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Determining Unification Energies of Fermion's in Zero Space

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Abstract: Femtometer sizes were obtained for the Radii of the Electron, Proton and Neutron using a Quantum Mechanical Energy Relationship and the Saxon-Woods Model. Yotta-electronvolt and 10000 Yotta-electronvolt energies were obtained for the invariant Gravitational Mass Energies of the Electron and Nucleons, respectively, using the Plank length in a renormalization calculation. An expression was found to determine the Gravitational Coefficients, A, B, and C, which scale the Gravitational Mass Vectors through the Higg's Field, for the Electron, Proton and Neutron, using Stoke's Theorem. All numerical results are given with nine figures to present the scale of dimensions without rounding. Moreover, this work suggests that there is no need for Gluons, but for direct evidence the Large Hadron Collider (LHC) maybe able to justify this claim.

Keywords: gravitational mass energies, Plank length, Higg's field, fermions.

Introduction

Grand Unification Theories (GUT's) suggest that all fields, gravitational, strong, electromagnetic and electro-weak are composed of a single unified form at significant energy [1], and that the deposition of this form of energy in space develops the mass, charge and particular characteristics associated with fermions, which completes a Standard Model [2]. In this work it is argued that matter is self-unifying, and that complex mathematics can relate GUT's to a new idea that a fermion is wound, and formed, with Gravitational Mass Energy (G_{ME}). G_{ME} disseminates through the Higgs Particle (H) on a zero energy plane (zero space), where the radius of one winding is on the order of the Plank length (l_p approx. = 10^{-35} m). Using this concept of windings produces a result, of which the product of the fermion's radius (r), and the rest mass-energy of the fermion, all renormalized over the Plank length, and gives a value for the G_{ME} , for that particular fermion.

To preserve the spin quantum numbers of fermions, Dirac has shown a relationship between the Gravomagnetic Monopole quantization and the speed of light [3]. Also, Albert Einstein showed that rest mass momentum of a fermion is proportional to the speed of light [4]. Thus it is argued that the G_{ME} winding rate with respect to time is a measure of the internal angular velocity of the fermion. The angular momentum at every point within the fermion has a internal angular velocity equal to the speed of light, and giving the fermion having a naturalized unit radius equal to 1, because the space inside the fermion is dimensionless, we have

$$\omega = c \quad (1)$$

In other words, at any tangential point within the fermion's structure, the gradient of angularity of the G_{ME} at any given point, with respect to time is equivalent to

$$\frac{d\theta}{dt} = c \quad , \quad (2)$$

where c is the speed of light. Figure 1 depicts the tangential gradients of the windings within the structure of the Fermion. Each of the individual Gravitational Mass Energy Vectors Points (GMEVP), which originate and terminate on the surface of the fermion, E_x , E_y , and E_z have the mixed coordinates of the other two diffeomorphism-invariant Energy Vectors, because all space is similar [5], and the GMEV revolve at the speed of light regardless of the orientation, or position in space. The difference between this new concept of GMEVP's, which are supportive of Quantum Electrodynamics (QED) theories; is that quarks exchange the Strong Force of Hadrons via gluons, whereas the GMEV are already mixed and have a self exchange of force which is infinitely variant, eliminating the need for gluons. The electron being a special case, a Lepton has its own point like individuality, but in this theory, the electron has a GMEV matrix just as the Hadrons. Quarks, if they exist, would themselves be composed of G_{ME} .

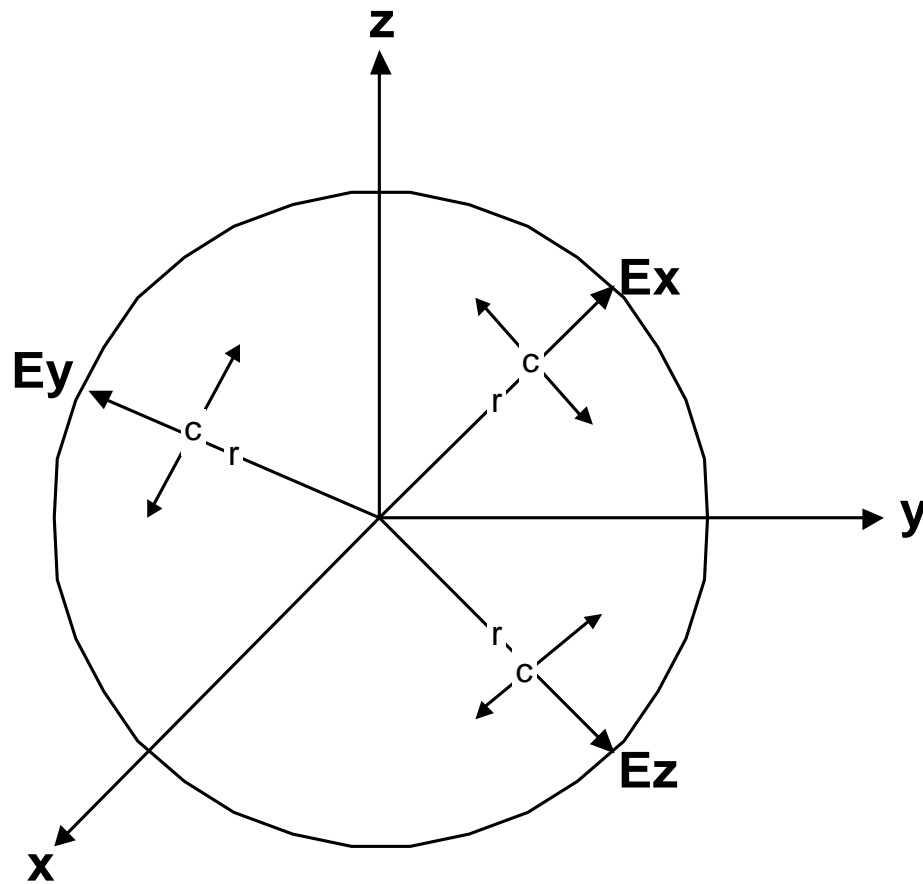


Figure 1. Mixed co-ordinate GMEVP's E_x , E_y , and E_z . Any point within the fermion is revolving at the speed of light c , with a dimensionless coefficient radius r .

Determining the Radius of a Fermion

A stationary fermion has rest mass energy that is related to the internal angular momentum inside that fermion. Thus, using the quantum energy relationship

$$E = \frac{\hbar^2 k^2}{2m} \quad (3)$$

and noting that

$$\hbar k = mv = mwr \quad (4)$$

It can be stated (by using equation 1) that

$$\hbar k = mcr \quad (5)$$

for inside a fermion, with r being naturalized.

Substituting equation 5 into equation 3 gives,

$$E = \frac{m^2 c^2 r^2}{2m} = \frac{mc^2 r^2}{2} \quad (6)$$

Equation 6 can be solved for unit less value of r, with the use of the well-known rest mass energy formula, equation 7

$$E = mc^2 \quad (7)$$

By inserting 7 into equation 6, we get the resulting equation 8. Therefore the Dimensionless Unit Radius Coefficient, along any direction of internal polarization, is given by,

$$r = \sqrt{2} \quad (8)$$

This coefficient is common to all fermions and produces a minimum Mass Gap¹ above Zero Space. Formalizing with the simplest case, that the fermion is isotropic, and all internal refractive indices are equivalent. Then by using a semiclassical approach with the use of the Saxon-Woods Model [6], because the Fermion's Mass-Energy and the fermion's self-made graviton are intrinsically linked; the physical radius of a Fermion may be calculated with successive mass ratios. Therefore, with (A) equal to 1/1836.1, for the electron, where (A) is the nucleon number, the radius of the electron (e) is given by the equation,

$$r^e = \frac{\sqrt{2}}{\sqrt[3]{1836.1}} \times 1.2 \text{ fm} \quad (9)$$

¹ Quantum Yang-Mills Theory, by Arthur Jaffe and Edward Witten – Millennium Problem, PDF - http://www.mi.sanu.ac.yu/~zorano/izazovi21vek/yang_mills.pdf, Harvard University.

Thus $r^e=0.13858965$ femtometers (fm which is $1E-15m$).

Similarly, with a nucleon number equal to 1 and $939.573/938.280$ (the ratio of the neutron to the proton in MeV), to give the radius of the proton (p) and neutron (n) respectively, as,

$$r^p = \sqrt{2} \times 1.2 \text{ fm} \quad (10)$$

and,

$$r^n = \frac{\sqrt{2}}{\sqrt[3]{\frac{938.280 \text{ Mev}}{939.573 \text{ Mev}}}} \times 1.2 \text{ fm} \quad (11)$$

This gives 1.69705628 fm and 1.69783546 fm respectively, for the radius of the proton and the neutron. A nucleons radius is about twelve times the radius of an electron.

Gravitational Revolutionary Energy for Fermions

Any revolving infinitesimal energy vector $E dr$ must be analytic at the surface of the Fermion, simply stated by Stokes Theorem [7]

$$\oint_c E dr = \oiint_c \nabla \times E \cdot n ds = G_{ME} \times l_p \quad (12)$$

which is equivalent to,

$$Er = \nabla \times E \cdot n 4\pi r^2 = G_{ME} \times l_p \quad (13)$$

Therefore, overcoming singularity

$$G_{ME} = \frac{Er}{l_p} \quad (14)$$

Using this formula, and with our values for r, the theoretical values for the invariant Gravitational Revolutionary Energies (G_{ME})'s of the atomic fermion's are:

$$G_{ME}^e = 4.38223979 \times 10^{18} \text{ Mev} \quad (15)$$

$$G_{ME}^p = 9.85304788 \times 10^{22} \text{ Mev} \quad (16)$$

and for the Neutron,

$$G_{ME}^n = 9.87115608 \times 10^{22} \text{ Mev} \quad (17)$$

The G_{ME} 's are the energies of unification, just before the Plank Epoch, when all matter was of one form. The G_{ME} for the electron is a lot less than the Plank Energy, while the G_{ME} for the proton and neutron are just greater, this could suggest why chemistry is the way it is. Thus, by renormalizing by the Plank length at the surface of the Fermion, all singularities are removed [8], exposing the apparent suppressed non-renormalizable interaction of gravity that is observed at lower energy [9]. The G_{ME} for any stationary or non-stationary

Nucleons or atomic species can be given, by summing over all members of the group (relativity has no effect on something already revolving at c , it is a phenomena that is external observed) [10].

Determining the Winding Number for the Gravitational Energy of Fermions

Using Cauchy's integral formula [11], summed over all space (dv) and time (dt), as space and time diverging around the Plank length, gives,

$$G_{ME} I(r, t) = \frac{1}{2\pi i} \oint_{st} \frac{G_{ME}}{l_p - \infty} dv dt \quad (18)$$

This is to say a fermion is bounded by a closed curve and the G_{ME} is analytic everywhere on the surface. The G_{ME} has an imaginary pole at $-\infty$ inside the fermion [12]. The closed curve integral evaluation of $dv dt$ in equation 16, over all space and time, is equal to 1, from Completeness. Therefore, the inverse of 2π by the Plank length gives the number of windings, per second, from an imaginary point at $-\infty$, for any fermion, and all fermion's have the same number of windings, independent of there G_{ME} 's as shown below.

$$I(r, s) = 9.848485 \times 10^{33} s^{-1} \quad (19)$$

Gravitational Energy Coefficients for Fermions

It follows from equation 13, that a curl of a Gravomagnetic Monopole, throughout internal space and time, is

$$G_{ME(x,y,z)} \times l_p = 4\pi r^2 \begin{vmatrix} i & j & k \\ \frac{\partial}{\partial x} & \frac{\partial}{\partial y} & \frac{\partial}{\partial z} \\ E_x & E_y & E_z \end{vmatrix} \bullet \langle Ai + Bj + Ck \rangle \quad (20)$$

A, B and C are the Gravitational Energy Coefficients (G_{EC}), whose overall arbitrary plus or minus sign, reflects the intrinsic spin angular momentum either up or down. The polarized GMEVP's, with mixed Minkowski coordinates [13], are as follows:

$$E_x = AE_o e^{\langle ikBy - wt \rangle} \bullet e^{\langle ikCz - wt \rangle} \quad (21)$$

$$E_y = BE_o e^{\langle ikAx - wt \rangle} \bullet e^{\langle ikCz - wt \rangle} \quad (22)$$

and

$$E_z = CE_o e^{\langle ikAx - wt \rangle} \cdot e^{\langle ikBy - wt \rangle} \quad (23)$$

The simplest case of isotropic internalization, with (A=B=C) and by using a process of rationalization, the two solutions for the G_{EC} for isotropic fermion's are found by inserting inturn equations, 21, 22 and 23 into 20, and finding a real solution gives

$$A = B = C = \left[\frac{G_{ME}^2 l_p^2}{64k^2 E_o^2 \pi^2 r^4} \right]^{1/6} \quad (24)$$

Initially you get a trivial solution, but with a suitable choice of planar reversed axial rotation, to maximize the Shears Mechanism [14], the coefficients become realizable. The Non-Commutative GMEVP's produce an operator that is outside its own eigenstate, which could describe the existence of Chiral Symmetry Breaking², and why there is a charge parity violation, because of the reverse axial rotation to create matter.

The G_{EC} , is dependent on the radius r, and by letting k be significantly small so (24) approaches 1 then by taking the modulus squared of Equation 21, and rearranging to solve for E_o , with light-like coordinates, ($k(x,y,z)$ equal to ct) and similarly for Equations 22 and 23, we have given the result

$$E_o^2 = E_{(x,y,z)}^2 \quad (25)$$

Equation 25 is Albert Einstein's result for a fermion with rest mass energy. All fermions may now be given a boost from this inertial frame of rest, but the G_{ME} is always invariant. This work shows a corresponding principle for Fermion's between the G_{ME} and rest mass energies of a semi-quantum relativistic nature.

Conclusion

All Fermion's are constituted by G_{ME} , which emanates from the H particle, at a typical size on the order of the Plank length. By renormalising with the Plank length, all singularities are removed from the G_{ME} in infinitely small space. The renormalizing of Quantum Gravity can be incorporated into Grand Unification Theories (GUT's). Notice that the energy equations 21, 22 and 23 have been described as vectors. When describing GMEV; the radius of the fermion is the magnitude for each vector, and the G_{ME} , represents the energy of angularity with respect to time at which the radius revolves (at the speed of light).

The mathematical treatment used to find the radii and the G_{ME} , can be generalized for any fermion, because all fermion's have the same number of windings per second. The Gravitational Energy Coefficients satisfy Stokes theorem, and as a consequence, Fermions obtain their initial rest mass energy.

Not only is unified matter of a very high-energy, but zero space is not in the same phase plane as 4 – space! The rest mass energy is a minimum static bound energy state, because for a constant E (x, y,

² Quantum Yang-Mills Theory, by Arthur Jaffe and Edward Witten – Millennium Problem, PDF - http://www.mi.sanu.ac.yu/~zorano/izazovi21vek/yang_mills.pdf, Harvard University.

$z) = E_0$, the div-grad of the G_{ME} , is zero, this could be a reason why Quarks are totally confined³, with no gluons, which the LHC may vindicate.

Therefore, it is concluded, that the rest mass-energy equivalent G_{ME} distribution inside a fermion is internalized, but inflicts a charge and a mass field on space, and the G_{ME} is an invariant of motion, as the laws of physics are invariant in any physical frame of reference. This hypothetical work may lay the possible groundwork, to find unification energies for all particles of the Supersymmetry. Additionally, the unsuppressed gravity we experience everyday is non-renormalizable, because it has an infinite number of parameters; but G_{ME} is renormalizable because it acts through a single particle point.

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³ Quantum Yang-Mills Theory, by Arthur Jaffe and Edward Witten – Millennium Problem, PDF - http://www.mi.sanu.ac.yu/~zorano/izazovi21vek/yang_mills.pdf, Harvard University.