Abstract

Numerous attempts have been made over many years to provide a theory that unifies gravity with the other forces. The attempt to do this demands that Einstein's General Theory of Relativity has to be an integral part since the General Theory of Relativity supposedly provides the framework for the gravitational field. Further, quantum field theory has not been combined or unified with the General Theory of Relativity although string theory claims a solution is somewhere in an unlimited number of solutions.

This paper presents a form of calculating gravitational force based on a formula that is purely electrical and magnetic which makes it seamlessly interface with the forces electric, magnetic, strong and weak. As such, the quantum realm is also easily interfaced to the electrogravitational equation as presented in this paper. Herein, the electric and magnetic parameters in the electrogravitational equation are functionally equal to mass and the so-called gravitational constant, G. Within the new electric and magnetic form of G, the Plank length is utilized to connect to what I call energy space, the same space that created the Big Bang. As such, the concept of instantaneous gravitational action independent of distance is established. This can be regarded as the fundamental quantum aspect of gravity.

This newest form of the electrogravitational equation is the long sought after format which not only provides the same result numerically as Newton's gravitational formula but also the single Newton force parameter result. As such, it stands as the first real unification of the fields of force.
The Newtonian gravitational equation is given as:

\[ F = \frac{G m_1 m_2}{r^2} \]  

where \( F \) = force in Newtons, \( G \) is the gravitational constant, \( m_1 \) and \( m_2 \) are the two masses set apart, and \( r \) is the distance between the centers of the masses. It is the purpose of this paper to convert the above gravitational equation into electric and magnetic terms so as to unify the gravitational equation with the other known electric and magnetic forces.

The gravitational equation can be expressed in the form:

\[ F = \left( \frac{m_1}{r} \right) G \left( \frac{m_2}{r} \right) \]  

which is mass per meter times the gravitational constant times mass per meter. Let \( r \) be the radius in meters of the \( n_1 \) shell of the hydrogen atom and the two masses be the mass of two electrons separated by that distance. Further, let the vector magnetic potential \( (A_{vec}) \) related to mass per unit distance be stated as:

\[ A_{vec} = \frac{\Phi_o}{a_o} \left( \frac{4}{\pi} \right)^{\frac{1}{2}} \]

where,

\[ \Phi_o = 2.067834610 \times 10^{-15} \text{ weber} \]

Fluxoid quantum

\[ \varepsilon_o = 8.854187817 \times 10^{-12} \text{ farad} \cdot \text{m}^{-1} \]

Electric permittivity

\[ a_o = 5.291772490 \times 10^{-11} \text{ m} \]

Bohr radius

Then:

\[ A_{vec} = 4.4093004741 \times 10^{-5} \frac{\text{volt} \cdot \text{sec}}{\text{m}} \]

The \( H_{n1} \) quantum \( A_{vec} \) field expression equivalent to mass per meter is therefore,

\[ m_{\chi} := \varepsilon_o A_{vec} \]

or,

\[ m_{\chi} = 1.7214250569 \times 10^{-20} \frac{\text{kg}}{\text{m}} \]

Let:

\[ G_{\text{const}} = 6.672590000 \times 10^{-11} \text{ newton} \cdot \text{m}^2 \cdot \text{kg}^{-2} \]

Gravitational constant

\[ m_e := 9.109389700 \times 10^{-31} \text{ kg} \]

Electron rest mass
Then the standard gravitational equation yields:

\[ F_{\text{grav}} := \frac{m_e G_{\text{const}} m_e}{a_0^2} \quad F_{\text{grav}} = 1.977291389 \times 10^{-50} \text{ N} \]

Substituting the quantum \(A_{\text{vec}}\) field expression equivalent to mass per meter:

\[ F_{1\text{EG}} := m_\lambda G_{\text{const}} m_\lambda \quad F_{1\text{EG}} = 1.9772914149 \times 10^{-50} \text{ N} \]

Then we see that the two forms quantum field and Newtonian are equivalent. However, we must now complete the conversion of \(G\) to also be expressed in quantum electric and magnetic terms.

Let:

\[ c_{\text{vel}} := 2.997924580 \times 10^8 \text{ m/s} \quad \text{Speed of light in vacuum} \]

\[ h := 6.626075500 \times 10^{-34} \text{ J s} \quad \text{Planck constant} \]

\[ r_p := \sqrt{\frac{G_{\text{const}} h}{c^3}} \quad r_p = 4.0508331539 \times 10^{-35} \text{ m} \quad \text{Planck least quantum length} \]

\[ \mu_o := 4 \pi \times 10^{-07} \text{ H/m} \quad \text{Magnetic permeability} \]

\[ q_o := 1.602177330 \times 10^{-19} \text{ C} \quad \text{Electron charge} \]

\[ \alpha := 7.297353080 \times 10^{-03} \quad \text{Fine structure constant} \]

\[ G_{\text{EGQ}} := \frac{c^2}{\mu_o} \left( \frac{r_p}{q_o} \right)^2 \alpha^2 \quad G_{\text{EGQ}} = 6.6725900609 \times 10^{-11} \text{ N m}^2 \text{ kg}^{-2} \]

The Newtonian and electrogravitational forms above are shown to be equivalent.
Finally, we can now state the equivalent electrogravitational equation that is equivalent to the standard Newtonian gravitation as:

$$F_{EGQ} = m_x G_{EGQ} m_x$$  \[11\]

$$F_{EGQ} = 1.9772914329 \times 10^{-50} \text{ newton}$$

$$F_{grav} = 0.9999999778 \frac{F_{EGQ}}{F_{EGQ}}$$  \[12\]

The fields Newtonian and Electrogravitation are effectively unified.

QED

Note that in deriving the electrogravitational form of $G_{EGQ}$, the Plank least quantum distance $r_p$ is fundamental and thus the connector is established for gravitation as taking place in that least quantum Plank distance. That supports my previous postulate that gravitation is connected in energy space which is that same space that is connected instantly to all matter throughout normal space.

The total electrogravitational equation expanded from the above is:

$$F_{EGQ_{total}} := \varepsilon_o \left[ \frac{\Phi_o}{a_o} \left( \frac{4}{\pi} \right)^2 \right] \left[ \frac{1}{\mu_o} \left( \frac{r_p^2}{a_q^2} \right)^2 \right] \left[ \frac{1}{\varepsilon_o} \left( \frac{\Phi_o}{a_o} \left( \frac{4}{\pi} \right)^2 \right) \right]$$

$$F_{EGQ_{total}} = 1.9772914329 \times 10^{-50} \text{ N}$$  \[13\]

The extra Newton and henry per meter terms in my other solution online is now removed and the above result is exactly equal in unit terms to the standard Newtonian equation as well as in the required degree of accuracy numerically.

Ω

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Addendum

The three states of field may be considered as mass, momentum and energy. Then the formulae may be stated such that a force for a given field, (gravitational, magnetic, electric and strong force), will yield the same force for each of the three field states. Then twelve total formulae will result from this conceptual approach to field unification.

For the two system quantum electrogravitational momentum interaction:

\[ v_{LM} := \sqrt{\frac{1}{\mu_0} \left( \frac{r}{q} \right)^2 \cdot 2 \cdot \frac{\alpha}{(\frac{m}{\text{sec}})^2}} \]

Where:

\[ v_{LM} = 0.0854245461 \frac{m}{s} \]

Then:

\[ G_{EGQP} := 9.1438498148 \times 10^{-9} \frac{m}{kg} \]

From equation 15 above:

\[ v_{LM} = 0.0854245461 \frac{m}{s} \]

Then:

\[ \frac{m_e v_{LM}}{a_o} = 1.470519532 \times 10^{-21} \frac{kg \cdot m}{s} \quad (= \text{Least quantum momentum.}) \]

\[ \frac{m_e v_{LM}}{a_o} G_{EGQP} \frac{m_e v_{LM}}{a_o} = 1.977291407 \times 10^{-50} \text{N} \]

Adapting \( G_{EGQ} \) for the two-system quantum electrogravitational energy interaction:

\[ G_{EGQE} := c^2 \left( \frac{1}{\mu_0} \right) \left( \frac{r}{q} \right)^2 \cdot 2 \cdot \frac{\alpha^2}{(\frac{m}{\text{sec}})^4} \]

Check on conversion constant for \( G_{EGE1} \):

\[ \frac{m_e (v_{LM})^2}{a_o} G_{EGQE} \frac{m_e (v_{LM})^2}{a_o} = 1.977291407 \times 10^{-50} \text{N} \]
The three states of field for the magnetic force are considered next.

\[ F_{Mn1} := \frac{m_e v_{LM}}{a_o} \]

\[ F_{Mn1} = 1.2561846359 \times 10^{-22} \text{ newton} \]  \hspace{1cm} 18)

The magnetic force is part of the electrogravitational force.

In the below formula, we will allow \( r_p \) to increase so as to allow the force \( F_{Mn1} \) to be the result in a two system interaction. The magnetic force result will be based solely on a two system mass interaction. The below formula is the mass only solution for the two system magnetic force case.

\[ F_{Mn1} = \frac{m_e}{a_o} \left[ \frac{2}{c} \left( \frac{1}{\mu_o} \right) \left( \frac{r_p}{q_o} \right)^2 \right] \alpha^2 \frac{m_e}{a_o} \]


\[ \text{has solution(s) for } r_p \text{ of:} \]

\[ \sqrt{2 \cdot \sqrt{F_{Mn1} \cdot a_o \cdot q_o \cdot \sqrt{\mu_o}}} \]

\[ \frac{r_p}{2 \sqrt{\alpha \cdot c \cdot m_e}} \]

\[ \text{if } \alpha \neq 0 \land c \neq 0 \land m_e \neq 0 \]

\[ 0 \] \hspace{1cm} 20)

Let \( r_p \) be stated as \( r_M \)

\[ r_M := \frac{\sqrt{2 \cdot \sqrt{F_{Mn1} \cdot a_o \cdot q_o \cdot \sqrt{\mu_o}}}}{2 \sqrt{\alpha \cdot c \cdot m_e}} \]

\[ r_M = 3.2287599308 \times 10^{-21} \text{ m} \]

\[ \text{Then:} \]

\[ F_{Mn1} := \frac{m_e}{a_o} \left[ \frac{2}{c} \left( \frac{1}{\mu_o} \right) \left( \frac{r_M}{q_o} \right)^2 \right] \alpha^2 \frac{m_e}{a_o} \]

\[ F_{Mn1} = 1.2561846359 \times 10^{-22} \text{ N} \]  \hspace{1cm} 22)
Then magnetic force may exist locally in the n1 shell of hydrogen for example, or it also may exist in a two system interaction involving mass only between two atoms at an arbitrary distance. The force connector is modified in the $r_p$ parameter to open up a larger energy gate for the force constant to act on particles between one system to the other instantly. Here we define the pulse width as meters of opening based on Plank time times the speed of light. Modified Plank time can be defined as based on relativistic increase of time. The opening is an area since it is squared. I am tempted to call this "God's Energy Gate".

$$t_p = \sqrt{\frac{\hbar}{G_{\text{const}} c^5}} \quad \text{or,} \quad t_p = 1.3512124958 \times 10^{-43} \text{ s} = \text{Plank time} \quad \text{Then:}$$

$$r_{pt} := (c) \cdot t_p \quad \text{or,} \quad r_{pt} = 4.0508331539 \times 10^{-35} \text{ m} \quad \text{where,} \quad r_p = 4.0508331539 \times 10^{-35} \text{ m}$$

Since local magnetic force varies as $1/r$, we can allow for it to be taken for or related closely to the electroweak force.

The next step up is momentum in the magnetic force state and is shown below.

$$F_{M_{pn1}} := \frac{m_e \cdot v_{LM}}{a_o} \left[ \frac{c^2}{\mu_o} \left( \frac{r_M^2}{q_o^2} \right)^2 \cdot \alpha \cdot \alpha' \right] \cdot \frac{m_e \cdot v_{LM}}{a_o} \cdot \frac{\alpha}{(\alpha \cdot \text{m} / \text{sec})^2}$$

The force is:

$$F_{M_{pn1}} = 1.2561846359 \times 10^{-22} \text{ N}$$

By now the reader should have realized that this progression reveals that motion we observe is originally dependant on a fundamental basic velocity that is much less. The connector, with the variable opening to energy space, is what creates the force that eventually causes the observed velocity even when the fundamental beginning velocity is what I have termed previously as "least quantum velocity." The next formula shows the energy field related to the magnetic force.

$$F_{M_{En1}} := \frac{m_e \cdot v_{LM}}{a_o} \left[ \frac{c^2}{\mu_o} \left( \frac{r_M^2}{q_o^2} \right)^2 \cdot \alpha \cdot \alpha' \right] \cdot \frac{m_e \cdot v_{LM}}{a_o} \cdot \frac{\alpha^2}{(\alpha \cdot \text{m} / \text{sec})^4}$$

where,

$$F_{M_{En1}} = 1.2561846359 \times 10^{-22} \text{ N}$$
The electric field of force at the n1 shell of the hydrogen atom is considered next for mass, momentum and energy as for the previous force fields. The force related to the electric field can be stated as:

\[
F_{E_{n1}} := \frac{q_0}{a_0} \cdot \frac{1}{4 \pi \varepsilon_0} \cdot \frac{q_0}{a_0} = \frac{1}{8 \pi \varepsilon_0} 
\]

\[
F_{E_{n1}} = 8.238729466 \times 10^{-8} \text{N} \tag{29}
\]

Then the solution for the gate width related to an increased \( r_p \) is:

\[
F_{E_{n1}} = \frac{m_e}{a_0} \left[ 2 \left( \frac{1}{\mu_0} \right) \left( \frac{r_p^2}{q_0^2} \right) \cdot \alpha \cdot 2 \right] \frac{m_e}{a_0} \quad \text{has solution(s) for } r_p \text{ of:} \tag{30}
\]

\[
\begin{align*}
\left[ \sqrt{2} \cdot \sqrt{F_{E_{n1}} \cdot a_0^2 \cdot q_0^2 \cdot \mu_0} \right] \\
\frac{2 \sqrt{\alpha \cdot c \cdot m_e}}{2 \sqrt{\alpha \cdot c \cdot m_e}} \\
\text{if } \alpha \neq 0 \land c \neq 0 \land m_e \neq 0 \\
0 \text{ if } F_{E_{n1}} = 0 \land \alpha = 0 \lor F_{E_{n1}} = 0 \land c = 0 \lor F_{E_{n1}} = 0 \land m_e = 0
\end{align*}
\tag{31}
\]

Then the increased gate width for the electric force connector is:

\[
r_E := \frac{\sqrt{2} \cdot \sqrt{F_{E_{n1}} \cdot a_0 \cdot q_0} \cdot \sqrt{\mu_0}}{2 \sqrt{\alpha \cdot c \cdot m_e}} \quad \text{or}, \quad r_E = 8.268736213 \times 10^{-14} \text{m} \tag{32}
\]

Stating the force formula in the electric field for mass only:

\[
F_{E_{m1}} := \frac{m_e}{a_0} \left[ 2 \left( \frac{1}{\mu_0} \right) \left( \frac{F_E^2}{q_0^2} \right) \cdot \alpha \cdot 2 \right] \frac{m_e}{a_0} \quad \text{or}, \quad F_{E_{m1}} = 8.238729466 \times 10^{-8} \text{N} \tag{33}
\]

We see that in this process, the connector term again continues to control the force via the energy gate width while the mass, momentum and energy remain fixed.
The next step up is momentum in the electric field force state and is shown below.

\[
FE_{pn1} := \frac{m_e v_{LM}}{a_o} \left[ \frac{2}{c^2} \left( \frac{1}{\mu_0} \right) \left( \frac{r_E^2}{q_o^2} \right) \alpha \cdot 2 \right] \frac{m_e v_{LM}}{a_o} \frac{\alpha}{\left( \frac{m}{\text{sec}} \right)^2} 
\]

The force is: \[ FE_{pn1} = 8.238729466 \times 10^{-8} \text{ N} \] \[ \text{[34]} \]

The final step up is the energy of the electric field and this is shown below.

\[
FE_{En1} := \frac{m_e v_{LM}}{a_o} \left[ \frac{2}{c^2} \left( \frac{1}{\mu_0} \right) \left( \frac{r_E^2}{q_o^2} \right) \alpha \cdot 2 \right] \frac{m_e v_{LM}}{a_o} \frac{2}{\alpha} \left( \frac{m}{\text{sec}} \right)^4 
\]

The force is: \[ FE_{En1} = 8.238729466 \times 10^{-8} \text{ N} \] \[ \text{[36]} \]

The mechanics of the above force field analysis derive the proper force but notice that for the electric force field the velocity is very low. The force derived is based on the mechanics of the energy gate connector and is non-local in its action. The reaction local space contains the observable result. We know that force = mass times velocity squared all divided by the radius.

Then: \[ v_{n1} := \sqrt{\frac{FE_{En1} a_o}{m_e}} \quad v_{n1} = 2.1876914144 \times 10^6 \text{ m/s} \quad = n1 \text{ velocity.} \] \[ \text{[37]} \]

where, \[ c \cdot \alpha = 2.1876914167 \times 10^6 \text{ m/s} \] \[ \text{[38]} \]

Then it is the unseen force in non-local space as derived for the non-local space connectors that eventually create the observed velocities for local space from the very small least quantum velocity \( v_{LM} \). The least quantum velocity is fundamental to all of the forces and resides in non-local space. Tests that I have performed on rotating magnet systems have revealed the least quantum velocity's existence by the frequency of rotation difference as measured in the below videos. The 285 Mb file is the best for viewing and requires the Apple QuickTime Player.

See: \[ \text{http://www.electrogravity.com/BMRT/BalMagResTests.wmv} \] 44 Mb

Also: \[ \text{http://www.electrogravity.com/BMRT/BalMagResTests_6.mov} \] 285 Mb
The magnets used have a radius of 2.54 cm. (= 1 inch) Therefore, the difference frequency related to that radius to arrive at a difference velocity equal to $v_{LM}$ is:

$$v_{LM} = 2 \cdot \pi \cdot \Delta f \cdot r_{disk} \quad r_{disk} := 2.54 \cdot \text{cm} \quad \Delta f := \frac{v_{LM}}{2 \cdot \pi \cdot r_{disk}} \quad \Delta f = 0.5352653062 \text{ Hz}$$

Finally: $7.83 \text{ Hz} - \Delta f = 7.2947346938 \text{ Hz}$ which is the test result in the video.

The connector constants are listed below for review.

**Mass:**

$$G_{EGQ} = 6.6725900609 \times 10^{-11} \frac{\text{Nm}^2}{\text{kg}^2} \quad \text{eq. 9}$$

**Momentum:**

$$G_{EGQP} = 9.1438498148 \times 10^{-9} \frac{\text{m}}{\text{kg}} \quad \text{eq. 14}$$

**Energy:**

$$G_{EGQE} = 1.2530365072 \times 10^{-6} \frac{1}{\text{N}} \quad \text{eq. 16}$$

The connector constants above have a progressive dimensional as well as magnitude relationship that allows for a prediction to be made for further dimensional constants. Starting with the mass connector constant we notice that moving down a power of one in newton and meter units while moving up a power of one in mass units gives the units of dimensional expression for the momentum connector constant. Also at the same time the magnitude increases from the mass connector value by the inverse of the fine structure constant which by itself is expressed as meter squared per second squared also known as the sievert which is known as radiation dose. The same can be said for moving up from the momentum connector constant to the energy connector constant.

Let $G_{EGQX} := G_{EGQE} \left( v_{LM}^2 \right)^{-1}$ or, $G_{EGQX} = 1.7171109763 \times 10^{-4} \frac{1}{\text{m} \cdot \text{kg}} \quad \text{eq. 40}$

Then the new unknown connector constant for unknown force follows the same progression.
The nuclear strong force actually is in the $10^{-15}$ meter range as shown in the below chart.

(See: http://en.wikipedia.org/wiki/Fundamental_interaction)

<table>
<thead>
<tr>
<th>Interaction</th>
<th>Current theory</th>
<th>Mediators</th>
<th>Relative strength</th>
<th>Long-distance behavior</th>
<th>Range (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong</td>
<td>Quantum chromodynamics</td>
<td>gluons</td>
<td>$10^{38}$</td>
<td>$\frac{1}{r}$ (see discussion below)</td>
<td>$10^{-15}$</td>
</tr>
<tr>
<td>Electromagnetic</td>
<td>Quantum electrodynamics</td>
<td>photons</td>
<td>$10^{36}$</td>
<td>$\frac{1}{r^2}$</td>
<td>$\infty$</td>
</tr>
<tr>
<td>Weak</td>
<td>Electroweak Theory</td>
<td>W and Z bosons</td>
<td>$10^{25}$</td>
<td>$\frac{1}{r} e^{-\frac{ mw z}{r}}$</td>
<td>$10^{-18}$</td>
</tr>
<tr>
<td>Gravitation</td>
<td>General Relativity</td>
<td>gravitons</td>
<td>1</td>
<td>$\frac{1}{r^2}$</td>
<td>$\infty$</td>
</tr>
</tbody>
</table>

The electromagnetic force is actually the electric force field derived from photon energy action although it is not clarified as such in contemporary physics. I propose that the so called electroweak force is in general derived from a portion of a force constant expression such as:

$$F_{EW} = \frac{h \cdot f_X}{r_X}$$

which fits the format of the weak force $1/r$ in the above table of forces. 41)

The quantum magnetic force field is NOT the magnetic field portion of a boson or photon which is equal in energy to the electric field in same said boson or photon. See eq. 18 above. It is totally an entity by itself.

The three connector gate width dimensions are stated below for review.

$$r_p = 4.0508331539 \times 10^{-35} \text{ m} \quad r_M = 3.2287599308 \times 10^{-21} \text{ m} \quad r_E = 8.268736213 \times 10^{-14} \text{ m} \quad 42)$$

The strong force will follow the above force analysis format for the gravitational, magnetic and electric fields except that the strong force is known to be 100 times stronger than the electric field force at a given distance. Therefore:

$$F_{N1} = 100 \cdot F_{E1}$$

where the energy gate width and height increase by a factor of 10 each.

Then:

$$r_N = 10 \cdot r_E \quad \text{or} \quad r_N = 8.268736213 \times 10^{-13} \text{ m} \quad 43)$$

The Compton radius of the electron is:

$$r_{elctn} = 3.861593223 \times 10^{-13} \text{ m}$$
The golden ratio appears in the ratio of the Compton radius of the electron and the nuclear force energy gate width.

\[
\frac{r_{\text{force}}}{r_{\text{elctn}}} = \frac{r_N}{r_{\text{elctn}}} - \sqrt{2 \cdot \ln \left( \frac{r_{\text{force}}}{r_{\text{elctn}}} \right)}^{-1} = 1.6207201789
\]

\[
\Phi_{\text{gold}} := \frac{1 + \sqrt{5}}{2} \quad \text{or} \quad \Phi_{\text{gold}} = 1.6180339887 \quad \text{(Near match.)}
\]

If it were possible to control the force gate width, unlimited force field energy would be available. Force fields could be generated for energy supplies, weapons, energy transmission over unlimited distances and instantaneous communications.

Inertia comes about through the construct of the force generating connector since it is the connector that allows for the force to be passed from non-local space to local space. Action passes through the connector from one local space system to another instantly but reaction from the connector to the local space primary action requires a finite time.

In summation, all the forces in local space depends on the non-local least quantum velocity \(v_{\text{LM}}\) and the force connector that sets the scale of the force. The energy gate width in meters squared is the window from energy space that controls the magnitude of the force connector.

\[\Omega\]

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