

# The Higgs Mass-Energy Gravity Construct

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## Abstract

Recent evidence of a 125 GeV Higgs boson at CERN, the result of light speed proton collisions, infers that the boson's measured value is its rest mass value compounded by its speed of light momentum velocity, a ratio of the speed of light to ground state energy roots. The equation for its mass-energy thus turns out to be

$$m_H = [m_p - 3^{\frac{1}{2}}(2m_U + m_D)] / \alpha = 125.1 \text{ GeV}$$

where  $m_p$ ,  $m_U$  and  $m_D$  are the proton, Up quark and Down quark mass-energies and  $\alpha$  is Sommerfeld's number, the ratio of the ground state to speed of light energy roots. A concept of mass and Gravity as effects of an underlying root interaction of Electromagnetic energy on the  $hc = h/(u_0 \epsilon_0)^{\frac{1}{2}}$  impedance energy density of space is then developed. This also suggests that theoretical preon substate root components of quarks are energy information states of the mathematical model's dynamic patterns.

The ground state to light speed energy roots ratio is Sommerfeld's  $\alpha = e^2/2\epsilon_0 hc = 0.007297353$  number that correlates the ground state electric field energy root to the light speed inertial energy root, so  $\alpha = (E_o/E_c)^{1/2}$ , similar to Einstein's Electrodynamics of Moving Bodies Lorentz transformation, as expounded upon in Quark Relativity Transform (QRT).

Thus the proton's ground state Higgs boson would consist of the proton's  $m_p = 938.3$  MeV mass-energy minus the mass-energy of the quark triton structure that generates it by its  $3^{1/2}$  spherical momentum, according to Einstein's expression of Maxwell's principle that a "magnet ... in motion," or electric charge, results in a "field with a definite energy value" in Electrodynamics of Moving Bodies, as shown in QRT and The Higgs Condition (HC). Thus the Higgs boson mass-energy would be  $m_H = [m_p - 3^{1/2}(2m_U + m_D)]/\alpha = 125.1$  GeV, where  $m_U = (\frac{1}{2}m_e c^2)2^{1/2}3^{1/2}2\pi = 3.9323$  MeV and  $m_D = 3^{1/2}m_U = 6.8109$  MeV are the Up and Down quark mass-energies.

The proton's mass-energy, as shown in QRT and HC, is

$$m_p = (\frac{1}{2}eh/2\pi)2^{1/2}3^{1/2}3c^3 = 3^{1/2}(m_U/\alpha + m_D - m_U) = 938.3 \text{ MeV}$$

since it is field energy generated by the charged quark triton's light speed spherical momentum with respect to its ground state condition. It was also shown in HC that the electron's size and mass-energy are functions of the  $hc = h/(u_o \epsilon_o)^{1/2} = 1.9864473 \times 10^{-25} \text{ J}\cdot\text{m}$  impedance energy of free space by

$$r_{eo} = hc3^{1/2}\pi / \alpha^2 = 2.03 \times 10^{-20} \text{ m and}$$

$$m_e = 32/3e^3/2^{1/2}4\pi\epsilon_o hc^2 = 3^{2/3}e\alpha(u_o \epsilon_o)^{1/2}/2^{1/2}2\pi = 9.13 \times 10^{-31} \text{ kg.}$$

This concept was further extended to the quark and proton radii by:

$$r_{qi} = hc3^{1/2}\pi/\alpha^4(2^{1/2}3^{1/2})^2 = 0.0635 \text{ fm and } r_{qo} = hc\pi/2\alpha^3 = 0.803 \times 10^{-18} \text{ m}$$

$$r_{pi} = r_{qi}3^{2/3}2^{1/2}3^{1/2}\pi = 1.017 \text{ fm and } r_{po} = r_{qi}3^{2/3}2\pi = 0.8303 \text{ fm}$$

The Strong force was then correlated to Gravity by showing that the distance the Strong force travels at light speed equates to the distance Gravity travels at light speed by the equivalence of the proton's radius to the light year determined by the  $m_s m_e / r_e^2 = m_e v_e^2 / r_e$  Gravity based centripetal orbit:

$$\frac{1}{2}3^{4/3}2^{1/2}\pi/r_{pi} = 9.45 \times 10^{15} \text{ m, within 0.1\% of the } 9.46 \times 10^{15} \text{ m light year.}$$

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$$\frac{1}{2} 3^{4/3} 2^{1/2} \pi / r_{pi} = 9.45 \times 10^{15} \text{ m, within 0.1\% of the light year.}$$

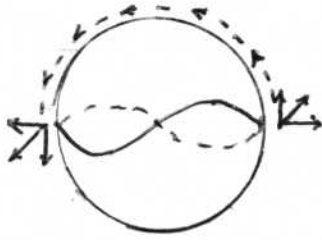
This reference of the  $hc = h/(u_o \epsilon_o)^{1/2}$  impedance energy of space to the electron's size and mass, the quark and proton radii, and the Gravity to Strong force correlation similarly extends to the quark and proton mass-energies

$$m_U = (\frac{1}{2} m_e c^2) 2^{1/2} 3^{1/2} 2\pi = 3^{2/3} 3^{1/2} e^3 / 4 \epsilon_o h = 3.94 \text{ MeV}$$

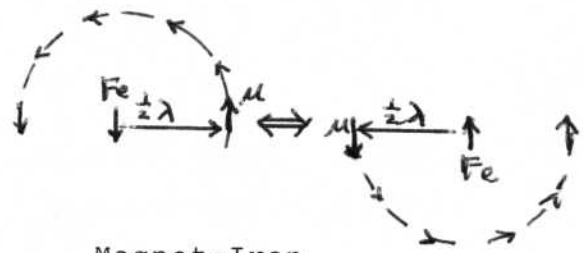
$$m_p = 3^{1/2} (m_U / \alpha + m_D - m_U) = (3^{2/3} 3eoc/2)(1/\alpha + 3^{1/2} - 1) = 940 \text{ MeV, within 0.2\%, thus showing the correlation of space's energy density impedance to the constructs of matter.}$$

The premise of the Higgs Condition was that the fundamental spin-0 Higgs boson is the  $hc = h/(u_o \epsilon_o)^{1/2}$  impedance energy of space that mediates the fermionic  $\frac{1}{2}$ -waves of EM energy by alignment of neutral 4-D Minkowski space-time points pairs,  $\uparrow \downarrow = \text{Net } 0$ , to  $\uparrow \uparrow$  and  $\downarrow \downarrow$  excited states that constitute Einstein's "field with a definite energy value" generated by the motion of polarized fermionic  $\frac{1}{2}$ -spin energy states. This was then extended to include net neutral matter constructs by Einstein's Quantized Continuous Matter Construct "formation entit[ies]" comprised of fermionic energy states mediated by a Higgs boson mass-energy they generate by their motion in space.

In other words, the  $e^+$  quark triton charge's  $3^{1/2}$  light speed spherical angular momentum generates a  $B = d\phi_E/dt$  field energy of "definite energy value" in equilibrium with its motion. This occurs because the fermionic triton's motion creates a standing wave energy resonance between space and the triton as it rotates to the opposite side by its spherical momentum, thus interacting itself with the effect it



Triton-Boson



Magnet-Iron

generates in the bosonic space. This mediation of the fermionic triton's interaction with itself occurs over a quantized distance and time, and thus with a quantized energy, because the bosonic space presents as a reciprocal fermionic force that maintains the equilibrium of the triton's spherical momentum.

Since it moves at light speed relative to the bosonic space it contracts it to the size of the wavelength it creates by its momentum with respect to the relative ground state energy root of bosonic space, so  $\lambda = hc/E = hc/3^{\frac{1}{2}}(2m_U + m_D)2^{\frac{1}{2}}3^{\frac{1}{2}}2\pi = 1.01 \text{ fm}$ , where  $hc$  is the  $2 \times 10^{-25} \text{ J}\cdot\text{m}$  1-D bosonic impedance energy density of space,  $3^{\frac{1}{2}}(2m_U + m_D) = 25.4 \text{ MEV} = 4.0729 \times 10^{-12} \text{ J}$  is the mass-energy of the quark triton in its  $3^{\frac{1}{2}}$  spherical momentum,  $2^{\frac{1}{2}}3^{\frac{1}{2}}$  is the angular and spherical momentum distribution of its energy,  $\pi$  is the  $\frac{1}{2}$ -sphere hemicircle it travels and  $2\pi$  is the matter wavelength of its diametric resonance motion. Thus the triton maintains an equilibrium resonance with the contracted bosonic region it traverses.

The fermionic triton's orbital around the contracted space Higgs boson it generates is analogous to a bar magnet and piece of iron the magnet induces reciprocal poles in, or oppositely charged particles where charge polarity is construed as the orientation polarity of the energy, in which the iron is at the center rotating its polarities as the magnet rotates polarity by its light speed orbit about the iron. The motion generates the "definite energy value" field in space contracted to  $\lambda = hc/3^{\frac{1}{2}}(2m_U + m_D)2^{\frac{1}{2}}3^{\frac{1}{2}}2\pi^2$ .

This is why the proton's radius corresponds to the distance of the light year by  $\frac{1}{2}3^{\frac{4}{3}}2^{\frac{1}{2}}\pi/r_{pi} = 9.45 \times 10^{15} \text{ m}$ ,  $9.5 \times 10^{15} \text{ m}$  if  $r_{pi} = 1.01 \text{ fm}$  is used, and the relative force of Gravity is the acceleration effect of fermionic motion on bosonic space. However the "field of a definite

