Unifying physical theory to gravitational mechanics
by Michael W. Brace

Abstract

This paper negates the principles of earlier gravitational theory(s) by which the constant of gravitation G *has been deduced in terms of being a fundamental force in the universe. Demonstrable anomalous gravitational effects, reproducible in the laboratory, are discussed in context with other fundamental forces. It is shown that the theory does include features which can explain observed gravitational mechanics on both a macro-scale, micro-scale and sub-atomic scale, as well as anti-gravitational effects. The action points to vacuum energy fluctuations arising from graviton density.*

I.   Introduction

The author has assembled the framework for a unified physical theory; an all-encompassing, coherent theoretical framework of physics that offers a plausible and valid explanation for gravity, and links together the dynamic and observed physical interactions of the universe. Simple in its approach the authors' theory offers a solid theoretical model for what we have learned about the physical universe today and accounts for many, if not all of the observed and predicted behavior of mass and energy in our 3-dimensional space.

II.   History

As we look into the history of the development of a unified physical theory it is important to note that many of the most respected physicists throughout the history of mankind have worked on just such a theory over the course of the last two centuries, however not all of them are (or were) working on the same theory. For instance, in 2005 the American Physical Society (APS) released an article discussing Albert Einstein and his search for a unified theory.

> "... Albert Einstein spent the last thirty years of his life on a fruitless quest for a way to combine gravity and electromagnetism into a single elegant theory."

> "In addition, he believed there was a link between the need to resolve apparent paradoxes of quantum mechanics and the need to unify electromagnetism and gravity." [1]

Albert Einstein acknowledged the need for such a theory, however for him the unified theory was a vehicle by which to unify gravity and electromagnetism; the one theory that could combine and describe two very similar but distinctly different forces. It was this desire, the desire to unify these two similar but different forces, that kept Albert Einstein's' version of a unifying theory from coalescing over the last hundred years, and it is this same desire that still keeps this unified theory divergent today. In addition to this quandary, the same 2005 APS publication went on to site an example of another quandary that also supports keeping this dilemma in place:

> In 1918, Hermann Weyl proposed a unification scheme based on a generalization of Riemannian geometry. Inspired by Weyl's work, Theodor Kaluza showed that by extending space-time to five dimensions, one could produce the Einstein equations in four dimensions, plus an extra set of equations that is equivalent to Maxwell's equations for electromagnetism. The fifth dimension would be compact, curled up so small that we can't detect it. Oskar Klein later refined this idea. [1]

In the referenced example above the divergence in acceptable proof and theoretical acceptance is summed up in the second to last sentence: *The fifth dimension would be compact, curled up so small that we can't detect it.* It is the authors' contention, as well

as most other learned scientist's as well, that if you can't detect something then the only proof of its existence can be, and will forever be based in the theoretical as long as one adheres to that theory.

The problem in unifying the theories of electromagnetism and gravity is that while physics has identified (and proven) almost all properties of electromagnetism with countless tests, solid equations and measurable results we still know very little about gravity; especially what causes it.

We know [and have proven] almost all of physical characteristics surround electromagnetism; we know what causes it, how to create it and how to control it. We have come to understand that very building blocks of matter and energy are based in electromagnetism. Of the 4 fundamental forces in the universe (gravity, strong nuclear, weak nuclear and electromagnetism) the theories and explanations of electromagnetism are more established in fact and less in theory than with any of the other 3 forces.

It is the definition, and cause of *gravity* that keeps gravity (and for the most part the other 2 fundamental forces of the universe) separated and non-compliant to any generally accepted and/or proven unified theory, and it continues to do so to this very date. To sum up this quandary in mathematical terms we have one equation and two unknowns.

Unifying Theory = Electromagnetism + Gravity, or

Electromagnetism = Unifying Theory + Gravity

The author learned long ago that one cannot solve a single equation with two unknowns. You either need to solve one of the unknowns or generate a second equation. This especially holds true if one attempts to define these forces in formal mathematical arguments and *one* of the mathematical arguments is not solvable.

One might argue that the equations used in Special Relativity and/or quantum mechanics were generated to be the 'second' equation needed to help solve the first equation, but the 'unknowns' in these equations

don't match up to the unknowns in the first equation. And so the cycle continues; the net result is that science is not looking for a unifying theory, it is looking for a unifying set of equations hoping to find enough common unknowns to solve for X.

III.   Gravity and the physics behind it.

If the reader spends enough time researching the physics of the universe eventually one will realize that throughout history the single greatest difficulty in any discussion (or theory) about the physics of the universe is defining gravity. Without a solid theory (or physical proof) about what *causes* gravity any attempt to include gravity in any equations, theories or models about the physics of the universe will always result in speculation, disconnect and more theories about these same physics. But what do we know about the physics of gravity?

We classify it is a positive, attractive force between two or more objects of mass and label it as a physical property of mass. We also speculate that, like electromagnetism, if the is an attractive force there might be a repulsive force associated with gravity as well (i.e. anti-gravity).

We know the resultant vectors due to the force of gravity, and we have developed laws describing its behavior in relation to mass. Many years ago the author remembers that we use to say it was the most powerful of the 4 fundamental forces, but science has revised that definition to say that while gravity theoretically has the potential to be the most powerful force in the universe (aka the Black Hole) it is no longer considered the strongest force, just the fundamental force with the greatest reach across space.

The Merriam-Webster [online] Dictionary defines gravity as follows:

> ...a fundamental physical force that is responsible for interactions which occur because of mass between particles, between aggregations of matter (as stars and planets), and between particles (as photons) and aggregations of matter,

that is 10^{-39} times the strength of the strong force, and that extends over infinite distances but is dominant over macroscopic distances especially between aggregations of matter... [3]

We have determined that the force of gravity behaves virtually identical to the attractant force of electromagnetism and that the magnitude of the force is dependent on the proximity of mass (R^2), however what creates gravity, why it does not behave on a macro-scale in the same manner that it behaves on a micro-scale, and why it can be defeated [through antigravity] is still a mystery to many.

We have used gravity to predict many observed phenomena based on the same wave and energy dynamics found in many other forms of energy, but we cannot create gravity like we can most of these other forms of energy. We state that it is the strongest 'localized' force in the universe, capable of condensing matter into a gravitational anomaly known as a Black Hole (where not even light can escape its attractive force) but yet we cannot coalesce stable matter itself beyond an atomic weight of 92 no matter how hard we try. Indeed, we have not found *any* form of stable matter denser than Uranium, even though we theorize that it does exist in a collapsing star.

To which most of the aforementioned definitions and theories stated about gravity is still in all based in theory, not in fact. The only fact that we know about the force we label as gravity is that it is a property of mass in one form or another.

IV. Gravity and the reality behind it.

As science continued the use of formal mathematical arguments to describe gravity, and continues the need for these additional, undetectable dimensions and un-confirmable string theories that have become common-place when used to describe gravity, it is the authors' opinion that it was the advent of these additional, hypothetical dimensions and theories that kept Einstein away for the answers he sought in part because "*He [too] also became more and more absorbed in formal mathematical arguments, rather* *than following the physical intuition that had guided him in his youth to his great discoveries.*" [1]

While the author does not profess to be an expert on Albert Einstein's theories of General Relativity and Special Relativity, after years of study I did come to the conclusion that Einstein developed the theories on Special Relativity because the cause and effects of gravity could not be accounted for on both a macro and micro scale, and that those portions of his theories of General Relativity that fell short on a universal scale were based on Newtonian gravitational mechanics. Once again the author noted that even Einstein had to continually morph his theories on the universe until his dying days due to the enigma of gravity.

The author has spent the better part of the last 40 years studying gravity. Every essay, publication and widely accepted theory about gravity that I came across often involved a myriad of equations, postulates and suppositions to support the findings presented therein, but very few of them agreed with, or were in concert with each other. It was the author's observation that while everyone proved itself mathematically valid, very few of these essays and reports used the same equation or in the same context.

Having spent my life surrounded by many of these equations the author came quick to take note of those equations and formula that fit the argument and those that didn't. Accordingly the author likened many of these explanations, equations and conclusions used to support or defend gravity to an informal fallacy. (An informal fallacy occurs in an argument whose stated premises may fail to adequately support its proposed conclusion. [2])

If the history of modern physics, Relativity and/or the search for a unifying theory has taught us anything it is that *gravity* is the linchpin force that must be included in any widely accepted theory that is, or ever has been study at any level beyond science fiction. Yet the explanations and discussions of gravity, and what causes gravity *still* reside in the realm of science fiction to this very day. It should go without saying, but no unifying theory about the physics of the

universe will ever be vetted out, or proven, until the fundamental force of gravity is accounted for.

Because the resultant force of gravity is real, observable and measurable in 3-dimensional space it must be accounted for in both mathematical arguments as well as reality-based arguments in order to for those arguments to serve as a foundation for a unifying theory of everything.

V.   Gravity and the mathematics behind It.

In the authors' humble opinion the single greatest discovery of my lifetime occurred in 1998 when the Hubble telescope peered across the universe and showed the world that the universe was not decelerating (as hypothesized in the original Big Bang Theory) but actually accelerating away from itself.

If the mass of the universe is constant, then F=M $_x$ A tells us that if A is *positive* then F must be *positive* as well. Therefore, there must be some universe-wide force causing all of the mass to accelerate. Immediately the only force that came to mind, the only force that affects mass in this fashion (and that could be this far reaching on a universal scale) was gravity. And the author finds no error in these conclusions. However, gravity as a by-product of mass is an attractive force between objects of mass, not a repulsion force between objects of mass as seen with universal expansion. Therein lies the dilemma of this discovery: you can't have gravity without mass (because gravity is an 'attracting force' unique to mass) and the amount of mass in the universe is constant...but yet all of the mass of the universe is experiencing the force of acceleration *away from itself*.

The flurry of explanations for this out-of-balanced universe came out at a dizzying pace and this author admits he had a difficult time keeping up with all of them.

As the author has come to understand the flow of logic of the numerous theories that came forth to explain this observed phenomenon they went something like this: Since the only fundamental force in the universe that reacts against mass is gravity, gravitational forces are the cause for this acceleration. Since the only source of gravity is mass an 'invisible' source of mass must be causing this acceleration; this became to be known as Dark Matter.

However, when the amount of energy required to cause this universal acceleration was actually calculated (F=M $_x$ A) the amount of force being generated was far greater than expected. This left us with only one of two choices: either the universe is made of up over 73% to 78% matter that we cannot see, or that all of this matter is really a manifestation of the current same 'time-space distortion' theories that are being used to explain gravity. Regardless of its origin many scientists no longer referred to this source of energy as Dark Matter, they simply referred to it as Dark Energy.

The theories of Dark Energy help resurrect several other previously popular theories, among them several theories concerning Vacuum Energy (or Void Energy) and a number of theories concerning the aether. The author will not attempt to relay 150+ years of work in both theoretical fields concerning both subject matters in this paper, but I will say that many of the theories in both fields of study were both proven and disproven; it was all according to which argument you believed, which equation was used and whether or not it was explained in terms of General Relativity or Special Relativity.

Over the last 15 years the author has looked at the rapidly changing field of gravitational mechanics and how it was being used to explain universal acceleration and I came to the same conclusion that many other scientist before him came to as well: If you take gravity out of the 'equation' then everything is easily explainable. In other words if gravity really isn't a primary (fundamental) force at all then everything fits and the equations governing the universe balance out to zero.

Let us consider the most fundamental physic equations to account for universal acceleration and balance them. In a static situation the [dynamic] sum of the forces must equal zero.

$\Sigma F = O$

If the 4 fundamental forces in the universe are F_G (gravity), F_{SN} (Strong Nuclear), F_{WN} (Weak Nuclear) and F_E (Electromagnetism) then our simplified equation governing the forces of the universe now looks like this:

$$\Sigma F = F_G + F_{SN} + F_{WN} + F_E = O$$

The magnitude and direction of force is defined by each other in order to achieve a balanced equation. If we assign the attracting force of electromagnetism (F_E) a positive (+) number then we should assign the attracting forces of gravity (F_G) and strong nuclear (F_{SN}) the same positive (+) values. This leaves the repulsion forces of weak nuclear (F_{WN}) as the only negative (-) integer in the equation. (Electromagnetism can be both a positive and a negative force).

$$\Sigma F = (+)F_G + (+)F_{SN} + (-)F_{WN} + F_E = O$$

$$(+)F_G + (+)F_{SN} + F_E = (+)F_{WN}$$

$$F_G + F_{SN} + F_E = F_{WN}$$

However we now know the universe is not in a static state; it is accelerating. Since it is assumed that our accelerating force is due to the force of gravity it is a positive (+) force of the same value. (If it is not it has to be a negative (-) repulsive force and that force hasn't been hypothesized yet.)

$$\Sigma F = (+)F_G + (+)F_{SN} + (-)F_{WN} + F_E = (+)F_G$$

$$\Sigma F = (+)F_{SN} + (-)F_{WN} + F_E = O$$

Since we have not been able to tie electromagnetism to gravity, and we know that electromagnetism is a regional force (related to R^2), that it can be both a positive or a negative force, and that it is not a far-reaching force then we can drop it out of the equation as well.

$$\Sigma F = (+)F_{SN} + (-)F_{WN} = O$$

$$F_{SN} = F_{WN}$$

(While one might debate the legitimacy of the argument, it is strictly based on conventional physics without any hypothetical or unknown variables so the author will keep it standing for know.)

This argument tells us one of three things: there is yet another undiscovered fundamental force in the universe, that strong nuclear and weak nuclear are of the same values and/or that gravity may not exist as a fundamental force in the universe.

It also might mean that since weak nuclear is an integer of the same value as the electromagnetic repulsion force (a force that wants to disassemble the like-charged particles found in the nucleus of the atom) then the force of strong nuclear is also just the same as electromagnetic force as well (remember, electromagnetic force can be an attracting force). However, since we know that like-charged particles repel each other, and we have no other force to describe why 92 protons clumped together will stay in contact with each other, so we theorized strong nuclear force.

In other words strong nuclear forces (theoretically caused by WIMPS) were hypothesized because gravity isn't regionally strong enough keep 92 protons in contact together with each other. In theory it is the same strength as the electromagnetic repulsion between them added to the weak nuclear energy that wants to deplete them. But if strong nuclear energy is only theorized to exist (in order to counteract electromagnetism and weak nuclear energy) then maybe strong nuclear and weak nuclear forces may not exist after all, and the only real fundament force in the universe is the only one we can truly state exists for certain: the electromagnetic forces.

Or maybe the author (and the majority of other scientists) committed an informal fallacy by equating the force of 'gravity' generated between two objects of mass to the same force of 'gravity' that is accelerating the mass of the universe apart.

This argument might makes sense given that theoretical gravity [gravity attributed to mass] can

eventually override all weak nuclear and electromagnetic forces and crush all matter into a super-dense mass (thus creating a gravitational force so strong that nothing can escape its reach). But according to conventional theories gravity can only do so regionally and not across the span of the universe.

So it may not be this theoretical 'gravity' force that is causing mass to accelerate from itself after all.

In the mathematical arguments presented in this section the author could have very well committed one or more informal fallacies by assuming that the force of gravity (F_G) is causing universal acceleration and/or by using this force as a constant instead of as a variable. Or, the author could have made the error in logic that gravity is a stable force based on the assumption that mass causes gravity and that mass is a stable element in the universal composition. However, according to conventional theories governing the existence of Black Holes, gravity is not a stable force and can intensify beyond its current state of definition.

It is the authors' conclusion is that while the mathematical equations used in this section might be valid for explaining the force dynamics of mass in the universe, the mathematical arguments are not.

VI.   Does gravity exist as a force?

The author learned very early on that matter and energy can neither be created nor destroyed; they are only interchangeable. Most scientists, including the author believe that to be a fact. We also learned that mass is constant across the universe (about 4.8%). If these facts are not in dispute then one must ask "were does all of that theoretical increase in gravitational force(s) get its energy from, especially for what is needed to create a Black Hole or to cause universal acceleration?" Based on these arguments the author chose to follow the path less taken and, when gravity fell out of the equations, I took them off the list of fundamental forces in the universe.

From here on out the author's theoretical models were based on the premise that gravity does exist as a

force, but it is not a fundamental force in the universe. Accordingly the force of attraction between two or more objects of mass is a *resultant* force between objects of mass and not a *primary* force. This also means that because gravity is only related to mass in close proximity with itself it is not the most far reaching force in the universe. Like magnetism its strength can be calculated in $1/R^2$ but unlike magnetism its origin is not based on the force of electromagnetic attraction between two particles of opposite charge. Simply put, in order to develop a unifying theory the author had to eliminate gravity from any universal fundamental force vector based equation. And, as the author stated earlier, I was not alone in this theory.

After discussing some of these mathematical enigmas with several colleagues of mine one of them brought the following book to my attention: *The Unobservable Universe* by Dr. Scott Tyson.

In his book Dr. Tyson very succinctly walks the reader though the mathematical arguments (and physical disconnect) between the factual and the theoretical explanations of gravity. He then goes on to show that by using these same mathematical arguments, arguments that plagued Einstein to his final days on earth, gravity falls out of his equations as well. (The author would like to note that while Dr. Tyson eliminated the force of gravity as a fundamental force he did not eliminate it entirely; he regulated it to a value of 1 when compared to the values of the other 3 fundamental forces of the universe*).

In his book *The Unobservable Universe* Dr. Tyson too arrived at the same conclusion that the author did many years ago: There are not 3 states of existence in the known universe; matter, energy and the nothingness of space (the void). There are only 2 states of existence in the known universe, matter (mass) and energy, and that the 'void of space' is in fact an energy field. Liking his Void Energy to that of space/time distortion he used Void Energy to describe the resultant force we feel as gravity.

The authors work and Dr. Tysons' work did bare one other striking similarity: both Dr. Tyson and the author attribute the force of gravity to particle dynamics,

however the fundamental role of this particle and its dynamic properties in the void was very different. They differed because while Dr. Tysons' mathematical arguments eliminated gravity as a force they did not account for the physics and mechanics of gravity, especially Newtonian Mechanics and the conservation of momentum, as did the authors'.

> *The author would like to apologies up front to Dr. Tyson if my overview of your work was not accurately surmise the content of your book. Like most theories discussing the physics of the universe the author based his comments from a different frame of reference and it may not completely align with yours.

VII. If gravity is not a fundamental force, then what is it?

Even Einstein considered some variants on his theories of Special Relativity in order to take gravity out of his equations. Like many other scientists he did so by considering the existence of "aether". (The author put aether in quotes because I have come to understand that the concept of aether has had a number of different theoretical physical properties, meanings and definitions to scientists over the years.) Unfortunately what Einstein needed aether to do was not what he envisioned it did so he abandoned the concept early on in favor of quantum mechanics. But that doesn't mean aether (or some variant of aether) doesn't exist. Dr. Tysons' Void Energy is a form of aether, Dark Energy is a form of aether, as is theoretically any other energy field occupying the void of space.

The author considered the existence of aether very early on using very much the same logic that many other physicists used: if electromagnetic energy is propagated across the universe without physical matter present, and yet it has a speed limit (*C*), then it must have a medium by which to propagate itself through and a medium by which to restrict its speed against. Just as sound energy needs a solid-matter medium in which to propagate an energy wave though, so must electromagnetic energy have a medium by which to propagate through.

(To which the author was pleasantly surprised to learn that while I was researching the subject of aether a descendant of mine, Dr. DeWitt Bristol Brace (1904) also worked on proving the existence of *luminescent* aether based on the Michelson–Morley experiments of 1887. And, depending on which interpretation of Special Relativity you use, Dr. Brace either proved or disproved the existence of luminescent aether.)

Recently the concept of aether has been use to describe Dark Energy and/or Vacuum Energy but in the authors' opinion they are still missing the mark because the fundamental force of gravity is still in their equations. Dr. Tyson used a variant of aether (void energy) to mathematically eliminate gravity through the use of particle/wave dynamics but he did not factor in gravity's known properties, so the other 3 fundamental forces in the universe still remained in his equations.

The author knows that it is not enough to eliminate gravity as a fundamental force when assembling a unified theory for all remaining forces; I had to account for gravity as well. The author found that by using particle and energy dynamics within the framework of conventional physics and proven particle dynamics I could not only eliminate gravity as a force altogether, I could also unify strong nuclear, weak nuclear and electromagnetic force into series of known, observable, detectible, hypothetical and repeatable phenomena without the use of more than one equation and one unknown.

If we treat gravity as a resultant force in such as any other resultant force (e.g. chemical explosion, ferrous material magnetic attraction, impact propagation, expansion due to heat, etc.) we do not have to explain its origin in term of any other fundamental force. In doing so the force of gravity begins to manifest itself because of the interactions of mass in relation to itself. Gravity is not constant but it does have a minimal value (0) and a maximum value. It also only manifests itself as an 'attracting' force and never as a repulsive force.

Like other forms of resultant energy gravity's resultant energy can be measured, predicted, initiated and

negated. This also means that gravity is the transportation of force (or energy) and not the transportation of matter.

> Authors' note: Since we are on the verge of discovering 'gravity waves' I would ask the readers to consider what we hypothesize gravity waves are and how we theorize they are being propagating through space. A wave is either a linear propagation of the compression and decompression of energy across a fixed distance and/or the oscillatory action of a particle in space due to the propagation of energy. Waves are a 'memory' of another resultant force and the resultant transport of its energy, not its matter. In all descriptions a wave uses particle dynamics to describe its physical manifestation and force vector, and it is based on the original disturbance in the medium by which it is propagating.

VIII.   Unifying the unifying theory

The author has learned that ever since it was discovered that the physics of photons could be described using both particle dynamics and wave dynamics it has become acceptable to describe the physical interaction between many forces, energy and matter in terms of particle dynamics even though they may behave like a wave. Many of the theoretical particles used to describe these theoretical interactions have been found to exist (e.g. electrons, protons, Higgs Boson, etc.) but many have not been seen yet and only exist in theories (e.g. gravitons, quarks, etc.). Like their proven counterparts, these theoretical particles came into existence because of the need fill the gap between the discovered & confirmed and the theoretical & unconfirmed.

As the author coalesced his theories on gravity the need for such a particle emerged. According to the framework by which this particles is based this particle must exist in 3-dimesional space. The author speculates that it probably has been long since discovered but hereto uncategorized or unobserved for its function. The author also speculates that this particle is part of the electromagnetic spectrum because (according to my theories) it is as common as the photon is throughout the universe.

As the author narrowed down the properties of this particle, how it behaved, how it interacted with matter (to create the force of gravity) and how it interacted with void energy I did so based on two assumptions:

- Void energy is real, and
- that this theoretical particle physically behaves within the constraints of every other known and discovered particle to date.

The author also speculates that this particle is a sub-atomic particle and that it must operate in a quantum system. (The author did not wish to construct a transitory particle with hypothetical properties.) Accordingly these particles behave as fermions in that that their statistics restrict the number of them that occupy the same quantum state. (This was a major variation between Dr. Tysons' mathematical arguments and the authors'.) The author did not make up this particle to perform a task. Instead the author identified each task that gravity performs, the physical manifestation of that task and the laws of motion that govern these manifestations and tailored the definitions of this particle accordingly.

A great deal of time has been spent, and indeed an entire book was written by the author, describing the relationship of this particle to mass and to void energy so in the context of this essay I will not attempt to go into too much detail about how this particle came to exist in my theories about gravity. Instead the author will educate the reader about the authors' basis of this particle through observation, experiment and results, and tie together these theories about gravity and the other theoretical fundamental forces of the universe.

IX.   Defining the particle

The first physical definition and dynamic description that the author likens his particles to were those physical attributes typical of most particles found in the electromagnetic spectrum (EMS). They may or
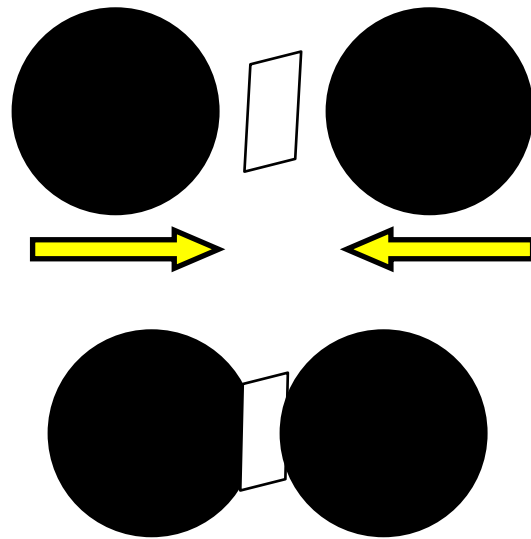
may not have mass however they have volume and they can exert force. It was felt that one such definition also included the rule of R^2. (Because the force of magnetism is related to R^2 and the force vector of gravity is related to R^2 then the definition of this particle must indeed be related to R^2). To fit this hypothesis the author also observed that while some forces increase with R^2 some particles in the EMS decrease with R^2. A simple means to confirm this was to run an experiment involving particles in the visible light spectrum of the EMS and an object of mass.

> Authors' note: rather that continually refer to my theoretical particle in the generic term from herein I will refer to them in one of the more conventionally accepted term of 'graviton'. This term is not to be confused however to describe the hypothetical elementary particle that mediates the force of gravitation in the framework of quantum field theory and that is hypothesized to be a spin-2 boson. I chose the more ambiguous definition of my graviton as a hypothetical particle that causes gravity and the effects of it on mass.

Photons are not proportionality restricted traveling through mass by density. They are only restricted while traveling through objects of mass due to opacity. Using photons and opacity as a substitute for the graviton and density I conducted the following experiment:

The author suspended two 3" diameter smooth, featureless completely opaque flat-black orbs with very thin clear monofilament lines in close proximity to each other in the center of a large room uniformly lit from all directions. A very small, paper-thin photocell was hung between them with thin, bare copper strands. Several other identical photocells where hung about the room to establish the amount of ambient light present in the room. The photocell was used to approximate the lumens between the orbs as they moved in relation to each other and was always centered between them. Figure 1 below typifies the setup:

Figure 1

The experiment was run several times and the photocell between the orbs was reversed so as to keep the sampling unbiased. Each run produced the same results: $L = R^2/a$ where L is the number of lumens measured, R was the radius distance between them and a was the constant factor establish from 100% to 0% of shadow area between the orbs.

The experiment was then repeated with two photocells placed back-to-back and inserted between the orbs. This was done to determine the amount of light drop between the orbs caused by the opacity of the photocell itself.

While every attempt to make keep a linear the author understood that unless the photocell was infinitesimally small it will always measure light between the two orbs even when they were touching.

The results were as expected and showed conclusively that the amount of ambient light between the spheres went down in a non-linear progression as the orbs came in close proximity to each other.

The purpose of this experiment, and the authors' supposition about gravitons, was what gave cause to my theory that it was not an increase in gravitons that manifested itself as the force of gravity, it was the decrease in relative graviton density between objects

of mass [as they approached each other] that causes an increase in the reactive force between them. Furthermore gravitons, like most elementary particles in the universe, have behavioral patterns in relation to mass that define their relation to mass.

From this experiment the author deduced that gravitons' interaction to an object of mass is based strictly on the density of the mass, just as a photons' interaction to an object of mass is based on the transparency of the object of mass.

From there the author started to build the foundation for his theories on the graviton. Some of the first postulates are as follows:

a) In mass-less free space the density of the particulate count of gravitons per unit volume behave much as a particles of gas and that they attempt to remain dispersed and evenly fill the space around them,
b) they disperse in all directions in an attempt to remain at a constant density and
c) as objects of mass come in close proximity to each other in free space the density of the masses determines the drop in density per unit volume of gravitons between them.

Now that the author has established some of the basic relationships between gravitons and objects of mass we need to further define the interactions between objects of mass and gravitons to affect mass as gravity does. This relationship serves to define several more theories concerning the descriptions and parameters of gravitons.

X. The graviton and mass

How gravitons effects mass, and how gravitons generate the force of gravity between them is a relationship that requires energy and, according to some of the estimates I have read on the extreme amount of energy needed to accelerate the mass of the universe, gravitons need a lot of energy. Accordingly, the authors' theory garners this energy from the void [energy].

If the void is an energy field then it must behave in accordance with the laws of physics (as does every other energy field) to maintain an existence in the physical universe; the void energy must have density and/or have a pressure gradient. Tying the two concepts together, gravitons and void energy, then becomes an exercise in simple physics.

The author likens the physical characteristics of the graviton to that of a photon in the light-orb experiment above. This leads the author to the conclusion that [like photons] gravitons can pass through matter (mass) and this then leads me to the next postulate:

a) Mass impedes the movement of gravitons and
b) this resistance to motion through mass is linear and based on the density of mass.

Just as an electron is impeded though conductive material* at different rates, so are gravitons while transiting objects of mass. The denser the matter, the more resistance is imparted to the graviton; it is a linear relationship.

> *The author does remember reading many years ago that it was discovered that the same electromagnetic particle that enters a conductive medium is not the same particle that exists the medium. Since the author has not identified the graviton particle in the electromagnetic spectrum I am unsure if it behaves as the electron does while transiting mass.

As mass displaces gravitons the void energy field attempts to equalize the graviton particle density in surrounding space in very much the same fashion that the earth's atmosphere attempts to maintain the same barometric pressure between the air molecules that it is made from. There is an average void energy and graviton pressure in the universe but that pressure can vary in local environments.

The physical and dynamic interactions between the graviton, the void energy and the matter in proximity to gravitons comprise the force of gravity. As the density of gravitons between objects of mass decreases so decreases void energy gradient between

them. A corresponding increase in void energy pressure is seen around the object of mass in an attempt to equalize graviton density between them. However, like the lighted orb experiment involving protons the gravitons between two objects of mass cannot establish equilibrium due to the 'opaque' nature of matter to gravitons. The more dense the matter, the less the ambient field of gravitons can maintain equilibrium between them. The lower the graviton pressure the lower the void energy pressure.

Simply put the force of gravity is a pressure differential in localized void energy due to a pressure differential in localized graviton density. As void energy attempts to equalize graviton density only mass can impede this equalization of pressure. This means that graviton particles behavior in void energy is very similar (if not identical to) gas molecules in an atmosphere. This also implies that gravitons behave in a manner consistent with Boyle's [Gas] Law.

The author has shown that rather than the force of gravity being a by-product of mass, it is a product of the density of matter and that the governing factor between the interactions of graviton particles and the pressurized space surrounding mass creates the force of gravity. Therefore, while mass (and its corresponding density) is still the fundamental 'cause' of the apparent force of gravity between two objects of mass, the force of gravity does not exist as a separate, fundamental force.

A similar analogy could be drawn between the expected results of introducing two very cold, non-gaseous permeable objects of mass in a large rubber balloon filled with a hot gas. The Ideal Gas Law tell us that the pressure of the gas in the sealed balloon will begin to drop (due to the drop in temperature caused by the very cold objects) however the pressure of gas around the objects will remain the same due to the constriction of the rubber balloon. However, if the cold objects of mass were in close proximity to each other the gas between them would constrict at a faster rate than what the surrounding gas around them could compensate for because the gas cannot permeate the objects of mass to maintain localized pressure relative to the ambient pressure. The pressure between them would be less and the

pressure differential surrounding them would cause them to be drawn together.

In this experiment the laws of the conservation of energy are maintained because the reduction in pressure of the gas (due to the introduction if a cold object) is equalized by the decrease in surface area of the rubber balloon and its resultant force vector on the enclosed gas. The objects of mass appear to have an attractant force between them causing them to accelerate towards each other but in actuality the there is no force or generated energy between them. Accordingly the objects of mass would be 'stuck' together until the entire temperature of the enclosed system reached equilibrium. At that point they would no longer be attracted to each other and be free to move about.

In summary, void energy provides the pressure that keeps gravitons at a constant density. Gravitons provide the resistance to mass which provides for a counter-force against mass, and mass restricts the movements of gravitons based on its density. The relationship between gravitons and void energy is the inverse of Boyle's Law;

$D_G \propto V_E$

$D_G / V_E = k_U$

D_G = Density of gravitons

V_E = Void Energy Pressure

k_U = Universal pressure ratio in a fixed volume

XI.   An understanding of gravity caused by gravitons and how it affects matter.

As the author began to attribute much of the gravitons' behavior to that of many other common particles found in the physical universe (in particular how they interact with mass) the explanations to the many other aspects of gravity's behavior began to emerge. As explained in the analogy about the two cold objects of mass in a rubber balloon, if gravity is a by-product of physical interaction of mass between

particles and the pressurized space surrounding them then many of the 'laws' concerning gravity have a simple explanation in the dynamics and physics between mass and graviton particles.

Applying the authors' theories about the graviton and void energy, how they interact with each other and how they react in combination to mass we have used classical particle dynamics physics to explain the expected results in previous examples. These same interactions can be used to explain previously unexplained expected results, namely Newton's Law of Motion and the laws concerning the conservation of momentum, energy, and angular momentum.

In a resting body of mass in an even distribution of gravitons in an average pressure density of void energy the body of mass resists movement due to the resistance of movement of the surrounding gravitons. If an accelerating force is applied to the object of mass the gravitons will react against the mass with a corresponding force in the opposite direction. The magnitude of this force is proportional to the density of the mass and the duration of this force corresponds to the duration of the accelerating force. An object of mass at rest is constrained by gravitons and tends to remain at rest.

In a body of mass in motion in an even distribution of gravitons in an average pressure density of void energy the body of mass remains in motion due to the relative motion of movement of the surrounding gravitons. If a decelerating force is applied to the object of mass the surrounding gravitons will attempt to remain in motion and react against the mass with a corresponding force in the opposite direction. The magnitude of this force is proportional to the density of the mass and the duration of this force corresponds to the duration of the decelerating force. An object of mass in motion is constrained by gravitons moving in concert with it and tends to remain in motion.

In each of the above observations gravitons are acting in concert with mass just as particles of mass react with solid objects of mass in both a static and dynamic observation. The analogy could be drawn between the following interactions:

In a large pot a constant volume of liquid is set in motion by using a stirring device (such as a spoon). The initial resistance to the spoons' motion is caused by the resistance of the water and its desire to remain at rest. The resistance force against the spoon is solely based on the shape of the spoon as it is accelerated through the water. If the spoon if released, at the instant the accelerating force is removed from the spoon the spoon will continue in motion in the pot at the same velocity as the surrounding particles of liquid. Any decelerating forces applied to the spoon will result in an opposite force applied against the spoon by the body of liquid in motion relative to the space surrounding the spoon. (This motion of mass through a static field of gravitons will behave in accordance with classic turbulent flow dynamics.)

Figure 2 (attached as a separate page at the end of this essay) demonstrates this principle in fluid dynamics. Figure 2 is an illustration of a large-eddy simulation of the flow past a cylinder in the sub-critical turbulent regime at Re=47000 (SISM in the Turb'Flow solver). [4]

The arrows in Figure 2 represent pressure flow gradients. Note the low pressure gradients and eddies that form on the side of the solid object of mass on the opposite side of the direction of flow, and the high pressure gradients that formed on the forward side of the solid object of mass in the direction of flow. As long as an accelerating force is imparted to either the flow, or the solid object of mass in this flow, there exists a reactive force against both.

XII.   The theories of antigravity.

Many experiments over the last century have shown evidence of antigravity, and indeed many have proven that rotary motion alone can negate gravity (the author is referring to the gyroscope and 'anti-gravity wheel' experiments and observations that have been performed over the years) however there has not been a single, consistent (or accepted) theory to explain the observed phenomena.

In his 1991 published work The Theory of Antigravity [5], Dr. Aspden discusses antigravity experiments,

devices, and inventors based on a rotating mass and its antigravity effects. In this published essay Dr. Aspden makes the following introduction concerning the outcome of these experiments:

1. INTRODUCTION

The recent media interest in antigravity devices and their public demonstration has presented a technological problem, which is complicated by the lack of interest of the theoretical physicist. Theory has not yet given us an accepted comprehensive understanding of the true nature of gravitational forces and particularly the field unification with electromagnetism. It is, therefore, rather bewildering to be confronted with the suggestion that there are any laboratory-verifiable anomalies of an antigravitational nature. This is even more disconcerting when we consider that our hopes for resolving the unification problem have come to rely on our imaginary probes into the events when the universe was first created.

During my research on antigravity the author went on to look into as many of these experiments as I could find and each time the author came away with the same conclusion: they either didn't know why it did what it did, or they offered a theory based on current hypothetical physic and/or electromagnet definitions of gravity. But each explanation still fell short (or was disproven) because each explanation offered for the results of these experiments was still under the assumption that gravity exists as a separate force, as did Dr. Aspden's observations and opinions. (The author likens many of their explanations, equations and conclusions to an informal fallacy.)

One of these experiments that Dr. Aspden based much of his essay on was the Hayasaka-Takeuchi Experiment [6]. This experiment left every physicist scrambling for an explanation to the results seen. Even Dr. Aspden offered up some good suppositions for the results; ideas that only served to somewhat bolstered the authors' theories.

In this same published essay Dr. Aspden makes the following statement:

3. THE FUNDAMENTAL QUESTION

At the very outset of this discussion it is necessary to distinguish between two schools of thought as to the action involved in antigravity. Most of those researching this field believe that mass retains its full and normal gravitational property, but that the anomalous levitation or propulsion effect comes from an out-of-balance force which somehow is developed by exploiting the absence of centrifugal effects when a spinning flywheel, offset from a separate axis of rotation, is caused to precess. Others, including this author, subscribe to the view that there is a loss of weight by the force-precessed mass in the flywheel and that the underlying energy action in the vacuum field plays a role in this enigmatic behavior. The distinction is most important, because in the first case the action is a dynamic action akin to the effect of an electric or magnetic field that can act across empty space to produce force developing thrust. [5]

Later in this same essay Dr. Aspden discusses the experimental evidence seen to date:

7. THE EXPERIMENTAL FACTS

To the author, the most significant fact of experiment is presented to anyone who has witnessed Laithwaite lift that heavy spinning flywheel by applying a slight manipulating force to a supporting shaft. The end of the shaft remote from the flywheel is supported in the crook of his little finger on an outstretched arm. The lift force needed is said to be less than 1 kg, whereas the wheel weighed 8 kg and the supporting shaft weighed 2.7 kg. Readers who have difficulty believing this should examine the photograph of this demonstration in Ref. 4, p. 64.
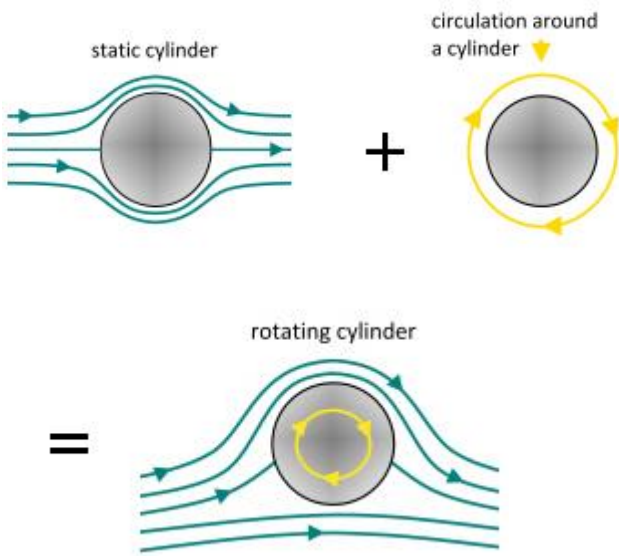
In this experiment there is no vibration and the evidence points to the wheel being able to lift more than its own weight.[5]

The author has found that the effects of 'antigravity' seen during previous experiments involving a rotating mass can be explained and accounted for using the

same flow dynamics and predictable pressure gradients that occurred in the authors' pot-of-liquid experiments (illustrated in Section XI) if rotation is applied to the object of mass while in a steady state flow of gravitons in a regional field of void energy.
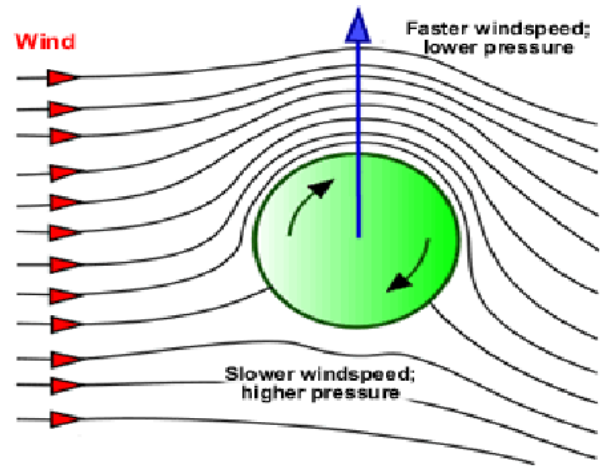
The Kutta–Joukowski theorem is a fundamental theorem of flow of a compressible gas about a solid object of mass and it is used to explain the flow dynamics of a rotating circular cylinder translating in a uniform fluid at a constant speed. According to these classic theories on flow dynamics when a rotating solid object is placed in a steady date flow of compressible particles the flow about the cylinder the cylinder behaves in accordance with the Magnus Effect and produces a force against one side of the rotating cylinder (Figure 3 below).

Figure 3.

When a rotating cylinder is traveling through a flow of compressible gas the pressure differential in the pressure differential in the laminar flow of gas creates a force vector that will effect against the rotating cylinder as shown below in Figure 4.

Figure 4.

It is this vectored force that allows a sail boat equipped only with rotating cylinders as sails to move into the wind (Figure 5 below [7]).
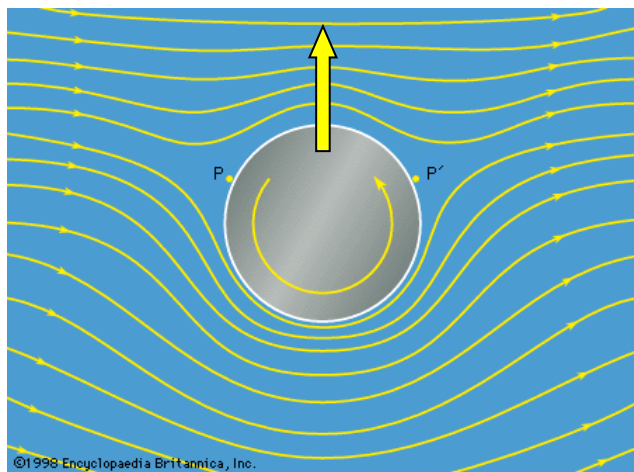
Figure 5.

In a laminar flow about a rotating cylinder gravitons suspended in void energy will exhibit flow patterns similar to the Magnus Effect. In the laminar flow an increase in graviton density results in an increase in surrounding void energy pressure. The increase in void energy pressure will cause the gravitons to attempt to equalize in volumetric density through and about the cylinder. This will cause a force against the rotating cylinder just opposite in direction found in

14

the Magnus Effect and result in a force vector as pictured below in Figure 6.

Figure 6.

©1998 Encyclopaedia Britannica, Inc.

In the picture above if the reader is looking at the rotating cylinder from the side, and the earth is below the cylinder, the reader will note that the resultant force vector pictured above (in yellow) is identical to the force vector described in the gyroscopic precession in an 'antigravity wheel'. As long as the cylinder continues to rotate and there continues to be a positive velocity flow in the field of gravitons around it the rotating cylinder will experience a force normal to its path, but in the opposite direction of rotation based on the direction of its rotation.

It is important to note that this reduction in graviton density and increase in void energy pressure is very regional in scope and will only affect the rotating body of mass with a force within a distance [related to R^2] to another body of mass. In the case of the antigravity wheel (gyroscope) the force against the rotating cylinder can only react against the force of gravity created between the rotating object of mass and the earth. In the case involving an antigravity wheel the spinning wheel does not create a reactive force on the upwards side of the rotating object of mass; it only equalizes and negates the pressure gradient between wheel and the earth.

The theoretical interactions between gravitons, void energy and mass described in this section has given the author just cause to define several more theoretical parameters concerning the graviton:

a) Gravitons behave in accordance with the fundamental theorems governing compressible flow and the laws of gaseous matter,
b) a reduction in graviton density in localized void energy will correspond to a reduction in localized void energy pressure and that
c) if left unconstrained and/or unrestricted by mass gravitons will seek to equalize the pressure between them and the localized void energy pressure.

The author would also like to point out another antigravity phenomenon that is known as the Hutchinson effect. The Hutchinson effect uses "electromagnetic influences developed by a peculiar combination of electric power equipment, including Tesla coils, and has caused blocks of wood or metal to lose weight". [5] Much of the work of John Hutchinson has been captured by video and motion picture camera of which the author has seen. "To witness what is shown is quite disconcerting, because it is quite incomprehensible in terms of accepted physics, and yet one cannot just write it off as an unnatural phenomenon." [5]

If in fact the authors' theories about the graviton residing in the electromagnetic spectrum are correct then John Hutchinson may have accidently devised a means to manipulate them (just as it has been speculated that Nikolas Tesla may have done in his antigravity experiments).

In summary, the notion of 'antigravity' is a misnomer for a force that can be created to react against the force of gravity. Since gravity is not a fundamental force (or a latent force that can be extracted) antigravity and the perceived effects of it on mass can be described as equalization in void energy pressure and graviton density between two objects of mass. It is important to make this distinction as it is this principle that the author will use to describe the other fundamental forces of the universe governing mass.

15

XIII. Gravitons and matter

Author's note: The author understands that some of the statements in this section may be considered gross oversimplifications of many of the theoretical models governing atomic and subatomic particles, however as the author has previously noted many of the mathematical arguments and predictions for the theories behind these particles, particularly the particles theorized to cause (or react) against gravity are based on an informal fallacy if gravity does not exist as a fundamental force in the first place.

The author admits that he is not, nor will he probably live long enough to be an expert in atomic construction, deconstruction and sub-atomic particle dynamics. However I have seen, learned and been taught enough about this area of physics over the last 40+ years to know that the physics of atomic theory is still in a state of flux. Accordingly, one of the authors' primary goal in the development of these models is to avoid the introduction of any new or different unproven theories about the physical make up of the universe. Instead, the author has made every attempt to keep his models within the realm of reality, proven quantum mechanics and proven physics. In doing so the author has created a model that at first observation could replace gravity as a fundamental force. Subsequently the author began to redefine the other 3 forces of the universe within the context of that model.

Of the 4 fundamental forces used to describe the physical dynamics of the universe, 3 of them (gravity, strong and weak nuclear forces) pertain to mass and the formation and deconstruction of matter from mass. The 4th, electromagnetism, only pertains to mass if electromagnetic forces are present, associated or can be associated within that object of mass. Charged particles of mass will behave in accordance with all governing laws of physics, those governing mass and those governing electromagnetism. If the electromagnetic properties of a charged particle (or object of mass) leave (or are removed) from that particle the particle is will still adhere to the laws of physics governing mass.

If gravity is not a fundamental force in the universe then the other 2 forces governing mass must be directly related to the force of electromagnetism because in a static situation the sum of the forces must equal zero. In a rather simplistic view many of the theoretical particles regarding strong nuclear force(s) are needed to counteract the repulsive properties of like-charged particles (protons) and the theories regarding weak nuclear force(s) are directly correlated to those repulsive properties of these same atomic and sub-atomic particles. All of them include the force of gravity as part of their mathematical arguments.

Removing the force of gravity from the theoretical mathematical arguments governing the physics of mass in the universe can only be realized if the other fundamental forces can be accounted for in current statements of fact, current theories not involving gravity, and remain in concert with the force of electromagnetism. In the authors' theoretical models concerning gravity this task was accomplished by placing further physical restrictions on the graviton and how it interacts with matter. In doing so the author has built a hypothetical model using gravitons and void energy dynamics to replace the major force components of the other two forces, strong nuclear and weak nuclear, governing mass and the formation/destruction of matter.

If the graviton is modeled to be about or near the same size of many other popular theoretical subatomic particles (quarks, leptons, etc.) then the relationship between the void energy and the graviton is still valid in describing the mechanical interactions of atomic composition.

For the formation of stable mass to occur it is necessary for the graviton to be smaller than the proton/neutron, but not as so small as at to maintain a stable fit between when the protons are in *immediate* contact with each other. As two or more protons are brought in close proximity to each other the electromagnetic forces within those particles dictate that they will repel each other with a non-

linear force related to R^2. However, if the kinetic forces that cause this convergence of like-charged particles to come into contact with each other is greater than the repulsive forces between them they will collide with each other.

If during this collision the vectors of the compressing forces are such that all gravitons between the protons and neutrons are expelled simultaneously the resultant drop in void energy pressure between the protons will result in an increase in graviton density in the area immediately surrounding the clump of protons and an increase in the void energy pressure reacting against the displaced gravitons. As more protons are forced against the nucleus of the atom being formed they will remain in place as long as the resultant force of the collision is strong enough to displace the gravitons between them and weak enough not to disrupt (or disturb) the now seamless exterior of the atomic nucleus.

- In a stable atom quarks and other such theoretical subatomic particles are theorized to reside in this space between protons so the theoretical size of the graviton particle is probably larger than most other theoretical residual subatomic particles.

The author theorizes that matter can and will continue to be formed in this way until the repulsive force of the protons in the nucleus of the atom being formed overcome the buildup of graviton density and ambient pressure of the void energy field surrounding it. At which point no additional protons can be added to the nucleus and still be expected to remain in the nucleus and/or be stable. According to conventional physics this occurs at or near the stable mass of Uranium 238 with an atomic mass of 92 protons. Heavier elements have been created, and indeed still heavier elements may lie in our future, but none of these heavier elements will survive longer than takes for the forces of the ambient void energy pressure gradient and the electromagnetic forces within the nucleus to reach equalization.
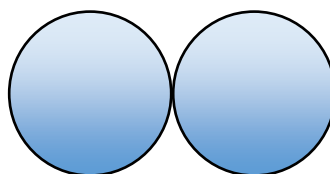
Since the proton mass has size and shape, and since void energy pressure can be measured in force units per surface area (e.g. pascal, PSI, etc.) the surface texture and shape of the proton nucleus directly affects the amount of pressure holding an atomic nucleus together, to which there will be certain geometric arrangements of atomic nuclei that will be more stable than others.

To which one of the supporting facts to the validity of this theory is the construct of the atom itself. The most basic (and abundant) element in the universe is hydrogen; one proton and one electron with an atomic weight of one. The next heaviest element in the periodic table is helium with two protons, two neutrons and 2 electrons with an atomic weight of 4. Consider the geometric make up these two atoms and the reader will understand the reason why helium has two neutrons and hydrogen has none.

Since void energy is measured in pressure it requires a 3-dimentional shape with measurable surface area to act against (height, width and length). While a single-proton atomic nucleus does not need void pressure to maintain stability any atomic nucleus with more than one proton does. However two particles cannot be caused to exert a force against themselves unless the area between them is enclosed in 3-dimentional space. As shown in in Figure 7 below you see two particles in immediate contact with each other.
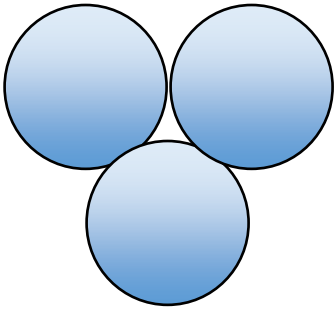
Figure 7.

In Figure 7 illustrated above gravitons can still migrate between the particles, and so any repulsive force between these particles will result in a deconstruction of this configuration.
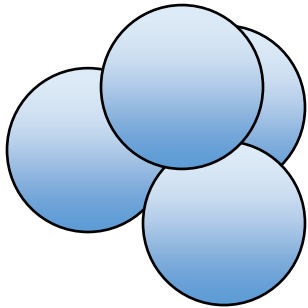
If, as shown in Figure 8 below, we had a 3rd particle we still have a 2-dimentional shape with length and width only and offers no enclosed space by which to exclude gravitons.

Figure 8

If we introduce a 4th particle then we can construct a 3-dimentional shape with an exterior surface area and provide an enclosed interior space; in this case a 4-sided pyramid as illustrated in Figure 9.

Figure 9

If the pressure gradient between these 4 particles (illustrated in Figure 9 above) is far enough below the surrounding ambient pressure gradient of graviton/void energy surrounding it, and it is strong enough to counteract the repulsive forces between these particles, the shape will remain intact.

Authors note: In order for this theory to present itself in the most favorable argument the author assumes that while unrestricted charged particles of mass (such as protons) tend to be spherical in shape they are not solid in construct, and when pressed against other particles their exterior can and will deform to other exterior and contacting forces present. As a point of reference the author considers the exterior of most particles of energy associated with mass akin to that of a soft rubber

ball; it will contort their exterior surface to accommodate other cavities and protrusions in their immediate vicinity.

Once a stable nucleus of like charged particles forms its corresponding shape and magnetic strength value (e.g. tesla value) this value will dictate how many electrons it will attract and how many it can maintain it is atomic electron shell. Just as nuclear stability is based on the surface geometry and the surface area of the nucleus, electron stability will be based on the same. And, as in nucleus stability, there will be certain geometric and electromagnetic surface properties that determine stability in the electron shell.

The authors' theoretical model of the atom dictates that while the volume of space within the nucleus of the atom has the lowest density of gravitons found in nature the immediate area surrounding the nucleus will have the highest density of gravitons found in nature. In order for the author's model to maintain continuity between atomic and subatomic dynamics the author theorizes that the overall density ratio of gravitons to void energy pressure inside the volume of the outer-most stable electron shell will be the same as the surrounding area outside the electron shell. Disruptions in this ratio will result in instability of the atom.

While it may be theoretically possible to form the nucleus of an atom into a non-spherical 2-dimesional shape the physical dynamics of the universe dictate that [based on geometry] it will be unstable and will not remain non-spherical indefinitely.

If the atomic nucleus is subject to a kinetic force vector strong enough to overcome the stability between the surrounding [stabile] pressure field generated by the void energy to graviton density ratio then the nucleus will destruct with the maximum kinetic energy equivalent of $E=MC^2$. However according to the authors' theory there still exists a void energy pressure gradient acting on the nucleus trying to keep the nucleus together during this decomposition of the nucleus, hence the destructive reactive force will always be less than the repulsive electromagnetic force of the nucleus particles themselves. It is the authors' hypothesis that the

reduction in the overall latent energy that lies within the atomic structure, and the overall magnitude of this force, can be equated to weak nuclear force(s) since both theories detail the physical decay of the atomic structure.

While the authors' theory about gravity and the formation of gravitational forces do not vary greatly from previous theoretical models (as well as several modern theories) I do realize that using these theories to describe the subatomic universe and the particle dynamics therein has resulted in a rather radical departure from most conventional theories. But the proof of these theories lies in current research and not necessarily in future endeavors.

Over the past century science has attempted to prove the existence of stable mass beyond the atomic weight of 92. Using super-colliders we have smashed atoms together with enough kinetic energy to cause the formation of elements with atomic numbers over 117. However none of these elements existed for more than a few milliseconds. The authors' theory points to the reasoning behind these discoveries.

Based on these theories about the formation of gravity and how gravitons can be used to construct matter [using the same dynamic model] the author predicts that stable matter cannot become denser than what the surrounding void energy pressure will allow. Accordingly the author predicts that super-dense matter (the type of theoretical matter that is used to construct a Black Hole) does not exist. Therefore Black Holes, as defined by those current theories in which they are comprised of super-dense matter (matter that is so dense that the gravitational field generated is powerful enough to overcome all other universal forces) do not exist.

The author does not doubt the existence of Black Holes. However, according to the authors' theories Black Holes are not comprised of super-dense matter. Instead they are comprised of a low-pressure area in localized void energy pressure. According to the authors' theories this area can be characterized by a low graviton density gradient.

In the authors' theories I have shown how gravitons and void energy interact much like other energy fields including those made from compressible gas particles, and that these particles are subject to the same laws of motion and dynamics as are all other particles in the universe. Accordingly it is the authors' point of view that all matter in the universe behaves much like gaseous cloud particles, and that it is no accident or mere coincidence that its structural manifestation on a universal scale mimics those found on a planetary scale in our atmosphere.

As a perfect example and overwhelming proof of this theory the author compares the physical manifestations of a cyclonic storm (formed on this or any other planet with an atmosphere) to that of many common galactic formations seen in the universe. The source of energy for the formation of a cyclonic weather structure does include an area of extreme gravitational pull in its center. At the center of every cyclonic storm is an area of extreme low pressure relative to the area surrounding it. The same condition exists at the center of every cyclonic galaxy.

The authors' theories leads to the speculation that just as actual atmospheric pressure gradients cause weather patterns in a gaseous atmosphere the same type of theoretical void energy pressure gradients cause galactic formation patterns in the universe.

In summary, the authors' theories have shown that by eliminating gravity and substituting gravitons and void energy in its place it is possible to construct a theoretical model by which mass can be assembled and matter can be coalesced. However the author has not spent nearly enough time researching all of the variability and permutations involved in the makeup of this theoretical model concerning the formation of mass and matter, but the author feels that the framework is sound enough for further construction.

XIV.   Theoretical predictions, past and present.

The author has used his theories to describe the physical constructs of the universe on everything from a universal and galactic scale to that of the atomic and subatomic scale. In doing so the author has come to

realize that many of the predicted gravitational phenomena that we search for (within the aforementioned scales) fit within the confines of this model. While many theoretical physicists over the last 200 years have predicted a number of accepted gravitational phenomena, not all of these predictions have been proven. And for many of those that have been proven the cause for these phenomena still remains lost in a sea of theoretical hypotheses.

The last section of this essay will discuss several of the more well know and plausible theoretical predictions and evaluate the form, fit and function of the authors' theories in relation to these predictions.

1) Black Holes

As previously discussed they do exist however they are not an object of mass; they are just the opposite. Black Holes are a volume of real space with significantly less void energy and/or gravitons when compared to the surrounding area on a universal scale. Accordingly they will eventually dissipate by equalizing in pressure with surrounding space.

If matter enters a 'black hole' space it will deconstruct to its most stable element relative to the pressure of the void energy in that space.

2) Worm Holes

Worm Holes are constructed in the same manner as Black Holes, however they have a cyclonic, longitudinal axis component as well. An appropriate analogy would be that of a tornado or a horizontal cyclonic wind shear.

Worm Holes can be created in the same manner as low-pressure vortices are: through the interaction of mass and gravitons. As large objects of mass (such as galaxies and massive star clusters) pass by each other they will disturb the high-density graviton area surrounding each of them creating wakes and vortices of gravitons. These turbulent vortices of gravitons will propagate though space until the ambient pressure around them equalizes with the low pressure inside of them.

3) The Big Bang Theory

If the Big Bang was an explosive release of gravitons, and not mass, then all that we have seen to date regarding the Big Bang becomes fact and not theory. If the universe consisted of 4.8% mass by density 14 billion years ago, but there were no gravitons to coalesce this mass into matter, there would not be any star formations nor would there be universal expansion. The spontaneous release of gravitons would instantly cause mass to move in all directions away from the release of gravitons. As mass collided with itself it would also begin to collate. The shadow wake of low density gravitons behind the objects of mass would cause the mass to accelerate away from the release of gravitons as long as there is a flow of gravitons moving past the object of mass.

If the object of mass has a spin the flow of gravitons around the object of mass would become more laminar and the forces of acceleration affecting it would decrease accordingly. To which if two objects of mass passed by each other the gravitational forces would vary based on the spin vectors of the mass. This would account for the fact that not all objects of mass in the universe are expanding and/or accelerating in the same direction and can have different force vectors relative to all other objects of mass in the same space.

4) Gravity waves

The author has breached this subject in prior sections however I did not make it clear what I thought gravity waves are or how one might detect them within the confines of this theory.

Since the authors' theories account for gravitons to travel in both wave and particulate fashion I speculate that gravity waves do exist in the form of graviton movement. As theorized by other scientists the author also speculates that gravity waves from the time of the Big Bang may still exist due to the refraction of gravitons being propagated across the universe. Using the author's theoretical interface between gravitons and mass-related gravity waves the proof in gravity waves will lie in the theoretical

interaction between mass and gravitons in locally disturbed void energy pressure.

A sound wave propagating through the air is a pressure wave of compressible energy being propagated outwardly from the source of energy generating the pressure differential. A gravity wave is very similar. The means to detect gravity waves will be based on what gravitons affect: mass. Accordingly the means to measure the magnitude of a gravity wave would be based on the same means by which to measure the force of gravity, however since the author theories do not support gravity as a stand-alone force (such as the kinetic force of impact found in the pressure wave of sound) when mass is impacted by a gravity wave the author predicts it will behave in an oscillatory motion and not a constant linear motion. It may vibrate in local space but it will not move; it will remain in place relative to universal space.

5)   Traveling faster than the Speed of Light

One of the authors' original premises to his theories on gravity was the existence of void energy in the form of aether. The theory behind aether has been that it is the medium by which electromagnetic energy can propagate across the universe, and that it is the medium that sets the maximum velocity for energy and/or particles traversing it. Accordingly the graviton was introduced as a particle that uses this same medium as a means to propagate through space.

In the previous discussion concerning Worm Holes the authors' theories contend that Worm Holes are low-pressure cyclonic vortices acting along a linear longitudinal axis. One of the popular theoretical properties concerning Worm Holes is that it may be possible to travel great distances though space at velocities faster than the speed of light by traveling through a Worm Hole. The author agrees with this theory in that his theories not only support the existence of Worm Holes by offering an explanation of what they physically are (and how they are formed) but his theories also offer a valid hypothesis as to why superluminal speed through them is possible.

The physics of energy particle dynamics has proven that different types of energy particles travel at different speeds though different mediums, and their speed is dependent on the construction of that medium by which they traverse. We have also seen where in many cases the maximum velocity vectors obtain while propagating through this medium may or may not be based entirely on the density of said medium.

While the photon has been slowed down to the pace of a brisk walk [of a human] the electron has never gotten to travel any slower than 96% of the speed of light. This tells us that different types of particles travel through medium densities non-proportionally. A case in point would be that of the pressure wave of sound; the more dense the medium the faster it travels, however the same cannot be said for electron wave propagating through metal. Electrons do not travel faster through the denser metals than they do through some of the lighter ones. And we have found that light particles/waves tend to be indifferent to the density of a transparent medium almost all together.

Over the years this has lead us to the observation that both mass and energy particles are comprised of energy, but in the universal laws of dynamics and motion they are treated as one and the same; however the same laws of motion that holds true for energy particles and/or waves do not always apply to particles of mass. According to the authors' theories the only particle that universally affects the motion of mass is the graviton.

It has been theorized that as matter accelerates it increases in mass, so much so that it has been theorized that as the speed of matter approaches that of the speed of light its corresponding mass becomes infinite. According to the authors' theories this holds true. According to the authors' theories that when an accelerating force is applied to an object of mass a pressure gradient of localized gravitons builds up in front of the mass resisting its acceleration based on the density of the mass being accelerating [Newton's first law of motion]. The denser the mass the greater the pressure gradient in front of it becomes. (Please refer to the eddy flow simulation made referenced to in section IX.)

Since gravitons are restricted to the same velocity limits as all other particles in the universe (e.g. photons) it cannot travel faster than the speed of light through the average pressure gradient of the void. It is this same pressure gradient that restricts the density of the graviton particles surrounding mass. Like a shock wave building in front of a rapidly moving object through the air, the pressure wave of gravitons would gain in severity as the speed of the object increases. However, unlike a shock wave formed in a gas, a shock wave made in front of an object of mass comprised of gravitons cannot be surpassed (gravitons pass through an object for the most part, not around it*). At or near the speed of light the density wave in front of a moving would almost be infinite in ambient void energy pressure.

*Authors' note: This same postulate has lead the author to form several more hypothesis about the nature of gravitons in relation to objects of mass experiencing an accelerating force. While I am unsure whether or not gravitons pass through, are bumped through or have a tendency to 'slip' around an accelerating object of mass, I do theorize that at some velocity they can do none of these actions because of the constraining force of localized graviton density and void energy pressure around the object being accelerated. After the accelerating force is removed, and at some relative terminal velocity the gravitons in front of the moving object of mass will remain in front of that object and if the accelerating force is removed Newton's first law of motion will not apply; the object of mass will begin to decrease in velocity until the gravitons surrounding the object can pass through or slip around without resistance due to a corresponding build up in the localized void energy pressure.

The author speculates that Newton's first law of motion may be logarithmic in applicability when it comes to an object in motion tending to stay in motion. The authors speculates that at very low velocities this law of motion would be true, however at much higher percentages of *C* (the speed of light) the field of gravitons surrounding a moving object of mass should begin to experience resistance (a decelerating force) against the

localized void pressure and graviton density gradients even when it is no longer under the influence of an accelerating force.

The author theorizes that if gravitons were physically moved from one side of an object of mass *around* the same object of mass, and ejected on the other side of that object of mass, several different laws of physics would begin to influence that object of mass.

There would form a pressure/density gradient on opposing sides of the object of mass and the mass would be accelerated towards the area of lower pressure at or near the same rate that the gravitons were being relocated. The average pressure/density of the universe would attempt to keep the average graviton density and void pressure equalized in the local space surrounding the object of mass. Accordingly, Newton's first law of motion would not apply as the object of mass would not experience the density increase/decrease of gravitons in its forward motion; according to the authors' theories the object of mass would not experience momentum while being accelerated in such a fashion.

According to the authors' theories as the localized density population of gravitons decreases so does the void energy pressure, and it is this density-pressure relationship that restricts all particles going thorough it faster than the speed of light (*C*). Theoretically if you lower this pressure density ratio of gravitons to void energy enough an object of mass can travel faster than normally possible in localized space, up to and faster than *C*.

In previous work the author has referred to this as a Relative Superluminal Drive in that as far as the object of mass is concerned it is not traveling in localized space any faster than this object of mass (vehicle) can transfer gravitons from the forward side to the aft side of the vehicle. However as the vehicle travels from point A in space to point B in space, all the while being observed and measured from a third separate perspective, the object of mass will be traversing between points A and B at a much faster velocity than indicated within the confines of the vehicle and the localized space around it. To which, it is theoretically possible within the constraints of this unifying theory

to go between two fixed points in space much faster than *C*.

A good analogy to this hypothesis is that of the supercavitation (supercavity) drive. In the 1960's the Russian navy began to develop a way to convert liquid water to gaseous water [vapor] in front of a torpedo while being thrust forward. Over the years this technology has allowed the Russian and the US Navy to develop torpedoes that can travel much faster under water than ever previously imagined. To date the author has seen evidence that a number of scientists are working on submersible vehicles that can travel underwater at speeds in excess of 100 mph. Science has proven that the theory of a supercavity drive is valid one: if you lower the form drag of a medium that is caused by the pressure interference of that medium on a moving vehicle from in front of that vehicle, that same said vehicle can travel faster though that medium. To which since the only resistance to the motion of a graviton are other gravitons in its path then there is no theoretical speed limit to a graviton in a void energy pressure gradient approaching zero.

In summary many of the factual predictions and futuristic science fiction-based predictions concerning the physics of the universe are based on gravitational mechanics and how they affect matter in our physical universe. By simplifying the gravitational mechanics of the universe, and eliminating all of the theoretical that is not based in observed phenomena, the author found that many of the predictions and observations can be accounted for in the authors' theories governing these same mechanics on both a macro-scale and a micro-scale.
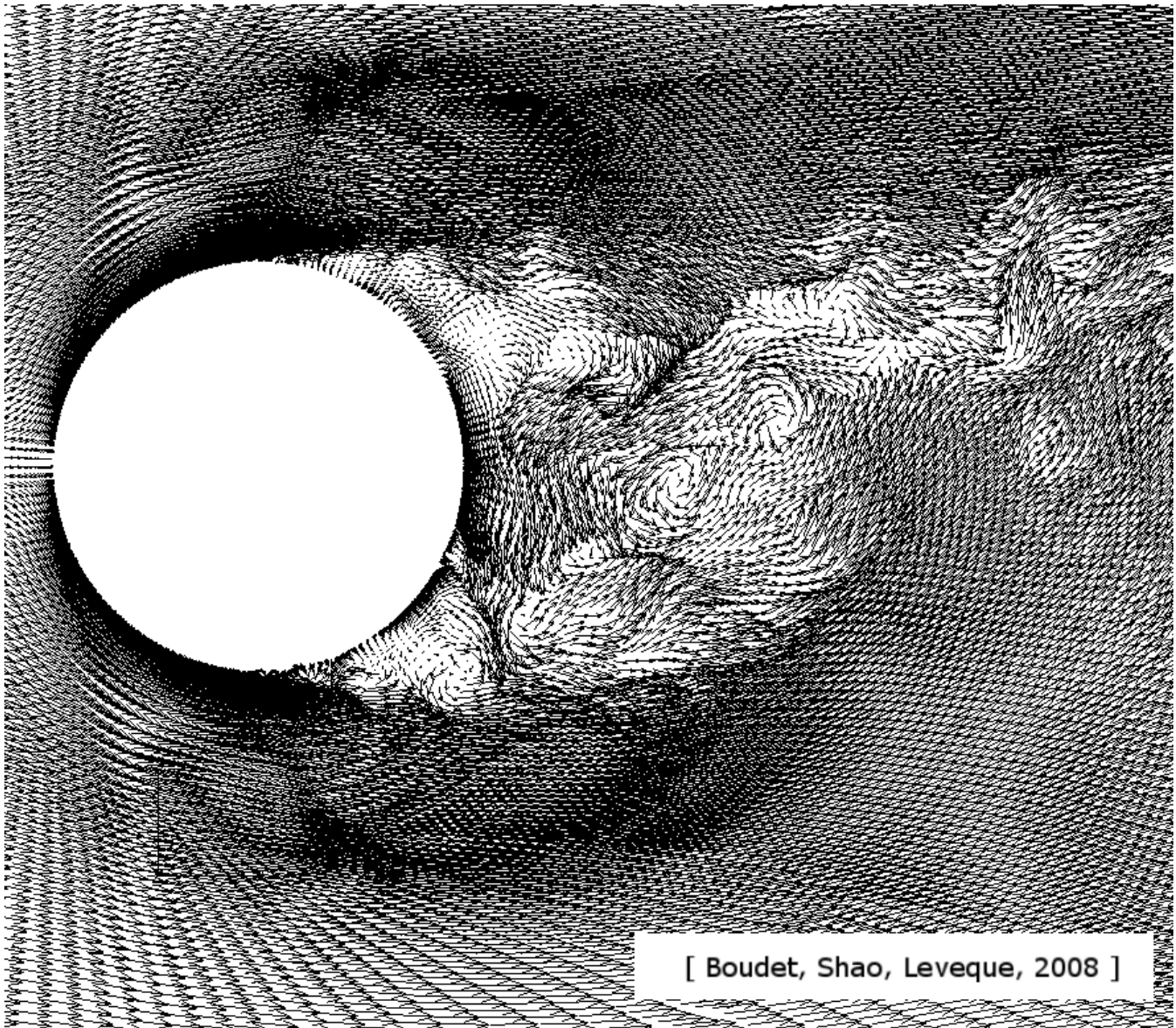
XV.   Acknowledgment

Figure 2; A large-eddy simulation of the flow past a cylinder in the sub-critical turbulent regime at Re=47000 (SISM in the Turb'Flow solver). [4]

[Boudet, Shao, Leveque, 2008]

References

[1] APS News, December 2005 (Volume 14, Number 11)

[2] Kelly, D. (1994) The Art of Reasoning. W W Norton & Company, Inc. ISBN 0-393-96466-3

[3] Merriam-Webster Dictionary, definitions: "gravity", www.merriam-webster.com; September 2015

[4] CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE; Emmanuel Lévêque's Website; http://perso.ens-lyon.fr/emmanuel.leveque/research.php; Turbulence in Fluids.

[5] The Theory of Antigravity; H. Aspden; Physical Essays; APS volume 4, number 1, 1991

[6] H. Hayasaka and S. Tackeuchi, Phys. Rev. I.ell. 63, 2701 (1989).

[7] "Buckau Flettner Rotor Ship LOC 37764u"