Relativity Redux: The World Year of Physics
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See Addendum, Mar. 11/06 below:
See Addendum, Oct. 1/06 below:

Introduction:
The World Year of Physics was selected to coincide with the 100th anniversary of the publication of A. Einstein's pivotal works; the most famous being the paper which came to be known as the special theory of relativity.[1] This decision was entirely fitting since this paper most typifies the state of theoretical physics in the 20th century and to this day.

Since its publication, special relativity has survived countless attacks by critics who proved beyond doubt that it contained irreconcilable contradictions. To this date, no experiment either conceived or executed can be cited as definite proof of the theory. Only those experiments whose results were sufficiently vague and subject to wider interpretation have been adopted[2]. Those that might contradict relativity were ignored[3].

The two postulates, which serve as the basis for special relativity are,

1. The laws of physics are the same in all inertial frames of reference.
2. Any ray of light moves in the "stationary" system of coordinates (absolute vacuum assumed throughout) with the determined velocity [c], whether the ray be emitted by a stationary or by a moving body.

On the basis of the second postulate, A. Einstein concluded that the relative motion of an object with respect to an observer was the cause of contraction of space, dilation of time and increase in mass. Furthermore, this was not mere appearance, but a physical modification. A contradiction obviously arises because of the first postulate. Since either frame of reference can be considered in motion, the modifications would be reciprocal and therefore not discernable. In this case, the theory would be merely tautologica1. Furthermore, measurement of one-way propagation of light would require that space and time both expand and contract and the mass both increase and decrease depending on its direction of travel[4]. This requirement is studiously ignored in all experiments and references to special relativity.

A further consideration was A. Einstein's statement that the aether did not exist. This could only be an expression of belief since no evidence or theoretical requirement was presented to substantiate it. In fact, the second postulate demands as a logical consequence that light propagates at [c] in each inertial frame of reference and that there is no contiguity among them[5].

The above arguments form the basis for all refutations. One would think a theory that contradicts its own postulates would be rejected out of hand. But this is not the case.

Nevertheless, we can make the unequivocal statement that since the experiments of special relativity are "gedanken", they can and have been refuted in the same manner.

This of course, will have no impact on the vast majority of physicists since it is widely believed that relativity theory is the framework upon which all of atomic physics is constructed. This is often expressed in what is considered by some to be the most famous equation in all of science, the equivalence of mass and energy, $\mathbf{e = mc^2}$

The formula contains relativistic mass as a fundamental component. It is of absolutely no value to show that this is precluded by the preceding arguments since they are based on mere logic. Therefore, the purpose of this paper will be to provide **conclusive proof that the energy formula and with it, the theoretical basis of relativity is false**.

First Argument
It is assumed that the constancy of the speed of light necessarily requires that space and time be modified to accommodate it. In fact, the opposite is true. Any absolute value requires absolutes in its measurement as stated by Isaac Newton over three hundred years ago.[6] Failure to acknowledge this fundamental requirement by theoretical physicists is due either to ignorance or contempt for logic. This alone is sufficient to negate the theory.

Second Argument
The basic assumption that time dilates and space contracts in the direction of motion is demonstrably false. A strictly geometric analysis of the relativistic modifications formula $[(c^2 - v^2)/c^2]^{1/2}$ confirms the direction of any presumed "contraction" will be perpendicular to the direction of motion. At any time [t] it represents ½ the chord [*l*] (Diagram 1) measured from the object in motion to the surface of a spherical wave front emitted at [*O*] at time [*0*] as determined by a "fixed" observer. Obviously, the formula is that of a right triangle with [ct] and [vt] representing the hypotenuse and base distances respectively. (This is further substantiated by A. Vukelja's identification[7] of "contracted" length as dependent on the cosine of the angle opposite the base distance.) The wave front will have reached the vertical distance [ct] from [*O'*] in [*S'*] and precisely the same distance in [*S*] represented by the hypotenuse! Dilation of time and contraction of space are **not** required and the situation is symmetrical with respect to both observers. The displacement is due to the finite velocity of light.

Diagram 1.
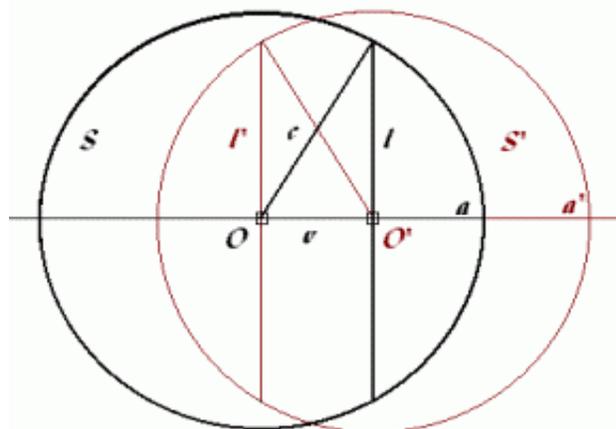
Third Argument

The apologists for relativity claim that it is a generalization, incorporating classical mechanics as a special case. This belief is illustrated with the observation that relativistic velocities approach Newtonian at the lower limits. This is totally misleading since the formulas are unrelated, the velocities at no time coincide and they **diverge to infinity** at the upper limits.

Fourth Argument

The energy formula is perceived as the foundation for the transformation of mass to energy. In fact it is not conversion, but the release (or creation) of **binding** energy. A simple ratio will confirm that the "rest energy" of the electron does not equal its charge, nor is it involved in the mechanical force equations of the hydrogen atom.

The most famous support given the formula is in pair creation. This does not occur in free space. The basic beta decay process involves the conversion of protons-neutrons with the emission of neutrinos and electrons-positrons. The result is considered to be the creation of material particles since it is assumed that an electron cannot exist within a nucleus. I have demonstrated that an electron has the characteristics of a wave as it approaches a nucleus and by a process of inversion, becomes a nucleon[8].

A total separation of the dual aspects (mass, charge) of an individual particle takes place when kinetic energy exceeds the binding (conservative) energy (see the eighth argument) beyond the classical electron radius. This is the basis for "pair creation" and identifies the "masses" as being pre-existent. In the reverse process the pion, a nuclear "particle", is assumed to decay into a muon and finally an electron or positron. In summary, there is more than sufficient reason to state that the fundamental particles pre-exist and are not created. Furthermore, there is a reasonable indication that the proton itself is subject to dissolution[9]

Fifth Argument

The commonly accepted energy of a photon is frequency times Planck's constant [hf] and its momentum is [hf/c]. Its virtual or pseudo mass is therefore [hf/c^2]. A previous paper[10] on the synthesis of classical mechanics and relativistic theory indicated a coincidence between them. This is quantified as follows:

$$m_i v_m c \cos(\phi)/(m_i + m_o) = v_k^2/2 \text{ (1)}$$

where [v_m, c, v_k] are relativistic linear, light and "kinetic" velocities, [ϕ] is the angle of electron deflection and [m_i, m_o], the initial photon "pseudo" mass and rest mass of the electron respectively. A simple re-arrangement of standard relativistic formulas gives,

$$m v_m^2/(m + m_o) = v_k^2/2 \text{ (2)}$$

where m, is the "relativistic" mass. Combining shows,

$$m(m_i + m_o)/m_i(m + m_o) = \cos(\phi)c/v_m \text{ (3)}$$

Approaching 90° deflection for the photon, the "relativistic" mass of the electron equals the initial (pseudo) mass of the photon. Also, equation (1), explicitly contains

$$2m_i c \cos(\phi)/(m_i + m_o) \quad (4)$$

which is simply the Newtonian velocity [v_n]. This velocity is **implicit in all relativisitic formulas and is not in any way supplanted by them**. Also, $[v_m v_n = v_k^2]$

Since the angle [ϕ] represents the direction of the particle moving at [v_m] then [v_n] must be opposite, [$\phi +/- 180^o$]. The pseudo mass [m_f] of radiation emitted[11] at angle [$\varnothing$] after a photon-electron collision is,

$$m_f = 1/[1/m_i + (1 - \cos(\varnothing))/m_o] \quad (5)$$

If [$1 - \cos(\varnothing) = x$] then

$$m_f = m_i m_o/m_i x + m_o \quad (6)$$

As indicated in equations (5,6), "relativistic mass" is dependent on the deflection angle of the photon as this determines the transfer of momentum. At a photon deflection of 90 degrees (zero lateral component), the kinetic energy of the electron equals,

$$m_i c^2 - m_f c^2 = m_i^2 c^2/m_i + m_o = mv_k^2/2$$

Dividing by the Newtonian velocity (equation (4)),

$$m_i c/\cos(\phi) = mv_m$$

The result is angular dependency and an inelastic collision in keeping with the conservation of momentum. Note specifically that twice the relativistic kinetic energy divided by Newtonian velocity equals relativistic momentum.

It has been demonstrated in a previous paper[12] that the total energy radiated is precisely equal to the energy involved in the change of state of an electron. Therefore, the subsequent interaction of the "photon" and an electron as evidenced in a Compton collision is equivalent to an electron-electron collision, differing only in proximity. This is the reason Planck's constant may be used with respect to photon dynamics and resolves the mysterious particle-wave duality ascribed to the photon.

Sixth Argument
The Compton effect was widely hailed as confirmation of special relativity. In fact, **it refutes its most basic tenet**, that of the dependence of relativistic modifications on velocity. It is considered to be an elastic collision between radiation (a photon) and a free electron. As such, the kinetic energy lost in radiation equals that gained by the electron. This clearly establishes that the collision is the cause of the electron's motion and the **velocity is the effect**. As stated above, it is **obviously not an elastic collision** since there is a presumed increase in the mass of the electron! The velocities and "relativistic" masses are related as follows:

$$v_k^2/v_m^2 = v_n^2/v_k^2 = 2m/m+m_o = \quad v_n/v_m = 1/(1 - v_k^2/4c^2) \quad (\mathbf{8})$$

The energy involved in a Compton collision may be represented[13] by,

$$(m_i - m_f)c^2 = (m - m_o)c^2 = mv_k^2/2 \quad (\mathbf{9})$$

It should be quite evident from equation (9) that the speed of light, apart from being a component of the photon's initial and recoil energy, is **not at all related to the "rest" mass of the electron**! It should also be evident from the 5th argument that it is **not related to "relativistic" mass for the same reason**. Furthermore, it was shown in a previous paper[14] that the Lorentz transformation equations applied to wavelengths and frequencies of light rather than mass. Finally, the recoil wavelength of the photon is dependent on the "Compton wavelength", [h/mc] which is a component of the intrinsic magnetic moment of the electron, $\approx$[eh/mc].

If the velocity of light is associated with the composition of mass, it definitely cannot be attributed to relativity theory.

Seventh Argument:
Relativity provides the following relationships

$$m^2/(m^2 - m_o^2) = c^2/v_m^2 \quad (\mathbf{10})$$
$$m/2(m - m_o) = c^2/v_k^2 \quad (\mathbf{11})$$

Since $v_m v_n = vk^2$

$$(m + m_o)/4(m - m_o) = c^2/v_n^2 \quad (\mathbf{12})$$
$$(m + m_o)v_n^2/4 = (m - m_o)c^2 = (m_i - m_f)c^2 = mv_k^2/2 \quad (\mathbf{13})$$
$$(m + m_o)v_n/2 = mv_m \quad (\mathbf{14})$$

Equations (13, 14) display an opposing equivalence for kinetic energy and momentum as per Newton's third law of mechanics

In mechanics, there must be an initial linear motion before the angular appears. In electrodynamics, there must be an initial linear motion before a magnetic field appears. The angular and magnetic effects are at right angles to the direction of motion and appear subsequent to it. This explains the need for an initial speed in the curvature of mass in a gravitational field or that of an electron's path in a magnetic field. The presence of a force perpendicular to field and linear velocity identifies a coincidence between magnetism and the mechanics of angular velocity. It should be evident that **in all respects, the dynamics of electromagnetism parallel that of mechanics[15]**. One is the antithesis of the other.

Fields, charges and masses are invariant[16]. Any disturbance causes a displacement of the mechanical and electromagnetic aspects of a particle (inertial effects) which is expended when balance is restored. This statement is substantiated below.

Eighth Argument

It has been demonstrated in the foregoing that relativistic "mass" is totally dependent on the photon's deflection angle. Diagram 1 identifies the invariance of mass, charge and fields. The following arguments clearly identify that what is assumed to be a relativistic mass increase is in fact a separation of the dual and combined states of mechanics and electromagnetism and will manifest itself in both.

A basic premise in relativity theory is,

$$m = m_o/\beta, \text{ where } \beta = (1 - v_m^2/c^2)^{1/2} = \beta_1 = (1 - v_k^2/2c^2) \quad (15)$$

Squaring and multiplying both sides by $c^4(1-v^2/c^2)^{1/2}$, we obtain

$$m^2c^4 - m^2v_m^2c^2 = m_o^2c^4 \quad (16)$$

Using the relativistic equations $[E_o = m_oc^2]$ and $[E = mc^2]$, energy then becomes

$$E^2 = m^2c^4 = (mv_k^2 + m_oc^2)^2$$

which results in the relationship between momentum and energy of,

$$m^2v_m^2c^2 + m_o^2c^4 = m^2v_k^4/4 + mm_ov_k^2c^2 + m_o^2c^4 \quad (17)$$
$$m^2v_m^2c^2 - m^2v_k^4/4 = mm_ov_k^2c^2 \quad (18)$$
$$mv_m^2 - mv_k^4/4c^2 = m_ov_k^2 \quad (19)$$

The tautological aspect of relativity theory is obvious in the use of velocities in determining the ratio of the relativistic and rest masses **when the opposite is true**. Since velocities are proportional to masses as they are in classical mechanics, the mass difference disappears when $[\beta_1]$ is applied.

$$m_ov_m^2 - m_ov_k^4/4c^2 = m_ov_k^2 - m_ov_k^2/2c^2 \quad (20)$$
$$m_ov_m^2 = m_ov_k^2 - m_ov_k^4/4c^2 \quad (21)$$
$$v_m^2 = (v_k - v_k^2/2c)(v_k + v_k^2/2c) \quad (22)$$

It is evident that equation (17) represents the combined mechanical and electrodynamic aspects of sub-atomic particle interactions. Equation (21) may be multiplied by the electron's charge $[e]$, or $[ec^2]$ or $[m_oe^2c^2]$. Momentum and energy are simultaneously identified within it. The right hand terms of equation (22) represent both the intrinsic angular momentum and magnetic moment (spin) including induced (ie. inertial) effects. Since their combination (root) reduces to $[v_m]$, **the $[g_s]$ factor in the spin magnetic dipole moment (sans anomaly) is accounted for**.

Equation (1) identifies the combined and opposing linear velocities. In their ratio, we will find the "relativistic" inertial effect. This is neither mass nor induced field, but a displacement of the opposing and combined aspects of the invariant dual states. If we replace the rest mass and relativistic mass of equation (19) with the symbols of displacement $[q]$ and $[Q]$,

$Qv_m^2 - Qv_k^4/4c^2 = qv_k^2$ (**23**)

Dividing equation (23) by $[v_k^2]$,

$$v_m^2/v_k^2 - v_k^2/4c^2 = q/Q \ \ (\textbf{24})$$

Since $v_n v_m = vk^2$, we divide equation (21) by $[vk^4]$,

$$1/v_n^2 - 1/4c^2 = q/v_k^2 Q \ \ (\textbf{25})$$

Equation's (24 and 25) reduce to

$$v_m/v_n - v_k^2/4c^2 = Q/q \ \ (\textbf{26})$$

Since $v_m/v_n = 1 - v_k^2/4c^2$ (see equation (8)),

$$Q/q = 1 - v_k^2/4c^2 - v_k^2/4c^2 = \beta_1 \ (\textbf{27})$$

All particle interactions including orbits are implicit in equation 17. We must conclude that an unperturbed hydrogen atom is in precise equilibrium. Any deviation or progression up the scale of the periodic table will result in a displacement between dual states which combined, result in "apparent" elliptical orbits. (Note that there can be no elliptical orbits unless both foci are occupied.[17]) As an ellipse is the geometric mean of two circles, we may identify the radii of the circles to be $[v_m t$ and $v_n t]$ at time $[t]$, the product $[v_k^2 t^2]$ times $[\pi]$ equals the area of an ellipse. Since $[v_k]$ is identified as the velocity component of "kinetic" energy, we may assume that the area of the ellipse is a representation of the energy of the system.

Summary:
Herein is a truly simple synthesis of the so-called relativistic equations, electromagnetism and classical mechanics which not only represents a unification of physics, but explains hitherto mysterious aspects such as inertia, quanta et al. Only recognized formulas are used in the development of the theory. All of classical mechanics remains intact and relativity is placed on a solid foundation! The theory itself conforms to all experimental criteria. Furthermore, it points directly to the unification of all forces[18]; now a virtual no-brainer. **There is no other theory before or since that can claim this attribute!**

It has been nearly four years since this information was made available - with no **overt** response. Instead, the year 2005 celebrated 100 years of wildly improbable theories with no foundation in logic, experience, or common sense. Their irrelevance opens the gates to a technology that rushes ahead with no guidelines or ethics. We have seen in the theories, the virtual antithesis of objectivity; a celebration of mysticism over logic, arrogance over intelligence, mathematical obfuscation over clarity, and the triumph of cronyism and censorship. It is a system of thought that has been supplanted. One can only hope that it will soon - R. I. P.

Addendum Mar. 11, 2006:

Where is evidence for the dual aspect of a hydrogen atom? The answer was given in a previous paper[19] where it was stated that Dirac's relativistic treatment of the hydrogen atom kinetic energy levels[20] (statcoulombs) corresponded to equation (22). It is herein made explicit.

$$E = -ue^4/2h^2n^2 \ [1 + a^2/n \ (1/(j + \tfrac{1}{2}) - \tfrac{3}{4}n)] \tag{a}$$

Where $[u]$ = reduced mass of the electron, and $[n]$ and $[j +\tfrac{1}{2}] = 1$ (1st Bohr orbit). $[a]$ = fine structure constant. Using the Bohr equivalence, equation (1) reduces to

$$E = -um_e^2v^4r^2/2m_e^2v^2r^2 \ [1 + a^2 \ (1 - \tfrac{3}{4} \ )]$$
$$E = -uv^2/2 \ [1 + v^2/4c^2 \ ]$$
$$E = -uv^2/2 + uv^4/8c^2 \tag{b}$$

Where $[m_e]$ = mass of the electron, $[v]$ = velocity in the first Bohr orbit, $[a = v/c]$. Removing $u/2$ (both sides) and re-arranging,

$$v^2 \ = \ v^2 - v^4/4c^2 \tag{c}$$

It is obvious that two velocities are involved. Replacing the velocity on the left with the linear velocity $[v_m]$ and on the right with the angular velocity $[v_k]$, we have

$$v_m^2 = v_k^2 - v_k^4/4c^2 \ \text{ or since } v_mv_n = v_k^2$$
$$v_m/v_n = 1 - v_k^2/4c^2 \tag{d}$$

The substitution of velocities is easily justified in that the ratio $[v_k/v_m]$ at the first Bohr orbit is in the order of 1.000007. Experimental confirmation may be had if the accuracy is sufficient to identify it.

This explains the energy level shifts in the spectrum of the hydrogen atom as derived from dual states.

Addendum, Oct. 1/06
There is a pathetic fallacy associated with the assumption that the Lorentz transformation equations are relativistic. In fact, they are Galilean!
a. The assumed modifications of space, time and mass are reciprocal and therefore cancel. This specifically identifies an invariant space, time and mass.
b. Compound times are substituted for compound velocities (c +/- v).
c. They implicitly rely on a substratum (aether) which is common to both the moving object and observer.
See: Relativistic Transformation Equations: Additional Support for dual states at,
    http://wbabin.net/babin/transform.pdf

[1] W. Perrett and G.B. Jeffery, "On the Electrodynamics of Moving Bodies", (translation) The Principle of Relativity, Dover Publications, New York, N.Y. P38 (1952).

[2] An example of this is the Fizeau experiment where the results were attributed to relativity theory by default. See http://wbabin.net/sokolov/sokolov15.pdf for a thoroughly classical treatment.

[3] Römer's determination of light speed and the potential measurement of one-way propagation of light.

[4] An Analysis of the Theoretical Foundations of Special Relativity, W. Babin http://wbabin.net/babin/webdoc1.htm

[5] The Synthesis of Quantum Electrodynamics, Relativity and Classical Mechanics, W. Babin, International Scientists Club, St. Petersburg, July 9, 2002. http://wbabin.net/babin/wd6.htm.

[6] A Theoretical Analysis of the Foundations of Special Relativity, W. Babin, http://wbabin.net/babin/webdoc1.htm.

[7] The Triangle of Velocities, A. Vukelja, http://wbabin.net/physics/vukelja2.pdf

[8] Ibid 5 & The Theoretical Basis for Superluminal Speeds and Superconductivity, W. Babin, http://wbabin.net/babin/super.htm

[9] Ibid 5.

[10] Ibid 5.

[11] Ibid 5.

[12] Ibid 5.

[13] Ibid 5. Identifies the energy of radiation as E/2 and equaling the energy of the electron (Rydberg radius)

[14] Theoretical Analysis of Sub-Atomic Particle Interactions, Lorentz Transformations, W. Babin, July, 2000, http:// wbabin.net/babin/dyna2.htm

[15] The Equivalence of Magnetic and Kinetic Energy, C. van der Togt, http://wbabin.net/physics/cvdteq.pdf

[16] Determinism versus Probabilism, W. Babin, http://wbabin.net/babin/dvp.htm

[17] Explaining the Ellipse, M. Mathis, http://wbabin.net/mathis/mathis20.htm

[18] The Grand Unified Field Theory, Walter Babin, http://wbabin.net/babin/guft.htm

[19] Ibid 5

[20] Quantum Physics, John Wiley & Sons, 1985, Eisberg-Resnick, p 286