LORENTZIAN DYNAMICS. **Ronald R. Hatch, 1142 Lakme Ave., Wilmington, CA 90744**

A number of modern physicists have espoused some form of absolute ether theory. But any such theory must explain a number of experiments via dynamic forces in place of the SRT kinematic explanation. This paper attempts to resolve a number of these experimental issues and to provide a coherent explanation of the apparent relativity which results. The specific stimulus for this paper was provided by Sherwin's experiment which attempted to detect directly the Lorentz-Fitzgerald length contraction. However, the Sherwin experiment is generalized herein to thought experiments involving gravitational and electromagnetic interactions. The appropriate force equations are explored for a mass particle in a gravitational orbit and for a charged particle in an electrostatic orbit. The requirement of apparent relativity while angular momentum and energy are conserved puts very specific and precise limits on the form of the force equations. Ironically, the electromagnetic Lorentz force does not meet the requirements. Neither does the Ampere force law. Only the Gauss-Riemann-Whittaker force law has the appropriate functional dependence.

Lorentzian Dynamics

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Introduction

Einstein was led to the positivistic assumption that all inertial frames are equivalent because he "found that no measurement could provide a criterion for simultaneity that would give the same result for all observers." The special relativity theory (SRT) and non-simultaneity of time are built upon inertial frame symmetry [1]. But the discovery of the cosmic background radiation (CBR) falsifies Einstein's fundamental assumption. If we define the absolute inertial frame as that inertial frame which causes the CBR to appear most uniform in temperature (isothermal) a simple criterion for simultaneity exists. Specifically, we assign an isotropic speed of light to the CBR frame and for all other frames the speed of light is assigned an anisotropic value equal to the vector sum of the CBR light speed added to the velocity of the frame with respect to the CBR frame. The velocity of each inertial frame is determined from the direction and magnitude of the dipole temperature distribution of the CBR in that frame. Using the speed of light velocities so defined allows one to specify a common time, which exhibits a common simultaneity independent of the frame velocity.

In spite of this demonstrable falsification of the foundation of SRT, it lives on, being firmly embedded in the ossified minds of establishment physics. Too much is at stake to admit the error.

But, the experimental evidence cries out for some form of the ether of Lorentz and Poincare'. Several years ago, while arguing with some establishment physicists on the internet, I was told in no uncertain terms that any difference between SRT and Lorentzian relativity was purely metaphysical. I have argued elsewhere [1] that such is not the case. However, I want to present a new and more powerful argument here. Specifically, SRT ascribes all the relativistic effects to kinematics and the source of the effects are left to some magical property of space-time, i.e. no causative agent is ever identified. By contrast, if there is an absolute ether frame, the relativistic effects must be due to dynamic forces rather than kinematics and an explanation of the forces is needed. But, if we can find the forces involved, the delightful reward is a conservation of energy and momentum across all inertial frames.

Two experiments stimulated this paper. The first was Sherwin's experiment which attempted to detect the Lorentz-Fitzgerald contraction [2]. In fact, in a prior paper [3], I criticized his experiment for failing to consider the change of mass with velocity and showed that, when mass change is considered, the conservation of momentum implied length contraction. In this paper, the analysis is extended to the conservation of energy as well.

The second stimulus was only a thought experiment. Carpenter [4] suggested that an exploding cloud of electrons in a very high speed frame would, because of magnetic forces in a stationary frame, become a longitudinal pencil beam of electrons capable of doing bodily harm to the stationary observer. The analysis herein shows that the opposite would occur. Specifically, Carpenter ignored additional effects which would cause the high speed cloud of electrons to flatten like a pancake in the longitudinal direction.

After some preliminary arguments, idealized versions of these two experiments will be analyzed in detail.

Background

Before proceeding a summary of the major features of my modified Lorentz ether theory (MLET) is needed:

- The light medium is an elastic solid ether
- Matter is a standing wave within the ether
- The ether reaction time determines the speed of light, c.
- Because of the internal motion of the matter standing wave and the ether reaction time, the internal ether density is reduced and the external ether density is increased.
- The speed of light is a function of the ether density
- The external ether density and its affect on the speed of light affects the standing wave energy of external matter and gives rise to gravitational potential.
- Electric potential is caused by a phase variation in the ether density caused by the rotation of the underlying standing wave.
- Magnetic potential is caused by a phase variation in the ether shear resulting from motion of an electric potential.
- Analogous to the magnetic potential there is a kinetic potential (called gravito-magnetic potential by relativists) which is caused by ether shear resulting from motion of a gravitational potential.
- Because matter is a standing wave structure, it is affected by the two way velocity of light with respect to it and, thus, contracts in the longitudinal direction when put in motion.
- The gravitational mass decreases with velocity. (see [5])
- The kinetic energy is twice the classical amount and increases with velocity.
- The inertial mass is composed of both the gravitational mass (structural energy divided by the speed of light squared) and the kinetic mass (kinetic energy divided by the speed of light squared)
- The inertial mass increases with velocity.
- Ideal clocks run slower when moving relative to the absolute ether frame or when moved to a region of increased ether density (decreased gravitational potential).

Light Clocks

Theoretically, a light clock can be constructed by measuring the time interval for light to make a round trip between two mirrors. The frequency of radiation from a laser is a close approximation to such a light clock. When this clock is given a velocity with respect to the CBR, the round trip time of the light beam is increased and the output frequency is decreased. If the light path is orthogonal to the motion, the increased travel time is caused directly by the extra distance the beam must travel. If the light path is aligned with the motion the increased travel time is also caused by the extra distance traveled. However, the physical contraction of the longitudinal distance is required to make the light travel time equal to that of the transverse beam. Figure 1 illustrates the transverse and longitudinal light beams for a clock traveling at 0.6 the speed of light.

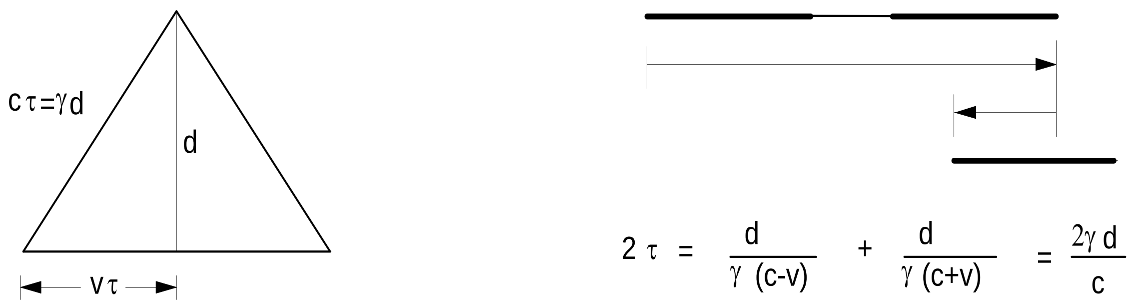

Figure 1 THE LIGHT CLOCK—TRANSVERSE AND LONGITUDINAL

Mechanical Clocks

The oldest clocks known are mechanical clocks. The spinning earth is such a clock. The orbit of the moon around the earth is such a clock. The orbit of the earth around the sun is such a clock. An idealization of these orbital clocks will be considered in some detail later. For now, we note that a small mass in orbit around a very large mass will appear to behave much like the hand of a clock. But, if we impart a common translational velocity to both bodies, the “clock” will run slower. The slowing is caused by the increased inertial mass and (as we shall see later) a decreased force.

Ellipses, Circles and Observers—Transformations

Assuming Lorentz-Fitzgerald contraction, when a velocity is imparted to a spherical object, it will be deformed into a prolate ellipsoid. An ellipse is obtained when this ellipsoid is cut by any plane containing the velocity vector. Figure 2 shows such an ellipse together with a circle representing a non-moving sphere cut through its center by the same plane. Designating the original diameter of the sphere as d and applying the standard contraction formula gives a semiminor axis of d/γ. Where γ is given by:

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

For illustrative purposes, a high velocity of 0.6 the speed of light is chosen. This results in a value of γ of 1.25 and a value of 0.8 for the inverse.

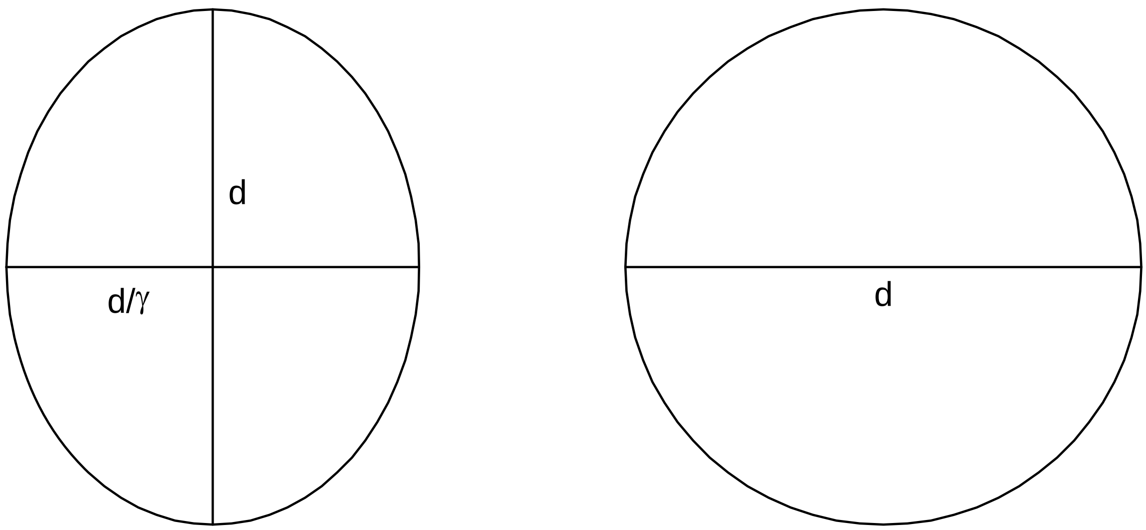

Figure 2 LORENTZ-FITZGERALD CONTRACTION DUE TO A VELOCITY OF 0.6 THE SPEED OF LIGHT

Using the assumptions given earlier it is quite easy to construct the transformation from the absolute frame to the moving frame. This transformation is called the Tanghlerini or Selleri transformation and is easily described. Note the transformation, repeated here, describes the results of mapping measurements taken with stationary instruments in the stationary frame to theoretical measurements taken with moving instruments. I have appended to this time and position transformation the inertial and gravitational mass transformation for completeness.

The following equations are used to map measurements in the absolute frame to the measurements which the moving instruments would ascribe to the parameters measured.

$$t_m = \frac{t_a}{\gamma} \quad (2)$$

$$x_m = \gamma(x_a - vt_a) \quad (3)$$

$$M_m = \frac{M_a}{\gamma} \quad (4)$$

$$m_m = \gamma\ m_a \quad (5)$$

The first equation says that for the same elapsed time the moving clock will read a smaller number than the absolute clock. This is because the units of measured time are larger in the moving frame than in the absolute frame. Similarly, the second equation first adjusts for the position of the moving axis and then scales the distance up to account for the fact that the units of distance in the moving frame are smaller. The y and z measurements do not need transformation since they are not affected by the motion when that motion is along the x axis.

Equations (4) and (5) are the result of recent work in which I have found it necessary to distinguish between inertial mass and gravitational mass. They also reflect the fact that the kinetic energy is twice that conventionally ascribed to it. Thus, the inertial mass in equation (4) as measured in the absolute frame translates into a lower inertial mass when measured in the larger units of the inertial mass in the moving frame. The results for the gravitational mass are just the opposite as shown in equation (5). Note that in the absolute frame with stationary mass

$$M_a = m_a \tag{6}$$

but, in the moving frame the difference is the kinetic energy (when scaled by the speed of light squared).

$$K_E = c^2(m_m - M_m) = c^2(\gamma - \frac{1}{\gamma})m_a = \frac{m_a v^2}{\gamma} \tag{7}$$

which is twice that classically assigned to the kinetic energy.

There are several convincing arguments that indicate kinetic energy is not acted upon by the gravitational potential. First, it is directly analogous to the magnetic energy not being acted upon by the electric potential.

Second, even though the General Theory of Relativity (GRT) teaches that all energy is acted upon by the gravitational potential, it is clearly true that electromagnetic radiation is excepted. The bending of light is a refraction effect and not due to the action of the gravitational potential. There is no change in the energy of “falling” electromagnetic radiation. The apparent change in energy is due to the change in the units of the measuring apparatus at different gravitational potentials.

Third, the gravitational equations developed in a previous paper [5] demanded that the kinetic energy not be acted upon by gravity.

Finally, the gravitational potential appears to be due to the fact that a smaller amount of standing wave structural energy is needed for quantized matter in a more dense ether. Thus, a standing wave particle in the presence of an ether density gradient is acted upon by that gradient of ether density (gravitational potential) so that it trades some of its internal structural energy for kinetic energy. But, obviously there is no gravitational mechanism for trading kinetic energy into further kinetic energy.

Equations (2) through (5) represent the expanded form of the Tanghlerini-Selleri transformation of measured values. However, often it is the information as to what movement does to the units which is of interest. In this regard, I find that motion causes a scaling by γ or by its inverse such that:

- Lengths contract
- Clocks have larger units, i.e. they slow down
- Inertial mass increases
- Gravitational mass decreases

The inverse Tanghlerini-Selleri transformation is obtained by replacing γ by its inverse and vice versa.

Let us return to the ellipse and circle of figure 2 and ask what an observer traveling with the moving ellipse would see if he were forced to observe using the finite velocity of the speed of light. Figure 3 is an omniscient top view of the situation. Omniscient because we have assumed for illustrative purposes an infinite velocity for our observations of the situation.

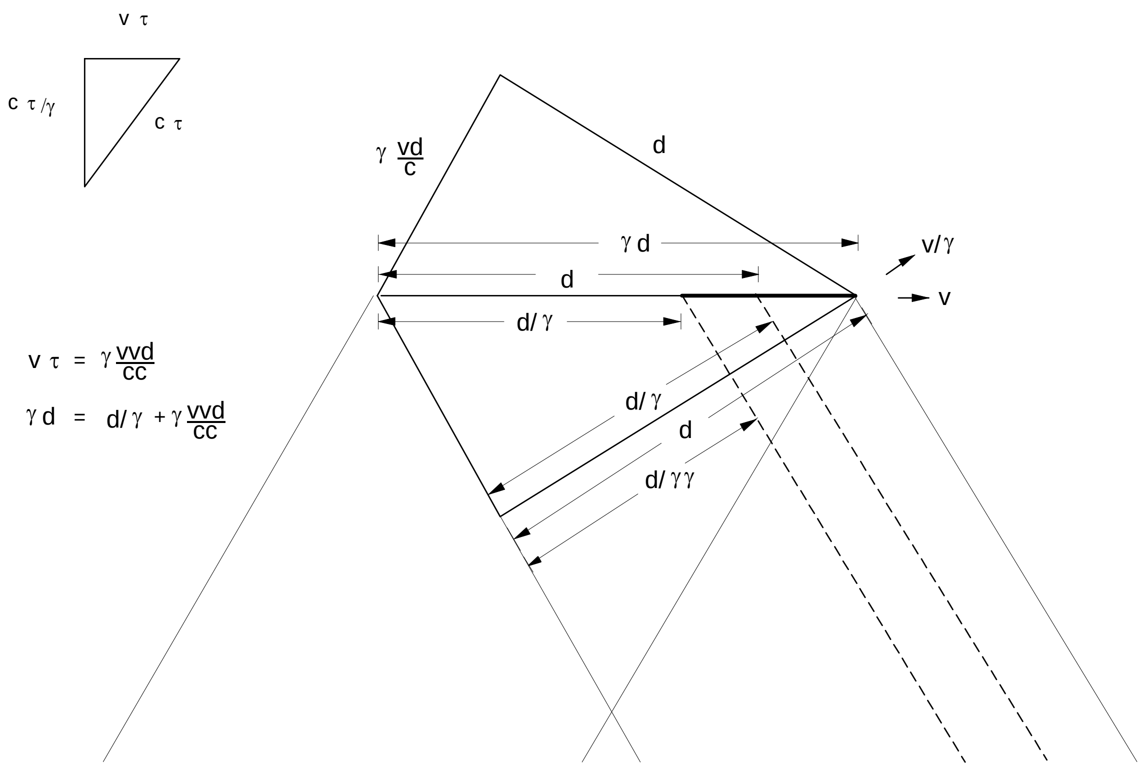

Figure 3 OMNISCIENT TOP VIEW IN ABSOLUTE FRAME

In the top left corner of Figure (3) is a small vector diagram showing the relative geometry of the light beam and an object traveling at 0.6 the speed of light. In the main portion of the figure two incoming light rays are shown as light dotted lines angling upwards to the right. These light rays are assumed to come from the observer traveling with the contracted ellipse but at some distance, y, away. (Thus, the two light rays are parallel to one another.) The left most ray strikes the trailing edge of the semiminor axis of the ellipse and the other strikes the leading edge. Both rays arrive at an angle (the aberration angle) because they left the observer at some prior time and must be aimed at an angle in order to arrive at the moving ellipse, which is shown as a horizontal line of length d/γ. Because of the angle of approach, the left most ray will arrive at the ellipse first. In fact, as shown in the figure that first ray will travel an extra distance of γvd/c before the second ray will strike the leading edge of the ellipse. Dividing that distance by the speed of light gives us the amount ot time elapsed and multiplying that time by the velocity of the ellipse gives us the distance that the leading edge will travel before the second ray of light reaches it.

$$\tau = \frac{\gamma v d}{c^2} \tag{8}$$

$$x = \frac{\gamma v^2 d}{c^2} \tag{9}$$

Adding this distance onto the length of the semiminor axis gives the total separation in the x axis of the point where the left ray and the right ray strike the two ends of the axis:

$$\gamma d = \frac{d}{\gamma} + \frac{\gamma v^2 d}{c^2} \tag{10}$$

The extra movement during the time the light beam is illuminating the axis is shown as the dark portion of the horizontal axis in Figure 3 and, as shown, causes the apparent length of the moving axis to be longer than even the non-moving diameter of the circle. (Marked off as the length d in the figure). Finally, note that these x axis distances will be decreased by the inverse of γ when the reflected light is mapped into the simultaneity (common wave front) plane of the light beam. Thus, the moving observer sees the moving shortened ellipse as a circle and the stationary circle as a shortened ellipse. This is exactly the inverse of what the stationary observer in the absolute frame sees. We have apparent relativity.

In fact, as shown in a prior paper [3], if the distance x is substituted in place of d in equation (8), the time bias is precisely the amount obtained by Einstein synchronization and causes the Tanghlerini-Selleri transformation to be the same as the forward Lorentz transformation. The reverse transformation remains different because using the anisotropy of the CBR we know that the time bias must be undone before the reverse Tanghlerini-Selleri transformation is applied.

The results of this section are summarized in Figure 4. Reality shows that the correct transformations are the Tanghlerini-Selleri transformations. But the apparent Lorentz transformations are much more practical for local physics. However, if we want to keep the physics straight, the underlying absolute frame is the point of reference. It is clear that switching frames in the middle of an experiment is invalid. Lorentz boosts have no physical basis. In other words, we do not have real relativity, we have apparent relativity. This leads to practical causal explanations for such things as the twin paradox and, as we shall see later, Thomas precession.

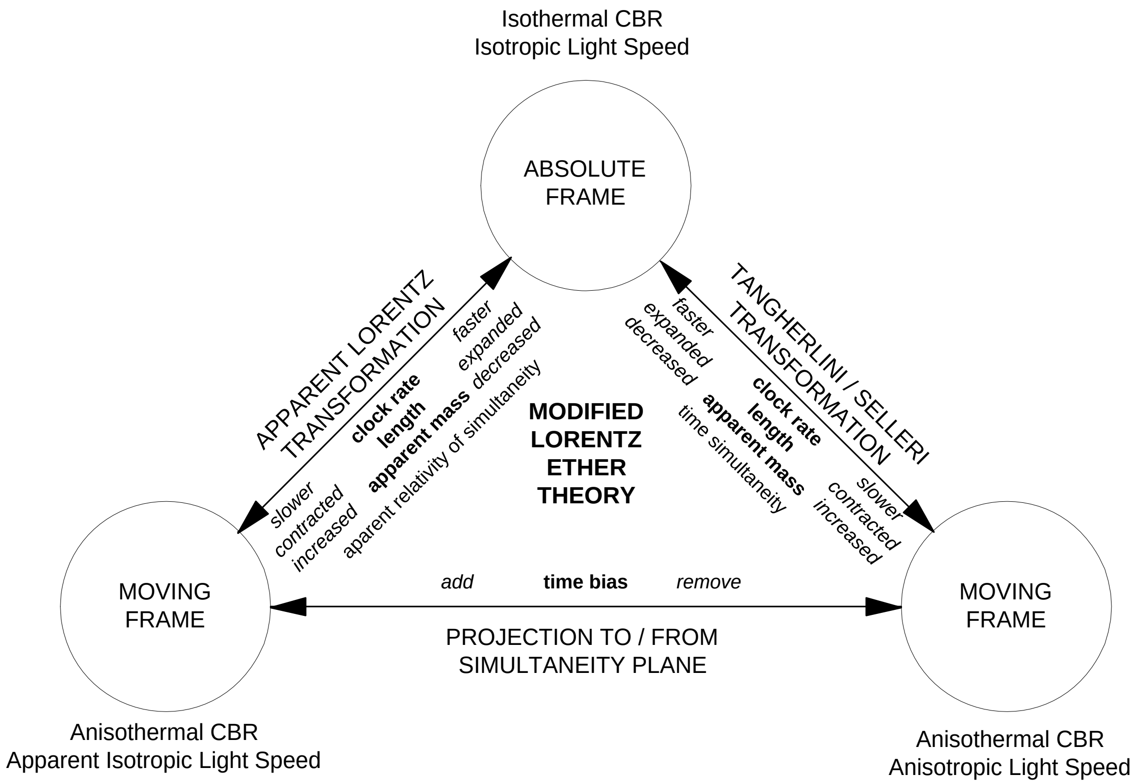

Figure 4 RELATIONSHIP BETWEEN FRAMES

Sherwin's Experiment Continued

Sherwin performed an experiment [2] with a resonant spinning mass, which he claimed provided evidence that Lorentz-Fitzgerald contraction does not occur. In my earlier paper [3], I showed that Sherwin's experiment was faulty in that it ignored the increase of inertial mass with velocity. By including the increase of inertial mass with velocity, I was able to show that angular momentum was conserved only if Lorentz-Fitzgerald contraction did in fact occur. The hole left in my earlier paper was that I did not show that energy was conserved. That is at least partially remedied in this paper.

- **Review—Conservation of Angular Momentum**

Figure 5 shows the results of the prior paper. The conservation of momentum demands that, when the spin velocity of an orbiting particle is in the same direction as the translational velocity, the inertial mass will increase and hence the spin velocity will slow. This slowing of the spin velocity allows the center of spin to gain on the orbital position and the orbit is thereby flattened. A similar symmetrical process occurs in the opposite half of the orbit where the spin velocity is increased. The center of spin does not move as far and the orbit is flattened on the other side as well.

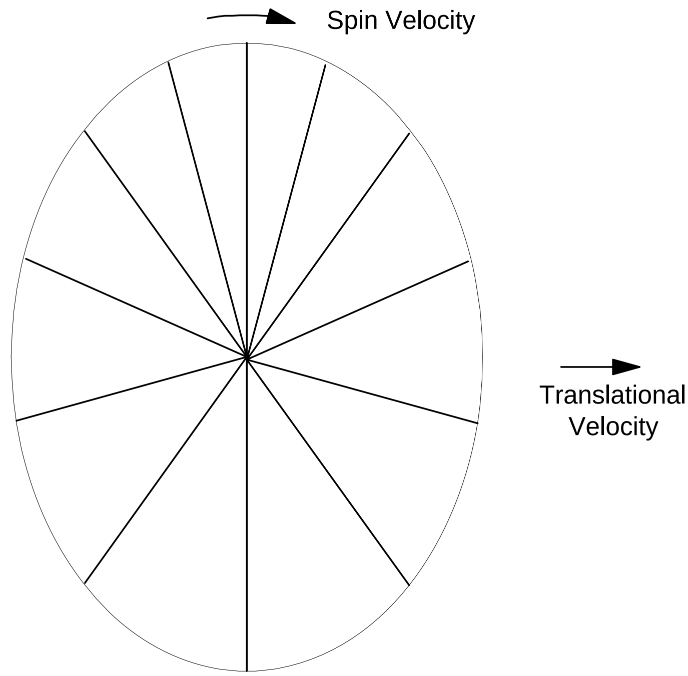

Figure 5 Effects of Momentum Conservation

The spokes are included in Figure 5 to show what the effect of spin velocity is on the the rate of rotation. In the figure the spokes would be 30 degrees apart if the wheel were not spinning. Furthermore the distortion of the spoke position is also consistent with the Lorentz-Fitzgerald contraction and illustrates the source of Thomas precession. Thomas precession arises due to the length contraction in the upper half of the figure and the resulting offset in the center of mass position. Of course, as observed in experiment, Thomas precession with this mechanism occurs only when spin velocity is present and only when the force acts on the center of spin rather than the center of mass. Muller [6] makes an attempt to give the same explanation for Thomas precession using SRT. But it does not work because SRT claims the effect is present whenever a curved path is followed—even if it is not spinning. Mullers figure with its curved spokes is also incorrect. The spin contraction effect is clearly linear in the spin velocity. Thus it displaces the spokes in angle—it does not cause them to bend or undergo shear forces. Because gravitational forces act on the center of mass, gravitational forces do not cause Thomas precession.

Finally, when the physically distorted shape and spoke location are projected into the simultaneity plane of Figure 3 (i.e. the position is modified to account for the clock bias), by looking at the position at a later point in time for negative x positions and earlier in time for positive x positions, the shape of the wheel will appear circular and the spokes will appear to be equally spaced at 30 degree intervals.

- **Idealized Gravitational Experiment—Conservation of Energy**

The constraint of conservation of momentum was significant. What can be learned from conservation of energy? Conservation of energy while the velocity is changing requires the existence of forces, and we must leave behind the kinematics of SRT. While Sherwin's experiment was concerned with intermolecular forces and hence ultimately electromagnetic forces. In our MLET, gravitational forces are somewhat simpler to deal with than electromagnetic forces and we consider those forces first. To do so, the experiment is idealized by making the central mass much heavier than the orbiting particle and a translation velocity of the entire orbiting pair is assumed. From the conservation of momentum, we already know that the orbit must be flattened by the traditional Lorentz-Fitzgerald amount when the translation velocity is in the orbital plane and, furthermore, this flattening of orbit is independent of spin velocity (i.e. of orbital radius). This means that it is valid to consider separately the forces resulting from the common translation velocity and the forces resulting from the product of the translation and spin velocities.

It is commonly assumed in GRT that motion of a large gravitational mass creates a field similar to the magnetic field generated by motion of an electromagnetic charge. Such fields are referred to as gravitomagnetic fields. In my book [7], I called such fields kinetic fields and I still prefer that name since they are, I believe, associated with the kinetic energy with respect to the absolute CBR frame.

In terms of underlying mechanism, I believe, the kinetic field is a shear field, while a magnetic field is an oscillating shear field with apparent phase motion. In any case, I believe that the kinetic force laws are essentially identical in form to the magnetic force laws between charges of the same sign. But the form of the magnetic force law is a subject of considerable controversy, especially within the dissident physics community. Most within that community rule out the (ironically named) Lorentz force law because it clearly does not obey Newton's third law. That leaves most of the dissidents favoring Ampere' force law. But I have argued in my book that the Gauss, Rieman, Whittaker (GRW) force law is the correct one. The distinction between these latter two force laws is their interpretation of or additional constraint on Newton's third law.

Newton's third law is given as [8]: "To every action there is always opposed an equal reaction—or the mutual actions of the two bodies upon each other are always equal, and directed to contrary parts." The difference between the Ampere' and the GRW force laws are in the constraint implied by the last phrase "directed to contrary parts." The Ampere' force law results from constraining the forces to be directed along the line joining the bodies involved, while the GRW force law only requires that the forces on the two bodies to be oppositely directed, i.e. they need not be along the line joining the two bodies. I favored the GRW force law because it allowed the direction of the forces to be determined by the gradient of the magnetic lines of force—which in my limited experience allowed a torque to be present between two magnetic sources. But the Ampere' force law does not allow the presence of a torque between two current elements.

As I showed in my book, the GRW force law, in contrast to the Ampere' force law, has a very interesting property. Specifically, any two given current elements at a given separation distance yield a force which is of constant amplitude—only the direction of the force changes as the relative orientation of the two current elements is changed. But, the strongest argument in favor of the GRW force law is the newly discovered fact that, when adapted to the kinetic force between moving masses, it supplies precisely the force needed to conserve the energy of an orbit flattened by Lorentz-Fitzgerald contraction.

- **Kinetic Force from Common Velocity**

The MLET model of gravitational potential is that its source is the gradient of ether density. The ether density relaxation closely approximates an inverse radial dependence [5] but, because it is a function of the effective two-way speed of light, I believe that the potential is itself subject to Lorentz-Fitzgerald contraction. The gravitational force results from the action of the local ether density gradient upon the matter standing wave of the mass particle. This means that the apparent action of gravity is instantaneous and the direction of the force is that of the maximum gradient. But, if the potential suffers Lorentz-Fitzgerald contraction, this means that the gravitational force is itself not directed along the line joining the two bodies. Thus, we are faced with the gravitational analog of the Trouton-Nobel electrostatic experiment. An additional force is needed to cause the total force to be along the line joining the two bodies—else apparent relativity will be lost. The GRW kinetic force provides precisely the correct force vector to cause the combined gravitational and kinetic force to be directed along the line joining the two bodies when they have a common translation velocity with respect to the absolute CBR frame.

The direction of the GRW force due to the common translation velocity is shown in Figure 6. The common translation velocity is shown on the left at 45 degree intervals of the orbit. The direction of the force resulting from the GRW law is shown on the right at 45 degree intervals. The magnitude of the force is given by:

$$f = \frac{GMmv^2}{r^2c^2} = (1 - 1/\gamma^2)F = \beta^2 F \qquad (11)$$

where *F* is the gravitational force and β is the ratio of the translation velocity to the speed of light. At 45 degrees this force is orthogonal to the gravity force and causes the total force to be directed toward the central gravitational body.

As indicated above, the direction of the gravitational force is affected by the translation velocity. The magnitude of the force is affected also. The rate at which clocks run is affected by the absolute velocity. Because GM contains units of inverse time squared its value will be diminished proportional to β squared. The gravitational mass of the orbiting body is decreased by half that amount. Even though the gravitational potential is flattened so that it is approximately the same at all points in the flattened orbit, the spatial derivative of that potential is greater at the 90 degree point in the orbit due to the shorter radial distance. This larger gradient causes the force to be increased by β squared at that point in the orbit.

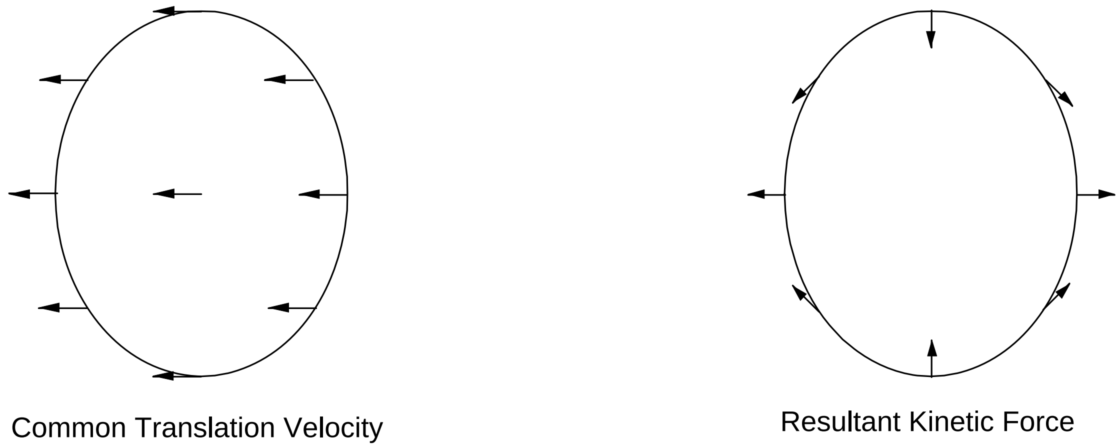

Figure 6 Kinetic Force from the Common Translation Velocity

The radial gravitational force variation from nominal in terms of ½ β squared is given in the table below at 0, 45, and 90 degrees as a function of the above factors.

	GM	m	Gradient	Kinetic (radial)	Net
0 degrees (top)	-2	-1	0	+2	-1
45 degrees	-2	-1	+1	0	-2
90 degrees	-2	-1	+2	-2	-3

One unit of net decreased force at each point in the orbit combines with the average increase in the inertial mass of the orbiting particle to cause the particle to orbit slower, i.e. the mechanical clock runs slower. The additional decrease in the net radial force is exactly that needed to cause the decreased curvature of the orbit in the vicinity of 90 and 270 degrees. For an apparent spherical (in the moving frame) group of gravitating particles, the additional reduced force in the line of the velocity vector would cause the group to maintain its longitudinal length contraction in the absolute frame as the group shrinks from gravitational and kinetic forces.

- **Kinetic Force from the Product of Spin and Translation Velocities**

It is time to turn to the kinetic forces arising from the spin velocity. The left hand side of Figure 7 shows the spin velocity relative to the translation velocity. The direction of the kinetic force resulting is shown on the right hand side of Figure 7. The magnitude of the force is the same as that shown in equation (11), except it is no longer the translation velocity squared in the numerator, but is, instead, the product of the translation and spin velocities. The direction of the force in the figure is always downward. Clearly, this causes the maximum and minimum kinetic energy to be at precisely the correct points in the orbit. The integral of the force across the diameter of the orbit corresponds precisely to the energy difference between the alignment of the spin velocity with the translation velocity and against the translation velocity.

Figure 7 Kinetic Force from the Relative Spin Velocity

The Electromagnetic Counterpart

Assuming the electron suffers Lorentz-Fitzgerald contraction, allows one to carry over the kinetic force from the common translation velocity, developed above for kinetic forces, to the problem posed by Carpenter [4]. The only difference would appear to be the expansion of the cloud of electrons as opposed to the contraction of the cloud of particles. Unfortunately, nature is not so simple.

Additional complexity is revealed when an attempt is made to explain the electric and magnetic forces of an electron orbiting a nucleus as both move with a common velocity relative to the absolute CBR frame. One finds that the magnetic forces are exactly opposite to the kinetic forces as shown in Figures 6 and 7. The solution is not obvious.

- **Models of Electrons and Particles**

I believe that the solution to the problem of magnetic forces due to velocity in an absolute CBR frame lies in a better understanding of the electron itself. Non-relativists have proposed a number of models in the literature. A few of them are discussed below.

Bergman [9] has proposed a spinning ring model for the electron. It has some interesting properties and has been used to construct some interesting atomic structure models. But it does nothing to help us resolve any velocity effect issues.

Wolff [10] has proposed an ingoing and outgoing standing wave structure for the electron to which he has recently added a spin concept. Unfortunately, his model (he says he has no model—that he just uses physical reality) depends upon magic. In addition, to the magic of the incoming wave, he has added a magical 90 degree phase rotation at the center where the incoming wave is converted to an outgoing wave.

Hill [11] and Kubel [12] present models of generalized matter rather than electrons specifically. But they are interesting. I liked Hill's result of modeling electromagnetic waves in a reflective box. But, as I previously argued, it did not reflect the Lorentz-Fitzgerald contraction and so, in my opinion was somewhat faulty. Kubel shows the effect of a wave moving at the velocity of light inside a circular reflecting surface, which is given a translation velocity. His result shows promise for explaining the problem with magnetic forces—as discussed below. One clear plus for both Hill and Kubel is that, with their reflecting membrane, they are clearly not claiming (as Wolff does) an exact match with physical reality. They are offering simplified models.

Finally, I still like the electron model offered in my book [7] better than the other alternatives. My brother, Ed, added a translation velocity to a computerized model of that electron. The translation velocity was constrained to move along the spin axis—corresponding to an apparent physical constraint experimentally observed. The result was very interesting and very close to what Kubel's later simplified model predicted. The electron was deformed into an elongated (oblate) ellipsoid in the longitudinal direction rather than a contracted (prolate) ellipsoid. While the stationary standing wave model had synchronous expansion and contraction cycles at the two ends of the spin axis, in the moving model the expansion and contraction cycles were no longer synchronous. However, if a Lorentzian time bias is added as a moving observer (or as another moving electron) would see, the cycles become synchronous and the electron appears contracted. Incidentally, there is no reason to require incoming waves (per Wolff) to create a standing wave structure. Hugens principle tells us that at all points of disturbance in a standing wave structure the disturbance will attempt to dissipate in all directions simultaneously.

The way forward seems clear, but I must admit that I have not completed the development. The electromagnetic force has some distinct differences from the gravitational. The gravitational force appears to be the direct result of the local ether density gradient and hence appears to be instantaneous. That is not the case for the electric force. The electric force between two charges is, I believe, imparted at the point in space where the standing wave of the two charges is of equal length. This means that the electric force suffers retardation. This retardation means that the force direction and the surface of interaction between two charges is modified by their translation velocity.

From Kubel's model and the computerized view of my model, it seems clear that, though the orbit of an electron around the nucleus is contracted in the longitudinal direction, the direction of the electric force will correspond to that of an elongated ellipse in the longitudinal direction. Thus, the magnetic force, though in the opposite direction of the corresponding kinetic force, will cause the total force to point toward the center of the orbit. Thus, an explanation of the Trouton-Nobel experiment is obtained, but the capacitor turning force which had to be counteracted was exactly opposite that expected in the original experiment. Figure 8 is an attempt to illustrate this effect.

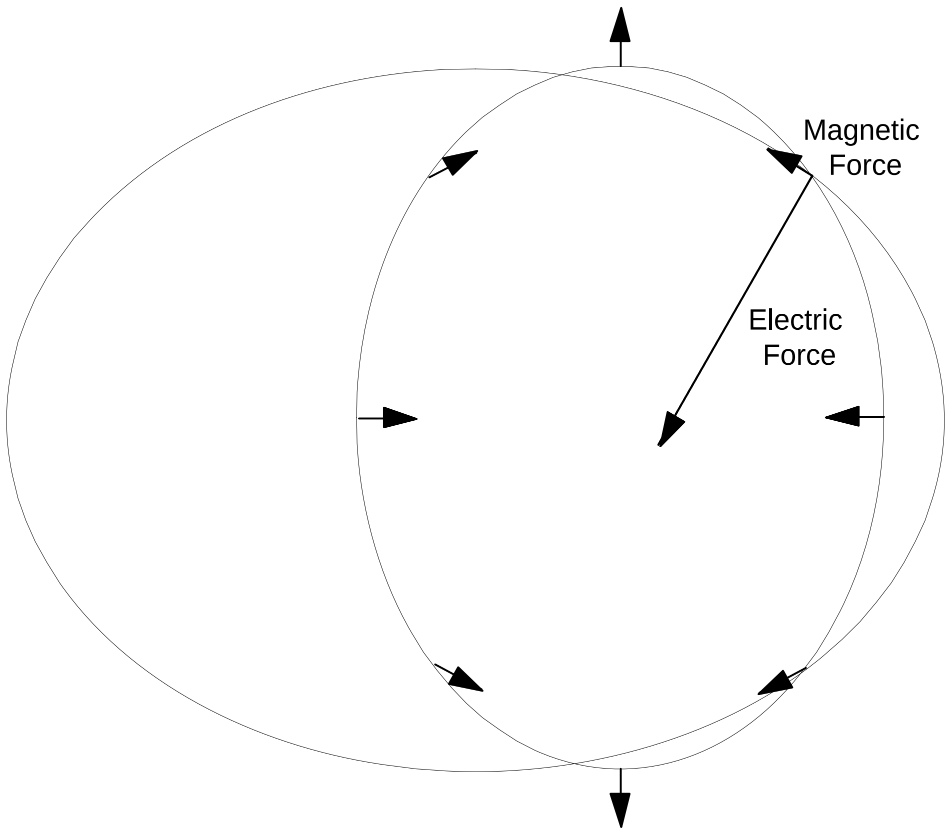

Figure 8 Direction of Magnetic Forces

Conclusion

An attempt has been made to explain the dynamic forces at work on moving particles in an absolute ether. If apparent relativity is to hold, some such dynamic force is required. For the gravitational and kinetic force the attempt was remarkably successful. The GRW force law provided precisely the force needed to conserve energy for both the translation velocity and the spin velocity effects. It argues very strongly that the GRW force law is the correct form of the force law rather than that of Lorentz or Ampere'.

The development of the electromagnetic forces at work on moving charges in an absolute ether is not complete. But the way forward has been outlined and the continuing development does not appear to be overly difficult. The goal is in sight. There is no need for the kinematic magic of SRT.

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