A Theoretical Model of the Structure of Space Based on the Speed of Light

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Present mainstream physics has abandoned the concept of a carrier of light waves. This paper's intent is to restore the concept of a carrier by utilizing light speed as the foundation for defining the structure of such a carrier, which was commonly referred to in the 19th century as aether. By using established empirical and experimental data, it is possible to put forward an extremely powerful three-dimensional structure over which angular impulses (aka light, aka electromagnetism) can move in a wave distribution at a speed of ~300000 kilometers per second (c). Once the structure has been defined, proper understanding of the aether's dynamics makes it possible to move beyond the speed of light alone and encompass concepts of gravity, gravitational lensing, and origination of mass. Based on the structure of the medium as presented here, the model strongly supports a return to a mechanics-based physics in rejecting wave-particle duality while absorbing quantum theory.

1. Introduction

In the early 1500's, Nicolaus Copernicus created a manuscript of a new design of the solar system which put the sun at the center. For nearly 2000 years, the earth had held the central position of the Ptolemic system. Only when the Copernican model was finally accepted was it possible to move forward with newer concepts which would have not have been possible within the framework of an earth-centered system. Kepler's laws of planetary motion and Newton's law of gravity required that the sun be at the center, otherwise the formula as presented would have been illogical if not totally inconceivable within the Ptolemic earth-centered model. Present-day physics has adopted a model of space which is devoid of a carrier medium for light (electromagnetic) waves, accepting instead a "complementarian" model which describes light as both wave without a defined carrier and as a particle. Restoration of an aether, the 19th century name for the medium to act as a carrier for light waves, would enable physics to return to a mechanics-based model (cause and effect). By using the speed of light (c), a new dynamics-based structure for a light-wave carrier can be deduced, which would give physics such a model.

There is good reason to believe that all energy is motion. This means that heat, sound, chemical, microwave, light, radiant, electromagnetic, electrical, magnetic, radioactive, caloric, nuclear and any other designated form of energy are due to motion (volume displacement over time). As it is presently believed that mass is energy, then by logical extension, mass is motion or a gradient of motion or a "potential" to move as in a resistance to movement. Waves are a form of energy transfer (and therefore a transfer of motion), where –

Wave [1]
7. *Physics*
b. A disturbance traveling through a medium by which energy is transferred from one particle of the medium to another without causing any permanent displacement of the medium itself.

What is meant by disturbance? It is the transfer of some sort of motion (energy), or change in position of a structural object, which could be either a linear (volume) displacement or a rotational (surface area) displacement.

Empirical statement of electromagnetic energy qualities: Light energy moves in a symmetrically expanding wave pattern at an approximate speed of 3 x10^{10} centimeters per second in a vacuum, with an energy degradation proportional to 1/distance squared ($1/d^2$), with polarized (transverse) motion and with a quantized final transfer of energy.

The light energy (aka angular impulse) does not move as a particle, but as a torque impulse on aether medium particles and transfers energy as a quantized amount of movement ($I\omega$) onto a final receptor particle. Maxwell was quick to note that such a rotational energy transfer would require an "idler arm" character [2] in order for any torque to move in a forward direction or outward direction. It has been shown that light movement conforms to the definitional qualities of a wave which encompass reflection, refraction, and interference, which do not support a direct particle movement of light, as required by corpuscular theory or photon theory.

2. Objective

The objective is to devise a three-dimensional construct which allows for the movement of something at the speed of light. I am hesitant to say move light as it would appear that what light, aka electromagnetism, is still remains a mystery. This paper will use the premise that light is a wave transfer of energy in the form of angular impulses [3], much in the fashion of sound energy moving as waves of linear impulses over a medium of particles. By using standard mechanics of physics, it is possible to formulate such a model that would be capable of moving something such as an impulse at the speed of light while also conforming with the other known qualities of light such as energy decay per distance-squared and polarization with transverse wave propagation.

3. Analysis

With the above considerations in mind, in order to conform to the above requirements of movement for electromagnetic wave energy, the following hypothetical structure is proposed as the medium, classically known as aether. This medium must resemble a construct which exists as:

1. For any wave energy transfer of motion, there must exist a medium of some form of three-dimensional array of particles over which the wave motion (energy) can be transferred.
2. In any empty space, commonly referred to as a vacuum, where it is known that sound cannot be transmitted but light readily passes, there must exist some form of three-dimensional element to allow for energy movement known as electromagnetic waves to pass through this space.
3. The system's energy can be defined as total kinetic energy:

   Total Kinetic Energy (TKE) = total linear motion + total rotational motion

   $$TKE = \tfrac{1}{2}\, mv^2 + \tfrac{1}{2}\, I w^2 \qquad (1)$$

   Since sound wave energy has been shown to be linear impulse (mv) and since no sound is present (mv = 0) in the above empty space through which light may pass, the formula reduces to

   $$TKE = \tfrac{1}{2}\, I w^2 \text{ where } \tfrac{1}{2}\,(mv)\, v = 0 \qquad (2)$$

4. Therefore, light must be equivalent to an angular impulse (Iw). TKE = ½ (Iw) w, where the impulse (Iw) moves at an angular velocity. w must be proportional to the speed of light c, and linear velocity v = 2$\pi r w$. Then a photon is an angular impulse transferred on a particle; a photon is not a particle (it does not have any spatial volume itself but changes the volume position of a particle as does all motion (energy)).
5. The only three-dimensional object capable of a meaningful rendering the above parameters of light as noted in the introduction is a sphere. Therefore:

   $$TKE = \tfrac{1}{2}\, I w^2 = \tfrac{1}{2}\,(\tfrac{2}{5}\, mr^2) w^2 = \tfrac{1}{5}\, mr^2 w^2 \qquad (3)$$

   where moment of inertia of a solid sphere, I = $\frac{2}{5}$ mr^2. The author acknowledges that a different Moment of inertia may need to be considered, such as a hollow sphere ($\frac{2}{3}$ mr^2), solid disc (mr^2/4), wire disc (mr^2/2), or partial moment of a sphere, since the contact point is not on the equatorial axis.
6. Electron size, proton central core sphere, and aether sphere size are identical in spatial displacement size (not mass), and based on Planck's constant, h, it can be shown that a reasonable radius of the aether sphere is approximately 2.23x10^{-14} cm. where Planck's constant, h = Surface Area of a sphere. [h = 4πr^2]. Then light energy moving through a vacuum at linear speed of c would be proportional to v = 2$\pi r w$ which gives an approximate angular velocity of 2.91x10^{23} rotations per second. Since the only structure which would not self destruct while maintaining symmetry and speed would be a matrix of body-centered spheres, the actual contact point of speed transfer would be at an angle of approximately 35.26 degrees. At this angle, the length of the segment at the contact point between spheres would be approximately 2.57x10^{-14} cm and one rotation would move through four segments or 1.03x10^{-13} cm.

$$c = 1.03\text{x}10^{-13} \times 2.91\text{x}10^{23} = 2.997\text{x}10^{10} \text{ cm/sec}$$

With the above considerations in mind, in order to conform to the above requirements of movement for electromagnetic wave energy, the following hypothetical structure is proposed as the medium, classically known as aether. This medium must resemble a construct which exists as:

4. Quantum Aether Hypothesis

Aether - A contiguous structure of body-centered identical spheres of approximate radius of 2.23x10^{-14} cm. Alternating layers exhibit opposite spin at an approximate rotational speed of 2.91x10^{23} rotations per second and have an effective mass of zero in pure aether. It occupies all space and all particles which occupy space, which are a subset of modified aether. It readily transfers light wave energy (angular impulses). Contiguous denotes the direct contact, "solid state", of adjacent spheres to allow for transverse movement of light on the aether matrix.

5. Discussion

Quantum aether theory strongly supports the concept that all spheres are the same volume and are essentially the building blocks (spheres) of all structures of the universe. This means the electron, the positron and central core spheres of neutrons and protons are all the same size. The size suggested in this paper is reasonable when considering sizes calculated from earlier measurements. Max Born [4] used Millikan's measurement of electron charge, e, to arrive at an electron radius of 1.88E-13 cm.

Classical resting electron radius has been calculated to be on the order of 2.8E-13 cm. [5] Recent experiments on proton core have given radius approximations from 0.21 to 0.89 femtometers (10E-15 meters) [2.1 to 8.9E-14 centimeters] and 2.10553 x 10-16 meter [6]. Again from Einstein's Theory of Relativity, Born calculates the proton nuclear core as having a radius of 1.5E-14 cm. [7]. Whatever it turns out to be, it can be understood logically that this is the smallest indivisible particle in the universe and all of these spheres would have the same spatial displacement volume: electron, positron, proton center core sphere(s), and the neutron center core sphere(s). And these have a fixed volume value which is total displacement in space and can never be less than one sphere volume, a function of the Pauli Exclusion Principle. So why do many think that electrons are sometimes waves? This is a misinterpretation of an experimental result due to a lack of understanding of experimental limits created by the belief that aether did not exist. If one shoots particles with no medium present (which was believed to be the case for a vacuum) then one has no reason to assume that the observed waves were anything other than the particles being shot into it. But when shooting anything in aether, especially particles which are the same or greater size than the aether spheres, there is going to be a ripple effect (a wave). The classic experiment, to which the writer is referring, is the double slit experiment, described by John Horgan in The End of Science:

> "When electrons are aimed at a barrier containing two slits, the electrons act like waves; they go through both slits at once and form what is called an interference pattern, created by the overlapping of the waves, when they strike a

detector on the far side of the barrier. If the physicist closes off one slit at a time, however, the electrons pass through the open slit like simple particles and the interference pattern disappears." Wheeler tried to add a "delayed-choice where the experimenter decides whether to leave both slits open or to close one off after the electrons have already passed through the barrier—with the same results. The electrons seem to know in advance how the physicist will choose to observe them. [8]

Under quantum aether theory, the physicist is firing the electrons in a medium which propagates the wave at the speed of light. So unless the scientist's choice is faster than the speed of light or unless the electrons are being fired at the speed of light, whenever there are two slits open, there will *always be a wave interference pattern*. The electron could even miss the slit or be fired parallel to the slits or one could fire any other particle like a BB shot and a wave interference pattern still would occur as long as two slits were open. Movement of the electron will make a wave in the aether, as does anything which moves within it. Even experiments firing electrons in a vacuum at a blank wall detector are believed to show the "wave" pattern of electrons, until one realizes that the vacuum is not empty, it is full of aether spheres of the same size as electrons which act to deflect the electrons in a fixed pattern, most likely identical to a body-centered structural design seen by X-ray diffraction pattern. Electrons are particles and at all times. But as a particle, the electron can and does carry wave motion in various energy states which helps to explain its magnetic moment as it moves through the aether and therefore is likely to transmit wave information to the aether on frequent occasions, but its spatial volume displacement can never be less than one sphere volume.

Due to the direct contact of the spheres, the structure as presented here would act like a "solid" as a necessary prerequisite for moving transverse waves, but would function as a super fluid due to its elastic qualities. As a body-centered matrix of spheres, over 31 per cent of its space appears to be "empty" and as such available for extreme plasticity at the speed of light as objects move through it. One of the arguments against an aether in the 19th century was the unlikelihood of planets to be able to move through such a substance without some sort of slowing effect. It is fairly clear now that a movement effect does occur and is known as the earth's magnetosphere, which could be reasonably explained by the presence of the aether.

While the purest spin aether would only exist in deep space between galaxies, the aether matrix appears to be embedded in virtually all space including all massive objects. This was in fact Lorentz position on aether who writes:

> "Indeed, one of the most important of our fundamental assumptions must be that the ether not only occupies all space between molecules, atoms or electrons, but that it pervades all these particles. We shall add the hypothesis that, though the particles may move, the ether always remains at rest."[9] (The hypothesis presented in this paper would not agree to Lorentz's statement of the ether pervading electrons since in this theory, the electron is the SAME size as the aether sphere, and therefore would not have any "pervading particles" in the electron.)

The purest spin aether would likely be faster than what is presently held to be the maximum speed which transfers light at approximately 2.997x10 ^{8} m/sec. in a vacuum near the surface of earth. It is well known that the speed of light varies based on the compound in which the light is moving. It is clear that mass and gravity (which is the result of mass) slow light, which directly translates to slower aether spin velocity. This becomes very clear when one looks at what happens to light speed as we move from a vacuum (1), to air (1.000293), to water (1.333), to glass (1.50), and to carbon diamond (2.417). (Refractive Indices noted in parenthesis). With the radius of a sphere remaining constant at estimated 2.23E-14 cm, then

	m/sec		Rot/sec
Speed of light in vacuum	299792458	requires	2.910E+23
Air	299704645		2.909E+23
Water	224900569		2.184E+23
Glass	199861639		1.940E+23
Diamond	123932393		1.203E+23

As can be easily seen, the speed of the aether spin would be expected to be much higher away from the surface of earth or any massive object. This in turn would create a spin pressure gradient where an object in high space would be pushed toward the surface of a planet by such a differential in aether spin speed.

As acceleration is velocity over time, gravity variance could be proportional to the difference in the speed of light at high altitude versus the lower altitude spin speeds.

6. Gravity

Present physics explanation of the cause of gravity is that it is an action at a distance (between two particles with mass). Even the father of gravity, Sir Isaac Newton, did not accept this position, noting, 'that one body may act upon another at a distance through a vacuum, without the mediation of anything else,. . . . is to me so great an absurdity that I believe no man, who has in philosophical matters a competent faculty for thinking can ever fall into." [10] Newton proposed that "its (aether's) density varies from one body to another, being greatest in free interplanetary spaces,"[11] and "the density of the aether might vary from place to place, and that bodies might tend to move from the denser parts of the medium toward the rarer." [12] One has to be careful here in interpreting what exactly is meant by "density" which appears to apply to a volume gradient density, not a mass density. Since the aether spin is higher in the vacuum of space, this results in a greater volume (spin volume) density per unit of time which causes any massive object or substance which does not displace the same volume per unit of time to be pushed to an area of lower spin volume, the lowest being on the surface of the nearest planet.

$$F = ma = mg \quad \text{gravity} = \text{acceleration} = \frac{v}{t} = \frac{c}{t}$$

$$F(\text{near surface}) = mg_n$$
$$F(\text{above surface}) = mg_a$$

Assuming mass as a constant

$$\Delta F = F_a - F_n = mg_a - mg_n = m(g_a - g_n)$$

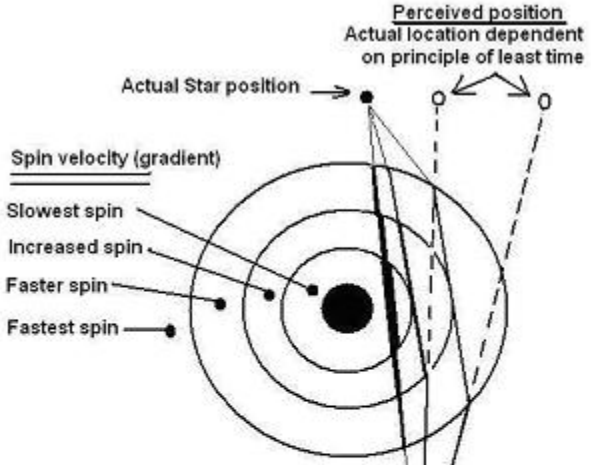
$$\frac{\Delta F}{m} = g_a - g_n = \frac{c_a - c_n}{t} =$$

Gravity gradient

Since the speed of light appears to be a function of aether spin velocity, then the speed of light high above the surface ($\mathbf{c}_a$) would be similar to vacuum speed and speed near the surface ($\mathbf{c}_n$) would be similar to air speed, then a gravity acceleration gradient of at least 87813 meters/sec/sec ((299792458 – 299704645)/time) would be active between these two positions.

7. Gravitational Lensing

In the mid 1600's, Fermat introduced the principle of least time for the movement of light rays, which described how **light travels the route which takes the least time** during reflection or refraction. This is an extremely important principle which comes into play when discussing the ability of gravity to 'bend' light waves. [13] Gravitational lensing then becomes a function of aether spin which means the general relativity concept of bending space becomes invalid. What does occur with the bending of light passing near massive objects is nothing less than putting Fermat's principle of least time into action.. Since light velocity is dependent on aether spin which is slower near the surface of mass, the path of light will "bend" around the entrained aether of a mass by moving to a level where it can transit space at the fastest line, which may not be the shortest or straightest line.



Aether spin velocity increases as one moves away from the center of mass = faster speed of light transfer. Light will follow the route of least time in preference to least distance and (in this example) star image will appear shifted to right relative to actual position.

Einstein's general theory allows for prediction of bending of light by using distance from mass as a surrogate for the actual cause, speed of light variation. As one moves farther away from center of mass, the speed of light speeds up because the aether spin velocity increases. Light speed is not an invariant as claimed by special theory of relativity.

$$\text{Angle of deviation } a = 2\,K\,M\,/\,V^2R$$

where M is mass of a star, V is invariant speed of light, K is the constant of gravitation, and R the distance from the center of the sphere to the ray.[14] The distance R from center of mass has to be used to correct for the error of assuming speed of light is a constant.

8. Origin of Mass [15]

If somehow one would be able to see aether in the most remote area between galaxies, based on the design noted above, one would see essentially two identical layers of spheres, one rotating to the left (counterclockwise) and the other to right (clockwise), carefully noting that two spheres of identical spin never touch each other. For want of a better term, consider a nine-sphere body-centered structure, designated as a NANOcube, which consists of nine spheres, one on each corner of the cube and one in the center which has the opposite spin direction of the other eight. As long as all spin speeds are identical, it would be impossible to tell any difference between two adjacent spheres of the same spin. Let's assume all spheres spin at 100 rotations per second (rps) so that a NANOcube has a total of 900 rotations per second (spin volumes) and that the laws of conservation of matter (sphere volume) and energy (motion) must not be violated. Now for whatever reason (Newton's outside force), the center sphere of the NANOcube slows to 92 rps, but motion must be conserved so the eight corner spheres each pick up one rotation to 101 rotations per second so conservation of motion is fulfilled as we still have a total of 900 spin volumes. But now we have a problem. Because of the differential spin velocity between the center 92 rps and the corner 101 rps spheres, either the slower spin center sphere will have to start moving in a retrograde spin due to the higher spin velocity of the corner spheres or the corner spheres will start moving through space by circling the center sphere at some specified rate. This is because the surface contact points are moving faster on the corner spheres than on the center. This in itself probably doesn't seem too dramatic, until one realizes another differential. The new NANOcube spins are no longer compatible with the fundamental aether spin, and the NANOcube complex breaks away from the ocean of undetectable aether particles. The NANOcube has acquired mass – energy of motion which is nonconforming with fundamental aether spin velocity. It has separated itself from the aether "pack". The writer is not saying that the NANOcube is an actual particle of any type such as a proton, which is almost certainly more complex than this, but the illustration demonstrates very well how mass can be defined within **QAT.** During consideration of mass, it may be helpful to consider the dimensions (labels) of mass. Maxwell was quick to point out that mass has the dimensions of L^3 / T^2 which means length cubed over time squared. He does this by combining the Newtonian mass law with Galilean movement formula showing that

$$S = \tfrac{1}{2}\,ft^2 = \tfrac{1}{2}\,mt^2 / r^2 \text{ and rearranging } m = 2\,s\,r^2 / t^2 \text{ [16]}$$

*Note the f in ½ ft2 is used by Maxwell to represent acceleration (a) as in the modern displacement formula of ½ at².

With this in mind, it is reasonable to consider several possible scenarios for mass. Volume times angular acceleration is one possible conclusion. This would include a spinning sphere whose volume (L^3) is under constant acceleration due to its rotational motion (angular velocity squared $w^2 = (theta)/ T^2$). An

alternative possibility would be the linear acceleration (L/ T^2) of a surface area (SA) (L^2) (representing the displacement of the surface of a rotating sphere). The second definition is favored by the writer (Mass = SA times Linear Acceleration). If we use SA times an acceleration, then $m = h\nu/c^2$ must equal SA and for one spin ($\upsilon = 1$) and assuming that 1 mass UNIT = 1, then

$$h\nu = mc^2 = (4\pi r^2)(4\pi^2 w^2) = 4\pi r^2 \ (1) \quad \text{and} \quad \upsilon = 2\pi w = 1$$

Using this calculation gives a radius of 2.23E-14 cm, a number very close to the radius expressed by Born, above, who calculates the proton nuclear core as having a radius of 1.5E-14 cm.

What about mass increase as velocity increases? We have already stated that mass is energy and that all energy is motion. As crudely described above, mass appears to be the result of particles moving differently from the basic aether spin. This creates a volume differential. The volume per unit of time is different. When an electron is accelerated to a high velocity(v(e)), why does its mass increase by the formula m/(Square root (1 – v(e) $^2/c^2$))? As the electron approaches the speed of light, it starts running into aether spheres which create a drag to the electron, which would increase the volume gradient (mass) experienced by the electron. It would appear that the more aether volume is displaced, the greater the mass. Remember c^2 is proportional to the aether spin velocity ($c^2 \sim 4pi^2 r^2 w^2$). The faster the electron's speed, the more likely it is to bump into the aether and experience aether drag in an exponential or squared function.

The presence of an aether medium allows for this understanding of mass concepts.

9. Conclusion

Fix the model, fix physics. Without the proper model of a medium to carry light energy, modern physics has drifted away from cause and effect into a fog of relativity and probability. In The Physical Foundations of General Relativity, D.W. Sciama is quick to point out, "In the inertial case we would want to say that inertial forces are exerted, not by space, *but by other bodies*. If this makes sense, then inertial forces are not fictitious after all, but are just as physical as any other forces. In consequence, **Newton's laws of motion would hold in all frames of reference**, and the problem of the preferred role of inertial frames would be solved."[17] The dynamics of an aether structure as presented here would be capable of distributing such inertial forces. When such a structure is restored to its proper place in natural philosophy, it would be possible to dismiss wave-particle dualism, relativity, and "empty" atoms.

> "The ether has dropped out of science, not because scientists as a whole formed a reasonable judgment that no such thing exists, but because they find they can describe all the phenomena of nature quite perfectly without it. It merely cumbers the picture, so they leave it out. If at some future time they find they need it, they will put it back again."[18] (James Jeans, Fellow of the Royal Society, The Universe Around Us, 1930, page 329)

It will not be an easy task to "put it back again" as modern physics under the direction of Albert Einstein dismissed aether,

> "All our attempts to make ether real failed. It revealed neither its mechanical construction nor absolute motion.....Our attempts to discover the properties of ether led to difficulties and contradictions. After such bad experiences, this is the moment to forget the ether completely and never try to mention its name. We shall say: our space has the physical property of transmitting waves, and so omit the use of a word we have decided to avoid."[19]

But in doing so, Einstein dismissed his best option for "saving" cause and effects physics and avoiding the descent into present dependence on probability theory of quantum mechanics, a theory to which Einstein himself severely objected. Aether dynamics and structural integrity would be able to absorb quantum theory without skipping a beat. As noted above, aether theory can define a mechanism for gravity which would allow for gravity to be connected indirectly to the other forces. By using speed of light for defining size and spin of a medium to carry angular impulse energy, a more cohesive, yet simply model of space can be defined.

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