A Theorem of Mass Being Derived From Electrical Standing Waves

- by -

Jerry E. Bayles

This paper formalizes a concept presented in my book, "Electrogravitation As A Unified Field Theory", (as well as in numerous related papers), the concept of mass being the result of standing waves. More exactly, the result of electrical standing waves.

First, the electric mass equation developed in previous papers will be presented in terms related directly to the rest mass energy of the electron. This is done so as to establish the fact that ordinary parameters such as the permeability of free space, the charge squared of an electron, and the classic electron radius directly establish the mass of the electron. Then we will develop an actual standing wave on a transmission line of arbitrary load resistance and line impedance. Using currents derived from charge and time related to frequency, the mass-gain involving the current squared times the wavelength squared feature of the developed mass-energy equation will be presented. This suggests that an electrical mass creation may be nonlinear to the forth power by reason of the current squared times the wavelength squared.

Then the naturally negative mass feature involving the phasor form of purely reactive current is presented which suggests that purely reactive energy has a built-in negative mass associated with its field. From that, we launch into a transmission line analysis involving standing waves and examine the results of a standing voltage and current wave given some arbitrary input voltage, line impedance, and load. From the current derivation, we utilize the mass-energy equation to plot a resulting mass wave buildup on the transmission line. Note that in Mathcad, the parameters of the equations are active and can be changed for analysis purposes. If you do not have your own Mathcad 6.0+ or later, you can download the Mathcad Explorer for free from Mathcad website. (Link at: http://www.electrogravity.com).

Next, the current and mass-plot is animated relative to decreasing $\lambda/4$ wavelength steps to show how the mass builds to a limit at one end of the transmission line. Then the electric-mass equation is analyzed for its relationship to force, momentum, inductance, (**A**) vector, **B** vector, Poynting power, rest mass, and the quantum Hall ohm. Finally, we reach back to the beginning statement for the equation of a standing wave on page (3) and compare it with the quantum equation for a standing wave on page (16). The nearly identical structure of the macro-system equations verses the quantum system equations suggests that the method of electrically created mass may indeed be possible. The relative parameters of analysis are presented next.

The Electric Equivalent of Mass

$u_o := 1.256637061 \cdot 10^{-06} \cdot henry \cdot m^{-1}$	Magnetic permeability.
$m_e := 9.109389700 \cdot 10^{-31} \cdot kg$	Electron rest mass.
$q_o := 1.602177330 \cdot 10^{-19} \cdot coul$	Electron charge.
$c := 2.997924580 \cdot 10^{08} \cdot m \cdot sec^{-1}$	Speed of light in a vacuum.
$h := 6.626075500 \cdot 10^{-34} \cdot joule \cdot sec$	Plank constant.
$l_q := 2.817940920 \cdot 10^{-15} \cdot m$	Classical electron radius.

Let: $n_q := 1$ — Current multiplier for analysis.

Let: $t_x := \frac{h}{m_e \cdot c^2}$ $\quad t_x = 8.09330099961637 \cdot 10^{-21} \cdot sec$ — eq. 1

and: $i_q := \frac{n_q \cdot q_o}{t_x}$ $\quad i_q = 19.79633934380971 \cdot amp$ — eq. 2

Now let: $m_e \cdot c^2 = \left(u_o \cdot \frac{i_q^{\,2}}{4 \cdot \pi \cdot l_q} \right) \cdot (d)^2$ Solving for d: — eq. 3

has solutions)

$$\begin{bmatrix} \frac{-2}{\left(\sqrt{u_o} \cdot i_q\right)} \cdot \sqrt{\pi} \cdot \sqrt{l_q} \cdot \sqrt{m_e} \cdot c \\ \frac{2}{\left(\sqrt{u_o} \cdot i_q\right)} \cdot \sqrt{\pi} \cdot \sqrt{l_q} \cdot \sqrt{m_e} \cdot c \end{bmatrix}$$

Note that the m_e term is proportional to the square of the current term since c^2 is a constant.

Where:

$$\frac{-2}{\left(\sqrt{u_o} \cdot i_q\right)} \cdot \sqrt{\pi} \cdot \sqrt{l_q} \cdot \sqrt{m_e} \cdot c = -2.426310601573248 \cdot 10^{-12} \cdot m \qquad \text{eq. 4}$$

and:

$$\frac{2}{\left(\sqrt{u_o} \cdot i_q\right)} \cdot \sqrt{\pi} \cdot \sqrt{l_q} \cdot \sqrt{m_e} \cdot c = 2.426310601573248 \cdot 10^{-12} \cdot m \qquad \text{eq. 5}$$

Check: $d := \frac{h}{m_e \cdot c}$ $\quad d = 2.426310600008849 \cdot 10^{-12} \cdot m$ — eq. 6

(= Compton wavelength of the electron.)

Quantum mass check of the above:

$$m_x := \left(u_o \cdot \frac{i_q^2}{4 \cdot \pi \cdot l_q}\right) \cdot \left(\frac{d}{c}\right)^2 \qquad m_x = 9.109389688253175 \cdot 10^{-31} \cdot kg \qquad \text{eq. 7}$$

(= rest mass of the electron.)

Note that the mass is proportional to the current squared for a fixed wavelength, d. Then related to current, the mass would increase exponentially.

Let us calculate the effective mass related to the current squared in an antenna with the following parameters:

Let: $i_{ant} := 1 \cdot 10^{02} \cdot amp$ and $f_{ant} := 1 \cdot 10^{04} \cdot Hz$

Then: $d_{ant} := \frac{c}{f_{ant}}$ or, $d_{ant} = 2.99792458 \cdot 10^4 \cdot m$

Then the effective mass is given by:

$$m_{ant} := \left(u_o \cdot \frac{i_{ant}^2}{4 \cdot \pi \cdot l_q}\right) \cdot \left(\frac{d_{ant}}{c}\right)^2 \qquad \text{eq. 8}$$

or, $m_{ant} = 3.548690437601892 \cdot 10^3 \cdot kg$ (A significant mass increase over the mass of the electron.)

Note that the above macroscopic effective mass calculation now is proportional to the square of the current as well as the square of the wavelength. If we consider the case for purely inductive or capacitive current, then the following applies:

Let: $\theta := \frac{\pi}{2}$ and $i_{sw} := i_{ant} \cdot e^{j \cdot \theta}$ (Inductive case)

then: $i_{sw} = 6.123031769111886 \cdot 10^{-15} + 100j \cdot amp$

Then the effective mass related to purely reactive current wave is given below as:

$$m_{sw} := \left(u_o \cdot \frac{i_{sw}^2}{4 \cdot \pi \cdot l_q}\right) \cdot \left(\frac{d_{ant}}{c}\right)^2 \quad \text{or,} \qquad \text{eq. 9}$$

$$m_{sw} = -3.548690437601892 \cdot 10^3 + 4.34574885763599 \cdot 10^{-13} j \cdot kg$$

Note for a purely reactive current wave, the effective mass is negative and real. This implies that a powerful enough wave should be able to reverse the attraction of gravity since the effective field mass is negative.

As an example, let us calculate the force of repulsion at the surface of the Earth for the above mass. First we establish related parameters as:

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

$R_E := 6.37 \cdot 10^6 \cdot m$ Mean radius of the Earth.

$M_E := 5.98 \cdot 10^{24} \cdot kg$ Mass of the Earth.

Then the force on the surface of the earth related to the negative effective mass calculated above is given by the equation below as:

$$F_E := \frac{G \cdot M_E \cdot m_{sw}}{R_E^{\,2}} \quad \text{or,} \qquad \text{eq. 10}$$

$$F_E = \left(-3.4896741455283 \cdot 10^4 + 4.273477131383632 \cdot 10^{-12} j\right) \cdot newton$$

which is a real and negative force of repulsion by reason of the standard equation result is normally positive and one of attraction.

If we allow for a 0 or 180 degree (0 or π) in theta above, the force will be one of attraction since the effective mass will be positive. Inserting a theta (θ) of ($\pi/2$) or ($-\pi/2$) will yield an effective negative mass.

Then if the top of a UFO style craft had a real component field while the bottom had a reactive field, the top would attract and the bottom would repel other normal mass.

The following is an analysis of mass related to a standing wave of current in a transmission line.

The voltage and currents along the line with respect to time are given by the following equations below, which is the sum of the forward and reverse propagating waves. [1]

$$V\left(z_{vec}\right) = V_{plusvec} \cdot e^{-j \cdot \left(\frac{\omega}{u}\right) \cdot z} + V_{negvec} \cdot e^{j \cdot \left(\frac{\omega}{u}\right) \cdot z} \qquad \text{eq. 11}$$

z = any point on line.

$$I\left(z_{vec}\right) = \frac{V_{plusvec}}{R_c} \cdot e^{-j \cdot \left(\frac{\omega}{u}\right) \cdot z} - \frac{V_{negvec}}{R_c} \cdot e^{j \cdot \left(\frac{\omega}{u}\right) \cdot z} \qquad \text{eq. 12}$$

where the $V_{plusvec}$ and V_{negvec} terms are generally complex numbers as:

$$V_{plusvec} = V_{mplus} \cdot e^{j \cdot \theta} \quad \text{and} \quad V_{negvec} = V_{mneg} \cdot e^{-j \cdot \theta}$$ [1]

Related to the above equations, various other parameters are defined as:

$f := 5 \cdot 10^{4}$	Frequency (Hz)
$\omega := 2 \cdot \pi \cdot f$	Angular frequency (rad/sec)
$u := 2 \cdot 10^{08}$	Propagation velocity of transmission line (m/sec)
$\zeta := 5 \cdot 10^{03}$	Actual length of line (m)
$R_c := 50$	Characteristic Impedance of transmission line (ohms)
$Z_L := 1 \cdot 10^{06} + j \cdot 0$	Load impedance (ohms)
$V_S := 1 + j \cdot 0$	Input source voltage
$\beta := \frac{\omega}{u}$	Phase constant

where, $\beta = 1.570796326794896 \cdot 10^{-3}$ rad/m

Note: Odd multiples of a quarter wavelength are generally used in the analysis.

Line length as fraction of wavelength is given as:

$$\lambda := \frac{u}{f} \quad \text{or,} \quad \lambda = 4 \cdot 10^{3} \quad \text{(m)}$$ eq. 13

The line length in units of wavelength is:

$$\frac{\zeta}{\lambda} = 1.25$$ eq. 14

The reflection coefficient at the load and the input is calculated next:

$$\Gamma_L := \frac{Z_L - R_c}{Z_L + R_c} \qquad \Gamma_L = 0.99990000499975 \quad \text{(Load)}$$ eq. 15

Next we define z as any point along the line. Then:

$$\Gamma(z) := \Gamma_L \cdot e^{j \cdot 2 \cdot \beta \cdot (z - \zeta)}$$ which is the generalized voltage reflection coefficient. eq. 16

Then the reflection coefficient at the input to the line is:

$$\Gamma(0) = -0.99990000499975 - 2.388421162252511 \cdot 10^{-15} j \qquad \text{(Input)} \qquad \text{eq. 17}$$

The voltage standing wave ratio (VSWR) is:

$$VSWR := \text{if}\left(\left|\Gamma_L\right| \neq 1, \frac{1 + \left|\Gamma_L\right|}{1 - \left|\Gamma_L\right|}, \infty\right) \qquad \text{eq. 18}$$

$$VSWR = 1.999999999998918 \cdot 10^{4}$$

The nominal line input impedance is calculated to be:

$$Z_{in} := R_c \cdot \left(\frac{1 + \Gamma(0)}{1 - \Gamma(0)}\right) \qquad \text{eq. 19}$$

$$Z_{in} = 2.500000000001353 \cdot 10^{-3} - 5.971650025849473 \cdot 10^{-14} j \qquad \text{(ohms)}$$

Next, we determine the time domain voltage at the line input and at the load:

First the source end reflection coefficient is calculated as:

$$\Gamma_S := \frac{Z_{in} - R_c}{Z_{in} + R_c} \qquad \Gamma_S = -0.99990000499975 - 2.388421162252511 \cdot 10^{-15} j \qquad \text{eq. 20}$$

$$V(z) := \frac{1 + \Gamma_L \cdot e^{-j \cdot 2 \cdot \beta \cdot (\zeta - z)}}{1 - \Gamma_S \cdot \Gamma_L \cdot e^{-j \cdot 2 \cdot \beta \cdot \zeta}} \cdot \frac{R_c}{Z_{in} + R_c} \cdot V_S \cdot e^{-j \cdot \beta \cdot z} \qquad \text{eq. 21}$$

Then the input V(z) is:

$$\left|V(0)\right| = 0.499999999999993 \qquad (= V_{in}) \qquad \text{eq. 22}$$

The input phase is:

$$\text{if}\left(\left|V(0)\right| \neq 0, \frac{\arg(V(0))}{\deg}, 0\right) = -1.748877310638352 \cdot 10^{-23} \qquad \text{eq. 23}$$

The load voltage is:

$$|V(\zeta)| = 9.999999999994459 \cdot 10^{3}$$ eq. 24

Note that the voltage at multiples of a quarter-wavelength on the line is equal to the input voltage times the VSWR.

The load phase is:

$$\mathrm{if}\left(|V(\zeta)| \neq 0, \frac{\arg(V(\zeta))}{\deg}, 0\right) = -89.99999999863138$$ eq. 25

Since we have an expression for the voltage anywhere on the line, then the current at the load and input may be expressed as:

(amp)

$$I_{in} := \frac{V(0)}{Z_{in}} \qquad I_{in} = 199.9999999998892 + 4.777320020674286 \cdot 10^{-9} j$$ eq. 26

(amp)

$$I_L := \frac{V(\zeta)}{Z_L} \qquad I_L = 2.388660016308792 \cdot 10^{-13} - 9.99999999999446 \cdot 10^{-3} j$$ eq. 27

The time average power is given below as:

$$P_{av}(\zeta) := \frac{1}{2} \cdot \mathrm{Re}\left[V(\zeta) \cdot \left(\overline{I_L}\right)\right]$$ eq. 28

$$P_{av}(\zeta) = 49.99999999994459$$ (watt)

The plot of phasor domain voltage and current is presented below.

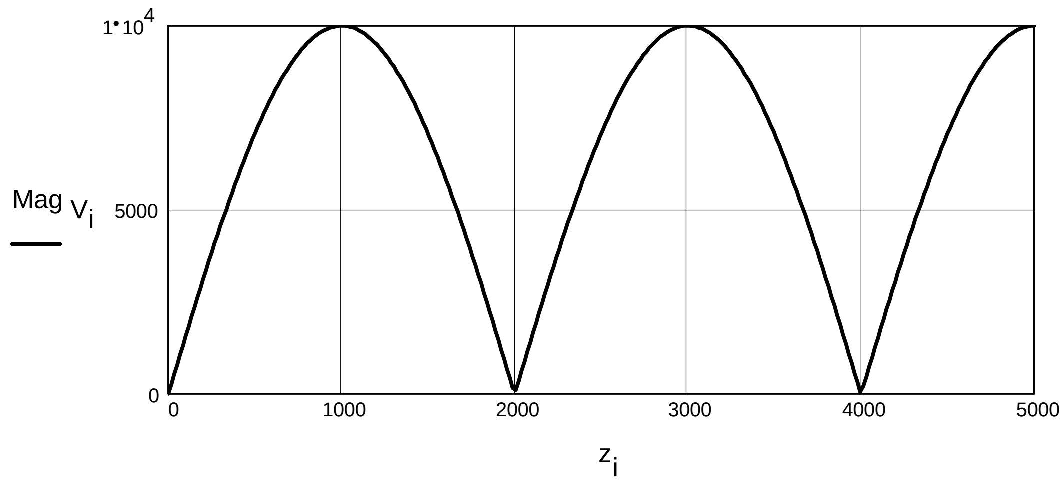
$$npts := 300 \qquad z_{start} := 0 \qquad z_{end} := \zeta$$

$$i := 0 .. npts - 1 \qquad z_i := z_{start} + i \cdot \frac{z_{end} - z_{start}}{npts - 1}$$

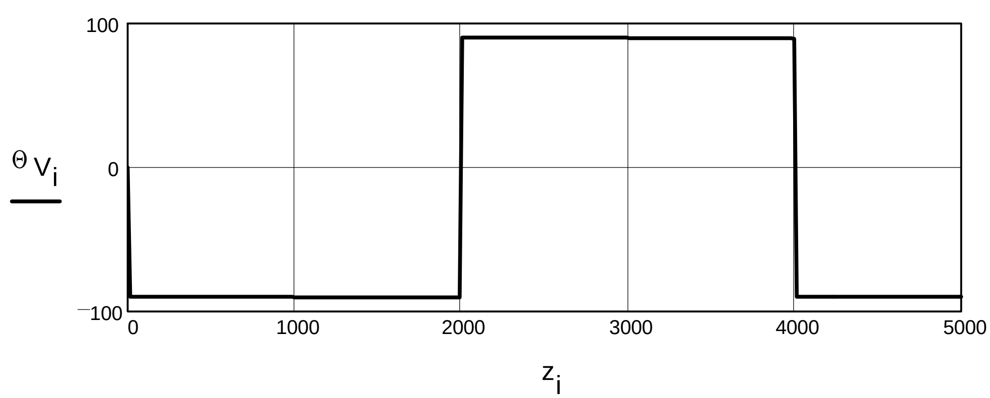
$$Mag_{V_i} := |V(z_i)|$$ (Voltage magnitude along the line from start to end)

$$\Theta_{V_i} := \mathrm{if}\left(|V(z_i)| \neq 0, \frac{\arg(V(z_i))}{\deg}, 0\right)$$ (Voltage phase along line) eq. 29

Voltage magnitude along the transmission line.



Voltage phase along the transmission line.



Next the current along the transmission line may be given by:

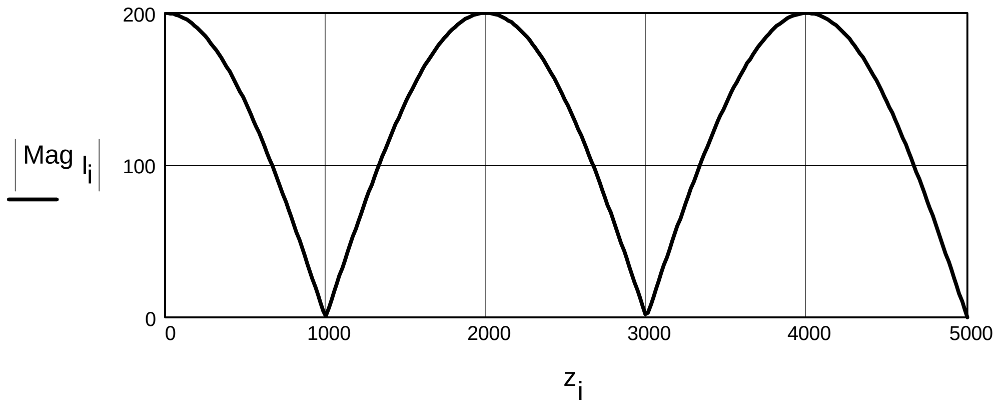
$$Mag\ I_i := \frac{V(z_i)}{R_c \cdot \left(\frac{1+\Gamma(z_i)}{1-\Gamma(z_i)}\right)} \quad \text{eq. 30} \qquad \text{Equivalent to:} \quad I(z_i) = \frac{V(z_i)}{Z(z_i)} \quad \text{eq. 31}$$

Where again:

$$I_{in} = 199.9999999998892 + 4.777320020674286 \cdot 10^{-9} j$$

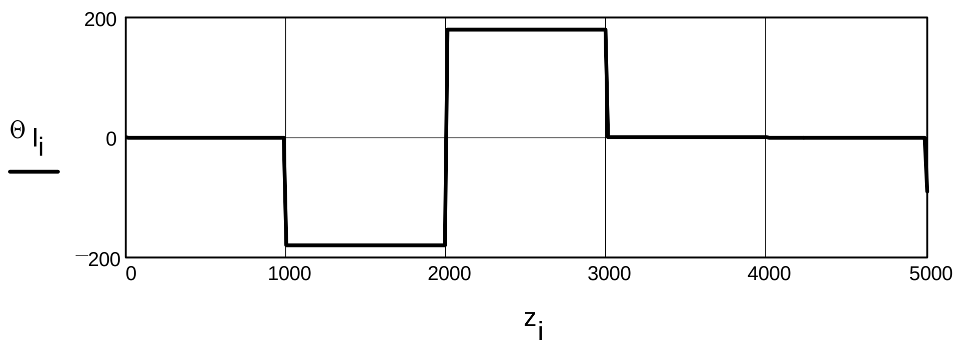
$$I_L = 2.388660016308792 \cdot 10^{-13} - 9.99999999999446 \cdot 10^{-3} j$$

Plot of the current along line



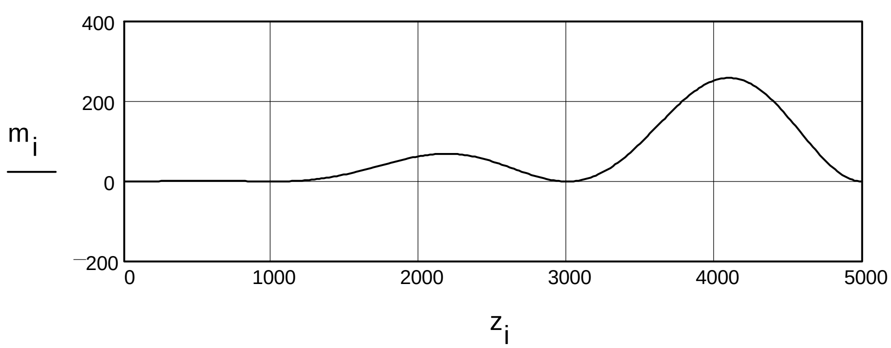
The current phase is derived as: $\Theta I_i := \text{if}\left(\left|\text{Mag } I_i\right| \neq 0, \frac{\arg\left(\text{Mag } I_i\right)}{\deg}, 0\right)$ eq. 32

The current phase plot is provided below as:



Based on the line amps calculated above at a given line length, the effective field mass in the transmission line can be calculated as:

$$m_i := \left[u_o \cdot \frac{\left(\text{Mag } I_i\right)^2}{4 \cdot \pi \cdot I_q}\right] \cdot \left(\frac{z_i}{c}\right)^2 \qquad \text{or,} \qquad \text{eq. 33}$$



If the frequency is increased, the mass calculation will vary in sine wave fashion, with each wave going through zero and back to a maximum. Each maximum however will be increasing logrithmically by the square of the distance along the line, or z^2. (This is accompanied by an increasing frequency.) If the frequency were swept from low to high, the increasing effective mass nodes and peaks would be pushed along the line. This suggests a field-mass reaction propulsion system may be possible.

Next an animated plot is generated to show how the mass increases and at the same time travels to the right on the transmission line. This action would constitute a mass propulsion system, with the reaction force being to the left.

First, we establish new parameters related to the frequency increasing.

$$n := 1 + 2\cdot FRAME$$

$$f_n := n\cdot\left(1\cdot 10^4\right)$$ Frequency (Hz)

$$\omega_n := 2\cdot\pi\cdot f_n$$ Angular frequency (rad/sec)

$$\beta_n := \frac{\omega_n}{u}$$ Phase constant

The reflection coefficient at the load and the input is:

$$\Gamma_L := \frac{Z_L - R_c}{Z_L + R_c} \qquad \Gamma_L = 0.99990000499975$$ (Load) eq. 34

Next we again define z as some arbitrary point along the line. Then:

$$\Gamma(z) := \Gamma_L\cdot e^{j\cdot 2\cdot\beta_n\cdot(z-\zeta)}$$ eq. 35

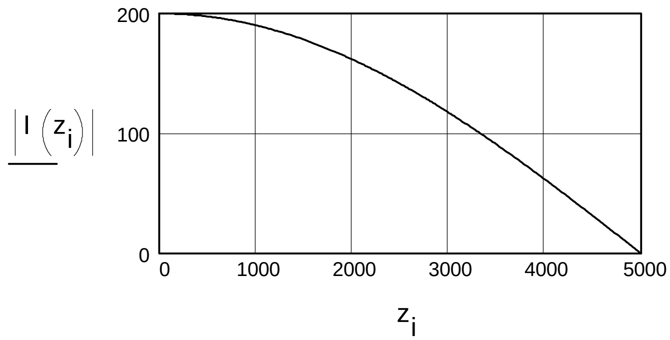
Then:

$$V(z) := \frac{1 + \Gamma_L\cdot e^{-j\cdot 2\cdot\beta_n\cdot(\zeta - z)}}{1 - \Gamma_S\cdot\Gamma_L\cdot e^{-j\cdot 2\cdot\beta_n\cdot\zeta}}\cdot\frac{R_c}{Z_{in} + R_c}\cdot V_S\cdot e^{-j\cdot\beta_n\cdot z}$$ eq. 36

And:

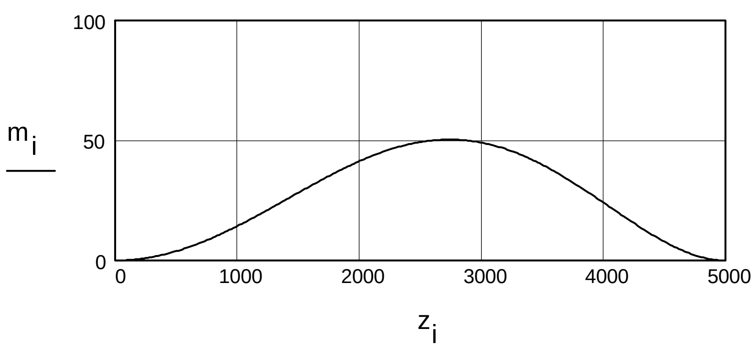
$$I(z) := \frac{V(z)}{\left[R_c\cdot\left(\frac{1 + \Gamma(z)}{1 - \Gamma(z)}\right)\right]}$$ Current as a function of z along the line. eq. 37

Next, the line current is animated in quarter wavelength multiples, (1/4, 3/4, 1 1/4, ---etc.), in terms of current along the length, z. The input is at the left.



Next, the field mass is animated in quarter wavelength multiples. (1/4, 3/4, 1 1/4, ---etc.)

$$m_i := \left[u_o \cdot \frac{\left(\left|I\left(z_i\right)\right|\right)^2}{4 \cdot \pi \cdot I_q}\right] \cdot \left(\frac{z_i}{c}\right)^2 \qquad \text{eq. 38}$$



The animations are saved as Current.avi and MassWave.avi respectively. To view these from Mathcad, click on the animate feature of Mathcad and then select playback. Click on the file you wish to view. The animations may also be viewed with the RealPlayer program (http://www.real.com/) which is available on the web for free.

The MassWave file shows the mass increasing to a limit slightly below 400 kg. Also, the bulk of the mass is shifted to the right side of the transmission line. This effectively makes the transmission line a field mass driver to the right which would cause a recoil of the line to the left, like firing a rifle.

The equation that is used for calculating the mass above has some interesting properties related to the vector magnetic potential, force, and energy. The following equations are all derived from and related to the electric field mass energy equation.

Electron Compton Rest Mass Energy Constant:

$$E_{electron} := \frac{u_o \cdot i_q^2}{4 \cdot \pi \cdot l_q} \cdot (d)^2 \quad E_{electron} = 8.187111157449305 \cdot 10^{-14} \cdot joule \qquad \text{eq. 39}$$

and, $m_e \cdot c^2 = 8.187111168006826 \cdot 10^{-14} \cdot joule$ (Electron rest mass energy)

The above can be restated as:

$$E_{electron} := \frac{u_o \cdot q_o^2}{4 \cdot \pi \cdot l_q} \cdot \left(\frac{d^2}{t_x^2}\right) \quad E_{electron} = 8.187111157449303 \cdot 10^{-14} \cdot joule \qquad \text{eq. 40}$$

Electron Compton Force Constant:

$$F_{electron} := \frac{u_o \cdot q_o^2}{4 \cdot \pi \cdot l_q} \cdot \left(\frac{d}{t_x^2}\right) \quad F_{electron} = 0.033743046572106 \cdot newton \qquad \text{eq. 41}$$

Electron Compton Momentum Constant:

eq. 42

$$P_{electron} := \frac{u_o \cdot q_o^2}{4 \cdot \pi \cdot l_q} \cdot \left(\frac{d}{t_x}\right) \quad P_{electron} = 2.730926325521272 \cdot 10^{-22} \cdot kg \cdot m \cdot sec^{-1}$$

Electron Compton A Vector Constant:

eq. 43

$$A_{electron} := \frac{u_o \cdot q_o}{4 \cdot \pi \cdot l_q} \cdot \left(\frac{d}{t_x}\right) \quad A_{electron} = 1.704509403788202 \cdot 10^{-3} \cdot m^{-1} \cdot weber$$

(In the same direction as the electron motion.)

Electron Compton B Vector Constant:

eq. 44

$$B_{electron} := \frac{u_o \cdot q_o}{4 \cdot \pi \cdot l_q} \cdot \left(\frac{1}{t_x}\right) \quad B_{electron} = 7.025108012889963 \cdot 10^{8} \cdot m^{-2} \cdot weber$$

(Circles around electron motion in right-hand fashion)

Thus we can see that the mass-energy equation used above contains the terms for basic force and field parameter constants which are related to and contained within the electron rest mass energy.

Of further interest, the following parameters are also associated with the equation for the Compton rest mass energy of the electron.

The Quantum Inductance of the electron:

$$L_e := \frac{u_o}{4 \cdot \pi \cdot l_q} \cdot d^2 \qquad L_e = 2.089108073164695 \cdot 10^{-16} \cdot \text{henry} \qquad \text{eq. 45}$$

Note that d^2 is related to a torus as $d^2 = (2\pi\ r)^2 = 4\ \pi^2\ r^2$ which = torus area.

Rest Mass of the electron:

$$m_e := \frac{u_o \cdot q_o^{\,2}}{4 \cdot \pi \cdot l_q} \qquad m_e = 9.109389688253174 \cdot 10^{-31} \cdot \text{kg} \qquad \text{eq. 46}$$

Poynting Power of the electron:

$$S_e := \frac{u_o \cdot q_o^{\,2}}{4 \cdot \pi \cdot l_q} \cdot \left(\frac{1}{t_x^{\,3}}\right) \qquad S_e = 1.718352278713946 \cdot 10^{30} \cdot m^{-2} \cdot \text{watt} \qquad \text{eq. 47}$$

Quantum Hall Ohm of the electron:

eq. 48

$$R_Q := \frac{u_o}{4 \cdot \pi \cdot l_q} \cdot \frac{d^2}{t_x} \qquad R_Q = 2.581280584107426 \cdot 10^4 \cdot \text{ohm}$$

(= Standard SI value.)

The fact that the vector magnetic potential (**A**) is in the same direction as the direction of the electron is relevant to the notion of the electron having an associated information wave capable of action that changes the phase of a distant particle by altering that distant particles momentum. Further, the (**A**) vector does not diminish in potential over distance concerning the inline motion of the electron. The (**A**) vector also may exist in a space free of the (**B**) field that created it and it has an inline motion with the electron that cannot be shielded against as conventional shielding is normally understood.

The mechanics associated with the inline motion of the electron and its associated (**A**) vector lends itself to being adapted to the Schrodinger wave equation. David Bohm showed that the (**A**) vector that is associated with the motion of the electron is connected with a quantum energy potential Q that has a magnitude dependent on the rate of change of the phase associated with the electrons wavefunction. [2]

Based on the above information concerning the nature of the (**A**) vector passing through all material and its ability to interact on a quantum level, we have a very strong case for stating that it may be the gravitational action and also may properly be termed electrogravity, or electrogravitation.

The geometry of the area of a torus of equal circumference in the major and minor wavelength is suggested by the above equations involving d^2, (which is equal to d_1 x $d_2 = d^2$), which are the major and minor wavelengths associated with the Compton wave length of the electron multiplied together to form the area of the surface of the electron torus. (Where $d_1 = d_2 = \lambda_e$ of the electron = $h / m_e c$). See my book, "Electrogravitation As A Unified Field Theory", pages 8 & 9, equations 14 & 15, where the energy density of the electron is shown to be related directly to the shape of a torus. (This book is available on the web for free in Adobe Acrobat format at **http://www.electrogravity.com**.) Also is shown how that tremendous energy is gated through the appropriate circular quantum area and time to yield the field energy at the surface of the electron. It turns out that the electron field energy at the Compton radius of the electron is 1/137 that of the rest mass energy. This is an important result that proves the case for the shape of the electron being a torus..

The concept of the electron being a torus shape is enhanced by the picture of a point spinning around a loop such that the form generated is like a spring wrapped around to almost meet its beginning point. This cycle repeats so that space is covered in a given time which eventually forms a nearly closed spherical shape since the torus is also precessing due to the spinning point almost meeting at the last starting point.

Since the (**A**) vector is generated inline to the motion of the charge, the spinning charge-point eventually vectors (**A**) in all possible directions in space which guarantees that the electron will generate an electrogravitational action in all possible directions. This may also explain why the assumption of 'spin' seems to have all possible assumed results in actual measurement conditions.

The (**A**) vector circulates around the axis of motion of the electron and also the circulation follows the right hand rule where if the thumb of the right hand points in the direction of the charge motion, the direction of the (**A**) vector *circulation* is in the same direction as the fingers when closed. Again, the *direction* of the (**A**) vector also is in the same direction as the charge motion for the case of all (**A**) vector system analysis. Then the mass also moves in the same direction as the (**A**) vector which implies that the (**A**) vector direction is intimately connected to the nature of mass as well as charge motion since they all have the same vector direction.

It may be postulated that if a charged mass in circular motion in a plane parallel to the Earth is directly above a like system rotating opposite and inline with the upper system, then a force of attraction may exist between them. This is saying that (**A**) vectors in nearly parallel circulation against each other may interweave, (like a screw turning into threads), thus causing both systems to want to move together. Also, one of the systems will want to attract the Earth while the other would want to repel the Earth, depending on the direction of circulation of the respective system's (**A**) vector.

The (**A**) vector's interaction with each other suggests that energy is expended to cause work to be done. How would this energy be replaced in order that the conservation of energy be maintained? I ask the reader to consider the case for a singular electron that is located somewhere in a universe by itself. In this concept, the electron will be allowed to extend its field energy throughout all of the empty universe. How much field energy would this take? Or, put another way, how much energy must be supplied by the electron to fill a nearly infinite volume universe with its energy field? This is a very important question and it must be considered as being fundamental to the mechanics of all matter. The answer is obvious. The energy comes not from the electron itself but from the same energy space that created the big bang. Then the electron draws on the energy from energy space whenever it needs to alter its state or the state of its field. This occurs when its associated wavefunction is altered, wherever its associated wavefunction is and this action occurs instantly. This is David Bohm's entangled states of matter.

Then, the (**A**) vector action may be somewhat entropic in its field action. This will cause a work to be done on another (**A**) vector field which will result in a real force of attraction or repulsion. It is possible that the ordinary photon may not be connected to energy space since it has a balanced charge aspect which results in zero charge overall. Then an electrogravitational action may over time and distance cause the photon to lose energy since a bare photon cannot establish an external field. This would explain the Hubbell red shift and thus also make the case for a non-expanding universe. The bottom line is that you must expend energy to do work and gravitational attraction that moves mass does work on that mass, period. The energy to do that is supplied from energy space, which has a nearly infinite amount of energy.

It can be further postulated that this is but one of a myriad of universes, where each one was created in a time apart from our own by the same huge blast of energy that would be equivalent to a weighted impulse function. The weighted impulse function has a nearly infinite energy at time zero and has practically zero energy at time above zero. Our universe would be likened to part of a huge computer like program where each universe shared its existence with all of the other universes in time-slice fashion. This would also allow for a complete hold to be put on any universe for adjustment purposes or for the elimination, if needed, of any universe gone wrong. Then since our memories are supported by the action of the quantum particles in our brain, it would appear to us that our universe was continuous and there would be no experiment we could devise that would be able to prove otherwise.

The sum total action would resemble a giant spiral of created universes, each one assigned a specific radial place along the spiral arm of total creation and a specific angle away from the beginning of it all. Thus if you knew the correct angular displacement and frequency, (the displacement code key), you could indeed walk through walls and between other universes to get to the other side of the wall, where you would simply pop back into existence. Your matter would take the place of the matter that had existed where you arrived at and that matter you displaced would be sent to where you had been. You would not even make a sound leaving or arriving. These very actions have been reported by stories set down in print in the Bible as well as eye witnesses in modern times.

The above description of the (**A**) vector interaction is somewhat similar to the ordinary magnetic force action except the (**A**) vector is orthogonal (90 degrees) to the **B** field magnetic lines of flux and the (**A**) vector cannot be shielded against since it can exist apart from the **B** field that it would normally be connected with in the same space.

Based on the above analysis, if a charge-field mass, (i. e. high current standing wave node), were to be circulated around the perimeter of a saucer shaped craft, a corresponding (**A**) vector would be generated parallel to and circulate with it. This is the basic action required to interact with a like field generated by the Earth and the total interaction would be one of electrogravitational attraction or repulsion. The charge-mass would best be generated by creating standing waves as outlined previously in the previous standing wave analysis.

The mechanics of hurricanes, tornadoes, cyclones, dust devils, all mimic the above action. The rotation of planets around the Sun and the rotation of the planets turning about their axis attest to the fact that gravity most likely has a circulation action built into its basic make up. Thus, nature has given us important clues as to the mechanics of gravity in the motion of things affected by gravity. The (**A**) vector carries and imparts a change of momentum since it is born of momentum related action. Then the (**A**) vector is not only connected with the **B** field but also with the mass energy of the charge that creates the **B** field. That was readily demonstrated by the equations of pages 11 and 12 previous.

The method of gravitation or antigravitation has been suggested above but what if we wished to impart a sudden quantum translation of position that would mimic the electron, but on a macroscopic scale? We would alter the rate of circulation, changing the 'phase' of our charged macro particle. Since it looks to space to be an electron, (a <u>BIG</u> electron), the macro electron saucer would suddenly jump in a direction inline with the point on its perimeter, (perimeter through center of craft), that was phase distorted. Then, as with David Bohms quantum **Q** potential, it is simply phase that controls energy **Q**, which then imparts the energy required from energy space to effect the quantum jump of our craft.

The rate of transition and distance covered would occur in repetitive increments, the faster the increments, the faster and farther the average translation. This design allows for the craft operator to control the craft motion directly. The craft could also be controlled via a remote information wave. This would explain why some UFO craft appear to bobble around or act erratic, since the control from a distance may be difficult to maintain if the distance is very great. This also implies that a quantum information wave, (a controlled and vectored (**A**) wave), might be used to initiate an electrogravitational action in what would normally be considered inanimate material. It may even be used to cause molecular vibration to heat things up or cool them down. In some cases, it might even be used to cause so-called spontaneous human combustion. It would do its work from the inside to the outside, since it cannot be shielded against. This type of controlled information wave may have been used to build the pyramids. It could also quite readily undo whatever has been built. Remember, it is not the power of the wave that causes action, but its ability to cause sudden energy transition and particle translation/vibration through the affected particles self energy which David Bohm defined as the **Q** potential.

In the beginning of this paper the formula for the electromagnetic standing wave was presented on the bottom of page 3. There exist similar formulas for the quantum case involving the motion of the electron for example. The following quote applies directly to the concept of particle standing waves and also linear motion. This will be seen as very similar to the case for a transmission line as presented above. The following is a quote from the reference [3] at the end of this paper. {Begin quote}

"A spatial wavefunction is complex if the particle it describes has a net motion; a spatial wavefunction is real if the particle has no net motion. For example, the spatial wavefunction (the only component we consider from here on) for a particle with linear momentum kh/2π is:

$$\psi = e^{i\cdot k\cdot x} = \cos(k\cdot x) + i\cdot\sin(k\cdot x) \qquad \text{eq. 49}$$

The wavefunction is complex, and the particle has a net momentum (to the right, increasing x). The real and imaginary components of ψ are drawn in figure C. 13a, {NOTE: This figure drawing not included in the quote}, and we see that the imaginary component precedes the real component in phase (that is, the imaginary component is shifted in the direction of the particle's motion). The wavefunction of a particle traveling with the same momentum in the opposite direction is:

$$\psi = e^{-i\cdot k\cdot x} = \cos(k\cdot x) - i\cdot\sin(k\cdot x) \qquad \text{eq. 50}$$

Now the imaginary component is shifted to the left of the real component (Fig. C13b), {NOTE: This figure drawing not included in the quote}, and so once again its relative location marks the direction of travel.

The wavefunction ψ = cos kx is real and corresponds to a standing wave with no net motion in either direction. It can be expressed as a superposition of the wavefunctions for motion to the left and right, because,

$$\psi = \cos(k\cdot x) = \frac{1}{2}\cdot\left(e^{i\cdot k\cdot x} + e^{-i\cdot k\cdot x}\right) \qquad \text{eq. 51}$$

and the imaginary, direction-indicating component of the wavefunction has been canceled." {End of quote.}

The similarities of the above equations involving quantum particles to the equations involving standing waves of a transmission line on the bottom of page 3 above are quite apparent. Then, it is suggested that since the quantum and macro-electronic equations are so similar, it may be possible to cause movement of a macro-quantum craft simply by altering its *phase* or *wavefunction*. It is also suggested that quantum space is very similar to transmission line geometry as far as how the particles move through space. Then, if you can see it, it is real and has a standing wave that is real. This is how the so-called UFO's may most likely appear and disappear so suddenly.

The following is also quoted from source [3] to further illuminate the nature of the wavefunction and its action on the particle motion:

"All wavefunctions of definite and nonzero energy are complex if we allow for their time dependence, since a time dependent wavefunction is the product of a spatial wavefunction ψ and a factor $e^{-iEt / 2\pi h}$. The rate at which a time dependent wavefunction changes from real to imaginary is therefore determined by its energy: The higher the energy the faster the wavefunction oscillates between purely real and purely imaginary. In this sense (and perhaps all the other rich, familiar attributes of energy are consequences of this sense), 'energy' is the rate of modulation of a wavefunction from real to imaginary." {End of quote.}

Also quoted: "a purely real (or purely imaginary) time-independant wavefunction represents a system with no net motion." {End of quote.} [4] Thus a UFO could be standing still (and be invisible) if it were totally in the imaginary wavefunction mode.

This may also explain why UFO's seem at times to be translucent and also why they would want to avoid radar. Radar would tend to interfere with the wavefunction, maybe even cause the UFO to crash. Just a Roswell type thought.

In summary, the foregoing has established that the mass related to the electron, (and possibly all other particles), is the result of quantum electrical standing waves. Based on this analysis, it is predicted that a large scale system may also be constructed which will mimic the electron in a quantum sense, that is, tunnel through ordinary space to pop out somewhere else instantaneously.

The energy required to do this 'jump' is not contained in the particle or structure, but simply gated in from energy space by controlling the particle or systems wave-function in a suitable fashion as described above. We may say that in order that the standing wave that makes up the particle be conserved, the energy is gated in to move the particle to a new point in space which in effect will conserve the standing wave and thus the integrity of the particle itself. This also suggests a method of tapping into energy space using a system of coherently managed particles where a single wavefunction would control them all and the energy imparted to the particles in unison from energy space would be converted by a suitable energy exchange device for use on an ordinary electric power grid.

Finally, we do not need for authorities to admit nor deny the existence of UFO's. They do exist and have been around much longer than the so called authorities.

-- Author --

Jerry E. Bayles

REFERENCES

[1] Introduction To Electromagnetic Fields; Paul, Clayton R. and Nasar, Syed A., McGraw-Hill International Editions, 1987, p. 394, eq. 37a & 37b.

[2] The Undivided Universe; Bohm, David and Hiley, Basil j., Routledge Press, 1993, pp. 28-54.

[3] Quanta; Atkins, P. W., Oxford University Press, 1991, pp. 61-62.

[4] Quanta; Atkins, P. W., Oxford University Press, 1991, p. 394.

Note: For those who wish an excellent and understandable companion reference to the book "Quanta" above, I recommend P. W. Atkins book, Molecular Quantum Mechanics by P. W. Atkins and R. S. Friedman. I obtained the third edition, (Oxford University Press), 1997, from Barnes & Noble on the web.

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