Simple Beauty

**A Foundation
for the Unification of Physics**

New Quantum Field Theory (Superfluidic)

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An Evolving Project ...

A Framework Hypothesis for the ZPE Field

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Gentlemen:

Enclosed below is a framework hypothesis for a definition of the so called ZPE field. It aetheric in nature but you might find it interesting and entertaining. It represents over 22 years of research and it is provided in a spirit of cooperation and hope.

If you do find it interesting or mildly worthwile please let me know.
Helpful comment will be greatly appreciated.
Thank you in advance for your time and consideration

Paul Stowe
Nullius in Verba

Simple Beauty

A Foundation for the Unification of Physics

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ABSTRACT

The discovery by Max Planck.s in 1900 that the emission of thermal radiation could only occur in discrete quantities related to a emission constant (called Planck's constant) and the subsequent evolution of quantum mechanics, has resulted in an inability to establish a standard foundation for all classes of physical phenomena. Recent efforts not withstanding (Superstring theories, SU(3)XSU(2)XU(1) ...etc), there still remains a distinct separation of quantum mechanics from other branches of physics, notably general relativity. This discussion suggests a common foundation for all physical phenomena and derives the known physical constants (h, e, o, μo, , R). It also provides for the manifestation of the four known forces as well as a simple explanation of there existence.

INTRODUCTION

Many of apparent inconsistencies that exist in our current understanding of physics have results from a basic lack of understanding of what are called fields. These fields, electric, magnetic, gravitational...etc, have been the nemesis of physicists since the birth of modern science, and continues unresolved by quantum mechanics. A classical example of this is the problem of an electron interacting with it's own field. This case results in the equations of quantum mechanics diverging to infinity. To overcome this problem, Bethe[1] introduced the process of ignoring the higher order terms that result from taking these equations to their limit of zero distance, in what is now a common practice called renormalization.

These field problems result in class of entities called virtual, existing only to balance and explain interactions. These entities can (and do) violate accepted physical laws. This is deemed acceptable since they are assumed to exist temporarily at time intervals shorter than the Heisenberg's uncertainty limit. It has been known for some time that such virtual entities necessitate the existence of energy in this virtual realm (Field), giving rise to the concept of quantum zero point energy.

As a result of this presentation I will propose the elimination of both the need for renormalization and any such virtual fields. This will be accomplished by replacing the virtual field with a real physical media within which we define elemental particles (which more precisely should be called structures) and the resultant forces which act between them.

The scope of this presentation is limited to conveying basic concepts. No attempt will be made to try to derive all possible elements and processes that can result. To do so would result in encompassing all of known physics (a daunting task). Although the basic field concepts are extremely simple, even the simplest permutations are not.

In the text, we deal with scalars, vectors, and populational averages. With the limitation of ASCII for UserNet presentations such variables will have to be described as follows: scalar values will be designated by standard lower case typeface (example c, speed of light), vectors variables will be designated by upper case typeface type (example V directional velocity), populational averages will be designated by bracketed typeface (example [p] populational average of momentum), and a vector value utilizing the

populational average will be both upper case and bracketed (example [P]). A full list of variable definitions can be found at the end of the text under the section designated nomenclature.

BASIC FIELD CONCEPTS

We will start by defining a single vector entity (a basic quantum {not a photon, neutrino, graviton}). The fundamental properties of this quantum entity is; it has momentum P, occupies space consisting of volume s, obeys Newton laws of motion, exerts no force, and no external forces are exerted on it. This quanta therefore move through four dimensional space (x,y,z,t) at velocity V and has an apparent mass m, equal to (P/V).

Next, a population n of these quantum, having random orientation, occupying volume s', such that there is spacing between the entities, results in a system described by basic kinetic theory (without friction or interacting forces {a superfluid state}). Since each quantum, by definition, has an intrinsic momentum P, the system momentum p_s, becomes simply n[p].

A direct approach for defining such a system's total energy is in terms of total quanta interactions directly. In any such system, these interactions, are directly proportional to the average travel distance between collisions (called the mean free path {MFP}) also known as the interaction length l, and the momentum of the colliding quantum. This property directly defines the lagrangian action parameter h of the system. This becomes:

> h = 2[p] intergral(from 0 to l) dl
> h = 2m[v] intergral (from 0 to l) dl
> h = 2pl = 2m[v]l {eq. 1}

A direct consequence of this, results in the least action rule for such systems.

The action parameter h may be directly integrated by the rate of these interactions to define an internal energy j. Since the rate of interaction i, is simply [v]/2l, this becomes:

> j = intergral (from 0 to i) nh di
> j = nhi {eq. 2}

and, nhi = 2n[p]li and i = v/2l, therefore equals nm[v]^2. Given nm must be the total mass m' of the system, this results in a total system energy of j = m'[v]^2. If [v] were to be c we find that we have the relativistic form of the energy equation. If the interactions are in the form of wave motion i will be the frequency and we get j = hi, the energy contained by a wave of frequency i. Of course this does not define the total energy of n waves of frequency i.

Next, we can define the systemic fluctuations in the momentum content of a limiting volume element. This is known as the divergence. Divergence is defined as:

> DIV = Lim as s -> minimum: (closed intergral of da) / ds
>
> Where a is the surface area of volume s

taken for momentum we get:

> DIV p = Lim -> minimum: ([p] closed intergral da) / ds {eq. 3}

This term e, becomes +/-2[p]/r in a torroidal topology (predominantly consisting of vortex rings {this is an assumption based on the spinor topology of superstring theories and consistent with the earlier atomic vortex theories}), a = 4pi^2zr and s = 2pi^2zr^2 {z is the large torroidal radius and r the poloidal axis} and represents an intrinsic fluctuation of the quantized particulate momentum in the limiting volume element.

If e is zero, the system is by definiton, incompressible. However, this would of necessity, require l {MFP} to be zero (no physical spacing between the individual quantum). Such a situation results in conditions that are totally incompatible with all known physical phenomena. It is the spacing l, which results in a finite transmission speed that is critical to the development and propagation of any wave phenomena. However given l as being non zero, it is a requisite that e must be non zero, and will have both a positive and negative value. Therefore e must be a permanent feature of the system! We will suggest here that e is the basis for electrical charge in physical systems.

DEFINITION OF PERMITTIVITY AND PERMEABILITY

In classic kinetic theory, longitudinal (simple compression) wave speed is defined as:

$c\_l = sqrt(3q / rho)$ {eq. 4a}

where rho is the density of the medium and q is systemic pressure.

Transverse waves in an elastic medium are defined as:

$c\_t = sqrt(q / rho)$ {eq. 4b}

> Note: The author recognizes that under classical kinetic theory, transverse waves are not carried in fluids. However, Lord Kelvin demonstrated (ref 5 Volume 1, page 296), that only transverse waves would exist in a fluid predominantly consisting of vortex rings, a state which he called a vortex sponge. The reason for this, is due to the gyroscopic action of the fluid circulation around the large and small axis of the vortices.

with pressure q therefore becomes $1/3(rho\ c\_l^2)$ or $(rho\ c\_t^2)$ To resolve these parameters we turn to the well known electro-magnetic equation analogous to 4b above. This equation, first introduced by J. C. Maxwell, correlated the speed of propogation of light c to the permittivity epsilon_not and permeability mu_not of an apparent vacuum. This relationship is:

$c = sqrt(1/epsilon\_not\ mu\_not)$ {eq. 5}

Assuming equation 5 is equal to equation 4b (bbased on the observation that light propagates as transverse waves) we find that both have two terms. Remembering that e was defined as +/-2[p]/r, resulting in units of mass over time (mass flow), and knowing that columbic force F is $e^2/(4pi\ epsilon\_not\ d^2)$, we find that epsilon_not will have units of mass over volume (a density term) leaving mu_not as having units equivalent to 1/q, which in standard kinetic theory is known as the "coefficient of compressibility".

We now have self consistent definitions for h, e, epsilon_not, and mu_not, the question is, will definitions hold up? First, given h = 2[p]l and e = 2[p]/r and if we assume r -> l we find l becomes:

$l = sqrt(h/e) = 6.43E-08$ m {eq. 6}

and [p] becomes:

$[p] = sqrt(he)/2 = 5.15E-27$ kg-m/sec {eq. 7}

when h and e have there established measured values of 6.626E- 34 and 1.602E-19 respectively.

Next lets consider a volume that corresponds to Kelvin's vortex sponge. One must realize that changes in any one ring affect all others. As one ring dilates or contracts (resulting in volume/area changes of the ring) it must result in a responding sympathetic distortion of all other rings (quantum non-locality?) if the total volume of the system is to remain constant. The resulting coupling factor will consist of square root of 3 (1.73...[the relationship of particle speed to transverse wave speed]), the geometry of the ring (4 PI^2

[the area geometry constant of a torroidial ring]). This should lead to numeric term that would be constant for these types of interactions. This term, designated a, then becomes:

$$a = \sqrt{3}(4\pi^2) \quad \{eq.\ 8\}$$

which is 136.757 / 2 ... This is extremely close to inverse alpha (the quantum fine structure constant) at 137.036 / 2... with a difference of only 0.2%. We will later show that these and other differences are related to the magnetic moment anomaly {MMA = 1.001165923} already identified in physics. In the case above, $2a(MMA)^2 = 137.074$ vs. 137.036...

If the fluid system were to consists predominantly of vortices, proper determination of any systemic density fluctuation {which may be what epsilon_not is} would include or involve the a term.

$$epsilon\_not = ae^2 / hc = 8.836E\text{-}12 \text{ kg/m}^3 \quad \{eq.\ 9\}$$

and mu_not becomes:

$$mu\_not = h / ace^2 = 1.26E\text{-}06 \text{ m-sec}^2 / \text{kg} \quad \{eq.\ 10\}$$

Since a is off by $\{MMA\}^2$ the above terms reflect this variance.

DEFINITION OF RYDBERG'S TERM - R

Understanding the basic nature wave action in any fluid we know that:

- Waves are carried by cyclic interactions of the fluid particles (quanta).

- The speed of a wave is dependent on the root mean speed of the particle population and l {MFP}.

Therefore, since wave action is dependent on l and c, one would logically expect that spectral emissions (due to a change in vibrational states of the vortices) in atoms to be related to these parameters. Indeed we should expect such frequency shifts in atoms to be:

$$dnu = (kc / l)(1/n1^2 - 1/n2^2) \quad \{eq.\ 11\}$$

where n1 and n2 represent the vibrational changes of a ring. In the case of transverse waves, k will be the eigenvalue of the maximum shear stress in the plane of propagation. Since this eigenvalue is $1/\sqrt{2}$, this results in:

$$R = k / l \text{ and } k = 1 / \sqrt{2} \text{ therefore } R = 1/ (\sqrt{2}\,l) \quad \{eq.\ 12\}$$

$$R = \sqrt{e / 2h} = 1.0995427E\text{+}07 \quad \{eq.\ 13\}$$

and this definition of Rydberg's term (R infinity) matches the published value again off by $\{MMA\}^2$. Further, it is clearly derived from our hypothesis and provides a concise, simple reason for it's existence.

ELEMENTAL MASS OF THE ELECTRON & PROTON

In Bohr's theory, the value of R infinity is defined as:

$$R = (e^4 m\_e) / (8\,epsilon\_not^2 h^3 c) \quad \{eq.\ 14\}$$

Since equations 13 and 14 can be equated, and equation 13 does not contain the mass of the electron (me), we can resolve this mass. This gives us:

$$m\_e = sqrt(2he)(2a)^2 / c = 9.09E\text{-}31 \text{ kg } \{eq. 15\}$$

and the mass a proton as:

$$m\_p = ((2a)^3(8pi^2/3)sqrt(pi\ he/6)) / c = 1.67E\text{-}27 \text{ kg } \{eq. 16\}$$

the difference between these masses being a geometric factor. Although the proton may appear to be 1836 times more massive than the electron "it may actually only be 1836 times less reac- tive to electromagnetic interaction than the electron state". The variance in the values computed above and published values is 0.19 and 0.62 percent respectively.

THERMAL PHYSICS

In the kinetic theory, the relationship of temperature to the system's dynamic energy, is given by the equation:

$$qs = 3kT \ \{eq. 17\}$$

where k is Boltzmann's constant (1.38E-23 J/K) and T is temperature. The question of what temperature really is remains an open issue in science. It is known that temperature is intimately related to the energy content of matter. Clear indication that temperature is not energy, is evidenced by the different heat capacity of various material substances. When at the same temperature, materials which have the same number of molecules, but different heat capacity, have significantly different internal energy. Current convention is that temperature is a direct measure of the kinetic energy of the atoms or mole- cules. If this is true, the heat content of one substance must be equal to that of another if their masses are equal. This is consistent with what is observed, the heat capacity decreases as the gram molecular weight of the substance increases. In tackling the question of what temperature truely is, one needs to resolve temperature into MKS units. It is logical to expect temperature to be some measure of the collisional process occuring between atoms. Given that h is the action parameter, and e is DIV p, temperature must correlate to these parameters and must also involve the system propagation speed c. In working through the above it was discovered that the value of correlation constant k, (Boltzmann's constant) does indeed relate to these parameters and can be defined as:

$$k = h / ec \ \{eq. 18\}$$

and using accepted value is accurate to 0.083 percent. This will give us the units of temperature as an impact term. These units are consistent with the concept that temperature is a measure of the rate of interactions of the particles within the system.

WAVE GENERATION

The most exciting aspect of this hypothesis is that a non zero Divergence forces oscillating action, resulting in wave motion. No resonant standing wave are necessary. This is discussed in Ref. 4 page 3-115. For those so inclined, this section titled "The 'Natural' Sources of Sound", is an excellent primer. But simply put, the fact that at its smallest scales a compressible fluid will have natural density and momentum flucuations, results in wave motion. This is the natural source of sound. In standard fliuds this action is damped (by inter-rmolecular forces) an only results in a certain "background" of so called white noise. In a superfluid which is undamped ..., well I think you can get the picture.

Given this, DIV p will result in a characteristic oscillation. Given spherical symmetry it follows the equation of a linear harmonic oscillator. This is:

$$mnu = 1/2pi\ sqrt(mk) \ \{eq. 19\}$$

and we find that elemental charge e does indeed fit this form as:

$$e = 1/2\pi \sqrt{\epsilon_{not}\, hc / \sqrt{3}} = 1.6038E\text{-}19 \text{ C} \quad \{eq. 20\}$$

Therefore, the thermal signature of this fluctuation with an electron's rest mass becomes:

$$he/m_e = 3kT$$

and then:

$$T = he/3km_e = 2.81 \text{ degrees K} \quad \{eq. 21\}$$

This resulting value is, to say the least, interesting.

SUPPORTING EVIDENCE

It is a powerful argument, when one can derive all of the known constants that describe all electromagnetic phenomena from three simple well defined properties, p, c, l and a single hypothesis. Application of Ocham's Razor would suggest that the description could provide a clearer picture of the underlying mechanisms that the system it would replace. However, other clues have pointed in this same direction. These include Penros- e's twistor hypothesis, string /superstring hypotheses, and Ashtekar's loop space derivations. All of these works have pointed to the torroidal vortex structure of space. To date however, there has been a lack of realization of what these mathematical topologies represent. Unfortunately, this is probably due to the current belief that the fluid dynamical models of space are proven untenable.

CONCLUDING COMMENTS

A more informative form of the charge equation would be:

$$e = \sqrt{h \sqrt{eps/3u}}/2\pi = 1.603818...E\text{-}19 \quad \{eq. 22\}$$

or

$$e = k / (4\pi^2 \sqrt{3}\, u) \quad \{eq. 23\}$$

which is obtained by simply substuting $\sqrt{1/(u\, eps)}$ for c into equation 19. We then noted that the computed result is again 1.00109 times greater that the currently accepted value of 1.60217...E-19. We then note that the above form of the charge equation requires that the value of elemental charge be dependent on the value of u and epsilon. Since we know that these are measurably different in different materials, a result of this definition leads directly to a straight forward explanation of observed galvanic potential difference in dis-similar materials.

Now to a more interesting coincidence, we see that the electron magnetic moment u_e is measured to be:

$$1.00115(eh/((4\pi)m_e) \text{ [the Bohr magnetron])}$$

and the 1.00115 is known as the "electron magnetic moment anomaly". This value is striking close to the 1.00108 variance computed above, which I submit it is. This would suggest that our measurements of these constants might be tainted by the environment (air) is which most are taken. This would result the systemic variances based on this value (1.00115).

NOMENCLATURE

h = Planck's Constant (Field Action), 6.6260755E-34 J-sec
e = Elemental Charge (DIV P), 1.6021773E-19 C (kg/sec)
Epsilon_not = Permittivity (differential density), 8.8541879E-12 Nt-m2/C2 (kg/m3)
mu_not = Permeability (1/Pressure), 4 E-7 C2-sec/N-m4 (m-sec2/kg)
a = 1/2 of the inverse Fine Structure Constant, No units
m_e = Electron Mass, 9.1093897E-31 kg
m_p = Proton Mass, 1.672623E-27 kg
R = Spectra Emission Term, 10973731.534 (1/m)
k = Boltzmann's Constant, 1.380658E-23 J/mol- K (m-sec)
T = absolute temperature, K (kg-m/sec3)
c = Speed of Light, 2.99792458E+08
p = momentum, 5.1517347E-27 kg-m/sec
l = Mean Free Path (interaction length), 6.43091693E-08 m
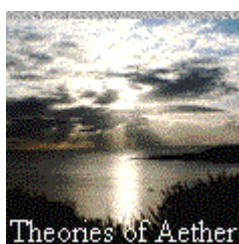v = velocity, m/sec
M = mass, kg
n = numeric value

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