rear before they bond, p-electons from the east side of the electron may bond with e-electons from the west side of the electron.

Metamorphoses of reabsorbed strings.

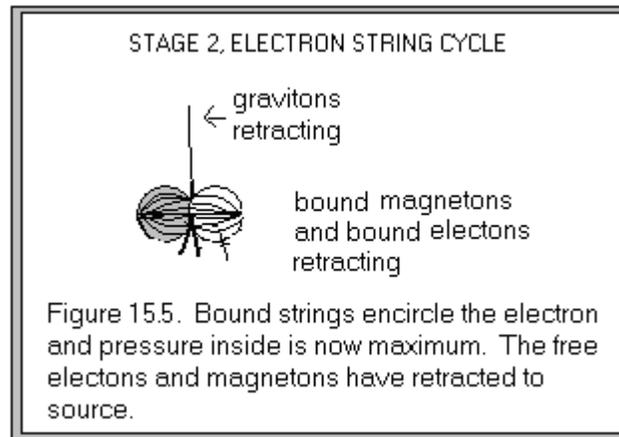
I believe the material inside the electron must have strong elastic properties just like the strings. This is the same property that is necessary to keep the electron coherent during a nuclear explosion, and it is the same property that allows a tiny amount of this goo to be stretched across a galaxy.

As the various strings are absorbed, they become buried deep within the electron where they fuse under great pressure to become the generic, primordial goo for the creation of new strings.

GOO DEFINED

Goo is the primordial elastic material used to make virtual elastic strings. It makes up the interior of the electron and other particles. I theorize that there are at least two kinds of goo: n-goo and s-goo that correspond to the north and south hemispheres of an electron.

Stage Two: Maximum pressure reached



By the end of stage one, gravitons, bound magnetons, and bound electrons have created maximum pressure on the electron. This stage must exist for a very brief period of time because the electron immediately begins making new strings.

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Stage three: Creation of new strings. When the pressure inside the electron reaches a critical point, portals open up, and bits of goo are ejected into space to form new virtual elastic strings. The creation of strings continues until they reach maximum and stage one begins anew. During this process, the portals are constantly being forced open and snapped closed as the strings spew forth from within the electron.

Following the ejection of strings, the internal mass and pressure of the electron is sharply reduced. Finally, a point is reached where the internal pressure is insufficient to make new strings. At this time, a maximum number of strings surround the electron and stage one has been reached. The old strings surrounding the photon are quickly reabsorbed and the new strings begin applying pressure on the electron.

Rock cycles versus string cycles

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. Finally, it melts to form the magma. Under sufficient pressure, the Earth's crust opens and lava is thrust 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 a dense, primordial, elastic goo for the creation of new strings. Like lava, the property that makes a string unique depends upon the location of the portal.

I believe two degrees of specificity are necessary to describe the differences between strings. One comes from its size, which is determined by the portal, and the other from the sphere it is ejected from, either n-goo or s-goo. Perhaps gravitons are composed of both n-goo and s-goo, which causes them to have a weak interaction with electrons and magnetons as explained in the chapters that follow.

Relative influence of Electons versus Magnetons on Creating Pressure

Perhaps half of the e-electons created by the electron become bound to p-electons emanating from the proton, and for this reason, they have little influence on creating internal pressure. However, it is known that the electron is also making p-electons that become bound to e-electons. Thus the energy associated with bound electons may be exactly equal to the energy of the bound magnetons. In this view, magnetons, electons, and gravitons are all important in creating pressure necessary for self induction.

Electron String Cycle

The electron's spin angular momentum creates an inward pressure on the electron as gravitons, bound electons, and bound magnetons wrap around the electron and retract back to source. The elastic goo inside the electron becomes greatly condensed with tremendous potential energy. It metamorphoses to form primordial n-goo or s-goo.

When internal pressure reaches a critical state, portals open, and the stored energy inside the electron ejects new strings into space. The portals continue to open and close until the internal pressure is reduced to a base level where it can no longer eject strings. Different kinds of strings have their own unique portals that vary in size and location on the electron. They control pressure and size of string.

Following the ejection of strings, the cycle continues because the portals close and the strings that surround the electron retract back to source. This creates a self inducing cycle driven by the never ending motion of the electron.

Particle Wave duality and String Cycles

In 1924, Louis de Broglie suggested that electrons and other matter with known mass might have wave properties in the same manner as photons, the particles that make up light and other forms of electromagnetic radiation (discussed in detail in the chapters that follow). The frequency of the electron wave is calculated in the same manner as that done for photons:

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frequency = E/h where E = energy in joules and h is Planck's constant. The length of the wave is calculated just as you would for photons:

$$\text{Wavelength} = h/\text{momentum.}$$

The wave nature of electrons has been shown by using refraction and diffraction techniques (discussed in detail for photons in the chapters that follow), and in 1929 Louis de Broglie received a Nobel Prize in physics for having discovered the wave nature of electrons.

According to VES theory, the wave nature of electrons is explained by its strings, which are ejected at a 90-degree angle to its flight path, just as it explains the wave nature of light. The length of an electron wave has nothing to do with the length of the electron. It merely reflects the length of time and distance traveled while the electron goes through its string cycle. The frequency of oscillation is entirely explained by the creation and re-absorption of electrons and magnetons. The strings emanating from the electron cause diffraction, reflection, and refraction.

A beam of electrons whose velocity is 5.9×10^6 m/s would have a momentum of 5.4×10^{-24} kg.m/s, and its wavelength would be 1.3×10^{-10} meters. This electron would travel 1.3×10^{-10} meters (wavelength) and take 2.2×10^{-17} seconds to complete one oscillation or one string cycle.

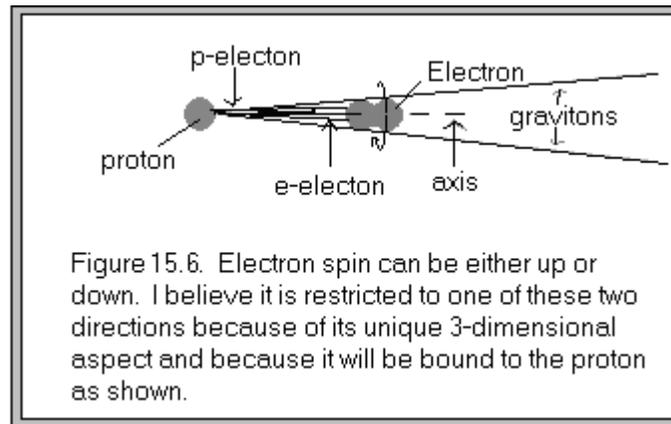
My model states that an electron always exists as a particle and the waves we see at right angles to its flight path are virtual elastic strings. The wavelength in meters is the distance the electron travels in meters as it goes through its string cycle. The diffraction, refraction, and reflection experiments that prove the particle has wave properties are explained by the electron's strings. This is examined in detail for photons in the chapters that follow, and the explanation applies equally well to electrons.

This model fits nicely with Heisenberg's idea that electrons are particles whose complicated orbits are a reflection of their energy states.

The Orientation of the Electron in Orbit

I believe an electron spins in the direction it is moving around the nucleus of an atom for the same reason that Earth spins in the direction it is moving around the Sun. It is surrounded by gravitons and possibly other

strings emanating from the nucleus and other sources. According to my model, the electron is not perfectly round, and for this reason, it becomes oriented as shown in Figure 15.6. This seems the most likely position that would allow it to spin up or down, but not in any other direction as shown by scientists. In nature, there is an even mix of electrons spinning in each direction



Electron Orbital Patterns

Many if not most physicists believe that photons do not have mass because of the special theory of relativity. We will examine this concept in detail in the chapters that follow. For now, please suffer a little and let me range freely with the idea that photons do have mass.

If photons have mass, it greatly simplifies our understanding of the orbital patterns of electrons as they circle the nucleus. It explains why an electron goes to an outer orbit when it absorbs the mass of a photon. It does so because its angular momentum increases. In the same manner, when an electron ejects a photon it loses angular momentum and moves closer to the nucleus. This is identical to our solar system. A large planet that loses mass moves closer to the central body because its orbital angular momentum decreases. Orbital angular momentum is equal to: mass x velocity x the radius between central body and object. In part, orbital angular momentum prevents it from spiraling into the nucleus just as it holds earth in its orbit about from the Sun.

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Niels Bohr (1885-1962) reasoned that the momentum of the electron would be related to Planck's constant and would increase in increments related to the mass of the photon it absorbs or ejects. When the electron is in its closest orbit next to the nucleus, it cannot emit photons. This electron is in its ground state. Although it cannot emit photons, it can absorb photons and move to an outer orbit according to its increase in angular momentum: The greater the mass of the photon absorbed the greater the increase in angular momentum and the greater the size of the orbit. The equation he derived is

$$\text{momentum} = \frac{n h}{2 \pi r}$$

Where n is any whole number and h is Planck's constant (6.6×10^{-27} erg-seconds). When n is one, the electron is in its ground state, when n is 2 it has moved slightly to an outer orbit and its momentum is twice the size as in its ground state.

The story is more complicated than this simple picture. Physicists have shown that the wavelength of the electron is important in determining the number of electrons that can occupy a particular orbit. Only one electron is found in the lowest ground state, and its orbital distance around the nucleus is the same as its wavelength. It is also the time it takes to go through one string cycle.

An electron rotating around the nucleus creates magnetons and other strings that are swept to the rear as they collide with a dense fabric of strings from other sources. Those strings swept to the rear are to some extent trapped in a string matrix, and at least for a moment, they assume the same orbital pattern as the electron in orbit. In this fashion they present a physical barrier to an electron attempting to occupy the same space. When there is only one electron in its ground state, it must be spaced sufficient distance from the nucleus that its own strings will not unduly interfere with its rotation. The orbital distance in this situation is the same as the length of the string cycle because the electron has maximum strings once per cycle.

Two electrons can exist in the same orbit if the orbital distance is sufficiently large to accommodate two wavelengths, or two string cycles. According to VES theory, the distance between the electrons must

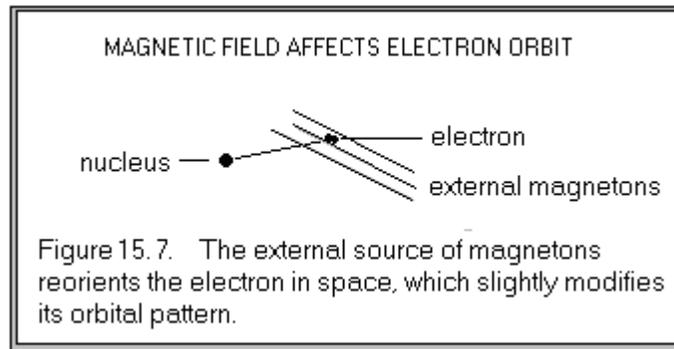
The Electromagnetic Forces

accommodate the magnetons and electrons that are for a moment trapped in the matrix.

Physicists have shown that only two electrons can occupy the same orbital pattern and to do so one must be spinning up and the other spinning down. This suggests that spinning up versus spinning down causes the strings trailing behind the electron to occupy a slightly different position in space.

It is thought that electrons can exist in elliptical orbits as well as circular orbits. According to VES theory, if the electron is in an elliptical orbit, then its strings do not interfere with those in the circular orbit. This means its angular momentum is different and it can emit a slightly different photon when it moves closer to the nucleus.

It is also possible to force the electron into a different orbit by treating it with a magnetic field. Physicists reason that this changes the tilt of the electron. According to VES theory, the magnetons form a physical barrier that the electron must negotiate its way through as it orbits the electron. This causes the electron to change its configuration in space, which changes its tilt slightly.



Because the electron is going through a string cycle, there is the possibility that once per cycle there will be fewer strings connecting the electron to the nucleus of the atom. This gives the opportunity for the electron to briefly stray away from the nucleus. Perhaps this explains why all attempts to experimentally measure orbital patterns meet with failure.

Oscillation Frequency of Atoms

Atoms have unique oscillation frequencies. Scientists reason that oscillation is related to the positive charges emanating from the nucleus (my p-electons) and negative charges from the electrons (my e-electons). Gravitational attraction between the two bodies may also have a role. The fact that the whole atom has an oscillation frequency suggests that the rate that electrons are going through their string cycles is the same frequency as the rate that quarks are going through their string cycles. This seems reasonable because the bonds formed between e-electons from the electron and p-electons from the nucleus would pull them into synchrony.

The vibration frequency of the atom will depend upon the number of its electrons and their orbits, and its protons: String cycles and oscillation frequency will have the same periodicity and each atom will oscillate at a unique frequency.

Scientists measure the oscillation frequency of atoms by the appearance and disappearance of its magnetic fields.

In the chapters that follow, we will gain even greater appreciation of string cycles and how they explain the velocity of light, Maxwell's equations, and the observations and experiments attributed to the theory of relativity.

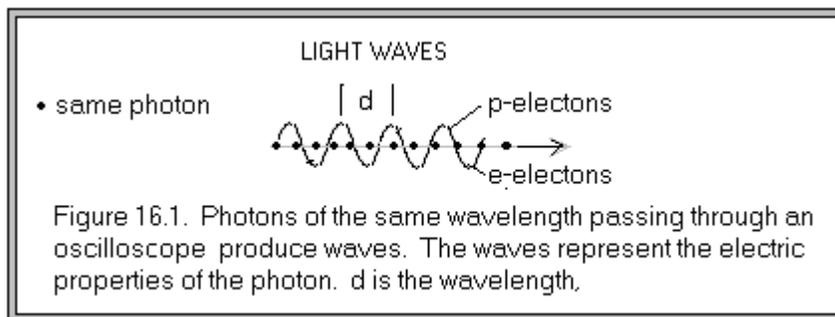
CHAPTER XVI

Photon

The Basic Unit of Light

The light we receive from the Sun and other sources is composed of tiny particles called photons. Photons are similar to electrons in several key areas: They are particles that behave in many respects like waves, and they both create electric and magnetic fields. According to VES theory, this means photons develop spin angular momentum and go through a string cycle in the same manner as an electron.

The photon's waves can be detected by diffraction, refraction, and reflection which I will discuss in Chapter XVIII. In addition, they can be viewed directly with an oscilloscope. In this case, we are examining the photon's electric fields. To accomplish this goal, a stream of photons with the same wavelength is fed through an oscilloscope. The instantaneous value of the electric fields are seen on the screen as the photon moves through the instrument. This is shown in Figure 16.1.



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. The relationship between wavelength and frequency is a

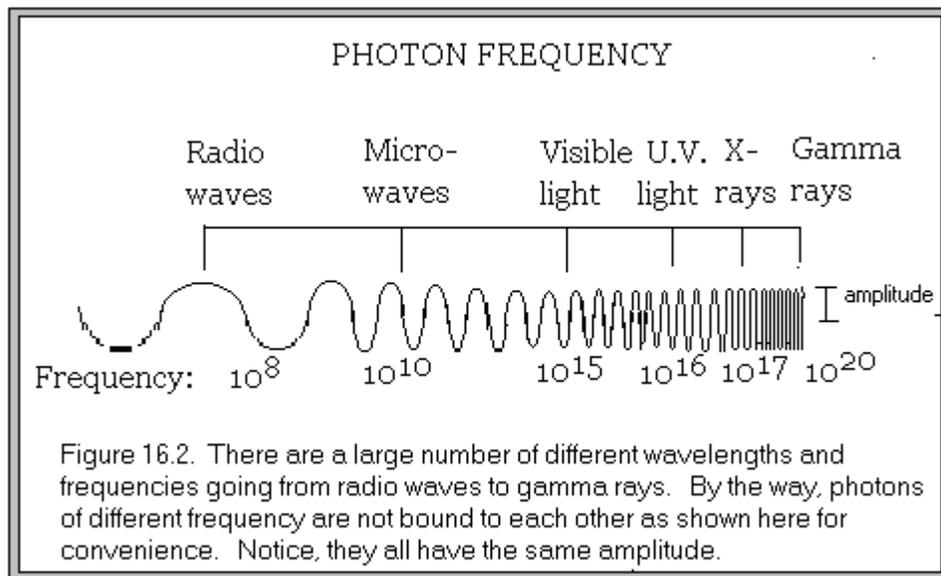
Electromagnetic radiation

function of the velocity of light. And all photons travel at the same velocity, which is approximately 3×10^8 meters per second.

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

According to VES theory, that portion of the wave above the midpoint is created by p-electons and that portion below the midpoint is created by e-electons. This means the length of the wave has nothing to do with the length of a photon. It is merely the distance the photon travels as it goes through its string cycles. I will continue with this discussion in depth in the next chapter.

Kinds of Photons



Physicists speak of photons as electromagnetic radiation. Visible light is just one type of electromagnetic radiation; other common types we are familiar with include radio waves, heat waves, microwaves, visible light of

different colors, x-rays, and gamma rays. The photons mentioned all have different oscillation frequencies. In fact there is a continuous array of electromagnetic radiation beginning with low frequency radio waves and ending with high frequency gamma rays (see figure 16.2).

Why do some photons have higher oscillation frequencies than others?

First let's keep in mind that oscillation frequencies are created when photons go through their string cycles. What we are really asking is this: why do some photons go through their string cycles faster than other photons? There can be only one answer to this question. Some must have greater spin angular momentum since spin angular momentum is the root cause of string cycles, just as explained for electrons. This is only possible if the photon has mass. This controversial subject will be explored in detail in this chapter.

Calculating the mass of a photon

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 spin angular momentum. Let's look at a couple of examples. The mass of a radio wave photon with a frequency of 1×10^4 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 $E = \text{mass} \times c^2$.

radio photon energy	radio photon mass
$\text{energy} = 6.6 \times 10^{-34} \text{ j.s.} \times 1 \times 10^4$	$E = \text{mass} \times (3 \times 10^8)^2$
$\text{energy} = 6.6 \times 10^{-30} \text{ j.s.}$	$\text{mass} = \frac{6.6 \times 10^{-30} \text{ j.s.}}{(3 \times 10^8)^2} = \boxed{7.3 \times 10^{-47} \text{ kg}}$

The mass of a gamma photon with a frequency of 1×10^{18} is calculated as follows:

Electromagnetic radiation

gamma photon energy

$$\text{energy} = 6.6 \times 10^{-34} \text{ j.s.} \times 1 \times 10^{18}$$

$$\text{energy} = 6.6 \times 10^{-16} \text{ j.s.}$$

gamma photon mass

$$E = \text{mass} \times (3 \times 10^8)^2$$

$$\text{mass} = \frac{6.6 \times 10^{-16} \text{ j.s.}}{(3 \times 10^8)^2} = \boxed{7.3 \times 10^{-33} \text{ kg}}$$

This shows that the mass of a gamma photon is 1×10^{14} times greater than a small radio wave photon. This is of course a tremendous difference. Since both photons are traveling at the same velocity, the momentum of the gamma photon must be 1×10^{14} times greater than the radio wave photon. This explains why its spin angular momentum is that much greater, and why it develops pressure inside the photon that much faster. No wonder the string cycle of a gamma photon is 1×10^{14} times more rapid than a radio wave photon.

Of course none of this makes any sense unless the photon has mass. We will come back to spin angular momentum and string cycles in the next chapter, but for now, let's examine the proposition that photons have mass. This makes a very interesting story.

Photons Are Particles

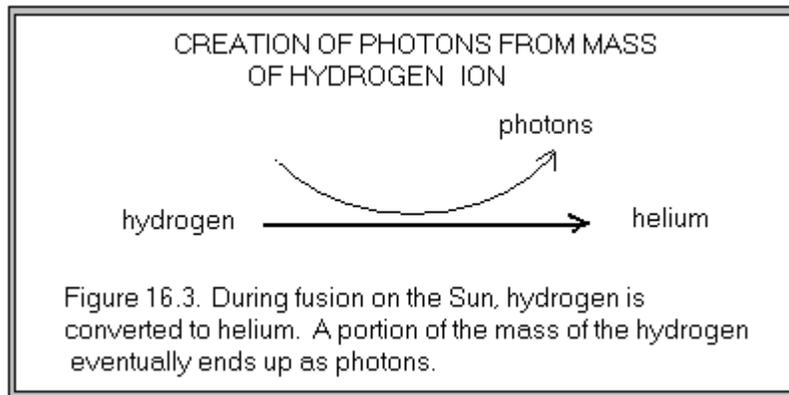
Newton proposed that light was composed of particles but the idea was rejected by many scientists because photons also have wave properties. In 1898, Max Planck came to realize that light emitted by a glowing iron rod placed in a fire could only be explained mathematically if light was composed of particles, 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. Thus the quantum theory was born. Each particle, or photon, is a single quantity of energy and mass.

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 some metal plates,

it causes an electric current. Einstein received a noble prize because he recognized that the photoelectric effect could only be explained if light was composed of discrete particles. We now call these particles photons. The empirical evidence shows these particles have mass.

Photons from Sun come from Mass during Fusion

If photons are particles, it suggests that they have mass. Is there any direct evidence for this assumption? The answer to that question is a definite yes. 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. We receive this energy here on Earth in the form of visible light photons and other photons of greater and lesser energy.



Under intense gravitational force, pressure inside the Sun causes hydrogen ions to fuse and form helium ions. 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) combines with an electron and the two are converted into two gamma rays (photons), which we eventually see as photons of light here on Earth.

In the second reaction, a proton + deuterium combine and release another gamma ray photon plus an intermediate. Two intermediates then combine to form helium plus two protons. Thus in the creation of helium, a portion of the mass of the hydrogen is released as gamma ray photons, which are

equivalent to millions of photons of lesser mass and energy. There seems to be no doubt that the photons created in a nuclear reaction begin as normal every day mass.

Direct Evidence that Photons have Mass

There is other more direct evidence that photons have mass. Physicists have shown that photons have momentum. Recall that linear momentum is calculated as mass x velocity. According to this equation, if a photon has momentum, then it must have mass. Let's examine the evidence.

In the 1870s, Maxwell predicted that light had momentum. Thus it was his belief at the time that photons have mass:

$$\text{momentum} = \text{mass} \times \text{velocity}$$

The equation he provided was: momentum = E/c where E is its energy and c the velocity of light. Notice that this equation is the same as the more famous one only slightly rearranged:

$$E = m c^2$$

$$E = m \times c \times c \quad \text{where } m \times c = \text{momentum}$$

$$E = \text{momentum} \times c$$

$$\text{momentum} = \frac{E}{c} = \frac{m \times c \times \cancel{c}}{\cancel{c}}$$

Obviously, physicists were well aware that $E = mc^2$ long before Einstein popularized this equation when he made the assumption that mass could be converted to pure energy or vice versa.

De Broglia also provided an equation that physicists use to calculate the momentum of photons:

$$\text{momentum} = \frac{h}{\text{wavelength}} \quad \text{where } h = \frac{\text{energy}}{\text{frequency}} = \text{Planck's constant}$$

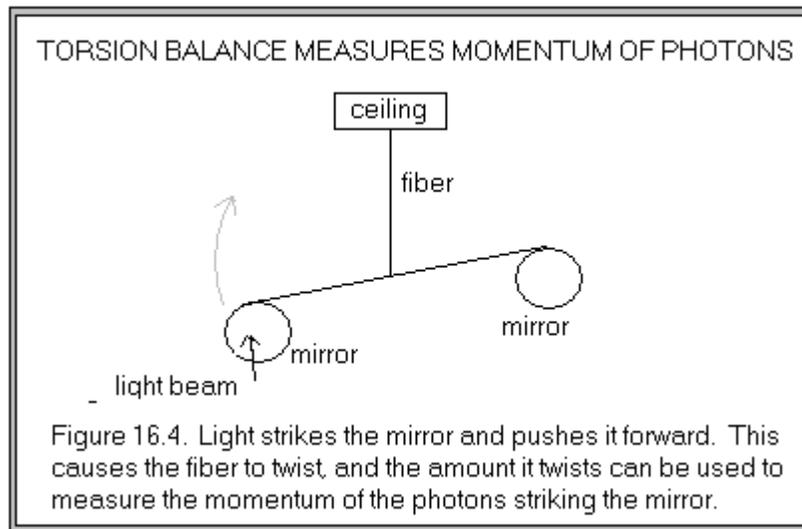
I have already introduced the equation that shows the relationship between wavelength and the velocity and frequency of light:

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

Combinations of this equation and those above can be used to derive any of the other equations including $E = mc^2$.

Electromagnetic radiation

The first measurement of the momentum of light was achieved very soon after the turn of the century (1900) by several investigators. One experimental procedure made use of a torsion balance as shown in Figure 16.4.



A light of known intensity and wavelength is directed against the mirror as shown in figure 16.4. The light causes the mirror to move away from the light beam, which causes the fiber to twist. The force exerted to twist the fiber can be used to measure the momentum of the photons striking the mirror. The momentum measured by the torsion balance and by other means is as predicted by the mathematical equations provided above. These experiments demonstrate unequivocally that photons have momentum, which surely means they have mass since momentum is defined as mass \times velocity. It makes no sense to say that the photon gains mass at the instant it strikes the mirror because momentum can only be achieved by a moving mass.

Another line of evidence that suggests that photons have mass is the effect of gravity on photons. Physicists have shown that light from distant stars bends inward towards large bodies on their way to Earth. They refer to

Electromagnetic radiation

this as gravitational lensing. Scientists believe they move inward toward the stars partly because of the gravitational attraction between star and photon. If this is true, the gravitational force of attraction between star and photon strongly suggests that photons have mass while in flight. Recall that the gravitational force of attraction is computed using the universal law of gravitation by multiplying the mass of the two bodies together.

$$\text{Force in Newtons} = \frac{G \text{ Mass}_1 \text{ Mass}_2}{(\text{distance})^2}$$

Like momentum, the gravitational force of attraction between photon and star shows us photons have mass.

Another line of evidence comes from comets passing through our solar system. Scientists believe the tail of the comet is directed away from the sun because it is constantly subjected to a stream of photons from the sun pushing on the molecules making up the tail of the comet. This observation can only be explained if photons have momentum and therefore mass. .

I believe the relationships I uncovered absolutely show that gravitons have their effects on the bodies in our solar system because they have a physical presence in space. In fact, there is no other way to explain a large number of different observations in our solar system as discussed in the first section of this book. The easiest interpretation is that gravitons have mass. If virtual elastic strings have mass and photons create strings, then it is reasonable to believe that photons also have mass.

Scientists have discovered quasiparticles that wink in and out of existence, as well as collide and exchange momentum. These are the Bose-Einstein condensates I discussed previously. Some are called magnons because they are believed to be magnetic waves. Are these the same as the magneton strings described in this book? It seems highly possible. If so, it means there is direct confirmation that virtual elastic strings have mass. If strings have mass, photons have mass.

From the foregoing discussion, it is evident that photons originate as mass when they are created by fusion on the Sun, and it is equally clear that photons have mass when they transfer their momentum to an object as in the torsion balance experiment or when they collide with the molecules that make up the comet's tail. Other evidence cited points in the same direction. Photons have mass.

In the next chapter, I will develop the theme that a photon's spin angular momentum is the workhorse that creates the electric and magnetic force fields created by a photon. It is far easier to reach this conclusion if a photon has mass while in flight.

Why do many Physicists Prefer to Believe Photons do not have Mass?

The reason that many physicists do not believe that photons have mass lies in Einstein's special theory of relativity. According to this theory, a photon in flight cannot have mass because its mass under these conditions would be infinite. The equation that expresses this relationship is:

$$\text{flight mass} = \frac{\text{rest mass}}{1 - \left(\frac{v}{c}\right)^2} = \frac{\text{mass}}{0}$$

where v = velocity of the mass and c is the velocity of light.

Notice, if the velocity of photon, v , is c then mass is divided by zero. Essentially this means its flight mass is infinite.

Because special relativity does not allow a photon to have mass while traveling at the speed of light, physicists speak of photons as being pure energy. They would like to believe that the mass of the photon in flight is converted to energy. What is energy?

Energy is defined as the capacity to do work. For example, we say that water flowing downstream has energy. It can turn a waterwheel that grinds our corn. Notice this is only possible because water has mass, and the energy it possesses comes from the mass of water in motion. In fact it is a general theme of nature that the energy possessed by a particle comes from mass in motion. The movement of atoms and their subatomic particles is directly responsible for all the forces of nature. It is the mass of these little particles in motion that is responsible for the energy they possess. The movement of subatomic particles creates spin angular momentum a form of mass in motion, and spin angular momentum creates virtual elastic strings in motion, and virtual elastic strings have the capacity to do work, they have energy because they are mass in motion. In this context, it makes no sense to say that a photon is pure energy. We can go even further. One of the

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most celebrated equations in physics is $E = mc^2$, which describes the energy and mass of a photon in flight. Its energy is equal to its mass times the square of its velocity, the speed of light, c . Until relativity came into existence, this equation meant exactly what it expresses, that the energy of a photon is the result of mass in motion.

PHOTONS ARE DISCRETE PARTICLES WITH MASS

The evidence shows photons are particles.

The evidence shows that photons have mass.

They are created from mass

They have momentum that by definition equals mass x velocity.

They are attracted by gravitation and therefore have mass.

They create force fields composed of strings with mass as shown by our solar system

Energy is the capacity to do work, and this is only possible if there is mass in motion.

The Creation of Photons

If the special theory of relativity is flawed, if photons in flight have mass, we are forced to conclude that photons are created from matter. Let's examine the facts.

I have already discussed the origin of photons on the Sun where a portion of the mass released in the fusion of hydrogen to helium ends up as photons. In this case, photons are created from the mass of the hydrogen atom during fusion not from pure energy. Of course this is not the only source of photons.

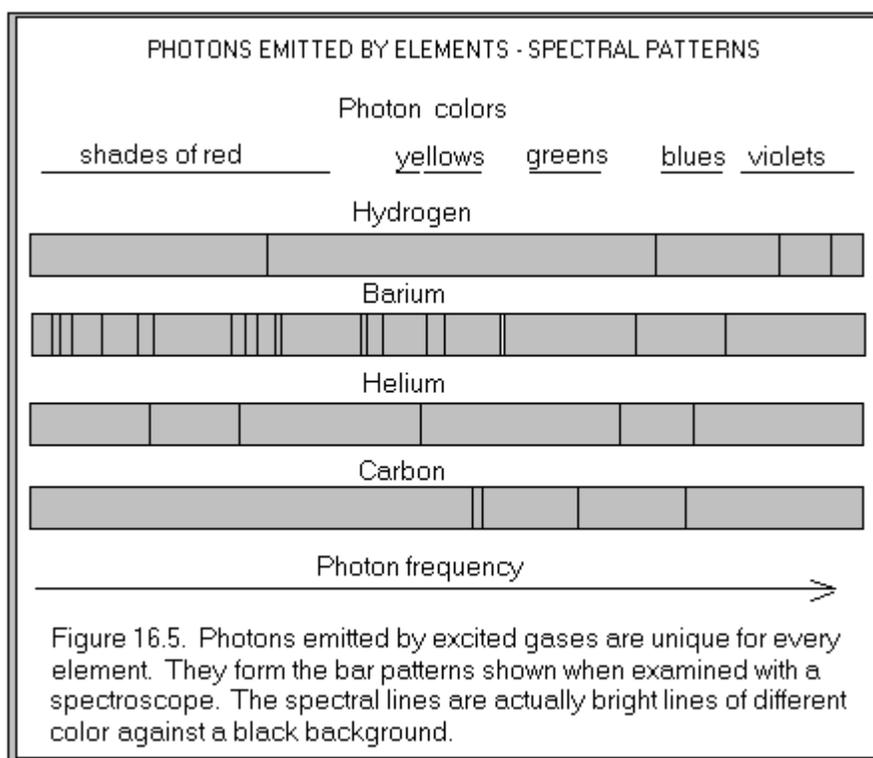
Metals, such as tungsten in the electric light bulb, readily give off photons when they get hot. In fact, every atom is capable of giving off photons if they are in an excited state.

Spectral Lines, Photon Emission

Think of wood burning in a fire, it puts out light of many different colors because there are many different kinds of hot, excited atoms. Scientists have shown that every element emits photons that are unique for that element. It

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depends on the atom's number of electrons and their orientation about the nucleus.



Scientists have measured the exact frequency of the photons emitted for every element in a hot gaseous state. 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. The total atom dictates the frequency of the light emitted.

Atoms absorb photons as well as emit photons. Atoms tend to absorb photons that have the same frequency as those they emit. Thus, absorption spectra have a great deal in common with emission spectra

PHOTON EMISSION AND ABSORPTION

When atoms are energized with heat or electric current, they emit photons. The kinds of photons emitted are unique for every atom.

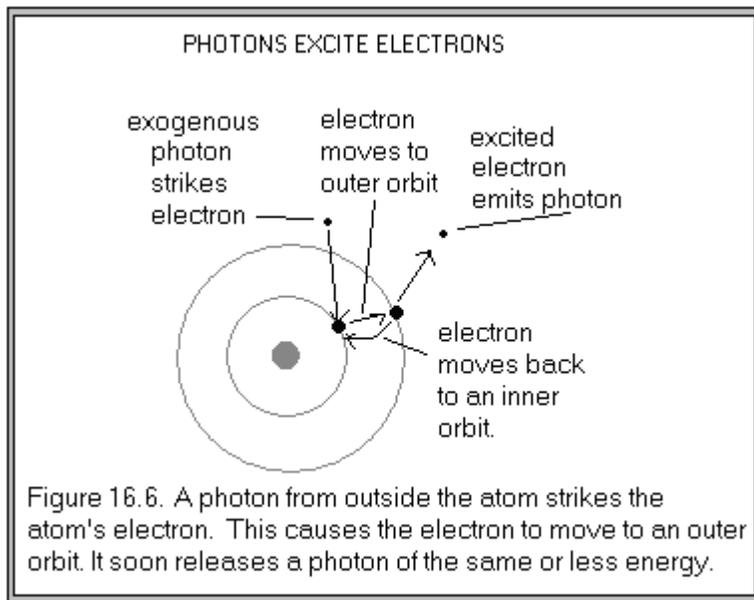
Atoms tend to absorb the same frequency of photons they emit.

Origin of light during photon emission

What is the origin of the photons created by atoms in an excited state? The answer to this question leads to an interesting conclusion.

Soon after Planck advanced his theory that light is composed of particles (quanta), a Danish physicist named Niels Bohr suggested that the atom was much like our solar system. We now know his theory is basically correct although much more complicated than a solar system. At the center of the atom is the nucleus and whirling around it are electrons in orbit.

An electron isn't quite like a planet, however. It readily absorbs a photon and moves to an outer orbit. However, this excited state is unstable, and the electron quickly ejects a photon, a quantum of energy (mass in motion), and moves inward towards the nucleus. How far it may jump from one orbit to the next depends upon the photon acquired and the mass of the photon ejected. In this scenario, the electron absorbs a photon that originates from outside the atom and reemits a photon of equal or lower energy. This, of course, cannot be the whole story. It does not explain how light is created in a burning fire or from the filament in a burning light bulb. Nor can it explain why every hot element gives off photons specific for that element.



Where does a Photon come from in a Light Bulb?

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 electrons and atoms in their path. This raises the temperature of the filament to more than 2000 degrees C, and it causes the electrons associated with the tungsten atom to move into an outer orbit and emit photons.

When mercury atoms in a fluorescent light bulb are excited by an electric current, they emit ultraviolet light (UV). The UV photons are absorbed by the electrons of other atoms (phosphors) on the inner surface of the fluorescent tube. These electrons emit photons with less energy than the UV photons they absorb. Much of it is in the range of visible light. Notice that the mercury atoms emit photons because they are excited by the electric current, and the phosphor atoms emit photons because they are excited by UV photons emitted by the mercury atoms. Thus we see there are two fundamentally different sources of photons.

In the case of the tungsten filament, the electrons responsible for creating light, the ones actually emitting photons, are those associated with the

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tungsten atoms, not those moving as free electrons in the wire carrying current. 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 light. The free electrons entering the fluorescent tube do not emit light. 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 current. From these three examples, we can conclude that photons are only emitted by electrons orbiting the nucleus of an atom. This is the reason that photon emission is associated with atoms, not free electrons, and is specific for a specific kind of atom.

Origin of Photon Mass in a Light Bulb

If the tungsten filament is creating photons from preexisting mass, where does this mass come from? Let's first consider the electrons flowing through the wire.

The free electrons in an AC circuit tend to remain in the same area in the wire because the polarity of an AC circuit constantly changes. Their actual velocity is in the neighborhood of 1/10 of a millimeter per second, and a filament is several millimeters long. This means free electrons inside the tungsten filament tend to remain in one place where they are jostled back and forth as the current is reversed. This means fresh electrons flowing through an electric wire cannot be responsible for the mass released as photons by the tungsten filament.

In order 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 92 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.

CREATION OF PHOTONS

Photon emission is only associated with atoms, not free electrons boiling off the end of an electrode. The mass of all the photons created by a tungsten light bulb during its life time is too large to be accounted for by the electrons inside the filament.

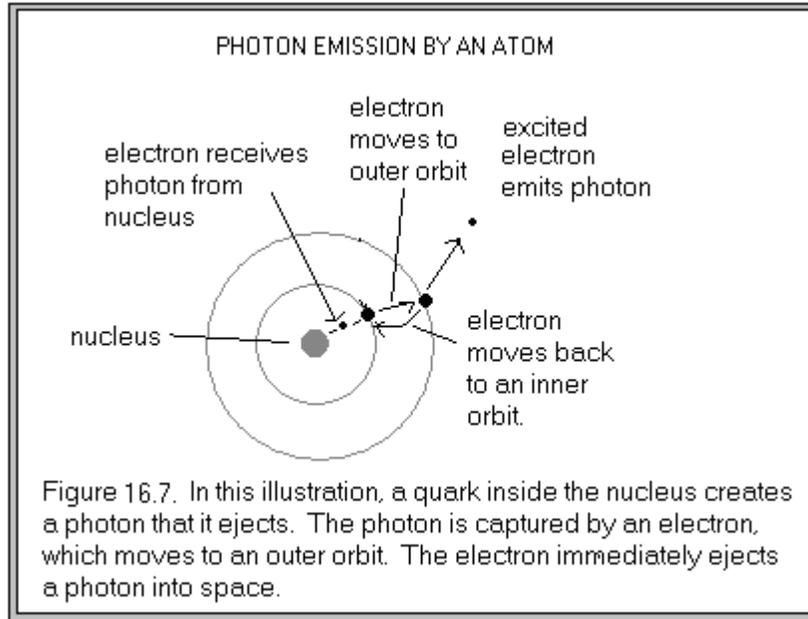
Quarks and Electrons Exchange Photons

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.” These physicists believe that quarks inside the nucleus of the atom create photons and that electrons and quarks exchange photons. Although VES theory does not agree with the idea that photons are the carriers of force between nucleus and electron, I was pleased to find that physicists believe that particles inside the nucleus emit photons and that electrons and quarks exchange photons.

Quarks make up less than 2% of the mass of a proton. An up quark has a mass of 5.3×10^{-30} kg and a down quark has twice this mass. 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 are spinning 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 then passed on to the electrons surrounding the nucleus that reemit them as visible light.

We can expect that the string cycles of electrons and quarks are in synchrony because p-electons from the nucleus are bound to e-electons emanating from the electron. This pulls them into synchrony. Thus the exchange of photons between electron and quark would be facilitated because their string cycles would be in sync.

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Let's return to the tungsten filament and think of the electric current surging through the wire. When the electrons enter the tungsten filament, they are crowded together. In this situation, the direction they are moving varies greatly as they are jostling to and fro. This is true whether it is a DC circuit or AC circuit. The surging electrons push and pull the quarks inside the nuclei of the tungsten atom, which greatly increases their spin angular momentum. It is reasonable that a surging current will influence the velocity and momentum of quarks more than it will influence electrons in orbit about the nucleus of the tungsten atom. This movement will increase the quarks spin angular momentum. This alone is good reason to believe that quarks are the ultimate source of photons created by atoms when energized by an outside source.

Imagine a quark spinning in a mass of goo. Some of this goo collects on the surface of the quark as it spins, then it is incorporated inside the quark where it is transformed into a tiny spinning particle, a photon. As the quark goes through its string cycle, the internal pressure increases and the photon is ejected into space where it is captured by an electron. The excited electron then moves to an outer orbit and emits a photon we see as visible

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light. This explains why spectral patterns are associated with atoms not free electrons.

The acceleration of particles is thought by scientists to be the root cause of photon emission. It is reasonable that an electric current would alter the velocity of quarks much more dramatically than it would alter the velocity of electrons whirling about the nucleus.

Mutable Atoms

I suspect that most scientists on Earth 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. We know $E = \text{mass in kg} \times c^2$, 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 (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, if we were to examine the ash from a burning log, we would find it impossible to measure any decrease in its mass. The photons emitted by the burning log are far less than the light put out by a 40 watt globe burning for 1000 hours; yet any mass increase is spread over kilograms of matter, not a few milligrams.

Notice that this explanation provides a reason why only those electrons associated with atoms are the ones that emit photons. It explains why free electrons boiling off the electrodes in a neon tube do not directly create light. Surely, they are in a highly energetic state as they surge back and forth at great velocity inside the tube where they collide with other electrons and other subatomic particles. However, they don't create light. Isn't this dramatic proof that photons are not created from pure energy? I have to believe so. All observations point to one conclusion: Spinning, energized

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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.

PHOTONS ARE CREATED FROM PREEXISTING MASS

During fusion, a portion of the hydrogen's mass is converted to photons. It seems logical that all photons are created from mass.

Photon emission involves the whole atom. Free electrons boiling off the electrodes do not emit light when excited.

I believe the acceleration of the quark as it moves to and fro increases its spin angular momentum and allows it to assemble a photon using the mass of the nucleus. The photon is then passed to an electron. This is the reason that only those electrons in orbit about an atom create photons during photon emission. The mass of the atom is ultimately restored by capturing exogenous photons.

My Own Experiments with Light Bulbs

Does a light bulb under constant voltage lose capacity to carry current? If so, is this due to the loss of mass from the tungsten atom no matter how minute this mass might be? Is it possible to reconstitute the ability of a tungsten filament to carry current if subjected to a long term treatment with a strong light source while not burning? To gain a better appreciation of this phenomenon, I examined the rate a Christmas tree light bulb loses capacity to carry current as a function of burn time, Terry (2008), note 35. I found, indeed, that a light bulb under constant voltage does lose its capacity to carry current, and it does so at a constant rate once it becomes hot, at least until it enters the burn out phase. However, the second part of this experiment was impossible to carryout because I also came to the

conclusion that tungsten atoms begin to fly off the filament the moment electricity begins flowing through the wire. This makes it difficult if not impossible to assess just why the filament loses capacity to carry current.

I also examined current decay rates for Christmas tree light bulbs subjected to different voltages. I found that decay rates increase exponentially as voltage increases (Terry, 2008), note 35. When decay rates for different voltages are plotted they are linear if plotted as \log_{10} . This is the same results scientists have shown for chemical reaction rates measured at different temperatures. This suggests that oxidation is the reason for decay, but this may not be true. Has all the oxygen been removed from a Christmas tree light bulb? Should decay rates tend to level off as the oxygen is depleted, or does the concentration of oxygen remain fairly constant? These factors have probably been studied, but I could not find the results in the literature.

I am hopeful that some scientist will take up the challenge to prove or disprove whether photon emission results in loss of mass as VES theory seems to demand.

Frequency of Photons controlled by Electric Current

An oscillator is used to control the frequency of the alternating current applied to a transmitting radio antenna. This means it controls the frequency that e-electrons alternate with p-electrons because in an alternating current the positive and negative fields are constantly reversed. When these strings bond to the antenna's electrons and quarks, they dictate the length of their string cycles. In this manner the total oscillation frequency of the antenna's atoms is controlled by the electric current. This in turn dictates the frequency of the photons emitted by the antenna. The higher the frequency of the alternating current, the higher the frequency of the photons created. When the frequency of the wave is controlled in this manner, we are talking about an FM radio station. Thus the imprint of the sound wave is achieved by controlling the length of string cycles.

Perhaps the quark's string cycle controls the frequency of the photon emitted simply because it controls the amount of goo that can be assembled by a quark per unit time with a given spin angular momentum.

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If the frequency of the current is held constant while the magnitude of the current is increased, there are more photons created per unit time but the frequency of the photons created remains the same. In this case, the number of quarks creating photons increases, not the rate of their string cycles. Electric current tends to flow along the periphery of the wire or antenna. However, stronger current likely cause atoms more inside the wire to emit photons that are passed from electron to electron until they eventually make their way to the surface. If we modulate the number of photons created per unit time while holding frequency constant, we are talking about an AM radio station. Notice in this case, the imprint of the sound wave is the pulsation of greater or lesser photons not the frequency of the individual photons.

A DC current causes an electric light bulb to emit photons in the same manner as an AC current, although for a given voltage the AC current creates approximately 60 percent more light (my own rather crude measurement). The moving electrons inside a wire are constantly banging into other electrons and atoms, which causes them to change direction frequently. This in turn causes the acceleration and deceleration of quarks in a DC or AC circuit.

One of the main points of this discussion is to show that strings emanating from other sources influence the string cycles of electrons and quarks. This idea is essential to understanding some aspects of relativity.

PHOTONS, SOME BASIC PROPERTIES

Electromagnetic radiation, including visible light, is composed of tiny particles called photons. Photons have electric and magnetic force fields that alternate with time.

The mass of the photon can be calculated using $E = m c^2$ because E and the speed of light are known for all photons. The only reason to believe photons do not have mass is special relativity, not the facts that plainly show photons have mass.

Photons are created from mass during fusion. Photons are also created when an element is heated in a gaseous state; the element creates photons that are characteristic for that element. This is called photon emission. Atoms tend to absorb the same photons they emit.

During photon emission, the evidence suggests that quarks create photons using the mass of the nucleus. The mass needed to create a photon is extremely minute when compared to the mass of the atom. When a quark emits a photon, the electrons in orbit about the nucleus easily capture the photon because electron and photon both vibrate at the same frequency. When an electron captures a photon, it moves to an outer orbit because it has greater orbital angular momentum. The excited electron soon releases a photon and moves to an inner orbit. This is the photon we recognize as light.

Quarks and electrons exchange photons. The direction of the exchange is dictated by outside energy sources and the state of the atom. This means an atom's mass is restored by the absorption of exogenous photons.

Electric currents can be used to control string cycles and the frequency of the photons emitted by atoms.

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CHAPTER XVII

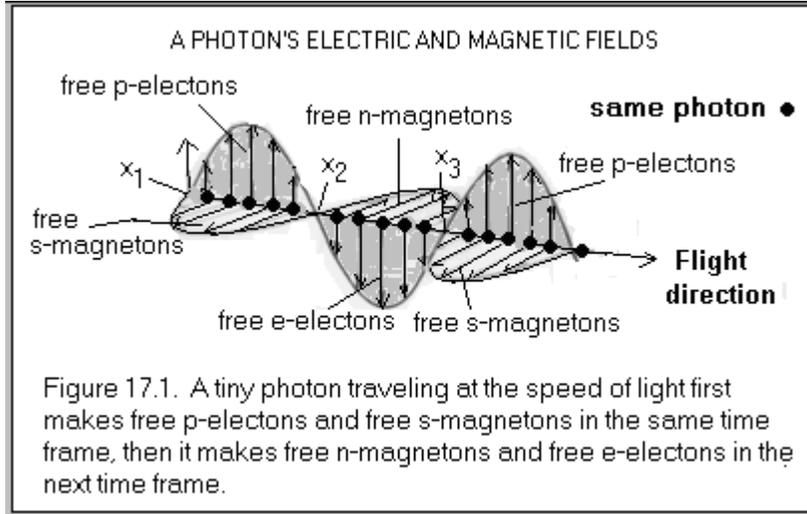
The Photon's String Cycles

In the previous chapter, I introduced the idea that a photon is a particle that exhibits some wavelike properties. According to VES theory, the photon's wave properties are created by the virtual elastic strings emanating from the particle as it goes through its string cycle. This means wavelength has nothing to do with the physical length of a photon, and it has nothing to do with the length of the strings ejected at right angles to the photon's flight path. It simply reflects the distance in meters a photon travels while going through its string cycle.

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

Waves created by Electric Fields and Magnetic Fields

In contrast to the electron, the photon alternates making e-electons and p-electons as well as n-magnetons and s-magnetons. In one string cycle it makes p-electons and s-magnetons in synchrony. Then it makes e-electons and n-magnetons in synchrony. This continues indefinitely. This is illustrated in Figure 17.1. Notice that the fields are at right angles to flight direction and they are at right angles to each other. The arrows represent the direction of the fields, and the height of the waves indicates the instantaneous concentration of the fields at any one time.



FREE STRING DEFINED

A free string is one that is not bound to its complementary twin. Oscilloscopes that measure the electric fields of photons give an instantaneous measurement of the concentration of free strings. They cannot measure bound strings.

I pointed out in Chapter XV that the velocity of light can be calculated by using certain electric and magnetic quantities. This was worked out by Maxwell in 1864. Photons show the same relationships.

$$c = \frac{E}{\beta} = \frac{1}{\sqrt{\mu_0 \epsilon_0}} = 3 \times 10^8$$

The measured velocity of light is 299,792,458 m/s, slightly less than the 3×10^8 value expressed for convenience.

The electric field E is a vector force and the value of E is proportional to the lines of electric force. In the same manner, the magnetic field is a vector force and the value of β is proportional to the lines of magnetic force. According to VES theory, the electric lines of force are comprised of

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electrons, and in the same manner the magnetic lines of force are magnetons. This leads to the conclusion that the number of free electrons divided by the number of free magnetons is equal to the velocity of light. This ratio applies to all photons, big and small.

$$c = \frac{E}{\beta} = \frac{\text{number of electrons}}{\text{number of magnetons}} = 3 \times 10^8$$

The energy density of the electric field = $\frac{1}{2} \epsilon_0 E^2$ where ϵ_0 is the electric constant with a value of 8.854×10^{-12} F/m, and E is a vector force. Energy density of the magnetic field = $\frac{1}{2} \beta^2 / \mu_0$ where μ_0 is the magnetic constant with a value of $4\pi \times 10^{-7}$ H/m and β is a vector force. These same ratios apply to photons and electrons.

If the energy of the photon's electric field and magnetic field are equal, and if the ratio of electrons to magnetons is 3×10^8 , then we also arrive at this relationship:

$(3 \times 10^8 \text{ electrons}) \times (\text{energy of one electron}) = (\text{one magneton}) \times (3 \times 10^8)$
This relationship is important in understanding the photon's string cycles.

Photon String Cycle

I propose that photons go through a string cycle similar to that of the electron. It is driven by the same forces that act on the electron to create virtual elastic strings; therefore, photons must make gravitons as well as electrons and magnetons.

A photon spins in the direction it is moving as it collides with gravitons and other strings in its path. According to my model, the spin angular momentum created causes the photon's internal pressure to increase for the same reasons explained for electrons. When the internal pressure reaches a critical point, a photon begins to eject virtual elastic strings, and when the pressure subsides to a base level, it makes no strings. This is illustrated in Figure 17.2 for the electric and magnetic fields of a photon.

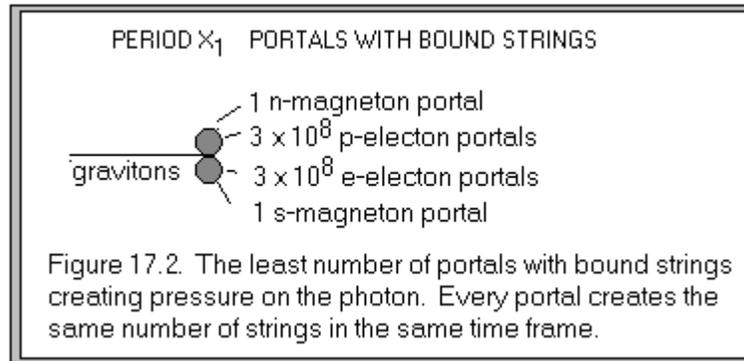
In addition to the electrons and magnetons we measure with our instruments, it is theorized that a large number of complementary strings are produced to drive the string cycles. Thus the photon, like the electron, is

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making complementary magneton pairs and complementary electron pairs with every string cycle. It is instructive to look at this a little more closely in conjunction with the photon's oscillation period as shown in Figure 17.1.

At x_1 all the strings have retracted to the point that none can be detected with our instruments. At this point in the string cycle, the bonded complementary pairs cover the exterior of the photon like an orange peel, and they are creating maximum pressure. Some of the condensed goo inside the photon will become strings, while the remainder will provide the potential elastic energy needed to eject new strings. Since the magneton has 3×10^8 more energy than an electron, electrons and magnetons more or less share equally in the constriction of the photon.

The number of bound electron pairs constricting the photon is 3×10^8 times greater than the number of bound magnetons. If every portal creates the same number of bound strings, then the least number of portals for bound strings is as shown in Figure 17.2.



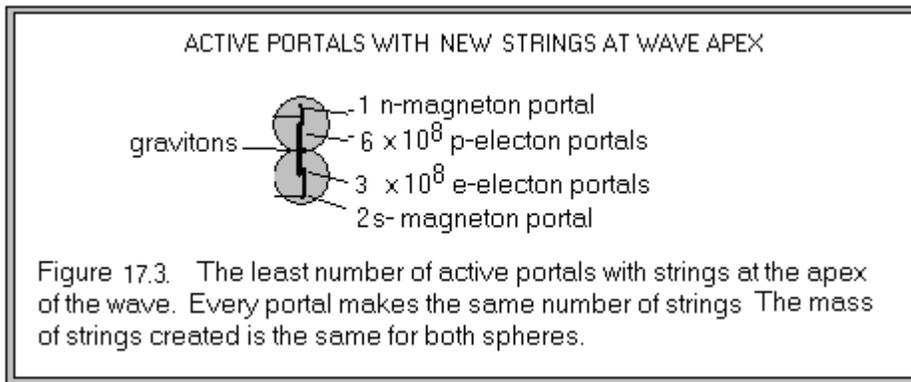
In addition to the bound strings that cover the photon at x_1 in Figure 17.1, there are free e-electons and free-n-magnetons still being reabsorbed from the previous period. Final re-absorption of these strings takes place by x_3 . They are not detected by our instruments because they have mostly retracted back to source. Perhaps this explains why free strings alternate with each oscillation period.

When the pressure inside the photon reaches a critical stage at x_1 , its portals open up and it begins making new strings. The creation of free p-electons and free s-magnetons allows our instruments to detect these strings.

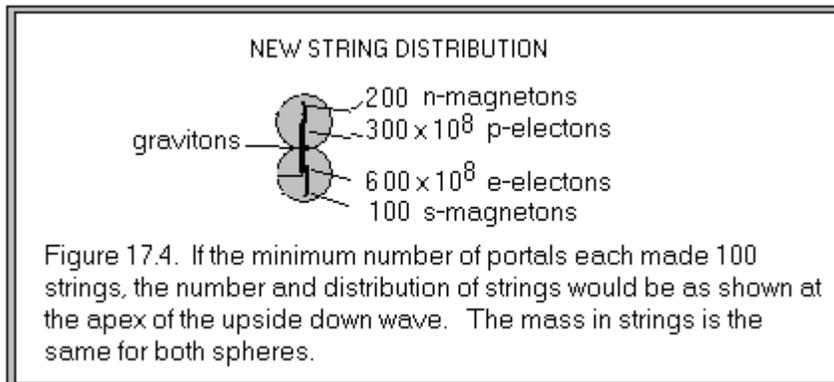
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The ratio between them is 3×10^8 to 1. During this time period, both spheres are creating the same mass in strings because 3×10^8 free p-electons is equivalent to 1 free s-magneton. Every portal ejects the same number of strings. The least number of active portals is shown in Figure 17.3.

At this stage, all of the strings created by the n-magneton portals become bound to s-magnetons, leaving free s-magneton strings. The same situation exists for electrons. In this case, all of the e-electons become bound to p-electons and the remaining free p-electons are detected by our instruments.



Period x_2 is similar to period x_1 . Following x_2 , the photon begins making free e-electons and free n-magnetons and the wave is below the midpoint. If every portal makes 100 strings, the crest of this upside down wave is created by the strings shown in Figure 17.4.



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Following the retraction of these strings, we arrive at period x_3 , where once more there are no strings that can be measured by our instruments and the photon has maximum constriction.

String Cycle Differences among Photons

The electric and magnetic waves for all photons reach the same amplitude at the apex of the waves. Thus at the apex of the electric wave, the number of free p-electons emanating from the radio wave photon is the same as the number emanating from a gamma photon. The difference between the two photons is the length of time it takes for each to reach a maximum number of strings and the length of time it takes to retract those strings to the point they can't be detected. As explained in the previous chapter, the rate photons go through their string cycles can be explained by the differences in their masses and the differences in their spin angular momentums.

Portals versus Radio Wave Size

We can calculate the mass of a photon, but there is no way to know its density; thus we have no way of predicting the physical size of a photon or the strings it makes. However, we can make some conclusion about the number of portals and how they might relate to a small photon.

The relationship between Maxwell's equations and the velocity of light can only be satisfied if the photon creates 3×10^8 electons in the same time frame as one magneton. This means there are 3×10^8 electon portals for every magneton portal.

Once the particle that is to become an electon or magneton passes through a portal, the string remaining behind would be extremely small in comparison to particle size. For example, if the electon and magneton particles travel 1×10^{10} km, it means the string remaining behind is that much smaller than the head of the particle. Thus if 100 to 1000 strings occupied a portal it would have little effect on remaining portal size. This means each portal could fire off 100 to 1000 strings before any retraction took place.

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If there are as many as 6×10^8 electron portals per sphere (see Figure 17.4), it means portal size must be very small if they are to fit on the surface area of a small radio wave photon. We can make an estimate of portal area to surface area of the radio wave sphere, if we have an estimate of their masses and if we assume the density of each is the same at the time the electron is ejected from the sphere.

A crude estimate of the mass of an electron is 3.28×10^{-63} kg (Chapter XXIV), while each sphere of a small radio wave photon would have a mass of 3.67×10^{-47} kg. Now, if we assume that the density of the photon sphere is the same as the density of the electron particle at the time it is ejected, it is possible to calculate the ratio between the total area encompassed by all electron portals and the surface area of the sphere. I did this in note 34. It turns out that only six percent of the surface area of each sphere of the radio photon would have to be devoted to the 6×10^8 electron portals. Two magneton portals take up far less than 1 percent. The portals for gravitons would be too small to affect this ratio. This little exercise provides us with this possibility: Even a small photon as well as a large photon may have just a small percentage of its surface area dedicated to string portals. I believe this is much more satisfying than the alternative

PHOTON'S STRING CYCLE

The number of strings created during a string cycle is the same for all photons. This is dictated by Maxwell's equations. It just takes longer for a photon of low spin angular momentum to create and retract the same number of strings as a photon with high energy.

Differences and Similarities between Electrons and Photons

My model for photons and electrons suggests there are important similarities between these two particles. Both particles likely create gravitons, magnetons, and electrons that work in concert to create the internal pressure needed to drive the string cycle.

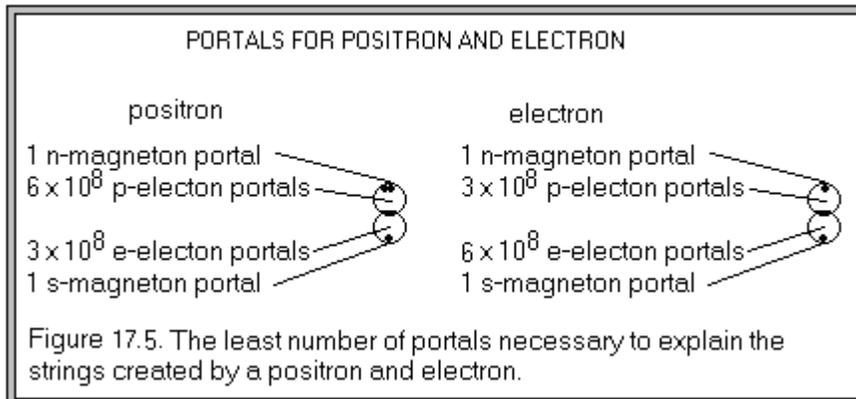
A major difference between electrons and photons is the ratio among strings at any one time during the string cycle. In the case of photons, free p-electrons and free e-electrons alternate every other string cycle; whereas,

electrons make no free p-electons, and the p-electons they do make become bound to e-electons. In a similar manner, all the magnetons created by electrons become bound as complementary pairs. In contrast, the photon makes free n-magnetons and free s-magnetons that alternate with each string cycle.

There is one other noteworthy difference between electrons and photons. The string mass created by the electron's individual spheres is not equal. However, in the case of photons, the string mass created by one sphere is always identical to string mass created by the other sphere. This finding has important implications for the velocity of light as discussed in the chapters that follow.

Positrons, Electrons and Photons

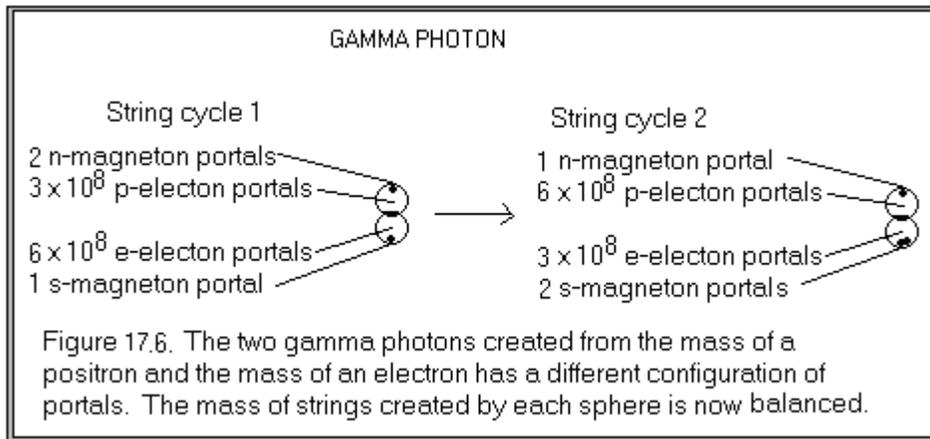
The antiparticle for an electron is called a positron. It has one unit of positive charge as opposed to the electron that has one unit of negative charge. Otherwise they are thought to be identical. A comparison of the portals for these two particles is shown in Figure 17.5.



The force of attraction between electron and positron is great because the electron is creating free e-electons and the positron is creating free p-electons. When these strings bind and pull the two particles together, it results in the annihilation of both particles. They are transformed into two gamma photons of the same mass as the original electron and positron. This means the portals have been changed. The gamma photons are now

creating the same mass of strings from each sphere. This is shown in Figure 17.6.

Electron + positron yields 2 gamma photons.



A List of Questions Applied to the Model

Why are gravitons, electrons, and magnetons the same entities if they are created by different subatomic particles?

An electron, for example, would be composed of the same n-goo or s-goo regardless of the subatomic particle that makes it, and there is no reason to believe that the portal would have to differ just because we are dealing with quarks, electrons, and photons. In the case of photons, the same pressure has to be developed to eject a string whether dealing with a radio wave photon or visible light photon. A small radio photon just takes longer to create the pressure to eject one magneton and 3×10^8 electrons in this exact ratio in the same time frame. This shows us that portals dictate the pressure needed to eject a string particle. Electrons and quarks also point to the same conclusion. Here we find there is an uneven number of string mass created by the two spheres. This means that the portal for a magneton only opens and closes under the same pressure regardless of the sphere making the string. Thus, the portal becomes a defining feature regulating string

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creation. This means a magneton, for example, is constructed of the same goo and is ejected under the same pressure regardless of the particle that emits it.

In the case of photons, why should the kind of electron and magneton alternate with each string cycle?

It seems that it must take longer to reabsorb the electron, or magneton, than one half of a string cycle. Remember once it has been partially absorbed it can no longer be detected by our instruments. It may take $\frac{1}{4}$ of an oscillation period to create a string and the next $\frac{3}{4}$ of this period to completely retract and reabsorb the string. Thus the strings being reabsorbed may not be available to be ejected in the next string cycle.

How long does it take for a string to retract back to its source?

From the previous question, we can see that it may take $\frac{3}{4}$ of an oscillation period for an electron or magneton to be completely reabsorbed and made ready to be ejected again.

In the case of gravitons, we have no idea how long it takes for one to be completely reabsorbed. It may require many cycles because a graviton travels 10 to 20 million light years. There is evidence that a graviton emanating from a spinning Earth remains in existence long enough to be reoriented in space. If this is true, a single graviton may be in existence through many string cycles.

What causes the unique shape of the string cycle?

The oscilloscope measures the electric potential at various, closely spaced intervals as the photon goes through its oscillation cycle. The measurement depends upon free electrons. Of course, it is actually examining a large number of photons whose vibrations are synchronized.

The free electron field potential at the beginning of the cycle is zero, but increases rapidly because new strings are constantly being added. By the time the cycle has reached its peak, billions of free electrons have been created. It takes just $\frac{1}{4}$ of the oscillation period to create the strings, and it takes the same amount of time for them to retract to the point they can no longer be detected. It is not that they have been fully reabsorbed.

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How does the string cycle get started when a new photon is created?

Unless a particle is spinning and creating strings, it has no way to wind strings around itself to create pressure. It has no way of ever getting the string cycle started. Therefore, the answer to the question must lie in the way that a photon is created. I believe it must be wholly functional at the time it is ejected from an electron; i.e., it is already going through its string cycle. The act of ejecting a photon gives it velocity and spin angular momentum.

How does an electron absorb and eject a photon?

Think of a photon that meets an electron. In this encounter, the photon's p-electons bond with the e-electons emanating from the electron. The force of attraction between the two particles will pull the photon up against the electron and down through a portal as the e-electons retract back to the interior of the photon. This means the e-electron portal of the electron can stretch to accommodate a photon if sufficient force is applied. Thus if one portal makes 100 strings, sufficient force comes from the bonding of 100 strings to the photon.

The magnetons created by an electron are always bound to their complementary twin and for this reason seems less likely to be involved in the capture and absorption of photons.

However, what happens if the string cycles of the two particles are not in sync? In this case, the photon is not making p-electons in the same time frame that the electron is making e-electons. This increases the possibility that the photon will escape without being absorbed.

When an electron absorbs a photon, either from a quark or the external environment, it moves to an outer orbit because its angular momentum increases. Spin angular momentum also increases. The sudden increase in spin angular momentum causes the electron to very quickly eject the photon it has just absorbed.

I believe a photon is ejected from an electron because of internal pressure in the same way it ejects virtual elastic strings, and it must be ejected when the electron is about to begin a new string cycle. At this time, pressure inside the electron is greatest, and it would not have any free strings to bond with the photon as it escapes.

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An electron must eject a photon at right angles to its line of flight, just as it ejects electrons. This eliminates a possible red shift or blue shift that might accompany a newly created photon.

Would spin of photon or electron be influenced by their strings?

Because strings bind to other strings, they retard the withdrawal of strings back to source. This will reduce spin velocity. This is an important consideration that I will discuss more fully when I take up relativity.

CHAPTER XVIII
Photons
Refraction, Diffraction, Reflection, and Interference

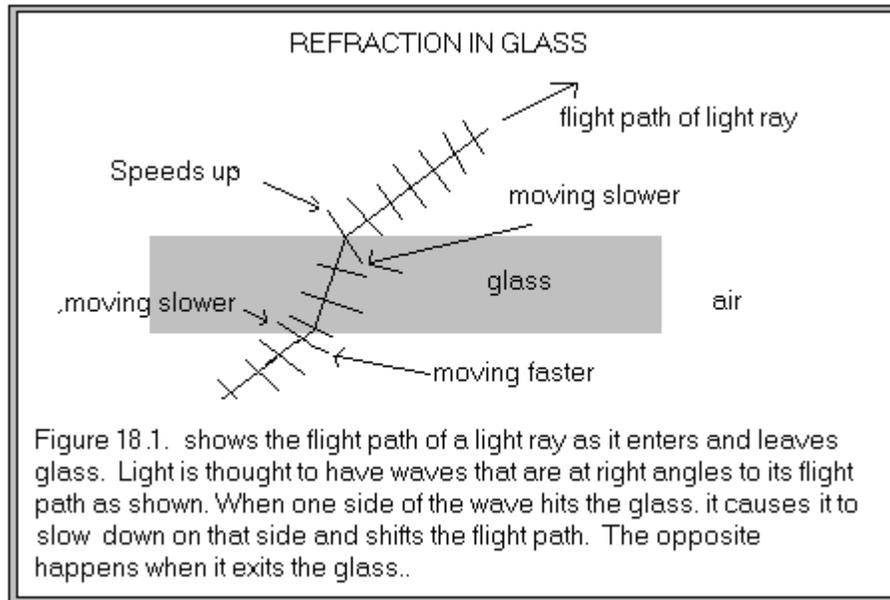
Scientists examine the wave properties of photons using refraction, diffraction, interference, and reflection. The purpose of this chapter is to examine these tests in relation to VES theory.

Refraction

When light enters or exits a denser medium at an angle, its line of flight changes. For example, when light passes from air into glass at an angle, the photon's flight path is bent. This phenomenon is known as refraction. The question is how does it fit VES theory?

Although a photon with a simple wave is often depicted as the cause of refraction, as shown in Figure 18.1, the actual observations make this unlikely. Photons from the Sun, and most other sources, are not in synchrony. This means that a simple transverse wave across the flight path may be at any angle. If you examine Figure 18.1, I believe you can convince yourself that the flight path of the light through glass would be different if the transverse wave was up and down rather than sideways. Thus, this explanation cannot tell us why we can clearly see a fish in a pond even though the light is bent. Simple waves would be sent through the water in multiple directions depending on how each photon wave front struck the surface of the water. This would surely distort the image of the fish greater than actually observed.

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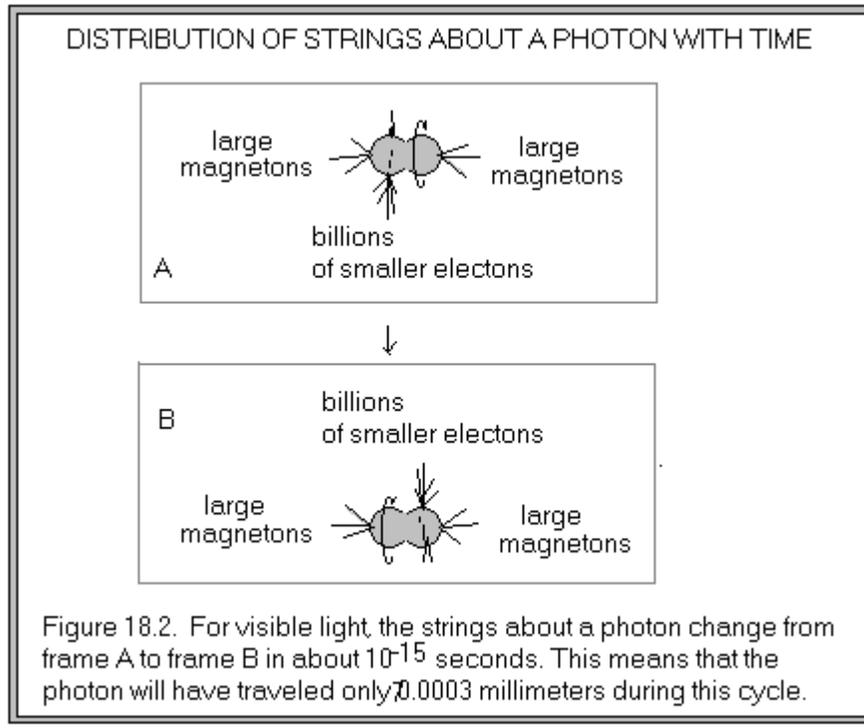


According to VES theory, photons are particles that emit electrons and magnetons at right angles to the flight path. In addition, electrons and magnetons are ejected at right angles to each other. This means the wave properties of a photon are far more complex than a simple wave.

According to my model, billions of free electrons will be created during every string cycle, along with billions that become bound as complementary pairs. In addition, there are a few much larger, more robust magnetons created at 90 degrees angle to the electrons. The mass of electrons and magnetons at any time is equal.

I believe there are two reasons that the photon will appear to have electrons completely surrounding the particle even though they are ejected at right angles to the photons flight path.. First, the photon is spinning rapidly on its axis. For example, a visible light photon may spin more than 30,000 times per oscillation (note 31). Second, e-electrons are emitted during one half of the oscillation period and p-electrons during the second half of the period. A visible light photon with a frequency of 10^{15} will travel only 0.0003 millimeters during one oscillation cycle.

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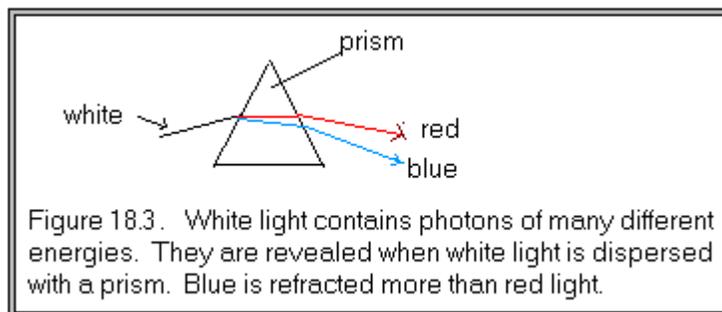


This picture of a photon gives it a three dimensional aspect that cannot be achieved by a simple standing wave model. It does not require that the photon be lined up in synchrony when it enters a denser medium because it is more like a fuzz ball approaching the glass. No matter what orientation, there will be virtual elastic strings aimed at the glass within a very short period. The change in flight path will be truer than if the photon was a simple standing wave.

According to my model, the transverse waves created by a photon are composed of strings. I believe they cause refraction because the strings become embedded in the denser medium. Thus, when a photon first comes in contact with glass, its magnetons and electrons become anchors that force the photon to swing around the anchor point and change its flight direction. This is very different than the mechanism that causes diffraction and reflection and much more effective.

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Scientists have shown that high-energy photons bend more as they enter a denser medium than do low-energy photons. For example, blue light bends more when going through a glass prism than red light. This is shown in Figure 18.3. High-energy photons make many more virtual elastic strings per unit time. This means more strings will be embedded in the glass per unit time. It means many more will be acting as anchors forcing a photon of blue light to change its direction more than a photon of red light.



If magnetons and electrons are embedded in the glass, it seems possible that light will be going slower when it passes out of glass into air. How does it regain the normal speed of light? Obviously, VES ether theory provides the answer. The photons interact with graviton waves that provide an outside energy source. The physical pulsation of these waves moving away from the glass pushes the photon forward.

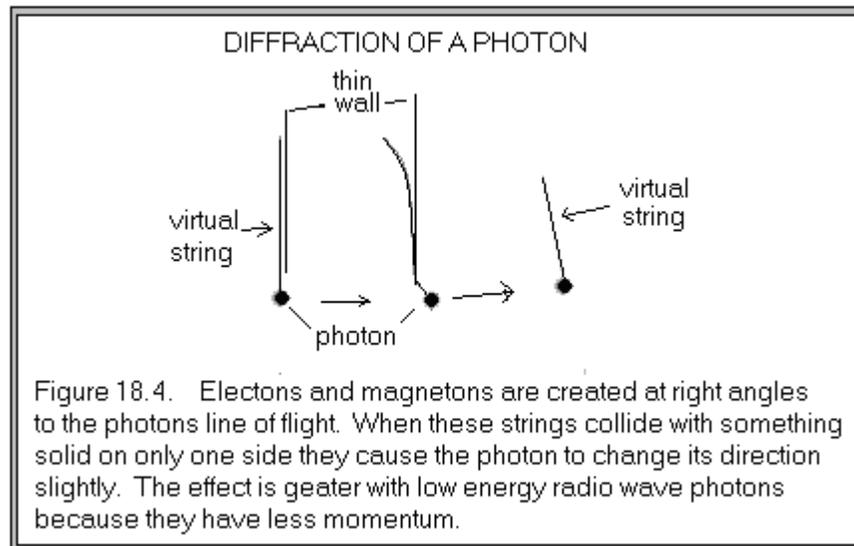
The Cause of Diffraction

The observation that light tends to bend around some obstruction is known as diffraction. Imagine a radio wave photon zipping by a thin wall at the speed of light. As it passes the barrier, it will tend to bend around it as shown in the next figure 18.4. I believe this happens because the strings that strike the wall are held back, which swings the photon around the barrier and in a new direction.

The evidence shows that a radio wave photon is bent more than a photon of visible light when it passes by an obstruction. This is completely the opposite of refraction. In the case of diffraction, electrons and magnetons

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are not interacting with the barrier. For this reason, they are not acting as secure anchors that swing the photon around the corner.



A photon of visible light has 100 billion times more momentum than a radio wave photon. Obviously, a radio wave photon and visible light photon will react differently when their strings collide with the wall. The radio wave photon will tend to change its flight path while a photon of visible light will tend to remain on course. However, both will be deflected to some degree.

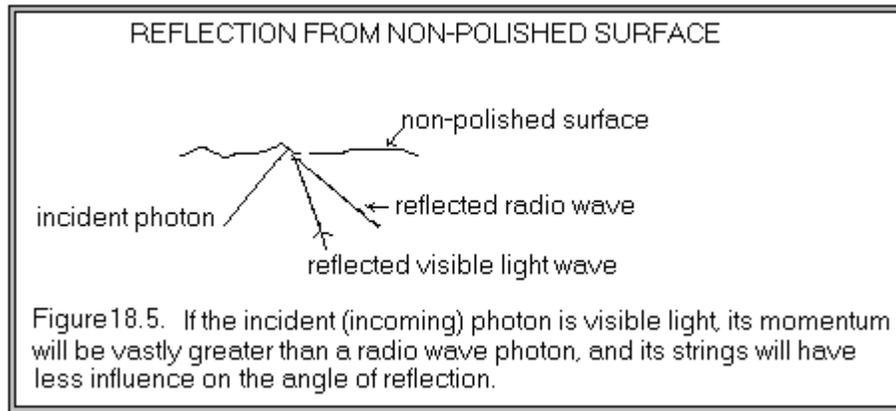
Reflection

When light strikes the surface of a lake at a small angle, it tends to be reflected back into the air. A photon skips off the surface of a lake for the same reason that a pebble can be made to skip off water.

As discussed in the previous section, the momentum of a visible light photon is 100 billion times greater than a radio wave photon. When strings from visible light come in contact with something, they have little effect on the particle's flight path. 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, the radio wave

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will be more influence by its strings that are strung out across the uneven surface. For this reason, the angle of reflection will be more nearly like the plane of the whole surface, figure 18.5.



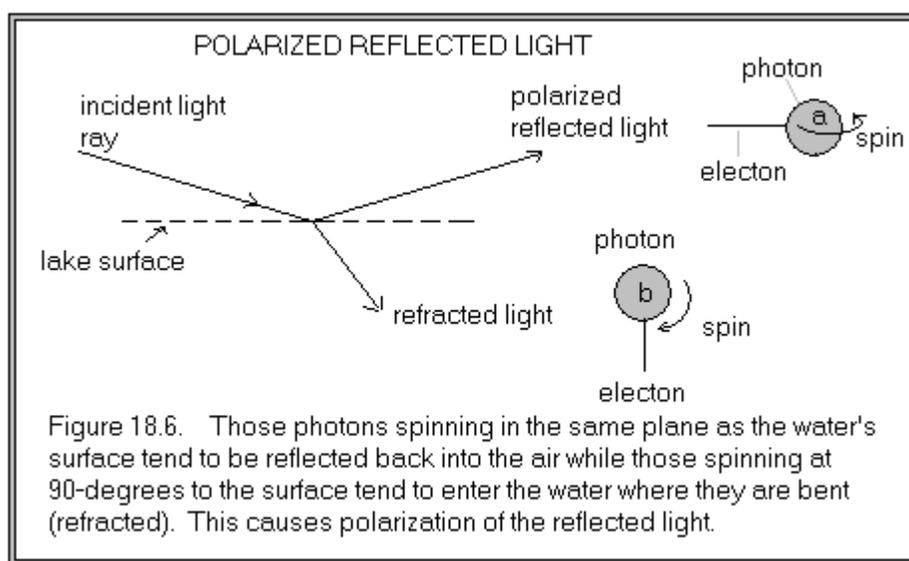
This explanation is consistent with my theory that light waves are not caused by the wavelength of the photon, which is merely the time it takes for the photon particle to go through its string cycles.

Polarization

If the electric force fields 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 can not pass through the second crystal. This is a complex situation if we have billions of electrons coming off in one direction and a small number of larger magnetons going in the other directions. Apparently, the photon's free electrons interact with the electrons in the crystal more than its magnetons. In the case of polarization, it is so complete that photons can not pass through the crystal if oriented in the wrong direction. These results suggest that polarization and refraction depend on more than simple interference provided by the structure they pass through.

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When Sun light shines onto the surface of a lake, a portion of the light enters the water where its path is bent by refraction. Another portion of the light is reflected off the surface of the lake. The light reflected tends to be polarized. If the photon's electrons are directed down into the lake, it will cause the photon to enter the water where it will be bent (refracted). If the electrons are in the same plane as the water, the photon will be reflected into space. This causes the reflected photons to be polarized.

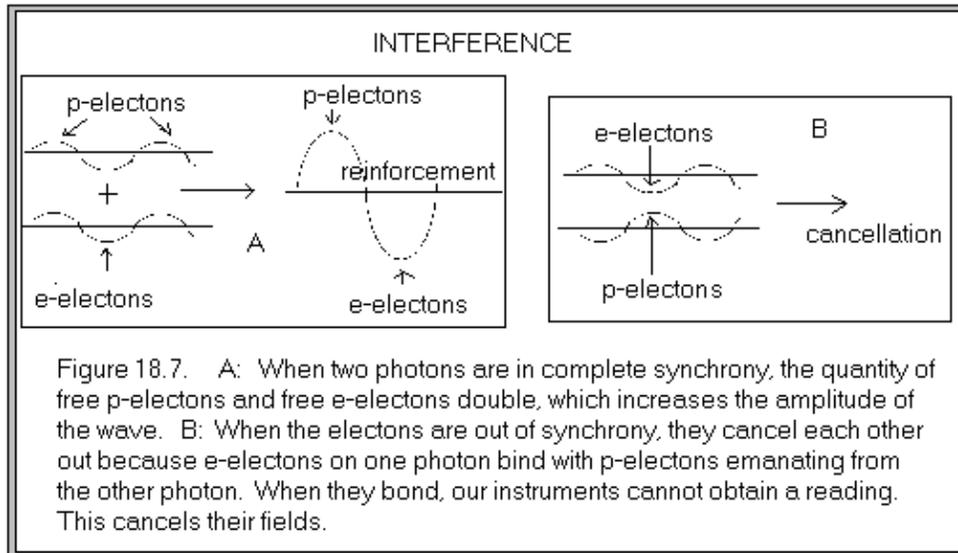


The Cause of Interference

When waves of the same wavelength are brought into close proximity they may either reinforce each other or cancel each other as shown in the next Figure 18.7.

When they are in complete synchrony, the strengths of the fields increase because they are both contributing to the number of free e-electrons and free p-electons. When they are completely out of synchrony, the p-electons on one photon binds to the e-electons on the other photon. Cancellation occurs because an oscilloscope cannot detect bonded electrons. Of course, partial cancellation occurs if the two photons are only partly out of synchrony.

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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 XIX

VES ETHER THEORY, SPECIAL THEORY OF RELATIVITY, AND THE VELOCITY OF LIGHT

It may come as a relief to know that I am not going to delve into most of the concepts used to explain relativity. What I am going to do is examine the basic equations, experiments, and observations that support relativity, and show how VES theory can explain these phenomena in a three dimensional world.

Albert Einstein published his special theory of relativity in 1905. The two postulates of this theory are as follows. Postulate one states that the laws of physics are the same in all uniformly moving frames of reference; namely, no preferred uniformly moving frame exists. I am not going to review the thinking behind this postulate because it would serve no useful purpose. Postulate two states that the velocity of light is unaffected by the velocity of the body that created it. By combining these postulates Einstein theorized that time was a fourth dimension that took its place along with the normal coordinates of space: length, width, and height. It is unnecessary to review how Einstein used his two postulates to arrive at this conclusion. However, it is important to understand the origin of relativity because relativity has to be used to explain VES ether theory.

VES ether theory

The theory of relativity has its roots in an experiment carried out by A. Michelson and E. W. Morley (1887), who demonstrated experimentally that the velocity of light is the same regardless of which direction it is aimed from a moving source. In this experiment, the velocity of light was measured in reference to Earth's motion as it orbits the Sun. The instrument used was an interferometer, which was easily capable of detecting the Earth's orbital velocity of 29,786 meters per second. They were able to show that Earth's velocity has no effect upon the velocity of light. This is explained in more detail in Figure 19.1.

Of course, this is far different than a bullet shot from a moving train. If a bullet is shot in the same direction the train is moving, its velocity is the combined sum of bullet velocity and train velocity; whereas, a bullet shot in the opposite direction is slower because the train's velocity must be subtracted from bullet velocity. All of this is perfectly reasonable, which caused the scientists at the time to ask why doesn't it apply to the velocity of light?

The Irish physicist G. Fitzgerald (1889) suggested that the velocity of light is modified by Earth's velocity, but cannot be detected in the Michelson-Morley experiment because the length of the instrument (slab of sandstone) 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.

$$\sqrt{1 - v^2 / c^2}$$

Where v is the velocity of the stone and c is the velocity of light. This equation is known as the Lorentz contraction, and it is always less than one.

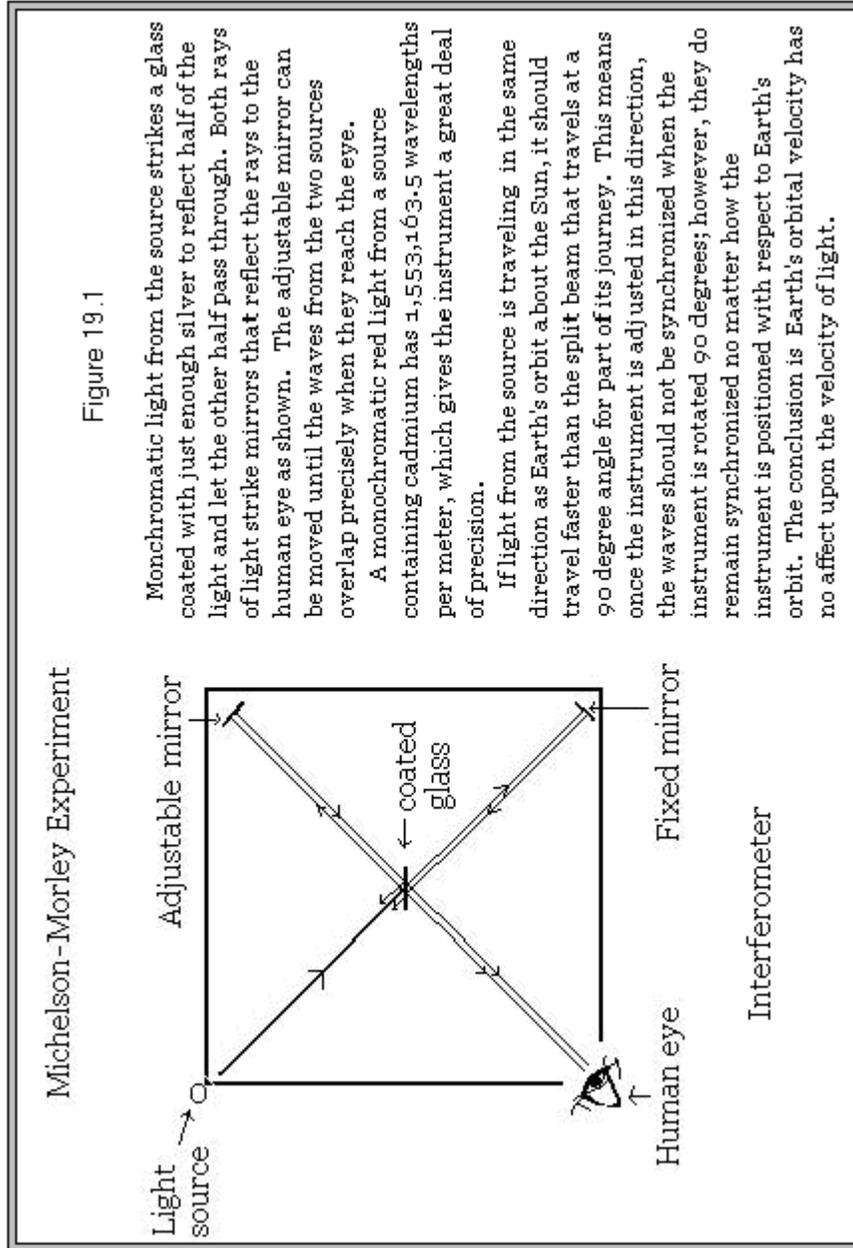


Figure 19.1

Monochromatic light from the source strikes a glass coated with just enough silver to reflect half of the light and let the other half pass through. Both rays of light strike mirrors that reflect the rays to the human eye as shown. The adjustable mirror can be moved until the waves from the two sources overlap precisely when they reach the eye.

A monochromatic red light from a source containing cadmium has 1,553,163.5 wavelengths per meter, which gives the instrument a great deal of precision.

If light from the source is traveling in the same direction as Earth's orbit about the Sun, it should travel faster than the split beam that travels at a 90 degree angle for part of its journey. This means once the instrument is adjusted in this direction, the waves should not be synchronized when the instrument is rotated 90 degrees; however, they do remain synchronized no matter how the instrument is positioned with respect to Earth's orbit. The conclusion is Earth's orbital velocity has no affect upon the velocity of light.

The reciprocal of the Lorentz contraction is designated as gamma. Gamma is always greater than one.

$$\text{gamma} = \frac{1}{\sqrt{1 - v^2 / c^2}}$$

Albert Einstein used the Lorentz contraction to develop his theory of relativity. The mathematical equations he derived have been of great importance in science and engineering. My theory must invoke the same equations to explain the relativistic effects between gravitons and other strings; namely, electrons and magnetons and the subatomic particles they are connected to. The most important equations are as follows:

Length contraction (relativity theory views this as a space contraction):

The space occupied by a moving body is less than the space occupied by the same body at rest. The equation derived by Einstein uses the Lorentz contraction. Essentially this is the same concept first thought of by G. Fitzgerald.

According to relativity, the length of a body in motion is less than the

$$\text{Length in motion} = \text{length at rest} \times \sqrt{1 - v^2 / c^2}$$

same body at rest because the Lorentz contraction is always less than 1.

I know of no experiment that tests this theory, and VES theory would not predict space contraction. However, the theory of special relativity necessarily leads to the curious assertion that a linear accelerator, a few thousands meters in length, contracts to a couple of meters when particles are being accelerated inside it.

Time dilation:

The special theory of relativity states that time slows down for an object in motion. This means that a clock in motion will actually tick fewer times per second compared to a stationary reference clock because length between ticks is greater. In this case, gamma is used, which is the reciprocal of the Lorentz contraction.

Relativistic time = normal time x gamma.

Because gamma is always greater than one, relativistic time is always greater than normal time. We will return to time dilation later in another chapter.

Relativistic Momentum:

The momentum of an object as it approaches the speed of light is not simply mass x velocity.

Relativistic momentum = gamma x mass x velocity.

Because gamma is always greater than one, relativistic momentum is always greater than mass x velocity.

We will examine this equation and the observations that support it at another time.

These three equations form the backbone of special relativity and all three relate to the calculations made by Lorentz to explain the Michelson-Morley experiment. In addition to these three equations, Earth's potential gravitational energy is used to explain several observations that deal directly with gravity as defined in Einstein's general theory of relativity.

$$\text{Earth's potential gravitational energy} = \frac{G M_E}{r}$$

This equation is not derived using relativity. G is the same universal constant used to calculate the universal law of gravitation, M_E is the mass of the Earth and r is the distance from Earth's center to the point in space where you want to determine Earth's potential gravitational energy. Earth's potential gravitational energy is a measure of its capacity to do work using the force of gravitation.

I will return to all of these equations after I have discussed the second postulate that the speed of light is unaffected by the motion of the object that created it.

Velocity of Light

Recall that Fitzgerald said the velocity of light would appear to be the same in any direction with respect to Earth's movement if the length of the measuring device changed in the direction it was moving. As you can see, this interpretation states that the speed of Earth is added to the speed of light but the increase in velocity cannot be detected because the length of the instrument changes.

The relativistic interpretation of the results of the Michelson-Morley experiment is entirely different. This theory states that the velocity of light is always 3×10^8 meters per second and needs no explanation beyond the 'isotropy of space.' In other words, relativity does not use the Lorentz contraction to explain the velocity of light. VES ether theory provides a much easier and more satisfying interpretation of this important experiment.

In Chapter XVII, we saw how a precise number of electrons and magnetons are created during a photon's string cycle and how the ratio of electrons to magnetons is the velocity of light. However, this does not explain the great mystery of Maxwell's equations: Why is it possible to use the magnetic and electric properties of light to calculate the velocity of light?

Maxwell's equations define the relationship between the velocity of light and its electric and magnetic quantities; however, his equations tell us nothing about the speed of light when it is ejected from an electron. Light might be going faster or slower than the normal velocity of light. In a similar vein, there is good reason to believe that light is going slower when it exits a denser medium such as glass, as discussed previously. Also, when a photon strikes a mirror and bounds away, it should be moving slower because it has transferred a portion of its momentum to the glass as shown by the torsion balance experiments (Chapter XVI). Also, it is logical that the velocity of light should be affected by a moving source. It should be going slower if ejected opposite to the direction of the moving source, and faster if ejected in the same direction as the moving source; however,

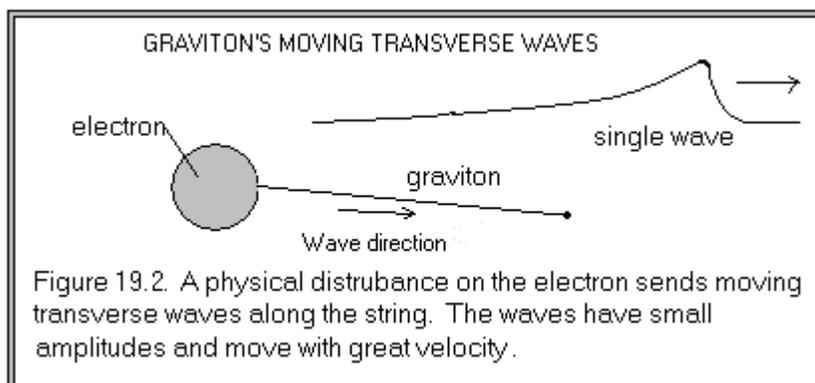
Michelson and Morley found that a moving source does not affect the velocity of light.

How can the electric and magnetic properties of light dictate a velocity of 3×10^8 meters per second under all the conditions I just listed? In fact, and most importantly, how do the electric and magnetic fields predetermine the velocity of light under any condition?

I believe the velocity of light can be explained if a physical entity in space transfers energy to the photon's electrons and magnetons streaming to the rear of the photon. Only in this manner can some property of free electrons and free magnetons predetermine the velocity of light. The question is what is there in the vast space around us that provides a source of energy that modulates the velocity of light? I believe the answer is gravitons. I have already introduced the idea that the friction between gravitons and the object it retracts through is caused by the bonds formed between gravitons and electrons and gravitons and magnetons. In this chapter and several that follow, I will discuss experiments dealing with relativity that provide strong evidence for this assumption. For the moment, however, let us continue with our analysis of the velocity of light.

How Do Gravitons Deliver Energy to Magnetons and Electrons?

In this section I will put forth a theory that explains how gravitons transfer energy to the photon's magnetons and electrons at great distance from the graviton's source. Recall that a virtual elastic string remains attached to the particle that generates it. Thus, 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.



Vibrating portals create traveling transverse waves

I theorize the act of creating strings sets up a physical vibration that sends moving, transverse waves along the length of the string. String 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 that every time the portal opens and closes it will create a physical disturbance in these strings. They will move back and forth in unison with the opening and closing of the portal, which will cause a wave with small amplitude to travel along the strings.

This is no different than stretching a piece of twine between two bodies, then causing a wave to be propagated along its length by plucking the twine with your fingers. There is one important exception to this analogy. The waves created in the twine are sent back upon themselves because both ends of the twine are firmly attached. In this situation, there is no net transfer of energy. However, gravitons are not connected to a firm object in space, and for this reason a wave is not sent back on itself. A string is more like a bullwhip snapping in space. This means energy can be transferred to the object that interacts with it.

The energy of moving, graviton waves might explain the energy in a vacuum of space as long proposed by physicists. For example, it has been proposed that the energy in a vacuum shifts the energy level of atoms slightly and exerts a force between closely spaced metal plates. This work was reviewed by Weiss (2001, vol. 159, page 86).

Speed of graviton waves

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 head as it is generation into space. 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 (I will discuss this in detail in another chapter). For example, the Andromeda galaxy is 2.5 million light years away (about 2×10^{22} meters) and the light we receive from this galaxy shows a small blue shift. If the blue shift is created by gravitons emanating from Andromeda, which they must for VES ether theory to be correct, then graviton waves must travel at least 2×10^{22} meters before the graviton is retracted. Even if the graviton existed for one full second, the waves would have to travel more than 2×10^{22} meters per second.

As mentioned, the amplitude of the wave would be very small because the displacement in the string is caused by the physical vibration of the source, and the string would have to have strong tensile strength in relation to its extremely small mass. Of course this is exactly what we might expect for a graviton.

If we use the equation derived to calculate the speed of waves proceeding along a common string stretched between two points, we find some interesting and relevant relationships. The strength of the elasticity of the string is the restoring force F that snaps the string back in place. It is expressed in newtons. Two other elements used in the equation are mass per unit length of the string (kg/meter) and the velocity of the waves (meters/second). The equation provided by physicists is as follows:

$$\text{wave speed} = \sqrt{\frac{F}{\text{mass (kg,m)}}$$

This equation holds if the amplitude of the wave is small. This is certainly true for waves contemplated here. 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.

$$F = (\text{velocity m/s})^2 \times (\text{mass kg/meter})$$

VES ether theory

Let's assume the velocity of the wave is 1×10^{23} meters per second and the mass of the string is 5×10^{-81} kg (see Chapter 24). A string stretched over 20 million light years is equivalent to $20 \times 10^6 \times 1 \times 10^{16}$ or 2×10^{23} meters. Thus kg per meter becomes 5×10^{-81} kg / 2×10^{23} meters or 2.5×10^{-104} kg/meter. Substituting these values into the equation given:

$$F = (\text{velocity m/s})^2 \times (\text{mass kg/meter})$$
$$F = (1 \times 10^{23} \text{ m/s})^2 \times 2.5 \times 10^{-104} = 2.5 \times 10^{-58} \text{ newtons.}$$

This is a very reasonable restoring force for a graviton. Recall that newton per graviton force for a graviton from the Sun retracting through Earth is 1.43×10^{-49} newtons. Thus, there is a good possibility that the velocity of the wave can reach 1×10^{23} meters per second if the mass of the string is extremely small and if the amplitude of the wave is small. I made this calculation long after I made a rough estimate of the mass of a graviton. I had no idea that an equation existed that would allow me to find the relationship between tensile strength, velocity of the wave, and the mass of the string. Fortunately, the physics book written by Halliday and Resnick is very complete.

The frequency of this wave is dependent upon the physical vibration at source that sends a small disturbance traveling along the string. We don't know the frequency of the waves, but there is a possibility that it is very high, and without knowing the frequency, there is no way to estimate the wavelength.

This analysis gives me confidence that the characteristics of graviton waves meet the requirements needed to help explain their effect on electrons and magnetons and the velocity of light. It complements and bolsters the large amount of evidence that shows gravitons are responsible for the observations we attribute to special relativity.

Bonding between strings.

I envision that gravitons bond in some manner with electrons and magnetons, which allows the graviton's moving transverse waves to nudge electrons and magnetons in the direction the graviton waves are traveling. In addition, it is theorized that gravitons are able to create a force of attraction because they form bonds with electrons and magnetons. This provides the

resistance necessary in order for the graviton to pull an object when it retracts. The evidence shows that the bond formed is very weak, much less than complementary bonds between electrons and between magnetons. For example, the gravitational force of attraction between electron and proton is 10^{49} times less than the electric force of attraction between these two particles.

The interaction of gravitons with electrons and magnetons is directly tied to the velocity of light, Maxwell's equations, relativity, and the force of gravitation. We will have many occasions to return to this subject in the chapters that follow.

Not long after I realized that gravitons might modulate the velocity of light, I discovered that a large number of 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 that deals with graviton waves forms the basis for an ether theory.

To understand how gravitons modulate the velocity of light, it is necessary to take a step back and examine VES ether theory.

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, a string.

Over the decades, a number of 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 believed in an ether theory, Kox (1986). 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 instrument that measured light as dictated by his equation.

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 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...".

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 was not able to find any reference 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 you believe, as I do, that gravitons remain connected to their source, then it becomes entirely possible that traveling transverse waves originating at source move along the string at high velocity. This forms the basis of VES ether theory.

VES Ether Theory

To develop this theory, let's first examine what we do know or can reasonably infer:

- 1) Traveling transverse waves proceed along the graviton string at great velocity. They are created by the physical vibration of the particle that creates it.
- 2) Electrons, quarks, and photons (hereafter referred to as particles) create gravitons, magnetons, and electrons as they go through their string cycles. This is fundamental to string theory.
- 3) The particle's strings are swept to the rear as the moving particle makes its way through a matrix of strings in space. This explains how complementary strings meet and bond.
- 4) Gravitons do not interact with complementary strings that have bonded. This is consistent with the concepts developed to explain Maxwell's equations.
- 5) Free magnetons and free electrons stream to the rear of the particle before they interact with gravitons; otherwise, gravitons would interact with all magnetons and electrons, which they don't. It is likely that they need to obtain some minimal length before there is any appreciable interaction.
- 6) Clearly, gravitons bond to both electrons and magnetons; however, as discussed previously, it is likely that a greater number of gravitons bond to magnetons than electrons. This is consistent with Maxwell's equations.
- 7) All electrons and magnetons have transverse waves that travel along their length and away from the particle that creates them. Because the strings are swept to the rear, the waves are moving opposite to the direction the particle is moving.
- 8) The interaction of graviton and electron or graviton and magneton comes from some special physical attributes that allows them to bond. This interaction may come about because gravitons are composed of both n-goo and s-goo as described in the chapter on string specificity.
- 9) The velocity of the photon seems to have an upper limit; for example, a large photon has 1×10^{10} greater mass than a radio wave, yet both travel at the velocity of light.

Rules of engagement

- 1) Graviton waves going in the same direction as the particle increase the particle's velocity and to a lesser extent shorten the length of its string cycle.
- 2) Graviton waves going in the opposite direction as the particle increase the length of the particle's string cycle and to a lesser extent decrease its velocity. It will also decrease the spin rate of the particle along with its spin angular momentum. Thus, the particle's energy state will be less.
- 3) When there are an equal number of graviton waves going in both directions:
 - a. Waves traveling against the particle's flight path primarily increase the length of the string cycle and lower its energy state. It has less effect on the velocity of the particle. The equation that fits this expectation is:

Relativistic string cycle rate = gamma x expected string cycle rate

Recall that gamma is the reciprocal of the Lorentz equation:

$$\text{gamma} = \frac{1}{\sqrt{1 - v^2 / c^2}}$$

- b. Waves going in the same direction as the particle primarily increase its velocity. They have less effect on the length of the string cycle and the particle's energy state. The equation that fits this expectation is:

Relativistic velocity = gamma x expected velocity

This is the same relationship as used in the special theory of relativity.

In either case, gamma increases rapidly as the particle approaches the speed of light as dictated by the equation for gamma. 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 oscillation periods.

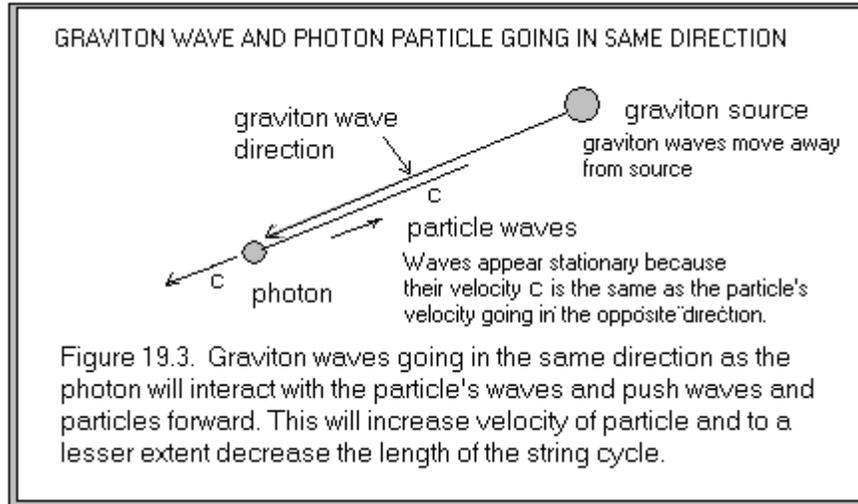
- 4) The strength of the bonds and the degree of interaction between gravitons and electrons and between gravitons and magnetons depends upon the velocity of the particle's waves streaming to the rear of the particle. Their **relative** velocity in relation to graviton wave velocity dictates the degree of bonding. It accounts for the magnitude of gamma, and therefore accounts for special relativity effects.
 - a. When the particle is traveling at the speed of light there is maximum interaction between graviton waves and the particle's string waves. This is true whether graviton waves and particle are going in the same direction or in the opposite direction.
 - b. When the particle slows down, the interaction decreases proportional to the magnitude of gamma.
 - c. If the particle is traveling faster than the speed of light, the gravitons disengage from the strings. This sets an upper limit for the velocity of photons and other particles to the speed of light.

- 5) Alignment of waves: The strength of the bond between gravitons and magnetons and between graviton and electrons depends upon the alignment of the strings. When they encounter each other at an angle, there is less interaction.

Nuts and Bolts of VES Ether Theory

When graviton waves and particles are going in the same direction.

When graviton waves are going in the same direction as the particle, the graviton waves bond to the particle's magnetons and electrons and push the particle forward. In the case of photons, it maintains the velocity of light.



Maximum interaction occurs when particle waves appear nearly stationary in space relative to the graviton's waves; namely, when particle and particle waves are traveling at the same velocity only in opposite direction, see Figure 19.3. Thus we know the photon's magneton waves and electron waves likely travel at the velocity of light.

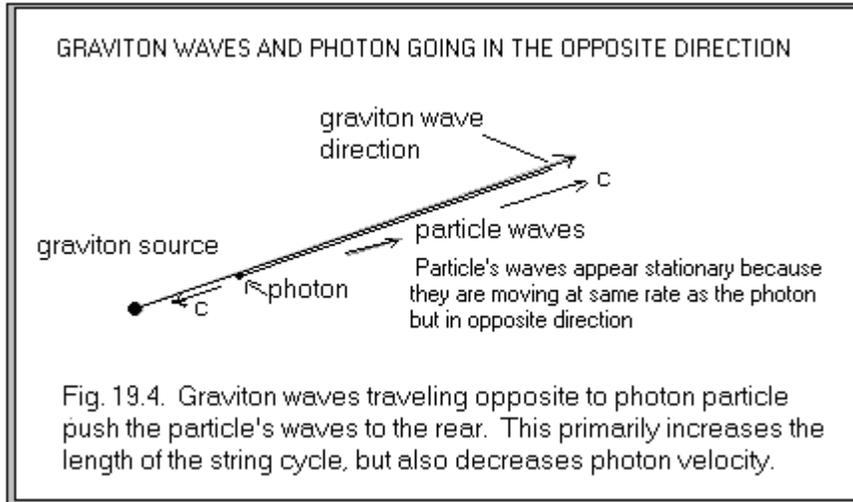
When the particle slows down, its magneton waves and electron waves are now streaming to the rear faster than the particle is moving forward. Bonding is reduced because graviton waves are going in one direction and particle waves are going in the opposite direction. It's a little like a person trying to hop a train by running in the opposite direction the train is moving.

The interaction between graviton waves and particle waves is **relative** to the speed of the particle and the velocity of the particle's waves going in the opposite direction. Mathematically it follows this equation: Relativistic velocity of particle = γ x expected velocity of particle. Since γ is always more than one, relativistic velocity is always more than the expected velocity of the particle.

Graviton waves and particle moving in the opposite direction

When graviton waves are going opposite to the particle's direction, they bind to the particle's waves and stretch them out behind the particle. This

increases the length of the particle's string cycle and decreases its spin angular momentum. It also decreases its velocity to some extent as you might expect.

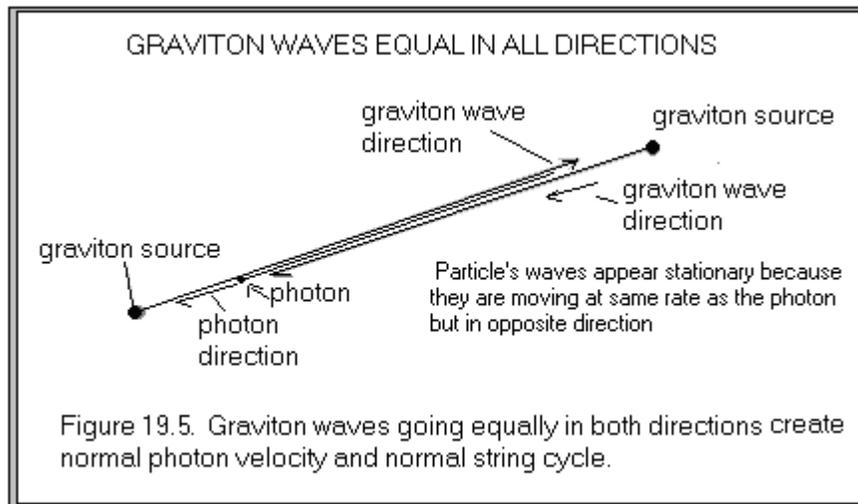


Graviton waves going opposite to the particle's direction will have their greatest effect when the particle is traveling at the speed of light. Under these conditions, the particle's waves going to the rear will be motionless relative to the graviton waves. Otherwise, gravitons will be pushing on waves going in the same direction. This is somewhat analogous to the wind pushing on an object going in the same direction. The faster the object is going, the less effect of the wind. If a sail boat is traveling as fast or faster than the wind, the wind will have little effect on the forward movement of the boat.

When there are an equal number of graviton waves in both directions

When a photon is moving along the surface of the Earth, it is likely that the number of gravitons going in each direction is fairly equal. Those coming from Earth have little effect because they will strike the photon's strings at an acute angle. Under these conditions, the photon will be traveling at the normal velocity of light and its string cycles will be normal, and along with it, its oscillation period. This is illustrated in figure 19.5. The

primary effect of gravitons going in the same direction as the particle is to maintain its velocity. In contrast, the primary effect of gravitons going in the opposite direction is to increase the length of string cycles. In the case of a photon, the net result is a photon traveling at the normal speed of light with a normal length of string cycle.



When there is a preponderance of graviton waves in one direction.

When a photon is traveling against a preponderance of graviton waves, its string cycles will be longer and the photon will move at a slower speed. When the preponderance of graviton waves are going in the same direction as the particle, the particle's string cycles will be shorter and its velocity may increase, but never greater than the speed of light because the gravitons will uncouple from the electrons and magnetons as dictated by VES ether theory.

When there is a strong gravitational field about an atom.

Strong gravitational fields will cause an increase in the length of time it takes for a particle to go through its string cycle. In the case of atoms, all of the subatomic particles making strings will be affected. Spin angular momentum associated with quarks and electrons will be reduced, and the

photons created by these atoms will show a red shift. I believe it is reasonable to assume that quarks will be more affected than electrons because they are not in orbit around some central body. However, the string cycles of all quarks and electrons are pulled into synchrony because they are bound to each other during the string cycles.

This is analogous to the situation in a transmitting radio antenna where the energy of the photon emitted can be controlled by an oscillator. In this case, an electric current is used to control the atom's string cycles.

Interplay between the Gravitational Force of Attraction and VES ether theory

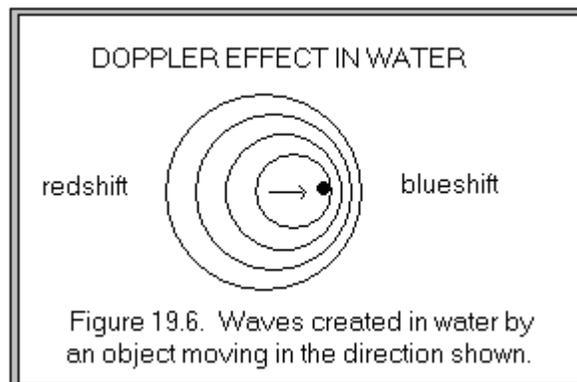
For a graviton to exert a force of attraction, it is necessary that it remain connected to its source and it must bond in some manner with the object it is retracting through. The theory is that a graviton binds to the object it is pulling because it binds to that object's electrons and magnetons. Now we find that this same bond is necessary to explain the velocity of light and relativity.

Let's consider a photon traveling along the surface of Earth. In this situation, there are an equal number of gravitons going in either direction, and the gravitational force of attraction will have no net effect on photons or VES ether theory. Thus we don't need to explain any potential conflict between graviton waves and force of attraction. However, there are many situations when there are a greater number of graviton waves going in one direction. For example, when a photon from the Sun nears Earth, the number of graviton waves from Earth traveling against the photon will be greater than those from the Sun traveling with the photon. Yet, as we shall see, graviton waves from Earth moving against an incoming photon will have greater impact on the photon than the gravitational force of attraction. This is discussed at length in Chapter XXI. I believe this outcome can be explained by the fact that gravitons remain in space through many string cycles, also discussed at length in another chapter. Thus there is more opportunity for moving transverse waves to affect photon velocity and energy than the brief resistance created when the graviton retracts back to source.

Doppler Effect

When graviton waves are emanating from a moving source they will show a Doppler Effect. This is similar to an ambulance coming towards us with its siren blaring. New sound waves are continually being made, which means each wave will begin a little closer to us. This will cause the waves to bunch up as they approach our ears and we will perceive it as a higher pitch. The opposite occurs when the ambulance is moving away. Air molecules that become arranged as waves transmit sound.

This is perhaps easier to visualize if we think of a toad moving through water. If he is moving towards us, the water waves will be bunched up as shown in Figure 19.6. On the other hand, the waves going away from his movement will be further apart. In either case the water molecules become arranged as waves.



A graviton always remains attached to its source. This allows physical vibrations at source to be transmitted along the strings as moving waves. When the source is moving in the same direction the string is generated, the string waves will be bunched up (said to be blue shifted), and when the body is moving in the opposite direction, the string waves will be spread farther apart (red shifted). The reason this is possible is because we are dealing with an elastic string. When the source moves towards the graviton extending out into space, the movement of the body causes the string to shorten, thus each vibration of the string begins a little closer together. The opposite would be true if string and source were moving apart. Now the

string is slightly extended and each vibration is slightly farther apart. This would not be true if we were not dealing with an elastic string.

In addition to this type of Doppler Effect, the graviton as a whole will be affected by a moving source, and this will augment any possible Doppler Effect. For example, let's take the situation where a photon coming towards Earth was emitted by a star moving away from us. Any graviton from this star will be pulled through space at the same pace as the receding star. If it is bound to the photon coming towards us, it will pull on the photon's string and extend its string cycle; viola you have a red shift; namely, it will appear to have less energy because it's frequency of vibration is lower. In the same manner a graviton generated by a star moving towards us will allow the graviton particle to travel slightly faster than normal. This will produce a blue shift in the photon coming to Earth. Its frequency will be higher.

It is not possible to say which explanation for a red shift or blue shift would be more important. Possibly they are both at work and enhance each other. The idea that gravitons can cause a blue shift or red shift helps explain several observations that I will examine in the chapters that follow.

Reconciling Maxwell's Equations and the Velocity of Light

The velocity of light has intrigued scientists for centuries. According to Halliday and Resnick (1981), 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 enable scientists to make even more careful measurements because it is possible to determine the laser beam's wavelength and frequency. Knowing these two values the velocity of light can be calculated: $c = \text{wavelength} \times \text{frequency}$. The velocity of light is 299,792,458 meters per second, plus or minus 0.0008. This is close to 3×10^8 meters per second, and for convenience, I will use this value in the discussions that follow.

VES ether theory

Maxwell calculated the velocity of light using its electric and magnetic quantities. I introduced the following relationships earlier, but for convenience I will reiterate them here.

$$\frac{E}{\beta} = \frac{1}{\sqrt{\mu_0 \epsilon_0}} = 299,792,458 \text{ meters/second}$$

ϵ_0 is the electric constant and was originally determined by experimentation but now is derived to make the equation meet the exact velocity of light as shown here.

μ_0 , the magnetic constant, is equal to $4 \pi \times 10^{-7} \text{H/m}$.

β and E are vector forces. A vector force can only be described if its quantity and direction are included.

Energy density of the electric field = $1/2\epsilon_0 E^2$.

Energy density of the magnetic field = $1/2\beta^2 / \mu_0$.

Energy density of the electric field = energy density of the magnetic field

The value of E is proportional to the lines of electric force, and in the same manner, the value of β is proportional to the lines of magnetic force. According to VES theory, the electric lines of force are comprised of electrons, and the magnetic lines of force are magnetons. This leads to the conclusion that the number of free electrons divided by the number of free magnetons is equal to the velocity of light.

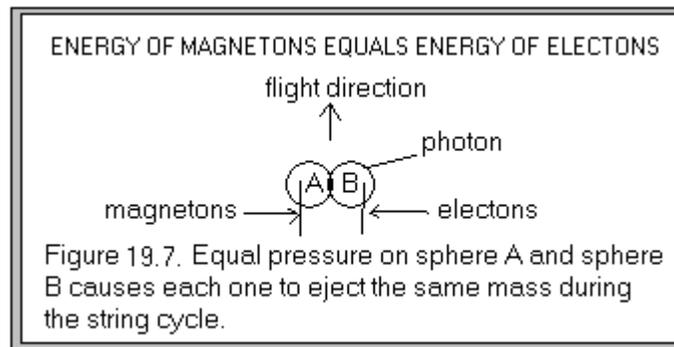
$$c = \frac{E}{\beta} = \frac{\text{number of electrons}}{\text{number of magnetons}} = 3 \times 10^8$$

This is true for all photons even though they can have vastly different energies.

We know from Maxwell's equations that both the electric field and the magnetic field are intimately tied to the velocity of light. Just why this is true is explained as follows:

Constraint number one: We know the energy density of the electric field is equal to the energy density of the magnetic field. We also know the number of electrons is 3×10^8 greater than the number of magnetons. Given these relationships, it becomes obvious that a magneton is 3×10^8 more energetic than an electron. From this I conclude that the same proportionality exists between their masses; namely, a magneton is 3×10^8 more massive than an electron. Thus the combined mass of 3×10^8 electrons is the same as the mass of one magneton.

My model for the photon shows it is divided into two spheres. Both spheres develop the same pressure during the string cycle, and for this reason eject the same string mass. The total mass of electrons created is equal to the total mass of magnetons, which means 3×10^8 electrons are created for every magneton during the same time frame.



Constraint number two: The force pushing the photon through space has this relationship:

$$\text{Force of } 3 \times 10^8 \text{ gravitons pushing on } 3 \times 10^8 \text{ electrons} =$$

$$\text{Force of } 3 \times 10^8 \text{ gravitons pushing on 1 magneton}$$

Constraint number three: Magneton waves and electron waves both travel away from the photon at the speed of light. This is dictated by VES ether theory. This finding seems rather remarkable since the magneton is 3×10^8 more massive than an electron. This can be examined by using the same equation I used to estimate the velocity of graviton waves.

$$\text{wave velocity} = \sqrt{\frac{F}{\text{mass/meter}}}$$

F is a measure of the tension of the string and its elastic restoring force. It is expressed in newtons. Mass is expressed in kilograms; it is divided by the total length of the string, which gives us kg/meter.

We know that a photon ejects the same mass of electrons as it does magnetons, although there are 3×10^8 electrons ejected for every magneton.

The pressure ejecting one large magneton is the same as the pressure ejecting 3×10^8 small electrons. For this reason, electrons and magnetons are ejected the same distance in space. The only restriction is that they are ejected in the same time frame so that equal pressure is applied to both spheres. Next, we can reasonably infer that the restoring force F for a magneton is 3×10^8 times greater than for an electron. This is dictated by the fact that $E/B = 3 \times 10^8$.

The theory is that both strings are ejected the same distance in space and the waves traveling along these strings do so at the speed of light, thus:

$$\begin{array}{c} \text{Magnetron} \\ \sqrt{\frac{F_m}{\frac{\text{mass}_m}{L}}} \end{array} = c = \begin{array}{c} \text{Electron} \\ \sqrt{\frac{F_e}{\frac{\text{mass}_e}{L}}} \end{array}$$

L in both equations has the same value. We know the restoring force of an electron F_e is 3×10^8 smaller than the restoring force of a magneton, thus we can substitute F_e with $F_m/3 \times 10^8$. And the mass of an electron is 3×10^8 smaller than the mass of a magneton. Thus we can substitute mass_e with $\text{mass}_m/3 \times 10^8$. By substitution we get:

Magneton waves

Electron waves

$$\sqrt{\frac{F_m}{\frac{\text{mass}_m}{L}}} = c = \sqrt{\frac{\frac{F_m}{3 \times 10^8}}{\frac{\text{mass}_m}{3 \times 10^8}}}$$

By rearranging we get:

$$\sqrt{\frac{F_m L}{\text{mass}_m}} = c = \sqrt{\frac{F_m L \cancel{3 \times 10^8}}{\cancel{3 \times 10^8} \text{mass}_m}}$$

Finally we see that the velocity of electron waves and magneton waves are both c , the velocity of light.

$$\sqrt{\frac{F_m L}{\text{mass}_m}} = c = \sqrt{\frac{F_m L}{\text{mass}_m}}$$

This clearly shows that the electric and magnetic properties of light dictate the same wave velocity for electrons and magnetons. And it is equally clear that the velocity of the electron and magneton waves is the defining property that dictates the velocity of light. This is the exact situation predicted by VES ether theory.

Even though we do not know the values that go into the equation for the speed of waves, the ratios are correct. They allow us to see why the electric force field divided by the magnetic force field is equal to the speed of light.

$$\frac{E}{\beta} = \frac{1}{\sqrt{\mu_0 \epsilon_0}} = 3 \times 10^8$$

It also allows us to understand why the electric constant ϵ_0 and the magnetic constant μ_0 can be used to calculate the velocity of light. The relationship between the constants and the force fields is dictated by the fact that the energy density of the electric field is equal to the energy density of the magnetic field.

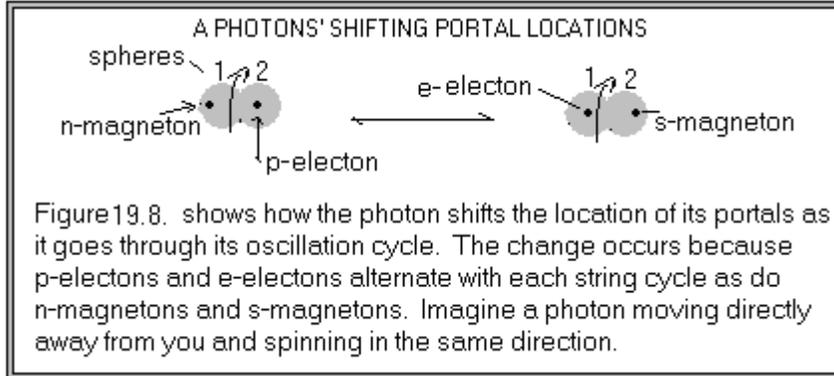
Constraint number four:

One might think that all photons obtain the same velocity because all photons create the same number of electrons and magnetons. However, this relationship is likely not correct. The mass of a gamma photon can be 10^{10} times greater than the mass of a radio wave photon; yet the same number of gravitons pushes both of these photons along at the speed of light. This suggests there is an upper limit to a photon's velocity, which is independent of the number of gravitons pushing on the photon.

This constraint is explained by VES ether theory. When the photon is traveling at the speed of light, there is maximum coupling between the photon's strings and gravitons, and the graviton waves are pushing with maximum force. However, if the photon exceeds the velocity of light, the gravitons become disengaged because the photon's strings no longer appear stationary in space. This loss of interaction follows gamma. Thus the velocity of the photon is dictated by the velocity of its electron and magneton waves. It is not dictated by the velocity of the graviton waves nor is it dictated by the total number of electrons and magnetons, nor is it dictated directly by the ratio of electrons to magnetons. E/B is the velocity of light because the speed of the waves dictates this ratio.

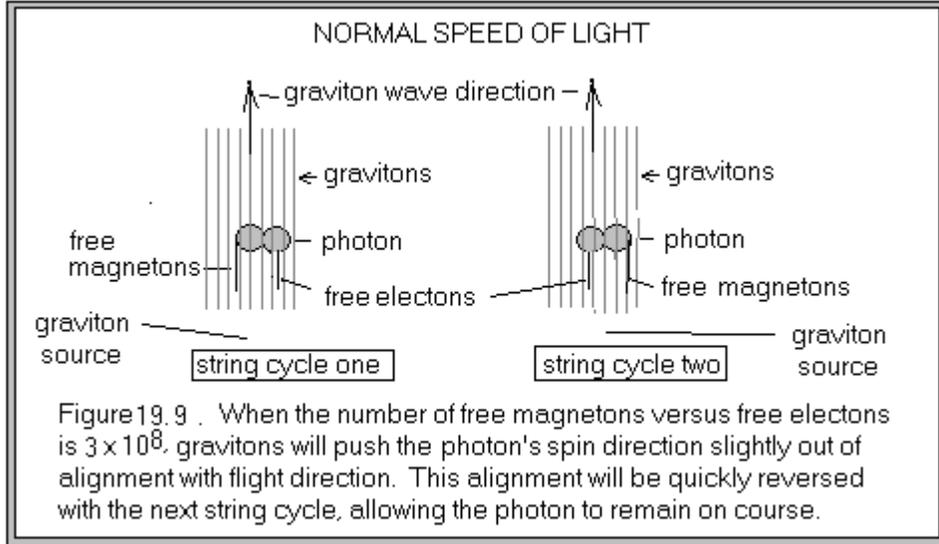
It should be noted in passing that the frequency of a photon's electron waves and magneton waves are the same because each portal makes the same number of strings per string cycle.

Constraint number five: The location of the portals creating strings is important because the photon has two different spheres. In order for the photon to move orderly through space, the same energy must be pushing equally on both spheres of the photon. Only in this manner can spin direction be more in alignment with the photon's flight path. Possible locations of the portals creating the two kinds of strings are shown in Figure 19.8.

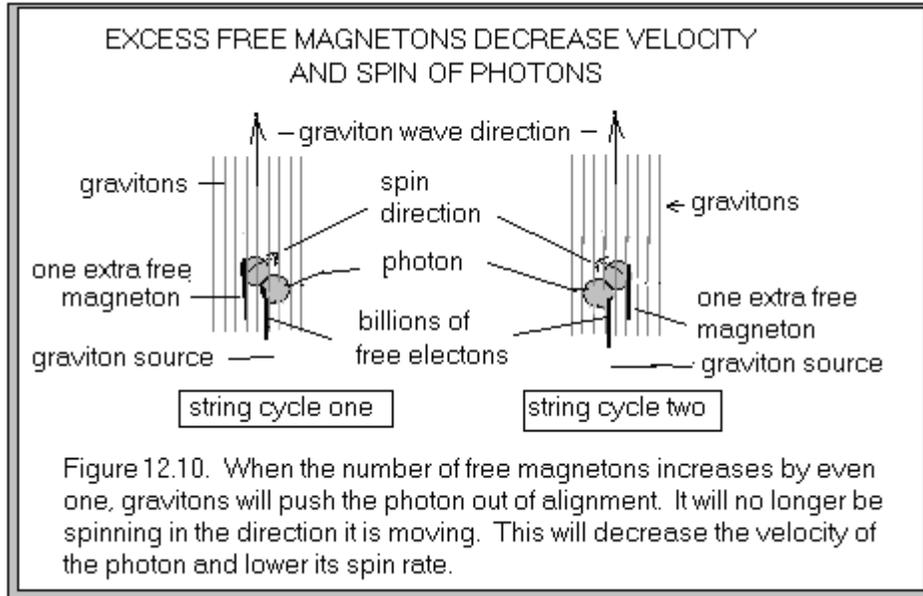


It may well be that the physical relationship of the portals is not exactly as pictured. Perhaps, the portals for magnetons are nearer the center of a sphere, but pointed away making it seem as though they are ejected at the poles. It is also true that portals for electons may be nearer the center between the two spheres.

If the portals are somewhat in the positions shown in Figure 19.8, and if gravitons push on the total number of magnetons with the same force as they push on the total number of electons, the photon will be pushed slightly out of alignment. Its spin direction will be slightly different than its flight path. However, this will be reversed in the next cycle because the magnetons and electons arise from the opposite spheres. This means a photon will zigzag slightly but remain on course. How this might look for a photon traveling at the normal speed of light is shown in Figure 19.9.

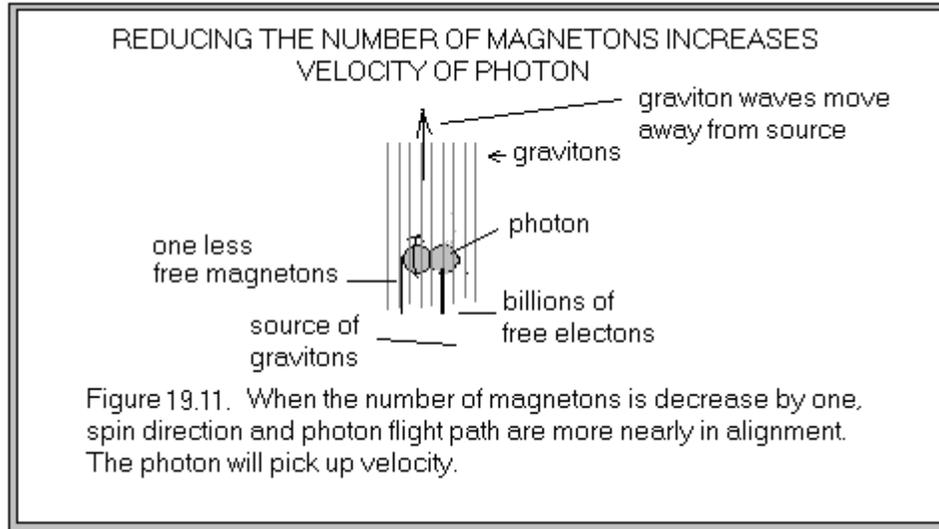


What happens when a photon is ejected in the same direction as a moving source, and the velocity of the photon is greater than the normal speed of light? Well according to restraint number three, it will automatically slow down because gravitons will have less interaction with the photons' strings. There is another curious thing that might happen. When traveling at a higher speed, a photon might create a greater number of strings than normal. If we increase the number of electrons by a few thousand, it will have little effect on the ratio between electrons and magnetons; however, even if one additional magneton is created, it might cause the ratio of electrons to magnetons to be less than 3×10^8 . This suggests that the velocity of the photon should decrease because spin alignment and photon flight direction are even more out of alignment. In Figure 19.10, we can see how this might work.



Now since the photon's speed decreases, the number of strings created in the next cycle will decrease as well. This will tend to restore the balance of strings, which will restore a normal velocity of light.

This brings us to the third situation: When the ratio between free magnetons and free electrons is greater than 3×10^8 . This might occur when a photon loses part of its velocity for any number of reasons, some of which were listed above. Under these conditions, the photon might make fewer strings than normal. If it makes even one less magneton, the ratio between electrons and magnetons might be greater than normal, and accordingly, the velocity of the photon will increase. This can be explained physically because spin and flight direction will be more in alignment. This is shown in Figure 19.11.

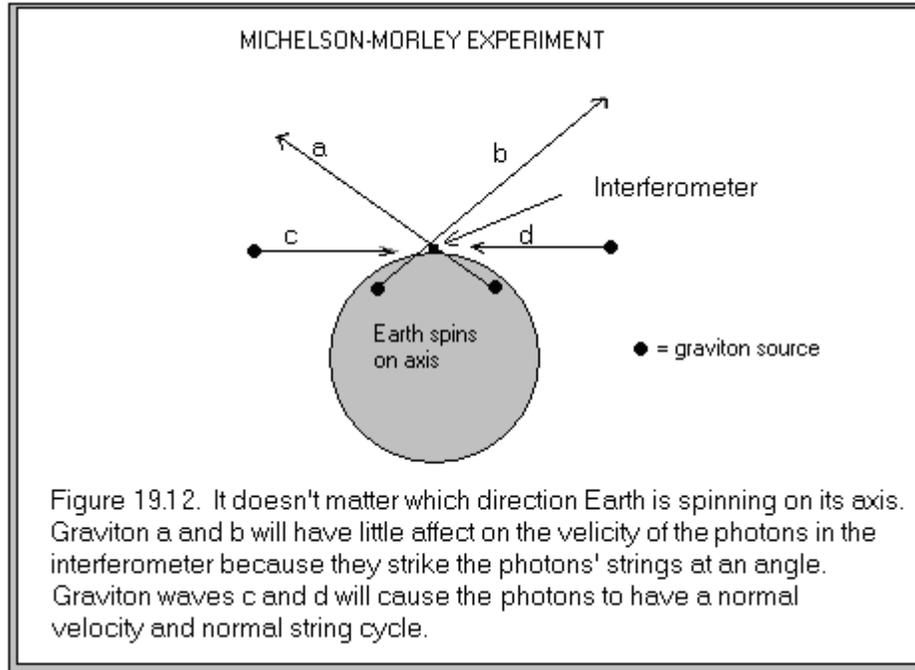


It is not known whether fewer strings are created if the velocity of the photon decreases, and it is not known whether the ratio of electrons to magnetons would be disturbed; however, if it does occur it would augment rather than disturb the effect of gravitons on photons. The same is true if the photon exceeds the velocity of light.

Perhaps what this analysis shows more than any other is that it is crucial that the same force, or nearly so, is being applied on both halves of the photon or it would likely go tumbling through space.

Doppler Effect has no Influence on the Michelson-Morley Experiment

A photon moving along Earth's surface is not affected by graviton waves emanating from Earth because the waves strike the magnetons and electrons streaming to the rear of the photon at an acute angle. Thus it doesn't matter if the graviton wave emanating from a spinning planet has some Doppler characteristics. This shown in Figure 19.12.



Final Analysis of the Michelson-Morley Experiment

Once a photon is ejected into space, that is freely moving through the interferometer in the Michelson-Morley experiment, it is no longer influenced by the velocity of the spinning planet or the direction it orbits the Sun. If the photon is sent off with a slightly greater velocity because it is ejected in the direction of the moving planet, its velocity is immediately corrected because gravitons disengage from the photon's electrons and magnetons as explained by VES ether theory. This is also true for photons ejected opposite to orbital direction; even if they are going slower in the beginning, they will quickly be readjusted to the normal velocity of light because the force of gravitons pushing on a small photon provides more than enough energy to raise the photon's velocity even if the gravitons are only partially bound to the photon's strings. Thus the effect of Earth's movement cannot be detected in the interferometer even though the photon ejected may initially have a different velocity.

Electric and Magnetic Quantities and the Velocity of Light

- 1) The energy density of the electric field is equal to the energy density of the magnetic field. I assume that the masses associated with the two fields are also proportional.
- 2) The electric lines of force E are proportional to the number of electrons, and the magnetic lines of force B are proportional to the number of magnetons.
- 3) The electric lines of force E divided by the magnetic lines of force B is equal to 3×10^8 . Thus the ratio of free electrons to free magnetons is equal to 3×10^8 . Thus the mass of 3×10^8 electrons is equal to the mass of 1 magneton.
- 4) Free electrons are ejected from one sphere and free magnetons from the other sphere. Equal pressure causes both spheres to eject the same mass the same distance in space. Thus one sphere creates 3×10^8 electrons and the other creates 1 magneton, at least this is the ratio.
- 5) The velocity of the photon is dependent upon the velocity of its traveling transverse waves. Both magneton and electron waves move at 3×10^8 m/s. This is the primary factor that determines the velocity of light because it determines the interaction between gravitons and electrons and between gravitons and magnetons.
- 6) If the photon exceeds the velocity of light, the gravitons will tend to disengage and slow the photon down as explained by VES ether theory. This explains why all photons travel at the speed of light even though there may be a vast difference in their masses.
- 7) A photon traveling at less than the speed of light is quickly brought up to speed by gravitons pushing the particle forward.
- 8) The ratio of 3×10^8 electrons binding to 3×10^8 gravitons and one magneton binding to 3×10^8 gravitons is important because it keeps the photon spinning in approximately the same direction it is moving through space.

Gravitons form a Dense Fabric of Randomly Fluctuating Strings

The number of gravitons in space must be vast to account for the properties of the gravitational force of attraction. In addition a vast number of gravitons going in all directions are needed to explain their effect on the velocity of light.

If each proton equivalent makes 2.3×10^{23} strings per second, then the number of gravitons in space would be immense if they existed for one second. This is shown in Table 17.2. It should be kept in mind that the number may be billions of times larger than those shown in the table.

TABLE 19.1
MINIMUM GRAVITON CONCENTRATION AT EARTH'S SURFACE

Source of Gravitons	Mass, kg	Source's Total Gravitons	Distance Away In Centimeters	Gravitons per cm^2 , Earth Surface
Earth	6.0×10^{24}	8.2×10^{74}	637000000	1.6×10^{56}
Venus	4.9×10^{24}	6.7×10^{74}	1.1×10^{13}	4.5×10^{47}
Jupiter	1.9×10^{27}	2.6×10^{77}	7.8×10^{13}	3.4×10^{48}
Sun	2.0×10^{30}	2.7×10^{80}	1.5×10^{13}	9.5×10^{52}
Galaxy	2.2×10^{41}	3.0×10^{91}	2.6×10^{22}	3.5×10^{45}
Mountain	8.2×10^{15}	1.1×10^{66}	3206496	8.8×10^{51}
Building	120000	1.6×10^{55}	670	2.9×10^{48}
Coffee cup	1	1.4×10^{50}	10	1.1×10^{47}

The mass of the Earth contributes at least 10^{56} gravitons per square centimeter per second at Earth's surface, which is far more than the contribution of gravitons from all other sources combined. However, notice that the contributions from other sources are vast. Even a cup of coffee 10 centimeters away will contribute 10^{47} gravitons per square centimeter per second. The building that surrounds you, nearby mountains, the galaxy and planets in our solar system all contribute at least 10^{45} gravitons per

centimeter per second at Earth's surface. This means there are as many as 10^{30} gravitons per area of a proton. Thus, the space surrounding us is inundated by a vast number of transverse waves moving in all directions relative to any object on Earth. These are immense numbers, but completely justified by VES theory.

VES THEORY – MOVING TRANSVERSE WAVES

1. A vast number of gravitons bound to their source fill the space that surrounds us.
2. Subatomic particles interact with gravitons through their free electrons and free magnetons.
3. Strings have moving transverse waves that travel away from the source that creates the strings.
4. The energy of graviton waves has an effect upon the energy of small, fast moving particles via their electrons and magnetons.

Without graviton waves nudging a photon forward, it would lose velocity and eventually come to a halt as it collides with objects that impedes its forward motion. This includes a dense fabric of strings in its path as well as whole atoms and larger objects that it encounters. Graviton waves must be the predominate force that accounts for the velocity of all photons. However, without magnetons and electrons streaming behind the photon, there would be little interaction between gravitons and photons, and the photon would not be able to transfer its momentum. Thus, the velocity of a photon is equally depended upon graviton waves and photon strings.

Maxwell's Equations, Relativity, and VES Ether Theory

Maxwell's equations can be explained if free electrons and free magnetons bond in some manner with gravitons, and if gravitons create transverse waves that travel away from their source. Because electrons and magnetons bond to gravitons, it links gravitons to photons and other subatomic particles that make these strings. It allows gravitons to act as an outside energy source that modulates the velocity of light as well as

influence string cycles of photons and subatomic particles. This model provides the crucial link between Maxwell's equations and the mathematics behind the special theory of relativity. It provides the missing link that explains a large number of observations and experiments dealing with light and subatomic particles. The experimental evidence I present in Chapters XIX through XXII that deal with relativity will help convince you that gravitons modulate the velocity of light as well as influence the energy of subatomic particles. Here we will find that the concept of relativity is a useful one in elucidating the effect of gravitons on electrons and magnetons.

Induction of Electric and Magnetic Fields

Maxwell proposed that the electric field induces the creation of the magnetic field and vice versa. VES theory proposes that the electric and magnetic fields surrounding a photon are induced (created) because (1) spin angular momentum is coupled to linear velocity; (2) spin angular momentum creates pressure inside the particle when its strings retract. The energy is stored as potential elastic energy; (3) stored elastic energy is the work horse that ejects strings from the photon. (4) spin angular momentum aids in the retraction and absorption of strings.

The energy of the bound magnetons is equal to the energy of the bound electrons. In both cases, complementary strings arise from opposite spheres. When they bond and retract, the force created will be inward causing pressure within the photon to increase. The pressure condenses the elastic goo that is used for another string cycle. This analysis suggests that gravitons, magnetons and electrons work synergistically to create pressure and store potential elastic energy inside the photon. Thus, creation of the force fields occurs because of self-induction, although slightly different than envisioned by Maxwell.

If you examine carefully the magnetic fields and electric fields as illustrated in most physics books, it is obvious that the two fields begin at exactly the same time and reach a peak at exactly the same time. Also the ratio of the instantaneous value of electric field to the magnetic field is always the velocity of light, showing that both are propagated in the same time frame. This is exactly what you would expect if they are created at the same time during the string cycle. This is additional confirmation that

VES ether theory

gravitons, electrons, and magnetons work as one to induce the electric and magnetic fields.

The creation of electric current in a wire is achieved when spinning electrons collide with a barrier of magnetons provided by a stationary magnet. When the electrons strike this barrier they move off in the direction they are spinning, which is at right angles to the magneton barrier. Thus, the induction of electric current in a wire is entirely different than induction of electric fields surrounding a photon.

CHAPTER XX

VES ETHER THEORY AND SUBATOMIC PARTICLES

Most of the observations we are going to encounter in this chapter can be explained by the influence of gravitons on the string cycles of atoms and subatomic particles as explained by VES ether theory. This interaction accounts for all the experiments with cesium-based atomic clocks, the effect of strong gravitational fields on the creation of photons, and decay rate of radioactive particles in particle accelerators. One other important observation will be examined: The effect of gravitons on the velocity of subatomic particles in particle accelerators.

VES Ether Theory and Particle Accelerators

A particle accelerator is designed to increase the velocity of subatomic particles until they approach the speed of light. This provides a controlled environment for measuring the effect of velocity on string cycles and a controlled setting to examine the relationship between observed particle velocity versus expected velocity as the particle approaches the speed of light. .

Only those gravitons traveling along the surface of Earth will have an appreciable affect on the particle in the accelerator because those emanating from Earth will strike the particle's waves at an acute angle. For this reason, we can assume that an equal number of gravitons are traveling with and against the subatomic particle being accelerated.

According to VES ether theory, if we increase the velocity of an electron in a particle accelerator, we can expect two things to happen. First, the electron's velocity will increase faster than expected because graviton waves going in the same direction as the particle will increase its velocity. Second, the particle's string cycle will slow down more than expected because of graviton waves going in the opposite direction. Because the number of graviton waves along the surface of Earth is approximately equal, we can expect that velocity increase and string cycle reduction will occur at the same time and to the same extent. They both will follow the same relationship with gamma.

VES ether theory

The actual results show that electrons in a particle accelerator gain more momentum than can be accounted for by the force applied. It is often cited as one of the important proofs of the special theory of relativity. The equation that expresses this gain in momentum is:

$$\text{Relativistic momentum} = \gamma \times \text{expected momentum}$$

Thus:

$$\text{Relativistic mass} \times \text{velocity} = \gamma \times \text{expected mass} \times \text{velocity}$$

$$\text{Relativistic velocity} = \gamma \times \text{expected velocity}$$

Most physicists believe that the higher than expected momentum of particles in an accelerator is due to a higher than expected velocity. Einstein came to believe this even though he initially favored an increase in mass. Thus, greater than expected momentum in the accelerator is due to a greater than expected velocity as the particle approaches the speed of light.

$$\gamma = \frac{1}{\sqrt{1 - v^2/c^2}}$$

For example, if the velocity of an electron increases until a ratio of v/c is 0.9999999997, its velocity will be 57,700 times greater than expected according to the force applied.

According to VES ether theory, the momentum of the electron increases more than expected as it approaches the speed of light because an outside energy source (moving, transverse, graviton waves) interacts with the electron's strings and increases its velocity. This is the same interaction that explains the velocity of light and Maxwell's equations. The closer the electron approaches the speed of light, the greater the interaction as explained by VES ether theory.

An electron in motion differs little from a photon in motion. They are both creating electrons and magnetons that are swept to the rear of the particle. This allows graviton waves traveling with the particle to bind to its waves and push the electron forward. As the particle approaches the speed

of light, its train of waves flowing to the rear will be slower, and at the speed of light they will appear stationary in space with respect to an observer or the graviton waves approaching from the rear. At this point, there is maximum interaction between graviton waves and the electron's string waves, and graviton waves will have a maximum impact on the velocity of the electron. In contrast the slower the particle goes the less the interaction. The relativity recognized by Einstein is actually the velocity of the particle's waves moving to the rear **relative** to graviton waves going in the opposite direction.

VES THEORY AND FAST MOVING PARTICLES

Strings emanating from a subatomic particle are swept to the rear of the particle in motion. Graviton waves bind to the particle's waves and push the waves and particle forward, which increases its velocity.

The closer the particle is to the speed of light the easier it is for the strings to interact and the stronger the force applied. Thus, we are dealing with the speed of the particle's waves relative to graviton waves, which is a form of relativity, just as imagined by Einstein. For this reason, the velocity of particles follow the equations for relativity

Particle Accelerators Slow String Cycles

I began this discussion by noting that particle accelerators should have a second effect on small particles as they approach the speed of light. String cycle rate should decrease in the same proportion as gamma. Let's examine the evidence.

Radioactive particles that emit gamma rays are extremely sensitive indicators of time because they decay at a precise rate. The emission of gamma rays by an excited nucleus (higher energy) is analogous to the emission of photons by excited electrons. Thus, any action that lowers their rate of vibration and spin angular momentum can be expected to lower their rate of decay.

VES ether theory

Scientists have shown that the decay rate of radioactive particles in an accelerator does slow down as the particle's speed increases. The special theory of relativity uses time dilation to explain why gamma increases in this experiment. This interpretation says that a moving radioactive particle has less decay because time slows down while the particle is moving at a high speed. The closer the speed of the particle is to the speed of light, the greater gamma becomes. Thus according to the special theory of relativity:

$$\text{Relativistic time} = \text{gamma} \times \text{expected time.}$$

VES ether theory says that gravitons interact with electrons and magnetons emanating from radioactive subatomic particles. When graviton waves are traveling opposite to the direction of the radioactive particle, they pull the particle's strings to the rear, which retards their retraction, increases the length of string cycles, and reduces spin angular momentum; thus, the radioactive particle's energy state is lowered, and along with it, its decay rate. The closer the speed of the particle is to the speed of light, the greater the effect. Thus we have this equation:

$$\text{Relativistic length of string cycle} = \text{expected length of string cycle} \times \text{gamma.}$$

This confirms VES ether Rules of Engagement; namely, when there are an equal number of gravitons going in both directions relative to the movement of the particle, those going opposite to its movement will primarily affect its string cycles, and those going in the same direction will primarily affect the particle's velocity. In the case of photons traveling along the surface of Earth, it results in the normal velocity of light and normal string cycles. And in the case of particles in an accelerator, it explains why relativistic velocity and string cycle rate are both arrived at by multiplying with gamma.

Even though the speed of the particle increases more than expected as it accelerates, the particle's string cycles and energy state become proportionally slower. VES ether theory explains both of these phenomena in a three dimensional world. We don't have to assume that the huge particle accelerator shrinks to a few meters while in use, nor do we have to assume that time is a fourth dimension.

PARTICLE ACCELERATORS

Decay of a radioactive particle depends upon its energy state, which is dependent upon the rate of its string cycles. String cycles decrease in a particle accelerator because graviton waves going in the opposite direction of the particle bond to its strings and inhibit their retraction. This reduces radioactive particle decay rate.

Relativistic length of string cycle = expected length of string cycle x gamma.

The velocity of a particle in an accelerator increases more than expected because graviton waves going in the same direction bind to the particle's strings and push the particle forward.

Relativistic velocity = expected velocity x gamma.

Because string cycles and velocity are both corrected by gamma, it confirms the idea that the particle's string waves moving to the rear of the particle appear motionless in space when the particle is going at the speed of light.

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 bonding occurs between gravitons and magnetons and between gravitons and electrons just as proposed by VES ether theory. The data supports the idea that gravitons have an affect on string cycles.

Cesium-beam Atomic Clocks and the Gravitational Frequency Shift

A cesium-beam atomic clock measures the exact oscillation frequency of the cesium atoms, which is 9,192,631,770 cycles/second. This amounts to

an accuracy of 1 second in 1,400,000 years, which makes a cesium-beam atomic clock the most sensitive device ever made for measuring time.

The oscillation frequency of atoms was discussed in a previous chapter. Briefly, it can be said that the oscillation frequency of an atom is determined by the string cycles of its electrons and quarks. Electron string cycles and quark string cycles become synchronized because their electrons and p-electrons bond as they go through their individual cycles. This forces them into synchrony. Scientists follow the atom's oscillation frequency by measuring the magnetic field during the oscillation cycle.

It has been shown that a cesium 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. Clocks at rest on Earth are about 7×10^{-10} slower than clocks at rest at infinity, Ashby (2003). Although this is an extremely small number, a good Cesium clock only has an error of 5×10^{-14} nanoseconds per day.

VES ether theory and cesium-beam atomic clocks

According to VES ether theory, gravitons bond to the electrons and magnetons within the cesium atom. Those graviton waves going opposite to the direction of the atom's electrons and quarks will delay string retraction and increase the length of their string cycles. Because quarks are bound to electrons by strings, the two bodies would be forced into synchrony. Thus, in a strong gravitational field we can expect string cycle rates to slow down. The net result is an atom whose electron string cycles and quark string cycles are in synchrony but at a lower frequency. The clock will have a slower oscillation frequency and tick fewer times per second. This completely explains the effect of the gravitational force on cesium-beam clocks.

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

$$\text{Earth's potential gravitational energy} = \frac{G M_E}{r}$$

the gravitational constant, M_E the mass of the Earth, and r is the distance to Earth's center.

According to VES ether theory, this is a reflection of the energy required to extend the length of string cycles and dampen the vibration rate of the atom. It provides a rational, physical reason why the strength of the gravitational field is correlated with the rate atoms vibrate.

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 bond to electrons and magnetons just as predicted to explain the gravitational force of attraction, the velocity of light, Maxwell's equations, and special relativity.

By the way, no theory of relativity is required to calculate Earth's potential gravitational energy.

GRAVITATIONAL FREQUENCY SHIFT

A cesium beam clock depends upon the frequency of the cesium atom. Cesium atoms vibrate less frequently in a strong gravitational field.

According to VES ether theory, the penetration of an atom by untold billions of gravitons increases the length of string cycles and dampens the vibration rate of the cesium atom. This is an energy driven interaction between gravitons from Earth and the electrons and magnetons created by quarks and electrons within the atom.

Strong Gravitational Fields and Gravitational Red Shift

In the previous section, I explained how atoms in a strong gravitational field have a slower than normal vibration frequency because their string

cycles are extended. As we might expect, this affects the photons emitted by these atoms.

Basically, 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 excited 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. This is referred to as a red shift because red is found at the lower end of the light spectrum. 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 red shift is known by scientists to be the result of strong gravitational fields.

According to VES ether theory, graviton waves going in the opposite direction to the movement of a subatomic particle will increase the length of the particle’s string cycle and decrease spin angular momentum of its quarks and electrons. A decrease in spin angular momentum causes the atom to make a photon with less energy; it will show a red shift.

Recall that electricity is used to control the energy of the photons emitted by a transmitting radio antenna. In this situation, the antenna is receiving pulses of e-electons then p-electons that are controlled by an oscillator. This brings the atom’s oscillation frequency to some desired value, which in turn controls the energy of the photons emitted. The photons emitted by the radio antenna are controlled by the oscillator because pulses of e-electons and p-electons control the antenna’s string cycle frequency. 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 string 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 string 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 in gravitational fields and the behavior of subatomic particles in particle accelerators, which are cited in support of relativity.

Radioactive Decay in Particle Accelerators

The radioactive decay of particles in a particle accelerator decreases as the velocity of the particle increases. This is used as proof for time dilation. Earlier in this chapter, I discussed how this observation can be explained by VES ether theory.

Cesium Clocks in Satellites

A cesium atomic clock in motion ticks fewer times per second than an atomic clock at rest. For this reason, clocks placed on satellites in orbit must be preset to adjust for this factor as well as the gravitational frequency shift, discussed previously, 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 potential energy of

gravitation and the velocity of the clock. The faster the clock is moving, the greater the retardation of its string cycles just as we saw in radioactive particles in particle accelerators.

It is possible that quarks would be influenced by the velocity of the satellite more than electrons because they are not orbiting around some central body at a high velocity. However, electron string cycles and quark string cycles would be pulled into synchrony because they are bound to each other. Because instruments follow the atom's oscillation frequency by measuring the magnetic field during the oscillation cycle, the clock will be running slower when its string cycles are extended.

Cesium Clocks in Airplanes

J.C. Hafele and R. Keating (1971) tested time dilation by flying cesium-beam 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.

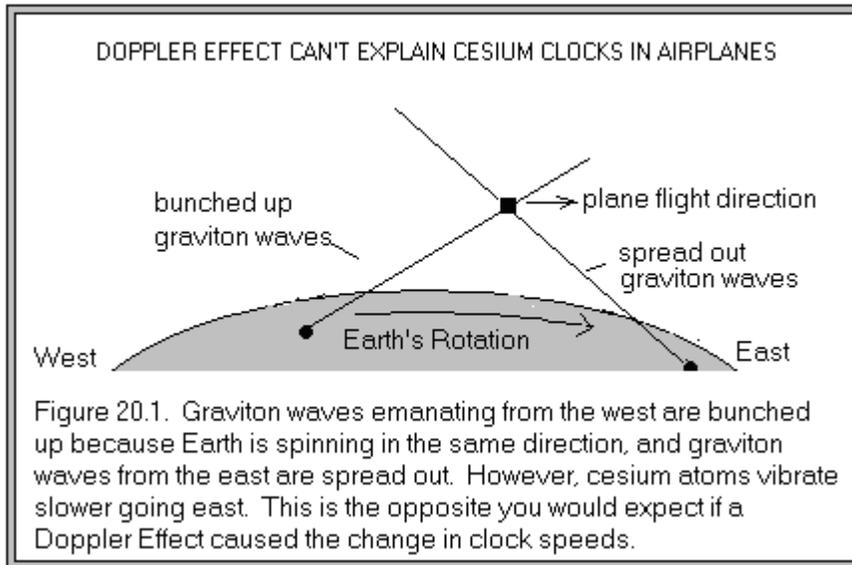
According to the authors, this is what you would expect because of relativistic time dilation. This opinion is not shared with some physicists. D. McCarthy (1997) stated his belief that "...not only did Hafele-Keating invalidate the reference frames of all the clocks and observers in the experiment, 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 can not 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. 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.

If clock speed varied because of a change in gamma, the speed of the clocks would be independent of Earth's rotation, but this is not true. Obviously there must be stronger forces acting on a slow moving cesium clock to alter the number of times it oscillates per second. These forces must emanate from a spinning earth, and they must differ according to whether they emanate from the east or west side of the planet.

A Doppler Effect involving graviton waves emanating from Earth can not explain the results because waves from the west side of Earth can be expected to have greater frequency than those emanating from the east side of the planet. The opposite would have to be true to explain the Hafele and Keating experiment. This is illustrated and explained in Figure 20.1. Some other factor must supply significantly more energy to the system.



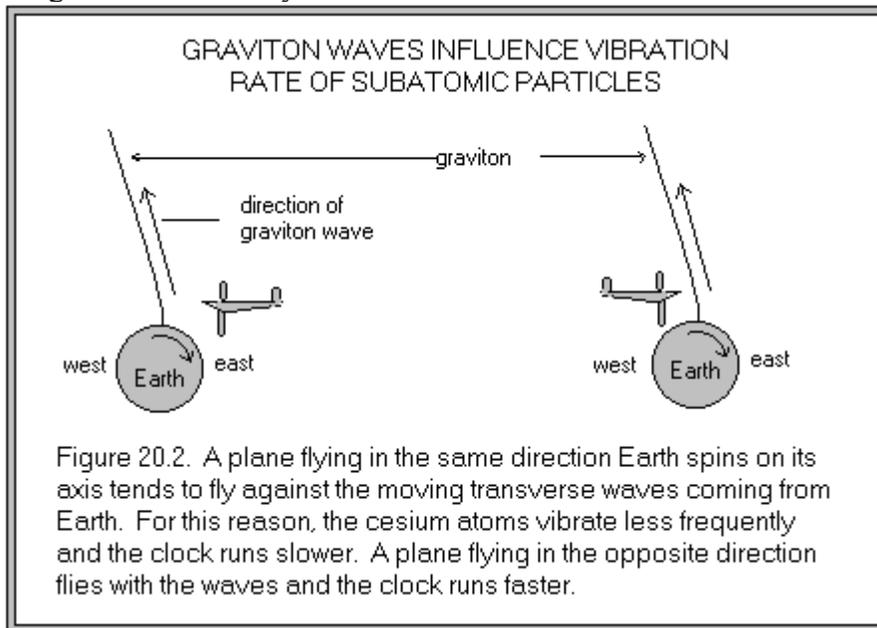
Orientation of Earth's gravitons in space

Another possibility is that Earth's gravitons exist long enough in space to be reoriented as Earth spins on its axis. Because Earth spins east, the long

graviton strings would tend to bend and travel away from Earth in the opposite direction. Thus, a plane flying east will be flying against graviton waves emanating from Earth, which will retard the electrons and magnetons moving back to source. This will lengthen string cycles and oscillation frequency of the cesium atom. The clock will tick fewer times per second. This is shown in Figure 20.2, next page.

When the plane is flying west, its electron and magneton strings will have a tendency to flow east to the rear of the particles. A majority of graviton waves going in the same direction as the plane will be pushing these waves back to source. This will decrease the length of the clocks string cycles, and the clock will tick fewer times per second.

Earth rotates on its axis 464 meters per second. A one-second interval would result in a 2.9-degree angle displacement between a fixed point in the sky at 9,144 meters above the ground and a point on Earth [note 22]. Could this degree or some vastly smaller amount cause the effect I am claiming?



In order to evaluate this question it is useful to compare the differences observed between the land-based clocks and those flown around the world. It would have taken roughly 1.8×10^{14} nanoseconds to make the trip around

the world [note 23], while the clocks in the planes were only 107 nanoseconds different from expected. The ratio between these two figures is 6×10^{-13} , which is so small that any interaction between gravitons waves and the atoms' strings would account for the difference observed. Like many of the observations involving relativity, our measuring devices are extremely sensitive, which makes it possible to detect even the smallest changes.

The Effect of Earth's Movement on Earth-based Atomic Clocks

Clocks on the surface of Earth are actually in motion as Earth spins on its axis. However, the Earth spins faster near the equator than it does near one of the poles. The effect of the spinning Earth on clock speed should depend upon where the clock is located upon Earth's surface. It should also depend upon Earth's potential gravitational energy.

As we leave the equator, and its equatorial bulge, the gravitational force field 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.

We have examined a large number of observations that can be explained if we assume that magnetons and electrons interact with gravitons. They include Maxwell's equations, the velocity of light, and the effect of gravitons on subatomic particles in motion or stationary 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 cesium atom, it decreases oscillation frequency while the opposite occurs if the majority of graviton waves and atom are going in the same direction.

I concur with Renshaw (1995) and others, who believe that slowing of clocks by gravity or motion have “no effect upon time itself, but only upon the instrumentation or processes by which we choose to measure time.”

VES THEORY AND SPINNING BODIES

Gravitons emanating from a spinning body, such as Earth, will have their orientation altered slightly in space. The long virtual elastic strings will tend to trail behind the spinning body they are attached to.

The orientation of the moving, transverse, graviton waves created by a large spinning body will affect the energy of atoms in space.

An atom moving against the direction of the waves will vibrate more slowly than an atom moving with the waves.

Biological Aging

One outcome of special relativity was the concept that a person in motion ages slower than a person at rest. My analysis of cesium clocks suggests there might be a chemical basis for this notion. If all atoms in motion take longer to go through their string cycles, it suggests that the aging process will be slower too. For example, some biologists believe we are genetically programmed to age through the shortening of our telomeres. We might imagine that this process will slow down if all string cycles occur at a slower rate. In this weird world, even our thought processes would be slower.

CHAPTER XXI

VES ETHER THEORY AND PHOTONS

We have already seen how gravitons modulate the velocity of light and the length of a photon's string cycle. The evidence shows that a photon has a normal speed of light and normal string cycles when the number 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. In addition, I will discuss how light we receive from outer space is influenced by its source.

Gravitational Fields Influence Energy of Incoming Photons

Scientists have shown that photons arriving here on Earth from areas of the sky with strong gravitational fields have higher energy than those arriving from a weak gravitational field. Four independent labs have reached this conclusion, Cowen (2003). The light we receive from our Sun shows similar characteristics as explained below and in Figure 21.1. D. Samain (1991) reports that light from the Sun reaching Earth has greater red shift than predicted after taking into consideration the original gravitational red shift due to the Sun. It has also been shown that photons emanating from the edge of the Sun show a greater red shift on their way to Earth than those coming from the center of the Sun.

VES ether theory explains these results as follows: A preponderance of gravitons going in the same direction as the photon will tend to maintain the velocity of the photon and decrease the length of its string cycle, while a preponderance of gravitons going in the opposite direction will tend to increase the length of the photon's string cycle as well as slow down its velocity. The final red shift observed here on Earth will depend upon the

concentration of Earth's gravitons going against the incoming photons in relation to the concentration of the star's gravitons traveling with the photons.

It follows that photons coming from the center of the Sun are surrounded by a greater concentration of gravitons than photons emanating from the Sun's disc. Thus, photons traveling in the same direction as a high concentration of gravitons show less red shift. This is as predicted by VES ether theory. The point in space where the average concentration of Earth's gravitons is equal to the average concentration of the Sun's gravitons is 257,000 km from Earth. This is shown in Table 21.1.

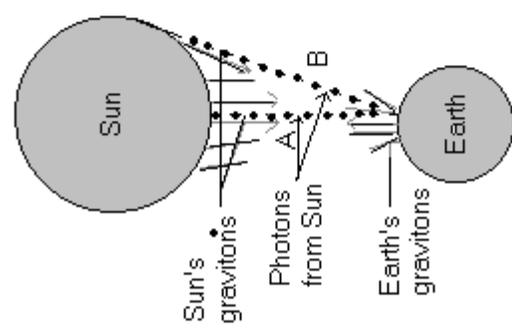
TABLE 21.1
GRAVITON CONCENTRATION EMANATING FROM EARTH AND SUN

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}

For most of the photon's journey from the Sun to Earth, the majority of the graviton waves are going in the same direction. However, at some point during its journey, Earth's gravitons will outnumber the Sun's gravitons. This will create a red shift.

The observed shift is exactly opposite to what might be expected from the gravitational force of attraction. For example, a photon emitted from the center of the Sun has its strings being pulled back to the Sun as the graviton retracts. This should create a red shift. However, the opposite is true, as explained above. This is not an unreasonable finding if the graviton remains in space through several string cycles. This allows the graviton's moving transverse waves to interact with the photon's electrons and magnetons for a much longer time than the brief resistance they afford when the graviton retracts back to source.

Figure 21.1



The following facts are known:

- (1) Photons emitted within the Sun have less energy (vibrate slower) because of a gravitational red-shift. (2) There is an additional red-shift as the photons travel to Earth. (3) Photon A arriving at Earth's surface shows less red-shift than photon B.

Interpretation:

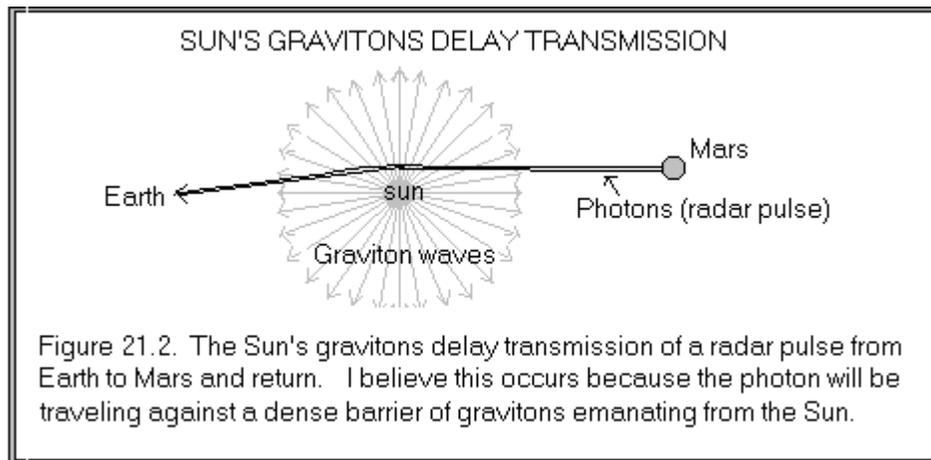
Graviton waves increase energy of photon in flight if photon and graviton wave are traveling in the same direction. Because there are more graviton waves emanating from the center of the Sun, there is less red-shift of graviton A than graviton B.

Earth's gravitons directed against incoming photons cause a decrease in their string cycles that our instruments record as a red shift.

Direction of Graviton Waves is Important to the Velocity of the Photon

There are a number of situations in which the number of gravitons going in one direction outnumbers those coming from the reverse direction. 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 bond to the particle's strings and stretch them to the rear. This extends the particle's string 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. This is shown in Figure 19.7. In this situation, a preponderance of gravitons will be directed against the flight path of the photon for much of its journey. Because electrons and magnetons are swept to the rear of the photon, graviton waves will have a tendency to stretch the waves out behind the photon. Not only does this slow the photon down, it decreases its string cycle because it delays retraction of the strings. Bertotti, Iess, and Tortora (2003) have shown that the frequency of the photon is also affected.



When the photon leaves the Sun, it is likely that a large concentration of gravitons going in the same direction as the photon will attempt to push the

photon faster than the speed of light. However this cannot occur because the gravitons will disengage from the photon, automatically slowing it down. Thus the loss in time created by a high concentration of gravitons flowing against the photon as it travels towards the Sun can not be made up by a large concentration of gravitons traveling with the photon.

Photon transmission, as depicted in Figure 21.2, shows one other characteristic. The photon bends or curves as it passes near the Sun. This will be discussed in the next chapter.

A Moving Body Influences the Frequency of the Photon it Creates

The primary reason scientists believe that distant stars are receding from us at great velocity began with the work of Edwin Hubble. He demonstrated that electromagnetic radiation coming from distant stars has a lower frequency than expected. He suggested that star light has a lower frequency for the same reason that a siren on a car changes its pitch as it moves away from us. This is known as the Doppler Effect. This was discussed in Chapter XIX. Let's examine three important observations.

Facts to Keep in Mind

Hubble discovered that the more distant a star is from our galaxy, the greater the light is red shifted. It appears as though stars at great distance are traveling away from us faster than nearby stars. If this is true, the velocities of these distant stars approach the speed of light. The data has led some scientists to conclude that the universe is expanding at great velocity. It is often referred to as a 'run-away universe.' The energy that drives galaxies apart is called dark energy because it is not understood. It should be noted that the red shift of light coming from distant stars is devoid of any dependency upon dust or some other agent that might have caused the electromagnetic radiation to lose energy. This has been ruled out by researchers, Sincell (2001).

There is another observation that I think bears on this problem. Scientists have discovered vast voids in our sky that are some 300 million light years across where scientists find no visible light. The largest cluster of galaxies under their own internal gravity is 10 to 20 million light years across. This

limits the length of a graviton. Thus, according to VES theory, there should be no gravitons inside the 300 million light year voids other than those produced by gasses, a few stray bodies, and photons of lower frequency.

Do these voids extend away from us to the end of the universe some 15 billion light years away? This does not seem reasonable. It seems far more likely that stars do exist behind these voids, but the visible light they emit does not reach us. Is this an extreme case of factors producing a red shift? I believe so because we do receive low energy microwaves and radio waves from these voids.

A third observation is that a few nearby galaxies show a blue shift. This means they are coming toward us. For example, the light we receive from Andromeda, a galaxy only 2.3 million light years away, shows a weak blue shift. The distance light travels in one year is about 1×10^{16} meters, thus Andromeda is 2.3×10^{22} meters away. The blue shift indicates the galaxy is moving towards us. Red shifts are also observed within local galaxies. A galaxy spinning around its center will have half of its stars going away from us and half coming towards us. Those coming towards us are blue shifted and those going away are red shifted. Astronomers have used this information to calculate the galaxy's velocity of rotation.

A blue shift is only observed in a few nearby galaxies like Andromeda. Those further from us show only a red shift. Thus, it appears we are dealing with two different phenomena. Astrophysicists believe we only see a red shift in far away galaxies because the universe is expanding. Almost all stars are thought to be moving away from us. Only those galaxies in our local cluster, under the influence of their own internal gravity, are not expanding away from each other at great velocity.

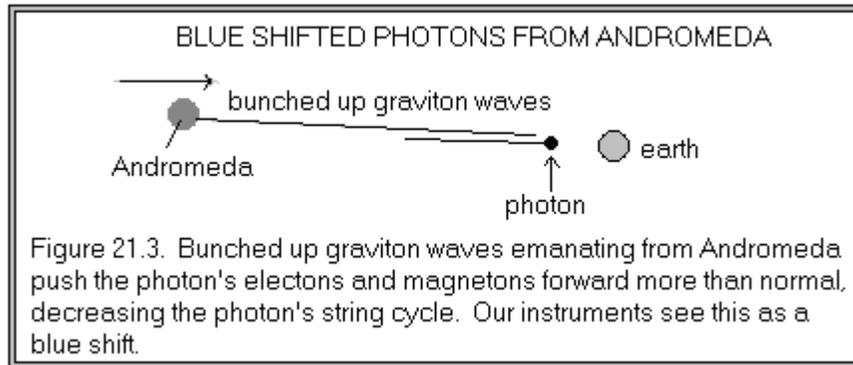
Scientists like to think of the universe as a large balloon that is constantly getting bigger. All the galaxies are on the surface of the balloon, which means they are constantly growing farther apart as the balloon expands. VES ether theory provides an alternative theory.

Let's tackle the local blue shift first. We will then examine why distant stars show only a red shift.

Reason for the Local Doppler Effect

The key to understanding the local Doppler Effect is to keep in mind that a blue shift occurs when the star is coming towards us and red shift if the star is moving away. The second important bit of information is that blue shifts only occur if the star is well within the area encompassed by our local cluster. For example, Andromeda shows a slight blue shift, and it is only 2.3 million light years away.

As explained earlier, graviton waves will show a Doppler Effect if the source of the graviton is moving. When the source is moving in the same direction as the graviton wave, the vibrations along the string are spaced a shorter distance apart. This means when they encounter a photon traveling to Earth, they will push the photon's strings forward faster and shorten its string cycle. It will also enable the photon to spin faster on its axis, which will decrease the length of its string cycles. The combined effect we will see as a blue shift.



The same reasoning only in reverse shows why a local star moving away from us shows a red shift. Because it is a local star, it will affect the red shift until the photon reaches Earth.

The Doppler Effect, at least in nearby galaxies, is a true Doppler Effect created by graviton waves that interact with photons. Because interaction is dependent upon the relative velocity of graviton waves versus particle string waves, relativity calculations are used to calculate the degree of red shift or blue shift.

The Local Doppler Effect

Photons ejected from a moving source show a small blue shift if photon and star are going in the same direction, or a small red shift if going in the opposite direction.

Graviton waves leaving the nearby star will be bunched up and create a blue shift if the star is coming towards us or spread out and create a red shift if the star is moving away from us. In order to see this shift, the moving star must be relatively close by so that it can continue to influence the photon's string cycle until the photon reaches Earth.

We should ask this question. Why does the Doppler Effect continue after the photon from Andromeda encounters the gravitons emanating from Earth? Certainly, the concentration of gravitons from Earth directed against the photon will be greater at some point. This means we should see a red shift just as we see a red shift in the light we see from our Sun. However, there is a difference. Graviton waves from the Sun are vibrating with approximately the same frequency as those emanating from Earth. This means any red shift is more nearly a reflection of the relative concentration of gravitons from both sources. In contrast, graviton waves from Andromeda have greater frequency, which makes up for the greater number of Earth's graviton waves that have a lower frequency. We also should keep in mind that the blue shift observed is very small.

The evidence presented here shows that graviton waves must travel at immense velocities otherwise they would not be able to travel millions of light years before the graviton ceases to exist. Andromeda is 2.5 million light years away (about 2×10^{22} meters) and the light we receive from this galaxy shows a small blue shift. This means the waves must travel 2×10^{22} meters before the graviton is retracted. In Chapter XIX, I presented mathematic evidence that the expected properties of graviton waves makes it seem highly possible that they could indeed travel from Andromeda to Earth in less than 1 second. Thus there is no conflict between the observed velocity dictated by the distance from Andromeda to Earth and the expected velocity as calculated in Chapter XIX.

Voids in the Sky

There are areas of the sky that emit no visible light, some being as much as 300 million light years across. However, even these areas contain a rich assortment of low energy photons in the form of radio waves and microwaves. Does something happen to the photons of visible light as they make their way to Earth or is it possible that vast tunnels extend across the universe?

Let's assume that stars do exist in back of these voids, but the visible light they emit is perceived as radio waves and microwaves when it reaches Earth. I believe this can be explained by VES ether theory.

Normal velocity of light and normal strings cycles are maintained when the number of gravitons going with the photon are equal in number to those going in the opposite direction. Under this situation, those graviton waves going in the same direction as the photon will maintain the velocity of the photon but have less effect upon its string cycle. In contrast those going against the photon will pull its strings in the opposite direction. This will primarily extend the length of the string cycles. Thus when there are an equal number of gravitons going in both directions, the photon achieves the normal speed of light and normal string cycle. However, when there is a preponderance of graviton waves going against the photon, its string cycle will be extended. We have already seen how this explains the red shift in light we see from our Sun and the red shift of light we see from more distant stars.

The ratio of gravitons emanating from Earth is never more than 2000 times greater than gravitons we receive from our Sun. However, gravitons coming towards Earth from the great voids must be extremely small; many billions of times less than from our Earth and our solar system. This in itself easily explains why the photons we receive from the great voids appear to be radio waves and microwaves.

There are other factors that might be involved.

1. Because there will be far fewer strings in voids, it will take longer to sweep magnetons to the rear where they can bond. This will increase the time it takes for a photon to go through its string cycle. If we were to measure this photon, it would appear to have a red shift.

2. There will be fewer strings for the photon to roll on to couple linear velocity to spin velocity. This means that any process that decreases spin rate becomes more permanent.
3. There will be fewer gravitons to maintain the velocity of the photon. Any obstruction that decreases the velocity of the photon will tend to decrease spin rate because the two are coupled.
4. If there is a paucity of strings in space, we might imagine the magnetons created by a photon will reach farther out into space as free magnetons. This means they are available to bond to other complementary strings. This will retard string cycles.

Taking all of these factors into consideration, leads me to believe that visible light photons are reduced to what we measure as radio waves and microwaves as they travel through a vast area where there is a paucity of gravitons. They will appear to be photons with less energy even though their masses may be those of visible light photons. This is difficult to test because the velocity of these particles might also be less.

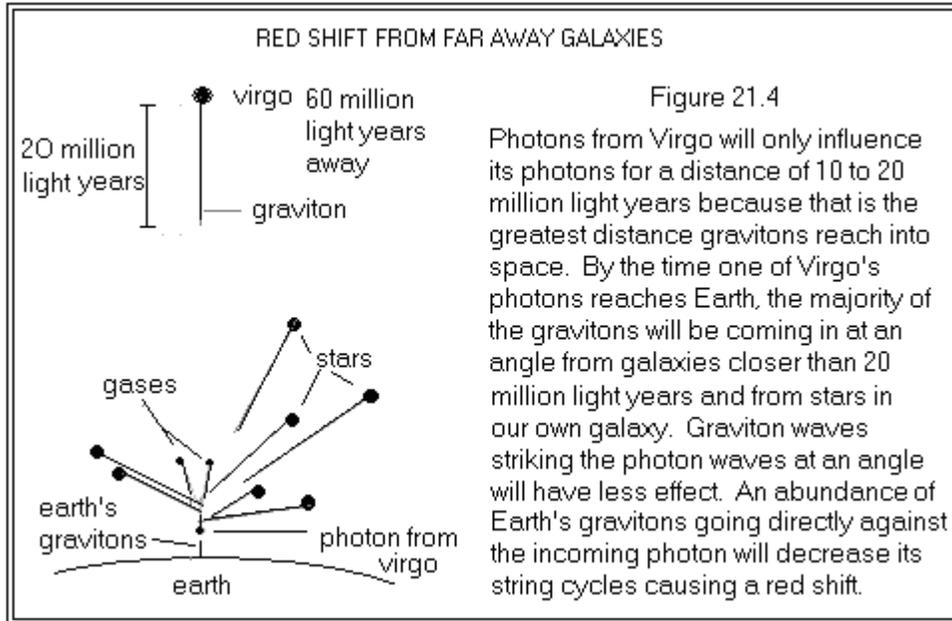
Photons Arriving Here from Deep Space

Galaxies outside our local cluster show only a red shift. The belief is that they are moving away from us. The greater the distance between Earth and the galaxy studied the greater the degree of red shift. Scientists use the red shift to calculate the velocity of these clusters relative to our own.

It is estimated that the Virgo cluster, which is some 60 million light years away, is moving away from us at slightly greater than 1 million meters per second; whereas, galaxies that are some 5 billion light years away are moving away from us at 145 million meters per second (slightly less than $\frac{1}{2}$ the velocity of light). Some astrophysicists believe the velocity of the galaxies near the edge of our universe, perhaps some 15 billion light years away, may be moving away from us at the velocity of light, some 3 hundred million meters per second, and if this is true, we will never see the light emitted by these stars.

We have already examined what might be expected when photons are forced to travel through voids in space where string concentrations are low. Does this explain why photons from far away places show a loss in energy? I believe the answer to that question is yes. For example, graviton strings

emanating from Virgo only influence the velocity and string cycles of the light it emits for 10 to 20 million light years. Thus there will be fewer gravitons to balance those from Earth directed against Virgo's incoming photons. For this reason we see a red shift.



If the void is 40 light years or more across, the photon's string cycle will depend on the strings created by gases and other photons within the void. Even when the void is much less, gravitons emitted from stars along the periphery will have far less impact on the photon's velocity and string cycles because they will strike the photon's strings at an angle.

The fact that we can distinguish these far away galaxies shows there is great space that surrounds them throughout their journey. However, the fact that visible light emanating from these stars is not reduced entirely to radio waves and microwaves indicates that for most of its journey the parameters affecting string cycles is fairly normal. For most of the journey, the number of strings in space will be greater than in a deep void some 300 million light years across. This means that string cycles, spin velocity, and linear velocity

will be more nearly normal. The net result is that photons reaching Earth from a cluster like Virgo will have higher energy (shorter string cycles) than those seen coming from the great voids.

It can be expected that the degree of red shift is dependent upon the distance between Earth and the object observed. It is a reflection of the distance a photon must traverse where string concentrations in space are low compared to the number directed against them as they draw near Earth. One reason this is likely true seems clear. In order for us to see a faint star billions of light years away means there must be a void around it for its entire journey to Earth. We would never be able to pick up a faint galaxy of stars coming from a bright area of the sky. Its light would be swamped out. Thus the fainter the star the greater the void must be that surrounds it. Likewise, the closer the galaxy is to us the more concentrated the stars can be that surround it.

There are other considerations as well. For example, once the photon is more than 20 million light years away from its source, it will depend upon other gravitons to maintain its normal velocity and normal string cycle. If there is a dearth of graviton waves traveling in the same direction as the photon its velocity will decrease and its string cycles will be extended. This was discussed previously. If this situation persists for billions of light years, it seems possible that the photon's string cycle will continue to be extended as the photon continues on its journey.

If this portion of VES ether theory is correct, then we have a poorer idea of how far objects are away from us because we cannot rely on the red shift as a source of information. It may or may not be correlated with distance from us as envisioned by astrophysicists. In addition, the red shift becomes unreliable as an indicator of the velocity of stars in far away galaxies; those outside the local cluster. The degree of red shift may not reflect the velocity of the star that created the light.

We actually have some proof for this interpretation of red shift. If you recall, I mentioned that light received from the sky where there is a greater concentration of stars shows less red shift on its way to Earth 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 red shift than light from its perimeter.

I'm not certain there is any reason to believe in the Big Bang Theory that I have thought fondly of my entire life or in a run-away universe as envisioned by astrophysicists. Both of these rely on red shifts, and red shift may be poor indicators of the velocity of far away galaxies.

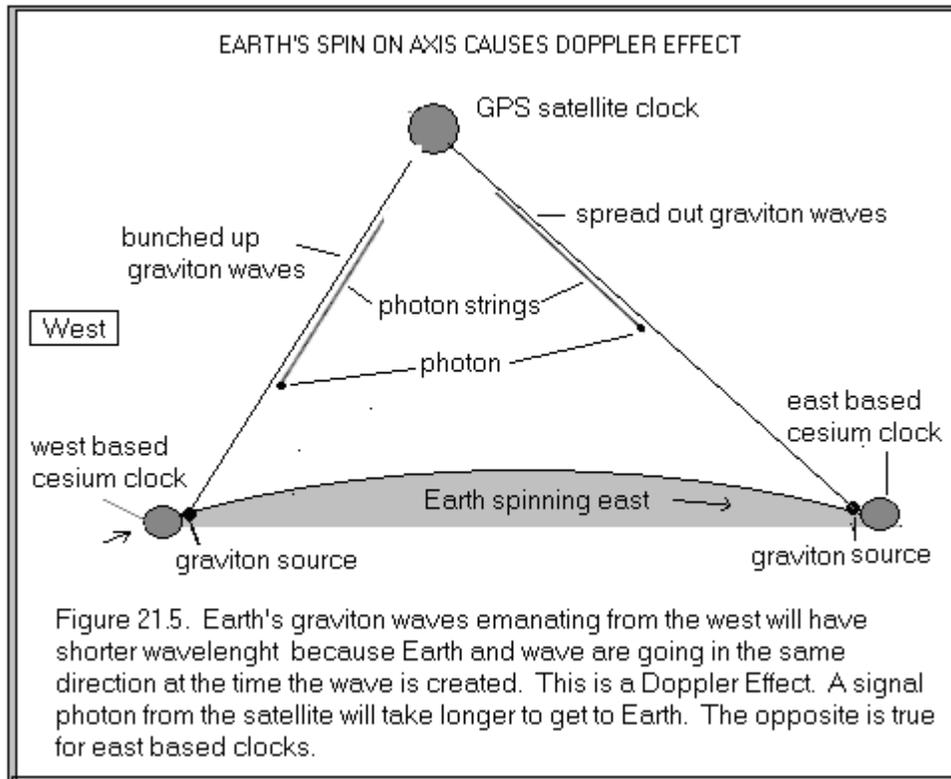
Spinning Earth Alters the Velocity of Photons

Around-the-world Sagnac Experiment:

Allan and 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 a 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. I believe this can be explained by a Doppler effect involving graviton waves emanating from earth.

Earth spins on its axis from west to east. For this reason, the length of the graviton waves directed at the satellite will depend upon their origin. If the waves are emanating from the west, they will have a shorter wave length than those emanating from the east. This means photons from the GPS satellite going west will run into gravitons with shorter wave lengths. The greater energy of these waves will impede the flight of the photons in their path more than average and delay their flight time from satellite clock to the Earth based clock. 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. They will encounter graviton strings with longer wavelengths than expected. Since their energy is less, 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.



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.

The magnitude of what I believe is a Doppler affect was confirmed 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.

It seems reasonable that the Doppler Effect in this situation dominates more that the reorientation of the waves about Earth simply because the graviton waves emanating from Earth are directed inline against incoming photons. This allows them to exert their maximum effect.

Diurnal Star Light Aberration

The light we receive from known stars 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 shown in 21.7. This is a very small aberration in the light we see from distant stars. The aberration is greater at the equator than at the poles because Earth's spin rate at the equator is greater.

VES ether theory provides a reasonable, consistent explanation for a variety of experiments that are often cited as evidence for relativity. I believe when Lorentz made his calculation, he unwittingly came up with the equation that expresses the interaction between moving, transverse, graviton waves and the electrons and magnetons created by photons and other subatomic particles. Lorentz's equation provides a necessary link between the theories of relativity, Maxwell's equation, and VES ether theory. It explains why VES ether theory and relativity are explained by the same equations.

“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 XXII VES THEORY AND THE GENERAL THEORY OF RELATIVITY

Einstein's general theory of relativity explains gravity in terms of a four dimensional world in which time and the geometry of space interact. However, particle physicists explain the strong and weak nuclear forces and the electromagnetic 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 many physicists would like to believe is that a truly fundamental theory of gravity must be quantum in nature.

There are several important observations that are often cited as proof of Einstein's general theory of relativity. Let's examine these observations.

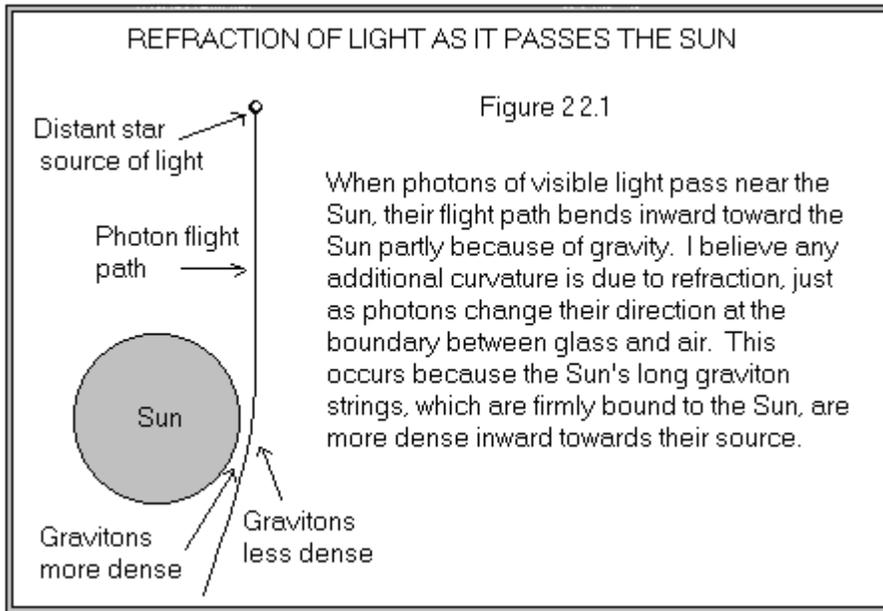
Gravitational Red shift

Gravitational red shift is one of the first observations used as evidence for general relativity. I explained in Chapter XX how VES ether theory accounts for this observation. It completely explains the gravitational red shift in physical terms in a three dimensional world. Since the gravitational force fields are used to calculate the red shift, it provides strong evidence that graviton waves provide the energy that controls string cycles, and it shows why graviton waves are an integral component of VES ether theory.

Bending of Light in Strong Gravitational Fields

The bending of light in a strong gravitation field is cited as proof of the general theory of relativity. For example, during an eclipse of the Sun, scientists have observed that light rays from distant stars change their course of direction as they pass by the Sun. The actual measurements reported vary widely from less than what you would expect from gravity

alone to greater than that expected for relativity plus gravity, and in some cases they appear to occur at the wrong angle. This suggests that refraction here on earth may distort the true picture in some cases. However, most of the values observed are greater than those predicted using the Newtonian force of gravity.



This dramatic proof of relativity can just as easily be interpreted by refraction. The concentration of the Sun's gravitons between the light ray and Sun would be greater than the concentration of gravitons on the side of the light ray distal to the Sun. This would change the direction of the photon's flight, just as light beams are refracted in glass and other media. See Figure 22.1.

Recall that electrons and magnetons are ejected at right angles to the flight path of the photon. Those strings directed towards the Sun will be impeded more than those directed away from the Sun. This will cause the photon to bend inward towards the Sun.

Sjodin (1982) published an article in *Zeitschrift fur Naturforschung A* in which he concluded through mathematical considerations that "The

formulae for bending of light and retardation of light signals near point masses are obtained in a very simple and natural way making use of classical optics. This is accomplished by characterizing the ether density in each point through a refraction index and assuming that the velocity of light is inversely proportional to this index. The results agree with general relativity and with made experiments.” Sjodin (1990) states in a second article on this subject that “the equations of general relativity and classical optics for the motion of light in a static, spherically symmetric gravitational field will be exactly equivalent. The general relativistic solution of the problem can thus be interpreted as an exact translation of the solution of classical optics..” Bagge (1982) shares Sjodin’s conclusions. “The resulting refractive index for light in a gravitational field delivers for the Sun a deviation of 1.75”, in good conformity with the observations and the results of general relativity.”

According to VES theory, virtual elastic strings that create the electric and magnetic force fields of a photon are coming off this body at right angles to the flight path. The strings on the interior of the flight path would strike many more of the Sun’s gravitons and other strings than those directed away from the Sun. This easily explains refraction and the bending of light as it passes near our Sun.

Planet 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 XII, I discuss how Mercury’s elliptical orbit causes planet precession because it alters the relationship between repulsion force per graviton versus attraction force per graviton. My theory is strongly supported by a number of 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. Marmet (1999), at the time a physicist at Ottawa University, explained his stand on the general theory of relativity: “Without having to introduce any new physics, we arrive at the same equation as predicted by Einstein (referring to precession of Mercury’s orbit). Similar consequences have been obtained when studying other relevant phenomena. Therefore, space is mathematically flat and the relativity principles are useless.”

Frame Dragging

Recently scientists have confirmed that the spin of Earth on its axis affects the velocity of artificial satellites in space. In Chapter XI, I discussed how VES theory accounts for this phenomenon, see Figure 11.3 and read the text associated with it.

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.”

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.

The general theory of relativity 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.

CHAPTER XXIII QUARKS

Quarks are small subatomic particles found within protons and neutrons. They are slightly larger than electrons and more complex. In addition to making electrons, magnetons and gravitons, quarks also make several kinds of gluons that are responsible for the strong nuclear force, and they must create other strings responsible for the weak nuclear force.

I do not have sufficient information on the weak nuclear force to assess it in terms of VES theory, and for this reason, I will restrict my discussion to the strong nuclear force and the electromagnetic forces.

Spin Angular Momentum

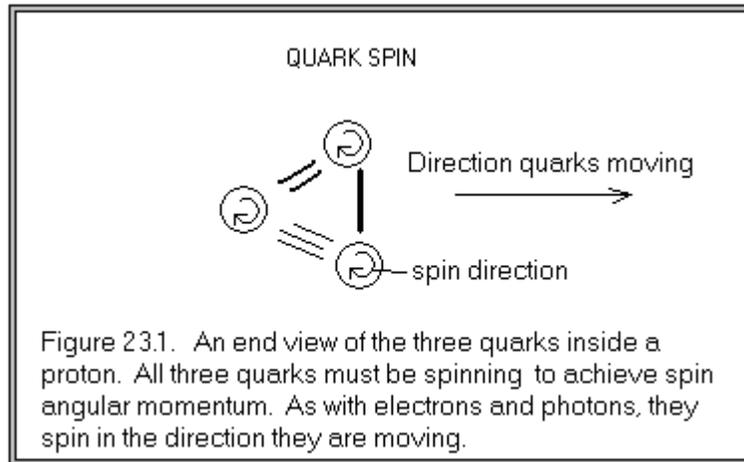
I believe the creation of strings by quarks is driven by the same forces that drive the electron's string cycle. It depends upon the movement of quarks and their spin angular momentum. This source of energy creates an inward pressure on the quark as it goes through its string cycle. This causes the elastic goo inside the quark to be condensed, which results in the storage of potential energy that is available to create, eject, and reabsorb strings.

Spin angular momentum can only be created by a moving particle. I know of no suggestions that quarks are moving around a central body as in the case of the electron; however, 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. See figure 23.2. 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, which I assume is in parallel with electron spin. I also discovered from the same review the possibility of

quark-antiquark pairs inside the atom. Their function if any towards the forces of nature is unknown.

There is the possibility that gravitons also influence the motion of electrons and quarks because they form weak bonds with strings emanating from these particles. Even a fast moving particle at some remote site in our galaxy or in some galaxy far away may have an effect on the atoms that surround us. Thus the movement of quarks is intimately tied to electrons and gravitons and the constant bumping of atoms as they collide with one another.

Previously, I discussed the evidence that suggests quarks are yanked to and fro by pulsating electric currents (electrons). This would indeed increase their spin angular momentum and the rate of their string cycles. I believe under these conditions, an increase in spin angular momentum causes the quark to create photons that it passes onto electrons in orbit as discussed at length in Chapter XVI.



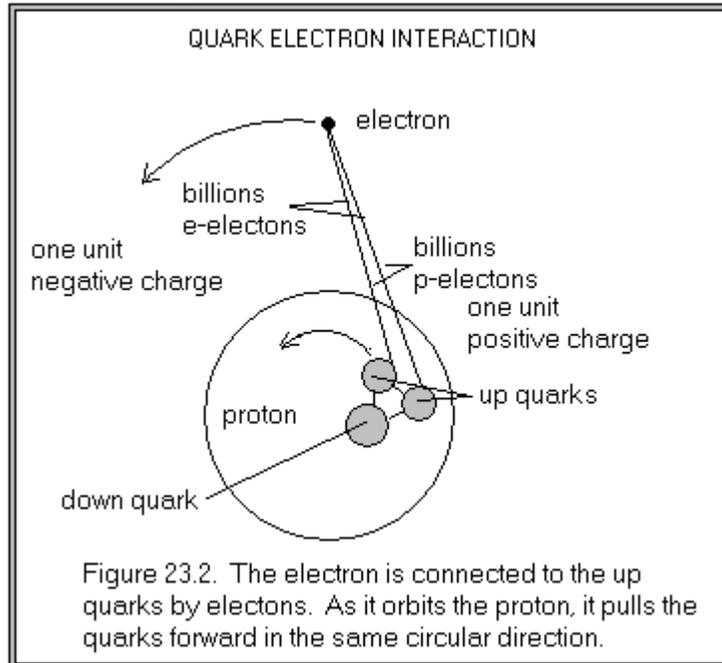
Quark String Cycle

Gluons are the strings responsible for the strong nuclear force. It seems unlikely that they are involved in creating pressure on quarks to induce the string cycle. It seems far more reasonable that quark string cycles are created by the same forces and in the same manner as for electrons and

Quarks

photons. Just what the weak nuclear forces might contribute to this picture is unknown.

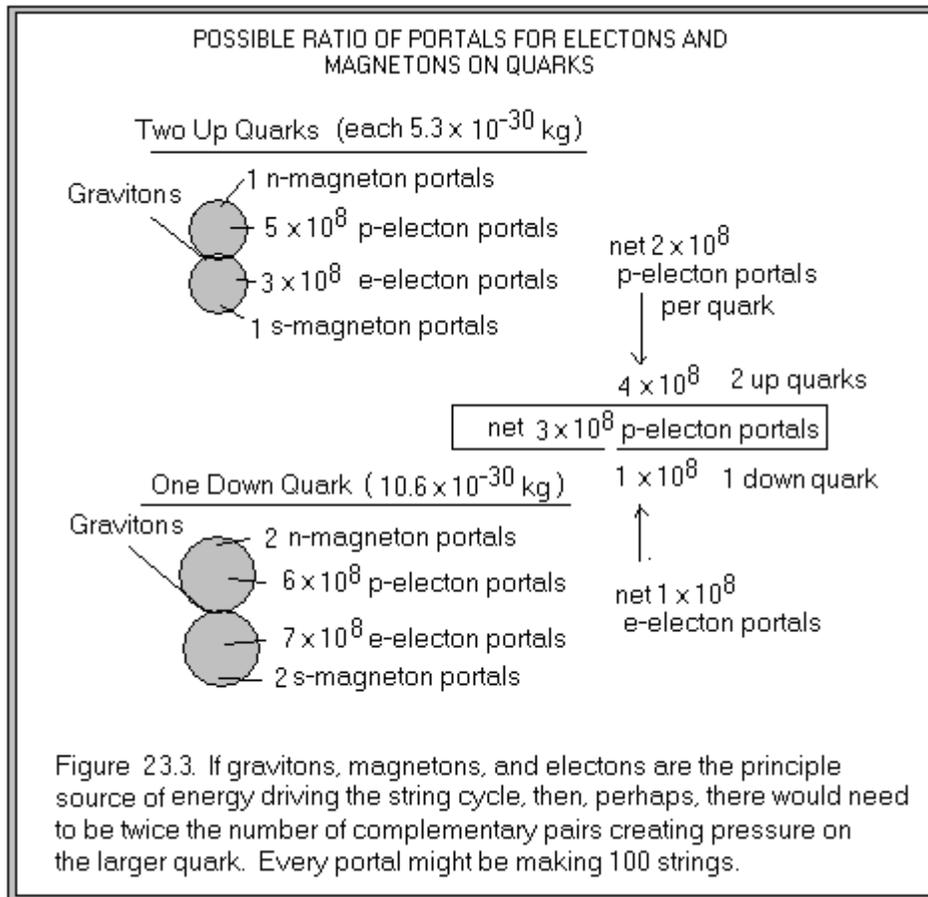
As discussed previously, the electric force field created by the proton is the result of the interaction of two kinds of quarks: up quarks and down quarks. The up quark string cycle produces a $\frac{2}{3}$ positive electric charge and there are two per proton, which combined yields $\frac{4}{3}$ positive electric charge. The down quark string cycle produces a $\frac{1}{3}$ 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 precisely 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.



If we assume that a quark is something like an electron, then each quark is composed of two spheres. Also the theory says that all quarks are making both p-electons and e-electons, and all quarks are like tiny bar magnets making n-magnetons and s-magnetons. Finally, all quarks would be making gravitons. Pressure is created within quarks, when gravitons and

complementary electrons and complementary magnetons retract. This drives the string cycle.

The down quark is twice as large of as the up quark. It seems reasonable that it needs twice as many complementary strings that bond and create pressure to equal the pressure created on the smaller up quark. For the same reason, the down quark may have twice the number of portals for magnetons as the up quark. Just how this might work out is shown in Figure 23.3.



All the portals might be making 100 strings per cycle. This works out to 300×10^8 free p-electons emanating from the proton, which would be equal to one unit of positive charge. The electron would also be making 300×10^8 free e-electons to achieve complete neutralization as well as to bind the electron to the proton as it whizzes in orbit about the nucleus.

This theoretical model provides a scenario that explains how quark string cycles might be driven by the same forces that drive the string cycles of electrons and photons. The portals would control the amount of pressure that needs to reside inside the quark to eject a string.

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.

Because p-electons emanate from two different quarks, it causes a strong force of repulsion between quarks. An even stronger force of attraction must be present to prevent the nucleus from flying apart. This force is known as the strong nuclear force. It only acts with its nearest neighbors within the atom (less than 10^{-15} meters).

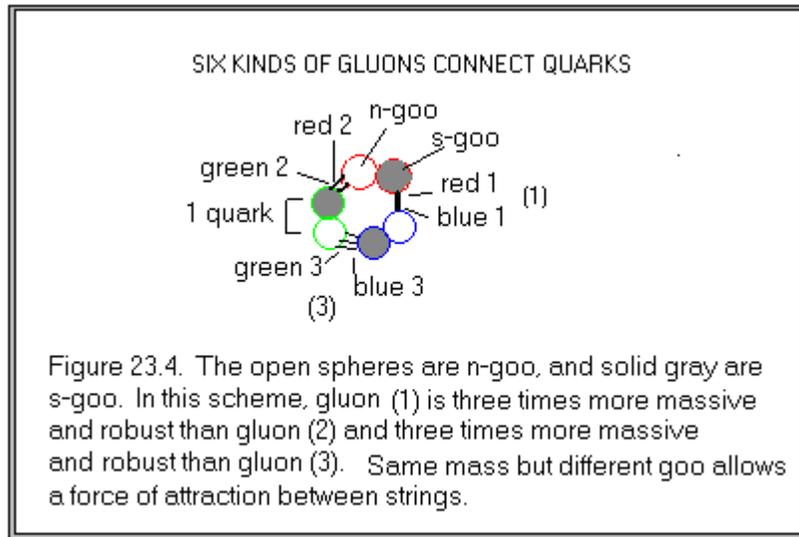
Scientists have discovered that the strong nuclear force comes in three different types of charges in contrast to the electric force that has two. The three different types are known collectively as color charges, and they are frequently designated as red, blue, and green.

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. 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

According to VES theory, gluons are the strings responsible for the strong nuclear force. It predicts that gluons are the most massive virtual elastic strings. It also predicts that gluons come in three different masses and are either n-goo or s-goo. This means there are six different kinds of gluons. Just how the six gluons might interact with three quarks is shown in Figure 23.4.

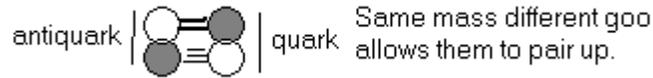


In this scenario, the relative mass of the string is shown by its number, which can be 1, 2, or 3. Like the electrons and magnetons, there is a force of attraction between two strings if they have the same mass but opposite goo. For example, there is a force of attraction between green3 gluons and blue3 gluons because they both have the same mass but opposite goo.

In contrast, gluons created by the north sphere of the red quark would have no attraction with of the gluons emitted by the south sphere of the red quark. The reason being they are made from different goo 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.

Quarks

The color charge on an antiquark is opposite to the normal quark, which allows a normal quark and its antiquark to pair up.



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.

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 magneton or 3×10^8 bound electrons. On the other hand, it may take a larger number of gluon strings to produce the same force.

Gluon Elasticity

In Chapter IX, I discussed the evidence showing that gluons behave as if they are rubber bands.

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CHAPTER XXIV 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 bond and form a force of repulsion? I believe all of this can be accomplished if there are two degrees of specificity.

The First Degree of Specificity comes from Size of String

The size and nature of the portal and its duct likely determines the ultimate size of the string. And size difference is the factor that determines whether the string will be an electron, magneton, 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 the previous chapter, I theorized that gluons come in three different sizes and degrees of robustness. I have already discussed in detail that the magneton is 3×10^8 times more energetic than an electron. It is reasonable their masses show the same proportional differences.

Finally, we might expect the weak nuclear force, which is some 10^{-7} times smaller than the strong nuclear force, to have relatively small strings. Finally, a graviton is likely to be the smallest string, which would help explain how it is ejected 20 million light years into space at enormous velocity.

According to this model, two strings with different mass do not form strong bonds with each other. They neither create a strong force of attraction nor a strong force of repulsion between them. Thus electrons and magnetons do not interact with each other, and as far is known, they do not

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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.

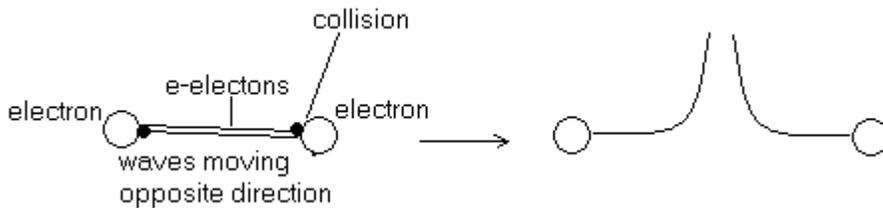
The Second Degree of Specificity comes from the Physical Nature of the String

The theory holds that the physical structure of the string is dependent upon whether it is composed of n-goo or s-goo. What makes n-goo different from s-goo? I personally like to think a virtual elastic string is composed of something akin to Velcro. The nodules and sinkholes that form n-goo are just the opposite for s-goo. Thus two strings with the same mass but opposite goo bond and form a force of attraction.

This means the fine structure of the string develops as it is created in space, which explains why strings only bond with other strings. They do not bond to the primordial goo that makes up the atom and its subatomic particles.

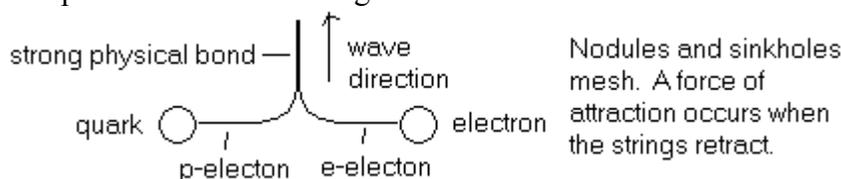
String Specificity and the Nature of the Bonds Formed

A force of repulsion can only occur between identical strings, strings that have the same mass and are composed of the same goo. Perhaps this combination directs the heads of the strings toward the opposing electrons where they strike with all their momentum, creating a force of repulsion. In this case there is no resistance when they retract back to source because their nodules and sinkholes don't mesh. It's as though there is some structural stickiness between strings of the same goo, which you might expect, and it is just enough to keep the head of one string aimed along the other until it strikes the electron. However, the two strings are never united together as one because their traveling waves are moving in the opposite direction and their nodules and sinkholes don't mesh.



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A force of attraction between e-electons and p-electons occurs because they have the same mass and the same traveling waves, and because their sinkholes and nodules find a perfect fit. In this case, the two strings trail off together like two snakes in a mating dance or better yet two strands of DNA. Thus, the difference in charge between e-electon and p-electon is ultimately caused by a difference in the physical structure of two strings that have identical waves. This allows them to bond tightly together and resist separation when the strings retract back to source.



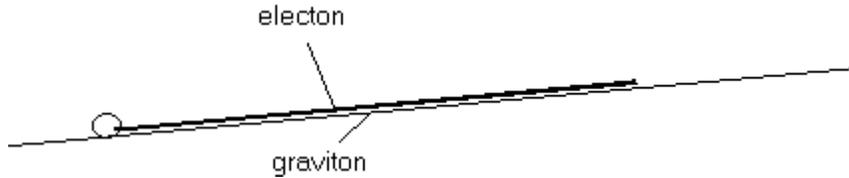
Because the two complementary strings bind throughout their long length, it creates strong resistance when the individual strands retract back to source.

Gravitons

Because there is no shielding or neutralization effect associated with the gravitational force, we know that gravitons are not attracted to each other to any great extent. In addition, they do not bond and form a force of repulsion. My model suggests the possibility that a graviton is composed of both n-goo and s-goo because its portal is near the center between the north and south poles. The structure of each graviton may be somewhat unique because of the distribution of n-goo and s-goo along its length. This would help explain why there is no force of repulsion between gravitons. This would also help explain why it has no complementary string, which relies on one string being made of s-goo and the other string of n-goo.

Maximum bonding between gravitons and magnetons and gravitons and electrons only occurs when magneton waves and electron waves appear stationary in space relative to the traveling graviton waves. Even under these conditions the bonds formed are very weak, much weaker than the bonds formed between complementary strings.

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This explanation of graviton specificity suggests that some weak interaction may occur between any two strings composed of the same goo. This would be difficult to detect for most strings because complementary bonding would completely overshadow this type of bond.

When the graviton retracts, bonds formed are quickly broken and not reformed because the graviton changes its physical form, possibly becoming more diffuse and irregular throughout its length. This suggests a reason why gravitons and other strings do not bond to the goo inside the atom. Bonding requires a specific structural feature that is only present in goo when it exists as a string.

The weak bonds formed between gravitons and other strings allow a force of attraction to take place when gravitons retract back to source. The greater the density and distance through an object the greater the number of electrons and magnetons the string can bind to, which allows the graviton to create greater force. Because gravitons bond to electrons and magnetons, it allows gravitons to influence string cycles and modulate the velocity of light.

Strong Nuclear Forces

VES theory predicts that gluons, the strings responsible for the strong nuclear force, are the most massive virtual elastic strings. It also predicts that gluons come in three different masses and are either n-goo or s-goo. This means there are six different kinds of gluons. This was discussed in detail under the chapter on quarks.

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STRING SPECIFICITY

The two degrees of specificity are physical size and type of goo. In addition, a string takes on a three dimensional characteristic that encourages bonds. For this reason, a string does not bind to goo unless it exists in the form of a string.

Complementary strings have the same mass but different goo. This allows them to bond and create a force of attraction when they retract.

Complementary strings with the same mass and same goo create a force of repulsion when they bond.

Gravitons may be composed of both types of goo, and although much smaller than the other strings, form very weak bonds with electrons and magnetons. Perhaps there is weak bonding between any two strings with the same goo.

Magnitude of the Forces of Nature

Perhaps one of the greatest mysteries surrounding the forces of nature is the great difference in magnitude between the force of gravitation and all the other forces, at least as calculated between proton and electron. For example, the electric force between electron and proton in a hydrogen atom is 8.2×10^{-8} newtons [note 20], while the gravitational force between these two bodies at the same distance is 3.6×10^{-47} newtons [note 21]. Thus, in this example, the electric force is 2×10^{39} greater than the gravitational force. The strong nuclear force is often quoted as being 60 times greater than the electric force. Even the weak nuclear force is believed to be 10^{29} times stronger than gravity.

During the course of this book, I have examined three different characteristics that help define the magnitude of the attraction force between bodies. They likely apply to all the forces of nature. These are:

1. The nature of the bond 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.

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One of the tenets of VES theory is that the connection between a graviton and the object it interacts with is by friction created by a mechanical bond between graviton and electron and graviton and magneton. Thus the density and distance through the object is of paramount importance to the force a graviton is able to exert. In contrast, the other forces of nature make connections between complementary strings. In this case the full length of the string becomes bonded to the other string. Perhaps this is more like Velcro. This causes a strong bond between all complementary pairs.

The strength of a graviton's attachment to electrons and magnetons is far less than bonds formed by complementary pairs. For this reason, a graviton retracting back through a small body like a proton creates very little force; whereas, the electric force between electron and proton depends upon strong connections between strings. This allows each e-electron and each p-electron to exert much greater force. I believe this explanation accounts for most of the difference between gravitons and electrons as seen when the forces they generate are between small particles. The relationship between graviton force and large bodies is entirely different.

Force per graviton is directly related to the density and size of the object the graviton retracts through. If we carry this to the logical extreme, a graviton might be capable of exerting a force as great as an electron that mediates the electric force if it retracts through a great mass. For example, if we assume our Sun's density is larger by a factor of 10^{27} , then Earth's gravitons retracting through this sun would generate a force of 4×10^{-21} newtons per graviton [note 25], which is of course likely beyond a graviton's potential energy. In contrast, newtons per graviton between two protons separated by 5.3×10^{-11} meters is only 1.1×10^{-57} (note 28). This is shown in Table 20.1.

It is obvious that the force created by a graviton cannot increase indefinitely. When resistance between graviton and the body it is retracting through reaches an upper threshold, the graviton will be exerting all of its potential energy. Any additional friction between graviton and object will not produce any additional force.

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TABLE 24.1
NEWTONS PER GRAVITON FOR DIFFERENT SYSTEMS

System Graviton connections	Distance between bodies in meters	Kg Mass of body graviton is retracting through	Newton Per graviton
Proton through proton	5.3×10^{-11}	1.7×10^{-27}	1.1×10^{-57}
Sun through Earth	1.5×10^{11}	6.0×10^{24}	1.4×10^{-49}
Earth through Sun	1.5×10^{11}	2×10^{30}	3.9×10^{-48}
Earth through sun1*	1.5×10^{11}	2×10^{40}	3.9×10^{-38}
Earth through sun2*	1.5×10^{11}	2×10^{57}	$3.9 \times 10^{-21} **$

*Assumed sun with greater mass but same diameter and distance from Earth as our Sun.

** This force is too large to be realistic.

Energy per Graviton

The energy per graviton can be calculated just like force per graviton. Halliday and Resnick (1981) provide the following equation to calculate the work done or energy gained in joules in the relationship between Sun and Earth:

$$\text{potential energy} = \frac{G M_s M_e}{r}$$

Where G is the universal constant (6.67×10^{-11}), M_s is the mass of the sun (1.989×10^{30}), M_e is the mass of Earth (5.98×10^{24} kg), and r is the distance between the two bodies (1.5×10^{11} meters). The equation is identical to the universal law of gravitation except r is used rather than r squared. The negative sign indicates that it is attractive. The equation gives us the total potential energy which is shared equally between the two bodies. I calculated the number of gravitons striking the Sun for each of the

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planets. I then divided one half of the total potential energy by the number of gravitons striking the Sun. The results give us the energy per graviton for each planet. The results are shown in Table 24.2.

TABLE 24.2
BONDING ENERGY IN PLANET-SUN SYSTEMS

System	Planet's Energy in Joules*	Planet's Gravitons Striking Sun/second	Planet's Joules Per Graviton
Mercury-Sun	-3.78×10^{32}	1.72×10^{69}	-2.20×10^{-37}
Venus-Sun	-2.98×10^{33}	7.09×10^{69}	-4.21×10^{-37}
Earth-Sun	-2.65×10^{33}	4.52×10^{69}	-5.86×10^{-37}
Mars-Sun	-1.87×10^{32}	2.08×10^{68}	-8.98×10^{-37}
Jupiter-Sun	-1.62×10^{35}	5.23×10^{70}	-3.09×10^{-36}
Saturn-Sun	-2.64×10^{34}	4.64×10^{69}	-5.69×10^{-36}
Uranus-Sun	-1.08×10^{33}	9.46×10^{67}	-1.14×10^{-35}
Neptune-Sun	-1.51×10^{33}	8.40×10^{67}	-1.80×10^{-35}
Pluto-Sun	-1.45×10^{29}	6.14×10^{64}	-2.36×10^{-35}

*Total bonding energy is twice that shown.

This shows us very clearly that joules per graviton for these systems approaches that of Planck's constant (6.6×10^{-34}), which is a ratio equal to energy divided by frequency. As pointed out by Hiscock (2002), physicists would like to believe the energy of a graviton is somewhere in this range. This suggests that the manner in which I calculated the number of gravitons created by matter might be in the ball park. However, the ball park is very large. It is entirely possible that the number of gravitons created is much greater than one per vibration of a proton as used to calculate the values in Table 25.2. If there were 1.5×10^9 gravitons made with every vibration of the proton, joules per graviton for those from Earth through our Sun would drop from 5.86×10^{-37} to 2.68×10^{-46} .

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Speculations on String Mass

If VES theory has any validity, the mass of the individual strings must be extremely small. We might get some idea of their mass by going at this in the following way. An electron ejects only 8×10^{-6} of itself into space when it creates one visible light photon.

$$\frac{\text{mass photon}}{\text{mass electron}} = \frac{7.33 \times 10^{-36} \text{ kg}}{9.11 \times 10^{-31} \text{ kg}} = 8 \times 10^{-6}$$

A radio wave photon with a frequency of 1×10^4 has a mass of 7.33×10^{-47} kg. If it ejects the same proportion (8×10^{-6}) as string mass per string cycle, the total would be 8×10^{-6} times 7.33×10^{-47} or 5.9×10^{-52} kg. In order to carry this thought to its logical conclusion, this would be the mass of all the electrons, magnetons, and gravitons created per string cycle.

Because the energy density of the magnetic and electric fields are the same, I assume the total mass of strings for each is equal. Thus the mass of all the magnetons becomes $5.9 \times 10^{-52}/2$ or 2.95×10^{-52} kg., and the total mass of the electrons becomes 2.95×10^{-52} kg. The mass of a graviton can be ignored because it is so small.

If we assume there are 300 magnetons (free + bound) created with every string cycle, the mass of each becomes 9.83×10^{-55} kg (2.95×10^{-52} kg / 300), and the mass of each electron becomes 3.28×10^{-63} kg (2.95×10^{-52} kg / 900×10^8). And the ratio between magneton mass and electron mass remains 3×10^8 . Of course these are at best reasonable guesstimates, but they do provide a feeling as to the utterly minute mass of strings.

How do gravitons fit into this equation? I previously discussed the idea that the largest structure in the universe that is under its own internal gravitational force is a cluster of galaxies, which is some 10 to 20 million light years across. If we assume that a graviton extends into space 20 million light years, and if we assume that it is generated and retracted in one second, then its velocity becomes 3.8×10^{23} meters per second [note 4]. Of course, the round trip may take less than one second, or it may be greater. Van Flandern (1998) and others have estimated that the gravitational force of attraction must be at least 24 billion times faster than light or 7×10^{18} meters per second. If this lower estimate were true, the graviton would have to exist 14 hours to make a round trip. Of course, this wouldn't work for

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the force of gravitation or VES theory. The higher value must be closer to the truth.

If we assume the velocity of a graviton is in the neighborhood of 3.8×10^{23} meters per second, we can make an estimate of its mass if we assume its energy is in the range of 6.6×10^{-34} joules because $E = \text{mass } v^2$. Plugging the two values into the equation gives a value of approximately 10^{-81} kg. Of course this is at best a rough guesstimate. However, an extremely small mass is expected if the graviton is ejected 10 to 20 light years at 10^{23} meters per second. It also suggests that the total mass of gravitons hardly affects the total mass of the remaining strings even if billions are made with every photon vibration.

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CHAPTER XXV FINAL THOUGHTS

The special theory of relativity is a mathematical model for our world that cannot be defined in a physical sense. Like the general theory of relativity, it requires a four dimensional world where time and space are warped, where a huge particle accelerator in use shrinks to a few meters, etc. Even more importantly, the special theory of relativity cannot explain the other forces of nature; in particular, it cannot be reconciled with the Standard Model of the atom developed by experimentation. It cannot explain the annual polar wobble of Earth on its axis, why the Sun spins much slower than expected, and other observations in our solar system, which are explained by VES theory. Some scientists in the field even doubt the evidence cited in proof of the special theory of relativity and well as the general theory that applies to gravity.

Relativity itself is an observable fact and the mathematics behind it as developed by Einstein and other scientists are unassailable; however, the basic cause of relativity does not stem from a four dimensional world. It has a much more mundane basis. The root cause is the interaction among the strings that cause the forces of nature.

One might think VES theory is also improbable because it forces us to believe that a mass too small to be comprehended can stretch more than a million light years. Is there a solution to this problem? The answer to that question is a definite yes. If the diameter of a graviton is small enough, it could be as dense as steel and still stretch for 20 million light years. In addition, it should be kept in mind scientists have shown that some materials actually expand when stretched. Is this the answer? Is it that simple? I believe so.

We can gain some appreciation of how small the diameter of a graviton might be by assuming it has the density of steel, then take an estimate of its mass in kilograms (10^{81}) and stretch it over 20 million light years. This gives an estimated diameter of 10^{-52} cm. An area the size of a square centimeter would be able to accommodate 10^{104} gravitons. There is plenty

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of room to accommodate even a huge number of gravitons created by a massive star.

The small diameter of a graviton explains why we cannot detect them in space even with the most sophisticated tools available to scientists. It explains why it is not possible to grab a fist full of gravitons and increase the gravitational pull on your hands by a corresponding amount. It is impossible for the human hand, and perhaps any device, to grasp a graviton firmly enough to retard its retraction to Earth. Perhaps some ingenious scientist can measure an increase in the gravitational attraction for a device that ensnares gravitons in a loop using a knot that tightens as the gravitons retract to Earth. This seems very doubtful, but who knows?

There are other reasons that a graviton must have an extremely small mass. They must be ejected at tremendous velocity if their momentum is to carry them across galaxies. This is only possible if the mass of the particle is extremely minute. Finally, it can be shown mathematically that an extremely small string is necessary if graviton waves created at source travel along the string at immense velocity. This is a necessary attribute if graviton waves explain the blue shift seen in light from Andromeda as proposed by VES ether theory. .

This brings us to another question we must ask and answer. How is it possible that a graviton remains intact when stretched over a vast distance? Very little is known about most of the mass that makes up matter. Less than two percent of the atom is made up of quarks and electrons, which means the remaining 98 percent remains uncharted. What is this material? What keeps it from being blasted asunder during nuclear explosions? How does it remain intact on the Sun when it is subjected to intense heat and fusion processes? I believe there is only one possible answer: The atom must have super cohesiveness and super elastic properties. And if so, isn't this the same property we must ascribe to virtual elastic strings? Of course the answer is yes. Gravitons must be impervious to heat, and they must remain intact and functional even though their diameters are extremely small. There is no reason to assume this is not possible, and there is super abundant evidence to suggest that this is the reality of the situation.

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Everywhere I have looked I have found evidence to support the virtual elastic string theory. Equally important, I have not had to sidestep any observation or experiment dealing with the forces of nature. I have come to believe there is almost overwhelming evidence for this simple explanation for the forces of nature. VES theory is not an improbable theory, but quite the opposite, it is highly probable.

Scientists do not discuss dark matter in terms of an elastic effect because to do so you must believe that gravitons are composed of matter and remain attached to the particles that create them. Scientists do not discuss the relationship between the force of gravitation and the density and distance through an object. Why, because it makes no sense unless you believe that gravitons are composed of matter with elastic properties. Scientists do not discuss the fact that the gravitational force per graviton increases as the size of the body increases. Why, because this observation is difficult to explain unless you use VES theory. Scientists do not discuss the fact that the gravitational force can only be explained by using the angles and distances of a three dimensional world. Why, because this fact does not fit the general theory of relativity, and it can't be explained unless gravitons are composed of matter with elastic properties.

The universal law of gravitation provides dramatic proof for VES theory.

The observations in our solar system provide strong support for the idea that gravitons are composed of matter, remain attached to their source, and because of their vast number, create a barrier to onrushing planets. This simple explanation has been dismissed by scientists, and for this reason no one has analyzed and published the ideas I present in this book. Even if they think that the spin of a planet on its axis must be associated with the manner it rotates around the central body, they can not act on their own impulses; they are forced to dismiss their ideas because it requires that gravitons have a physical presence in space and physical connections between satellite and central body.

Scientists know that angular momentum is being passed from central body to satellite, but they have not been able to formulate a physical mechanism for transfer because they see no basis for repulsion forces and no physical mechanism to explain the connection between central body and

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satellite. Even if they recognize that tilt is associated with distance, they dismiss it because they see no physical mechanism for repulsion forces, and no physical connections between planet and Sun. Even if they suspect there is a better answer to Mercury's strange orbit, they are unable to understand it because repulsion forces require that gravitons have a physical presence in space, a notion that scientists dismissed a hundred years ago. Even if they recognize that the annual polar wobble of Earth on its axis might be related to why a planet tilts on its axis, they are unable to come up with a physical explanation because they see no basis for repulsion forces: There was no theory that made it possible to recognize that tilt, wobble, and Mercury's orbit are all closely related.

Our solar system only makes sense if gravitons are composed of matter and remain attached to the particles that create them. Our solar system provides dramatic proof for VES theory.

VES theory explains in simple physical terms what causes negative and positive electric forces, the movement of electrons in a wire, positive and negative currents, and the interaction between the electric and magnetic force. In this connection, it explains in simple, physical terms how magnets in conjunction with a mechanical force can be used to induce an electric force and vice versa. Here we find that virtual elastic strings connecting the south and north poles of a magnet provide a barrier to onrushing electrons, as well as orienting the electrons in space, which causes them to move off in the direction they are spinning. Because scientists dismissed this simple idea, there was no way to explain physically how a magnet deflects electrons; there was no way to explain physically how magnetism aids in converting mechanical energy to electric energy and vice versa. Because scientists dismissed Michael Faraday's idea that the electric force and the magnetic force could be explained by elastic 'strings', I could find very little discussion of this concept in the literature.

The observations and experiments dealing electricity and magnetism provide another strong source of evidence that the forces of nature are due to virtual elastic strings.

Scientists have long claimed that moving subatomic particles spin in the direction they are moving. This is difficult to explain unless you believe that

In the end....

a virtual elastic string is composed of matter and remains attached to the object that creates it. Once you accept this notion, then you realized that photons and electrons spin in the direction they are moving for the same reason that Earth spins on its axis. Spin is induced in either case when the moving body rubs the virtual elastic strings in their path.

Scientists have long believed that spinning subatomic particles create spin angular momentum, and that spin angular momentum is the driving force behind the forces of nature. However, it is difficult if not impossible to reconcile this basic understanding of nature with a working model unless you believe that virtual elastic strings are composed of matter and remain attached to the particles that create them. Only then can you understand how virtual elastic strings can wind around a spinning particle and create internal pressure. Only then can you see how pressure inside the electron can eject a small mass into space at great velocity. Only then can you develop a model for string cycles, and see how it relates to many, many observations involving photons, electrons, and quarks, including those that relate to relativity.

String cycles very clearly explain what is meant by the wavelength of subatomic particles, including photons, and it explains why electrons and photons have both wave and particle attributes. The concept of string cycles leads to greater ease in explaining refraction, diffraction, interference for photons, electrons and other subatomic particles. Ultimately, it helps explain the velocity of light and relativity.

It is only possible to connect Maxwell's equations with the structure of the photon if you believe a photon has mass. This has been dismissed by most physicists because of the special theory of relativity. Once you assume photons and strings have mass, then it is possible to construct a model based on spin angular momentum for the creation of strings and the creation of photons. It also allows us to explain why Maxwell's equations can be used to calculate the velocity of light. It then becomes evident that VES theory provides a common theme for Maxwell's equations and the theory of relativity.

Finding a strong relationship between VES theory, Maxwell's equations, and special relativity was not something I anticipated until I began studying exactly what Maxwell and relativity was trying to tell us. Now that I see the

In the end....

interrelationships, I more than ever believe that the broad outline of VES theory is correct.

VES theory has a huge advantage over the special theory of relativity because it not only explains observations previously cited in support of relativity, it also explains many other observations that defy explanations by any other means. In addition, it is supported by the standard model of the atom and by all forces of nature, which is in sharp contrast to relativity. Special relativity is a wonderful mathematical model that allows scientists to predict many observations; however, the mathematics behind this model applies equally well to VES ether theory.

All the observations and experiments cited in this book can be explained by virtual elastic strings. This includes the universal law of gravitation, our solar system, our galaxy, electricity, magnetism and the nuclear forces. And the interaction of these strings explains the properties of light, the observations ascribed to relativity, and the cyclical self inducing nature of strings fed by the ceaseless energy of tiny moving subatomic particles.

The evidence is clear and overwhelming: Virtual elastic strings are responsible for the forces of nature. They are composed of matter, remain bound to their source, and by virtue of the fact that they bond to each other, they exert a force of attraction because of their elastic properties and the properties of the subatomic particles that create them.

Perhaps the reader will be kind enough to give me his or her input. I would like to hear from you whether your comments are positive or negative. vestheory@gmail.com

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:

$$F_g = G \frac{m_1 m_2}{r^2} = \frac{(6.67 \times 10^{-11} \text{ N.m}^2/\text{kg}^2) (1 \text{ kg}) (5.98 \times 10^{24} \text{ kg})}{(6.37 \times 10^6 \text{ m})^2}$$

$$= 9.8 \text{ newtons}$$

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:

$$F_g = G \frac{m_1 m_2}{d^2} = \frac{(6.67 \times 10^{-11} \text{ N.m}^2/\text{kg}^2) (1.99 \times 10^{30} \text{ kg}) (5.98 \times 10^{24} \text{ kg})}{(1.5 \times 10^{11} \text{ m})^2}$$

$$= 35.4 \times 10^{21} \text{ newtons}$$

G = gravitational constant m_1 = mass of Sun m_2 = mass of Earth
 d = distance between Earth and Sun

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 of:

$$F = G \frac{m_1 m_2}{r^2} = \frac{(6.67 \times 10^{-11} \text{ N.m}^2/\text{kg}^2) (3.4 \times 10^5 \text{ kg}) (5.98 \times 10^{24} \text{ kg})}{(6.37 \times 10^6 \text{ m})^2}$$

$$= 3.33 \times 10^6 \text{ newtons}$$

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

Addendums

$$35.4 \times 10^{21} / 3.33 \times 10^6 = 1 \times 10^{16}$$

Area of 5.04 cm steel cable is given by πr^2 or $(3.14) (2.52)^2 = 19.94 \text{ cm}^2$
 $= 1.99 \times 10^{-3} \text{ m}^2$

Area of 1×10^{16} cables becomes $(1 \times 10^{16})(1.99 \times 10^{-3} \text{ m}^2) = 1.99 \times 10^{13} \text{ m}^2$

Area of a cross section through Earth is πr^2 or $(3.14) (6.37 \times 10^6 \text{ m})^2$
 $= 12.7 \times 10^{13} \text{ m}^2$

Percentage of Earth's cross section for 1×10^{16} cables
 $= (100)(1.99 \times 10^{13} \text{ m}^2) / (12.7 \times 10^{13} \text{ m}^2) = 16 \text{ percent}$

Note 4: A cluster of galaxies may be as much as 20 million light years 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 $(3 \times 10^8 \text{ m/s}) (365.2422 \text{ days})(24 \text{ hours})(60 \text{ minutes})(60 \text{ seconds}) = 9.389 \times 10^{15}$ 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 $1.5 \times 10^{11} \text{ meters} / 1.9 \times 10^{21} \text{ meters} = 7.9 \times 10^{-11}$.

Note 6: Classical equation for wave length: wavelength = velocity / frequency

Note 7: De Broglie's equation for wave length is:

$$\text{Wavelength} = h / \text{momentum}$$

Where $h = \text{Planck's constant} = 6.63 \times 10^{-34} \text{ j.s}$

Momentum = (mass) (velocity).

Note 8: Theoretically, a proton oscillates at a very high frequency.

Addendums

$$\text{Frequency} = \frac{(\text{mass}) c^2}{h} = \frac{(1.67 \times 10^{-27} \text{ kg})(3 \times 10^8)^2}{(6.63 \times 10^{-34} \text{ J.s})}$$

$$= 2.3 \times 10^{23} \text{ vibrations per second}$$

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

Addendums

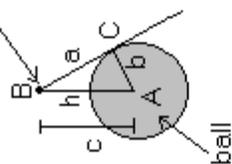
Note 10: The method for calculating the proportion of gravitons striking a ball from a source at some specified distance above its surface is shown below. It makes use of volume ratios. **See next page.**

Note 11: Calculation of the approximate number of the Sun's gravitons per meter square on Earth's surface. The total gravitons striking Earth [note 12] = 1.2×10^{71} . Radius of Earth = 6378140 m. Cross section through Earth = $\pi r^2 = 1.27 \times 10^{14} \text{ m}^2$. Number striking Earth / cross section through earth = $1.2 \times 10^{71} / 1.27 \times 10^{14} \text{ m}^2 = 9.5 \times 10^{56} \text{ gravitons/m}^2$. The gravitons per centimeter square = $9.5 \times 10^{56} / 1 \times 10^4 = 9.5 \times 10^{52} \text{ gravitons/cm}^2$.

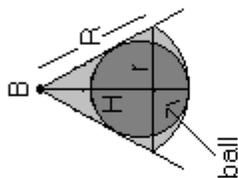
Note 12: Calculation of Sun's gravitons striking Earth:
Total Sun's gravitons = 2.7×10^{80} [note 9]. Radius of Earth = 6378140 m. Distance between Earth and Sun = $1.496 \times 10^{11} \text{ m}$. Partial volume of the sphere encompassing Earth is $6.37 \times 10^{24} \text{ m}^3$ [note 10]. Total volume of the sphere surrounding the Sun and encompassing Earth = $1.4 \times 10^{34} \text{ m}^3$. The ratio of volumes = 4.55×10^{-10} . Sun's gravitons striking Earth = Sun's total gravitons x ratio = $(4.55 \times 10^{-10})(2.7 \times 10^{80}) = 1.2 \times 10^{71}$

VOLUME OF A SECTION OF A SPHERE

graviton source



angle C = 90 degrees
 b = radius of ball = 10
 h = distance from ball = 11
 c = b + h = 21
 cosine angle A = b / c = 0.4762
 angle A = 61.563
 angle B = 90 - angle A = 28.437
 sine B = 0.4762



R = radius of sphere
 R = h + 2b
 R = 11 + (2 x 10) = 31
 r = radius of cone
 r = sin B x R = 0.4762 x 31 = 14.76
 H = height of cone
 H = r / tan B = $\frac{14.76}{0.542}$ = 27.26

$$\text{Volume of section of sphere} = V_s = \frac{2 \pi R^2 (R - H)}{3} = \frac{2 \pi \times 31 \times 31 (31 - 27.26)}{3} = 7528.34$$

$$\text{Total volume of sphere} = V_t = \frac{4 \pi R^3}{3} = \frac{4 \pi (31)^3}{3} = 124788.2$$

$$\text{Ratio} = \frac{V_s}{V_t} = .06033$$

Ratio equals that portion of gravitons from source that strike the ball.

Addendums

Note 13: Density versus force per graviton between two balls.

Density of balls:

Radius of balls = 2 cm

Volume of balls = $\frac{4}{3} \pi (2 \text{ cm})^3 = 33.51 \text{ cm}^3$.

Density of 0.2kg ball = $200 \text{ grams}/33.51 = 5.968 \text{ grams/cm}^3$

Density of 0.4kg ball = $400 \text{ grams}/33.51 = 11.94 \text{ grams/cm}^3$

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 = $G (0.2 \text{ kg})^2 / (10\text{m})^2 = 2.668 \times 10^{-14} \text{ newtons}$

Force between 0.4 kg balls = $G (0.4 \text{ kg})^2 / (10\text{m})^2 = 1.067 \times 10^{-13} \text{ newtons}$

Total gravitons created by balls:

Calculate total number of gravitons emanating per ball as in note 9:

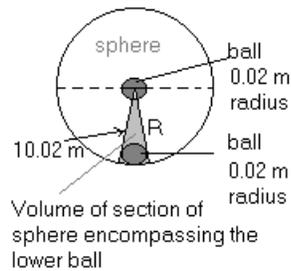
Gravitons per 0.2kg ball = $(2.3 \times 10^{23} \text{ vibrations per sec}) (0.2 \text{ kg}) / 1.67 \times 10^{-27} \text{ kg} =$

2.74955×10^{49}

Gravitons per 0.4kg ball = 5.509×10^{49}

Proportion of gravitons connecting with the other ball:

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.



R = radius of sphere = 10.02 m

H = height of cone, calculated as in note 10.

H = 10.01998

Volume of section = $\frac{2\pi R^2 (R-H)}{3} = 0.004206$

Total volume of sphere = $\frac{4}{3} \pi R^3 = 4213.973$

Proportion of gravitons striking target

$$\text{ratio} = \frac{0.004206}{4213.973} = 1.00 \times 10^{-6}$$

Addendums

Newtons per graviton:

$$\text{Gravitons from 0.2 kg ball striking the other ball} = 2.75 \times 10^{49} (1 \times 10^{-6}) = 2.75 \times 10^{43} \text{ (gravitons from both balls} = 5.5 \times 10^{43})$$

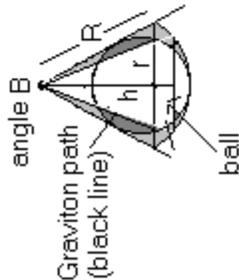
$$\text{Gravitons from 0.4 kg ball striking the other ball} = 5.509 \times 10^{49} (1 \times 10^{-6}) = 5.509 \times 10^{43} \text{ (gravitons from both balls} = 1.1 \times 10^{43})$$

$$\text{Newtons/graviton 0.2kg balls} = 2.668 \times 10^{-14} \text{ newtons} / 5.5 \times 10^{43} = 4.85 \times 10^{-58}$$

$$\text{Newtons/graviton 0.4kg balls} = 1.067 \times 10^{-13} \text{ newtons} / 1.1 \times 10^{43} = 9.7 \times 10^{-58}$$

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 $0.76 \times 7528.34 = 5721.538$. The balance of the calculations are explained as follows:

Effective Length of a Graviton Path through Sphere



$$V_{ns} = \frac{2\pi R^2 (R-h)}{3}$$

$$R-h = V_{ns} \cdot 3 / 2\pi R^2$$

$$R-h = 2.8427$$

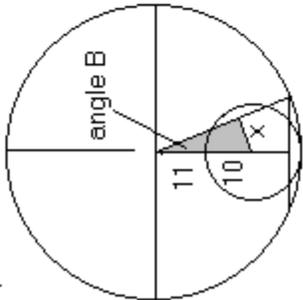
$$h = R - 2.8427 = 28.1573$$

$$\cosine B = h/R = 0.9083$$

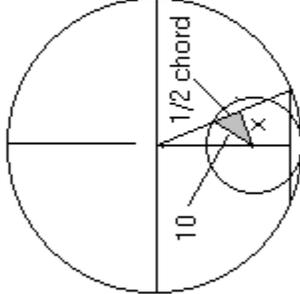
$$\text{angle } B = 24.7285$$

$$\sin B = 0.41832$$

V_{ns} = volume of new segment shown in white
 $V_{ns} = 0.76 \times 7528.34 = 5721.538$
 R for new segment is same length as old
 $R = 31$
 h = height of cone for new segment.



hypotenuse of grey = $11 + 10 = 21$
 $x = \sin B (21) = 8.785$



$(1/2 \text{ chord})^2 = 10^2 - x^2$
 $1/2 \text{ chord} = 4.778$
 full chord = 9.556
 length of graviton path = 9.556

Effective length = 9.556 (cosine B)
 Effective length = 8.680

Addendums

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 15: Calculation of the number of gravitons emanating from the galaxy striking the sun at 31,000 light years, 100,000 light years, and 300,000 light years.

Mass of Milky Way: 2.2×10^{41} kg

Total gravitons emanating from the galaxy per second.

$$\text{Gravitons} = \frac{(\text{mass}_g)(\text{frequency})}{\text{mass}_p} = \frac{(2.2 \times 10^{41} \text{ kg})(2.3 \times 10^{23})}{1.67 \times 10^{-27} \text{ kg}}$$

$$= 3.3 \times 10^{91}$$

where

mass_g = mass of the galaxy mass_p = mass of proton

frequency = oscillation frequency of proton

Because of the great distance between the center of the Milky Way and the theoretical sun light years away, the volume method of determining the number of gravitons making a connection with the theoretical sun cannot be used. Within limits of Excel, the height of the cone and radius of the circle are identical and the cosine of the angles are one, meaning that the gravitons are arriving in parallel. We can calculate the proportion of gravitons striking the theoretical sun by using area ratios. The proportion is equal to the area of a section through the sun divided by the area of a sphere surrounding the sun whose radius is the distance between sun and center of the galaxy.

Radius of sun = $r = 6.96 \times 10^8$ meters

Cross sectional area of sun = $\pi r^2 = \pi (6.96 \times 10^8)^2 = 1.52184 \times 10^{18} \text{ m}^2$

Addendums

Area of sphere encompassing the sun at different distances from the center of the Milky Way Galaxy.

For 31,000 light years:

Light year = 9.389×10^{15} meters

Distance at 31000 light years = $31000 \times 9.389 \times 10^{15}$ meters = 2.911×10^{20} m

Area of sphere with a radius R of $2.911 \times 10^{20} = 4\pi R^2 = 1.0648 \times 10^{42}$ m²

For 100,000 light years:

Distance = $100,000 \times 9.389 \times 10^{15}$ meters = 9.389×10^{20} meters

Area of sphere with a radius R of $9.389 \times 10^{20} = 4\pi R^2 = 1.1078 \times 10^{43}$ m²

For 300,000 light years

Distance = $300,000 \times 9.389 \times 10^{15}$ meters = 2.817×10^{21} meters

Area of sphere with a radius R of $9.389 \times 10^{20} = 4\pi R^2 = 9.97 \times 10^{43}$ m²

The ratio of the cross sectional area through sun to area of sphere gives the portion of gravitons from the galaxy striking the sun.

For 31,000 light years: ratio = $1.52184 \times 10^{18} / 1.0648 \times 10^{42}$ m²

Ratio = 1.429×10^{-24}

For 100,000 light years: ratio = $1.52184 \times 10^{18} / 1.1078 \times 10^{43}$ m²

Ratio = 1.37×10^{-25}

For 300,000 light years: ratio = $1.52184 \times 10^{18} / 9.97 \times 10^{43}$

m²

Ratio = 1.53×10^{-26}

Gravitons from galaxy striking sun = ratio x total gravitons emanating from galaxy

Gravitons for 31,000 light years = $1.43 \times 10^{-24} \times 3.3 \times 10^{91} = 4.33 \times 10^{67}$

Gravitons for 100,000 light years = $1.37 \times 10^{-25} \times 3.3 \times 10^{91} = 4.16 \times 10^{66}$

Gravitons for 100,000 light years = $1.53 \times 10^{-26} \times 3.3 \times 10^{91} = 4.63 \times 10^{65}$

Note 16: Force per graviton for theoretical sun in Milky Way Galaxy.

Gravitons striking sun from galaxy determined in note 15.

Gravitons for 31,000 light years = 4.33×10^{67}

Gravitons for 100,000 light years = 4.16×10^{66}

Gravitons for 100,000 light years = 4.63×10^{65}

Addendums

Force of the galaxy pulling on the theoretic sun at different distances from the galactic center is calculated in note 17 using the rotational velocity of the star.

31,000 light years: = 1.73×10^{20} newtons

100,000 light years: 5.36×10^{19} newtons

300,000 light years: 1.78×10^{19} newtons

Newton per graviton

For 31,000 light years = 1.73×10^{20} newtons / 4.33×10^{67}
newtons per graviton = 3.99×10^{-48}

For 100,000 light years 5.36×10^{19} newtons / 4.16×10^{66}
newtons per graviton = 1.29×10^{-47}

For 300,000 light years 1.78×10^{19} newtons / 4.63×10^{65}
newtons per graviton = 3.86×10^{-47}

Note 17: Newton force in galaxy using velocity of rotation

Mass of Sun (star) = 1.989×10^{30} kg

300,000 light years is $3 \times 10^5 (9.389 \times 10^{15}) = 2.817 \times 10^{21}$ meters (from note 4)

100,000 light years is $1 \times 10^5 (9.389 \times 10^{15}) = 9.389 \times 10^{20}$ meters (from note 4)

31,000 light years is $31,000 \times 9.389 \times 10^{15}$ meters = 2.911×10^{20} m (from note 4)

Rotation velocity of star: 225,000 m/sec

Force in newtons according to rotation velocity

Force = (mass) (acceleration), where acceleration = $v^2/\text{distance}$

Force at 31,000 light years from center of galaxy

Force = 1.989×10^{30} kg $(2.25 \times 10^5 \text{ meters/second})^2 / 2.911 \times 10^{20}$ m
= 3.46×10^{20} newtons

$\frac{1}{2}$ of this force contributed by galaxy = 1.73×10^{20} newtons

Force at 100,000 light years from center of galaxy

Addendums

$$\begin{aligned}\text{Force} &= 1.989 \times 10^{30} \text{ kg } (2.25 \times 10^5 \text{ meters/second})^2 / 9.389 \times 10^{20} \\ &= 10.72 \times 10^{19} \text{ newtons} \\ \frac{1}{2} \text{ of this force contributed by galaxy} &= 5.36 \times 10^{19} \text{ newtons} \\ \text{Force at 300,000 light years from center of galaxy} \\ \text{Force} &= 1.989 \times 10^{30} \text{ kg } (2.25 \times 10^5 \text{ meters/second})^2 / 2.817 \times 10^{21} \text{ meters} \\ &= 3.57 \times 10^{19} \text{ newtons} \\ \frac{1}{2} \text{ of this force contributed by galaxy} &= 1.78 \times 10^{19} \text{ newtons}\end{aligned}$$

Note 18: Gravitational force between a theoretical sun at different distances in the Milky Way galaxy according to the universal law of gravitation.

$$\begin{aligned}\text{Universal constant G:} &= 6.67 \times 10^{-11} \\ \text{Mass of Milky Way:} &= 2.2 \times 10^{41} \text{ kg} \\ \text{Mass of sun} &= 1.989 \times 10^{30} \text{ kg} \\ \text{31,000 light years is} &= 2.817 \times 10^{21} \text{ meters (note 17)} \\ \text{100,000 light years is} &= 9.389 \times 10^{20} \text{ meters (note 17)} \\ \text{300,000 light years is} &= 2.817 \times 10^{21} \text{ meters (note 17)}\end{aligned}$$

$$\begin{aligned}\text{Force in newtons for sun 31,000 light years away from galactic center} \\ \text{Force} &= 6.67 \times 10^{-11} (2.2 \times 10^{41} \text{ kg}) (1.989 \times 10^{30} \text{ kg}) / (2.817 \times 10^{20} \text{ m})^2 \\ &= 3.44 \times 10^{20} \text{ newtons} \\ \frac{1}{2} \text{ this force for galaxy attracting sun} &= 1.72 \times 10^{20} \text{ newtons}\end{aligned}$$

$$\begin{aligned}\text{Force in newtons for sun 100,000 light years away from galactic center} \\ \text{Force} &= 6.67 \times 10^{-11} (2.2 \times 10^{41} \text{ kg}) (1.989 \times 10^{30} \text{ kg}) / (1 \times 10^{21} \text{ m})^2 \\ &= 3.31 \times 10^{19} \text{ newtons} \\ \frac{1}{2} \text{ this force for galaxy attracting sun} &= 1.65 \times 10^{18} \text{ newtons}\end{aligned}$$

$$\begin{aligned}\text{Force in newtons for sun 300,000 light years away from galactic center} \\ \text{Force} &= 6.67 \times 10^{-11} (2.2 \times 10^{41} \text{ kg}) (1.989 \times 10^{30} \text{ kg}) / (3 \times 10^{21} \text{ m})^2 \\ &= 3.68 \times 10^{18} \text{ newtons} \\ \frac{1}{2} \text{ this force for galaxy attracting sun} &= 1.84 \times 10^{18} \text{ newtons}\end{aligned}$$

Note 19: Calculation of Earth's gravitons striking Sun.

Addendums

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} m³. Total volume of sphere surrounding Earth whose radius is the distance from Earth to Sun is = 1.4×10^{34} m³. 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
 $k = 9.0 \times 10^9 \text{ N}\cdot\text{m}^2/\text{C}^2$

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.

$$\text{Force} = \frac{(9.0 \times 10^9 \text{ N}\cdot\text{m}^2/\text{C}^2) (1.6 \times 10^{-19} \text{ C})^2}{(5.3 \times 10^{-11} \text{ m})^2} = 8.2 \times 10^{-8} \text{ newtons}$$

Note 21: Gravitational force of attraction between electron and proton.

$$F_g = G \frac{m_1 m_2}{d^2} = \frac{(6.67 \times 10^{-11} \text{ N}\cdot\text{m}^2/\text{kg}^2) (9.11 \times 10^{-31} \text{ kg}) (1.67 \times 10^{-27} \text{ kg})}{(5.3 \times 10^{-11} \text{ m})^2}$$

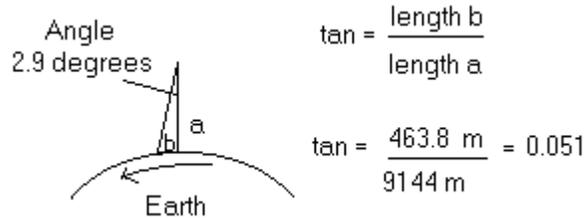
$$= 3.6 \times 10^{-47} \text{ newtons}$$

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.

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$$\tan = \frac{\text{length b}}{\text{length a}}$$

$$\tan = \frac{463.8 \text{ m}}{9144 \text{ m}} = 0.051$$

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 ($\text{Pi}2r$, 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 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 $2/3$.

$$\text{ratio} = \frac{\text{volume of sphere}}{\text{volume of cylinder}}$$

$$\text{ratio} = \frac{\frac{4 \pi r^3}{3}}{\pi r^2 2r} = \frac{4}{3} \cdot \frac{1}{2} = \frac{2}{3}$$

Note 25: The average force a graviton from Earth exerts when it retracts through our Sun is 3.9×10^{-48} newtons [note 14]. In we increase the mass of our Sun from 2×10^{30} kg to 2×10^{57} kg, but keep its size and its distance

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from Earth the same, we can calculate the new force per Earth's graviton created when it retracts through the more massive sun.

$$F_g = G \frac{m_1 m_2}{d^2} = \frac{(6.67 \times 10^{-11} \text{ N.m}^2/\text{kg}^2) (1.99 \times 10^{57} \text{ kg}) (5.98 \times 10^{24} \text{ kg})}{(1.5 \times 10^{11} \text{ m})^2}$$

$$= 35.4 \times 10^{48} \text{ newtons}$$

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 17.7×10^{48} newtons

Earth's gravitons striking Sun [note 12] = 4.43×10^{69} .

Therefore newtons per graviton = $17.7 \times 10^{48} / 4.43 \times 10^{69} = 4 \times 10^{-21}$

Note 26: The gravitational force of attraction between two protons with a separation of $5.3 \times 10^{-11} \text{ m}$

$$F_g = G \frac{m_1 m_2}{d^2} = \frac{(6.67 \times 10^{-11} \text{ N.m}^2/\text{kg}^2) (1.67 \times 10^{-27} \text{ kg}) (1.67 \times 10^{-27} \text{ kg})}{(5.3 \times 10^{-11} \text{ m})^2}$$

$$= 6.6 \times 10^{-44} \text{ newtons}$$

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 = $1 \times 10^{-15} \text{ m}$

proton's cross section = $\pi r^2 = \pi (1 \times 10^{-15} \text{ m})^2 = 3.17 \times 10^{-30} \text{ m}^2$.

distance between protons = $5.3 \times 10^{-11} \text{ m}$

area of sphere with a radius of $5.3 \times 10^{-11} \text{ meters} = 4\pi r^2 = 3.5 \times 10^{-20} \text{ m}^2$.

$$\text{ratio of cross section to sphere area} = \frac{3.17 \times 10^{-30} \text{ m}^2}{3.5 \times 10^{-20} \text{ m}^2} = 8.9 \times 10^{-11}$$

gravitons per proton per second = 2.3×10^{23} (oscillation frequency of proton)

gravitons making a connection = $2.3 \times 10^{23} \times 8.9 \times 10^{-11} = 2 \times 10^{13} / \text{second}$

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Note 28: Newton forces per graviton between two protons: Total force between two protons separated by $5.3 \times 10^{-11} \text{ m} = 6.6 \times 10^{-44}$ newtons (note 26). The number of gravitons making a connection by one of these protons is 2×10^{13} per second (note 27).

$$\text{Newtons per graviton} = 3.3 \times 10^{-44} / 2 \times 10^{13} = 1.6 \times 10^{-57}$$

Note 29: Newton forces per electron between two protons: Total force between two protons separated by $5.3 \times 10^{-11} \text{ m} = 8.2 \times 10^{-8}$ newtons (note 20). The number of electrons 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).

$$\text{Newtons per graviton} = 4.1 \times 10^{-8} / 2 \times 10^{13} = 2 \times 10^{-21}$$

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.

$$\text{frequency of visible light} = 1 \times 10^{15}$$

$$E = 1 \times 10^{15} \times 6.6 \times 10^{-34} = 6.6 \times 10^{-19} \text{ joules}$$

$$E = \text{mass } c^2$$

$$\text{mass} = \frac{6.6 \times 10^{-19}}{(3 \times 10^8)^2} = 7.3 \times 10^{-36} \text{ kg or } 7.3 \times 10^{-33} \text{ grams}$$

7.3×10^{-33} grams is equivalent to $7.3 \times 10^{-33} \text{ cm}^3$ if it has the density of water.

$$\frac{4}{3} \pi r^3 = \text{volume of sphere} = \frac{4}{3} \pi 7.3 \times 10^{-33}$$

$$r^3 = 1.7 \times 10^{-32} \text{ and the cube root or } r = 3 \times 10^{11} \text{ cm or } 3 \times 10^{-13} \text{ meters.}$$

$$\text{The circumference} = 2r \pi = 1.88 \times 10^{-12} \text{ meters}$$

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/cm³) (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 $\frac{1}{2}$ 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 its 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 my son-in-law, Dr. Robert Renden, a neuroscientist.

Note 34: How much of the surface of a radio wave photon is taken up by electron portals and magneton portals? If we assume that the density of the electron particle is the same as the density of the photon, then we can allow the volume of each to be equal to its mass for sake of comparison. In this manner we can estimate how the surface area of all the electron portals relates to the surface area of the photon's sphere.

In Chapter 24, I estimated the mass of an electron as 3.28×10^{-63} kg. Volume of a sphere is equal to $4\pi r^3/3$. If we let 3.28×10^{-63} equal the volume then radius r becomes 4.3×10^{-21} . The cross sectional area through this sphere is πr^2 , or 5.81×10^{-42} . This would be the area of one electron portal. If we assume there are 6×10^8 electron portals per each half of the photon, then value for the total cross sectional area for all electron portals on one sphere becomes 3.49×10^{-32} .

The mass of a small radio photon with a frequency of 1×10^4 is 7.33×10^{-47} kg. Since the photon has two spheres, each one is 3.67×10^{-47} kg. Thus for our purposes, the volume is equal to 3.67×10^{-47} , which is equal to $4\pi r^3/3$. Solving for r we get 2.05×10^{-16} . The surface area of this sphere is $4\pi r^2$, which becomes 5.28×10^{-31} .

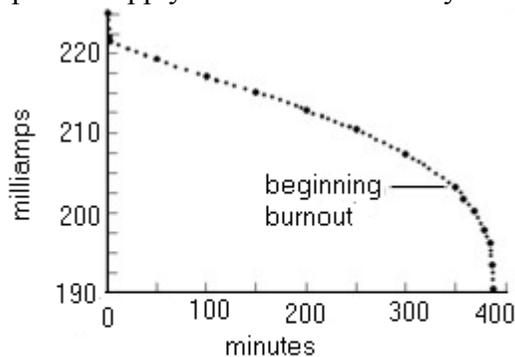
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Now if we divide the cross sectional area for all electron portals by the surface area of the one photon sphere, we get: $2.3 \times 10^{-33} / 5.28 \times 10^{-31}$ or 0.066.

If we use the same analysis for a magneton, which according to the model has just 2 portals per sphere, we find that its 2 portals take up 2.46×10^{-35} cross sectional area. They amount to just 0.0000466 of the area of one photon sphere. Combining magneton and electron portals we find only 0.00441, or 0.44 percent of the photon devoted to portals. Graviton portals would be even less.

Note: 35 The following is unpublished data by the author. I removed a Christmas tree light bulb and connected it directly to the DC power supply given below. I then applied 4.5 volts of DC current and recorded milliamps flowing through the wire until it burned out. I thank Matt Eiting, my son-in-law, who owns EM Research, for supplying me with some of the test equipment and introducing me to art of doing this type of experiment.

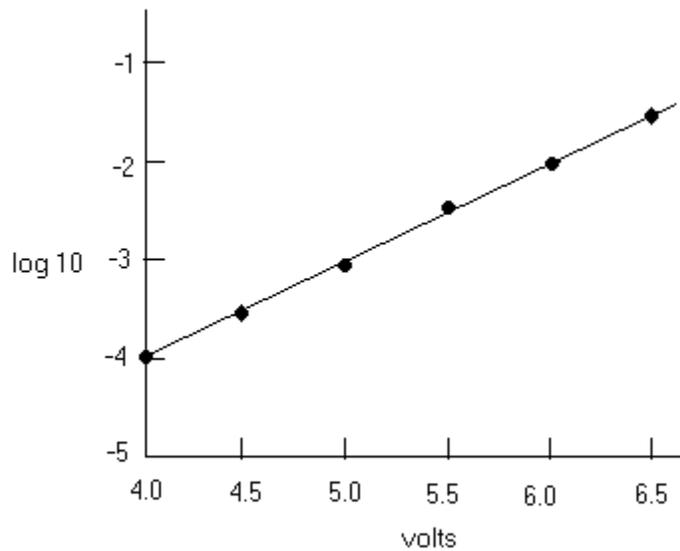
The DC power supply was a Hewlett-Packard 6264B with a control of 0 to 20 volts and 0 to 20 amps. Voltage and amps being applied were measured with a Craftsman multimeter IT10 and/or Fluke 111 multimeter: One measuring amp decay and the other monitoring the volts applied. The DC power supply was found to be very consistent.



One christmas tree light bulb was treated with 4.5 volts, and the decay of its capacity to carry current was measured.

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In a second experiment, 12 light bulbs were removed from the string it came with and each was connected to a wire of the same 20 cm length. The ends of these wires were connected to common wires and the common wires connected to the DC power supply to ensure they were in parallel. The bulbs were then treated with a set number of volts until the rate of decay could be determined, just as in the experiment above. This was repeated six times using new bulbs in each run. Voltage for each run varied as follows: 4.0, 4.5, 5.0, 5.5, 6.0, and 6.5 volts. The rate of decay, slope of line, was measured as amps/minute for each one, and then converted to log10. Slopes ranged from 0.00192 amps/min for 5 volts to 0.02536 amps/min for 6.5 volts. The results are shown in the next figure.



Log 10 plot of current decay rates

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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 (e-electrons) that neutralizes a portion of the positive electric field (p-electrons) emanating from up quarks.

elastic strings The elastic properties of strings allows them to retract back to source and create a force of attraction.

electron A general term for strings responsible for the electric force. Electons come in two varieties: e-electron and p-electron.

e-electron 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 force fields about quarks, electrons, and photons. When e-electons bond to p-electons it causes a force of attraction. When e-electons contact other e-electons it causes a force of repulsion.

electron A subatomic particle that creates e-electons, p-electons, n-magnetons, s-magnetons, and gravitons. It creates e-electons 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 Energy is the capacity to do work.

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.

force fields Force fields are compose of virtual elastic strings. For example, the quantity of the negative electric field is determined by the number of e-electons present.

gluon A general term for strings responsible for the strong nuclear force. VES theory suggests there are six different kinds of gluons.

goo Goo is the substance inside quarks, electrons, and photons that is used to create strings. It comes in two forms, n-goo and s-goo. It has strong elastic qualities. When compressed during the string 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, but it does bond weakly with electons and magnetons.

magneton A general term for strings responsible for the magnetic force. Magnetons come in two varieties: n-magnetons and s-magnetons.

n-magneton The string responsible for the magnetic force created at the north pole of electrons, photons, and quarks. When n-magnetons bond to s-magnetons it causes a force of attraction. When n-magnetons contact other n-magnetons 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.

p-electron 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-electrons bond to e-electrons it causes a force of attraction. When p-electrons contact other p-electrons 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.

quark A subatomic particle found within protons and neutrons. They are slightly larger than electrons. Quarks create p-electrons, e-electrons, n-magnetons, s-magnetons, 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-magneton The string responsible for the magnetic force created at the south pole of electrons, photons, and quarks.

string cycle Strings are created by quarks, electrons, and photons. The creation of string is cyclical in nature. String cycles create the oscillation cycles of these particles.

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 moving along the string as the particle vibrates. These

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transverse 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-electons that the electron binds to as it whirls about the proton.

virtual strings A particle is said to be virtual if it only exists for a short period of time. Thus virtual strings are constantly being created and reabsorbed.