

The Higgs Condition

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Abstract

By applying Maxwell's EM Theory, Boltzmann's probability in a system entropy function principle, and a spin-0 Higgs boson condition to Einstein's Minkowski space-time, a model is developed that correlates the Strong, EM, Weak and Gravity forces as an energy density progression that derives from free space's permeability-permittivity. A neutral time flow aspect of the condition is described in the Appendix that presents the natural laws as constant over time while time flow appears uni-directional but is really bi-directional at energy's root content and information level.

I) Gravity Correlation

Gravity, over 10^{45} times weaker than the Strong force, holds our planet in a continuous orbit about the Sun, and yet it correlates to the quark, hydrogen atom, EM wave and proton.

The quark Strong force energy state forms a stable Up-Down-Up quark triton configuration in the proton's construct and its size and mass energy correlates to hydrogen, EM waves, the Compton wavelength and energy, and the proton by the the $\alpha = e^2/2\epsilon_0 hc = 0.00729735$ Sommerfeld number that defines the ratio of the $e^2/2\epsilon_0 h$ ground state energy root of two charges to the c speed of light root of their maximum $\frac{1}{2}mc^2$ kinetic energy. In other words, $v_0 = \alpha c$ and $E_0 = \alpha^2 E_C$ define the ground to maximum energy state ratio in each domain's local natural law frame of reference, and thus the domain's to each other:

1) Hydrogen's ground state $\lambda_0 = 3.325 \times 10^{-10}$ m wavelength and $E_0 = 13.605698$ eV = 2.17987×10^{-18} J energy by:

Quark Interactive Radius: $r_{qi} = \frac{1}{2}\lambda_0 \alpha^3 = 0.0646$ fm

Quark Quantum Optical Radius: $r_{qo} = r_{qi} 3^{\frac{1}{2}} \alpha = 0.8165 \times 10^{-18}$ m

Up Quark Mass-Energy: $E_0 2^{\frac{1}{2}} 3^{\frac{1}{2}} 2\pi / \alpha^2 = 3.9323$ MeV = m_U

Down Quark Mass-Energy: $m_D = 3^{\frac{1}{2}} m_U = 6.8109$ MeV

2) EM $\lambda_{EM} = 911.268 \times 10^{-10}$ m wavelength for same E_0 energy by:
 $r_{qi} = \frac{1}{4}\lambda_{EM} \alpha^4 = 0.0646$ fm (r_{qo} , m_U and m_D same as in #1)

3) Compton $\lambda_C = 2.4263 \times 10^{-12}$ m wavelength and $E_C = \frac{1}{2}m_e c^2 = 0.2555$ MeV energy by:

$r_{qi} = \frac{1}{2}\lambda_C \alpha^2 = 0.646$ fm, where $\lambda_C = \alpha \lambda_0$ (r_{qo} same as in #1)

$m_U = E_C 2^{\frac{1}{2}} 3^{\frac{1}{2}} 2\pi = 3.9323$ MeV, where $E_C = E_0 / \alpha^2$ (m_D same as in #1)

4) Proton's $r_{pi} = 1.0341$ fm interactive radius, $r_{qo} = 0.844$ fm quantum optical radius, and $m_p = 1.673 \times 10^{-27}$ kg = 938.3 MeV mass-energy by:

$r_{pi} = r_{qi} 3^{2/3} 2^{\frac{1}{2}} 3^{\frac{1}{2}} \pi = 1.0341$ fm

$r_{po} = r_{qi} 3^{2/3} 2\pi = 0.844$ fm

$m_p = (\frac{1}{2}eh/2\pi) 2^{\frac{1}{2}} 3^{\frac{1}{2}} 3c^3 = 3^{\frac{1}{2}} (m_U / \alpha + m_D - m_U) = 1.673 \times 10^{-27}$ kg = 938.3 MeV

The quark's interactive radius is half the gluon's interaction distance with another quark in the proton's quark triton structure, and since the proton is the ground state nucleon, that achieves higher energy states like hydrogen's ground state, only the α -velocity coefficient, and not an α^2 energy density domain change, is involved in the $m_p = 3^{\frac{1}{2}}(m_U/\alpha + m_D - m_U)$ proton mass ground state and light speed quark triton that generates it. However, since the α velocity-size coefficient is involved in the mass construct, as a $3^{\frac{1}{2}}$ spherical momentum geometric resultant, it means the size of space is a mass-energy construct determinant, and the quark thus similarly correlates to gravity by the same $3^{\frac{1}{2}}$ coefficient.

A 9.46×10^{15} m light year is the distance the force of gravity travels at light speed for earth's one year orbital period determined by its $m_1 m_2 / r^2 = m v^2 / r$ gravity - centripetal force equilibrium. This nearly 10,000 trillion meter distance correlates to:

- 1) the proton's radius by: $\frac{1}{2} 3^{4/3} 2^{\frac{1}{2}} \pi / r_{pi} = 9.3 \times 10^{15} \text{ m}$
- 2) the quark's radius by: $\frac{1}{2} 3^{2/3} / 3^{\frac{1}{2}} r_{qi} = 9.3 \times 10^{15} \text{ m}$
- 3) the E_0 electron ground state energy by: $(E_0 c / h)^{\frac{1}{2}} / 2 \alpha^2 = 9.325 \times 10^{15} \text{ m}$, all within 2% of the $9.46 \times 10^{15} \text{ m}$ light year, and these Gravity, Strong and EM force domain correlations occur by the distance the force travels at light speed. They similarly correlate to the Weak force decays.

II) Weak Force Decays

The Weak force controls decays between the Strong nuclear and EM atomic domains. It's a transition state force between domains that correlates by the α size and α^2 energy density coefficients, and the boundary between the E atomic and m nuclear ground states is the $\lambda_c = \alpha \lambda_0$ and $E_c = E_0 / \alpha^2$ Compton wavelength and energy, since $r_{qi} = \frac{1}{2} \lambda_c \alpha^2$ and $m_U = E_c 2^{\frac{1}{2}} 3^{\frac{1}{2}} 2 \pi$. Thus the $t_c = \lambda_c / c = 0.80933 \times 10^{-20} \text{ s}$ Compton wavelength transit time correlates to the decays.

The 3 quark triton structure has a $2r_{qi}$ wavelength on each side and the $m_D - m_U = 2.88 \text{ MeV}$ gluon transit time between quarks is thus $t_q = 2r_{qi} / c = \lambda_c \alpha^2 / c = 0.430965 \times 10^{-24} \text{ s}$, which provides a Strong force interaction time reference. The neutral pion, resulting from the gluon's interaction with a triton's Up quark, has a $t_{pi^0} = 3^{\frac{1}{2}} t_c / \pi \alpha^2 = 0.838 \times 10^{-16} \text{ s}$ $\frac{1}{2}$ -life decay time.

When the neutral pion from a proton interacts with a neutron it forms a negative pion from the neutron's electron energy state, and the negative pion decays to a negative muon, and then to an electron, so it constitutes an excited energy state electron that decays by releasing its energies from the electron's inertial mass as it decays down to its E_0 ground state level. This is represented as a

$$t_{WV} = (t_{pi} \cdot \pi / 3^{\frac{1}{2}} \alpha^2) 2^{\frac{1}{2}} 3^{\frac{1}{2}} 2\pi = (t_c / \alpha^4) 2^{\frac{1}{2}} 3^{\frac{1}{2}} 2\pi = 0.44 \times 10^{-10} s$$

Weak force light speed to orbital velocity energy decay coefficient.

The negative pion thus decays by a $t_{pi-} = t_{WV} 2^{\frac{1}{2}} 3 / \alpha = 2.56 \times 10^{-8} s$ $\frac{1}{2}$ -life decay time to a muon state. which then decays to an electron ground state by $t_{\mu-} = t_{pi-} 3^{\frac{1}{2}} / 2^{\frac{1}{2}} 2\alpha = 2.15 \times 10^{-6} s$. Thus all the domains correlate by the distance their force travels at light speed with respect to each other in terms of the α size and α^2 energy density coefficients between domains, and since they do so with respect to the speed of light it is based on the symmetry of the Cauchy-Riemann Laplacian harmonic EM wave equations of Maxwell's Theory.

III) Spin-0 Higgs Condition Space-Time

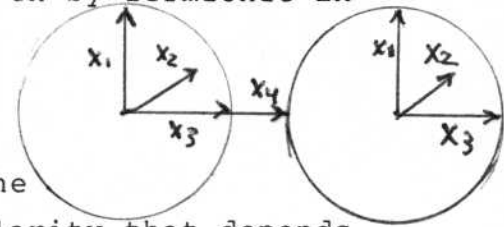
This interpretation supports the coexistence of a spin-0 Higgs boson force carrier operated on by the fermionic "particle" energy states of the Standard Model, and it extends to spin-0 Minkowski space-time as a gravity force carrier between symmetrically neutral fermionic pair matter constructs by Maxwell's polarity and Boltzmann entropy principles. That is, if a spin-0 bosonic force carrier provides the means by which fermionic forces interact at light speed then the spin-0 bosonic force carrier also provides the means by which interacting fermionic pairs in stable equilibriums interact with other stable equilibrium fermionic pairs: mass interacting with mass by gravity.

Maxwell unified the polarized charge and magnetism dipole vectors by right hand rule $B = d\phi_E/dt$ and $E = d\phi_B/dt$ oriented flux rate of change functions that extend to $d^2E/dx^2 = u_0 \epsilon_0 d^2E/dt^2$ and $d^2B/dx^2 = u_0 \epsilon_0 d^2B/dt^2$ bosonic EM force carriers by differentiation of the $d\phi/dt$ flux rate of change functions with respect to a 2nd entropic degree of freedom, x , since E and B are coincident $\cos(kx - wt)$ periodic changing field functions.

Thus when polarized fermionic $d\phi/dt$ changing field functions form a neutral bosonic structure they do so by operating on the neutral spin-0 $u_0 \epsilon_0$

permeability-permittivity bosonic ground state energy construct of space, just as bosonic EM wave constructs do by constructive wave superposition. This neutral field-free interpretation of $u_0 \epsilon_0$ space relegates it to a spin-0 Higgs $c = 1/(u_0 \epsilon_0)^{1/2}$ EM force carrier operated on by fermionic EM $1/2$ -wave energy state pairs (i.e. EM waves).

Einstein incorporated polarity in 4-D Minkowski space-time points by defining time-flow as an $x_4 = (-1)^{1/2} ct$ distance that energy travels in the $i = (-1)^{1/2}$ "imaginary" time dimension, a direction polarity that depends on energy flow.



He also incorporated polarity in his $ds^2 = g_{ik} dx_{1i} dx_{1k} + \dots$ "Riemann condition" "continuous transformation" of all coordinate "combinations 11, 12, ... up to 44" of $ds^2 = dx_1^2 + dx_2^2 + dx_3^2 + dx_4^2 = 0$ "field free" Minkowski 4-D space-time by separating the dx_n^2 second order differential elements of his $a^2 + b^2 = c^2$ Pythagorean function into individual dn roots that allow for polarized variations in his g-field gradient coefficients to accomodate field gradient direction polarity.

If his $ds^2 = 0$ field free 4-D space-time is interpreted as an oo-inertia 0-velocity spin-0 Higgs boson force carrier it leads to a Higgs "condition" of space's $u_0 \epsilon_0$ impedance to EM energy flow that can be characterized as a $\uparrow \downarrow$ neutral symmetry based reciprocal point-pair construct fundamental ground state energy defined by $hc = h/(u_0 \epsilon_0)^{1/2} = 1.986447311 \times 10^{-25} \text{ J}\cdot\text{m}$, with neutral time flow (see Appendix) energy density until acted on by relative fermionic oriented excited energy state conditions that result in $\uparrow \uparrow$ or $\downarrow \downarrow$ oriented point-pair fields, with $E = hf = hc/\lambda$ relative energy content yielding shorter wavelength spatial contraction that supports Maxwell's EM field polarities, with x_4 time flow direction polarity indicating the $d\phi/dt$ rate of change orientation.

~~In the~~ In the Minkowski 4-D space-time points model the \uparrow or \downarrow point orientations correspond to $2^{1/2}$ angular \curvearrowright and $3^{1/2}$ spherical \curvearrowright resultant momentums by the phased orientations of the x_1 , x_2 and x_3 dimension energies. In essence they constitute Schrodinger wave functions for each dimension at the fundamental ground state energy condition of free space so they are periodic energy oscillations between the + and -

energy directions in each of the x_n dimensions, but phased between them so as to yield the lowest energy state $2^{1/2}3^{1/2}$ angular-spherical momentum resultant.

This neutral spin-0 Higgs boson condition imposed upon the Minkowski construct of 4-D space-time renders it a $u_0 \epsilon_0$ impedance transform function that measures relative zero until acted upon by a fermionic condition to yield a resultant field strength if charge polarity is defined as energy flow orientation polarity, ~~left arrow~~ (+) or ~~right arrow~~ (-), imparted to point-pairs with an $h = 6.626075 \times 10^{-34} \text{J}\cdot\text{s}$ Planck's constant energy content existing in 4-D space-time as a $ds^2 = 0$ neutral $e^{-ix} = \cos x - i \sin x$ wave function between point pairs, such that x_1 , x_2 and x_3 spatial dimensions constitute $\uparrow \downarrow$ oppositely oriented $ds^2 = 0$ neutral reciprocal angular moments under field free conditions and $ds^2 \neq 0$ $\uparrow \uparrow$ or $\downarrow \downarrow$ polarized field conditions under fermionic influence.

IV) Spin-0 Higgs Condition Matter Construct

Einstein's 4-D Minkowski space-time has a $ds^2 = 0$ mathematical size but a Higgs condition gives the point-pairs a $ds^2 = hc = 2 \times 10^{-25} \text{J}\cdot\text{m}$ 1-D energy density physical reality size and $ds^2 = 0$ net energy in each dimension, about 10^5 times smaller than the $2 \times 10^{-20} \text{m}$ electron quantum optical radius. If all energy domains correlate by the α size and α^2 energy density coefficients and the electron is the fundamental stable matter state component it should relate by α^2 density, $3^{1/2}$ 3-D to 1-D, and $\pi^{1/2}$ -wave coefficients, which it does since $hc3^{1/2}\pi/\alpha^2 = 2.03 \times 10^{-20} \text{m}$, equivalent to the quark based $r_{eo} = r_{qi}\alpha^2(2^{1/2}3^{1/2})^2 = 2.06 \times 10^{-20} \text{m}$ electron quantum optical radius.

Similarly, its mass is calculated to be $m_e = 3^{2/3}(\frac{1}{2}eh/2\pi)\alpha^2 2^{1/2}3^{1/2}\pi/hc\alpha^3\pi = 9.129 \times 10^{-31} \text{kg} = 3^{2/3}e^3/2^{1/2}4\pi \epsilon_0 hc^2 = 3^{2/3}e^3u_0\epsilon_0/2^{1/2}4\pi\epsilon_0 h = 3^{2/3}e^3u_0/2^{1/2}4\pi h$, within 0.22% of its measured mass. Thus both electron size and mass-energy derive from the $hc = h/(u_0\epsilon_0)^{1/2}$ fundamental property of space, which means all matter structures derive from space.

Thus the quark and proton radii are:

$$\begin{aligned} r_{qi} &= hc3^{1/2}\pi/\alpha^4(2^{1/2}3^{1/2})^2 = 0.0646 \text{ fm} & r_{qo} &= hc\pi/2\alpha^3 = 0.803 \times 10^{-18} \text{m} \\ r_{pi} &= r_{qi}3^{2/3}2^{1/2}3^{1/2}\pi = 1.0169 \text{ fm} & r_{po} &= r_{qi}3^{2/3}2\pi = 0.8303 \text{ fm} \end{aligned}$$

and the proton's correlation to the $9.46 \times 10^{15} \text{m}$ light year is:

$$\frac{1}{2} 3^{4/3} 2^{1/2} \pi / r_{pi} = 9.452 \times 10^{15} \text{m}, \text{ within } 0.09\% \text{ of } 9.46 \times 10^{15} \text{m}.$$

The discrepancies between the solutions derived from free space's $u_0 \epsilon_0$ impedance upward and hydrogen's ground state size and energy downward, but accuracy between the $u_0 \epsilon_0$ proton size and gravity's light year, arises because the upward progression from $u_0 \epsilon_0$ relies on field energy constructs of matter's characteristics whereas the downward progression from hydrogen introduces matter size uncertainties into the fields.

These field energy and quantized energy matter constructs are the boundary conditions of physical reality and result in a Heisenberg Uncertainty because of the distinction between the continuous and quantized energy solutions of field and matter energy states, and thus form a basis for statistical behavior because the discontinuity always results in a quantized energy distinction at the matter's ground state level that becomes classical by Bohr's Correspondence Principle when the $E_n = E_0/n^2$ distinctions between energy states vanish for $n > 10,000$.

V) Resolution of Distinctions Between Field and Matter Based Constructs

This is a $\int 1/f(x) dx$ singularity function that occurs when $f(x) = E_0/n^2 \rightarrow 0$ because statistical behavior can't occur without distinguishable quantized energy states. Boltzmann $P_i = e^{S/k}$ instantaneous energy probabilities disappear, at $S = 0$ saturation, so $f(x) = S = 1/n^2 \rightarrow 0$, for domains bounded by $\alpha = v_0/c$, $\alpha = \lambda_0/\lambda_c$, and $\alpha^2 = E_0/E_c$ velocity, size and energy states.

Thus they will have $\alpha = e^2/2\epsilon_0 hc$ finite mathematical ranges but when matters' size constructs are incorporated between domains the quantized physical energy constructs' Heisenberg uncertainties yield a discontinuity between that parallels the $\frac{1}{2}$ -wave uncertainty in particle - wave field energy interactions. Hence the discrepancies between the upward and downward progression derived solutions, but the $10^{-25} \text{ J}\cdot\text{m}$ size of the $u_0 \epsilon_0$ energy states in free space is 10^5 times smaller than the electron, as is the proton with respect to the hydrogen atom, so it's $n > 10,000$ thus appears continuous without distinctions that interfere with matter at its electron lower boundary.

At the other end, the Sun has a 10^{57} proton mass equivalence that generates the gravity based one year orbit that defines the $9.46 \times 10^{15} \text{ m}$ light year gravitational field energy construct light speed propagation rate. It's continuous because the 10^{57} proton mass energy states and

light year are greater than $n > 10,000$ with respect to a single particle mass and $t_q = 0.44 \times 10^{-24}$ s nuclear interaction time. Since both hc and the light year rely on space's $u_0 \epsilon_0$ there are no resolution uncertainties to provide quantized orbital energy state distinctions, thus yielding a $3^{2/3} \alpha^4 / \pi h c = 9.45 \times 10^{15}$ m continuous derived light year.

VI) Einstein's Quantized Continuous Matter Construct

Einstein actually described a continuous, without distinctions, based matter construct in *On The Method Of Theoretical Physics*: "[I]t seems to me certain that we must give up the idea of a complete localization of the particles in a theoretical model. This seems to ... be a permanent upshot of Heisenberg's principle of uncertainty. But an atomic theory ... without localization of the particles in a mathematical sense is perfectly thinkable. For instance, to account for the atomic character of electricity, the field equations need only lead to the following conclusion: A portion of space (three dimensional) at whose boundaries electrical density appears everywhere, always contains a total electrical charge whose size is represented by whole number. In a continuum - theory atomic characteristics would be satisfactorily expressed by integral laws without localization of the formation entity which constitutes the atomic structure. Not until the atomic structure is represented in such a manner would I consider the quantum riddle solved."

He was referring to continuous field energies (i.e. "giv[ing] up the idea of a complete localization") because of Heisenberg's Uncertainty, but which at the structure's boundary the electrical density (i.e. $\alpha = e^2 / 2 \epsilon_0 h c$ energy size) "always contains a total ... whose size is represented by a whole number" (i.e. $1/n^2$ quantized), and results in a "continuum - theory ... satisfactorily expressed by integral laws (i.e. $\int 1/f(x) dx$, as $f(x) = 1/n^2 = S \rightarrow 0$) without localization of the formation entity which constitutes the ... structure."

Although referring to the atomic domain he actually described an underlying field basis for all energy domains based on quantized size and energy density partitioning by $\int 1/f(x) dx$ integral laws, a brilliant insight into a physical reality construct that extends from the hc energy construct size of space, through particles and their constructs, and up to gravitational field constructs, thus harmonizing continuous field and quantized energies. However to be complete the model requires the

symmetry of boson force carriers and fermion generators to provide a construct basis for the "formation entit[ies]."

VII) Mass-Energy

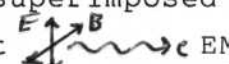

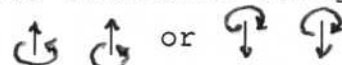
The main distinction between a Relativity field and Standard Model quantized force carrier is that a Relativity field is a continuously curved Lorentz gradient energy field superimposed on a $ds^2 = dx_1^2 + dx_2^2 + dx_3^2 + dx_4^2 = 0$ space metric, a structural framework upon which the field operates, whereas a quantized force energy carrier is a bosonic structure which may travel through space at light speed, but Einstein said that although he referenced $ds^2 = 0$ "field free" space, "There is no such thing as empty space" (i.e. space without field), so a field fills space as it moves through it at light speed and a quantized force has a finite size as it moves through space at light speed.

In Electrodynamics of Moving Bodies he also said that for a magnet in motion "an electric field with a definite energy value" results, but not without the magnet's motion (i.e. Maxwell's $E = d\phi/dt$), so the continuous field "with a definite energy value" relies on the relative motion of the force generator with respect to stationary space. And in Production and Transformation of Light he defined energy as "a continuous spatial function for all purely electromagnetic phenomena" that operates according to the optical wave theory of light but which also exists as "energy quanta localized at points of space that move without dividing," constituting a quantized force carrier in which "the energy is not distributed over ever increasing volumes of space."

He differentiated the two behaviors by pointing out that wave field "optical observations refer to time averages rather than instantaneous values," whereas the "energy quanta" are instantaneous values, referencing Wein's law based on $p(\nu)$ radiation density as a function of frequency ν as the point of reference for his analysis, thus referencing it to the hc 1-D energy density of space $E = hf = hc/\lambda$, since his "energy quanta" analysis and wave field natures both reference to $hc = h/(u_0 \epsilon_0)^{1/2} = 1.9864473 \times 10^{-25} \text{ J}\cdot\text{m}$ 1-D energy density.

Since $P_i = e^{S/k}$ probability is a system entropy function the energy density distribution form is a function of system circumstances, so both the optical wave field behavior and "energy quanta" characteristics of EM

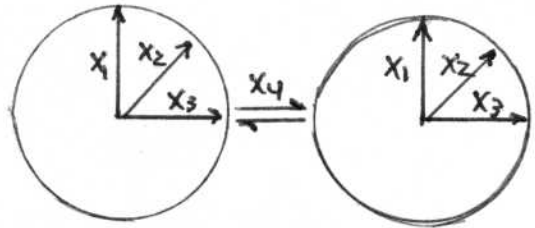
energy must be $hc = h/(u_0\epsilon_0)$ 1-D energy density impedance functions of free space, since the 4-D space-time entropic degrees of freedom of free space have a $u_0\epsilon_0$ ground state energy impedance, for $S = 100\%$ available entropic degrees of freedom and all the matter structures occupying space from electrons on up, and the Strong, EM, Weak and Gravity forces of their respective domains correlate by α size an α^2 energy density coefficients.

With this implementation and Heisenberg's $\frac{1}{2}$ -wave field energy uncertainty between wave nodes the "energy quanta" and "continuous spatial" field energy can be accommodated by the spin-0 Higgs boson condition of point-pair $u_0\epsilon_0$ free space impedance energy superimposed on $ds^2 = 0$ "field free" Minkowski space. This would mean that  EM energy would be an excited resonance energy superimposed on the  $u_0\epsilon_0$ impedance that forms  excited state point-pairs upon absorption of $E = hc/\lambda$ wave field energy in $h/(u_0\epsilon_0)^{1/2} = 2 \times 10^{-25}$ J·m quantized energy increments over $n > 10^4$ times smaller than $r_{e0} = 2 \times 10^{-20}$ m and $n^2 > (10^4)^2$ times smaller than $m_e = 3^{2/3} e\alpha/2^{1/2} 2\text{pic} = 9.129 \times 10^{-31}$ kg, the minimum stable matter state so $E_n = E_0/n^2$ for $n > 10,000$ is continuous (Note: $m_e = 3^{2/3} (\frac{1}{2}eh/2\pi i)\alpha^2 2^{1/2} 3^{1/2}/hc\alpha^2 = (\frac{1}{2}eh/2\pi i)3^{2/3} 2^{1/2}\alpha/hc = 3^{2/3} e\alpha/2^{1/2} 2\text{pic}$).

Thus the spin-0 Higgs boson condition supports both matter and EM $E = hc/\lambda$ "energy quanta" wave constructs that resonate their excited energy state with free space's $u_0\epsilon_0$ to yield both $E = hf$ quantized energy and $\partial^2 E/\partial x^2 = u_0\epsilon_0 \partial^2 E/\partial t^2$ and $\partial^2 B/\partial x^2 = u_0\epsilon_0 \partial^2 B/\partial t^2$ Maxwell EM wave field energy that are functions of $2^{1/2} 3^{1/2}$ matter and spin-0 Higgs conditions in free space' 4-D entropic degrees of freedom. In other words, a Higgs condition in free space is neutral until acted upon by an EM wave with $2^{1/2} 3^{1/2}$ angular and spherical momentums that present as fermionic energy states because only one side of the EM wave presents internally as the other side presents externally at light speed relative to the spin-0 Higgs boson contracted $u_0\epsilon_0$ of free space "particle" mass it captures by Electrodynamics of Moving Bodies Lorentz transformation, or it is an EM wave with 1-D momentum, by $E = hc/mc^2$, resonating with the $u_0\epsilon_0$ of free space.

The EM wave with $2^{\frac{1}{2}}3^{\frac{1}{2}}$ angular and spherical momentums present as fermionic because the wave is reciprocal over its cycle so it presents oppositely as it rotates to opposite sides of the "particle" matter construct, and thus presents one polarity uniformly as it reverses field energy polarities as it rotates to the opposite side of the "particle" at light speed, always presenting the same externally as the same "charge" orientation polarity by virtue of changing side as it reverses orientation.

The light speed velocity of the wave's "charge" orientation polarity contractsthe $u_0\epsilon_0$ impedance energy of space by $2/\alpha^2$, to yield $m_e = E_0$ $2/\alpha^2$, thus giving the spin-0 Higgs condition of space an α^2 density increase and m mass-energy "charge" content, r_{e0} radius, $\frac{1}{2}$ -spin and $u_B = \frac{1}{2}eh/m_e2\pi$ Bohr magneton, followed by the quark and proton constructs presented in Quantum Relativity Transform. It thus constructs "matter" from space's $u_0\epsilon_0$ Higgs condition as asymmetrical EM wave with light speed velocity, such that free space's $u_0\epsilon_0$ provides the fundamental basis for all matter and its properties.



Appendix: Neutral Time Flow

The Higgs condition introduces the concept of neutral time flow by the $u_0\epsilon_0$ energy resonance of the points-pairs:

Einstein represented time flow as a $x_4 = (-1)^{\frac{1}{2}}ct$ imaginary distance it takes energy to travel from one Minkowski point to the next at light speed. However under Higgs condition circumstances the dx_4^2 element of $ds^2 = dx_1^2 + dx_2^2 + dx_3^2 + dx_4^2 = 0$ Minkowski space is defined in terms of $dx_{4i}dx_{4k}$ roots in order to accommodate the gravitational field's gradient polarity, which includes a Relative time flow direction between stationary and moving objects to allow for time flow distinctions between them.

An object's motion past another object results in a Relative time flow dilation acceleration and deceleration as it moves past and, as Einstein concluded, it is not possible to determine which object is moving and which is stationary Relative to each other; only relative velocity can be determined, which means the time flow of one with respect to the other has a negative displacement. In the Higgs condition case the

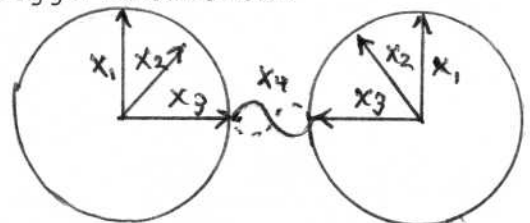
$u_0 \epsilon_0$ impedance energy of the point pairs resonates between them symmetrically in its ground state that constitutes a neutral field free space condition.

Under this field free circumstance each point undergoes negative time flow with respect to the other during the light speed $u_0 \epsilon_0$ impedance energy resonance cycle, thus resulting in a net neutral time flow resonance between points. This avoids time flow paradox conditions because because the spin-0 Higgs condition of free space always constitutes a local relative "present" time perspective that only changes under the influence of entropic circumstances. In other words the net neutral time flow always provides a relative "present" time until acted on by fermionic conditions that impose a change on the neutral point pair's alignments.

Alignments of point pairs from $\uparrow \downarrow$ to $\uparrow \uparrow$ or $\downarrow \downarrow$ represents an excited energy state with $\lambda = hc/mc^2$ spatial wave length contraction and $t = t_0/\Delta\lambda$ time dilation, and thus a time flow differentiation gradient between the space and the fermionic cause of the field energy. Thus the information of the fermionic state flows from the fermionic condition to the dilated time flow Higgs condition space from the "future" to the "past" as the energy content of the "past" intersects with it in the "present." This results in a Relative perspective of matter evolving into future states, flowing in one direction from the past to the future, but which is really a bi-directional intersect between past energy content and future energy information.

This renders time flow bi-directional, and thus in conformance with Standard Model symmetry at the root level of energy's information and content components while appearing to violate symmetry with past to future uni-directional time flow at the resultant composite level of content and information. This maintains the uniformity of the natural laws because they are always referenced to the "present" state of the spin-0 Higgs condition. The convergence of the information of a future state with the energy content of the past state in the present thus provides an apparent flow of energy content and information into the future relative to the "present" net neutral Higgs condition.

Energy resonance in the x_4 degree of freedom is time neutral because it's



not possible to determine direction of time flow from the periodicity of the resonance because of its perfect symmetry, a Heisenberg Uncertainty condition. Application of the natural laws thus stays constant under both parallel constant time flow and reciprocal time flow conditions. When no net energy change occurs the $P_i = e^{S/k}$ Boltzmann probability is 100% uniformity because there is no higher energy state available in its entropic degree of freedom.

For uniform u_0 impedance within and between the points, the $c = 1/(u_0 \epsilon_0)^{1/2}$ light speed flow of energy in all x_n degrees of freedom results in uniform distances with equal parallel and reciprocal symmetry because the energy distributes by equipartition in all available degrees of freedom with no extra energy for excited states. Addition of energy (i.e. content) has no effect until the $E = hf$ energy content reaches an $E_n = E_0/n^2$ harmonic state sufficient to resonate in equilibrium between two of the available degrees of freedom. At this point 2^{n-1} states are possible for $n = 2$, whereas before only $2^{1-1} = 2^0 = 1$ state was possible.

When this occurs parity between the parallel and reciprocal symmetry partitions and two energy states become possible. This is analogous to a coin remaining in its ground state until sufficient energy is added to make it flip, and thus $2^1 = 2$ possible states. This condition is differentiated by the energy's information change of n going from $E_n = E_0/n^2$ to its $E_0/2^2$ excited state, an energy information harmonic transition from $n = 1$ to $n = 2$ that depends on the $\lambda = hc/E$ wavelength of the energy matching the distances of the two degrees of freedom.

This parallels Yukawa's nuclear bond analysis where he set the $\frac{1}{2}$ -wave Heisenberg Uncertainty to the 1.4 fm bond distance to equate it to the pion's $\frac{1}{2}$ -wave node energy. It worked because the 1.4 fm distance corresponding to the 140 MeV pion energy equalled $2^{1/2} r_{pi}$, the proton's interactive radius and the $2^{1/2}$ angular momentum energy of the two degrees of freedom orthogonal to the $x_3 = 1$ fm degree of freedom, so $x_4 = 1.4$ fm resonates with x_1 and x_2 in a $x_4 = (x_1^2 + x_2^2)^{1/2}$ Pythagorean, as shown in the $m_p = (\frac{1}{2}eh/2\pi)2^{1/2}3^{1/2}3c^3 = 3^{1/2}(m_e/\alpha + m_D - m_U) = 938.3$ MeV proton mass-energy equation from the quark tritons orbital and $m_{pi^0} = (3/2)^{1/2}(3m_e c^2/2\alpha + 2^{1/2}m_e) + m_D - m_U/\pi = 135$ MeV neutral and $m_{pi^-} = m_{pi^0} + 2^{1/2}m_e + 3(m_e + E_n) = 139.7$ MeV charged pion mass-energy equations in Quantum Relativity Transform. It derives from the $B = d\phi/dt$ generated by the quark triton's orbital.

This quantized energy information increment constitutes time flow into the future by natural laws at the Minkowski 4-D space-time point level since $v = dx/dt$ and $E = md^2x/dt^2$ requires change in position in space and time and the $hc = 2 \times 10^{-25} \text{ J}\cdot\text{m}$ quantized distinctions become classical at the $r_{eo} = 2 \times 10^{-20} \text{ m}$ level of the electron, since $E_n = E_0/n^2 \rightarrow 0$ for $n > 10$ as a $\int 1/f(x) dx$ singularity transform from $f(x) = E_0/n^2$ quantum behavior to classical as $f(x) \rightarrow 0$. Thus at the content and information root level of energy there is a cause and effect relation for $x_4 = (-1)^{-1}$ time flow of energy in Minkowski space-time of energy content forward and information backward to provide natural law symmetry in the time dimension.

The spin-0 Higgs condition time flow model is thus always "present" until acted upon by a $v = dx/dt$ fermionic circumstance with respect to the $x_4 = (-1)^{\frac{1}{2}} ct$ 1-D $hc = 2 \times 10^{-25} \text{ J}\cdot\text{m}$ energy size of $u_0 \epsilon_0$ free space by the relative continuous result of a $\int 1/f(x) dx$ for $f(x) = E_0/n^2 \rightarrow 0$ quantized continuous singularity dhc/dt transformation function, since $c = dx_4/dt$, thus giving the perception of time flow forward by change in fermionic effects on Higgs space equaling time flow.