Neomechanical Gravitation Theory

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This paper proposes that gravity is caused by the actions of non-isotropic, heterogeneous distributions of aether particles throughout the universe. The Gravitational Pressure Gradient of a massive body describes these divergent aether distributions. The activity and density of free aether particles are greatest in the so-called vacuum of intergalactic space; they are least where the density of baryonic matter is greatest. This gradient is analogous to the atmospheric pressure gradient that surrounds Earth, but in reverse. Aethereal pressure increases with distance from the center of Earth just as it does for all celestial vortices. Ordinary baryonic matter consists of aether complexes that limit the free motion of aether particles, displacing them and producing what is, in effect, a sort of vacuum for aether. In addition to displacement, neomechanical interactions involving the absorption and emission of motion cause decreases in the activity of proximal aether, resulting in the pressure gradient. The result is that gravitation is a universal, but local, phenomenon. This proposal is consistent with the assumption of infinity, which underlies neomechanics and the belief that there are no true pulls in nature, as recognized in Newton's laws of motion. It avoids the problems of non-local causes of gravitation conjectured by Le Sage. The layering produced by a rapidly rotating celestial vortex during its early evolution pushes baryonic matter toward its axis. Satellites stay in orbit because distal aether pressure is greater than proximal aether pressure. The theory also predicts that the velocity of light is a function of aether density, in tune with gravitational and galactic redshift measurements.

1. Introduction

The physical cause of gravitation has remained a mystery for more than three centuries after Isaac Newton described the phenomenon mathematically. There have been countless proposals by those not satisfied with Newton's attraction and Einstein's curved empty space. We found both concepts fail simply because they are founded on a philosophical error: the assumption of finity. The opposing assumption, *infinity*, is absolutely critical for discovering the mechanical cause of gravitation and how the universe operates [1, 2, 3]. There could be no physical theory of gravitation as long as we believed that elementary particles could exist and that the universe was finite.

This paper, of course, only summarizes the detailed theory of gravitation presented in our recent book [3]. First, we show how fundamentals of gravitation and formation of baryonic matter are actually complimentary processes. Second, we continue in that vein to combine fractal, hierarchal, and vortex theories in applications ranging from the infinitely small to the infinitely large.

Classical mechanics assumes that the universe presents us with two fundamental phenomena: matter and the motion of matter. Matter exists; motion occurs. Matter, that is, anything in existence, has *xyz* dimensions and location. Motion is not *part* of the universe; it is what those parts do. Universal time is the motion of all things with respect to all other things in the universe.

Although our view of the universe as matter in motion is simple, it is opposed by indeterminists who believe that there must be "something" else. However, if one is careful with one's definitions, each "something" must be matter, that is, it must have *xyz* dimensions and location with respect to other things. There is no "something" that does not have *xyz* dimensions and location with respect to other things. In the infinite universe matter always contains and is surrounded by other matter.

2. Definitions

- **Determinism**: The belief that all effects have mechanical causes.
- **Indeterminism**: The belief that some effects may not have mechanical causes. Gravitational field theory is an example.
- **Microcosm**: A portion of the universe. All things are microcosms. Microcosm replaces the need to use the concept of a system or object.
- **Macrocosm**: The portion of the universe that resides outside of a particular microcosm. The entire universe equals a particular microcosm plus its macrocosm.
- **Univironment**: The composition and properties of a particular microcosm and its macrocosm, at a particular moment.

3. Assumptions

An analysis of philosophically laden theories such as those involving gravity must be founded on clearly stated fundamental assumptions. According to Collingwood [4], fundamental assumptions have two primary characteristics: 1) they always have opposites and 2) they never can be completely proven. If one posits more than one fundamental assumption, there is an additional criterion: 3) both must be consupponible. That is, if you assume one, you must be able to assume the other without contradiction. The foundation of our theory of gravity is based on **The Ten Assumptions of Science** [1], which is the philosophical foundation for **The Scientific Worldview** [2]. For the present work, we put special emphasis on six of the ten assumptions:

- **Assumption 4: Inseparability** - Just as there can be no motion without matter, so there can be no matter without motion.
- **Assumption 5: Conservation** - Matter and the motion of matter neither can be created nor destroyed.

- **Assumption 6: Complementarity** - All things are subject to divergence and convergence from other things.
- **Assumption 8: Infinity** - The universe is infinite, both in the microscopic and the macroscopic directions.
- **Assumption 9: Relativism** - All things have characteristics that make them similar to all other things as well as characteristics that make them dissimilar to all other things.
- **Assumption 10: Interconnection** - All things are interconnected, that is, between any two objects exist other objects that transmit matter and motion.

Assumptions 4 and 5 may seem quite obvious, although they are powerful antidotes to the more outrageous claims involving "action at a distance" and "curved space-time" that are sometimes considered to be universal causes of gravitation. For us, a cause is described by Newton's Second Law of Motion, F=ma, whereby one microcosm influences the motion of another upon contact. Assumptions 6, 8, 9, and 10 are critical to this analysis.

4. Neomechanics vs. Mechanics

Classical mechanics was an outgrowth of atomism, the belief that the universe consisted of tiny elementary particles that the Greeks called atoms. Today's physicists, conventional as well as dissidents, continue in that vein with a wide variety of theories hypothesizing elementary particles that supposedly are the constituents of all masses. With regard to gravitation, there is a special problem posed by finite particles such as the atom and the boson. The rules require all elementary particles to be identical, for if they were not, they would have to contain still other particles. That is where neomechanics comes in, first proposed by Borchardt in 2007 [2].

With its assumption of *infinity*, neomechanics cannot have an elementary particle with nothing inside itself. Neither can it have a universe with nothing outside itself. Most of the equations of classical mechanics apply to neomechanics, except for an important caveat: each is only an approximation. There are no true constants in neomechanics. In neomechanics, Newton's "finite object" becomes Borchardt's "microcosm," a portion of the universe that always contains an infinite number of submicrocosms surrounded by a "macrocosm" that contains an infinite number of supermicrocosms. This inclusion of *infinity* is the all-important difference between neomechanics and classical mechanics. In neomechanics, interactions between any two microcosms do not merely involve the acceleration of one and the deceleration of the other. Instead, in all contacts some of the motion of microcosm A is absorbed internally by both microcosm A and microcosm B. Thus, both the hammer and the nail transfer internal motion (heat) upon impact. This occurs because each contains submicrocosms capable of being accelerated. We assume this holds true for all portions of the universe, from the infinitely small to the infinitely large.

5. Gravitation and the Formation of Matter

In the infinite hierarchy, whatever we call "matter" must be produced from other matter [5]. If matter is truly infinitely divisible, as we assume, then there will always be a lower limit for detecting the sub-components of measurable matter. That is, at some point we will not see it, taste it, feel it, hear it, or detect it in any other way. Thus in our book we do not have one aether, but an infinite series, with each one being a complex formed from still smaller particles. NOTE: THIS IS DIFFERENT FROM ALL OTHER GRAVITY THEORIES. To explain how these complexes form, we can never start at the "beginning," for in an infinite regress, there is none. Nevertheless, we can start at some convenient point.

Here we start with our neomechanical theory of aether and how it causes gravitation. In addition to being the medium for the motion we call gravitation, we also hypothesize that it is the medium for the transmission of the motion we call light. First, we must imagine that "empty space" throughout the infinite universe contains an infinite number of aether microcosms, which, like all microcosms, are continually in motion. Second, in addition to following our *infinity* assumption, each of these microcosms must follow the Ninth Assumption of Science, *relativism* [1]. It is our claim that without the properties described by these two assumptions (which really imply each other), the universe could not exist.

Infinity and *relativism* allow us to understand the formation of ordinary baryonic matter and the occurrence of gravitation in ways that were impossible for atomism, classical mechanics, and relativity. The opposing assumptions, finity and absolutism, not only allowed for perfectly empty space, but they required all "atoms" or finite particles of whatever stripe to be identical. These "partless parts" could bounce around the universe forever per Newton's laws of motion, but they had no reason to form bonds or produce gravitation. A finite universe ruled by absolutism could not exist.
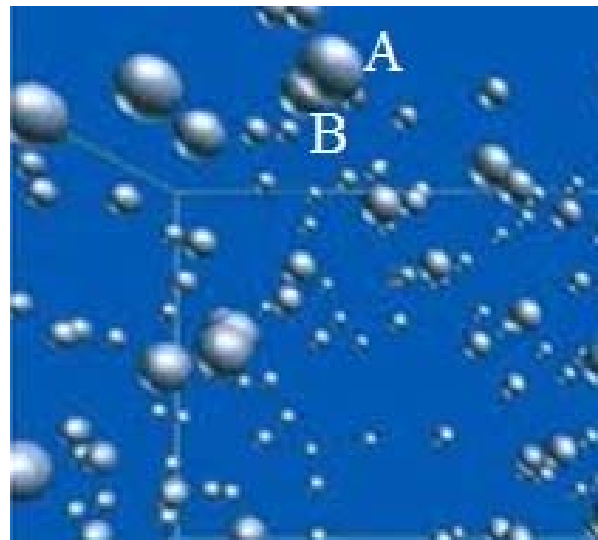

Fig. 1. Illustration of aether bonding in which large, slow particles are pushed together by small, fast particles (modified from [7]).

In an infinite universe, every microcosm is unique, in tune with *relativism*. Therefore, the existence of two aether particles with disparate properties is assured. Fig. 1 illustrates a group of similar, yet unique particles. One of these particles, A, invariably will be larger and/or slower than others. Now, trillions of aether particles are continually colliding with each other, pushing each other around at velocities perhaps as high as *c* or greater. Any aether particle, B, pushed near a slightly larger particle, however, will experience fewer impacts from the side facing the larger par-

ticle—as in the shadowing effect hypothesized in the Le Sage theory of gravitation [6]. In addition, aether particle B invariably will receive a more momentous impact from either left or right, causing it to rotate counter clockwise or clockwise around aether particle A.

This is the essence of both bonding and gravitation. Bonds develop from the stability produced by the restricted movement inherent in extra large microcosms. For a slightly smaller microcosm, simply being near such a large microcosm provides a refuge from some of the incessant impacts of other aether particles. In other words, the AB combination is relatively less active than A or B separately. Furthermore, its velocity will be less than that of the vast majority of trillions of free aether particles not so encumbered. In this way, nature bonds aether particles into ordinary baryonic matter. This is similar to every other reaction in the universe in which already existing, highly active small things combine to produce new, less active large things.

Still other, somewhat sluggish aether particles might join the new refuge from macrocosmic impacts by forming combinations otherwise known to us as baryonic matter. The result is a universe divided into two parts: highly active free aether and less active complexed aether. We see the univironmental interactions between these two parts as the process we call gravitation. Coming sections describe in more detail why these descriptions of gravitation and bonding only make sense after adopting the assumption of *infinity*. If one believes in the idealistic view of empty space, then the preceding section will never make sense. After rejecting empty space, the reader must then think through the consequences of infinitely divisible matter. Later topics in this paper help with this new way of thinking about matter and motion.

The details concerning gravitation all involve relative differences in activity. For instance, even the AB combination actually has two parts to it. "A" has more mass than "B." This means that impacts on A are less effective agents of change than impacts on B. One low angle impact from an especially high momentum aether particle could make B rotate around the more sluggish A. Like the fundamental process we are describing, this tendency of low-mass microcosms to rotate around high-mass microcosms occurs throughout the infinite hierarchy. In other words, it is simply easier for small microcosms to move other small microcosms than it is for them to move large ones.

6. Vortex Formation

Based on our assumptions of *relativism* and *infinity,* if the process described in the preceding section occurs once at any scale of the universe, it will occur again at all other scales –wherever similar univironmental conditions exist. One of the early products of aether complexification is hydrogen—the simplest atom. It is the most prevalent element detected by humans, constituting 75% of the baryonic matter in the known universe. For instance, huge clouds of hydrogen atoms provide the building blocks for stars and gas-giant planets. The fact that they form clouds at all is due to their interactions with the macrocosm. Once again, based on *relativism*, each cloud of hydrogen atoms will always be unique from every other hydrogen cloud that formed in the past or will form in the future. Each cloud, like all microcosms in the uni-

verse, is different, having a particular mass, direction, and velocity. Like all microcosms in the infinite universe, these relatively stable clouds of complexed aether eventually encounter a portion of the macrocosm that is different. That could be an already existing celestial body, another cloud, or a countervailing aether wind. An inevitably glancing collision with that other portion of the infinite universe may cause the cloud to rotate. Rotation is the key to the next step in atomic evolution.

As it rotates, the velocities of the microcosms within the cloud initially remain unchanged even though they become directed in a circle around a central point. This forms a free vortex with the tangential velocities of the inner regions initially being the same as the tangential velocities of the outer regions. This means that the angular velocity of the core will be greater than that of the periphery. Eventually, the inevitable shear between inner and outer regions causes the angular velocities of the inner and outer regions to become identical. The vortex rotates as if it were a solid disc, a forced vortex.

The progression from free to forced vortex aids in the development of baryonic matter by further slowing aether complexes, especially in the central region of the vortex. Of course, that is what the formation of baryonic matter is all about: the slowing and accumulation of aether particles to form new aether complexes. Positivists, who do not believe in aether, might erroneously call this the conversion of motion into matter. Einstein's followers might call it the magical conversion of "energy" into mass. Our deterministic assumptions of *inseparability* and *conservation*, however, prevent us from arriving at those theoretical dead ends. We simply describe the transformation of one kind of matter in motion into another kind of matter in motion in a universe characterized by microcosmic and macrocosmic infinity.

Early on, Descartes recognized the importance of vortices in gravitation. His theory prevailed until Newton's model gradually replaced it between 1690 and 1750. But Descartes, like Newton and Einstein, failed to recognize the connection between gravitation and the formation of matter. All used the now-indeterministic assumptions of finity and separability. Descartes' reliance on elementary particles (primary matter) and its rigid, unchanging structure led to the downfall of vortex theory in elucidating gravitation. Traditional aether theories suffered the same fate, and for the same reason: the assumption of finity. Le Sage came closest, perhaps, but the shadowing effect was itself a contradiction of his insistence that the pushers were everywhere isotropic. Not only that, but the pushers were finite and extra-universally derived. Likewise, because it has been discredited [8], Einstein's philosophy of curved space-time should be completely discarded. At the most, it might be considered a kind of vortex theory of gravity without the actual vortex.

Again, vortex formation is critical for forming larger and larger aether complexes from free aether particles. First, the rotation distinguishes one portion of the universe from its otherwise nondescript surroundings. Second, the inevitable shearing within the vortex decreases the tangential velocity of submicrocosms near the axis. As implied previously, any process that slows aether particles aids in the formation of aether complexes, which ultimately end up being the elements of baryonic matter. Third, the highly active aether particles within the macrocosm of the vortex produce impacts that are disproportionately greater on

the side of the microcosm facing the macrocosm. The imbalances cause aethereal pressures to be greater at more distant radii. This produces the gravitational effect that pushes the large, dense matter together at the center of the vortex, further aiding the complexification process through an increase in juxtaposition (Fig. 2). In a vortex, the effect intensifies as the density and mass of the core increases. Any decrease in the diameter of the vortex increases its period, just as skaters spin faster when they drop their arms, conserving their angular momentum.
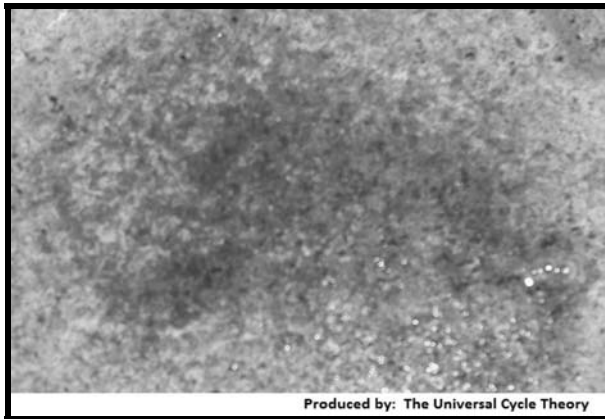
Fig. 2a. Sand and pepper before rotation of the water.
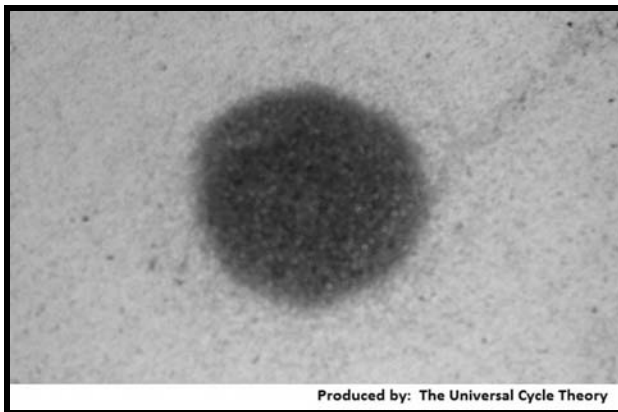
Fig. 2b. Sand and pepper after rotation of the water.

Thus, vortex motion performs two major functions: 1) It brings microcosms together, forming still larger microcosms and 2) these microcosms shadow each other, causing all of them to be subjected to fewer impacts from the highly active free microcosms in the macrocosm. From atoms to galaxies, the nuclei of microcosms become more massive with rotation. Although vortex motion is not required for gravitation, it gives a tremendous assist toward the accumulation of complexed aether. In short, rapid rotation at the beginning of their lives causes celestial microcosms to accrete matter; slowing rotation at the end of their lives causes celestial microcosms to excrete matter.

7. Vortex Dynamics

From the electron [5] to the Local Mega-Vortex [3], vortices dominate the structures and the motions within the infinite universe. We should learn all we can about them. The place to start is our new book "Universal Cycle Theory: Neomechanics of the Hierarchically Infinite Universe" [3]. The rest of this paper will only touch on the highlights significant for gravitational theory.

8. Gravitational Pressure Gradient

After developing the Neomechanical Theory of Gravitation independently, we learned from Duncan Shaw that Newton had the basic idea over 300 years ago (Fig. 3). This was startling to us because we were taught that Newton favored "attraction" and opposed hypothetical speculation. We now wonder why physicists favored imagined pullers over the imagined pushers that at least were more consistent with Newton's laws of motion. What he essentially proposed was our Gravitational Pressure Gradient, which we had devised as an inverse function of mass density.

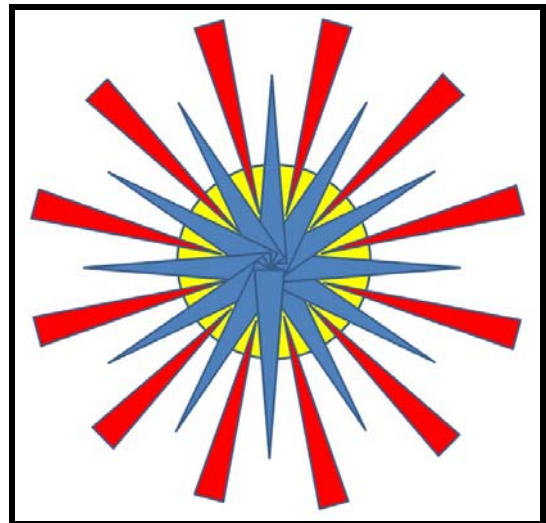**Fig. 3.** Newton's unadvertised mechanism for gravitation [9].

Fig. 4. Aether density (red) increases, while baryonic matter density (blue) decreases with distance from the center of a vortex.

The essence of neomechanical gravitational theory is that free aether exists wherever baryonic matter (complexed aether) does not. If you plotted aether activity (pressure or density) around any massive body, the distribution of aether and the distribution of baryonic matter would look like Fig. 4.

For Earth, we could use the colors of the spectrum to illustrate the Gravitational Pressure Gradient (Fig. 5). As with all vortices, the solid/gas ratio decreases with distance from the axis. The abrupt boundaries reflect changes of state such as the transition from solid to liquid or liquid to gas.
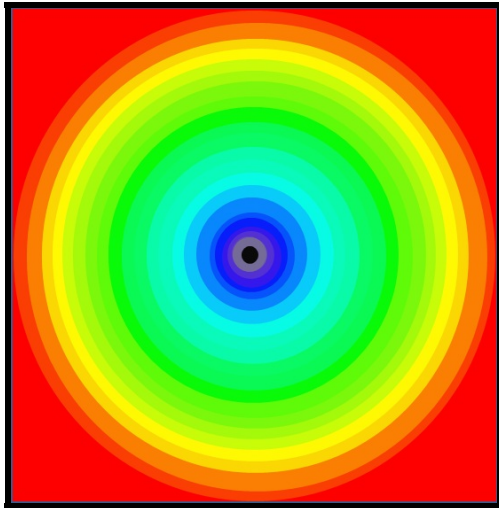

Fig. 5. Aether density (red) increases, while baryonic matter density (blue) decreases with distance from the center of Earth.

9. Total-Mass Equation

The supposition that "aether is where baryonic matter is not" is stated mathematically in Eq. (1). Once the assumptions of *infinity* and *interconnection* are accepted as true, then the total-mass equation naturally follows. The total-mass equation uses the following parameters:

m_m = **Measurable Mass** within a specified volume, g/cm^3

m_{im} = **Immeasurable Mass** within a specified volume, g/cm^3

m_t = **Total-Mass** within a specified volume, g/cm^3

$$m_t \rightarrow \lim(\infty) = m_m + m_{im} \qquad (1)$$

Initially, some might resist the idea that matter contains immeasurable components along with measurable components, but that is exactly what we propose. Newton partially agreed. Likewise, the idea that total-mass approaches infinity for every region of the universe might seem unimaginable. Yet, the assumptions of *infinity* and *interconnection* imply exactly that. Think about it. Between any two objects there exist other objects that transmit matter and motion. This type of *interconnection* continues into infinity. There has never been a single case in which that has not been true for measurable masses, and here we assume it is true for immeasurable masses as well. Empty space, like solid matter, is an idealization with no more chance of being real than Plato's ideal forms.

The beauty of the total-mass concept is that it identifies the material pushers needed to explain the gravitational motions of atoms, stars, galaxies, and all other microcosms. Microcosms endlessly collide against other microcosms to cause gravitation at every level of the infinite hierarchy. In essence, all pushers have other pushers in an infinite hierarchy.

For these reasons, we postulate that Eq. (1) mathematically describes the state of the universe everywhere. This equation

forces us to conclude that various combinations of solid-matter and gaseous-matter fill all regions of the universe with enormous concentrations. As a corollary, we conclude that regions of the universe full of solid-matter contain limited quantities of gaseous-matter, and vice versa. Based on these views, it becomes readily apparent that every microcosm moves through the universe by pushing an equal mass of other microcosms out of the way. All motions balance with offsetting motions per the assumption of *complementarity*. That is, all things are subject to divergence and convergence from other things.

10. Gravitation as a Local Phenomenon

From the above, it becomes clear that gravitation is not only universal, it is also local. Every microcosm in the universe is surrounded by and penetrated by continually changing combinations of infinitely divisible components of matter. As a specific case, some aether particles are trapped in complexes—called ordinary baryonic matter. Other aether particles remain free floating. They provide the mechanical cause of gravitation. As such, we need not hypothesize gravitons or some other finite particle from afar as the perpetrator of the push that is gravitation. We do not need to speculate that the moon's known lack of gravitational aberration requires particles that travel at 100,000 times the speed of light—the velocities of free aether particles need not be greater than *c*.

Satellites stay in orbit because they are part of an immense vortex, which, like all vortices, operates at the behest of a medium: aether. It forms a kind of curved space like Einstein suspected, but it is not really empty space like he claimed. The Gravitational Pressure Gradient is a function of distance from the axis of the vortex that it circulates.

11. Light Velocity a Function of Aether Density

Although our theory implies that there are an infinite number of smaller and smaller constituting aethers, we believe that the same aether particles that cause gravitation also transmit light and electricity. The theory also predicts that the velocity of light is a function of aether density, in tune with gravitational and galactic redshift measurements. In general, the velocity of wave motion tends to increase with the density of the medium. Sound, for instance, travels at 343 m/s in air, but at 5,120 m/s in iron. This presumably happens because the average particle-to-particle distance decreases as the density of the transmitting medium increases. Based on neomechanical theory, light waves move by the same mechanics as sound waves, with only the medium being different. Sound waves propagate through a molecular medium, while light waves propagate through an aether medium. The reason that light waves travel slower in water than they do in air is because the aether medium is rarer in water than it is in air. According to neomechanics, this occurs because the baryonic composition of water displaces aether in greater proportions than air does. Hence, the aether density in air is greater than the aether density in water. In addition, water molecules interfere with light transmission, lengthening the light path. Consequently, light travels faster in air than water, following the same transmission rules as sound waves. We emphasize that the waves propagate via the same mechanics, only the medium differs.

12. Aethereal Redshift

This means, of course, that light velocity must be greatest in the intergalactic regions where aether density is the greatest. Each light wave then occurs over a longer distance than it does in the solar system. We observe this as a galactic redshift commensurate with the distance traveled through such regions.

The aethereal redshift would be much less noticeable when part of the light path involves travel through a baryonic matter-laden region, such as a galaxy. In particular, the aethereal redshift would be less within the solar system or within the Milky Way. Nonetheless, because light velocity is a function of aether density, the aethereal redshift would be an inverse function of baryonic density. Light emitted from massive bodies would be redshifted merely because it was less and less encumbered by gravitationally held baryonic matter. Indeed, this so-called "gravitational redshift" is commonly observed in astronomy as one of the causes of the redshift in addition to the Doppler Effect.

In 1960, Pound and Rebka [10] demonstrated that EM waves traveling away from the surface of Earth were redshifted, while waves traveling toward the surface were blueshifted. They considered this a confirmation of Einstein's General Relativity Theory (GRT). To this day, GRT gets a confirmatory nod every time the light from a massive body appears redshifted [11]. We suppose one could imagine those little immaterial photons losing energy as they fought their way through the immaterial gravitational field. However, as Dowdy [8] clearly showed, gravity has no direct effect on light. According to neomechanical theory, the light bending claimed by Eddington [12] occurs simply because aether-density changes significantly within the Sun's corona. The intensifying aether density causes the light from distant stars to refract—similar to the way that the altered aether-density within a prism refracts light. Unfortunately for GRT, light from distant stars passing outside the corona is not bent even though it is well within the sun's gravitational influence [8]. The aethereal redshift and the misnamed "gravitational redshift" are one and the same.

13. Conclusion

1. Aether is the mechanical cause of gravitation.
2. Highly active aether forms less active aether complexes that we know as baryonic matter.
3. Rotation involving aether complexes promotes further complexification.
4. Resulting vortices produce layering conducive to solidification and stratification according to mass density.
5. Aether exists where baryonic matter does not as illustrated by the total-mass equation.
6. The activity, density, or pressure of aether increases with distance from massive bodies.
7. The resulting Gravitational Pressure Gradient surrounding each celestial body makes gravitation a local phenomenon.
8. Light velocity is a function of aether density.
9. An "aethereal redshift" occurs when light travels through intergalactic regions, where aether density is greatest, contributing to the galactic redshift.
10. An "aethereal redshift" occurs when light travels away from a massive body, a process misnamed "the gravitational redshift" by promoters of GRT.

11. An "aethereal blueshift" occurs when light travels toward a massive body as it encounters less dense aether.

This paper provides only a brief summary of some key elements of neomechanical gravitation. Unfortunately, an in-depth explanation goes well beyond the scope of this paper. For those seeking deeper explanations, our book [3] gives them. For example, it gives common sense explanations for several gravitational anomalies—explanations that the current lot of theories based on gravitational fields cannot provide.

14. Acknowledgements

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