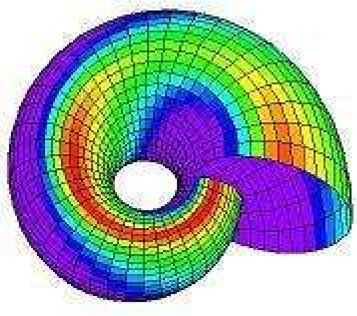

QUANTUM WAVEGUIDE STYLE ELECTROGRAVITATIONAL MECHANICS

- By -

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Introduction:

There are many similarities between waveguide action and quantum particle action such as phase velocity and group velocity, pulse width affecting the average energy in the wave, repetition rate and so on. It is of interest that the external part of a quantum particle is well mapped out in the *local space* that surrounds it due to observational accounting of its activity. However, the inner domain of the quantum particle is almost never, if ever, discussed at all.

This paper will delve into the concept of the inner domain of a quantum electron as having a connection to all other electrons in the universe wherein the connection between them is effectively instantaneous and as a result considered to be non-local. In essence, all electrons are physically aware of each other through the non-local domain. It is this connection that is proposed in this paper to be the electrogravitational connection, more commonly known in the contemporary vernacular as a gravitational connection.

It has been well demonstrated that split photons can instantly communicate a phase change in one of them to the other instantly regardless of the distance of separation or material that is between them and they do this with no loss of energy in the transit of this information exchange. This is not an amplitude exchange but rather a phase change which is especially suited for the quantum exchange of information.

The five forces summarized from the ebook, "Electrogravitation As A Unified Field Theory", by Jerry E. Bayles.

Electrogravitational force

(A) variable volt*sec/meter |---------constant newton---------| (A) variable volt*sec/meter

(amp) (amp)

$$F_{EG} = \left(\frac{\mu_o \cdot i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \Delta r_x}\right) \cdot \left[\left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right) \cdot \mu_o \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right)\right] \cdot \left(\frac{\mu_o \cdot i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \Delta r_x}\right)$$

Note: (A) = volt * sec / m = weber/m

Magnetic force

(A) (amp)

$$F_{EM} = \left(\frac{\mu_o \cdot i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \Delta r_x}\right) \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right)$$

= newton units.

Weak force

(-------------------------------------- F_{EE} --------------------------------------)

(Volt*m/sec) (------------- Watt Constant -------------) (Volt*m/sec) (Nuclear Magnetic Force)

$$F_{EW} = \left[\left(\frac{i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \varepsilon_o \cdot \Delta r_x}\right) \cdot \left[\left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right) \cdot \left[(3) \cdot \sqrt{\frac{\mu_o}{\varepsilon_o}}\right] \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right)\right] \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \varepsilon_o \cdot \Delta r_x}\right)\right] \cdot \left[\frac{(\pi)^2}{\varepsilon_o}\right] \cdot \left(\frac{\mu_o \cdot i_{LM}^2 \cdot \lambda_{LM}^2}{4 \cdot \pi \cdot \Delta r_x^2}\right)$$

Electrostatic force

(Volt*m/sec) (----------- Watt Constant -----------) (Volt*m/sec)

$$F_{EE} = \left(\frac{i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \varepsilon_o \cdot \Delta r_x}\right) \cdot \left[\left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right) \cdot \sqrt{\frac{3 \cdot \mu_o}{\varepsilon_o}} \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right)\right] \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \varepsilon_o \cdot \Delta r_x}\right)$$

Strong force

(-------------------------------------- F_{EE} --------------------------------------)

(Volt*m/sec) (----------- Watt Constant -----------) (Volt*m/sec) (Nuclear Magnetic Force)

$$F_{ES} = \left[\left(\frac{i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \varepsilon_o \cdot \Delta r_x}\right) \cdot \left[\left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right) \cdot \sqrt{\frac{3 \cdot \mu_o}{\varepsilon_o}} \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right)\right] \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \varepsilon_o \cdot \Delta r_x}\right)\right] \cdot \left(\frac{2 \cdot \pi \cdot R_{n1}}{\varepsilon_o \cdot \Delta r_x}\right) \cdot \left(\frac{\mu_o \cdot i_{LM}^2 \cdot \lambda_{LM}^2}{4 \cdot \pi \cdot \Delta r_x^2}\right)$$

EqualprnNew.xmcd

$\mu_o := 4\cdot\pi\cdot1\cdot10^{-07}\cdot henry\cdot m^{-1}$

$f_{LM} := 1.003224805\cdot10^{01}\cdot Hz$

$q_o := 1.602177330\cdot10^{-19}\cdot coul$

$\lambda_{LM} := 8.514995412\cdot10^{-03}\cdot m$

$\Delta r_x := 5.291772490\cdot10^{-11}\cdot m$

$l_q := 2.817940920\cdot10^{-15}\cdot m$

$G_K := 6.672590000\cdot10^{-11}\cdot newton\cdot m^2\cdot kg^{-2}$

$\alpha := 7.297353080\cdot10^{-03}$

$m_e := 9.109389700\cdot10^{-31}\cdot kg$

$h := 6.626075500\cdot10^{-34}\cdot joule\cdot sec$

$F_{GN} := G_K\cdot m_e^2\cdot\Delta r_x^{-2}$ $\qquad$ $F_{GN} = 1.9772913889685189\times10^{-50}\cdot newton$ (Standard Form)

$v_{LM} := \sqrt{\alpha}\cdot m\cdot sec^{-1}$ $\qquad$ $v_{LM} = 0.08542454612112375\,\frac{m}{s}$

$i_{LM} := q_o\cdot f_{LM}$ $\qquad$ $i_{LM} = 1.6073440394646707\times10^{-18}\cdot amp$

(A) variable volt*sec/meter $\qquad$ |------constant newton-------| (amp) (amp) $\qquad$ **(A)** variable volt*sec/meter

$$F_{EGK} := \left(\frac{\mu_o\cdot i_{LM}\cdot\lambda_{LM}}{4\cdot\pi\cdot\Delta r_x}\right)\cdot\left[\left(\frac{i_{LM}\cdot\lambda_{LM}}{l_q}\right)\cdot\mu_o\cdot\left(\frac{i_{LM}\cdot\lambda_{LM}}{l_q}\right)\right]\cdot\left(\frac{\mu_o\cdot i_{LM}\cdot\lambda_{LM}}{4\cdot\pi\cdot\Delta r_x}\right)$$

This is the original version of my electrogravitational equation where the permeability of free space connection constant μ_o was used as shown above and the result was very close to the standard Newton equation for gravity. However, the units were not the same and the magnitude was slightly off as shown below.

$F_{EGK} = 1.9829730770558183\times10^{-50}\cdot\frac{henry}{m}\cdot newton^2$ $\qquad$ $\frac{F_{EGK}}{F_{GN}} = 1.0028734703033644\cdot newton\cdot\frac{henry}{m}$

In Einstein's General Theory Field Equation, there is a constant term involving the Gravitational Constant G divided by the speed of light to the fourth power and that yields a 1/newton result.**(1)** That format can also be obtained by dividing the gravitational constant G by the least quantum velocity V_{LM} also taken to the fourth power where V_{LM} is the square root of the fine structure constant α given meter/sec units. This is shown immediately below as:

$G_\mu := G_K\cdot v_{LM}^{-4}$ $\qquad$ $G_\mu = 1.2530364957115376\times10^{-6}\cdot newton^{-1}$

The corrected form of the electrogravitational equation for correct magnitude and units is:

(A) variable volt*sec/meter |-------amp² * newton⁻¹-------| (A) variable volt*sec/meter

$$F1_{EG\mu} := \left(\frac{\mu_o \cdot i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \Delta r_x}\right) \cdot \left[\left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right) \cdot G_\mu \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right)\right] \cdot \left(\frac{\mu_o \cdot i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \Delta r_x}\right)$$

New Quantum Electrogravitational Equation

$$F1_{EG\mu} = 1.9772913849326714 \times 10^{-50} \cdot newton$$ (Correct)

$$\frac{F1_{EG\mu}}{F_{GN}} = 0.9999999979589009$$ **Very close to exact of F_{GN}**

Note that the permeability of free space μ_o does not apply to the gravitational quantum connection constant G_μ in the above equation. The quantum connection G_μ is non-local **internally** with Compton dimensional waveguide-like boundaries while the permeability connection μ_o is local and **external** to the electron or proton.

The above equation can be analyzed in its separate components as follows:

$$\left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right) \cdot G_\mu \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right) = 2.955877814356235 \times 10^{-17} \cdot amp^2 \cdot newton^{-1}$$

$$\frac{\mu_o \cdot i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \Delta r_x} = 2.5863785994978064 \times 10^{-17} \cdot \frac{weber}{m}$$ (Vector magnetic potential, **A**)

$$\left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right) = 4.856924793706185 \times 10^{-6} \cdot amp$$

Let: $\Delta f_E := \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q} \cdot \frac{1}{q_o}\right)$ therefore: $\Delta f_E = 3.03145270049863 \times 10^{13} \cdot Hz$ **Question:**

Can the above frequency may be interfered with to cause magnetic fields to be destroyed?

Note also that the internal electrogravitational frequency of f_{LM} also provides the correct result.

$$F2_{EG\mu} := \frac{h \cdot f_{LM}}{\Delta r_x} \cdot G_\mu \cdot \frac{h \cdot f_{LM}}{\Delta r_x}$$ $$F2_{EG\mu} = 1.9772913907420728 \times 10^{-50} \cdot newton$$

$$\frac{F_{GN}}{F2_{EG\mu}} = 0.9999999991030387$$ Very close to exact agreement.

$$F1_{EM} := \frac{\mu_o \cdot i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot \Delta r_x} \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right)$$ $$F1_{EM} = 1.2561846345811973 \times 10^{-22} \cdot newton$$ **(least quantum magnetic force)**

$V_c := 2.997924580 \cdot 10^{08} \cdot \frac{m}{sec}$

$G_\mu = 1.2530364957115376 \times 10^{-6} \cdot newton^{-1}$

$G_K = 6.6725900000000005 \times 10^{-11} \cdot newton \cdot m^2 \cdot kg^{-2}$

$V_G := v_{LM}$ $\qquad V_G = 0.08542454612112375 \frac{m}{s}$

$\frac{V_G}{V_c} = 2.849456143460545 \times 10^{-10}$ $\qquad B := 0.5000000000000000000000 \cdot m$

$\frac{V_G}{V_c} = \sqrt{1 - \frac{(\lambda_c)^2}{(2 \cdot B)^2}}$ Solving symbolically for the wavelength λ_c has solution(s)

$$\begin{pmatrix} \frac{2i \cdot B \cdot \sqrt{V_G - V_c} \cdot \sqrt{V_G + V_c}}{V_c} \\ -\frac{2i \cdot B \cdot \sqrt{V_G - V_c} \cdot \sqrt{V_G + V_c}}{V_c} \end{pmatrix} \quad \begin{matrix} \frac{2i \cdot B \cdot \sqrt{V_G - V_c} \cdot \sqrt{V_G + V_c}}{V_c} = -1.0000000000000002 \, m \\ -\frac{2i \cdot B \cdot \sqrt{V_G - V_c} \cdot \sqrt{V_G + V_c}}{V_c} = 1.0000000000000002 \, m \end{matrix}$$

$\lambda_c := 1.0000000000000002 \, m$ $\quad V_G := V_c \cdot \sqrt{1 - \frac{(\lambda_c)^2}{(2 \cdot B)^2}}$ $\qquad V_G = 6.317653656017281i \frac{m}{s}$ **Too Large**

Mathcad's symbolic equation solver yielded an unexpected value greater than one and it is a very sophisticated math engine. This will be shown to yield imaginary and negative results in key parameters to the velocity solutions in the quantum waveguide analysis that will follow. Since the resolution required is greater than the basic accuracy of 16 significant places, the actual value of the wavelength required to yield the correct group velocity has to be manually adjusted as shown below.

$\lambda_c := 1.00000000000000000000405970015675 \, m$ * $\qquad$ Adjusted manually so float result below = V_G. Note the number of significant digits!

$V_c \cdot \sqrt{1 - \frac{(\lambda_c)^2}{(2 \cdot B)^2}} = 0 \frac{m}{s}$ $\qquad$ Not enough accuracy. Float will work. See below result for the float symbolic operator set for 250 significant digits,

$V_G = 6.317653656017281i \frac{m}{s}$ $\qquad$ This is preset above

$V_c \cdot \sqrt{1 - \frac{(\lambda_c)^2}{(2 \cdot B)^2}} \text{ float}, 250 \rightarrow \frac{(0.08542454612109722i) \cdot m}{sec}$ $= \mathbf{V_G}$. Note the imaginary i

$(0.08542454612109722i)^4 = 5.325136197411932 \times 10^{-5}$

$\lambda_c - 1 \cdot m \text{ float}, 250 \rightarrow 4.05970015675 \times 10^{-20} \cdot m = 4.05970015675 \times 10^{-20} \, m$

Then set: $\Delta\lambda_c := 4.05970015675 \times 10^{-20}$ m

where a quantum reduction multiplier can be established as the ratio of $\Delta\lambda_c$ to 2B as:

$\Delta\lambda_{cR} := \Delta\lambda_c \cdot (2 \cdot B)^{-1}$ or, $\Delta\lambda_{cR} = 4.05970015675 \times 10^{-20}$

It is of interest that the very small number of $\Delta\lambda_{cR}$ **=** $4.05970015675 \times 10^{-20}$ times the Compton wavelength of the proton (set as the 2B dimension of the waveguide) yields a distance near the Plank distance. The result is indeed in the realm of the quantum plank distance.

$$m_p := 1.672623100 \cdot 10^{-27} \cdot kg$$

$\lambda_p := h \cdot m_p^{-1} \cdot V_c^{-1}$ $\lambda_p = 1.3214099930056824 \times 10^{-15}$ m Compton wavelength of the proton.

$R_p := \Delta\lambda_{cR} \cdot \lambda_p$ $R_p = 5.3645283557361845 \times 10^{-35}$ m Reduction product

$$d_{plank} := \sqrt{\frac{G_K \cdot h}{V_c^{3}}} \qquad d_{plank} = 4.050833153880679 \times 10^{-35} \text{ m}$$

The reduction product of the small difference $4.05970015675 \times 10^{-20}$ times the plank wavelength of the proton times two divided by the plank distance yields the square of the Golden ratio!

$$\left(\frac{R_p}{d_{plank}}\right) \cdot 2 = 2.648604942218858 \qquad \text{or:} \qquad (2.648604942218858)^{\frac{1}{4}} = 1.2757168630267228$$

where, $\frac{4}{\pi} = 1.2732395447351628$ and the value at the immediate left is at the heart of the geometry of the Great Pyramid of Giza in Egypt.

This analysis is based on waveguide design that incorporates phase velocity, group velocity and the speed of light. Quantum mechanics involving particle dynamics also incorporate phase velocity, group velocity and the speed of light as a reference. I am suggesting that quantum particles have an external locally observable field dynamic as well as non-local dynamics involving phase and group velocities that internally behave as the dynamics of a field inside of a waveguide. That is, a quantum particle such as the electron and proton create their own boundary that acts like a waveguide, but are the internal non-local part of the particle. Further, normal local time and space are quite separate from the non-local action. It appears that the action due to the non-local interaction is effectively instantaneous when viewed from the local observers frame of reference. Then in summary: The outside of the particle is local space and the inside of the particle is non-local space where time and location is the same single point for the centers of all similar particles. In the center, there is no space-time and is a single point shared by all the particles in the universe.

The waveguide equation that this analysis is based on is from the **Air Force manual: "Electronic Circuit Analysis", 52-8, Volume 2, pp. 11-12 through 11-17. Page 11-16** has the equation for waveguide action stated as:

$$\frac{V_g}{V_c} = \sqrt{1 - \left(\frac{\lambda}{2 \cdot B}\right)^2}$$

Notice the similarity to Einstein's Special Theory Of Relativity equation. It will be shown to be intimately related indeed!

The standard Special Theory Of Relativity involving the observed length shrinking as speed of an object increases is:

$$\Delta d = d_o \cdot \sqrt{1 - \frac{v^2}{c^2}}$$ Which can be arranged as: $$\frac{\Delta d}{d_o} = \sqrt{1 - \frac{v^2}{c^2}}$$

Squaring both sides around the equal sign and then transposing terms we arrive at:

$$\frac{v^2}{c^2} = \left(1 - \frac{\Delta d^2}{d_o^2}\right)$$ Taking the square root of both sides, we arrive at the same form as the previous waveguide equation: $$\frac{v}{c} = \sqrt{1 - \frac{\Delta d^2}{d_o^2}}$$

which has the same dimensional form and mathematical result as the waveguide formula above. In the waveguide reference mentioned above, there is a cosine relationship stated as:

$$\cos(\theta) = \frac{\lambda}{2 \cdot B}$$ Quote: "where λ is the wavelength in free space of the signal in the guide, and B is the inside wide dimension of the guide."(p. 11-16, vol2.)

The special theory of relativity and the waveguide are both based on the fundamental trigonometric relationship of:

$$(\sin(\theta))^2 + \mathrm{Cos}(\theta)^2 = 1$$

The phase velocity inside of the waveguide is a result that is of interest since the speed of the electrogravitational action depends on the above waveguide equation arranged to solve for it as follows:

$$\frac{V_c}{\sqrt{1 - \left(\frac{\lambda_c}{2 \cdot B}\right)^2}} \text{ float}, 250 \rightarrow -\frac{(1.0521041311273094i \times 10^{18}) \cdot m}{sec}$$ This is a tremendous velocity and is in the imaginary or non-local space!

The imaginary result is expected since we are working in the non-local space domain and that also applies to distance. That is the speed of the phase wave inside of the quantum waveguide between particles based on a group wave of the same waveguide geometry. **The group wave velocity V_G is equal to the square root of the fine structure constant α expressed in meter/second units.**

The estimated size of the universe is stated as: $\lambda_U := 3.24 \cdot 10^{26} \cdot m$

$$\frac{\lambda_U}{\left[\frac{(1.0521041311273094i \times 10^{18}) \cdot m}{sec}\right]} = -9.758691597022938i \cdot yr$$ Time to traverse the universe at the phase velocity V_p.

Notice the result is going backwards in time at the tremendous rate of the phase speed in the imaginary domain of the quantum non-local realm.

The relationship between phase velocity and group velocity for quantum particles as well as for waveguides is given by the expression:

$$V_p = \frac{V_c^2}{V_g}$$ **This is another indicator of quantum particle dynamics and waveguide geometry having a lot in common. V_c is the velocity of light in free space and in the waveguide.**

Below is the derivation of group velocity based on the above expression.

$$\frac{V_c^{\,2}}{-\frac{\left(1.0521041311273094i \times 10^{18}\right)\cdot m}{sec}} = 0.08542454612109722i\,\frac{m}{s}$$

Travel in the waveguide mode may cause people to go backwards in time.

The above result on the bottom of p.4 agrees: $\frac{(0.08542454612109722i)\cdot m}{sec}$ Where:

$$\sqrt{\left[\frac{(0.08542454612109722i)\cdot m}{sec}\right]\cdot\left[-\frac{\left(1.0521041311273094i \times 10^{18}\right)\cdot m}{sec}\right]} = 2.99792458 \times 10^{8}\,\frac{m}{s}$$

Then, the summary of the above work shows that Einstein's General Theory (which is an external local acting field equation) connecting constant is identical in form to my electrogravitational equation connector and differs only in the real value magnitude of the light-speed term in the denominator. Further, Einstein's Special Theory Of Relativity also has similar form, differing only in the usage of the geometry terms, but the units used match. and that a waveguide boundary is used for the quantum non-local action between the centers of the quantum particles themselves.

As a result of the above analysis, let the group velocity be stated as:

$$V_g := \frac{0.08542454612109722i\cdot m}{sec} \qquad \text{where:} \qquad V_g^{\,2} = -7.2973530799954665 \times 10^{-3}\,\frac{m^2}{s^2}$$

This is a very low velocity and it is what I call the least quantum velocity. It is also imaginary in its nature and when squared it assumes a negative sign. All matter, including photons, would be affected by this least quantum velocity. Positive energy would be diminished as it traveled through this negative energy field. Photons would lose energy over time and thus become downshifted in frequency until eventually the photons would arrive at the least quantum frequency I have termed f_{LM} above. Note also that the square of the group velocity is equal in absolute value to the quantum fine structure constant, α. The accumulation of this lowest possible energy could be what has been termed dark energy while mass at the lowest possible velocity would become dark matter?

In other words, the above downshift over time of all energy is at the heart of gravitational force while it also may be the cause of what has been termed red shift. Red shift has been taken to mean that the universe is expanding. This paper suggests that may not be entirely the case.

Since I have defined the least quantum electrogravitational frequency as being:
$f_{LM} = 10.032248050000002Hz$, then for each second of travel that much frequency shall be subtracted from whatever frequency is being considered.

https://en.wikipedia.org/wiki/Observable_universe

$U_{Radius} := 4.4\cdot 10^{26}\cdot m$ (From the above link.)

It is of interest to find the time it would take for a quanta of light to reach the edge of the universe.

$$U_T := \frac{U_{Radius}}{V_c}$$ Total time to edge of universe: $U_T = 1.467682018871869 \times 10^{18} \cdot sec$

Total possible downshift: $U_T \cdot \frac{f_{LM}}{sec} = 1.4724150071847375 \times 10^{19} \cdot Hz$

which means that an x-ray frequency would finally be downshifted to the least quantum frequency f_{LM} by the time it traveled from the edge of the universe to an observer at the center of the universe assuming that the rate of energy loss per second traveled was linear. The closer the observer was to the originating source of the photon, the less the downshift and for most observations the downshift could be taken as simple red shift. The outcome is this: The universe could be a lot bigger than what we can observe since the lowest quantum frequency is likely dark matter or energy and that gives us no clue as to the total distance from the point of origination.

The quantum energy related to the least quantum frequency is bedrock. Energy derived from that frequency downshift accumulates over time and interestingly could eventually form into a large negative energy that could form a dark matter or dark energy black hole. Energy of that type still has gravitational effect and could explain why some galaxies spin much faster than their mass should allow for. Dark energy and matter is so far invisible but it still can produce gravitational attraction.

Perhaps the slight slowing of the Pioneer spacecraft can even be explained by the energy downshift due to the action of negative energy in the void causing deceleration. In fact, slowing down can even be seen in the orbital velocity and rotation rates of the planets. It means that we do not get the action of gravitation for free. It causes energy loss in exchange for the force of attraction.

Then gravitation is a force of action and the units shown in the link (Reference 1) to a web page that shows the units of the General Theory of Relativity Field Equation prove that fact. They are joules per meter cubed or force per square meter which is pressure in the T_{uv} tensor term. Then energy in the field is exchanged for action on mass or energy in general. You do not get gravity for free. Some scientists have suggested that gravity is not a force. I will not comment on that viewpoint at all.

Armed with the least quantum velocity from above, we can compute the energy related to the non-relativistic mass of the electron as:

$$E_{LM} := m_e \cdot V_g^{\,2} \qquad E_{LM} = -6.647443298417398 \times 10^{-33} J$$

Where then the frequency is negative and is equal to:

$$f_{LMQ} := E_{LM} \cdot h^{-1} \qquad f_{LMQ} = -10.032248045494502 \cdot Hz$$

The final Electrogravitational force at r_{n1} between two electrons is calculated to be:

$$F_{EGQ} := \frac{h \cdot f_{LMQ}}{\Delta r_x} \cdot G_\mu \cdot \frac{h \cdot f_{LMQ}}{\Delta r_x} \qquad F_{EGQ} = 1.9772913889660633 \times 10^{-50} N$$

The negative frequency result is expected since the energy is real and negative. This is the subtraction frequency per second on all electromagnetic radiation frequency as well as the kinetic energy of moving matter containing mass: That is, until there is only the bedrock least quantum energy of E_{LM} left.

Then between the quantum centers of the electron and proton, a waveguide connection may exist in non-local space and the dynamics of the ordinary waveguide may apply to that quantum space just as for ordinary local space. The outside of the electron and proton are in local space and the interaction is by the magnetic vector potential which cannot be shielded against and that field provides the return path for the quantum non-local action to complete the entire action loop.

As an aid for understanding waveguide electronic analysis, two relevant pages from the aforementioned manual: Electronic Circuit Analysis, AF Manual 52-8, Volume 2 are presented below and on the next page.

$V_p \times V_g = c^2$ is like a weighted delta function.

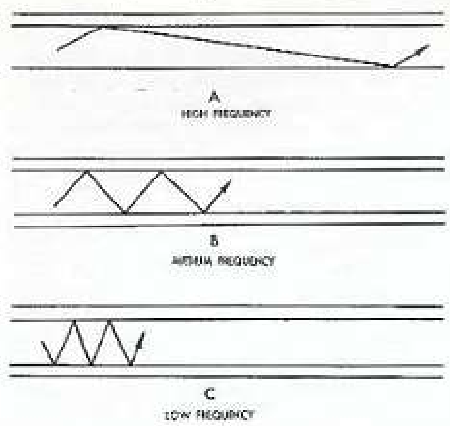

Figure 11–21. Angle at which Fields Cross Waveguide Varies with Frequency

zig-zag arrow at the velocity of light. But because of the long path, the wavefront actually travels very slowly along the waveguide. In Figure 11–21A the frequency is higher, and the wavefront or the group of waves actually travels a given distance in less time than those at C.

The axial velocity of a wavefront or a group of waves is called the *group velocity*. The relationship of the group velocity to diagonal velocity causes an unusual phenomenon. The velocity of propagation appears to be greater than the speed of light. As you can see in Figure 11–22, during a given time, a wavefront will move from point

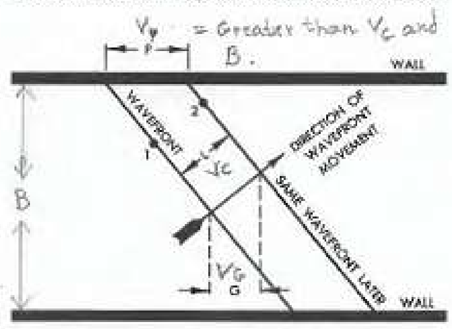

Figure 11–22. Relation of Phase, Group, and Wavefront Velocity

one to point two, or a distance L at the velocity of light (V_c). Due to this diagonal movement (direction of the arrow), the wavefront has actually moved down the guide only the distance G, which is necessarily a lower velocity. This is called group velocity (V_g).

But if an instrument were used to detect the two positions at the wall, they would be the distance P apart. This is greater than the distance L or G. The movement of the contact point between the wave and the wall is at a greater velocity. Since the phase of the r-f has changed over the distance P, this velocity is called the phase velocity (V_p). The mathematical relationship between the three velocities is stated by the equation,

$$V_c = \sqrt{V_p V_g}$$

where:

V_c = Velocity of light = 3×10^8 meters/second

V_p = Phase Velocity

V_g = Group Velocity.

And: $V_g = \frac{V_c^2}{V_p}$

This equation indicates that it is possible for the phase velocity to be greater than the velocity of light. As the frequency decreases, the angle of crossing is more of a right angle. In this condition the phase velocity increases. For measuring standing waves in a waveguide, it is the phase velocity which determines the distance between voltage maximum and minimum. For this reason, the wavelength measured in the guide will actually be greater than the wavelength in free space. or, $\lambda_G = V_p \cdot t$. (t = constant)

From a practical standpoint, the different velocities are related in the following manner: If the radio frequency being propagated is sine wave modulated, the modulation envelope will move forward through the waveguide at the group velocity, while the individual cycles of r-f energy will move forward through the modulation envelope at the phase velocity. If the modulation is a square wave, as in radar transmissions, again the square wave will travel at group velocity, while the r-f waveshape will move forward within the envelope.

Since the standing wave measuring equipment is affected by each r-f cycle, the wavelength will be governed by the rapid movement of the changes in r-f voltage. Since intelligence is conveyed by the modulation, the transfer of intelligence through the waveguide will be slower than

The phase vel., V_p, determines directly λ_G since: $\lambda_G = V_p \cdot \frac{1}{f}$. Then $\lambda_G \propto V_p$.

or $\lambda_G \cdot f = V_p$

It has occurred to me that if physicists first studied electronics in depth they would be better able to put together dynamics of science that escape them due to natural limitations of their discipline.

the speed of light, as is the case in other types of r-f lines.

Because of the way the fields are assumed to move across the waveguide, it is possible to establish a number of trigonometric relationships between certain factors. As shown in Figure 11–23, the angle that the wavefront makes with the wall (angle θ) is related to the wavelength and dimension of the guide and is,

$$\cos\theta = \frac{\lambda}{2B}$$

where λ is the wavelength in free space of the signal in the guide, and B is the inside wide dimension of the guide. The group velocity (V_g) is related to the velocity of light (V_c) as follows:

$$\frac{V_g}{V_c} = \sin\theta = \sqrt{1-\left(\frac{\lambda}{2B}\right)^2}$$

If $\lambda = 2B$; cutoff is reached.

NOTE: $\sin\theta^2 + \cos\theta^2 = 1$

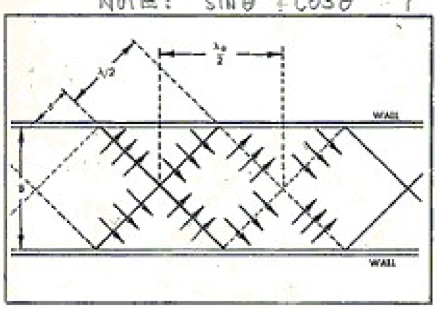

Figure 11–23. Trigonometric Relations Exist between Factors Indicated

Further, since it is possible to measure the wavelength in the guide (λg), the wavelength in space is equal to,

$$\frac{\lambda g}{\lambda} = \frac{1}{\sin\theta} = \frac{1}{\sqrt{1-\left(\frac{\lambda}{2B}\right)^2}}$$

At cutoff; $\lambda_G = \infty$, $V_p = \infty$

Solving this for λ, the equation becomes,

$$\lambda = \frac{2B\lambda g}{\sqrt{\lambda g^2 + 4B^2}}$$

After measuring the wavelength and the inside dimension of the waveguide, it is possible to calculate most other quantities associated with the waveguide (Figure 11–23).

Numbering System of the Modes

The normal configuration of the electromagnetic field within a waveguide is called the *dominant* mode of operation. The mode developed for the rectangular waveguide, as was explained before, is the dominant mode of operation. The dominant mode for the circular waveguide was also shown in Figure 11–16. A wide variety of higher modes is possible in either type of waveguide. The higher modes in the rectangular waveguide are seldom used in radar, but some of the higher modes in the circular waveguide are useful.

For ease in identifying modes, any field configuration can be classified as either a transverse electric mode or a transverse magnetic mode. These modes are abbreviated TE or TM, respectively.

In a transverse electric mode, all parts of the electric field are perpendicular to the length of the guide and no E-line is parallel to the direction of propagation.

In a transverse magnetic mode the plane of the H-field is perpendicular to the length of the waveguide. No H-line is parallel to direction of propagation.

It is interesting to note from these definitions that the wavefront in free space or in a coaxial line is a TEM mode, since both fields are perpendicular to the direction of propagation. This mode cannot exist in a waveguide.

In addition to the letters TE or TM, subscript numbers are used to complete the description of

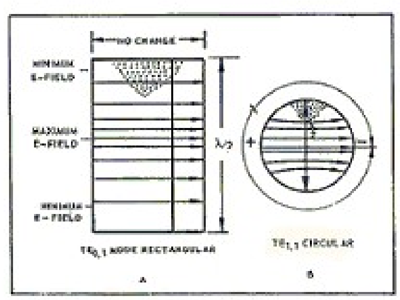

Figure 11–24. How to Count Wavelengths for Numbering Modes

$$\frac{\lambda_c}{\lambda_G} = \sin\theta = \frac{V_G}{V_c}$$

I perceive that the non-local quantum waveguide has a circular magnetic field and a radial electric field so that the phase wave velocity is inline with the center of the waveguide.

Waveguide dynamics for radar use usually transmit the electromagnetic power as a pulse of narrow width compared to the pulse repetition frequency. Therein, a 1 million watt radar pulse generated by a magnetron microwave oscillator can be only 10 microseconds wide which yields an average of 10 watts continuous power level per second. If the pulse repetition rate is 1000 pulses per second, then the total power is 10,000 watts per second. Then pulse width as well as pulse rate referenced to 1 second controls the actual power of the radiated microwave energy in a switched, or gated fashion.

The dynamics of the quantum waveguide can be considered to be very similar in its energy per second. For instance, the rest mass energy of an electron or proton may be the result of a very large energy such as Plank Energy, [2] being gated into the electron or proton by a narrow pulse width which serves to limit the amount of energy that the quantum particle can have in the real domain of local space. Without this energy input, the charge-field of the electron or proton could not exist. The normal condition exists where the electron and proton establish a standing conjugate field between them and no power is radiated out into local space. In that scenario, the field is stable. The other scenario is where the charged particle may be isolated in some way and the field begins to build up in volume and total energy content with each pulse input. Theoretically, this could continue for a total energy in the field approaching infinity. Plank energy density is huge. (4.633 x 10^ 113 joules/m^3). [2] I view this as the possible source for the energy input to all particles that if not gated and controlled as for the radar pulse situation, a "Big Bang" would be the result. Also, the conjugation of energy between the electron and proton external field serves as an energy control. The reference cited [2] is an excellent reference source for quantum constants involving Plank Units but also for other information such as the field equation of General Relativity as well as other equations of quantum usage.

As in my previous work, I consider that what we view as a continuous space-time is actually an existence much like the frames of a picture transmitted to a movie screen. The entire picture arrives all at once in sequential bits of time and in between those pictures there is room for other pictures to be transmitted to a different screen. The whole process could be time shared with potentially an unlimited number of screens. Our "normal" existence would seem continuous since even our memories would be on and off at the rate of the existence being refreshed by the master projector in non-local space. In other words, our very existence is gated like the radar pulse discussed above.

That may explain how some people, notably Jesus Christ, could move through locked doors into a room where his disciples in the upper room were. Phase shifting a pulsing electric field at the proper rate would possibly allow that to happen by moving in between the normal screen projection rate.

Back in the early 1940's, John Wheeler suggested that all of the electrons in the universe might be the same electron just traveling backwards and forwards in time. [3] This is the ultimate time share! It would explain also why all electrons are identical which is why he put forth that idea.

Second Summary: The three main features of this paper consist of the General Relativity coupling constant being identical to my Electrogravitational Equation coupling constant and differing only in magnitude. The second feature is the exact agreement in form between Special Relativity equation format for length based on velocity and the waveguide equation for velocities dependant upon physical dimensions. The third main feature is the pulse width characteristics applied to quantum energy which suggests that quantum particle energy is transformed from Plank level energy to the rest mass energy of a particle by the gating action that only lets a small amount of energy into the quantum particle. The field geometry onside of the quantum waveguide is most likely a radial electric field from the axis to the inside rim while also having an embedded magnetic field circulating around the axis of the guide and both fields are 90 degrees to each other and the axis direction of the guide.

As I finish this paper, I have just witnessed an eclipse of the sun on the same day.

Ω

Addendum:

In the below figure copied from the reference **Air Force manual: "Electronic Circuit Analysis", 52-8, Volume 2, pp. 11-12 through 11-17 and is page 17;** of particular interest is Fig. 11-35 where the first drawing at the bottom left shows a TM01 mode where it shows the wavelength as being 2.62 times the radius. From above on p. 5:

$$\left(\frac{R_p}{d_{plank}}\right)\cdot 2 = 2.648604942218858 \quad \text{and} \quad \left(\frac{4}{\pi}\right)^4 = 2.628091457199191$$

the field pattern. In describing field configurations in rectangular guides, the first small number indicates the number of half-wave patterns of the transverse lines that exist along the short dimension of the guide through the center of the cross section. The second small number indicates the number of transverse half-wave patterns that exist along the long dimension of the guide through the center of the cross section. For circular waveguides the first number indicates the number of full waves of the transverse field encountered around the circumference of the guide. The second number indicates the number of half-wave patterns that exist across the diameter.

Counting Wavelengths for Measuring Modes

In the rectangular mode illustrated in Figure 11–24A, note that all the electric lines are perpendicular to the direction of movement. This makes it a TE mode. In the direction across the narrow dimension of the guide parallel to the E-line, the intensity change is zero. Across the guide along the wide dimension, the E-field varies from zero at the top through maximum at the center to zero on the bottom. Since this is one-half wave, the second subscript is one. Thus, the complete description of this mode is $TE_{0,1}$.

In the circular waveguide in Figure 11–24B, the E-field is transverse and the letters which describe it are TE. Moving around the circumference starting at the top, the fields go from zero, through maximum positive (tail of arrows), through zero, through maximum negative (head of arrows), to zero. This is one full wave, so the number is one. Going through the diameter, the start is from zero at the top wall, through maximum in the center to zero at the bottom, one-half wave. The second subscript is one. The complete designation for the circular mode becomes $TE_{1,1}$.

Several circular and rectangular modes are possible. On each diagram illustrated in Figure 11–25 you can verify the numbering system. Note that the magnetic and electric fields are maximum in intensity in the same area. This indicates that the current and voltage are in phase. This is the condition which exists when there are no reflections to cause standing waves. In previous examples in which fields were developed, the fields were out of phase because of a short circuit at the end of the two-wire line.

INTRODUCING FIELDS INTO A WAVEGUIDE

A waveguide, as was explained before, is a single conductor. Therefore, it does not have the two connections which ordinary r-f lines have, and it is necessary to use special devices to put energy into a waveguide at one end and to remove it from the other. In a waveguide, as with many other electrical networks, reciprocity

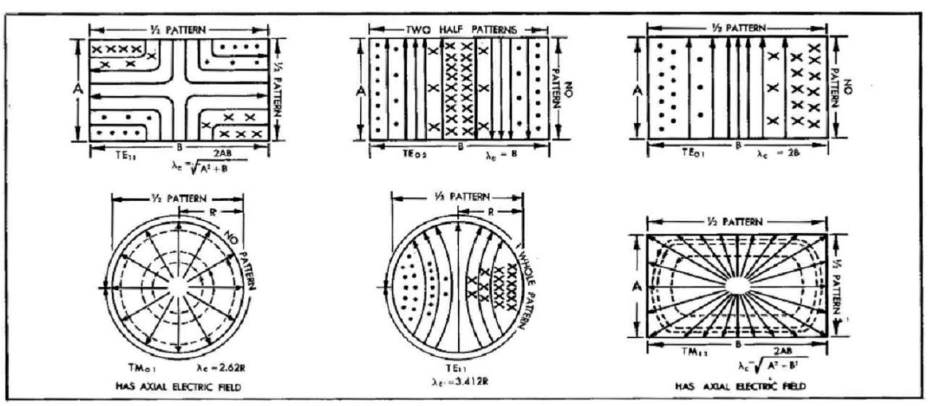

Figure 11–25. Various Modes in Waveguides

Reference **2** concerning "Plank Units" has some very interesting comments (in the highlighted area" about "the radial electric field and the circumferential metric strain are equal at the Strong Force scale within the electron thus satisfying Plank's force equality criteria."

History

Natural units began in 1881, when George Johnstone Stoney, noting that electric charge is quantized, derived units of length, time, and mass, now named Stoney units in his honor, by normalizing G, c, and the electron charge, e, to 1.[24] In 1898, Max Planck discovered that action is quantized, and published the result in a paper presented to the Prussian Academy of Sciences in May 1899.[25][26] At the end of the paper, Planck introduced, as a consequence of his discovery, the base units later named in his honor. The Planck units are based on the quantum of action, now usually known as Planck's constant. Planck called the constant b in his paper, though h is now common. Planck underlined the universality of the new unit system, writing:

> *...ihre Bedeutung für alle Zeiten und für alle, auch außerirdische und außermenschliche Kulturen notwendig behalten und welche daher als »natürliche Maßeinheiten« bezeichnet werden können...*
>
> ...These necessarily retain their meaning for all times and for all civilizations, even extraterrestrial and non-human ones, and can therefore be designated as "natural units"...

Planck considered only the units based on the universal constants G, h, c, and k_B to arrive at natural units for length, time, mass, and temperature.[26] Planck did not adopt any electromagnetic units. However, since the non-rationalized gravitational constant, G, is set to 1, a natural extension of Planck units to a unit of electric charge is to also set the non-rationalized Coulomb constant, k_e, to 1 as well.[27] Another convention is to use the elementary charge as the basic unit of electric charge in Planck system.[28] Such system is convenient for black hole physics. The two conventions for unit charge differ by a factor of the square root of the fine-structure constant. Planck's paper also gave numerical values for the base units that were close to modern values.

Big Changes. A recently published journal article shows gravity does not act via particle mass but via electromagnetic energy circulating within particles. The article gives an expression for G based on an electron model of two quantum loops. It shows the classical dimensions of G are in error by c^4, which has a major consequence for the numerical value of the Planck scale. The article shows the radial electric field and a circumferential metric strain, the origin of gravity, are equal at the Strong Force scale within the electron thus satisfying Planck's force equality criteria. But the value of the scale changes by c^4, about 8.077 x 10^41 in the units used to measure G. This means although Planck's notion was correct the scale actually relates to the electron, not some far smaller scale. Ref: Oakley WS. Analyzing the large number problem and Newton's G via a relativistic quantum loop model of the electron. Int J Sci Rep 2015; 1(4):201-5

List of physical equations

Physical quantities that have different dimensions (such as time and length) cannot be equated even if they are numerically equal (1 second is not the same as 1 metre). In theoretical physics, however, this scruple can be set aside, by a process called nondimensionalization. Table 4 shows how the use of Planck units simplifies many fundamental equations of physics, because this gives each of the five

I printed out the above article concerning Plank Units from Wikipedia in its entirety on August 26, 2017 and three days later the highlighted section above was gone from the web version. Of special interest is the reference: **Oakley WS. Analyzing the large number problems and Newton's G via a relativistic loop model of the electron. Int J Sci Rep 2015; 1(4):201-5**

Only when the Wikipedia article is printed out hardcopy did the below text show. QUOTE:

Big Changes. A recently published journal article shows gravity does not act via particle mass but via electromagnetic energy circulating within particles. The article gives an expression for G based on an electron model of two quantum loops. It shows the classical dimensions of G are in error by c/\4, which has a major consequence for the numerical value of the Planck scale. The article shows the radial electric field and a circumferential metric strain, the origin of gravity, are equal at the Strong Force scale within the electron thus satisfying Planck's force equality criteria. But the value of the scale changes by c/\4, about 8.077 x 10/\41 in the units used to measure G. This means although Planck's notion was correct the scale actually relates to the electron, not some far smaller scale. Ref: Oakley WS. Analyzing the large number problem and Newton's G via a relativistic quantum loop model of the electron. Int J Sci Rep 2015; 1(4):201-5 UNQUOTE

The reason the above red letter section is so important is the radial electric field and the circumferential metric strain being almost identical to the circular waveguide description of the inner waveguide fields on page 12 above. The difference being that instead of a circumferential magnetic field, a circumferential metric strain is specified. It is further cause for me to wonder at how close the waveguide dynamics are to Einstein's Special Theory of Relativity concerning the Lorentz formula and also the gravitational connection G. Instead of metric strain, the correct waveguide field is simply the circular magnetic field.

When were waveguides first tested? The following is of interest as it relates to ref. **4** in this paper: **"The first mathematical analysis of electromagnetic waves in a metal cylinder was performed by Lord Rayleigh in 1897." Also: "This misled him (A later engineer) somewhat; some of his experiments failed because he was not aware of the phenomenon of found in Lord Rayleigh's work. Serious theoretical work was taken up by and Sallie P. Mead. This work led to the discovery that for the TE01 mode in circular waveguide losses go down with frequency and at one time this was a serious contender for the format for long distance telecommunications."**

It is of no small interest that Einstein's work at the patent office coincided time wise with his very productive years in the early 1900's.

Ref. **5** of this paper is a link to a web site that illuminates Einstein's good fortune in landing a job at the patent office: **In June 1902, Einstein received the letter he had been impatiently waiting for: a positive answer regarding his application to be a technical expert –'96 class III at the Federal Office for Intellectual Property in Bern, colloquially known as the patent office.**

Perhaps there is only a coincidence in there being so much similarity in Einstein's Special and General theory of Relativity and waveguide mathematics: Perhaps not. He was in the right place at the right time for it not to be a coincidence at all.

A little thought on transposing terms on waveguide math and substituting tensors for magnetic fields in circular waveguides and suddenly you have something to write home about! In closing, the relevant Air Force Manual 52-8 PDF pages are available for download at:

http://www.electrogravity.com/QWM/WvGd_2.pdf

This includes the page with the red letter quote from above. -- Jerry E. Bayles Aug. 30, 2017

Ω

References:

1: What are the units used in Einstein's General Theory of Relativity?
https://physics.stackexchange.com/questions/34977/what-are-the-units-of-the-quantities-in-the-einstein-field-equation

2: Plank Units on the web: https://en.wikipedia.org/wiki/Planck_units

3: John Wheelers "One Electron Universe":
https://www.yahoo.com/news/m/f64303d7-ed31-33d9-b7c1-a2edbb49cd30/what-if-every-electron-is-the.html?.tsrc=daily_mail&uh_test=1_05

4: Wikipedia on waveguides:
https://en.wikipedia.org/wiki/Waveguide#History

5: Einstein at the patent office:
https://www.ige.ch/en/about-us/the-history-of-the-ipi/einstein/einstein-at-the-patent-office.html