A Proposed Test For Determining The Mechanics of Electrogravitation

by

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October 24, 2003

This paper presents an analysis of a proposed test for determining the possibility of creating direct interaction of an electrically charged aluminum oxide spinning disk with the gravitational field of the Earth. The paper is in four main sections and these are outlined briefly below.

The Vector Magnetic Potential As A Fundamental Mechanism Of Electrogravitational Mechanics

The fundamental importance of the Vector Magnetic Potential **A** is presented beginning on page 1 where it is shown that the changing VMP is the starting point of the creation of the electric and magnetic fields through its changing time and space parameters. The VMP cannot be shielded against and thus it is also a prime candidate for the gravitational action mechanism. In general, momentum generates an **A** vector and this is discussed on p. 7E.

The Electrogravitational Wavefunction Solution

Starting on page 5, it is presented that electrogravitational parameters and derived constants can be used in a quantum wavefunction solution to arrive at a fundamental electrogravitational Hamiltonian. This leads directly to an acoustic and an electric field frequency solution related to electron field electrogravitational interaction.

An Accelerated Spinning Disk Analysis Leads To A Derivation Of Correct Electrogravitational Atomic Force Constant

Beginning on page 8, a Poynting vector solution in cylindrical coordinates is integrated with respect to incremental time and radius related to circumference. What is found is a force and thus energy constant that is extremely close to the ratio of proton mass to electron mass when compared to my previously found force constant between two electrons. This offers a strong arguement for explaining why the proton has the mass it does compared to the electron. The result is by way of my previously derived electrogravitational constants of time, wavelength and frequency. To my knowledge, nowhere else will the reader see a derivation of the proton to electron mass-energy ratio based on contemporary field theories.

Electrogravitational Dynamics of Wavepacket Motion

The last section of this paper deals with wavepacket formation and presents the concept of how a wavepacket can represent quantum particle motion. Electrogravitational constants are used to demonstrate the motion of a typical electrogravitational 'particle' which is shown as group velocity action. The wavepacket's phase velocity is thus more than $1 \cdot 10^{18}$ meters per second, essentially instantaneous.

The Vector Magnetic Potential As A Fundamental Mechanism Of Electrogravitational Mechanics

The vector magnetic potential (**A**) can exist apart and isolated in space from the magnetic field which gives rise to its existence. As a direct result of this peculiar characteristic, the vector magnetic potential has been postulated by myself to be the fundamental action mechanism for the gravitational force. Below are several quotes from established experts concerning the unique character of the magnetic vector potential, hereafter designated as the **A** vector.

Shadowitz (1988a) states, "(1) **A** provides tremendous advantages when variations with time are considered; (2) there is an intimate relation between ϕ and A which will be brought out when relativity is considered; (3) a strong case can be made for the argument that the potential fields, rather than the electric field and the magnetic field, are the fundamental physical quantities; and (4) sometimes, as in the transformer or the betatron, a knowledge of **A** gives a more direct and physical insight than does a knowledge of **B**. The knowledge of **B** is really only needed when one must know the force. In quantum mechanics, it turns out, ϕ and **A** must be used and **E** and **B** cannot be substituted for them." -Unquote

In the above quote, the field potential ϕ, is in the units of volts.

Imry and Webb (April 1989) states, "When the theories of relativity and quantum mechanics were introduced, the potentials, not the electric and magnetic fields, appeared in the equations of quantum mechanics and the equations of relativity simplified into a compact mathematical form if the fields were expressed in terms of potentials. The experiments suggested by Aharonov and Bohm revealed the physical significance of potentials: a charged particle that passes close to but in no manner encounters a magnetic or electric field will nonetheless change its dynamics in a subtle but measurable way. The consequence of the Aharonov-Bohm effect is that the potentials, not the fields, act directly on charges." -Unquote.

The Aharonov-Bohm effect has been repeated successfully many times by different people and even with very small conducting wires at low temperatures as reported in related text of the above quote. A salient point is that the **A** vector is in the direction of the particle motion and is thus 90 degrees to the **B** field. The **A** vector has the units of weber/meter, or (volt·sec)/meter.

To elaborate on the Aharonov-Bohm experiment, Shadowitz (1988b) is quoted as, "The Aharonov-Bohm experiments are significant because there is a region where **B** vanishes but **A** is finite. The Aharonov-Bohm experiment (see Chap. 14, Sec. 14-2, Example 4) utilizes the interference fringes produced by two coherent electron beams (i.e., both beams are produced by one source); the two beams pass around the outside of a solenoid whose length is very long compared to its radius. One beam passes on one side and one on the other, both beams coming from a beam splitter which separates them from each other in the original electron beam. The beams pass only through a region where **B** = 0. A fringe system is produced in a plane where the beams are brought together again. It is found that a shift in the fringes occurs, when the current passes through the solenoid; though the force on any one electron is unaffected by the absence or presence of **A**. Further, the magnitude of the shift agrees with the prediction of quantum mechanics. This effect has no classical analog and is intrinsically quantum mechanical. The conclusion is nevertheless inescapable: **A** possesses physical significance." -Unquote.

It is important to note that even though **A** does not exert force on the electron directly, a phase shift in the electrons wave function does cause a change in its momentum. Ergo, the **A** vector can cause the electron to have a change in momentum which is self-induced through a change in the associated electron wavefunction. This is fundamental to my theory of electrogravitational mechanics.

Mathcad's required parameter statements are presented below. They are in S.I. units.

$\mu_o := 4\cdot\pi\cdot 1\cdot 10^{-07}\cdot H\cdot m^{-1}$ Magnetic permeability of free space.

$m_e := 9.109389700\cdot 10^{-31}\cdot kg$ Electron rest mass.

$q_o := 1.602177330\cdot 10^{-19}\cdot C$ Electron basic charge.

$l_q := 2.817940920\cdot 10^{-15}\cdot m$ Electron classic radius

$h := 6.626075500\cdot 10^{-34}\cdot J\cdot s$ Planks constant

$\alpha := 7.297353080\cdot 10^{-03}$ Fine structure constant.

The following constants are derived as a result of my own theory of electrogravitation.

$V_{LM} := \left(\sqrt{\alpha}\right)\cdot m\cdot s^{-1}$ $\quad V_{LM} = 8.542454612112\times 10^{-2}\,\frac{m}{s}$

$\lambda_{LM} := \frac{h}{m_e\cdot V_{LM}}$ $\quad \lambda_{LM} = 8.514995416151\times 10^{-3}\,m$

$W_{LM} := m_e\cdot V_{LM}^{\,2}$ $\quad W_{LM} = 6.647443298422\times 10^{-33}\,J$

$f_{LM} := \frac{W_{LM}}{h}$ $\quad f_{LM} = 1.003224804550\times 10^{1}\,Hz$

$t_{LM} := 1\cdot f_{LM}^{\,-1}$ $\quad t_{LM} = 9.967855613862\times 10^{-2}\,s$

$m'_e := \frac{\left(\mu_o\cdot q_o\cdot q_o\right)}{4\cdot\pi\cdot l_q}$ $\quad m'_e = 9.109389691413\times 10^{-31}\,kg$

$A_{LM} := \frac{\left(\mu_o\cdot q_o\cdot\lambda_{LM}\right)}{4\cdot\pi\cdot l_q\cdot t_{LM}}$ $\quad A_{LM} = 4.856924793895\times 10^{-13}\,weber\cdot m^{-1}$

Note that charge divided by time t = current and wave-length divided by time is velocity.

The quantum electrogravitational potential is derived by integrating the vector magnetic potential $\mathbf{A_{LM}}$ with respect to velocity in eq. 1, below.

Electric Scalar Potential:

$$\phi_{LM} := \int_0^{V_{LM}} \frac{\left(\mu_o \cdot q_o \cdot V_{LM}\right)}{4 \cdot \pi \cdot l_q} \, dV_{LM} \qquad \phi_{LM} = 2.074502980315 \times 10^{-14} V \qquad 1)$$

Note that: $\phi_{LM} t_{LM} = 2.067834617830 \times 10^{-15} Wb$ which is equal to the standard quantum fluxoid, Φo

Where the standard quantum fluxoid is: $\Phi_o := 2.067834610 \cdot 10^{-15} \cdot Wb$ 2)

Momentum is associated with the product of **A** and q_o where **A** is a vector and q_o is a scalar.

$$p_{LM} := \frac{q_o \cdot \left(\mu_o \cdot q_o \cdot \lambda_{LM}\right)}{4 \cdot \pi \cdot l_q \cdot t_{LM}} \qquad p_{LM} = 7.781654798294 \times 10^{-32} \frac{kg\,m}{s}$$

Note: <u>**A** imparts momentum to the charge, qo.</u> 3)

A new <u>field of force</u> inline along **A** is obtained by taking the derivative with respect to time of the **A** field acting on the charge q_o above.

$$F_{LM} := \frac{d}{dt_{LM}} \frac{q_o \cdot \left(\mu_o \cdot q_o \cdot \lambda_{LM}\right)}{4 \cdot \pi \cdot l_q \cdot t_{LM}} \qquad F_{LM} = -7.806749114095 \times 10^{-31} N$$

1st derivative of momentum, with respect to time, = <u>negative force.</u> 4)

It must be emphasized that the **A** vector instantly affects the charge by acting on it to change its momentum. A change of momentum must be accompanied by a change in the particles wavefunction which also affects the quantum wavelength of the charge-particle.

Negative energy, expressed as W_{LM} below, is obtained by integrating Force F_{LM} , with respect to wavelength λ_{LM}, below.

$$W_{LM} := \int_0^{\lambda_{LM}} F_{LM} \, d\lambda_{LM} \qquad W_{LM} = -6.647443292155 \times 10^{-33} J$$

Negative energy suggests entropy. 5)

Momentum equals q_o times **A** where charge q_o is a scalar and the vector magnetic potential **A** is a vector. Since energy is momentum times velocity, then a cross-product of q_o times λ_{LM} and the derivative with respect to time of the **A** vector yields energy as a vector. Note that the charge terms have been split between vectors as have the velocity terms. That is, mass is in the whole expression but split between the vectors. Note that the velocity term is shown as distance over time. The resultant energy vector $\mathbf{W'_{LM}}$ is shown in eq. 6, p. 4 below.

INSERT 1 3A

It is of interest what would develop if we applied the cross-product approach to the electric scalar potential and the vector magnetic potential.

Vector Magnetic Potential, p. 2. Scalar Electric Potential, p. 3.

$$A_{LM} = 4.856924793895 \times 10^{-13}\,\frac{\text{volt}\cdot\text{sec}}{\text{m}} \qquad \phi_{LM} = 2.074502980315 \times 10^{-14}\,\text{V}$$

Both have the ability to change the electron wavefunction in a region of space that is completely separate from the magnetic flux **B** and electric field **E** respectively and both represent a real entity that can only be detected by a change in the electron wavefunction. The vector magnetic potential causes a change in momentum and wavelength while the scalar electric potential causes a change in the energy and time of the electron wavefunction.

$$c := 2.997924580\cdot 10^{08}\cdot\frac{\text{m}}{\text{sec}} \qquad R_{n1} := \frac{h}{2\cdot\pi\cdot m_e\cdot c\cdot\alpha} \qquad R_{n1} = 5.291772526754 \times 10^{-11}\,\text{m}$$

$$Ax\phi := \mu_o\cdot\left[\begin{pmatrix}\dfrac{q_o\cdot V_{LM}\cdot A_{LM}}{R_{n1}}\\ 0\\ 0\end{pmatrix}\times\begin{pmatrix}0\\ \dfrac{2\cdot q_o\cdot\phi_{LM}}{R_{n1}}\\ 0\end{pmatrix}\right]$$

This is a two-system quantum electrogravitational action through non-local energy space with the reaction being observed in local normal space. 3A-1)

$$Ax\phi = \begin{pmatrix}0.000000000000 \times 10^{0}\\ 0.000000000000 \times 10^{0}\\ 1.982973049819 \times 10^{-50}\end{pmatrix}\text{newton}\cdot\frac{\text{henry}}{\text{m}}\cdot\text{newton}$$

In this result, the henry/m is a constant and the magnetic and electric terms vary inversely with the distance. The result Axϕ varies inversely with the square of the distance.

$$F_A := \frac{q_o\cdot V_{LM}\cdot A_{LM}}{R_{n1}} \qquad F_A = 1.256184625954 \times 10^{-22}\,\text{N}$$

Force in VMP system. *

* **V**ector **M**agnetic **P**otential. 3A-2)

$$F_\phi := \frac{2\cdot q_o\cdot\phi_{LM}}{R_{n1}} \qquad F_\phi = 1.256184625954 \times 10^{-22}\,\text{N}$$

Force in ESP system. **

** **E**lectric **S**calar **P**otential. 3A-3)

Note that the Newtonian gravitational result at the n1 Bohr orbital is presented below as:

$$G := 6.672590000\cdot 10^{-11}\cdot\text{newton}\cdot\text{m}^2\cdot\text{kg}^{-2}$$

$$F_{GN} := \frac{G\cdot m_e^{\,2}}{R_{n1}^{\,2}} \qquad F_{GN} = 1.977291361502 \times 10^{-50}\,\text{newton}$$ 3A-4)

INSERT 2

3B

The cross-product applies to system $F_{\mathbf{A}}$ being at 90 degrees to F_{ϕ} regardless of distance of separation and the result is inversely proportional the square of the distance of separation. Thus the action vector $Ax\phi$ is 90 degrees (for maximum force) to both initiator linear force systems which in turn are also 90 degrees to each other. This means that at some point in space, an electron in the vector magnetic potential system moving along the x direction will interact electrogravitationally through non-local energy space with another electron in the scalar potential system which is experiencing a potential difference force in the y direction where the cross product interaction reaction vector will be will be in the z direction through local space.

This implies that a large potential from the center of a disk to its outside rim and the disk horizontally positioned, (parallel with the surface of the Earth), should interact electrogravitationally with all vector magnetic systems in the Earth moving 90 degrees and horizontal to a particular radius vector electric potential in the disk's radial electric potential field. Further, a large current representative of many turns having a large magnemotive force number around the rim of the disk would also interact with electric potentials 90 degrees to a particular section of the rim's current vector where also the vector electric potential would be in the same horizontal plane for maximum force interaction in the vertical direction.

An actual experiment involving 100 turns at 1 amp of current for the A vector and a voltage of 20,000 volts for the ϕ potential at a distance of 10 centimeters is shown below. An expanded form of the above equation is used to illustrate all of the terms involved.

$$\mathrm{Dist} := 1\cdot 10^{-02}\cdot \mathrm{m} \qquad N := 100 \qquad \mathrm{Qmult} := \frac{1\cdot A}{\left(q_o\cdot f_{LM}\right)} \qquad \mathrm{Qmult} = 6.221443424032\times 10^{17}$$

$$\mathrm{Vmult} := \frac{20000\cdot \mathrm{volt}}{\phi_{LM}} \qquad \mathrm{Vmult} = 9.640863469363\times 10^{17} \tag{3B-1}$$

$$Ax\phi := \mu_o\cdot\left[\begin{bmatrix} \dfrac{q_o\cdot \mathrm{Qmult}\cdot N\cdot V_{LM}\cdot\dfrac{\left(\mu_o\cdot \mathrm{Qmult}\cdot N\cdot q_o\cdot\lambda_{LM}\right)}{4\cdot\pi\cdot l_q\cdot t_{LM}}}{\mathrm{Dist}} \\ 0 \\ 0 \end{bmatrix} \times \begin{bmatrix} 0 \\ \dfrac{2\cdot(\mathrm{Vmult})\cdot q_o\cdot\displaystyle\int_0^{V_{LM}}\frac{\left(\mu_o\cdot q_o\cdot V_{LM}\right)}{4\cdot\pi\cdot l_q}\,dV_{LM}}{\mathrm{Dist}} \\ 0 \end{bmatrix}\right]$$

$$Ax\phi = \begin{pmatrix} 0.000000000000\times 10^{0} \\ 0.000000000000\times 10^{0} \\ 2.072131873853\times 10^{-9} \end{pmatrix}\mathrm{newton}\cdot\frac{\mathrm{henry}}{\mathrm{m}}\cdot\mathrm{newton}$$

This is a very small force and it is easy to see that more current and voltage must be used to create a measureable force. Superconductive wire at 23,000 amps yeilds approximately 1 newton.

$$W'_{LM} := \begin{pmatrix} \lambda_{LM} \cdot q_o \\ 0 \\ 0 \end{pmatrix} \times \begin{bmatrix} 0 \\ \dfrac{d}{dt_{LM}} \dfrac{(\mu_o \cdot q_o \cdot \lambda_{LM})}{4 \cdot \pi \cdot l_q \cdot t_{LM}} \\ 0 \end{bmatrix} \qquad W'_{LM} = \begin{pmatrix} 0.000000000000 \times 10^{0} \\ 0.000000000000 \times 10^{0} \\ -6.647443292155 \times 10^{-33} \end{pmatrix} J \qquad 6)$$

<u>The faster the **A** field is changing with respect to time, the greater magnitude is the negative energy vector.</u> Also, please note that the first derivative with respect to time of the **A** vector is equal to a negative volt/meter which has the units of the electric **E** vector.

$$E_V := \frac{d}{dt_{LM}} \frac{(\mu_o \cdot q_o \cdot \lambda_{LM})}{4 \cdot \pi \cdot l_q \cdot t_{LM}} \qquad E_V = -4.872587427070 \times 10^{-12} \frac{V}{m} \qquad 7)$$

$$B_I := \frac{d}{d\lambda_{LM}} \frac{(\mu_o \cdot q_o \cdot \lambda_{LM})}{4 \cdot \pi \cdot l_q \cdot t_{LM}} \qquad B_I = 5.703966422205 \times 10^{-11} \text{tesla} \qquad 8)$$

Note that **B** is the result of the derivative of **A** with respect to a one-dimensional changing distance λ_{LM}.

The result of a changing **A** field with respect to distance in eq. 8 above results in the magnetic flux density **B**. The cross-product of $\mathbf{E_V}$ and $\mathbf{B_I}$ over μ_o is the electrogravitational poynting vector power.

$$S_{LM} := \left(\frac{1}{2 \cdot \mu_o}\right) \cdot \begin{pmatrix} E_V \\ 0 \\ 0 \end{pmatrix} \times \begin{pmatrix} 0 \\ B_I \\ 0 \end{pmatrix} \qquad S_{LM} = \begin{pmatrix} 0.000000000000 \times 10^{0} \\ 0.000000000000 \times 10^{0} \\ -1.105851320409 \times 10^{-16} \end{pmatrix} \frac{\text{watt}}{m^2} \qquad 9)$$

The result in eq. 9 is the familiar poynting power vector expressed as the power per square meter related to the least quantum electrogravitational action due to eq. 7 and 8 above.

Thus it is immediately apparent that the **A** vector changing in time and distance generates the poynting power vector and thus the **A** vector is more fundamental than **E** or **B**. Further, the power is very small compared to ordinary communications levels and is not easily detectable, even at close range.

The vector magnetic potential **A** <u>cannot</u> be shielded against as was demonstrated on a quantum scale by the famous Aharonhov-Bohm experiment involving electron diffraction patterns changing in a modified two-slit experiment in spite of the **A** field originating **B** field being absent. This was by reason of niobium shielding in a special torus shape that confined the **B** field completely and thus isolated it from having any magnetic influence on the passing electrons. The **A** vector did cause the electron wavefunctions to be changed which effectively changed their momentum.

I propose that a torus wound coil (toroid) with an open air core be used to establish an **A** field axially which could be pointed at moving charges or ionized gas to see what type of effect the **A** vector may have on the moving charged particles. Ordinary current transformers may be suitable for this experiment. Perhaps an ordinary television screen could show some type of directional diffraction due to the action of the **A** vector. Shielding of various types could be employed to verify that the action is from the A vector and not caused by ordinary magnetic effects.

The suggested experimental configuration is an aluminum-oxide grinding wheel 2-1/2 inches in diameter by 1/4 inch thick which is forced into angular acceleration while high voltage builds a charge from the rim to the driving center shaft. A current is passed through the center shaft when the high voltage is applied. This is synchronized by a rotating spark gap to a resonating tesla coil setup so that the current in the axis of rotation is also provided by the capacitve discharge associated with the tesla coil circuit. An angle of one radian between the current and voltage may be desirable.

The **A** vector is stated again for clarification of the $\mathbf{F'_{LM}}$ equation below the **A** equation.

$$A_{LM} := \frac{(\mu_o \cdot q_o \cdot \lambda_{LM})}{4 \cdot \pi \cdot l_q \cdot t_{LM}} \qquad A_{LM} = 4.856924793895 \times 10^{-13} \frac{weber}{m} \qquad \text{4A-01)}$$

The derivative of **A** with respect to wavelength yields the **B** vector $\mathbf{B_l}$ below. The cross-product of the **B** vector with the product of charge times velocity yields a third vector in the **Z** direction.

$$F'_{LMz} := \begin{pmatrix} q_o \cdot V_{LM} \\ 0 \\ 0 \end{pmatrix} \times \overbrace{\begin{bmatrix} 0 \\ \frac{d}{d\lambda_{LM}} \frac{(\mu_o \cdot q_o \cdot \lambda_{LM})}{4 \cdot \pi \cdot l_q \cdot t_{LM}} \\ 0 \end{bmatrix}}^{\mathbf{B_l}} \qquad F'_{LMz} = \begin{pmatrix} 0.000000000000 \times 10^{0} \\ 0.000000000000 \times 10^{0} \\ 7.806749114095 \times 10^{-31} \end{pmatrix} newton \qquad \text{4A-02)}$$

The changing wavelength that generates **B** is taken to be increments of circumference inwards from the rim of a rotating disk to the axis of rotation where the changing wavelength is in direct proportion to the changing radius. This would be in the x-y plane so that the force developed would be in the z axis. The action is that of a charge moving from the rim to the axis of rotation while the disk is spinning.

What satisfies the required mechanics for force in the z direction is a circular **B** field with a radial **E** field where the **E** field crosses at 90 degrees to the **B** field in the x-y plane. This is the cylindrical coordinate system. This is comparable to the fields in a coaxial cable.

A high voltage from the rim of an aluminum oxide grinding disk to its axis of rotation will satisfy the establishment of the **E** field in a radial direction. The **B** field will be established by passing the current from a spark gap arc-over through the axis of rotation. The interaction of the **B** field and **E** field will be at 90 degrees to each other and the axis of rotation, thus the force will be established in the z direction as required for vertical propulsion. The 'memory' of the aluminum oxide dielectric will hold a voltage across the disk while the gap arc-over current is passed through the axis of rotation of the disk. Both the current and voltage are in a state of change when the arc-over occurs. A charge-holding capacitor will allow for charge to build up for the arc-over current to have a large magnitude. Thus a strong pulse of current will occur at arc-over which will establish a strong dynamic **B** field around the circumference of the disk. Placing the **E** vector into where the charge times velocity is in the above equation and then dividing by the permeability of free space will yield the familiar Poynting power vector as shown by equation 9 previous. Power per meter squared is newtons per meter·second.

Note that eq. 6 is a photon equation. The derivative of the **A** vector with respect to time t_{LM} lacks a q_o charge term which means the **A** vector equation has no associated rest mass. Remember that the electron rest mass was defined on p. 2 in terms of the permeability of free space times the elemental electron charge squared all divided by 4π times the classic electron radius. There is only one charge term in the **A** vector and the **E** and **B** equations of eq. 7 and 8 above. Then also, both the **E** and the **B** field have no rest mass as shown in eq. 7 and 8 above.

There exist component velocities of the photon which break down into group and phase velocities where the product of group velocity times phase velocity is equal to the square of the velocity of light in free space. It is a fact that in the poynting power vector, the relationship between the **E** and **B** fields is expressed as **E** = c•**B** where c is the velocity of light in free space. In fact, the group and phase velocity concept also applies to the study of quantum particle velocities as well as propagation of electric and magnetic waves through a waveguide. Group velocity is normally considered to apply to real observable particles or information in local space while phase velocity is for the most part ignored. In my theory, phase velocity is the velocity of action between systems of **A** vectors and resides in what I call non-local energy space. Energy space also has the property of having the same distance between all action points of entry and exit from and to our normal space.

Electrogravitational phase velocity is calculated below based on the speed of light squared divided by the electrogravitational group velocity V_{LM} which we convert to be expressed as V_G.

$$c := 2.997924580\cdot 10^{08}\cdot m\cdot s^{-1} \qquad V_{LM} = 8.542454612112\times 10^{-2}\,\frac{m}{s} \qquad V_g := V_{LM}$$

Then: $$V_p := c^2\cdot V_g^{-1} \qquad V_p = 1.052104131127\times 10^{18}\,\frac{m}{s} \tag{4B-1)}$$

This is a considerable velocity and for local events can be considered to be effectively instantaneous. A light-year distance in meters is: (Where 3.15576 x 10^{07}s is the number of seconds in a year.):

$$T_{yr} := 3.15576\cdot 10^{07}\cdot s \qquad LY_{dist} := c\cdot T_{yr} \qquad LY_{dist} = 9.460730472581\times 10^{15}\,m \tag{4B-2)}$$

The time to go one light year at the phase velocity V_p is:

$$LY_{time} := LY_{dist}\cdot V_p^{-1} \qquad LY_{time} = 8.992199719287\times 10^{-3}\,s \tag{4B-3)}$$

The number of light-years covered in 8 hours at the phase velocity above is: (Where 2.88 x 10^{04} sec is the number of seconds in 8 hours.)

$$T_{8hr} := 2.88\cdot 10^{04}\cdot s \qquad LY_{8hr} := \frac{T_{8hr}}{LY_{time}} \qquad LY_{8hr} = 3.202775838956\times 10^{6} \tag{4B-4)}$$

This is the light-years traveled in 8 hours. The diameter of the Milky Way galaxy is only 100,000 light-years across. At the above phase velocity, we could traverse the diameter of our Milky Way Galaxy in 15 minutes. The star Betelgeuse, 650 light years from Earth, is only 0.1827 seconds away! The nearest galaxy, Andromeda, is 2.2 million light years away, or only 5.46 hours at V_p velocity. It might be tricky to navigate to nearby stars at this rate of travel. In 4.27 years, we could travel to the beginning of the universe, or 15 billion light-years.

<u>4C</u>

The energy related to the phase velocity V_p in energy space is calculated next and it is huge.

$E_p := m'_e \cdot V_p^2$ $\qquad E_p = 1.008339390124 \times 10^{6}\,J$ This is the electron rest-mass energy in energy space. 4C-1)

$\lambda_p := \dfrac{h}{m'_e \cdot V_p}$ $\qquad \lambda_p = 6.913665651656 \times 10^{-22}\,m$ This is the electron interaction distance in energy space. 4C-2)

$t_p := \dfrac{h}{m'_e \cdot V_p^2}$ $\qquad t_p = 6.571275073552 \times 10^{-40}\,s$ This is the Compton time related to the rest mass energy of the electron in energy space. 4C-3)

The simplified form of eq. 7 and 8 is shown below to allow for the greatest possible accuracy.

$E_{Vp} = \dfrac{d}{dt_p}\dfrac{\left(\mu_o \cdot q_o \cdot \lambda_p\right)}{4 \cdot \pi \cdot l_q \cdot t_p}$ simplifies to $E_{Vp} = \dfrac{-1}{4} \cdot \mu_o \cdot q_o \cdot \dfrac{\lambda_p}{\pi \cdot l_q \cdot t_p^2}$ 4C-4)

$B_{Ip} = \dfrac{d}{d\lambda_p}\dfrac{\left(\mu_o \cdot q_o \cdot \lambda_p\right)}{4 \cdot \pi \cdot l_q \cdot t_p}$ simplifies to $B_{Ip} = \dfrac{1}{4} \cdot \mu_o \cdot \dfrac{q_o}{\pi \cdot l_q \cdot t_p}$ 4C-5)

$E_{Vp} := \dfrac{-1}{4} \cdot \mu_o \cdot q_o \cdot \dfrac{\lambda_p}{\pi \cdot l_q \cdot t_p^2}$ $\qquad E_{Vp} = -9.103067803268 \times 10^{45}\,\dfrac{volt}{m}$ 4C-6)

$B_{Ip} := \dfrac{1}{4} \cdot \mu_o \cdot \dfrac{q_o}{\pi \cdot l_q \cdot t_p}$ $\qquad B_{Ip} = 8.652249842910 \times 10^{27}\,tesla$ 4C-7)

$S_p := \dfrac{\begin{pmatrix} E_{Vp} \\ 0 \\ 0 \end{pmatrix} \times \begin{pmatrix} 0 \\ B_{Ip} \\ 0 \end{pmatrix}}{2 \cdot \mu_o}$ $\qquad S_p = \begin{pmatrix} 0.000000000000 \times 10^{0} \\ 0.000000000000 \times 10^{0} \\ -3.133841082199 \times 10^{79} \end{pmatrix} \dfrac{watt}{m^2}$ This may be considered to be, effectively, an infinite amount of energy/m²•s. 4C-8)

The velocity vector is given as the ratio of the **E** field to the **B** field.

Thus: $\dfrac{E_{Vp}}{B_{Ip}} = -1.052104131127 \times 10^{18}\,\dfrac{m}{s}$ where, $V_p = 1.052104131127 \times 10^{18}\,\dfrac{m}{s}$ 4C-9)

Note that the two velocities above cancel each other out and are thus zero overall. This suggests a standing wave pattern may be applicable even to energy space.

Since the velocity of an electromagnetic wave is derived from the ratio of the **E** field to the **B** field, from p. 4, we can use the ratio of the electrogravitational $\mathbf{E_V}$ to $\mathbf{B_I}$ to derive the electrogravitational least quantum velocity. This is the group wave velocity.

$$\frac{E_V}{B_I} = -8.542454612112 \times 10^{-2}\,\frac{m}{s} \quad \text{where,} \quad V_{LM} = 8.542454612112 \times 10^{-2}\,\frac{m}{s} \qquad \text{4D-1)}$$

Again, the velocities cancel each other and could form a standing wave as a result.

The **E** and **B** fields for the Compton case of the electron fields related to the velocity of light is examined next.

$$E_e := m'_e \cdot c^2 \qquad E_e = 8.187111160289 \times 10^{-14}\,J$$
This is the electron rest-mass energy in normal space. 4D-2)

$$\lambda_e := \frac{h}{m'_e \cdot c} \qquad \lambda_e = 2.426310602296 \times 10^{-12}\,m$$
This is the electron Compton wavelength in normal space. 4D-3)

$$t_e := \frac{h}{m'_e \cdot c^2} \qquad t_e = 8.093301007245 \times 10^{-21}\,s$$
This is the Compton time related to the rest mass energy of the electron in normal space. 4D-4)

$$E_{Ve} = \frac{d}{dt_e}\frac{\left(\mu_o \cdot q_o \cdot \lambda_e\right)}{4 \cdot \pi \cdot l_q \cdot t_e} \quad \text{simplifies to} \quad E_{Ve} := \frac{-1}{4} \cdot \mu_o \cdot q_o \cdot \frac{\lambda_e}{\pi \cdot l_q \cdot t_e^2} \qquad \text{4D-5)}$$

$$B_{Ie} = \frac{d}{d\lambda_e}\frac{\left(\mu_o \cdot q_o \cdot \lambda_e\right)}{4 \cdot \pi \cdot l_q \cdot t_e} \quad \text{simplifies to} \quad B_{Ie} := \frac{1}{4} \cdot \mu_o \cdot \frac{q_o}{\pi \cdot l_q \cdot t_e} \qquad \text{4D-6)}$$

$$E_{Ve} = -2.106074397645 \times 10^{17}\,\frac{V}{m} \qquad B_{Ie} = 7.025108008705 \times 10^{8}\,T$$

$$S_e := \frac{\begin{pmatrix} E_{Ve} \\ 0 \\ 0 \end{pmatrix} \times \begin{pmatrix} 0 \\ B_{Ie} \\ 0 \end{pmatrix}}{2 \cdot \mu_o} \qquad S_e = \begin{pmatrix} 0.000000000000 \times 10^{0} \\ 0.000000000000 \times 10^{0} \\ -5.886902659436 \times 10^{31} \end{pmatrix} \frac{watt}{m^2} \qquad \text{4D-7)}$$

The electron torus energy was derived in my book, "Electrogravitation As A Unified Field Theory" as:

$$S_{max} := 1.57575043465 \cdot 10^{29} \cdot \frac{watt}{m^2}$$
(See p. 8 of Egchap01.pdf, eq.14.) 4D-8)

S_{max} energy was derived from the field energy, not the mass energy as for S_e above.

Again, the ratio of the E_{Ve} field to the B_{Ie} field yields the velocity related to the S_e field as:

$$\frac{E_{Ve}}{B_{Ie}} = -2.997924580000 \times 10^{8}\,\frac{m}{s} \quad \text{where,} \quad c = 2.997924580000 \times 10^{8}\,\frac{m}{s}$$ Again, a standing wave is suggested. 4E-1)

TORUS

$$E_{Se} := S_e \cdot \left(\frac{\lambda_e}{2\cdot\pi}\right)\cdot\left(\frac{\lambda_e}{2\cdot\pi}\right)\cdot\pi\cdot t_e \qquad E_{Se} = \begin{pmatrix} 0.000000000000 \times 10^{0} \\ 0.000000000000 \times 10^{0} \\ -2.232006606394 \times 10^{-13} \end{pmatrix} J \qquad E_e := m'_e \cdot c^2$$

$$E_e = 8.187111160289 \times 10^{-14}\,J$$

$$R_e := \frac{\left(-2.232006606394 \times 10^{-13}\right)\cdot J}{E_e} \qquad R_e = -2.726244413561 \times 10^{0} \qquad S_e = \begin{pmatrix} 0.000000000000 \times 10^{0} \\ 0.000000000000 \times 10^{0} \\ -5.886902659436 \times 10^{31} \end{pmatrix} \frac{watt}{m^2}$$

The phase velocity ratio of E_{Vp} over B_{Ip} should yield the phase velocity related to the S_p field as:

$$\frac{E_{Vp}}{B_{Ip}} = -1.052104131127 \times 10^{18}\,\frac{m}{s} \quad \text{where,} \quad V_p = 1.052104131127 \times 10^{18}\,\frac{m}{s}$$ Again, a standing wave is suggested.

TORUS

$$E_p := m'_e \cdot V_p^{\,2}$$ 4E-2)

$$E_{Sp} := S_p \cdot \left(\frac{\lambda_p}{2\cdot\pi}\right)\cdot\left(\frac{\lambda_e}{2\cdot\pi}\right)\cdot\pi\cdot t_p \qquad E_{Sp} = \begin{pmatrix} 0.000000000000 \times 10^{0} \\ 0.000000000000 \times 10^{0} \\ -2.748979629297 \times 10^{6} \end{pmatrix} J \qquad E_p = 1.008339390124 \times 10^{6}\,J$$

$$R_p := \frac{\left(-2.748979629297 \times 10^{6}\right)\cdot J}{E_p} \qquad R_p = -2.726244413560 \times 10^{0} \qquad S_p = \begin{pmatrix} 0.000000000000 \times 10^{0} \\ 0.000000000000 \times 10^{0} \\ -3.133841082199 \times 10^{79} \end{pmatrix} \frac{watt}{m^2}$$

The electrogravitational velocity ratio of E_V over B_I should yield the least quantum velocity V_{LM}:

$$\frac{E_V}{B_I} = -8.542454612112 \times 10^{-2}\,\frac{m}{s} \quad \text{where,} \quad V_{LM} = 8.542454612112 \times 10^{-2}\,\frac{m}{s}$$ Again, a standing wave is suggested.

TORUS

4E-3)

$$E_{SLM} := S_{LM} \cdot \left(\frac{\lambda_{LM}}{2\cdot\pi}\right)\cdot\left(\frac{\lambda_e}{2\cdot\pi}\right)\cdot\pi\cdot t_{LM} \qquad E_{SLM} = \begin{pmatrix} 0.000000000000 \times 10^{0} \\ 0.000000000000 \times 10^{0} \\ -1.812255513970 \times 10^{-32} \end{pmatrix} J \qquad E_{LM} := m'_e \cdot V_{LM}^{\,2}$$

$$R_{SLM} := \frac{\left(-1.812255513970 \times 10^{-32}\right)\cdot J}{E_{LM}} \qquad E_{LM} = 6.647443292155 \times 10^{-33}\,J$$

$$R_{SLM} = -2.726244413561 \times 10^{0} \qquad S_{LM} = \begin{pmatrix} 0.000000000000 \times 10^{0} \\ 0.000000000000 \times 10^{0} \\ -1.105851320409 \times 10^{-16} \end{pmatrix} \frac{watt}{m^2}$$

Expected result: Should be unity, or 1 for eq. 4E-1 through 4E-3. The reason for the 'error' is not apparent at this time.

<u>4F</u>

Each one of the TORUS labeled equations above scale the energy space energy down to local space energy which should be equal to rest mass energy but the result is not quite equal. Note that the resulting energies E_{Sp}, E_{Se} and E_{SLM} are greater than the respective rest mass energies. The ratios are nearly equal to the natural number e, or 2.726244414 verses 2.718281828. <u>Perhaps this calculated excess energy arises through the mechanics of generating an electromagnetic wave?</u> Further, if this energy exists, where does it go? Could this be the dark energy?

The equations in 4E-1 through 4E-3 all have the form of a torus in them. The largest circle is the wavelength represented by λ_{LM} and around the circumference of λ_{LM} is the wavelength of the electron represented by λ_e at 90 degrees to λ_{LM}. This is represented by equation 4E-3 above.

The next smaller torus is represented by the circle of λ_e circumference and around λ_e is another circle also of λ_e circumference 90 degrees to the first λ_e. This is represented by eq. 4E-1 above.

The smallest torus is represented by a λ_e circumference where the smallest circle λ_p encircles λ_e 90 degrees to the direction of λ_e. This is represented by eq. 4E-2 above. Wheels around wheels, each one encircling another and all are linked together. Returning to p. 4A, if the relationship of E=cB for the electromagnetic field can be extended to the case for momentum and energy involving rest mass. Further, it is of interest that the expression for E=cB can more properly be expressed as E= v X B since the force expression qE= qv X B is more correct when dealing with charge in motion relative to orthogonal magnetic fields which creates a third vector from x and y into the z direction. Then mE_z= mc_x X B_y. Let mE_z = $Force_z$.

Let: $i_{LM} := q_o \cdot f_{LM}$ $\qquad i_{LM} = 1.607344038744 \times 10^{-18}\,\mathrm{A}$ 4F-1)

$$Force_z := \begin{pmatrix} \dfrac{d}{dt_{LM}} m'_e \cdot \dfrac{\lambda_{LM}}{t_{LM}} \\ 0 \\ 0 \end{pmatrix} \times \begin{pmatrix} 0 \\ \dfrac{d}{dt_{LM}} \dfrac{\mu_o \cdot q_o}{4 \cdot \pi \cdot l_q} \cdot \dfrac{1}{t_{LM}} \\ 0 \end{pmatrix} \qquad Force_z = \begin{pmatrix} 0.000000000000 \times 10^{0} \\ 0.000000000000 \times 10^{0} \\ 4.467303353738 \times 10^{-40} \end{pmatrix} \frac{\mathrm{newton \cdot tesla}}{\mathrm{sec}}$$

where: $\dfrac{d}{dt_{LM}} m'_e \cdot \dfrac{\lambda_{LM}}{t_{LM}} = -7.806749114095 \times 10^{-31}\,\mathrm{N}$ Visualized as insulated particles of metal moving around the axis of spin cutting across the radial Δ**B** flux.

and: $\dfrac{\mu_o \cdot i_{LM}}{4 \cdot \pi \cdot l_q} = 5.703966422205 \times 10^{-11}\,\mathrm{tesla}$ Visualized as radially directed Δ**B** flux 90 degrees to the axis of rotation in the x and y disk rotation plane.

also, $\dfrac{\mu_o \cdot q_o}{4 \cdot \pi \cdot l_q} \cdot \dfrac{1}{t_{LM}} = 5.703966422205 \times 10^{-11}\,\mathrm{tesla}$ and $m'_e \cdot \dfrac{\lambda_{LM}}{t_{LM}} = 7.781654798294 \times 10^{-32}\,\dfrac{\mathrm{kg\,m}}{\mathrm{s}}$

It is not just spin that is important but rather the rate of change of spin as well as an actual mass parameter associated with small metal particles cutting across the changing magnetic flux. A vertical changing volts/m^2 would also exist.

<u>4G</u>

Smax Revisited:

Let the following be established: $\varepsilon_o := 8.854187817\cdot 10^{-12}\cdot \text{farad}\cdot \text{m}^{-1}$ $\quad r_c := \lambda_e\cdot(2\cdot\pi)^{-1}$ 4G-1)

Then the electric field in volts per meter at the Compton radius of the electron is given as:

$$E_{stat} := \frac{q_o}{4\cdot\pi\cdot\varepsilon_o\cdot r_c^{\,2}} \quad \text{where,} \quad E_{stat} = 9.656481950577\times 10^{15}\,\frac{\text{volt}}{\text{m}} \qquad \text{4G-2)}$$

The potential energy W_{pot} at the Compton radius of the electron is given as:

$$W_{pot} := \frac{q_o^{\,2}}{4\cdot\pi\cdot\varepsilon_o\cdot r_c} \quad \text{where,} \quad W_{pot} = 5.974424030055\times 10^{-16}\,\text{joule} \qquad \text{4G-3)}$$

This is equal to the rest mass energy times the fine structure constant.

The potential energy at the Compton radius of the electron divided by the rest mass energy of the electron yields the fine structure constant.

Or, $$\frac{W_{pot}}{E_e} = 7.297353013885\times 10^{-3} \quad \text{where,} \quad \alpha = 7.297353080000\times 10^{-3} \qquad \text{4G-4)}$$

The energy density of an electric field in standard form is given by the below equation as:

$$W_d := \frac{1}{2}\cdot\varepsilon_o\cdot E_{stat}^{\,2} \qquad W_d = 4.128160752373\times 10^{20}\,\frac{\text{joule}}{\text{m}^3} \qquad \text{4G-5)}$$

This is also in Pascal units which is force per meter^2.

Energy density is expressed as the total energy of the electric field divided by the volume occupied by the electric field. Let the volume of a torus be the volume above. The volume of a torus is found by multiplying the circumference of a circle running through the center of an area 90 degrees to the line of the circle's circumference line.

$$Vol_{torus} := 2\cdot\pi^2\cdot r_c^{\,3} \qquad Vol_{torus} = 1.136656720033\times 10^{-36}\,\text{m}^3 \qquad \text{4G-6)}$$

Then the energy density related to the torus volume is given as:

$$Wtorus_{den} := \frac{W_{pot}}{Vol_{torus}} \qquad Wtorus_{den} = 5.256137516944\times 10^{20}\,\frac{\text{joule}}{\text{m}^3} \qquad \text{4G-7)}$$

The square root of the Golden Ratio is arrived at when we divide the torus energy density by the energy density of the electric field as:

$$\frac{Wtorus_{den}}{W_d} = 1.273239544735\times 10^{0} \quad \text{compared to:} \quad \frac{4}{\pi} = 1.273239544735\times 10^{0} \qquad \text{4G-8)}$$

It is of extreme interest that the ratio of the torus energy of the Compton radius of the electron to its standard classical equation for the Compton radius of the electron is equal to the ratio of 4 over π. This is not only the square root of the golden ratio but is the ratio of the height of the Great pyramid of Giza to 1/2 its base length.

The energy at the Compton radius of the electron can be transformed to the field energy at it's surface by multiplying by the circular area related to the Compton radius, the speed of light and the Compton time.

$$We_{surf} := Wtorus_{den} \cdot \pi \cdot (r_c)^2 \cdot t_e \cdot c \qquad We_{surf} = 5.974424030055 \times 10^{-16}\, J \qquad \text{4H-1)}$$

Compare to: $E_e \cdot \alpha = 5.974424084184 \times 10^{-16}\, J$ and $W_{pot} = 5.974424030055 \times 10^{-16}\, J$

The Poynting power is computed as the energy density of the electron torus times the velocity of light.

$$S_{max} := Wtorus_{den} \cdot c \qquad S_{max} = 1.575750385791 \times 10^{29}\, \frac{watt}{m^2} \qquad \text{4H-2)}$$

This is the value obtained by eq. 14 of chapter 1, p. 8 of my book, "Electrogravitation As A Unified Field Theory" arrived at in more detail.

Next, the Poynting power eq. 4D-7 is restated not as a cross-product form so that the ratio to Smax may be more easily found.

$$S'_e := \frac{E_{Ve} \cdot B_{Ie}}{2 \cdot \mu_o} \qquad S'_e = -5.886902659436 \times 10^{31}\, \frac{watt}{m^2} \qquad \text{4H-3)}$$

$$R := \frac{S'_e \cdot \alpha}{S_{max}} \qquad R = -2.726244438261 \times 10^{0}$$

Note the S'e numerator is scaled down by the fine structure constant α . 4H-4)

$\frac{R}{e} = -1.002929280444 \times 10^{0}$ Says that R is very close to the natural number e.

Where,

$$\frac{1}{\alpha \cdot (R \cdot 16 \cdot \pi)} = -9.999999818096 \times 10^{-1} \qquad R = -2.726244438261 \times 10^{0} \qquad \text{4H-5)}$$

Effectively, $\alpha = \frac{1}{R \cdot 16 \cdot \pi}$

R represents the ratio of field energy to the rest mass energy at the Compton radius of the field in question. Thus an excess of energy very nearly equal to the natural number e exists in the field above that of the rest mass energy. Could the generation of an electromagnetic wave be a source of extra energy in the near field?

Let the three ratio's equal to R_e, R_p or R_{SLM} be called R_{All} since they are all equal.

Then: $$R_{All} := \frac{1}{\alpha\cdot(16\cdot\pi)} \qquad \text{or,} \qquad R_{All} = 2.726244388669 \times 10^{0} \qquad \text{4I-1)}$$

The geometric relationship between S_{max} of eq. 4H-2, (Poynting power also related to the value obtained by eq. 14, p. 8 in chapter 1 of my book, "Electrogravitation As A Unified Field Theory"), and the S_e value in eq. 4D-7 above may be expressed as follows:.

$$S_e = \begin{pmatrix} 0.000000000000 \times 10^{0} \\ 0.000000000000 \times 10^{0} \\ -5.886902659436 \times 10^{31} \end{pmatrix} \frac{watt}{m^2} \quad \text{and} \quad S_{max}\cdot\left(R_{All}\cdot\alpha^{-1}\right) = 5.886902552350 \times 10^{31}\,\frac{watt}{m^2} \qquad \text{4I-2)}$$

Note that R_{All} is the ratio of the torus field energy to the rest mass energy derived as shown on p. 4E by eq. 4E-1, 4E-2 and 4E-3 as the expressions R_e, R_p or R_{SLM} . S_e may be expressed without the cross product form related directly to Smax in terms of π and α as shown below.

$$S'_e := S_{max}\cdot\frac{1}{\alpha^2\cdot(16\pi)} \qquad \text{or,} \qquad S'_e = 5.886902552350 \times 10^{31}\,\frac{watt}{m^2} \qquad \text{4I-3)}$$

In the derivation of S_{max}, it was found that the energy at the surface of the Compton wavelength electron could be derived accurately if Smax was scaled as shown in eq. 4H-1 above. Thus the geometry of the electron was established as most likely that of a torus. This coincides with eq. 4E-1 through 4E-3 above where the scaling factors also contain torus parameters. The original expression for finding the volume related to the potential energy and the energy density of the E field is restated below.

First, let the following be restated in symbolic form so as to allow for Mathcad's symbolic derivation of the volume related to the energy density and energy potential of the Compton electron.

$$E_{stat} = \frac{q_o}{4\cdot\pi\cdot\varepsilon_o\cdot r_c^{2}} \qquad W_{pot} = \frac{q_o^{2}}{4\cdot\pi\cdot\varepsilon_o\cdot r_c} \qquad W_d = \frac{1}{2}\cdot\varepsilon_o\cdot E_{stat}^{2} \qquad \text{4I-4)}$$

Energy density = Potential Energy/volume or volume = potential energy /energy density.

$$W_d = \frac{1}{2}\cdot\varepsilon_o\cdot\left(\frac{q_o}{4\cdot\pi\cdot\varepsilon_o\cdot r_c^{2}}\right)^{2} \qquad \text{4I-5)}$$

The relevant terms to the volts per meter E field (E_{stat}) are included for clarification.

Then volume is derived as:

$$\mathrm{Vol}_{Wd} = \frac{\dfrac{q_o^{\,2}}{4\cdot\pi\cdot\varepsilon_o\cdot r_c}}{\left[\dfrac{1}{2}\cdot\varepsilon_o\cdot\left(\dfrac{q_o}{4\cdot\pi\cdot\varepsilon_o\cdot r_c^{\,2}}\right)^2\right]} \quad \text{simplifies to} \quad \mathrm{Vol}_{Wd} = 8\cdot\pi\cdot r_c^{\,3} \qquad \text{4J-1)}$$

This is not the torus geometry related to the volume of the electron and if used will not yield the correct Compton energy at the surface of the electron. The value will be in error by the following ratio:

$$\frac{8\cdot\pi\cdot r_c^{\,3}}{2\cdot\pi^2\cdot r_c^{\,3}} \quad \text{simplifies to} \quad \frac{4}{\pi} = 1.27323954474\times 10^0$$

Which is very close to the square root of the Golden Ratio. 4J-2)

Thus a hidden geometry of the torus is in the quantum electric fields related to the energy density and the energy potential at the surface of the Compton electron. This begs the question: "Is there also a hidden geometry related to 4E-1 through 4E-3 above?

Energy density may be derived as the ratio of the Poynting power to the velocity related to the transmission of that Poynting power. Eq. 4D-7 (Se, the poynting power of the electron) is used below for this purpose. For this analysis, the cross-product form is omitted for simplicity of the calculation format. First, Eq. 4D-5 and 4D-6 are restated below in symbolic form.

$$E_{Ve} = \frac{-1}{4}\cdot\mu_o\cdot q_o\cdot\frac{\lambda_e}{\pi\cdot l_q\cdot t_e^{\,2}} \qquad B_{Ie} = \frac{1}{4}\cdot\mu_o\cdot\frac{q_o}{\pi\cdot l_q\cdot t_e}$$

$$\mathrm{Vol}_{Se} = \frac{\dfrac{q_o^{\,2}}{4\cdot\pi\cdot\varepsilon_o\cdot r_c}}{\left[\dfrac{\left(\dfrac{-1}{4}\cdot\mu_o\cdot q_o\cdot\dfrac{2\cdot\pi\cdot r_c}{\pi\cdot l_q\cdot t_e^{\,2}}\right)\cdot\left(\dfrac{1}{4}\cdot\mu_o\cdot\dfrac{q_o}{\pi\cdot l_q\cdot t_e}\right)}{2\cdot\mu_o\cdot c}\right]} \quad \text{simplifies to} \quad \mathrm{Vol}_{Se} = \frac{-4}{\varepsilon_o\cdot r_c^{\,2}\cdot\mu_o}\cdot l_q^{\,2}\cdot t_e^{\,3}\cdot c \qquad \text{4J-3)}$$

Note that $l_q/r_c = \alpha$. Then:

$$\mathrm{Vol}_{Se} = \frac{-4}{\varepsilon_o\cdot r_c^{\,2}\cdot\mu_o}\cdot l_q^{\,2}\cdot t_e^{\,3}\cdot c \quad \text{or,} \quad \mathrm{Vol}_{Se} = -4\cdot\alpha^2\cdot c^3\cdot t_e^{\,3}$$

since $1/(\varepsilon_o\cdot\mu_o) = c^2$. 4J-4)

Note that $c\cdot t = \lambda_e$ and $\lambda_e = 2\pi\cdot r_c$.

$Vol_{Se} := -4 \cdot \alpha^2 \cdot (2 \cdot \pi \cdot r_c)^3$ or, $Vol_{Se} = -3.042495181765 \times 10^{-39} m^3$

Check:

Check: O.K.? (Yes) 4K-1)

$$S''_e := \frac{\left(\frac{q_o^2}{4 \cdot \pi \cdot \varepsilon_o \cdot r_c}\right)}{Vol_{Se}} \cdot c \qquad S''_e = -5.886902552350 \times 10^{31} \frac{watt}{m^2} \qquad S'_e = 5.886902552350 \times 10^{31} \frac{watt}{m^2}$$

Again:

$$Vol_{Se} = \frac{-4}{\varepsilon_o \cdot r_c^2 \cdot \mu_o} \cdot l_q^2 \cdot t_e^3 \cdot c \qquad \text{or,} \qquad Vol_{Se} = -4 \cdot \alpha^2 \cdot c^3 \cdot t_e^3$$ since $1/(\varepsilon_o \cdot \mu_o) = c^2$. 4K-2)

Or, simplifying further: $Vol_{Se} = -4 \cdot \alpha^2 \cdot (2 \cdot \pi \cdot r_c)^3$ simplifies to $Vol_{Se} = -32 \cdot \alpha^2 \cdot \pi^3 \cdot r_c^3$

Compared to the torus volume, dividing the S_e volume by the torus volume yields:

$$\frac{-32 \cdot \alpha^2 \cdot \pi^3 \cdot r_c^3}{2 \cdot \pi^2 \cdot r_c^3} \quad \text{simplifies to} \quad -16 \cdot \alpha^2 \cdot \pi$$ Where: 4K-3)

(Original Poynting power.)

$$S''_e \cdot (-16 \cdot \alpha^2 \cdot \pi) = 1.575750385791 \times 10^{29} \frac{watt}{m^2} \quad \text{and} \quad S_{max} = 1.575750385791 \times 10^{29} \frac{watt}{m^2}$$ 4K-4)

Sixteen times alpha squared times π appears to be the geometry related to S_e in relation to Smax. Smax is derived strictly from the energy density related to the electric field while Se is derived from the Poynting vector electromagnetic energy per meter squared and per unit time. It was seen that the scaling down of the energy from energy space to normal space for Se yielded an energy slightly greater than the rest mass energy of the electron by a factor close to the natural number e while the scaling down for Smax yielded the energy at the Compton surface of the electron.

The fine structure constant times twice the quantum ohm equals the free space impedance.

$R_Q := 2 \cdot (q_o^{-1} \cdot \Phi_o)$ $\qquad R_Q = 2.581280575228 \times 10^4 \Omega$ = Classic Quantum Ohm.

$R_S := \mu_o \cdot c$ $\qquad R_S = 3.767303134618 \times 10^2 \Omega$ = Free Space Impedance.

$2 \cdot R_Q \cdot \alpha = 3.767303151197 \times 10^2 \Omega$

The fine structure constant may represent a conversion process of standing wave energy that represents rest mass to standing wave energy that represents field mass wherein field mass generates through a changing **A** vector the electric and magnetic fields. Reversing this process would create matter out of field energy.

Normal space has an intrinsic impedence determined by the ratio of the **E** field divided by its associated **H** field which is **B** divided by the magnetic permeability of free space, μ_o . Associated with the velocity of light is group velocity and phase velocity which has applications in quantum physics as applied to the wavefunctions of particles and also applies to waveguide theory. It is of interest that waveguide mathematics yeilds equations very similar to the Lorentz relativistic gamma correction.

From p. 4:

$$\left[\frac{E_V}{\left(\frac{B_I}{\mu_o}\right)}\right] = -1.073476506121 \times 10^{-7}\,\Omega$$

This is the impedence of quantum electrogravitational space and it has a very low value characteristic of a near superconducting medium. It is also associated with the group velocity V_{LM}. 4L-1)

From p. 4D:

$$\left[\frac{E_{Ve}}{\left(\frac{B_{Ie}}{\mu_o}\right)}\right] = -3.767303134618 \times 10^{2}\,\Omega$$

This is the free-space impedence of normal space. 4L-2)

From p. 4C:

$$\left[\frac{E_{Vp}}{\left(\frac{B_{Ip}}{\mu_o}\right)}\right] = -1.322113043664 \times 10^{12}\,\Omega$$

This is the impedence of phase velocity Vp space and is effectively instantaneous action through energy space. 4L-3)

Let there be established standing waves such that the perimeter of a disk has a transmission line that is capable of supporting multiple waves and thus multiple nodes of high and low potential points around the rim. Let there be crystals be located at the nodes such that the electrical planes of the crystals drive the transmission lines with a proper match.

Next we drive the motional surface of the crystal with a sonic wave from the center of the disk in sub-resonance with the frequency in the transmission line. The transmission line has an outer surface and an inner surface such that the outside surface becomes the outside surface of the disk. The cross-product of the electrical field with the motional field produces a force field 90 degrees to both the electrical and motional fields which are both 90 degrees to each other. The force field is used to provide vertical and horizontal motion as requirements of motion necessitate.

Changing the frequency in even increments so as to increase or decrease the number of standing wave modes may allow for time travel.

A summation of the material presented concerning the **A** vector is as follows: The S.I. units of the **A** vector are (volt·sec)/meter. The derivative with respect to time of the **A** vector is volt/meter, or **E**. Note that changing time is inversely proportional to changing frequency, with increasing frequency resulting in increasing **E**. If the **E** field increases, it will eventually become ionizing to the air and may produce a pink or purplish glow surrounding the field frequency changing device. If we allow a charge to be acted on by the **E** field, the units become (coulomb)*(volts/meter) which is energy per meter which is force in newtons. Thus, the **A** vector changing with time acts directly on charge to accelerate that charge by inducing a change in the wavefunction which is equivalent to force if the particle has mass.

Rotation is associated with the **A** vector since joules/meter is equivalent to kg·(velocity)^2 /meter which is the inertial force expression for a mass rotating about a point in space. My electrogravitational expression is newtons times the permeability of free space times newtons. Thus, the **A** vector changing with time and radius (eq. 6 above) becomes the fundamental force mechanism for electrogravitational propulsion as well as electrogravitational action. If we think about a tornado, the **A** vector is in the rotation direction, the **E** vector is from the center to the perimeter and the pressure or energy gradient **W** is vertical. Nature is thus a demonstrator of gravitational mechanics.

The Electrogravitational Wavefunction Solution

The formula for the rate of change of phase along a neutral particle path is given in the book, "The New Physics" on page 463 and is presented below.(Taylor, 1989a.)

$$\Delta\theta := \frac{h \cdot V_{LM}}{2 \cdot \pi m_e} \qquad \Delta\theta = 9.889399243920 \times 10^{-6} \frac{m^3}{s^2} \qquad 10)$$

Obviously, this is incorrect as stated and may be a misprint. The result should be expressed in radians and that is used as an exponent to the natural number e to create the wavefunction. The suggested correct formula is shown below in particular for the electrogravitational case.

$$\Delta\theta_n := \frac{h}{m_e \cdot V_{LM} \cdot \lambda_{LM}} \qquad \Delta\theta_n = 1.000000000000 \times 10^0 \quad \text{The answer is in radians.} \qquad 11)$$

The above expression for the change in phase that is equal to $\Delta\theta_n$ is for a neutrally charged particle. An additional formula must be added to the above if we are dealing with a particle having charge. Thus is quoted from p. 469, eq. 17.16, (Taylor, 1989b) the below formula for the change of phase involving a charged particle such as the electron.

$$\Delta\theta_q := \frac{(2 \cdot \pi \cdot q_o \cdot \Phi_o)}{h} \qquad \Delta\theta_q = 3.141592638732 \times 10^0 \quad \text{which} = \pi. \qquad 12)$$

This angle must be added to the neutral particle angle to arrive at the total angle in radians.

$$\Delta\theta_{nq} := \Delta\theta_n + \Delta\theta_q \qquad \Delta\theta_{nq} = 4.141592638732 \times 10^{0}$$ The answer is in radians. 13)

The answer in degrees for $\Delta\theta_{nq}$ is: $\Delta\theta_{nq} = 2.372957786618 \times 10^{2}\,\mathrm{deg}$

The wavefunction ψ for the uncharged particle is derived as the natural number e raised to the power of $i\Delta\theta_n$ so as to arrive at a complex result, which is the nature of a quantum particle wavefunction.

$$\psi_{LMn} := e^{i \cdot \Delta\theta_n} \qquad \psi_{LMn} = 5.403023058681 \times 10^{-1} + 8.414709848079i \times 10^{-1} \tag{14)}$$

$\arg(\psi_{LMn}) = 1.000000000000 \times 10^{0}$ which is one radian.

The wavefunction ψ for the combined charged and neutral particle is derived as the natural number e raised to the power of $i\Delta\theta_{nq}$ so as to arrive at a complex result, which is also the nature of a quantum particle wavefunction.

$$\psi_{LMnq} := e^{i \cdot \Delta\theta_{nq}} \qquad \psi_{LMnq} = -5.403023183705 \times 10^{-1} - 8.414709767802i \times 10^{-1} \tag{15)}$$

where, $\arg(\psi_{LMnq}) = -1.227042213382 \times 10^{2}\,\mathrm{deg}$

It is of interest that adding the neutral wavefunction to the neutral plus charge wavefunction is an annihilation of both which suggests that the electrogravitational action may be the result of a charged particle to neutral plus charge particle action which could result in a zero energy result.

(Atkins, 1991a) states that "The time dependent Schrodinger equation is used to calculate the time evolution of a wavefunction. In many cases it is possible to separate the time dependence of a wavefunction from its spatial variation and to write the total wavefunction, Ψ, as a product of the spatial wavefunction, ψ, and a complex oscillating function of the form:

$$e^{\frac{-2 \cdot \pi i \cdot Et}{h}} \tag{16)}$$

where E is the energy of the state." Therefore, the time dependent electrogravitational wavefunction is stated in the above format immediately below this sentence as:

$$\Psi_{LM} := \psi_{LMnq} \cdot e^{\frac{-\left(2 \cdot \pi \cdot i \cdot W_{LM} \cdot t_{LM}\right)}{h}} \qquad \Psi_{LM} = -5.403023233543 \times 10^{-1} - 8.414709735801i \times 10^{-1} \tag{17)}$$

The time-dependent Schrodinger Equation is given by an example formula, (Atkins, 1991b), in his book's example in Box S.2 and is used as a guide for stating the electrogravitational Schrodinger equation below.

$$H\Psi = \left(i\cdot\frac{h}{2\cdot\pi}\right)\cdot\left(\frac{d}{dt_{LM}}\Psi_{LM}\right)$$ H is the Hamiltonian. 18)

or,

$$H\Psi := \left(i\cdot\frac{h}{2\cdot\pi}\right)\cdot\frac{d}{dt_{LM}}\left[\Psi_{LMnq}\cdot e^{\frac{-\left(2\cdot\pi\cdot i\cdot W_{LM}\cdot t_{LM}\right)}{h}}\right]$$ 19)

$$H\Psi = 3.591629055118\times10^{-33} + 5.593630578869i\times10^{-33}\,J$$ 20)

$$f_{real} := \frac{Re(H\Psi)}{h} \qquad f_{real} = 5.420446922342\times10^{0}\,Hz$$ = Acoustic frequency? 21)

$$f_{imag} := \frac{Im(H\Psi)}{h} \qquad f_{imag} = 8.441845522087\times10^{0}\,Hz$$ = Electric field frequency? 22)

$arg(H\Psi) = 9.999999792195\times10^{-1}$ = angle in radians $arg(H\Psi) = 5.729577832245\times10^{1}\,deg$

$|H\Psi| = 6.647443292155\times10^{-33}\,J$ = absolute value in joules which agrees with the postulated value of electrogravitational energy.

Note that: $W_{LM} = -6.647443292155\times10^{-33}\,J$

If we take the square root of the sum of the squares of hf_{real} and hf_{imag}, we arrive at the apparent energy which is equal to $hf_{LM} = W_{LM}$.

$$hf_a := \sqrt{\left(h\cdot f_{real}\right)^2 + \left(h\cdot f_{imag}\right)^2} \qquad hf_a = 6.647443292155\times10^{-33}\,J$$ 23)

Then a quantum frequency equal to f_a at the angle of one radian is equivalent to what constitutes the energy in the quantum electrogravitational energy loss. I have previously postulated that it is energy loss that is responsible for gravitational action. To be more precise, it can be equivalent to the slight frequency difference caused by spreading between energy states of a superposition of wavefunctions. This will be presented in more detail on page 14 in an analysis that demonstrates wavefunction mechanics using electrogravitational parameters. The important concept to be gleaned from the wavepacket analysis is that a wavepacket is similar to, if not the same as, a particle so that the wavepacket describes particle motion as well as it's most probable location. We may be surrounded by these ultra low energy slow moving packets and oblivious to them since we have no means to detect them at such low energies. These are wavepackets with a group velocity of V_{LM}. The phase velocity is the square of the speed of light divided by the group velocity and that is what I term the superluminal velocity, non-local action.

It is of interest that if the frequencies in eqs. 21 and 22 above are adjusted such that one of them is exactly equal to 2π Hz and we multiply that 2π Hz frequency by $4/\pi$, (which is extremely close to the square root of the golden ratio), we arrive at a frequency equal to 8 Hz. A measurement by Andrija Puharich (a medical doctor and well known researcher), fixes the Earth's Schumann frequency at 8 Hz. Other frequency peaks measured with a sensitive ELF magnetometers occur at 14 Hz, 20 Hz, 26 Hz, and 33 Hz. If we derive the square root of the sum of the squares of 2π Hz and a slightly adjusted 8.00 Hz, we arrive at the frequency below which is slightly above my calculated electrogravitational frequency f_{LM}.

Or, $$f'_{LM} := \sqrt{(2\cdot\pi\cdot\mathrm{Hz})^2 + (8.040609\cdot\mathrm{Hz})^2} \qquad f'_{LM} = 1.020440153538 \times 10^{1}\,\mathrm{Hz} \qquad \text{7A-01)}$$

Compare this with my postulated value of: $f_{LM} = 1.003224804550 \times 10^{1}\,\mathrm{Hz}$

The Great Pyramid's sides slope upwards at an angle of 51 deg., 51 min., 59 sec. = 51.86638889 deg.

[Great Pyramid ratio: H/(1/2 base)]: [Exact square root of golden mean]:

$$\mathrm{atan}\left(\frac{4}{\pi}\right) = 5.185397401278 \times 10^{1}\,\mathrm{deg} \qquad \mathrm{atan}\left(\sqrt{\frac{1+\sqrt{5}}{2}}\right) = 5.182729237299 \times 10^{1}\,\mathrm{deg} \qquad \text{7A-02)}$$

Restating eq. 19-23 in terms of an adjusted t'_{LM} reflecting the above frequencies:

$$t'_{LM} := f'_{LM}{}^{-1}$$

$$H'\Psi := \left(i\cdot\frac{h}{2\cdot\pi}\right)\cdot\frac{d}{dt'_{LM}}\left[\Psi_{LMnq}\cdot e^{\frac{-(2\cdot\pi\cdot i\cdot W_{LM}\cdot t'_{LM})}{h}}\right] \qquad \text{7A-03)}$$

$$H'\Psi = 4.163288185557 \times 10^{-33} + 5.182232511806i \times 10^{-33}\,\mathrm{J}$$

$$f'_{real} := \frac{\mathrm{Re}(H'\Psi)}{h} \qquad f'_{real} = 6.283188571512 \times 10^{0}\,\mathrm{Hz}$$ = Acoustic (real) frequency? 7A-04)

$$f'_{imag} := \frac{\mathrm{Im}(H'\Psi)}{h} \qquad f'_{imag} = 7.820968100659 \times 10^{0}\,\mathrm{Hz}$$ = Electric field (imag.) frequency? 7A-05)

$\arg(H'\Psi) = 8.939994192248 \times 10^{-1}$ = angle in radians $\qquad \arg(H'\Psi) = 5.122239360873 \times 10^{1}\,\mathrm{deg}$

$|H'\Psi| = 6.647443292155 \times 10^{-33}\,\mathrm{J}$ = absolute value in joules which agrees with the postulated value of electrogravitational energy.

Finally:

$$hf'_a := \sqrt{(h\cdot f'_{real})^2 + (h\cdot f'_{imag})^2} \qquad hf'_a = 6.647443292155 \times 10^{-33}\,\mathrm{J} \qquad \text{7A-06)}$$

This strongly suggests to me that the Great Pyramid used the Schumann frequencies in the process of quantum energy extraction by means of my postulated electrogravitational action frequency f_{LM}.

Another measurement by Bob Beck, (an engineering scientist) has measured a Schumann related frequency of 7.83 Hz, to the nearest 1/100 Hz. (Note: See eq. 7A-05 above.) It is very interesting that if we repeat page 7A above, we arrive at the originally calculated frequencies f_{imag} and f_{real} of eq. 21 and eq. 22. This is a small adjustment for a large change.

Or, $f''_{LM} := \sqrt{(2\cdot\pi\cdot Hz)^2 + (f'_{imag})^2}$ $\qquad f''_{LM} = 1.003224599160 \times 10^{1}\,Hz$ 7B-01)

Compare this with my postulated value of: $\qquad f_{LM} = 1.003224804550 \times 10^{1}\,Hz$

It is of great interest that the Great Pyramid's sides slope upwards at an angle of:

[Great Pyramid ratio: H/(1/2 base)]: [Exact square root of golden mean]:

$\operatorname{atan}\left(\frac{4}{\pi}\right) = 5.185397401278 \times 10^{1}\,deg \qquad \operatorname{atan}\left(\sqrt{\frac{1+\sqrt{5}}{2}}\right) = 5.182729237299 \times 10^{1}\,deg$ 7B-02)

Restating eq. 19-23 in terms of an adjusted t''_{LM} reflecting the above frequencies:

$t''_{LM} := f''_{LM}{}^{-1}$

$$H''\Psi := \left(i\cdot\frac{h}{2\cdot\pi}\right)\cdot\frac{d}{dt''_{LM}}\left[\Psi_{LMnq}\cdot e^{\frac{-(2\cdot\pi\cdot i\cdot W_{LM}\cdot t''_{LM})}{h}}\right]$$ 7B-03)

$H''\Psi = 3.591621859700 \times 10^{-33} + 5.593635198987i \times 10^{-33}\,J$

$f''_{real} := \frac{\operatorname{Re}(H''\Psi)}{h}$ $\qquad f''_{real} = 5.420436063097 \times 10^{0}\,Hz$ = Acoustic frequency? 7B-04)

$f''_{imag} := \frac{\operatorname{Im}(H''\Psi)}{h}$ $\qquad f''_{imag} = 8.441852494718 \times 10^{0}\,Hz$ = Electric field frequency? 7B-05)

$\arg(H''\Psi) = 1.000001265578 \times 10^{0}$ = angle in radians $\qquad \arg(H''\Psi) = 5.729585202536 \times 10^{1}\,deg$

$|H'\Psi| = 6.647443292155 \times 10^{-33}\,J$ = absolute value in joules which agrees with the postulated value of electrogravitational energy.

Finally: $hf''_a := \sqrt{(h\cdot f''_{real})^2 + (h\cdot f''_{imag})^2}$ $\qquad hf''_a = 6.647443292155 \times 10^{-33}\,J$ 7B-06)

Note that It has been established by precise electronic measurement that the King's Chamber and the Grand Corridor resonate strongly at 438 Hz. It is shown in the next equation that the fundamental electrogravitational frequency f'_{LM} ' (Eq. 7A-01 above.), is related to 438 Hz as follows:

$\Phi := \frac{1+\sqrt{5}}{2}$ or, $\qquad \Phi = 1.618033988750 \times 10^{0}$ = golden ratio.

$f_{GC} := f'_{LM}{}^{\Phi^2}$ $\qquad f_{GC} = 4.375624704356 \times 10^{2}\,\frac{1}{s^{2.618}}$ 7B-07)

It is suggested by the calculations involving 8.040609 Hz and 7.83 Hz, that the frequency of 8.040609 Hz is very relevant to the resonance of the King's Chamber as evidenced by the result in eq. 7B-07. It also is relevant to the slope angle obtained in 7A-05 where the result is very close to the actual slope of the side of the Great Pyramid. The frequency of 7.83 Hz is very relevant to the natural wavefunction derived frequencies of equations 21 and 22. Note that eq. 7A-05 gives the result very close to 7.83 Hz (the natural wavefunction frequency) but is based on the frequency of 8.040609 Hz in eq. 7A-01.

The frequency of 7.83 Hz is generated within the mechanics of page 7A and furthermore, the frequency of 7.83 Hz is therefore natural to the electron's electrogravitational wavefunction. By slightly adjusting the electrogravitational frequency up as in eq. 7A-01, the 7.83 Hz is generated in eq. 7A-05, which would add to the naturally ubiquitous Earth generated frequency of 7.83 Hz. The geometry of the Great Pyramid raises this to the other Schumann frequency related to 8.040609 Hz, where the process loops through again and becomes larger and larger. Power generation is the result by using the Schumann frequencies with the natural electrogravitational electron wavefunction frequencies. The fact that the angle derived by eq. 7A-05 is very close to the angle derived for the atan of the square root of the golden ratio and the slope of the rise of the Great Pyramid strongly argues for fundamental importance of the analysis as presented by pages 7A and 7B above where all of this derived by electron wavefunction analysis.

Another way of looking at the mechanics of the power generation by the Great Pyramid is to consider the beginning quantum electrogravitational frequencies of eq. 21 and 22 where the real (acoustic) frequency of 5.420446922342 Hz and the imaginary electric field frequency of 8.441845522087 Hz are modified by the geometry of the Great Pyramid so that the real (acoustic) frequency is forced to change to 2π Hz. This forces the imaginary (electric field) frequency to be 8.040609 Hz while also boosting the fundamental electrogravitational frequency up slightly to 10.204401535 Hz. The fundamental is 10.03224805 Hz. This combination generates the Imaginary electric field frequency equal to the 7.83 Hz Schumann frequency measured by Bob Beck as well as the real (acoustic) frequency of 2π Hz. The Schumann frequency is based on the resonance of electric field energy between the Earth and its ionosphere and thus the energy of the Earth's Schumann resonance adds to the energy derived by the Pyramid's frequency conversion process as described above. This combination of frequencies recombines to form the frequencies of eq. 21 and 22 as originally presented as being the fundamental result of the electron electrogravitational wavefunction. This is shown on p. 7B. The process loops while building energy by summing each small build into a much greater total energy, somewhat like the process of integrating.

I personally consider that the Great Pyramid was built by unknown persons many, many millennia before the age of the Pharaoh's and that they could teach us much about quantum physics, even today. Certainly, I have strong doubts that it was built with ropes, levers, copper chisels and wooden mallets.

It has been proposed by myself previously that there are many pyramids located world wide and that they may have been receptors or receiving stations of beamed energy from space. When the master power generator at Giza suffered a major explosion in the King's chamber, the energy was no longer beamed upwards for distribution by a network of satellite transfer devices which then beamed the energy to the receiving stations at the pyramids. Therefore the Great Pyramid at Giza was most likely built thousands of years before the Egyptian empire.

7D

If we restate the equation 7A-03 in terms of a changing frequency, we can graph f_{real} and f_{imag} as a function of changing frequency related to a changing time Δt.

$f1 := 2\cdot\pi\cdot Hz$ $\quad$ $\Delta f2 := -30.00\cdot Hz, -29.9\cdot Hz .. 30\cdot Hz$ $\quad$ $\Delta t(\Delta f2) := \left[\sqrt{f1^2 + (\Delta f2)^2}\right]^{-1}$

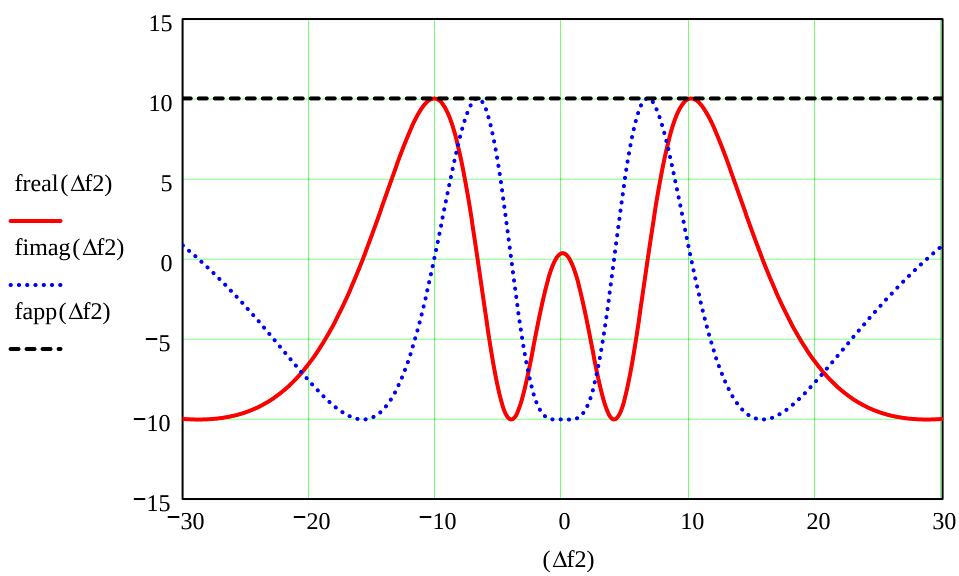
The simplified form of eq. 7A-03 is: $\quad$ $\Delta f(\Delta f2) := \sqrt{f1^2 + (\Delta f2)^2}$

$$H'\Psi := \psi_{LMnq}\cdot W_{LM}\cdot \exp\left(-2\cdot i\cdot\pi\cdot W_{LM}\cdot\frac{t'_{LM}}{h}\right) \qquad \text{7D-01)}$$

Next, a frequency range variable is assigned to the simplified equation for HΨ as follows:

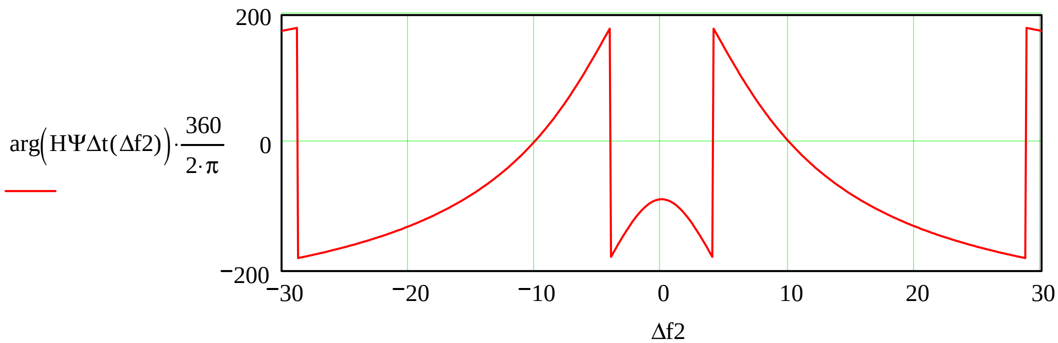
$$H\Psi\Delta t(\Delta f2) := \psi_{LMnq}\cdot W_{LM}\cdot \exp\left(-2\cdot i\cdot\pi\cdot W_{LM}\cdot\frac{\Delta t(\Delta f2)}{h}\right) \qquad \text{7D-02)}$$

$$freal(\Delta f2) := \frac{Re(H\Psi\Delta t(\Delta f2))}{h} \qquad fimag(\Delta f2) := \frac{Im(H\Psi\Delta t(\Delta f2))}{h} \qquad fapp(\Delta f2) := \sqrt{freal(\Delta f2)^2 + fimag(\Delta f2)^2}$$



It is immediately apparent that the vertical range of frequency variation is from -10 to +10 Hz which is the electrogravitational frequency in the limit imposed by W_{LM}. Also, if f1 is made lower, the rate of frequency change increases as Δf2 nears zero Hz. This amounts to a quantum electrogravitational energy increase related to H$\Psi\Delta$t in eq. 7D-02 above.

At 4.07 Hz, a phase reversal occurs from negative to positive which suggests a point that may be unstable and thus useful for creating an oscillator. A feedback of this type would always be positive for an amplifier whose output was 180 degrees away from the input signal.



It is of interest that electromagnetic radiation from earthquakes has a fundamental frequency at 4.0 Hz. (Carlson, 1996). Thus again, the relationship between quantum mass in motion and electromagnetic waves may have a common connection. In fact, eq. 3 of p. 3 above may be rewritten and expanded to show a general relationship that predicts the generation of the **A** vector based on momentum involving a mass moving at some velocity. This is for non-relativistic analysis but also applies in relativistic cases. First I state a new expression that will yield the basic quantum charge.

$q'_o := \sqrt{2 \cdot h \cdot c \cdot \alpha \cdot \varepsilon_o}$ or, $q'_o = 1.602177337258 \times 10^{-19}\ \mathrm{coul}$ 7E-1)

Momentum divided by charge equals the **A** vector. It also turns out that the inverse of the c, α and ε_o terms are equal to the standard quantum ohm R_Q. Then:

$A_{gen} = (m \cdot v) \cdot \sqrt{\frac{R_Q}{h}}$ Let: $R_Q := (2 \cdot c \cdot \alpha \cdot \varepsilon_o)^{-1}$ $R_Q = 2.581280564049 \times 10^{4}\ \Omega$ 7E-2)

And: $v_{car} := 50 \cdot \frac{mi}{hr}$ $m_{car} := 6000 \cdot lb$

Then the **A** vector associated with the motion of the car towards an observer will be found to be:

$A_{gen} := (m_{car} \cdot v_{car}) \cdot \sqrt{\frac{R_Q}{h}}$ $A_{gen} = 3.796844363655 \times 10^{23}\ \frac{weber}{m}$ This may be scaled down by area affected and the distance from the affected target electrons. 7E-3)

When the **A** vector interacts with electrons in its path, momentum is imparted to the electron. The **A** vector cannot be shielded against. Thus a massive train may be able to generate an **A** vector so strong as to completely overwhelm the potentials in the electric circuits of an automobile and cause it to stop in the path of an oncoming train. This has happened to many people, some of whom had new cars in perfect running condition. In fact, it happened to my own mother one day. Lucky for me, since I was not yet even a gleam in my father's eye, she survived by jumping from the car at the last second.

An Accelerated Spinning Disk Analysis Leads To A Derivation Of Correct Electrogravitational Atomic Force Constant

This paper originally started as a worksheet for the purpose of analyzing the mechanics associated with the results reported by R. A. Ford of a spinning disk experiment wherein a spinning disk of insulated dielectric material coated with silicon dioxide or sand was charged with high voltage across the rim and the disk rotated as a motor. What has caused my interest in particular was the reported "jumping" of the disk into the air unexpectedly at times with no explanation for that action to date.

The following quote concerning a spinning electrostatically charged disk built by H. D. Ruhmkorff and his associate Eugene Ducretet is as follows: (Ford, 2002a) "The disk develops a high speed of rotation and at a certain point instantly jumps up a fraction of an inch and off its support. The oddity is that the electrostatic forces are directed only in the horizontal plane, so whence the vertical component force? Knowledge of the jumping disk experiment may date back to the latter eighteenth century. The names of the natural philosophers Ben Franklin, Michael Faraday, Wilfrid de Fonvielle, and later Abbe Laborde have been mentioned in this regard."

The author further on that in his own experiments he used a miniature aluminum oxide grinding wheel (1/4 inch thick X 2 inches in diameter), which was much more massive than the fiberglass disk. He observed the following during his tests: (Ford, 2002b) "About three times John and I saw the top jump up and off its support. We cannot explain this phenomenon."

Equations 7, 8, and 9 demonstrate that the **A** vector changing with time and circumference, or radius, can create an **E** field in volts/meter and a **B** field in volt·seconds/meter, respectively. From this the Poynting power vector **S** in joules per square meter per second is derived. This indicates that the A vector is more fundamental than the **E** or **B** vector.

In order for the **A** vector to change in both time and radius, the disk would have to be accelerating or decelerating in its rate of rotation and the variable r would be a changing charge density from the axis of rotation to the edge of the disk which would look like a changing r from the standpoint of the field distribution across the disk. What I am aiming for is a force in the z direction (along the axis of rotation due to the changing rate of rotation and nonlinear charge distribution) as a result of a cross-product process in the x-y direction. What starts as an analysis in Cartesian coordinates changes to cylindrical coordinate system analysis although this may not be immediately apparent.

I next did the integration pertaining to the nonlinear time and radius parameters and the result was force in equations 33 and 34. The magnitude of the force caught my attention. (Note that I am using electrogravitationally related parameters and quantum charges.) In previous works published online I proposed a force constant which I present again in eq. 44 along with the electrogravitational equation it relates to in eq. 45. The New force constant derived in equation 33 is much larger. In fact, it is nearly exactly the ratio of twice the neutron mass to the electron mass. The ratio of the force in eq. 33 to twice the force in eq. 46 is extremely close to the ratio of proton mass to electron mass.

This result is fundamentally important since it points to the mechanics of atomic forces involving the nucleus and it was arrived at utilizing the electrogravitational parameters derived in my book, "Electrogravitation As A Unified Field Theory."

The below calculations are for converting from Cartesian to cylindrical for calculating the power and force related to a spinning disk with charges of opposite polarity on opposite sides of the disk, the disk having an accelerated rate of spin and the charges distributed in a nonlinear pattern increasing in quantity from the axis to the edge of the disk.

$$E_V = \frac{d}{dt_{LM}} \frac{(\mu_o \cdot q_o \cdot \lambda_{LM})}{4 \cdot \pi \cdot l_q \cdot t_{LM}} \quad \text{simplifies to} \quad E_V = \frac{-1}{4} \cdot \mu_o \cdot q_o \cdot \frac{\lambda_{LM}}{\pi \cdot l_q \cdot t_{LM}^2} \qquad 24)$$

$$B_I = \frac{d}{d\lambda_{LM}} \frac{(\mu_o \cdot q_o \cdot \lambda_{LM})}{4 \cdot \pi \cdot l_q \cdot t_{LM}} \quad \text{simplifies to} \quad B_I = \frac{1}{4} \cdot \mu_o \cdot \frac{q_o}{\pi \cdot l_q \cdot t_{LM}} \qquad 25)$$

$$S_Z := \frac{\begin{bmatrix} \frac{-(\mu_o \cdot q_o \cdot \lambda_{LM})}{4 \cdot \pi \cdot l_q \cdot t_{LM}^2} \\ 0 \\ 0 \end{bmatrix} \times \begin{bmatrix} 0 \\ \left(\frac{\mu_o \cdot q_o}{4 \cdot \pi \cdot l_q \cdot t_{LM}}\right) \\ 0 \end{bmatrix}}{2 \cdot \mu_o} \qquad S_Z = \begin{pmatrix} 0.000000000000 \times 10^{0} \\ 0.000000000000 \times 10^{0} \\ -1.105851320409 \times 10^{-16} \end{pmatrix} \frac{watt}{m^2} \qquad 26)$$

$$S_Z = \frac{\begin{bmatrix} \frac{-(\mu_o \cdot q_o \cdot \lambda_{LM})}{4 \cdot \pi \cdot l_q \cdot t_{LM}^2} \\ 0 \\ 0 \end{bmatrix} \times \begin{bmatrix} 0 \\ \left(\frac{\mu_o \cdot q_o}{4 \cdot \pi \cdot l_q \cdot t_{LM}}\right) \\ 0 \end{bmatrix}}{2 \cdot \mu_o} \quad \text{simplifies to} \quad S_Z = \begin{pmatrix} 0 \\ 0 \\ \frac{-1}{32} \cdot \mu_o \cdot q_o^2 \cdot \frac{\lambda_{LM}}{\pi^2 \cdot l_q^2 \cdot t_{LM}^3} \end{pmatrix} \qquad 27)$$

Further; rearranging terms for S_Z above;

$$S_Z = \frac{-(\mu_o \cdot q_o^2 \cdot \lambda_{LM})}{4 \cdot \pi \cdot l_q \cdot t_{LM}^2} \times \left(\frac{1}{8 \cdot \pi \cdot l_q \cdot t_{LM}}\right) \quad \text{and;} \quad m_e = \frac{\mu_o \cdot q_o^2}{4 \cdot \pi \cdot l_q} \quad \text{Then:} \qquad 28)$$

$$S_Z = -m_e \cdot \frac{\lambda_{LM}}{t_{LM}^2} \times \frac{1}{8 \cdot \pi \cdot l_q \cdot t_{LM}} \quad \text{where;} \quad a_{LM} := \frac{\lambda_{LM}}{t_{LM}^2} \quad a_{LM} = 8.570002358614 \times 10^{-1} \frac{m}{s^2} \qquad 29)$$

Eq. 29 above is restated below as:

$$S_Z = \frac{-m_e \cdot a_{LM}}{l_q} \times \frac{1}{8 \cdot \pi \cdot t_{LM}} \qquad 30)$$

$$S_Z := \begin{pmatrix} \dfrac{-m_e \cdot a_{LM}}{l_q} \\ 0 \\ 0 \end{pmatrix} \times \begin{pmatrix} 0 \\ \dfrac{1}{8 \cdot \pi \cdot t_{LM}} \\ 0 \end{pmatrix} \qquad S_Z = \begin{pmatrix} 0.000000000000 \times 10^{0} \\ 0.000000000000 \times 10^{0} \\ -1.105851321451 \times 10^{-16} \end{pmatrix} \frac{watt}{m^2} \qquad 31)$$

The situation for an accelerated spinning disk with charges arranged on an insulating dielectric medium is continued below.

$$S_{disk} := \frac{-m_e \cdot \lambda_{LM}}{8 \cdot \pi \cdot l_q \cdot t_{LM}^{3}} \qquad S_{disk} = -1.105851321451 \times 10^{-16} \frac{watt}{m^2}$$

Poynting power vector in the axis (Z) direction. 32)

$$Fdisk_Z := \int_0^{t_{LM}} \int_0^{\lambda_{LM}} \frac{-m_e \cdot \lambda_{LM}}{8 \cdot \pi \cdot l_q \cdot t_{LM}^{3}} \, d\lambda_{LM} \, dt_{LM} \qquad Fdisk_Z = -1.087423160961 \times 10^{-13} N \qquad 33)$$

This force constant has a very interesting magnitude.

Next, eq. 33 is shown below as eq. 34 with expanded terms as a check:

$$F'disk_Z := \int_0^{\lambda_{LM}} \int_0^{t_{LM}} \frac{-1}{32} \cdot \mu_o \cdot q_o^{2} \cdot \frac{\lambda_{LM}}{\pi^2 \cdot l_q^{2} \cdot t_{LM}^{3}} \, dt_{LM} \, d\lambda_{LM} \qquad F'disk_Z = -1.087423159936 \times 10^{-13} N \qquad 34)$$

Next, Establish the constant for the vel. of light as: $c := 2.997924580 \cdot 10^{08} \cdot m \cdot sec^{-1}$ Then:

Energy of electron field $m_e \cdot c^2 \cdot \alpha = 5.974424089816 \times 10^{-16} J$ Compton surface energy of the electron. 35)

NOTE: Energy is force times distance. Below in eq. 36 we arrive at an energy much greater than the W_{LM} of eq. 5 and 6 previously on pp. 3 and 4 simply by integrating the Poynting power with respect to the quantum electrogravitational parameters t_{LM} and λ_{LM} as shown in eq. 33 and 34 above.

$$Wdisk_Z := Fdisk_Z \cdot \lambda_{LM} \qquad Wdisk_Z = -9.259403231002 \times 10^{-16} J$$

Disk energy constant. 36)

This is an energy build-up with respect to time and distance which has a magnitude approaching the proton-electron forces in atoms. This will be examined in detail in the following analysis.

$$\operatorname{atan}\left(\frac{Wdisk_Z}{m_e \cdot c^2 \cdot \alpha}\right) = -9.977832447748 \times 10^{-1}$$ Very close to 1 radian in the negative time direction. 37)

Compare this with eq. 22 where: $\arg(H\Psi) = 9.999999792195 \times 10^{-1}$ radian.

The below integral finds the composite energy due to the double integral sum of the wavelength changes and the integral sum of the time changes.

$$W'disk_Z := \int_0^{t_{LM}} \int_0^{\lambda_{LM}} \int_0^{\lambda_{LM}} \frac{-m_e \cdot \lambda_{LM}}{8 \cdot \pi \cdot l_q \cdot t_{LM}^{3}} \, d\lambda_{LM} \, d\lambda_{LM} \, dt_{LM} \qquad W'disk_Z = -3.086467743667 \times 10^{-16}\,\text{J}$$ 38)

$$\frac{W'disk_Z}{m_e \cdot c^2 \cdot \alpha} = -5.166134337415 \times 10^{-1} \qquad \operatorname{atan}\left(\frac{W'disk_Z}{m_e \cdot c^2 \cdot \alpha}\right) = -2.732148386496 \times 10^{1}\,\text{deg}$$

$$\frac{Wdisk_Z}{W'disk_Z} = 3.000000000000 \times 10^{0}$$

The ratio of the disk energy in eq. 36 to the composite energy in eq. 38 above yields 3 exactly which develops 3 W'disk$_Z$ energys that could make up 1 Wdisk$_Z$ energy total. Thus 3 part electrogravitational nuclear style forces are established by eq. 38.

It is of interest that the above force Fdisk$_Z$ and F'disk$_Z$ when used as the center force constant in the electrogravitational equation involving two-system variable **A** vectors yields a result extremely close to the force between a neutron and electron at the r_{n1} level of the Hydrogen atom as compared to the standard formula for gravitational force. Let the following constants be stated first.

$$r_{n1} := l_q \cdot \alpha^{-2} \qquad r_{n1} = 5.291772483427 \times 10^{-11}\,\text{m}$$

$$m_n := 1.674928600 \cdot 10^{-27} \cdot \text{kg} \qquad G := 6.672590000 \cdot 10^{-11} \cdot \frac{\text{newton} \cdot \text{m}^2}{\text{kg}^2}$$

$$m_p := 1.672623100 \cdot 10^{-27} \cdot \text{kg} \qquad i_{LM} := q_o \cdot t_{LM}^{-1} \qquad i_{LM} = 1.607344038744 \times 10^{-18}\,\text{A}$$

I postulate that the gravitational constant G to have hidden parameters which do not appear in the conventional Newtonian formula for gravitational force. My theory requires a revised gravitational constant based on a modified fine structure constant with velocity^2 units added and the permeability of free space.

$$G' := \mu_o \cdot V_{LM}^{4} \qquad G' = 6.691763502870 \times 10^{-11}\,\frac{\text{m}^4}{\text{s}^4}\,\frac{\text{henry}}{\text{m}}$$

Note that V_{LM} squared is equal to the fine structure constant with added units of meters squared per second squared.

Avector Sys. 1 | Const Force | Avector Sys. 2

Note that in the result, only one of the newton terms is a variable and it depends on $1/r_{n1}^2$. 39)

$$F_{EGd} := \frac{\mu_o \cdot i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot r_{n1}} \cdot \left(Fdisk_Z\right) \cdot \frac{\mu_o \cdot i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot r_{n1}} \qquad F_{EGd} = -7.274158772773 \times 10^{-47}\,\text{newton} \cdot \frac{\text{henry}}{\text{m}} \cdot \text{newton}$$

40)

$$F_{Gen} := \frac{G \cdot m_n \cdot m_e}{r_{n1}^{\,2}} \qquad F_{Gen} = 3.635613378298 \times 10^{-47}\,\text{newton} \qquad \text{UnitsHidden} := 1 \cdot \frac{\text{henry}}{\text{m}} \cdot \text{newton}$$

Note: UnitsHidden is a constant.

$$\frac{F_{EGd}}{\left(2 \cdot F_{Gen} \cdot \text{UnitsHidden}\right)} = -1.000403235420 \times 10^{0}$$ Closest value. 41)

Placing a proton into the gravitational equation instead of the neutron gives the following result:

$$F_{Gep} := \frac{G \cdot m_p \cdot m_e}{r_{n1}^{\,2}} \qquad F_{Gep} = 3.630609041609 \times 10^{-47}\,\text{N}$$ 42)

$$\frac{F_{EGd}}{2 \cdot F_{Gep} \cdot \text{UnitsHidden}} = -1.001782165114 \times 10^{0}$$ 43)

The neutron-electron force interaction is the closest to the electrogravitational interaction. The angle of 1 radian between the real energy value of the Compton field energy at the surface of the electron and the FdiskZ value is quite similar to the electrogravitational wavefunction angle developed in eq. 22.

A previously established electrogravitational constant of force is:

$$F_{QK} := \frac{i_{LM} \cdot \lambda_{LM}}{l_q} \cdot \mu_o \cdot \frac{i_{LM} \cdot \lambda_{LM}}{l_q} \qquad F_{QK} = 2.964371447758 \times 10^{-17}\,\text{N}$$ 44)

Avector Sys. 1 | Const Force | Avector Sys. 2

Where: $$F_{EG} := \frac{\mu_o \cdot i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot r_{n1}} \cdot \left(\frac{i_{LM} \cdot \lambda_{LM}}{l_q} \cdot \mu_o \cdot \frac{i_{LM} \cdot \lambda_{LM}}{l_q}\right) \cdot \frac{\mu_o \cdot i_{LM} \cdot \lambda_{LM}}{4 \cdot \pi \cdot r_{n1}}$$ Electron-electron interaction only. 45)

Thus: $$F_{EG} = 1.982973082291 \times 10^{-50}\,\text{newton} \cdot \text{UnitsHidden}$$

See eqs. 39 and 40 above for explanation of "UnitsHidden" term.

The ratio of $2 \cdot F_{QK}$ and $Fdisk_Z$ is:

$$\frac{Fdisk_Z}{2 \cdot F_{QK}} = -1.834154693711 \times 10^{3}$$ and the proton to electron rest mass ratio is: 46)

$$\frac{m_p}{m_e} = 1.836152755656 \times 10^{3}$$ and the ratio of the $Fdisk_Z$ force F_{EGd} and $2 \cdot F_{EG}$ is: 47)

$$\frac{F_{EGd}}{2 \cdot F_{EG}} = -1.834154693711 \times 10^{3}$$ Finally, $$\left(\frac{F_{EGd}}{2 \cdot F_{EG}} \cdot \frac{m_e}{m_p}\right)^{-1} = -1.001089363919 \times 10^{0}$$ 48)

There is enough force in $Fdisk_Z$ to support 2 electrons in the first energy level of the Hydrogen atom.

From the above , the following is postulated: The use of the $Fdisk_Z$ rotating disk force constant in place of the F_{QK} force constant in the electrogravitational equation yields the force equal to a neutron-electron interaction at the rn1 level of the Hydrogen atom, which is the beginning quantum model for my electrogravitational theory as previously presented. This is a fundamentally important discovery since it arrives at the required force by integration of delta time and delta radius of spin to obtain the correct force at the atomic level between the nucleus and the electron shell. The basic changing parameters that are integrated as shown above are my previously derived fundamental values of time and wavelength for my theory of electrogravitation.

Further, the $Fdisk_Z$ angle between the Compton energy at the surface of the electron and the $Fdisk_Z$ quantum electrogravitational energy yields a negative angle very close to 1 radian while also the electrogravitational wavefunction angle in eq. 22 yields a positive angle very close to 1 radian. The two angles are conjugate which makes the fields want to attract since that minimizes the energy to the lowest state for the electron and the nucleus. Thus the first energy level is established.

Or: $$\operatorname{atan}\left(\frac{Wdisk_Z}{m_e \cdot c^2 \cdot \alpha}\right) + \arg(H\Psi) = 2.216734444659 \times 10^{-3}$$ radian left over. 49)

The calculation of the correct force constant associated with the attraction of a nucleus proton to the electron in the first level of the Bohr Atom <u>outside of using mass terms</u> is unprecedented to my knowledge. Equations 32,33 and 34 above suggest that the magnitude of the force arises from a sum of incremental changes associated with the rate of change of radius and time associated with my previously postulated electrogravitational constants in my foundation book, "Electrogravitation As A Unified Field Theory." That is: The nucleus proton mass-energy arises from a changing electrogravitational wavelength (due to changing radius or vis-versa) and time associated with the changing electrogravitational frequency.

Thus, change of circumferential perimeter wavelength and rate of rotation of the electrostatic radius vector creates a dynamic acceleration rotor much like the dynamics of a tornado, if not exactly like the dynamics of not only tornadoes, but also waterspouts, dust devils, hurricanes, and the like.

Addendum To Page 13: 13A

Multiplying the electrogravitational energy $Wdisk_Z$ of eq. 36 by the cotangent of one radian and then dividing that product into the Compton field energy of the proton yields a ratio number result very close to the ratio of proton rest mass to electron rest mass. Thus, the electrogravitational constants are connected to the proton by starting with the electrogravitational **A** vector, (eqs. 7, 8, 24 and 25) and deriving an electrogravitational poynting power vector (eqs. 26-32), from that deriving a quantum electrogravitational $Wdisk_Z$ energy (eq. 36) and finally using the cotantgent of the angle of one radian, the $Wdisk_Z$ energy is associated directly with the ratio of the proton to electron mass-energy which is shown below.

First, state to parameters: $\varepsilon_o := 8.854187817 \cdot 10^{-12} \cdot \text{farad} \cdot \text{m}^{-1}$ $\quad r_p := 2.103089365 \cdot 10^{-16} \cdot \text{m}$

$\theta_K := 360 \cdot \frac{1}{2 \cdot \pi} \cdot \text{deg}$ $\quad \theta_K = 1.000000000000 \times 10^{0}$ radian. $\quad \theta_K = 5.729577951308 \times 10^{1}\,\text{deg}$

$\tan(\theta_K) = 1.557407724655 \times 10^{0}$ $\quad \cot(\theta_K) = 6.420926159343 \times 10^{-1}$

$m_p \cdot c^2 \cdot \alpha = 1.096995525597 \times 10^{-12}\,\text{J}$ = Compton proton field energy where: 13A-01)

$\frac{q_o^{\,2}}{4 \cdot \pi \cdot \varepsilon_o \cdot r_p} = 1.096995493427 \times 10^{-12}\,\text{J}$ is also the Compton proton field energy. 13A-02)

The Compton field energy at the surface of the proton is taken as a ratio to the $Wdisk_Z$ energy of eq. 36 that is reduced by multiplying $Wdisk_Z$ by the cotangent of one radian. The result is very close to the ratio of the proton rest mass to the electron rest mass.

$Ratio_{protEG} := \left| \frac{m_p \cdot c^2 \cdot \alpha}{Wdisk_Z \cdot \cot(\theta_K)} \right|$ $\quad Ratio_{protEG} = 1.845118160269 \times 10^{3}$ 13A-03)

The ratio of proton mass to electron mass is:

$Ratio_{protelec} := \frac{m_p}{m_e}$ $\quad Ratio_{protelec} = 1.836152755656 \times 10^{3}$ 13A-04)

$\frac{Ratio_{protEG}}{Ratio_{protelec}} = 1.004882711738 \times 10^{0}$ The error by ratio is shown to be small. 13A-05)

The angle of one radian appears throughout this analysis, (eq. 22 EG wavefunction positive radian angle and also the negative radian result in eq. 37) and therefore is likely fundamentally important to electrogravitational mechanics as it is for all of quantum mechanics.

It is of interest that the electron-electron force constant F_{QK} of eq. 44 and the proton-electron force constant of eqs. 33 and 34 may be analyzed to find the most simple algebraic expression not involving integrals that will yield the ratio equal to the rest mass of the proton to the rest mass of the electron (as done in eq. 46) without involving rest mass or energy in the process of simplification or in the result.

First, eqs. 34 for $Fdisk_Z$ is restated with the integral form.

[------- Watts/m^2 --------]

$$\int_0^{\lambda_{LM}}\int_0^{t_{LM}} \frac{-1}{32}\cdot\mu_o\cdot q_o^{\,2}\cdot\frac{\lambda_{LM}}{\pi^2\cdot l_q^{\,2}\cdot t_{LM}^{\,3}}\,dt_{LM}\,d\lambda_{LM} = -1.087423159936\times10^{-13}\,N \qquad \text{13B-01)}$$

Where S_Z of eq. 27 is:

$$S_Z := \frac{-1}{32}\cdot\mu_o\cdot q_o^{\,2}\cdot\frac{\lambda_{LM}}{\pi^2\cdot l_q^{\,2}\cdot t_{LM}^{\,3}} \qquad S_Z = -1.105851320409\times10^{-16}\,\frac{1}{m^2}\,W \qquad \text{13B-02)}$$

The power/m2 in eq.27 is converted to force by general integral mechanics as:

$$F_Z := \frac{-1}{32\cdot(2)\cdot(-1)}\cdot\mu_o\cdot q_o^{\,2}\cdot\frac{\lambda_{LM}^{\,2}}{\pi^2\cdot l_q^{\,2}\cdot t_{LM}^{\,2}} \qquad F_Z = 4.693025372537\times10^{-20}\,N \qquad \text{13B-03)}$$

Note:

$$R_{force} := \frac{Fdisk_Z}{F_Z} \qquad R_{force} = -2.317104798378\times10^{6} \qquad Fdisk_Z = -1.087423160961\times10^{-13}\,N$$

Then: $FR_Z := R_{force}\cdot F_Z \qquad FR_Z = -1.087423160961\times10^{-13}\,N$

Now it is possible to find the ratio of the proton-electron force constant (now is FR_Z)to the electron-electron force constant FQK of eq. 44.

$$\text{FundamentalRatio} := \frac{R_{force}\cdot\left(\frac{1}{64}\cdot\mu_o\cdot q_o^{\,2}\cdot\frac{\lambda_{LM}^{\,2}}{\pi^2\cdot l_q^{\,2}\cdot t_{LM}^{\,2}}\right)}{2\cdot\left(\frac{i_{LM}\cdot\lambda_{LM}}{l_q}\cdot\mu_o\cdot\frac{i_{LM}\cdot\lambda_{LM}}{l_q}\right)} \qquad \frac{m_p}{m_e} = 1.836152755656\times10^{3} \qquad \text{13B-04)}$$

$$\text{FundamentalRatio} = -1.834154693711\times10^{3} \qquad \frac{Fdisk_Z}{2\cdot F_{QK}} = -1.834154693711\times10^{3}$$

Changing the F_{QK} term to reflect charge and time parameters so as to match the numerator:

$$\mathrm{FundamentalRatio} = \frac{R_{force}\cdot\left(\frac{1}{64}\cdot\mu_o\cdot q_o^{\,2}\cdot\frac{\lambda_{LM}^{\,2}}{\pi^2\cdot l_q^{\,2}\cdot t_{LM}^{\,2}}\right)}{2\cdot\left(\frac{q_o\cdot\lambda_{LM}}{l_q\cdot t_{LM}}\cdot\mu_o\cdot\frac{q_o\cdot\lambda_{LM}}{l_q\cdot t_{LM}}\right)} \qquad \text{13C-01)}$$

Proton-electron force constant. $FR_Z = Fdisk_Z$

Electron-electron force constant x 2. F_{QK} x 2.

If we disable all of the defined symbol values of the above parameters such as λ_{LM} and t_{LM}, the FundamentalRatio Mathcad symbolic solution becomes:

$$\mathrm{FundamentalRatio'} := \frac{1}{128}\cdot\frac{R_{force}}{\pi^2} \qquad \mathrm{FundamentalRatio'} = -1.834154693711\times 10^{3} \qquad \text{13C-02)}$$

where: $R_{force} = -2.317104798378\times 10^{6}$

The geometric term of interest is the 128·π² in the FundamentalRatio' denominator above. I read somewhere that this term was very important in some fundamental way to contemporary gravitational field mathematics.

Eq. 12B-03 indicates a smaller force constant (F_Z) than eq. 34 ($Fdisk_Z$) or 44 (F_{QK}):

$$\frac{F_{QK}}{F_Z} = 6.316546816697\times 10^{2} \qquad \text{13C-03)}$$

Is there an <u>action force</u> constant smaller than the electron-electron electrogravitational force constant?

In otherwords, a particle with a mass smaller than the electron by the above ratio amount?

$$\frac{F_Z}{F_{QK}} = 1.583143494412\times 10^{-3} \quad \text{or,} \quad m_x := \frac{F_Z}{F_{QK}}\cdot m_e \qquad \text{13C-04)}$$

Or: $m_x = 1.442147104161\times 10^{-33}\,\mathrm{kg}$ (= neutrino-like particle?)

This may be the base rest mass of neutrino's or even of a particle as yet undiscovered.

Energy is force times distance, or work, W. The forces $Fdisk_Z$ and $2{\cdot}F_{QK}$ can be multiplied by the compton wavelength of the proton and electron respectively to obtain a new energy constant and from this new energy constant, a frequency that is common to both by E = hf.

$\lambda_p := 2\cdot\pi\cdot r_p$ $\quad\quad$ $\lambda_p = 1.321410019785 \times 10^{-15}\,\mathrm{m}$

$\lambda_e := 2\cdot\pi\cdot l_q\cdot\alpha^{-1}$ $\quad\quad$ $\lambda_e = 2.426310580143 \times 10^{-12}\,\mathrm{m}$

Required Compton wavelength parameters statements.

The new electrogravitational action energy constants for the electron and proton are:

$EF_{QK} := 2\cdot F_{QK}\cdot\lambda_e$ $\quad\quad$ $EF_{QK} = 1.438497161434 \times 10^{-28}\,\mathrm{J}$ 13D-1)

$EFdisk_Z := Fdisk_Z\cdot\lambda_p$ $\quad\quad$ $EFdisk_Z = -1.436931860641 \times 10^{-28}\,\mathrm{J}$ 13D-2)

These EG field energies cancel and thus form the basis for attraction.

$f_{Ee} := EF_{QK}\cdot h^{-1}$ $\quad\quad$ $f_{Ee} = 2.170964036606 \times 10^{5}\,\mathrm{Hz}$ 13D-3)

$f_{Ep} := EFdisk_Z\cdot h^{-1}$ $\quad\quad$ $f_{Ep} = -2.168601701929 \times 10^{5}\,\mathrm{Hz}$ 13D-4)

These are Tesla Coil type frequencies or in the ultrasonic range. Also nuclear magnetic resonance range.

An equivalent rest mass based on the above energy constant is:

$$m_{Ee} := \frac{EF_{QK}}{c^2} \quad\quad m_{Ee} = 1.600543947302 \times 10^{-45}\,\mathrm{kg} \tag{13D-5}$$

$$m_{Ep} := \frac{EFdisk_Z}{c^2} \quad\quad m_{Ep} = -1.598802315288 \times 10^{-45}\,\mathrm{kg} \tag{13D-6}$$

Perhaps the above masses in eq. 13D-5 and 13D-6 can be considered possible lower mass limits for neutrino rest mass values.

The frequencies in 13D-3 and 13D-4 may be ultrasonic. By that I mean physical motion, not an electric, magnetic, or electromagnetic field oscillation. Since I consider mass as standing waves of energy, then ultrasonic physical motion in resonance amounts to motion of a standing wave at a much lower frequency than that which defines particle standing waves. If physical motion is considered as group velocity action, then standing wave energy that defines mass may be considered to have the phase velocity component. By combining both the group velocity and the phase velocity actions in proper resonance, it may cause a photon-like action where the system of the two properly phased group and phase actions try to propagate, not exactly like a photon, but as a low velocity phonon which is self-propagating. Then the group velocity motion may be placed 90 degrees to the phase velocity motion for the maximum system phonon velocity (similar to light propagation) 90 degrees to them both. This would create the force $Fdisk_Z$ in eq. 33 and 34 above. The geometry would be that of a torus, or vortex.

<u>13E</u>

It is of interest that energy related to phase velocity and the very small mass values computed in eq. 13D-5 and 13D-6 may be compared to the integral equation format of eq. 38 and search for a point or points where the two energys intercept. Further, if they intercept, what would be the frequency related to the time of intercept. That is, does the frequency related to the intercept relate to established frequencies already discussed?

From eq. 13D-5 and 13D-6, the small mass m_{Ee} times the phase velocity squared yields: 13E-1)

$$vel_{phase} := \frac{c^2}{V_{LM}} \qquad vel_{phase} = 1.052104131127 \times 10^{18} \frac{m}{s} \qquad m_{Ee} = 1.600543947302 \times 10^{-45} kg$$

$E_{vp} := m_{Ee} \cdot vel_{phase}^{\ 2}$ Where: $E_{vp} = 1.771679072211 \times 10^{-9} J$ 13E-2)

While we are at it, we may also include the various quark energys for comparison purposes immediately below as follows:

$EV_{top} := 175 \cdot 10^{09} \cdot volt$ $EV_{bottom} := 4.5 \cdot 10^{09} \cdot volt$ 13E-4)

$E_{top} := EV_{top} \cdot q_o$ $E_{bottom} := EV_{bottom} \cdot q_o$

$E_{top} = 2.803810327500 \times 10^{-8} J$ $E_{bottom} = 7.209797985000 \times 10^{-10} J$

$EV_{charm} := 1.3 \cdot 10^{09} \cdot volt$ $EV_{strange} := 200 \cdot 10^{06} \cdot volt$ 13E-5)

$E_{charm} := EV_{charm} \cdot q_o$ $E_{strange} := EV_{strange} \cdot q_o$

$E_{charm} = 2.082830529000 \times 10^{-10} J$ $E_{strange} = 3.204354660000 \times 10^{-11} J$

$EV_{up} := 5 \cdot 10^{06} \cdot volt$ $EV_{down} := 10 \cdot 10^{06} \cdot volt$ 13E-6

$E_{up} := EV_{up} \cdot q_o$ $E_{down} := EV_{down} \cdot q_o$

$E_{up} = 8.010886650000 \times 10^{-13} J$ $E_{down} = 1.602177330000 \times 10^{-12} J$

For the next analysis of relative quark energies verses the energy related to phase velocity as a function of a variable time that controls group velocity, phase velocity is equal to the speed of light squared divided by the variable group velocity.

Perhaps Eq. 34 may be utilized to extract the times necessary for yielding the above nuclear energies. Let the variable phase velocity energy ΔEvp be a reference in heavy blue below.

13F

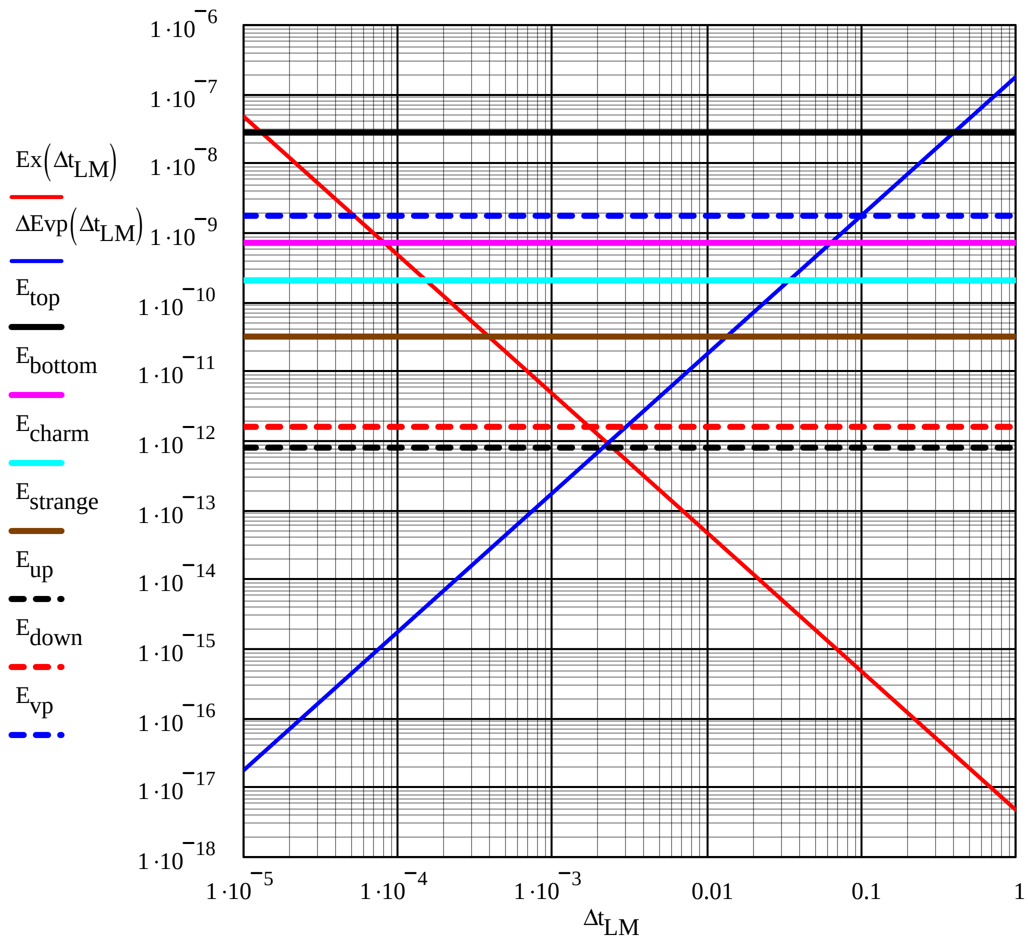
13F-1)

$$\Delta t_{LM} := 1.0\cdot 10^{-5}\cdot sec .. 1\cdot 10^{-0}\cdot sec \qquad \Delta Evp(\Delta t_{LM}) := m_{Ee}\cdot\left[\frac{c^2}{\left(\frac{\lambda_{LM}}{\Delta t_{LM}}\right)}\right]^2$$

As time increases, phase velocity increases as group velocity is decreasing.

$$Ex(\Delta t_{LM}) := \left|\tan(1.0000000000)\cdot\int_0^{\Delta t_{LM}}\int_0^{\lambda_{LM}}\int_0^{\lambda_{LM}} \frac{-m_e\cdot\lambda_{LM}}{8\cdot\pi\cdot l_q\cdot\Delta t_{LM}^{3}}\,d\lambda_{LM}\,d\lambda_{LM}\,d\Delta t_{LM}\right|$$

13F-2)



The crossing point of $Ex_{(\Delta tLM)}$ and $\Delta Evp_{(\Delta tLM)}$ is between the down and up quark energies. Note that the phase velocity energy E_{vp} related to V_{LM} is between the bottom and top quark energies.

Check: Let t_{LMnom} be set equal to the crossing point time in the graph above.

$$t_{LMnom} := 2.27495 \cdot 10^{-3} \cdot sec \qquad V_g := \frac{\lambda_{LM}}{t_{LMnom}} \qquad V_g = 3.742937390338 \times 10^{0} \frac{m}{s} \qquad \text{13G-1)}$$

Note: Phase velocity is: $$Vp := \frac{c^2}{\left(\dfrac{\lambda_{LM}}{t_{LMnom}}\right)} \qquad Vp = 2.401202812146 \times 10^{16} \frac{m}{s} \qquad \text{13G-2)}$$

$$Evp_{blu} := m_{Ee} \cdot \left[\frac{c^2}{\left(\dfrac{\lambda_{LM}}{t_{LMnom}}\right)}\right]^2$$ where then: $$Evp_{blu} = 9.228376189821 \times 10^{-13} J \qquad \text{13G-3)}$$

$$Ex_{red} := \left| \tan(1.0000000000) \cdot \int_0^{t_{LMnom}} \int_0^{\lambda_{LM}} \int_0^{\lambda_{LM}} \frac{-m_e \cdot \lambda_{LM}}{8 \cdot \pi \cdot l_q \cdot t_{LMnom}^{3}} \, d\lambda_{LM} \, d\lambda_{LM} \, dt_{LMnom} \right| \qquad \text{13G-4)}$$

Where then: $Ex_{red} = 9.228345212082 \times 10^{-13} J$ which is very close to the value of Evp_{blu} above.

The frequency corresponding to t_{LMnom} above is:

$$f_{LMnom} := t_{LMnom}^{-1} \quad \text{or,} \quad f_{LMnom} = 4.395701004418 \times 10^{2} Hz \qquad \text{13G-5)}$$

Note that the tan of 1 radian is: $$\tan(1.000000000000) = 1.557407724655 \times 10^{0} \qquad \text{13G-6)}$$

Where also: $$\operatorname{atan}\left(1.557407724655 \times 10^{0}\right) = 5.729577951308 \times 10^{1} deg \qquad \text{13G-7)}$$

It is of importance that again we have a value related to one radian appearing in the calculations such that when used as a multiplier in the above integral for Ex_{red} energy, the result is very close to the phase related energy of Evp_{blu} above. Thus, one radian as well as the phase velocity energy intercepting the line for the integral energy, where both are a function of time t_{LM}, coincide with a frequency related to the inverse of t_{LM} that yields 439.5701004418 Hz which is close to the 438 Hz resonance of the Great Pyramids King's Chamber and Grand Gallery.

The importance of one radian also appeared in eq. 13A-03 where the disk energy $Wdisk_Z$ is adjusted by the value of the cotangent of one radian and then divided into the field energy of the proton at the compton radius. The result was the ratio of proton rest mass energy to electron rest mass energy.

Electrogravitational Dynamics of Wavepacket Motion

The following is quoted from (Atkins 1991c), "A wavepacket is a superposition of wavefunctions that is usually strongly peaked in one region of space and virtually zero elsewhere. (Fig. W.6). The peak of the wavepacket denotes the most likely location of the particle; it occurs where the contributing wavefunctions are in phase and interfere constructively. Elsewhere, the wavefunctions interfere destructively, and the net amplitude of the wavepacket is small or zero.

A wavepacket moves because all the component functions change at different rates, and at different times the point of maximum constructive interference is in different locations. The motion of the wave packet corresponds very closely to the motion predicted for a classical particle in the same potential. An important difference from classical physics is that the wavepacket spreads with time, but this tendency is very small for massive, slow particles. -Unquote.

I propose that the frequency difference is very small as to the frequency separation caused by spreading, approximately 10 cycles out of 1^20 cycles per second. This causes particle motion which results in the gravitational action. The action is instantaneous through non-local energy space while the reaction is in observable local space. The carrier of the non-local instantaneous action is the wavefunction similar to the de Broglie pilot wave and the reaction is the net observable local space result. The Schrodinger wave equation does not describe an ordinary electromagnetic wave but a probability wave, and the probability wave determines all of the action and reaction of the total electrogravitational interaction.

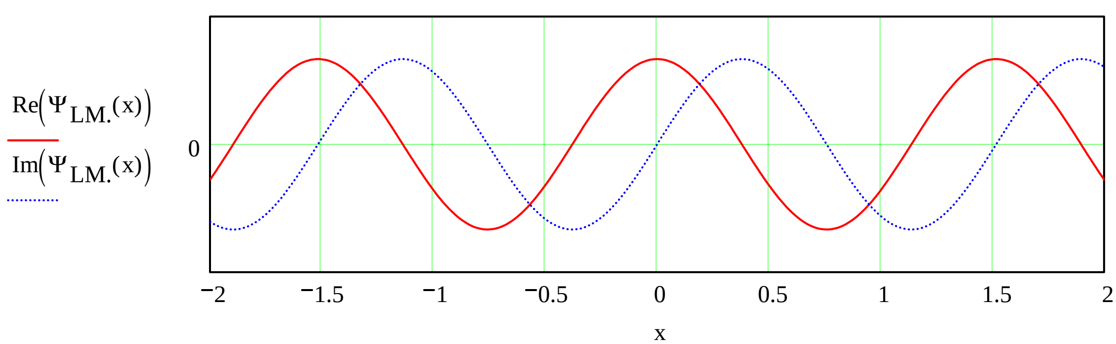
Packet generation and travel is modeled by the below analysis and parallels the model presented by: (Atkins and Friedman, 1997).

$x := -2.00, -1.99 .. 2.00$

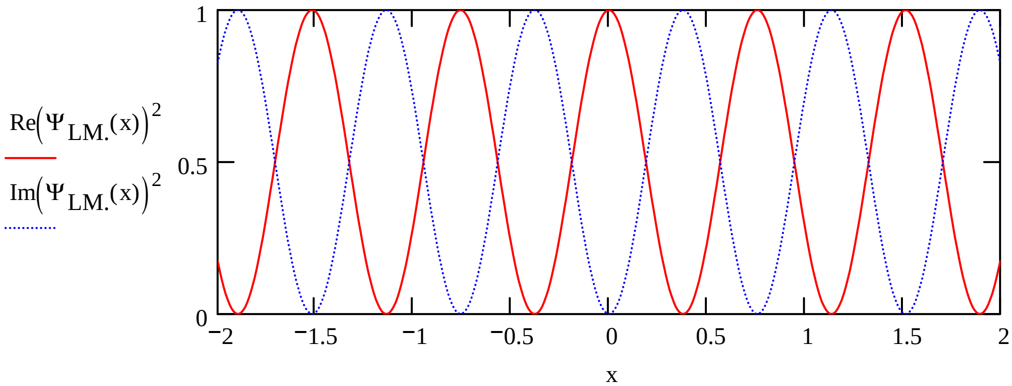
Allowing for a variation in phase is similar to a change in k, the wavevector equivalent to 1/r.

$$\Psi_{LM.}(x) := e^{x \cdot i \cdot \Delta\theta_{nq}} \cdot \left[e^{\frac{-(2 \cdot \pi \cdot i \cdot W_{LM} \cdot t_{LM})}{h}} \right]$$

The real (Re) follows the imaginary (Im)wave. The wave below is moving to the right. A negative xi$\Delta\theta_{nq}$ will reverse the wave travel so that the wave moves to the left. 50)



The square of the above wavefunction yields the probability plot below.



Wavepacket Calculations: pg. 490-491 of MQM.

$x := -.0300\cdot m, -.0299\cdot m .. .4000\cdot m$ $\quad v := V_{LM}$ $\quad \delta x := \lambda_{LM}$ $\quad \lambda_{LM} = 8.514995416151 \times 10^{-3} m$

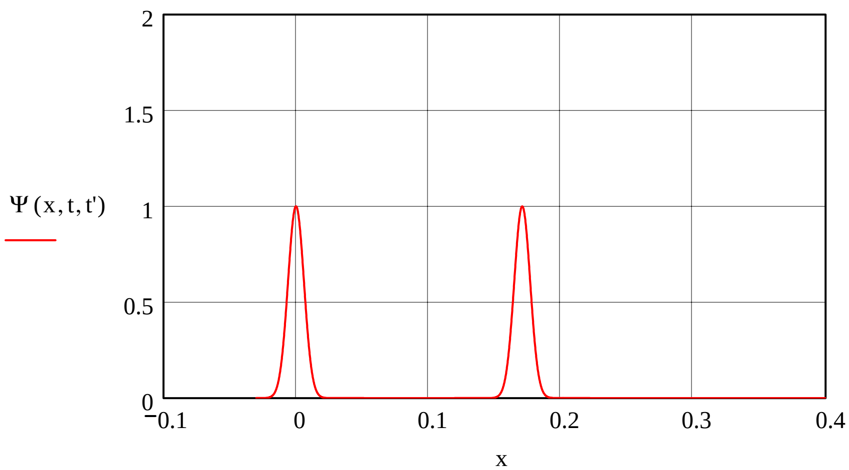
$\Gamma := \frac{1}{\delta x}$ $\quad \Gamma^{-1} = 8.514995416151 \times 10^{-3} m$ Note: $1/\Gamma$ is width control δx.

$t := 0$ $\quad t' := 2\cdot sec$

First Packet Second Packet

$$\Psi(x,t,t') := \left| e^{-\left[(x)-\left(v\cdot t+\frac{FRAME}{100}\right)\right]^2\cdot\Gamma^2} \right| + \left| e^{-[(x)-(v\cdot t')]^2\cdot\Gamma^2} \right|$$

Wavepackets will add their amplitudes when crossing each others position. Choose the file AVecPack.avi to view animation of packet at loc. 0x. 51)



Click inside the boxed area at the left to open the associated windows movie file which shows the wavepacket motion.

Wavepackets develop a velocity by reason of not being a perfect standing wave. The standing wave is affected by the wavefunction and thus changing the wavefunction alters the integrity of the standing wave and the particle moves as a result. If you control the wavefunction, you control the particle, or system of coherent particles.

THE END

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From File AVecDisk1.MCD
