An Analysis of the Theoretical Foundations of 20th Century Physics

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Abstract
A critical evaluation is made of the fundamental concepts that shape contemporary physics. The critique is based on the interdependence of philosophical principles and experimental evidence. Application of logical methods that incorporate this interdependence provide simple solutions to seemingly difficult problems, whereas it is shown that ignoring it leads to excessive complexity, *ad hoc* theories, contradictions and statements that have no basis in logic or experience.

Introduction

The amazing success of applied mechanics and electrodynamics during the 19th century allowed theoretical physics to usurp the role of philosophy, claiming itself in sole possession of, and sole purveyor of truth. There followed an astonishing series of improbable theories, including the idea of all matter compressed into a dimensionless point and gurgling accounts of the first nanosecond of existence. The advent of the "god" particle and eleven dimensional string theory suggested an asymptotic squeeze on both expansion and intelligibility. What necessarily followed was a proposal for the **total abrogation of physical law** in the "many worlds, many laws" theory[1]. This offered unlimited elbowroom for further metaphysical nonsense but left theoretical physics on the lip of total anarchy. The following is provided in order to forestall further collapse.

Postulates:

1. Accepts those of Galilean relativity, classical mechanics and electrodynamics.
2. The formulas of special relativity as an extension of, or incorporated in the above.
3. Intrinsic interdependency of philosophy with physics (they are the same).
4. Existence of archetypal functions, which are already explicitly or implicitly contained in the categories of philosophy.

A. THE GENERALIZATION OF PHILOSOPHY

Absolutism Versus Relativism

> *There is no chance and no anarchy in the universe. All is system and gradation.*
> *Ralph Waldo Emerson*

In the *Scholium* of Newton's *Principia*[2], we find definitions for the primitive physical concepts.

1. *Absolute, true and mathematical time, of itself and from its own nature flows equably without relation to anything external…*
2. *Absolute space, in its own nature, without relation to anything external, remains always similar and immovable…*
3. *Place is a part of space which a body takes up…*
4. *Absolute motion is the translation of a body from one absolute space into another.*

This statement of universal principle is then followed by the comment,

"It may be, that there is no such thing as an equitable motion, whereby time may be accurately measured… For it may be that there is no body really at rest, to which the places and motions of others may be referred… It follows that absolute rest cannot be determined from the position of bodies in our regions.[2]"

Taken together, the statements are an expression of pure Platonism in the acceptance of archetypal entities and their mundane counterparts. Furthermore, there is recognition of their antithetical nature and mutual exclusivity in the deduction,

"Wherefore, entire and absolute motions can be no otherwise determined than by immovable places.[3]"

Having declared absolutism to be beyond experimental verification, it was necessary for Newton's axiomatic laws of motion and their corollaries to conform to Galilean relativity. Relativity states that the laws of physics are **universal and absolute**, but apply to **the particular**[4]: This indicates a dimensional and/or hierarchical relationship. Relativity (true to its meaning,) relates to the interaction of inertial states.

Astonishingly, the belief in a universal continuum devoid of any physical attributes remained the dominant theory despite explicit experimental and theoretical evidence to the contrary. The null result of the Hoek experiment was re-interpreted by Fresnel to be the partial convection of light in matter due to a higher density of aether. As such, it fails the inductive test since it requires the universal aether to be both invariant and relativistic. While its mathematical representation may or may not be correct, it is based on a theoretical *non sequitur*.

In order to retain universality, the Michelson-Morley experiment was interpreted by Lorentz and Einstein as a contraction of space in the direction of motion, coupled with a dilation of time. This required the aether to be either a supra or sub-ordinate continuum. Einstein on the other hand, declared that a universal aether was not required in his formulas! This was hailed as a bold and liberating stroke although in practice, it was a re-statement of Galilean relativity, where the observer is placed in a dominant role. Unfortunately, Einstein's insight was destroyed by his insistence on a universal and absolute speed for light as in Maxwell's theory[5]. As Newton observed, if one thing is absolute, all things are absolute.

This cleared the way for Minkowski's four-dimensional continuum[6]. However, it was based on the presumed experimental evidence for special relativity and since there was no evidence, there existed a circular argument wherein one required the other as principle. In the final analysis, a bias towards relativism led to the destructive and essentially nihilistic doctrine of ontological relativity, which plagues theoretical physics to this day.

Determinism Versus Probabilism

Certainly the atoms did not post themselves purposefully in due order by an act of intelligence…
Lucretius

Absolutism received early confirmation in Planck's discovery of the fundamental unit of angular momentum, whose energy was determined only by the frequency of application. This was the understanding adopted by the earlier theorists. Under the Copenhagen interpretation, it gradually became its antithesis. Quantum mechanics, whose very name infers discreteness, predictability and simplicity, found itself expressed through an obscure probabilistic methodology and mathematical formalism of stunning complexity. Probability, an ancient concept[7], was called the "new quantum mechanics". Despite being the antithesis of law[8] it became a form of "conditional" law under the "uncertainty principle"; the condition being $\Delta p_x \Delta x \geq \hbar/2$ which, not surprisingly, is merely the either/or coin-flip basis for probability.

Although professing relativistic asynchronism and indeterminacy, it compiled a range of physical constants whose values were known to extremely high levels of accuracy[9], claiming that while one attribute of a given situation might be expressed with unlimited precision, the others were simultaneously uncertain. There is no logical basis for such a theory (although it may imply a practical limit) since the existence of one absolute precludes it. However, the operational advantage to probabilism is that **any law can be ignored if found to be inconvenient**. For example, quantum mechanics states that an insurmountable coulomb barrier can be penetrated by a particle, since the probability of such an event, although "vanishingly small", is not zero[10]. Another example of intellectual nonsense is that the weak force is mediated by virtual particles whose mass exceeds the nucleus by many orders of magnitude[11].

Iterative mathematics and statistical methods have wide application and importance in physics, but cannot be considered fundamental. If the probability of an event approaches zero, it will not

happen and the law is deterministic. If it approaches one, it will happen and the law is deterministic. If it is neither one nor the other, it may or may not happen, and no law applies. e.g. Since Schroedinger's equations approximate Bohr's orbitals for hydrogen, there is no practical need for introducing their "waves of probability" or the complexity they entail.

Probabilism states that something is true because it works. Determinism states that something works because it is true. While the latter insists on a logical progression to or from a given principle, the former admits to no such constraint. Theory is subordinated to the point that any explanation will suffice. Since probabilism has no basis in logic, **no logical argument will dislodge it**. Domination is achieved through **authority,** whose utterances can only be supplanted by a greater authority. This is the basis for the censorship practiced by mainstream physical journals as well as their acceptance of the unsubstantiated and wildly metaphysical theories delivered by the institutions of learning.

Monism Versus Dualism
> …first principles are incapable of demonstration, for they are known neither by art nor sagacity:
> Clement of Alexandria

Monism (in the general sense) is the ontological basis for the logical functions of regression and progression. It permeates the entire history of human thought, representing linear thinking of the most primitive kind. Examples abound: Aristotle's unmoved mover, general relativity's singularity, black holes, the big bang…. However, a critical evaluation reveals that each statement contains its opposite! Ontology pairs with teleology, thesis with antithesis and a deductive dialectic joins with the inductive in a circular argument. In Aristotle, we have motion and non-motion, black holes necessitating white holes and the big bang singularity implicitly containing multiplicity.

Given the polarity of fundamental concepts, it is not surprising that all operational theories contain both. This is sufficient reason for *angst* since it gives abundant evidence for the supporters of karmic inevitability and at the same time, the latitude for "free will" in the infinite distance between opposites. Yet no *angst* exists. According to C. G. Jung, the ability to simultaneously hold opposing views is a true sign of intelligence. As an example, we have no difficulty expressing the infinite complexity of the universe while referring to it in the singular.

Dualism found physical expression in the particle-wave theory of electromagnetic radiation and its almost mystical extension to de Broglie's matter waves. Both incorporate Planck's unit of angular momentum for the ground state of the hydrogen atom, which is invariant in total and in its parts[12]. Not surprisingly, the Rydberg constant reduces to *1/4πtc* where *t* is the orbital period and *c* is the speed of light. Since *m, v, r, t* are invariant, we need only extend our principle to the proton for the hydrogen atom to be invariant, (as befitting its first position in the periodic table).

The antithetical aspect is provided by the invariant charge on the electron. Where the particle is localized, the charge extends to infinity and the combination of the two (in one) is the physical counterpart of the "unity of opposites" expressed in the foregoing. Since we have already established the "object" as a particular and its charge as an infinite counterpart, it should be obvious that we have provided the **theoretical basis for Galilean frames of reference**[13]. This allows us to replace the hypothetical aether with the well-known attributes of the electromagnetic field[14], which has the speed of light as an experimentally and theoretically confirmed ratio. Empty space, devoid of any attributes**,** is replaced with a "null" field, signifying a system or systems in equilibrium. An important aspect of this theory is that it establishes the unequivocal conjunction of the finite with the infinite[15]. Equally important is the replacement of unknowns with known physical quantities.

Radiation (the photon) is then due to the excitation of the electron and given the experimental evidence, must display the characteristic magnitudes of the ground (or excited) states of the hydrogen atom. The angular momentum of the electron, $\hbar$ has the same magnitude in radiation. The "mass-equivalence" of the photon is reduced to *mα,* (*α* = fine-line constant,) and the speed, increased to *c*. **It is a disturbance of the medium** and the propagation speed is an attribute of the medium in which it moves[16]. According to fundamental principle, the speed of light cannot be

absolute without the same designation for time and space. By subordinating it to Galilean relativity, another *ad hoc* theory is removed.

Qualitative Versus Quantitative

…there are also incorporeal things:
Aristotle

The ontological principles identified in the foregoing are qualitative and *a priori.* They are by no means exhaustive or necessarily fundamental. Since quantitative statements are *a posteriori*, quality submits to no system of logic. This is no doubt the cause of the indiscriminate form of relativism that dominated the last century.

Considerable effort has gone towards demonstrating that any universal principle must contain its opposite. The history of philosophy and physics shows that one view is invariably championed to the exclusion of the other. Being only partially true, it will exceed its limit of application then be forced to adopt the opposite view. Clearly a synthesis is required.

We can begin by recognizing the need to discriminate in the selection of our ontological principles. Since this cannot be a logical process we must look to something external. A cursory examination of the improbable theories of modern physics and all *gedanken* experiments shows there is no **physical evidence for such beliefs**[17]. If logic must correspond with principle, then **principle must correspond with experience.** While this appears to be self-evident, the practice is not followed and we have established no ontological basis for it. The qualitative and quantitative aspects may well represent the most general expression of opposites but being primarily cognitive, they suggest no apparent link to the phenomenological world. This brings us to the four archetypal functions identified and explored in two previous papers[18].

The "Quaternity"

In the "Consilium consiugii" the four qualities are arranged as combinations of two contraries
C. G. Jung

The four archetypal "functions" are the basis for the generalization of both philosophy and physics. While they represent an easy step to the "pseudo-sciences" and mysticism, the reverse is also true. The functions are derived from theoretical imperatives and solid practical experience. When fully explored and understood, they will be accepted as the operational cornerstones for all of science and art.

> **Logic:** Quantity, progression, regression, mathematics, routine - separation
> **Intuition:** Metaphysics, religion, politics, geometry, quality - unification
> **Practicality:** Matter, pragmatism, certainty, application - structure
> **Emotion:** Art, music dance, liquidity, expression, uncertainty, morality – content

The archetypal functions are universal[19] and are equal in all respects. Each is expressed in a language incomprehensible to the other three. By necessity, they are simultaneously present in all things in varying degrees. No labels can fully identify their meaning. This particular selection represents the four categories of philosophy as an extension of the four psychological types of personalities. Rather than adopting one category to the exclusion of the others as has been done throughout history, the generalization of philosophy is achieved by identifying each as a necessary component of the whole.

The logical and intuitive functions may be loosely defined as "mind", or in existential terms, "essence", where the practical and emotional constitute "matter", or "existence". (It is important to note that the categories for mind have lately found **direct confirmation** in biophysics as left and right brain functions.)
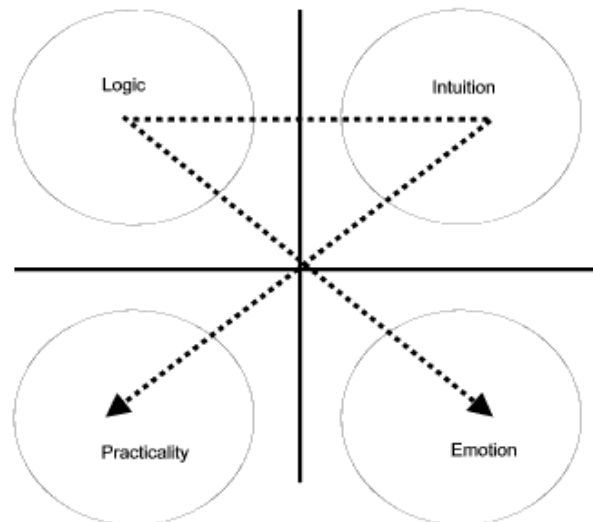
In Fig. 1, the diagonals indicate a counterbalance or corroborative dependency; the conjunction of noumena and phenomena. While a correlation is obvious with respect to theory (intuition) and experiment (practicality), the same cannot be said for the connection between logic and emotion. The relationship is best illustrated in J. W. Von Goethe's Faust where Mephistopheles claims,

"He calls it reason, thus his power's increased, to be far beastlier than any beast[20]."

The functions of intuition and logic represent Hegel's thesis and antithesis, with synthesis in structure (science) or content (art) as issue. How this is done is the subject of a broader philosophical work. What is of singular importance is that the platonic absolutes exist **absolutely** in the intellectual/encompassing constructs of the mind and in that empyrean realm in which they participate or of which they partake. In their union, one is lead to the inescapable conclusion that "truth" and "reality" are found in the **median position!**

Any philosophy that claims universality must incorporate the broadest ontological principles and their antitheses, must be logical, practical and have deep emotional relevance. Sufficient to say that the foundation for the re-establishment of natural philosophy has been laid in the foregoing. It remains to demonstrate and incorporate it in the laws of theoretical physics.

B. THE GENERALIZATION OF THEORETICAL PHYSICS

Introduction
The ontological basis for Galilean relativity has been confirmed and with it, the Newtonian laws of motion. Early quantum mechanics may be derived from principle, while its later probabilistic expression may be ignored as a disconnected collection of *ad hoc* and contradictory statements. A generalization of physics must then devolve to the synthesis of classical mechanics and special relativity. The following will conclusively demonstrate the fact that the latter is either contained in the former or in its logical extension. Much has been introduced in previous papers and is repeated here for clarity.

Transformation Equations:
> Not every violation of order is destructive of the frame of reference in which it appears
> *Alexander Aphrodisias*

Transformation involves the determination or transfer of physical attributes from one inertial frame of reference relative to another. According to the Michelson-Morley experiment, light travels at **c**

(vacuum), in all equivalent frames of reference. Galilean relativity then requires that light exhibit compound velocities for frames in uniform relative motion (similar to sound) which results in the simple addition or subtraction (*c+v, c-v*) of speeds. Since light can only be seen (or felt) in the observer's reference frame, this satisfies both requirements.

Special relativity however, insists on a universal speed for light and applies the formula

$$[(c-v_m)(c+v_m)/c^2]^{1/2} = (1-v_m^2/c^2)^{1/2} \qquad (1)$$

where v_m denotes the velocity associated with momentum.

as the modifications of time and space (and inversely to mass), along the **X** axis. This is a total misrepresentation of the fundamental principles of analytic geometry. Since it is the root of a second order equation it refers to area and must necessarily **incorporate the Y** axis.

Drawing a circle with light **c** as radius for a "fixed" and moving frame of reference, the formula represents the ½ chord **d** running perpendicular to a velocity displacement in *S'* from origin along the **X** axis (as base), to **c** as hypotenuse in **S**, the "fixed" observer's frame. Obviously, there is no change in space or time and consequently, no change in mass.
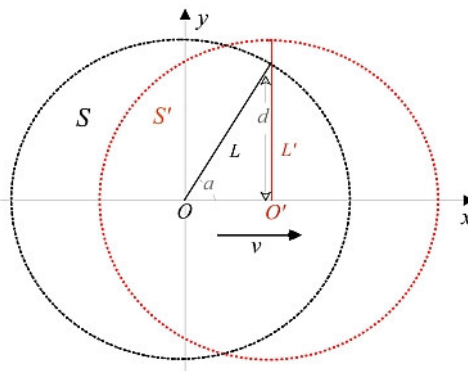

Fig. 2: The black and red dotted circles represent a spherical pulse of light emitted simultaneously in *S* and the moving frame of reference, *S'* at origin *0*, propagating over a period of time *t*. At the same instant, a beam of light in *S'* is emitted, perpendicular to its direction of travel, and observed in *S*.

The radii **L** and **L'** are equal, but the former is rotated at an angle **v/c**. This, coupled with compound velocities, provide the *de facto* basis for stellar aberration and the Sagnac effect[21,22]. Changes in velocity, such as in a transfer from one medium to another would display a variance in the vertical component as per **d** in Fig. 2.

As speed **v** increases or decreases, there is a corresponding change in the perpendicular, **d**. At origin, there is no velocity and no basis for "rest energy", other than possible spin. It reduces to zero (zero wavelength in the forward direction) when the displacement velocity equals **c**. While the speed of light is limited by its medium, matter is not. Superluminal speeds[23] would be represented by an inversion of the chord, **d**. This results in negative wavelengths. Among other things, objects approaching on the **X** axis would appear to be **receding in the opposite direction**. At **2c, d** would equal **-L**

The fact that there is a **simultaneous** velocity component for light along both the negative and positive **X** axis further indicates that the transformation equations of relativity apply to radiation. This has been covered in detail in previous papers[24]. Changes in space and time are replaced by

the normal changes in wavelength and frequency associated with the Doppler effect. Simultaneity is re-instated.

Special Relativity

The canonical equations of relativity contain the speed associated with momentum - *Eq, (1)*. A different speed emerges for kinetic energy:

$$(m-m_o)c^2 = mv_k^2/2 \text{ and } m/m_o = 1-v_k^2/2c^2 \tag{2}$$

where m and m_o represent relativistic and rest masses

The relationship between momentum and energy is expressed by,

$$m^2v_m^2c^2 + m_o^2c^4 = m^2v_k^4/4 + mm_ov_k^2c^2 + m_o^2c^4 \tag{3}$$

From *(1)* and *(2)* we derive the relationship between speeds[25]

$$v_m^2 = v_k^2 - v_k^4/4c^2 \text{ or } v_m^2/v_k^2 = 1 - v_k^2/4c^2 = m +m_o/2m \tag{4}$$

No justification exists for the kinetic energy in expression *(2)* unless it is assumed *a priori* that rest energy incorporates the speed of light. The rest energy cannot simply be "dropped in" to compensate for space-time changes. According to the tenets of relativity theory, an object at speed **c** would have an infinite, or zero mass! It appears that the famous equation regarding the equivalence of mass and energy could equally be reversed! What appears likely is for the rest energy to be associated with field. In any case, the representation is that of a constant in the sum of potential and kinetic energy.

The Compton Effect

The Compton effect[26] was widely hailed as an experimental confirmation of special relativity. It was seen as a perfectly elastic collision between a photon and an electron, yet the result is obviously partial, since the electron is presumed to gain a significant amount of mass at the expense of the photon's energy.

In order to simplify calculation, the recoil angle of the photon is set at 90°. Since the momentum **p** of the photon is,

$$p = E/c = hf/c \tag{5}$$

where E = energy, h = Planck's constant, f = frequency

its "mass-equivalence" becomes $p/c = m_l$ for the initial and m_f for the final. According to Compton,

$$(m_l - m_f)c^2 = (m - m_o)c^2 = mv_k^2/2 \tag{6}$$

and

$$p = m_1c = mv_mCos\ \phi \tag{7}$$

where ϕ = trajectory angle of the electron.

The previous section ascribed relativistic effects to the electromagnetic field. This **indicates no change in mass** and the application of the mechanics of an elastic collision with its attendant mechanical equations.

The energy of the "recoil" photon is,

$$(m_l m_o / m_l + m_o)c^2 \qquad\qquad\qquad (8)$$

This infers **total photon capture** and the subsequent release of energy equivalent to the so-called "reduced mass" of an orbiting pair. It is obviously a field coupling. Disregarding **c** in equation *(7)* we see that

$$m_l - m_f + m_o = m$$
and
$$(m_l - m_f)c^2 = mv_k^2/2 \qquad\qquad\qquad (9)$$

Obviously, c^2 is not related to the rest mass of the electron. There is either the sum of an induced magnetic field and the initial static electric field, or more probably, an intrinsic magnetic field that equals the electric field[27]. Yet induced magnetic fields are glaringly absent in the interpretation of the experiments of Bucherer[28] and Compton. Furthermore, it has been known since the earliest days of electromagnetic experimentation that fields have inertial properties[29].

The mechanical and electromagnetic interactive and parallel functions in the Compton effect provide dramatic proof of **mass-charge duality** and their product in *(3)* and *(4)*. Furthermore, a solid foundation in theory and experiment is made for the squared charge and second-order progression of radii in Dirac's relativistic treatment of the energy levels of the hydrogen atom[30].

The Compton effect also shows that an **accelerated charge does not emit radiation[31]**. Emission is limited to the magnitudes of a "reduced mass" of a mechanical coupling or electron orbit. The classical theory incorrectly inferred that an orbiting electron would spiral into the nucleus through loss of kinetic energy. This is obviously not the case, and the limitation to "orbits" with integral multiples of **h** may or may not apply to the electromagnetic field of the atom! We may also assume in contrast to current theory, that **all mechanical orbits are allowed** within certain parameters. To be explicit, the mechanical laws apply to matter, electromagnetic to field and their **combination is expressed in the equations of mechanics, electrodynamics and relativity**.

Further evidence of mass-charge duality is shown in the circular motion of a charged particle in a magnetic field[32]. The force equation (fundamental units-CGS sys) is,

$$F_m = evB/c = mv^2/r$$
Where e=charge, B=magnetic field, r&v=first Bohr radius, velocity

The center term (based on the Bohr equivalence, $e^2 = mv^2 r$) equals,

$$e^2 v^2/c^2 r^2 = mv^4/c^2 r$$

which obviously does not equal the third term. It represents the equivalent of a mechanical force and what appears to be a partial term for the magnetic field. Regardless, fourth order magnitudes are involved.

Inertia

> *The Stoics hold that there are two principles for the universe, the active and the passive*
> *Diogenes Laertius*

Relativists claim that the theory is a generalization, incorporating classical mechanics as a special case. This belief is illustrated with their 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. Furthermore, relativistic formulas implicitly **contain the Newtonian velocity.** This has been detailed in a previous paper and is merely summarized here.[33]

$$2m_i c v_m Cos\phi/(m_i + m_o) = v_n v_m = v_k^2 \qquad (10)$$

Obviously, Newtonian mechanics already contain inertial effects. Since v_m has been identified as linear motion, all calculations regarding v_n confirm that it also is linear, but in the reverse direction. The velocity associated with **total and kinetic energy is explicitly defined as the angular velocity v_k.** Since this is equal to the combined linear velocities, an immediate explanation for its scalar attribute is also identified.

Inertial effects are **incorporated** in "relativistic" masses,

$$(m - m_o)2c^2/m = 2m_i c v_m Cos\phi/(m_i + m_o) = v_n v_m = v_k^2 \qquad (11)$$

The distance d in Fig. 2 is the radius of a de Broglie "matter wave". By identifying $v_m t$ and $v_n t$ as the radii of circles we may define an ellipse as 2π times their product, with $v_k t$ being its semi-major axis (matter wave). Setting mass and charge (inertial displacement) as foci, the ellipse also represents a physical orbit. The displacement represents an increase in potential, which is retained until transfer in subsequent collisions. Both mass and charge are reciprocating inertial effects.

Planetary Orbits

Mathematics is written for mathematicians
Copernicus

The following formulas are taken directly from classical mechanics.

With respect to the center of mass, speeds of planets and suns are inversely proportional to their masses so that,

$$v_p/v_s = m_s/m_p \qquad (12)$$

The speeds relate as follows,

$$v_p = V(m_s/m_s+m_p) \qquad (13)$$
$$v_s = V(m_p/m_s+m_p) \qquad (14)$$

where V = sum of speeds of the sun and planet relative to center of mass, $m_s, v_s, m_p, v_p,$ = masses and speeds of the sun and planet respectively. Their kinetic energy would then be,

$$m_s v_s^2/2 = m_s m_p^2 V^2/2(m_s+m_p)^2 \qquad (15)$$
$$m_p v_p^2/2 = m_s^2 m_p V^2/2(m_s+m_p)^2 \qquad (16)$$

and adding,
$$m_p m_s V^2/2(m_s+m_p) \qquad (17)$$

By subtracting the potential energy, an expression for total energy is derived (circular orbit):

$$m_p m_s V^2/2(m_s+m_p) - m_p m_s G/r = -m_p m_s G/2r \qquad (18)$$

from which, according to convention, we derive the "proper" sum of velocities,

$$V^2 = G(m_s+m_p)/r \qquad (19)$$

However, we see that equation *(19)* is incorrect! The velocities have been initially defined and their sum **cannot be changed**. Once again, a pre-conditioned response determines the outcome. Because of the inverse proportionality of speeds with masses, (*19*) may be expressed:

$$v_p^2(m_s+m_p)^2/2m_s^2 \neq v_p^2(m_s+m_p)/m_s \qquad (20)$$

Although the differences among "relativistic-mechanical" speeds would be exceedingly small in planetary motion, there is no doubt that they exist. Further analysis will show that the energies associated with orbit incorporate v_k as in the Compton effect. For instance, the difference in *(20)* represents, $v_m/v_n = v_m^2/v_k^2 = v_k^2/v_n^2$

If we establish the proportionality constant **Q** as the counterpart to the gravitational **G** and apply the mechanical formula for total energy to the hydrogen atom, we will find,

$$m_pm_eV^2/2(m_p+m_e) - m_pm_eQ/r = (-m_pm_eQ/2r)v_k^2/2c^2 \qquad (21)$$
$$\text{where } V = v_p+v_e \text{ and } m_pm_e = \text{proton and electron velocities and masses}$$

$$= V^2/2 - (m_p+m_e)Q/r = (m_p+m_e)Q/2r)v_k^2/2c^2 \qquad (22)$$

Adjusting for the proportionality between velocities and masses,

$$= v_m^2(m_p+m_e)^2/2m_p^2 - v_m^2(m_p+m_e)/2m_p = -v_m^2(m_p+m_e)v_k^2/4m_pc^2 \qquad (23)$$
$$= (m_p+m_e)/2m_p - 1 = -v_k^2/4c^2 \qquad (24)$$
$$= (m_p-m_e)c^2 = m_pv_k^2/2 \qquad (25)$$

We see that a **classical** treatment of the total energy of the hydrogen atom reduces to **the relativistic expression for energy**.

Summary:
Much has been purposely omitted in this attempt to encompass philosophy and physics in the span of one paper. However, a continuation along the same line of reasoning obviously leads to the total unification of electrodynamics and mechanics (unified field theory). While the theoretical assumptions of special relativity have been disproved countless times, the formulas, when properly applied, represent a major step towards the generalization of all of physics. Indeed, the generalization has been accomplished. What remains is recognition of that fact.

All things are true, but only partially. Partiality generates ideas which have little practical use, other than to develop complicated and *ad hoc* theories in order to support unwarranted assumptions. Although speculative theories may lead to effective concepts, they should remain distinct and separate until representation is found in physical reality. In the above, there are no physical quantities or equations introduced that have no basis in, or cannot be found in experiment.

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[1] Physics looks for new Einstein as nature rewrites laws of universe, Times Newspapers Ltd., Sept. 9, 2001.
[2] Newton's Principia, Vol. 1, 3rd Edition, P.6, Motte's Translation, University of California Press, 1962.
[3] Ibid 2, P.9.
[4] Note: This demands the particle be absolute and invariant by logical extension.
[5] A Treatise on Electricity and Magnetism, James Clerk Maxwell, Chapter XX, Vol. 2, P. 431, Dover Publications, 1954.
[6] Space and Time, H. Minkowski, Address at the 80th Assembly of German Natural Scientists and Physicians, Cologne, Sept. 21, 1908.
[7] On the Nature of Things, Lucretius, P. 21, The Free Press, 1966, Edited, J. L. Saunders.

[8] "How dare we speak of the laws of chance? Is not chance the antithesis of all law?" Bertrand Russell.

[9] The Synthesis of Quantum Electrodynamics, Special Relativity and Classical Mechanics, Walter Babin, Published, International Scientists Club, St. Petersburg, RU. See, http://wbabin.net/babin/wd6.htm.

[10] Quantum Physics of Atoms, Molecules, et al., R. Eisberg, R. Resnick, P. 201, John Wiley & Sons, 2nd Edition, 1985.

[11] Why would we need a boson the size of an iron atom to flip a quark? The Infinite Weakness of the Theory of Weak Interactions, Miles Mathis, http://wbabin.net/mathis/mathis52.pdf

[12] Determinism Versus Probabilism in Physics, Walter Babin, http://wbabin.net/babin/dvp.htm

[13] This is subject to further generalization.

[14] "This inability to compare matter and energy to space… is clearly demarcating the limits of applicability of the philosophy of physical science", Spaced Out, D. & S. Birks, http://wbabin.net/physics/spaced.htm

[15] See: The Theoretical Basis for Superluminal Speeds and Superconductivity. Walter Babin, http://wbabin.net/babin/super.htm for the juxtaposition of the infinite and infinitely small.

[16] Ibid 9.

[17] "The black hole has no foundation in theory whatsoever. Neither Newton's theory nor Einstein's theory predict it. In fact, both theories preclude it…" Stephen J. Crothers, http://www.sjcrothers.plasmaresources.com/

[18] Mathematics, Logic and Intelligence, Walter Babin, http://wbabin.net/babin/intro1.htm: The Synthesis of Art and Science, Walter Babin, http://wbabin.net/babin/synthesis.pdf

[19] Mysterium Coniunctionis, C. G. Jung, Princeton University Press, 1976, P. 3 Footnotes:(ars chemica, P. 79) "In this stone are the four elements and it is to be compared to the world and the composition of the world". The book represents a vast storehouse of alchemical and symbolic references to the "quaternity".

[20] A military objective in a battle might be to kill more of the enemy troops than do they of yours. Such an objective might be logical, but it is morally reprehensible (emotion, content). It represents the mind-set that existed behind trench warfare and "ethnic cleansing".

[21] Ibid 9.

[22] A Classical Replacement for Relativity, Walter Babin See: http://wbabin.net/babin/precis.pdf

[23] Ibid 15

[24] A Theoretical Analysis of Sub-Atomic Particle Interactions, Published, 2002, International Scientists Club, St. Petersburg, RU. See: http://wbabin.net/babin/dyna2.htm. Ibid 7

[25] Ibid 9,

[26] A. Compton: Physical Review, 21, May 1923, p. 483

[27] "Clearly the dimensions of magnetic quantities are the same as those of the corresponding electric quantities…"Einstein's Theory of Relativity, Max Born, Dover Publications 1964, P. 155

[28] Science Abstracts 11, 687, 1908

[29] Ibid. 28, P. 210

[30] Ibid 10, P. 286.

[31] The Maxwellian "kinks" in the lines of force depend on the existence of a universal aether.

[32] Physics, K.R. Atkins, P 292, John Wiley & Sons, 1966

[33] Ibid 9.