# A Relativistic Solution For Momentum And Rest Mass Energy That Yields The Golden Ratio

-by-

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**Abstract**

Einstein's equation for rest mass energy where $E=mc^2$ is familiar to most people. The equation establishes how much energy is available from a given mass if that mass could be converted entirely to energy. However, since the $c^2$ term involves the square of light speed, if we allow that the light has an effect on the mass from a relativistic standpoint, then the relativistic mass would be infinite.

The following analysis examines the case where the so called rest mass is related to a velocity such that the product of the relativistic velocity squared and the resulting relativistic mass arrives at the so called rest mass energy $E=mc^2$. This is equivalent to $E=(m_{rel})(v_{rel}{}^2)$ Firstly however, the so called rest mass momentum is examined wherein the relativistic mass times a relativistic velocity will yield the same momentum as p=mc. It will be developed that the momentum relativistic velocity will incorporate the 1/2 the square root of two and where the inverse of the square root of two is also known to be equal to the root mean square of the value of sinusoidal power.

What is developed next is that the relativistic velocity that yields the proper Einstein momentum is different than the relativistic velocity that derives the proper Einstein rest mass energy. The ratio squared of the energy velocity divided by the momentum velocity all divided by two will be seen to be exactly equal to the inverse of the Golden Ratio, $\Phi$.

Further, the solutions to the velocities related to the energy being equal to the so called rest mass energy will be shown to incorporate the exact value of the Golden ratio as well as the square root of the golden ratio when taken as a ratio to the velocity of light.

Finally, it is presented the concept that what I call the least quantum velocity, which is related to the force of electrogravitation, can also be considered in the same manner as the relativistic approach to momentum mc and energy $mc^2$ as introduced above. The concept of relativistic correction as a mass approaches the velocity of light is extended to a mass approaching the absolute lower limit of velocity which in my work is defined as being equal to the square root of the fine structure constant in meter per second terms. The least quantum level force of gravity, what I have termed "Electrogravitational Force," is based on this least quantum energy equivalent velocity which occurs at all particle level connections to energy space.

Energy space is the non-local instantaneous connector space between all local space particle geometry. Part of the electron and proton geometry for example reside in local space and part resides in energy space. That is perhaps why the electron is considered both as a zero dimensional point and also has a companion Compton wavelength that is non-zero.

There exists the possibility that under extreme conditions the increased relativistic mass is coupled to the higher than c relativistic velocity would release energy in excess of the so called rest mass energy of the electron or proton. That may be the basis of the energy that causes spectacular supernovas. This same condition would occur at the electrogravitational energy level but could be used for safe power generation at the local level since the energy released is much more manageable.

The Compton momentum $m_oc$ may be also expressed relativistically as a velocity $v_{rel}$ less than c but approaching c and a resulting relativistic mass greater than $m_o$, such that $m_oc = m'v_{rel}$.

Let the Lorentz expression be stated for equivalent momentum involving the Compton momentum of the electron verses the relativistic mass product and a velocity less than c as:

$$m_o \cdot c = \frac{m_o}{\sqrt{1 - \frac{v_{rel}^2}{c^2}}} \cdot v_{rel} \quad \text{by factoring, yields} \quad c \cdot m_o = m_o \cdot \frac{c}{\sqrt{-(v_{rel} - c) \cdot (v_{rel} + c)}} \cdot v_{rel} \qquad 1)$$

$$\text{simplifies to} \quad c = -i \cdot \left[ \frac{c}{\left(\sqrt{v_{rel} - c} \cdot \sqrt{v_{rel} + c}\right)} \right] \cdot v_{rel} \quad \text{Let:} \quad c := 2.997924580 \cdot 10^{08} \cdot \frac{m}{sec} \qquad 2)$$

The above formula involving a solution for $v_{rel}$ is not directly solvable by the Mathcad symbolic engine. The message reads, "A closed form solution for the root does not exist. This root is given as the root of another polynomial." The following is a method of manually solving for $v_{rel}$ in the above Lorentz expression.

$$m_o \cdot c = \frac{m_o}{\sqrt{1 - \frac{v_{rel}^2}{c^2}}} \cdot v_{rel} \quad \text{yields} \quad c = \frac{1}{\sqrt{1 - \frac{v_{rel}^2}{c^2}}} \cdot v_{rel} \quad \text{Then squaring both sides:} \qquad 3)$$

$$c^2 = \frac{1}{\left(1 - \frac{v_{rel}^2}{c^2}\right)} \cdot v_{rel}^2 \quad \text{Next, multiplying through by} \quad \left(1 - \frac{v_{rel}^2}{c^2}\right) \quad \text{yields} \qquad 4)$$

$$\left(c^2 - v_{rel}^2\right) = v_{rel}^2 \quad \text{and} \quad c^2 - v_{rel}^2 = v_{rel}^2 \quad \text{has solution(s) for } v_{rel} \text{ of:} \quad \begin{bmatrix} \frac{-1}{2} \cdot \sqrt{2} \cdot c \\ \frac{1}{2} \cdot \sqrt{2} \cdot c \end{bmatrix} \qquad 5)$$

As a further solution method, squaring both sides will allow Mathcad to solve as follows:

$$\left[ -i \cdot \left[ \frac{c}{\left(\sqrt{v_{rel} - c} \cdot \sqrt{v_{rel} + c}\right)} \right] \cdot v_{rel} \right]^2 \quad \text{simplifies to} \quad c^2 \cdot \frac{v_{rel}^2}{\left[ (-v_{rel} + c) \cdot (v_{rel} + c) \right]} \qquad 6)$$

Then, solving for $v_{rel}$ involving the square of both sides:

$$c^2 = \left[ -i \cdot \left[ \frac{c}{\left(\sqrt{v_{rel} - c} \cdot \sqrt{v_{rel} + c}\right)} \right] \cdot v_{rel} \right]^2 \quad \text{has solution(s)} \quad \begin{bmatrix} \frac{-1}{2} \cdot \sqrt{2} \cdot c \\ \frac{1}{2} \cdot \sqrt{2} \cdot c \end{bmatrix} \qquad 7)$$

As a result, both methods are in agreement.

The following solutions are used in the above Lorentz equation:

$$v1_{rel} := \frac{-1}{2}\cdot\sqrt{2}\cdot c \qquad v1_{rel} = -2.1198528\cdot 10^{8}\ \cdot m\cdot sec^{-1} \qquad \frac{v1_{rel}}{c} = -0.7071067812 \qquad 8)$$

$$v2_{rel} := \frac{1}{2}\cdot\sqrt{2}\cdot c \qquad v2_{rel} = 2.1198528\cdot 10^{8}\ \cdot m\cdot sec^{-1} \qquad \frac{v2_{rel}}{c} = 0.7071067812 \qquad 9)$$

Then:

$$x1_{v} := -i\cdot\frac{c}{\left(\sqrt{v1_{rel}-c}\cdot\sqrt{v1_{rel}+c}\right)}\cdot v1_{rel} \qquad x1_{v} = 2.99792458\cdot 10^{8}\ \cdot m\cdot sec^{-1} \qquad 10)$$

$$c = 2.99792458\cdot 10^{8}\ \cdot m\cdot sec^{-1}$$

And:

$$x2_{v} := -i\cdot\frac{c}{\left(\sqrt{v2_{rel}-c}\cdot\sqrt{v2_{rel}+c}\right)}\cdot v2_{rel} \qquad x2_{v} = -2.99792458\cdot 10^{8}\ \cdot m\cdot sec^{-1} \qquad 11)$$

The above result suggests that a negative as well as positive velocity can be applied to the concept of a negative and positive momentum such as for electron pair production. It is known that when a gamma energy photon having an energy equal to two electron rest mass energies passes close enough to a nucleus, the gamma photon breaks into an electron and positron with opposite vectors of motion. Let us use the Lorentz solution for the above velocities to solve for the relativistic mass of the electron.

Let: $c := 2.997924580\cdot 10^{08}\cdot\frac{m}{sec}$ Velocity of light. $m_{e} := 9.109389700\cdot 10^{-31}\cdot kg$ Electron rest mass.

$$p1_{e} := \frac{m_{e}}{\sqrt{1-\frac{v1_{rel}^{2}}{c^{2}}}}\cdot v1_{rel} \qquad p1_{e} = -2.730926329\cdot 10^{-22}\ \cdot kg\cdot m\cdot sec^{-1} \qquad \frac{p1_{e}}{m_{e}\cdot c} = -1 \qquad 12)$$

We see that the momentums are equal in absolute value but have opposite sign and thus can be considered to have opposite vectors in space.

$$p2_{e} := \frac{m_{e}}{\sqrt{1-\frac{v2_{rel}^{2}}{c^{2}}}}\cdot v2_{rel} \qquad p2_{e} = 2.730926329\cdot 10^{-22}\ \cdot kg\cdot m\cdot sec^{-1} \qquad \frac{p2_{e}}{m_{e}\cdot c} = 1 \qquad 13)$$

The absolute electron Compton equivalent momentum in a standing wave scenario is

$$p_{e} := \left|m_{e}\cdot c\right| \qquad p_{e} = 2.730926329\cdot 10^{-22}\ \cdot kg\cdot m\cdot sec^{-1} \qquad 14)$$

The mechanics suggested by the above results may be that the lesser velocities $v1_{rel}$ and $v2_{rel}$ are induced into the standing waves of the energy that can represent the potential mass-energy of two electron(s) by the strong near fields of the nucleus that the gamma ray is passing by. When the lesser velocities are created by the nearby nucleus, pair production occurs.

Positive and negative momentum apply to matter and its counterpart anti-matter. This involves the symmetrical concept of positive and negative energy and thus positive and negative time as well.

In the below equations, the temporary relativistic mass during pair production is calculated as:

$$m1'_e := \frac{m_e}{\sqrt{1 - \frac{v1_{rel}^2}{c^2}}} \qquad m1'_e = 1.2882622459 \cdot 10^{-30} \cdot kg \qquad \frac{m1'_e}{m_e} = 1.4142135624 \qquad 15)$$

$$m_e = 9.1093897 \cdot 10^{-31} \cdot kg$$

$$m2'_e := \frac{m_e}{\sqrt{1 - \frac{v2_{rel}^2}{c^2}}} \qquad m2'_e = 1.2882622459 \cdot 10^{-30} \cdot kg \qquad \frac{m2'_e}{m_e} = 1.4142135624 \qquad 16)$$

The possible velocities related to Compton momentum can be considered as both positive and negative since one must be opposite to the other. Further, since momentum is conserved in this case, the slowing of the velocity of light in the standing wave field that creates the rest mass energy of the electron or positron causes an increase relativistically of the relativistic field-mass in inverse proportion to the decrease in the standing wave field's velocity. We see that the resulting field-mass is positive in both cases of the above solutions for relativistic mass and thus the temporary relativistic field mass so derived is independent of the sign of velocity. It is of interest that the square root of 2 is peculiar to the angle involved with the standard light cone propagation angle. That is, pair production occurs at the angle that defines the separation between local and non-local space as referenced to the direction of propagation of the light. **If uninterrupted by near fields of a nucleus, it is herein postulated that the photon does not move in continuous fashion, but instead jumps a wavelength ahead along its line of momentum and effectively travels at the least quantum velocity when it is undergoing a complete cycle of oscillation in the wave phase. Thus it is both a wave and a particle but not at the exact same time.**

The momentum in the normal and virtual modes of the gamma ray as described above is the same. Pair production occurs as the final step where the virtual mode of the gamma ray is forced to create normal mass from the relativistic mass with a corresponding increase of field velocity from $v_{rel}$ to c which then is the velocity associated with the standing wave that defines the mass of the particle.

Let: $c := 2.997924580 \cdot 10^{08} \cdot \frac{m}{sec}$ Velocity of light. $m_e := 9.109389700 \cdot 10^{-31} \cdot kg$ Electron rest mass.

$$v_{erel} := \left(\frac{1}{2} \cdot \sqrt{2 \cdot c}\right) \qquad v_{erel} = 2.1198528 \cdot 10^{8} \cdot m \cdot sec^{-1} \qquad \text{and} \qquad \frac{c}{v_{erel}} = 1.4142135624 \qquad 17)$$

$$m_e \cdot c = 2.730926329 \cdot 10^{-22} \cdot kg \cdot m \cdot sec^{-1} \qquad 18)$$

$$m1'_e \cdot v1_{rel} = -2.730926329 \cdot 10^{-22} \cdot kg \cdot m \cdot sec^{-1} \qquad 19)$$

$$m2'_e \cdot v2_{rel} = 2.730926329 \cdot 10^{-22} \cdot kg \cdot m \cdot sec^{-1} \qquad 20)$$

Here we again use the velocity such that the product of the relativistic mass increase and its corresponding velocity are equal to the Compton value of $m_e c$.

**The energies are NOT equal however:** $m1'_e \cdot v1_{rel}^2 = 5.7891618252 \cdot 10^{-14} \cdot joule$ 21)

$$m_e \cdot c^2 = 8.187111168 \cdot 10^{-14} \cdot joule \qquad \text{where:} \qquad \frac{m_e \cdot c^2}{m1'_e \cdot v1_{rel}^2} = 1.4142135624 \qquad 22)$$

Now let the $v_{erel}$ be solved for that will yield the same relativistic energy as the Compton rest mass **energy** of the electron. This is solved for in the Lorentz equation as in the manner of the momentum above.

$$m_e \cdot c^2 = \frac{m_e}{\sqrt{1 - \frac{v'_{rel}{}^2}{c^2}}} \cdot v'_{rel}{}^2$$ Both sides are squared to remove the radical in the denominator. 23)

Then: $$\left(m_e \cdot c^2\right)^2 = \left[\frac{m_e}{\sqrt{1 - \frac{v'_{rel}{}^2}{c^2}}} \cdot v'_{rel}{}^2\right]^2$$ simplifies to $$m_e{}^2 \cdot c^4 = -m_e{}^2 \cdot c^2 \cdot \frac{v'_{rel}{}^4}{\left(-c^2 + v'_{rel}{}^2\right)}$$ 24)

Mathcad's symbolic solve engine has four solution(s) for $v'_{rel}$ of:

Let: where:

$$\begin{bmatrix} \frac{1}{2} \cdot \sqrt{-c^2 \cdot \left(1 + \sqrt{5}\right)} \cdot \sqrt{2} \\ \frac{-1}{2} \cdot \sqrt{-c^2 \cdot \left(1 + \sqrt{5}\right)} \cdot \sqrt{2} \\ \frac{1}{2} \cdot c \cdot \sqrt{-1 + \sqrt{5}} \cdot \sqrt{2} \\ \frac{-1}{2} \cdot c \cdot \sqrt{-1 + \sqrt{5}} \cdot \sqrt{2} \end{bmatrix}$$

$$v5_{rel} := \frac{1}{2} \cdot \sqrt{-c^2 \cdot \left(1 + \sqrt{5}\right)} \cdot \sqrt{2} \qquad v5_{rel} = 3.8134189735 \cdot 10^8 i \cdot m \cdot sec^{-1}$$ 25)

$$v6_{rel} := \frac{-1}{2} \cdot \sqrt{-c^2 \cdot \left(1 + \sqrt{5}\right)} \cdot \sqrt{2} \qquad v6_{rel} = -3.8134189735 \cdot 10^8 i \cdot m \cdot sec^{-1}$$ 26)

$$v7_{rel} := \frac{1}{2} \cdot c \cdot \sqrt{\left(-1 + \sqrt{5}\right)} \cdot \sqrt{2} \qquad v7_{rel} = 2.356822539 \cdot 10^8 \cdot m \cdot sec^{-1}$$ 27)

$$v8_{rel} := \frac{-1}{2} \cdot c \cdot \sqrt{\left(-1 + \sqrt{5}\right)} \cdot \sqrt{2} \qquad v8_{rel} = -2.356822539 \cdot 10^8 \cdot m \cdot sec^{-1}$$ 28)

There are two solutions each in the imaginary and real plane of a positive and negative sign for each respectively.

**It is of extreme interest that in all of the four solutions that find the $v_{rel}$ velocity where the energy kinetic is equal to the relativistic energy of the electron velocity, the terms involving the square root of:**

$$\left(1 + \sqrt{5}\right) = 3.2360679775 \qquad \text{and} \qquad \left(-1 + \sqrt{5}\right) = 1.2360679775$$ 29)

**are equal to twice the accepted values for the solutions to the golden ratio known as Φ.**

$$\Phi1 := \frac{1 + \sqrt{5}}{2} \qquad \Phi1 = 1.6180339887 \qquad \Phi2 := \frac{-1 + \sqrt{5}}{2} \qquad \Phi2 = 0.6180339887$$ 30)

where the inverse of Φ2 is equal to Φ1. Or: $\Phi2^{-1} = 1.6180339887$ 31)

**As an added feature of significance, the actual velocity solutions of $v_{rel}$ form the square root of the golden ratio when taken as a ratio to the velocity of light, c. This relates directly to the ratio of the height of the Great Pyramid at Giza to half its base length wherein the result is equal to $4/\pi$.**

The following ratios of the relativistic velocities to the speed of light are established:

$$\frac{\frac{1}{2}\cdot\sqrt{-c^2\cdot\left(1+\sqrt{5}\right)}\cdot\sqrt{2}}{c} = 1.2720196495i \qquad \sqrt{-\Phi 1} = 1.2720196495i \qquad \frac{4}{\pi} = 1.2732395447 \qquad 32)$$

$$\frac{\frac{-1}{2}\cdot\sqrt{-c^2\cdot\left(1+\sqrt{5}\right)}\cdot\sqrt{2}}{c} = -1.2720196495i \qquad -\sqrt{\Phi 1} = -1.2720196495 \qquad 33)$$

$$\frac{\frac{1}{2}\cdot c\cdot\sqrt{\left(-1+\sqrt{5}\right)}\cdot\sqrt{2}}{c} = 0.7861513778 \qquad \sqrt{\Phi 2} = 0.7861513778 \qquad 34)$$

$$\frac{\frac{-1}{2}\cdot c\cdot\sqrt{\left(-1+\sqrt{5}\right)}\cdot\sqrt{2}}{c} = -0.7861513778 \qquad -\sqrt{\Phi 2} = -0.7861513778 \qquad 35)$$

$$v_{ratio} := \frac{\frac{1}{2}\cdot c\cdot\sqrt{\left(-1+\sqrt{5}\right)}\cdot\sqrt{2}}{\left(\frac{1}{2}\cdot\sqrt{2}\cdot c\right)} \quad \text{and} \quad \frac{{v_{ratio}}^2}{2}\cdot\Phi 1 = 1 \qquad \left(\frac{\pi}{v_{ratio}\cdot 2}\right)^2\cdot\frac{1}{2} = 0.998084711 \qquad 36)$$

Where:

$$\frac{\frac{1}{2}\cdot c\cdot\sqrt{\left(-1+\sqrt{5}\right)}\cdot\sqrt{2}}{\left(\frac{1}{2}\cdot\sqrt{2}\cdot c\right)} \quad \text{simplifies to} \quad \sqrt{-1+\sqrt{5}} = 1.1117859405 \qquad 37)$$

$$\text{and where,} \quad \frac{\left(\sqrt{-1+\sqrt{5}}\right)^2}{2} = 0.6180339887 \quad \text{and} \quad \Phi 2 = 0.6180339887 \qquad 38)$$

The four solutions above for the relative velocities will yield two different relativistic mass values as follows:

$$m5_{rel} := \frac{m_e}{\sqrt{1-\frac{{v5_{rel}}^2}{c^2}}} \qquad m5_{rel} = 5.6299124514\cdot 10^{-31}\cdot kg \qquad 39)$$

$$m6_{rel} := \frac{m_e}{\sqrt{1-\frac{{v6_{rel}}^2}{c^2}}} \qquad m6_{rel} = 5.6299124514\cdot 10^{-31}\cdot kg \qquad 40)$$

$$m7_{rel} := \frac{m_e}{\sqrt{1 - \frac{v7_{rel}^2}{c^2}}} \qquad m7_{rel} = 1.4739302151 \cdot 10^{-30} \cdot kg \qquad 41)$$

$$m8_{rel} := \frac{m_e}{\sqrt{1 - \frac{v8_{rel}^2}{c^2}}} \qquad m8_{rel} = 1.4739302151 \cdot 10^{-30} \cdot kg \qquad 42)$$

$$m5_{rel} \cdot v5_{rel}^2 = -8.187111168 \cdot 10^{-14} \cdot joule \qquad m6_{rel} \cdot v6_{rel}^2 = -8.187111168 \cdot 10^{-14} \cdot joule \qquad 43)$$

$$m7_{rel} \cdot v7_{rel}^2 = 8.187111168 \cdot 10^{-14} \cdot joule \qquad m8_{rel} \cdot v8_{rel}^2 = 8.187111168 \cdot 10^{-14} \cdot joule \qquad 44)$$

Where: $m_e \cdot c^2 = 8.187111168 \cdot 10^{-14} \cdot joule$ 45)

It is therefore postulated, as for the case of momentum above, that the photon is in a state of simultaneous juxtaposition (as for the state of entanglement) such that it is a product of relativistic field mass times the $v_{rel}^2$ as shown above so that field mass-energy equals the 'rest mass' energy equal to $E = mc^2$.

The connection of the relativistic mass field for quantum energy and the golden ratio must be considered as fundamental to the structure and action of energy related to the so called rest mass energy. Then it is possible to think of the structure of the Great Pyramid at Giza in Egypt as being aligned so as to channel in the relativistic mass energy of ALL electromagnetic photons interacting with rest mass energy and thus concentrate the energy into a useful and coherent resonant package.

Further, the structure of matter in the universe may be based on the golden ratio as applied to the relativistic solution presented above. It is a stunning concept to say the least. I say that in sincere humility since it is God's beautiful creation.

Let Plank's constant be stated as: $h := 6.626075500 \cdot 10^{-34} \cdot joule \cdot sec$

The obvious possibilities of the product of the relativistic mass and velocity squared products are stated below as:

$$\frac{m5_{rel} \cdot v7_{rel}^2}{m_e \cdot c^2} = 0.3819660113 \qquad \text{Also:} \qquad m5_{rel} \cdot v5_{rel}^2 = -8.187111168 \cdot 10^{-14} \cdot joule \qquad 46)$$

$$\frac{m6_{rel} \cdot v8_{rel}^2}{m_e \cdot c^2} = 0.3819660113 \qquad \text{Also:} \qquad m6_{rel} \cdot v6_{rel}^2 = -8.187111168 \cdot 10^{-14} \cdot joule \qquad 47)$$

$$\frac{m7_{rel} \cdot v5_{rel}^2}{m_e \cdot c^2} = -2.6180339887 \qquad \text{Also:} \qquad m7_{rel} \cdot v7_{rel}^2 = 8.187111168 \cdot 10^{-14} \cdot joule \qquad 48)$$

$$\frac{m8_{rel} \cdot v6_{rel}^2}{m_e \cdot c^2} = -2.6180339887 \qquad \text{Also:} \qquad m8_{rel} \cdot v8_{rel}^2 = 8.187111168 \cdot 10^{-14} \cdot joule \qquad 49)$$

It is seen that the total relativistic energy of the above right products equate to the rest mass energy of the electron. There are also the above left side possibility of probable relativistic mass times velocity squared combinations that do not equal the rest mass energy of the electron as shown below.

$m5_{rel} \cdot v7_{rel}^2 = 3.1271981965 \cdot 10^{-14} \cdot joule$ = positive mass-field energy < $m_e c^2$. 50)

$m6_{rel} \cdot v8_{rel}^2 = 3.1271981965 \cdot 10^{-14} \cdot joule$ = positive mass-field energy < $m_e c^2$. 51)

$m7_{rel} \cdot v5_{rel}^2 = -2.1434135308 \cdot 10^{-13} \cdot joule$ = |negative mass-field energy| > $m_e c^2$. 52)

$m8_{rel} \cdot v6_{rel}^2 = -2.1434135308 \cdot 10^{-13} \cdot joule$ = |negative mass-field energy| > $m_e c^2$. 53)

The last two combinations yield an absolute value of negative energy that is greater than the rest mass of the electron and under forced conditions could be a possible source of the negative energy that is filling the universe thus causing an accelerated expansion rate. The velocities $v5_{rel}$ and $v6_{rel}$ are also in the imaginary realm and are thus may be a non-local connection to energy space.

Non-local implies the energy space connection. In the extreme case, a resonant condition of all such particles in a mass as large as a neutron star undergoing extreme pressure and temperature caused by capture of material from space could cause a sudden release of energy into normal space from energy space and this is what is termed a supernova.

The symmetry of increased field mass and reduced velocity being equal to reduced field mass times increased velocity yielding the same momentum or energy is a balanced condition and is what would be desired in a well behaved system. However, if the symmetry were broken and the increased field mass became associated with the increased velocity above c, the system would gain energy per unit time of energy refresh and the field would become enormous in a short period of time. The result would indeed be a supernova for a system of particles as large as a star.

Further, if a reduced field mass were to be coupled to reduced velocity on a large scale in resonant fashion, the result would be a catastrophic implosion of matter and energy leading to what is called a singularity, or in more common terms, a black hole star.

This leads into the case for the electrogravitational force which I view as being the result of a symmetry breaking in the realm of the least quantum velocity allowed in nature.

**The Least Quantum Energy and Momentum Relativistic Electrogravitational Velocity Solutions.**

$\alpha := 7.297353080 \cdot 10^{-03}$ $\quad v_{LM} := \sqrt{\alpha} \cdot \frac{m}{sec}$ $\quad v_{LM} = 0.0854245461 \cdot m \cdot sec^{-1}$

$v'1_{rel} := \frac{-1}{2} \cdot \sqrt{2} \cdot v_{LM}$ $\quad v'1_{rel} = -0.0604042758 \cdot m \cdot sec^{-1}$ $\quad \frac{v'1_{rel}}{v_{LM}} = -0.7071067812$ 54)

$v'2_{rel} := \frac{1}{2} \cdot \sqrt{2} \cdot v_{LM}$ $\quad v'2_{rel} = 0.0604042758 \cdot m \cdot sec^{-1}$ $\quad \frac{v'2_{rel}}{v_{LM}} = 0.7071067812$ 55)

Then: $x'1_v := -i \cdot \frac{v_{LM}}{\left(\sqrt{v'1_{rel} - v_{LM}} \cdot \sqrt{v'1_{rel} + v_{LM}}\right)} \cdot v'1_{rel}$ $\quad x'1_v = 0.0854245461 \cdot m \cdot sec^{-1}$ 56)

$$v'5_{rel} := \frac{1}{2}\cdot\sqrt{-v_{LM}^{2}\cdot\left(1+\sqrt{5}\right)}\cdot\sqrt{2} \qquad v'5_{rel} = 0.1086617012i\cdot m\cdot sec^{-1}$$ 57)

$$v'6_{rel} := \frac{-1}{2}\cdot\sqrt{-v_{LM}^{2}\cdot\left(1+\sqrt{5}\right)}\cdot\sqrt{2} \qquad v'6_{rel} = -0.1086617012i\cdot m\cdot sec^{-1}$$ 58)

$$v'7_{rel} := \frac{1}{2}\cdot v_{LM}\cdot\sqrt{\left(-1+\sqrt{5}\right)}\cdot\sqrt{2} \qquad v'7_{rel} = 0.0671566246\cdot m\cdot sec^{-1}$$ 59)

$$v'8_{rel} := \frac{-1}{2}\cdot v_{LM}\cdot\sqrt{\left(-1+\sqrt{5}\right)}\cdot\sqrt{2} \qquad v'8_{rel} = -0.0671566246\cdot m\cdot sec^{-1}$$ 60)

**These are the four solutions related to the least quantum electrogravitational energy.**

where:

$$\frac{\frac{1}{2}\cdot\sqrt{-v_{LM}^{2}\cdot\left(1+\sqrt{5}\right)}\cdot\sqrt{2}}{v_{LM}} = 1.2720196495i \qquad \sqrt{-\Phi1} = 1.2720196495i \qquad \frac{4}{\pi} = 1.2732395447$$ 61)

$$\frac{\frac{-1}{2}\cdot\sqrt{-v_{LM}^{2}\cdot\left(1+\sqrt{5}\right)}\cdot\sqrt{2}}{v_{LM}} = -1.2720196495i \qquad -\sqrt{\Phi1} = -1.2720196495$$ 62)

$$\frac{\frac{1}{2}\cdot v_{LM}\cdot\sqrt{\left(-1+\sqrt{5}\right)}\cdot\sqrt{2}}{v_{LM}} = 0.7861513778 \qquad \sqrt{\Phi2} = 0.7861513778$$ 63)

$$\frac{\frac{-1}{2}\cdot c\cdot\sqrt{\left(-1+\sqrt{5}\right)}\cdot\sqrt{2}}{c} = -0.7861513778 \qquad -\sqrt{\Phi2} = -0.7861513778$$ 64)

And: $$v'_{ratio} := \frac{\frac{1}{2}\cdot v_{LM}\cdot\sqrt{\left(-1+\sqrt{5}\right)}\cdot\sqrt{2}}{\left(\frac{1}{2}\cdot\sqrt{2}\cdot v_{LM}\right)} \quad \text{and} \quad \frac{v'_{ratio}{}^{2}}{2}\cdot\Phi1 = 1 \qquad \left(\frac{\pi}{v'_{ratio}\cdot 2}\right)^{2}\cdot\frac{1}{2} = 0.998084711$$ 65)

Where:

$$\frac{\frac{1}{2}\cdot v_{LM}\cdot\sqrt{\left(-1+\sqrt{5}\right)}\cdot\sqrt{2}}{\left(\frac{1}{2}\cdot\sqrt{2}\cdot v_{LM}\right)} \quad \text{simplifies to} \quad \sqrt{-1+\sqrt{5}} = 1.1117859405$$ 66)

and where, $$\frac{\left(\sqrt{-1+\sqrt{5}}\right)^{2}}{2} = 0.6180339887 \quad \text{and} \quad \Phi2 = 0.6180339887$$ 67)

Thus it is seen that the relativistic solution is the same for the velocities near light c and the least quantum velocity $v_{LM}$ as far as the Golden Ratio is concerned. Then the solutions for relativistic mass also apply so that the correct 'rest mass' electrogravitational momentum as well as energy are arrived at.

$$m'5_{rel} := \frac{m_e}{\sqrt{1-\frac{v'5_{rel}^2}{v_{LM}^2}}} \qquad m'5_{rel} = 5.6299124514\cdot 10^{-31}\ \cdot kg \qquad 68)$$

$$m'6_{rel} := \frac{m_e}{\sqrt{1-\frac{v'6_{rel}^2}{v_{LM}^2}}} \qquad m'6_{rel} = 5.6299124514\cdot 10^{-31}\ \cdot kg \qquad 69)$$

$$m'7_{rel} := \frac{m_e}{\sqrt{1-\frac{v'7_{rel}^2}{v_{LM}^2}}} \qquad m7_{rel} = 1.4739302151\cdot 10^{-30}\ \cdot kg \qquad 70)$$

$$m'8_{rel} := \frac{m_e}{\sqrt{1-\frac{v'8_{rel}^2}{v_{LM}^2}}} \qquad m8_{rel} = 1.4739302151\cdot 10^{-30}\ \cdot kg \qquad 71)$$

$$m'5_{rel}\cdot v'5_{rel}^2 = -6.6474432984\cdot 10^{-33}\ \cdot joule \quad m'6_{rel}\cdot v'6_{rel}^2 = -6.6474432984\cdot 10^{-33}\ \cdot joule \qquad 72)$$

$$m'7_{rel}\cdot v'7_{rel}^2 = 6.6474432984\cdot 10^{-33}\ \cdot joule \quad m'8_{rel}\cdot v'8_{rel}^2 = 6.6474432984\cdot 10^{-33}\ \cdot joule \qquad 73)$$

Where: $m_e\cdot v_{LM}^2 = 6.6474432984\cdot 10^{-33}\ \cdot joule$ and $f_{LM} := m_e\cdot v_{LM}^2\cdot h^{-1}$ 74)

Let: $\mu_o := 4\cdot\pi\cdot 1\cdot 10^{-07}\cdot\frac{henry}{m}$ $R_{n1} := 5.291772490\cdot 10^{-11}\cdot m$ $m_p := 1.672623100\cdot 10^{-27}\cdot kg$

The electrogravitational equation can be stated for an electron and proton separated by the n1 Bohr radius as:

$$F_{EG} := \frac{m'5_{rel}\cdot\left(v'5_{rel}\cdot v'6_{rel}\right)}{R_{n1}}\cdot\mu_o\cdot\left[\frac{m_p\cdot\frac{1}{\Phi 1}\cdot v'5_{rel}^2}{R_{n1}}\right] \qquad 75)$$

Note that the Golden Ratio relativistic solution also applies to the proton mass where in this example only one of the four possible solutions is used..

$$F_{EG} = -3.6410414873\cdot 10^{-47}\ \cdot newton\cdot\frac{henry}{m}\cdot newton \qquad 76)$$

This agrees very closely to the standard Newtonian solution.

The above result unit parameters have one of the Newton terms fixed as a constant as well as the permeability constant $\mu_o$. (Then force has a *dual* local and non-local action.) The result varies as $1/R^2$.

There also exists the excess energy condition where the increased mass and the velocity greater than the least quantum velocity may be considered.

$$m'7_{rel} \cdot v'5_{rel}{}^2 = -1.7403232494 \cdot 10^{-32} \cdot joule \quad 77)$$

Where: $f_{LMhigh} := \frac{m'7_{rel} \cdot v'5_{rel}{}^2}{h}$ $\quad f_{LMhigh} = -26.2647663667 \cdot Hz$ 78)

Note that the energy and thus the time related frequency is negative since both $v'5_{rel}$ and $v'6_{rel}$ are imaginary realm and the square of the imaginary operator is always negative. Both excess relativistic masses are positive. A negative energy is the result and this causes entropy which I have defined in my work as being associated with the fact that gravity is most always a force of attraction between matter.

Of further interest, there exists a negative energy related frequency in Hz that is very close to the inverse of the fine structure constant as shown below.

$f_{\alpha} := f_{LMhigh} \cdot \left(\Phi 1 \cdot \sqrt{2}\right)^2$ $\quad f_{\alpha} = -137.5241021091 \cdot Hz$ and $\quad f_{LM} \cdot \Phi 1^4 \cdot 2 = 137.5241021091 \cdot Hz$ 79)

The above frequency was presented in one of my previous papers concerning energy related to the length of what I have termed an "Energy Pipe."[1]

This is shown below as an excerpt from the above paper reference. Let: $\Delta\lambda 1 := 32.9867228627 \cdot in$

35) Let: $\Delta\lambda_{peak1} := 3 \cdot \Delta\lambda 1$ Then: $\Delta\lambda_{peak1} = 8.2466807157 \cdot ft$ 80)

This is the distance the smallest pipe (1+ 1/2 inches outside diameter) is adjusted to in length before it enters the next larger (1+3/4 inches outside diameter) pipe. The 1+3/4 inch outside diameter pipe is also adjusted for the same length before it enters the 2+1/4 inch outside diameter pipe.

The acoustic frequency is calculated based on the speed of sound at sea level and 72 degrees Fahrenheit as the ambient air temperature.

$$v_{air} := 1130 \cdot \frac{ft}{sec}$$

36) $f_{peak1} := \frac{v_{air}}{\Delta\lambda_{peak1}}$ $\quad f_{peak1} = 137.0248271953 \cdot Hz$ **This is a serendipitous result and unexpected before this analysis!!** 81)

**The above frequency result is effectively equal in absolute magnitude to the inverse of the fine structure constant, neglecting the units Hz.**

The above excerpt further supports my contention that there exists a fundamentally important connection to energy spaced from an acoustic and thus air velocity related standpoint.

Further, another connection to my previous work exists in the above $\Delta\lambda_{peak1}$ wavelength as follows:

$f_{A'dbf} := \frac{c}{\Delta\lambda_{peak1} \cdot \Phi 1}$ $\quad f_{A'dbf} = 7.3712122996 \cdot 10^7 \cdot Hz$ 82)

The following correlation is an excerpt from my previous work[2] which is as follows:

29) $A'_{dbf} = \frac{h}{\lambda'_{fc}{}^{2} \cdot m_e}$ or, $A'_{dbf} = 7.3405234414 \cdot 10^{7} \cdot Hz$ **This is the mass motional vibration rate forming the De Broglie matter wave.** 83)

The wavelength above also is fundamental to distances between the 'resonators' in the Grand Gallery of the Great Pyramid at Giza.[3] This distance is:

$$\frac{\Delta\lambda_{peak1}}{3} \cdot 2 = 1.6757255214 \cdot m$$ Shave off a little for dimensions of the resonators, we arrive at the golden ratio in meters. 84)

It is of interest that 1/4 Δλ1 divided into the velocity of light arrives at a frequency near the hyperfine frequency of the hydrogen atom.

$$\frac{\Delta\lambda1}{4} = 8.2466807157 \cdot in \quad \text{and} \quad \frac{c}{\left(\frac{\Delta\lambda1}{4}\right)} = 1.4312246447 \cdot 10^{9} \cdot Hz$$ 85)

Christopher Dunn in his book[3] suggests that the hyperfine frequency was utilized in a hydrogen gas environment in the King's Chamber and Grand Gallery to build a microwave energy to tremendous levels.

In a previous on-line paper, I presented a mathematical proof of the energy available from the proton field of the Hydrogen1 atom.[4] I call this energy the proton pressure wave. This is energy that is transformed into normal space from energy space by the geometry of the proton field. It creates the pressure that keeps the electron from falling into the nucleus with some energy left over.

**Summary:**

It is of interest that the results of eqs. 5, 25, 26, 27 and 28 all have the fraction plus and minus 1/2 which may be related directly to the spin of charged particles such as the electron and the proton. Also, the square root of two appears in both the case for relativistic momentum as well as for relativistic energy of the same equations. Finally, in the equations for relativistic energy, it is seen that the Golden Ratio appears as well as its square root and its square.

The square root of 2 as well as the Golden Ratio are irrational numbers. That is, they are incommensurables, they have no common measure. They cannot be expressed as a fraction. This implies infinity of growth without limit since the numbers go on without limit. Then God's universe may be thought of as expanding without limit by reason that it is based on a foundation of the irrational numbers involving the square root of two and Φ. Then it is no surprise that nature is abundant with examples of the Golden ratio in its design since the most basic particles are also based on the Golden ratio as expressed in the above equations.

**Conclusion:**

The equation $E = mc^2$ cannot be taken at face value since the mass term would be infinite if it were actually connected to the term c. This requires that the above approach be used since it fits the Special Theory of Relativity concerning mass having a velocity approaching c that will yield the proper so-called rest mass. This approach also generates the observed dual nature of positive and negative energy pair production which is not demonstrated by $E = mc^2$. Finally, the connection to the least quantum of electrogravitational action is again reinforced by allowing for the existence of the least quantum velocity as well as the least quantum velocity also having a direct connection to Einstein's Special Theory of Relativity.

Ω

**References:**


1. http://www.electrogravity.com/EnergyPipe/EnergyPipe_Add1.pdf, p. 5, eqs. 35 and 36.

2. http://www.electrogravity.com/DualFreqEG/A_frequency4.pdf, p. 6, eq. 29.

3. Dunn, Christopher, "The Giza Powerplant" Bear & Company, Copyright 1998 by Christopher Dunn. See p. 168 for a detailed picture which can be scaled for the actual distance between resonators.

4. http://www.electrogravity.com/HydDisEnergy/HydDisEnergy_1.pdf