THE PHYSICS OF FREE ENERGY DEVICES

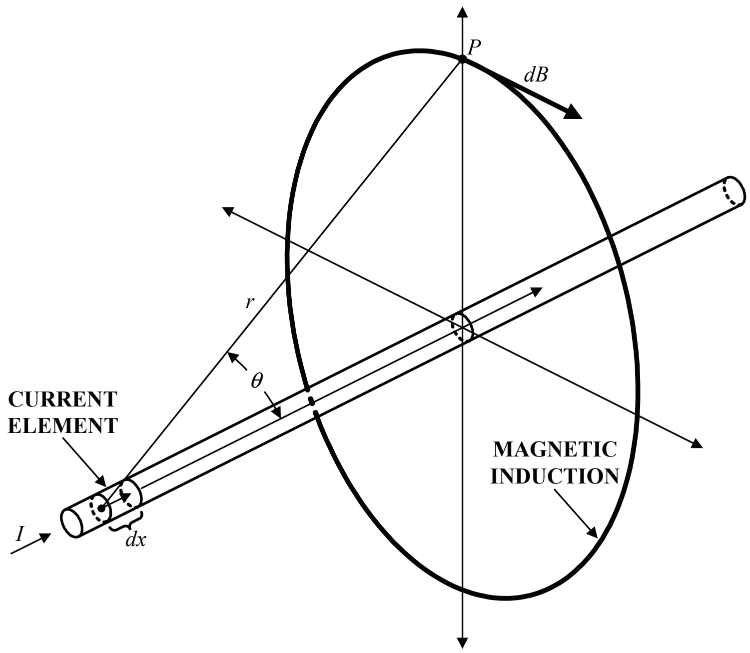

FIGURE 1. The magnetic induction produced by a positive current element.

A constant positive electric current I must create a stable magnetic field B around a wire. This stable field is due to the flow of electric current shown above. The change of magnetic induction dB at a fixed point P produced by a current element dx is calculated using the Biot-Savart's Law,

$$dB = \frac{\mu_0 I}{4\pi} \frac{dx \times r}{r^3} \tag{1}$$

Or,

$$dB = \frac{\mu_0 I}{4\pi} \frac{\sin(\theta) dx}{r^2} \tag{2}$$

Since charge q is quantized in a single electron e^-, the electric current I is defined as quantity N of charges e^- passing a fixed point per change of time dt or,

$$I = \dot{q} = \frac{q}{dt} = \frac{N e^-}{dt} \tag{3}$$

And velocity v_x of an electron passing a fixed point is defined as change of distance dx per change of time dt or,

$$v_x = \dot{x} = \frac{dx}{dt} \tag{4}$$

Or,

$$dt = \frac{dx}{v_x}$$

Then, the electric current I is redefined as,

$$I = v_x \frac{N\, e^-}{dx} \tag{5}$$

So, the change of magnetic induction dB at a fixed point P produced by quantity N of charges e^- moving at velocity v_x is,

$$dB = \frac{\mu_0\, v_x}{4\pi} \frac{N\, e^- \sin(\theta)}{r^2} \tag{6}$$

To find the magnetic induction B produced by a single electron at point P when $\theta = 90^\circ$ and $N = 1$, then integrate,

$$B = \int dB = \frac{\mu_0\, e^-\, v_x}{4\pi\, r^2} \tag{7}$$

The total energy density η_B of magnetic field B contained within volume $\mathcal{V}$ is,

$$\eta_B = \frac{U_B}{\mathcal{V}} = \frac{B^2}{2\,\mu_0} \tag{8}$$

Therefore, the total field energy U_B of magnetic field B contained within volume $\mathcal{V}$ is,

$$U_B = \frac{B^2}{2\,\mu_0}\mathcal{V} = \frac{\mu_0 \left(e^-\right)^2 {v_x}^2}{32\,\pi^2\, r^4}\mathcal{V} \tag{9}$$

The solution of the Dirac Equation shows the total energy E_M contained within matter $\pm M$ is,

$$E_M = \pm M\, c^2 \tag{10}$$

Equate total magnetic field energy U_B to the total energy $\pm E_M$ contained within matter,

$$U_B = \pm E_M \tag{11}$$

Therefore, the magnetic mass M_B and the total magnetic field energy U_B contained within volume $\mathcal{V}$ is,

$$M_B = \frac{U_B}{c^2} = \frac{\mu_0 \left(e^-\right)^2}{32\,\pi^2\, r^4} \frac{{v_x}^2}{c^2}\mathcal{V} \tag{12}$$

Likewise, the fluctuating magnetic mass dM_B and the fluctuating total magnetic field energy dU_B contained within a change of volume $d\mathcal{V}$ is,

$$dM_B = \frac{dU_B}{c^2} = \frac{\mu_0 \left(e^-\right)^2}{32\pi^2 r^4} \frac{{v_x}^2}{c^2} d\mathcal{V} \tag{13}$$

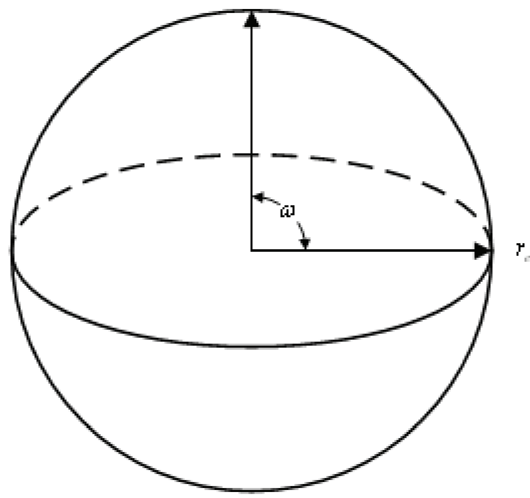

FIGURE 2. The volume $\mathcal{V}$ of an electron is initially modeled as a spheroid.

The volume of an electron is initially modeled as a spheroid,

$$\mathcal{V} = 2\pi \int_0^{\pi} \sin(\omega) d\omega \int_0^{r_e} r^2 dr = 4\pi \int_0^{r_e} r^2 dr \tag{14}$$

Since the energy of an electron is finite, no electric or magnetic field component or mass can exist at its' center. Therefore, the electric, magnetic and mass must exist outside the sphere. Now, the volume of an electron is modeled as an empty spheroid with only surface area. Given the radius of a fluctuating magnetic mass dM_e ranging from a classic electron radius r_e to infinity, or $r_e \le r \le \infty$, the derivative form of a moving electron is,

$$dM_B = \frac{dU_B}{c^2} = \frac{\mu_0 \left(e^-\right)^2}{32\pi^2 r^4} \frac{{v_x}^2}{c^2} d\left(4\pi \int_{r_e}^{\infty} r^2 dr\right) = \frac{\mu_0 \left(e^-\right)^2}{8\pi} \frac{{v_x}^2}{c^2} d\left(\int_{r_e}^{\infty} \frac{1}{r^2} dr\right) \tag{15}$$

The fluctuating magnetic mass dM_B is,

$$dM_B = \frac{dU_B}{c^2} = \frac{\mu_0 \left(e^-\right)^2}{8\pi r_e} \frac{{v_x}^2}{c^2} \tag{16}$$

So, given the rest mass of an electron M_e, the difference form of the *special relativistic* mass M_{ev} of an electron moving at velocity v_x is

$$M_{ev} = \gamma_{SR}\, M_e = M_e \pm \dot{M}_e = M_e \pm dM_e = M_e\left(1 \pm \frac{{v_x}^2}{2\,c^2}\right) \tag{17}$$

By equating the fluctuating magnetic mass dM_B to the *special relativistic* mass dM_e,

$$dM_B = dM_e = \frac{\mu_0\left(e^-\right)^2}{8\pi r_e}\frac{{v_x}^2}{c^2} = \frac{M_e}{2}\frac{{v_x}^2}{c^2} \tag{18}$$

The equation reduces to,

$$M_e = \frac{\mu_0\left(e^-\right)^2}{4\pi r_e} \tag{19}$$

So, given,

- Permeability of free space $\mu_0 = 4\pi \times 10^{-7}\ H/m$
- Fundamental charge of an electron $e^- = 1.602177 \times 10^{-19}\, C$
- Classic electron radius $r_e = 2.817941 \times 10^{-15}\, m$
- Actual Rest mass of an electron $M_e' = 9.109390 \times 10^{-31}\, kg$

$$M_e = \frac{\left(4\pi \times 10^{-7}\ H/m\right)\left(1.602177 \times 10^{-19}\, C\right)^2}{4\pi\left(2.817941 \times 10^{-15}\, m\right)} \tag{20}$$

This shows the calculated mass M_e of an electron is identical to its' actual rest mass M_e',

$$9.109386 \times 10^{-31}\, kg \Leftrightarrow 9.109390 \times 10^{-31}\, kg \tag{21}$$

So, the fluctuating magnetic mass ΔM_B, which is outside the electron, is the fluctuating mass ΔM_e of the electron,

$$\Delta M_B = \Delta M_e = M_e \frac{{v_x}^2}{2\,c^2} \tag{22}$$

So, the velocity of an electron is,

$$v_x = \sqrt{\frac{2\,\Delta M_e c^2}{M_e}} = \sqrt{\frac{2\Delta M_B c^2}{M_e}} = \sqrt{\frac{2\Delta U_B}{M_e}} \tag{23}$$

Therefore, if the fluctuating magnetic field energy is **positive**, then the velocity of the electron is *real*. However, if the fluctuating magnetic field energy is **negative**, then the velocity is *imaginary*.

Likewise, if the fluctuating magnetic mass is **positive**, then the velocity of the electron is *real*. However, if the fluctuating magnetic mass is **negative**, then the velocity is *imaginary*.

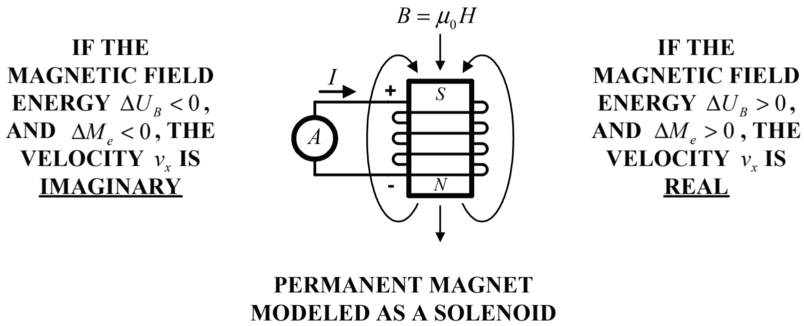

FIGURE 27. The fluctuating magnetic field energy.

Now, the difference form of the inertial RED SHIFT (or BLUE SHIFT) of the magnetic mass $\Delta M_B / M_B$ and the mass $\Delta M_e / M_e$ of a particle moving at a velocity v_x is,

$$\frac{\Delta M_B}{M_B} = \frac{\Delta M_e}{M_e} = \frac{v_x^{\,2}}{2c^2} \tag{24}$$

A particle can move at a *real* (i.e., time-forward) velocity v_x, at an *imaginary* (i.e., time-reversed) velocity $j\,v_x$, or at a velocity that is a combination of the two. The *real* and *imaginary* components are rotated about the temporal axis and therefore, can be described as *complex* motion. The rotation is given as $0° \le \theta \le 90°$, where the *real* axis is $\theta = 0°$ and the *imaginary* time-reversed axis is $\theta = 90°$. The complex number uses the Euler's identity $e^{j\theta}$, which functions as a temporal rotation operator or phase operator. The *complex* velocity v_x is,

$$v_x = v\,e^{j\theta} = v\cos\theta + j\,v\sin\theta \tag{25}$$

Given the rest mass of an electron M_e or the classic electron radius r_e, the difference forms of the *special relativistic* magnetic mass M_{ev} model of a particle moving at a *complex* velocity v_x, where $0° \le \theta \le 90°$ are,

$$M_{ev} = M_e \pm \Delta M_e = M_e\left(1 \pm \frac{v_x^{\,2}}{2c^2}\right) = M_e\, e^{\left(\frac{v_x^{\,2}}{2c^2}\right)} \tag{26}$$

$$M_{ev} = M_e \pm \Delta M_e = \frac{\mu_0\left(e^-\right)^2}{4\pi\, r_e}\left(1 \pm \frac{v_x^{\,2}}{2c^2}\right) = \frac{\mu_0\left(e^-\right)^2}{4\pi\, r_e}\, e^{\left(\frac{v_x^{\,2}}{2c^2}\right)} \tag{27}$$

Now, apply the new **Principle of Equivalence Theorem** where the fluctuating magnetic mass of a moving electron is equivalent to *natural relativistic* mass due to the Earth's gravity well,

$$\Delta M_e = \frac{\mu_0 \left(e^-\right)^2}{8\pi r_e} \frac{v_x^{\,2}}{c^2} = M_e \frac{v_x^{\,2}}{2c^2} = M_e \frac{\left(g_{y_1}\, y_1 - g_{y_0}\, y_0\right)}{c^2} = G\, M_E\, M_e \frac{\left(\frac{1}{y_1} - \frac{1}{y_0}\right)}{c^2} \tag{28}$$

$$v_x = \sqrt{2\left(g_{y_1}\, y_1 - g_{y_0}\, y_0\right)} = \sqrt{2\, G\, M_E \left(\frac{1}{y_1} - \frac{1}{y_0}\right)} \tag{29}$$

The position y_1 of an electron moving at a velocity v_x within Earth's gravity well g_Y where $0 < y_1 \le \infty$ or $-1 \le \frac{y_0\, v_x^{\,2}}{2\, G\, M_E}$ is,

$$y_1 = \frac{1}{g_{y_1}}\left(g_{y_0}\, y_0 + \frac{v_x^{\,2}}{2}\right) = \frac{1}{g_{y_1}}\left(g_{y_0}\, y_0 + \frac{\Delta M_e\, c^2}{M_e}\right) \tag{30}$$

$$y_1 = \frac{y_0}{1 + \frac{y_0\, v_x^{\,2}}{2\, G\, M_E}} = \frac{y_0}{1 + \frac{y_0\, c^2\, \Delta M_e}{G\, M_E\, M_e}} \tag{31}$$

The equivalent maximum *complex* velocity $v_{x\max}$ at $y_1 = \infty$ is,

$$v_{x\max} = \sqrt{-\frac{2\, G\, M_E}{y_0}} \tag{32}$$

Given the equivalent maximum *complex* velocity $v_{x\max}$, the minimum gravitational mass $M_{e\min}$ at $y_1 = \infty$ is,

$$M_{e\min} = M_e\left(1 + \frac{v_x^{\,2}}{2\, c^2}\right) = M_e\left(1 - \frac{G\, M_E}{y_0\, c^2}\right) = M_e\, e^{\left(-\frac{G\, M_E}{y_0\, c^2}\right)} \tag{33}$$

The equivalent maximum fluctuating gravitational mass of the electron ΔM_e at $y_1 = \infty$ is,

$$\Delta M_{e\max} = M_{e\min} - M_e = -\frac{G\, M_E\, M_e}{y_0\, c^2} \tag{34}$$

So, the difference form of the gravitational RED SHIFT (or BLUE SHIFT) of the magnetic mass $\Delta M_B / M_B$ and the mass $\Delta M_e / M_e$ of a particle displaced a distance Δy within a given gravity well g_Y is,

$$\frac{\Delta M_B}{M_B} = \frac{\Delta M_e}{M_e} = \frac{\left(g_{y_1}\, y_1 - g_{y_0}\, y_0\right)}{c^2} \tag{35}$$

Given the rest mass of an electron M_e or the classic electron radius r_e, the difference forms of the *natural relativistic* mass M_{ey_1} model of a particle displaced a distance Δy within a given gravity well g_Y are,

$$M_{ey_1} = M_e \pm \Delta M_e = M_e \left(1 \pm \frac{\left(g_{y_1}\, y_1 - g_{y_0}\, y_0 \right)}{c^2} \right) = M_e\, e^{\left(\frac{g_{y_1}\, y_1 - g_{y_0} y_0}{c^2} \right)} \tag{36}$$

$$M_{ey_1} = M_e \pm \Delta M_e = \frac{\mu_0 \left(e^- \right)^2}{4\pi\, r_e} \left(1 \pm \frac{\left(g_{y_1}\, y_1 - g_{y_0}\, y_0 \right)}{c^2} \right) = \frac{\mu_0 \left(e^- \right)^2}{4\pi\, r_e} e^{\left(\frac{g_{y_1}\, y_1 - g_{y_0} y_0}{c^2} \right)} \tag{37}$$

In summary, Gravitomagnetic Theory shows that a moving electron produces an increase in *relativistic* mass that extends from its' classic radius r_e to infinity, and couples to gravity. This motion can either have a velocity v_x or a *complex* (i.e., time-future) velocity $j\, v_x$. If the velocity is *complex*, then the electron will exhibit an antigravitational effect, and produce a *complex* (i.e., time-future) magnetic field $j\, B$. In addition, the total field energy U_B of a *complex* magnetic field $j\, B$ contained within a volume $\mathcal{V}$ is NEGATIVE.

Example 6. An electron e^- moving through a wire at a time-forward velocity v_x where $\theta = 0°$ produces a time-forward magnetic induction B at a distance r.

Given,

- Direction of time is forward $\theta = 0°$
- Velocity of electron e^- through a wire $v = 1.0 \times 10^{-2}\ m/\text{sec}$
- Permeability of free space $\mu_0 = 4\pi \times 10^{-7}\ H/m$
- Fundamental charge of an electron $e^- = 1.602177 \times 10^{-19}\, C$
- Rest mass of an electron $M_e = 9.109390 \times 10^{-31}\, kg$
- Radius $r = 1.0\, m$
- Gravitational constant $G = 6.67260 \times 10^{-11}\ N\, m^2 / kg^2$
- Radius of surface of Earth $y_0 = 6.3781 \times 10^{6}\, m$
- Mass of the Earth $M_E = 5.9787 \times 10^{24}\ kg$

The time-forward velocity v_x, where $\theta = 0°$ is,

$$v_x = v\, e^{j\theta} = \left(1.0 \times 10^{-2}\ m/\text{sec} \right) e^{j0°} = 1.0 \times 10^{-2}\ m/\text{sec} \tag{38}$$

The time-forward magnetic induction B at distance r is,

$$B = \frac{\mu_0\, e^-\, v_x}{4\pi\, r^2} = \frac{\left(4\pi \times 10^{-7}\ H/m \right)\left(1.602177 \times 10^{-19}\ C \right)\left(1.0 \times 10^{-2}\ m/\text{sec} \right)}{4\pi \left(1.0\, m \right)^2} \tag{39}$$

$$B = 1.602177 \times 10^{-28}\, T \tag{40}$$

The POSITIVE fluctuating mass ΔM_e of the electron e^- is,

$$\Delta M_e = M_e \frac{v_x^{\,2}}{2c^2} = \left(9.1093897\times10^{-31}\,kg\right)\frac{\left(1.0\times10^{-2}\ m/\sec\right)^2}{2\left(2.99792458\times10^{8}\ m/\sec\right)^2} \tag{41}$$

$$\Delta M_e = 5.067782\times10^{-52}\,kg \tag{42}$$

Applying the new **Principle of Equivalence Theorem**,

$$y_1 = \frac{y_0}{1+\dfrac{y_0\,v_x^{\,2}}{2\,G\,M_E}} = \frac{\left(6.3781\times10^{6}\,m\right)}{1+\dfrac{\left(6.3781\times10^{6}\,m\right)\left(1.0\times10^{-2}\ m/\sec\right)^2}{2\left(6.67260\times10^{-11}\ N\,m^2/kg^2\right)\left(5.9787\times10^{24}\ kg\right)}} \tag{43}$$

$$y_1 = 6.37809999999490\times10^{6}\,m \tag{44}$$

So, the equivalent POSITIVE displacement Δy is gravitational within the Earth's gravity well is,

$$\Delta y = y_0 - y_1 = 5.0981\times10^{-6}\,m \tag{45}$$

Example 7. An electron e^- moving through a wire at a time-advanced velocity v_x where $0° < \theta < 90°$ produces a time-advanced magnetic induction B at a distance r.

Given,

- Direction of time is advanced $\theta = 45°$
- Velocity of electron e^- through a wire $v = 1.0\times10^{-2}\ m/\sec$
- Permeability of free space $\mu_0 = 4\pi\times10^{-7}\ H/m$
- Fundamental charge of an electron $e^- = 1.602177\times10^{-19}\,C$
- Rest mass of an electron $M_e = 9.109390\times10^{-31}\,kg$
- Radius $r = 1.0\,m$
- Gravitational constant $G = 6.67260\times10^{-11}\ N\,m^2/kg^2$
- Radius of surface of Earth $y_0 = 6.3781\times10^{6}\,m$
- Mass of the Earth $M_E = 5.9787\times10^{24}\ kg$

The time-advanced velocity v_x, where $\theta = 45°$ is,

$$v_x = v\,e^{j\theta} = \left(1.0\times10^{-2}\ m/\sec\right)e^{j\,45°} = 7.071068\times10^{-3} + 7.071068\,j\times10^{-3}\ m/\sec \tag{46}$$

The time-advanced magnetic induction B at distance r is,

$$B = \frac{\mu_0\,e^-\,v_x}{4\pi\,r^2} = \frac{\left(4\pi\times10^{-7}\ H/m\right)\left(1.602177\times10^{-19}\ C\right)\left(7.071068\times10^{-3} + 7.071068\,j\times10^{-3}\ m/\sec\right)}{4\pi\left(1.0\,m\right)^2} \tag{47}$$

$$B = 1.132910\times10^{-28} + 1.132910\,j\times10^{-28}\,T \tag{48}$$

The IMAGINARY fluctuating mass ΔM_e of the electron e^- is,

$$\Delta M_e = M_e \frac{{v_x}^2}{2c^2} = \left(9.1093897\times10^{-31}\,kg\right)\frac{\left(7.071068\times10^{-3} + 7.071068\,j\times10^{-3}\ m/\sec\right)^2}{2\left(2.99792458\times10^{8}\ m/\sec\right)^2} \tag{49}$$

$$\Delta M_e = 5.067782\,j\times10^{-52}\,kg \tag{50}$$

Applying the new **Principle of Equivalence Theorem**,

$$y_1 = \frac{y_0}{1+\dfrac{y_0\,{v_x}^2}{2\,G\,M_E}} = \frac{\left(6.3781\times10^{6}\,m\right)}{1+\dfrac{\left(6.3781\times10^{6}\,m\right)\left(7.071068\times10^{-3}+7.071068\,j\times10^{-3}\ m/\sec\right)^2}{2\left(6.67260\times10^{-11}\ N\,m^2/kg^2\right)\left(5.9787\times10^{24}\ kg\right)}} \tag{51}$$

$$y_1 = 6.3781\times10^{6}\,m - 5.0986\,j\times10^{-6}\,m \tag{52}$$

So, the equivalent IMAGINARY displacement Δy is shown to be non-gravitational within the Earth's gravity well is,

$$\Delta y = y_0 - y_1 = 5.0986\,j\times10^{-6}\,m \tag{53}$$

The maximum time-future velocity $v_{x\max}$ within the Earth's gravity well is,

$$v_{x\max} = \sqrt{-\frac{2\,G\,M_E}{y_0}} = \sqrt{-\frac{2\left(6.67260\times10^{-11}\ N\,m^2/kg^2\right)\left(5.9787\times10^{24}\ kg\right)}{\left(6.3781\times10^{6}\,m\right)}} \tag{54}$$

$$v_{x\max} = 1.11846\,j\times10^{4}\ m/\sec \tag{55}$$

Example 8. An electron e^- moving through a wire at a time-future velocity v_x where $\theta = 90°$ produces a time-future magnetic induction B at a distance r.

Given,

- Direction of time is future $\theta = 90°$
- Velocity of electron e^- through a wire $v = 1.0\times10^{-2}\ m/\sec$
- Permeability of free space $\mu_0 = 4\pi\times10^{-7}\ H/m$
- Fundamental charge of an electron $e^- = 1.602177\times10^{-19}\,C$
- Rest mass of an electron $M_e = 9.109390\times10^{-31}\,kg$
- Radius $r = 1.0\,m$
- Gravitational constant $G = 6.67260\times10^{-11}\ N\,m^2/kg^2$
- Radius of surface of Earth $y_0 = 6.3781\times10^{6}\,m$
- Mass of the Earth $M_E = 5.9787\times10^{24}\ kg$

The time-future velocity v_x, where $\theta = 90°$ is,

$$v_x = v\,e^{j\theta} = \left(1.0\times10^{-2}\ m/\sec\right)e^{j90°} = 1.0\,j\times10^{-2}\ m/\sec \tag{56}$$

The time-future magnetic induction B at distance r is,

$$B = \frac{\mu_0 \, e^- \, v_x}{4\pi \, r^2} = \frac{\left(4\pi \times 10^{-7} \; H/m\right)\left(1.602177 \times 10^{-19} \; C\right)\left(1.0\, j \times 10^{-2} \; m/\sec\right)}{4\pi \left(1.0\, m\right)^2} \tag{57}$$

$$B = 1.602177\, j \times 10^{-28}\, T \tag{58}$$

The NEGATIVE fluctuating mass ΔM_e of the electron e^- is,

$$\Delta M_e = M_e \frac{{v_x}^2}{2c^2} = \left(9.1093897 \times 10^{-31} kg\right) \frac{\left(1.0\, j \times 10^{-2} \; m/\sec\right)^2}{2\left(2.99792458 \times 10^{8} \; m/\sec\right)^2} \tag{59}$$

$$\Delta M_e = -5.067782 \times 10^{-52}\, kg \tag{60}$$

Applying the new **Principle of Equivalence Theorem**,

$$y_1 = \frac{y_0}{1 + \dfrac{y_0 \, {v_x}^2}{2\, G\, M_E}} = \frac{\left(6.3781 \times 10^{6}\, m\right)}{1 + \dfrac{\left(6.3781 \times 10^{6}\, m\right)\left(1.0\, j \times 10^{-2} \; m/\sec\right)^2}{2\left(6.67260 \times 10^{-11} \; N\, m^2/kg^2\right)\left(5.9787 \times 10^{24} \; kg\right)}} \tag{61}$$

$$y_1 = 6.37800000000510 \times 10^{6}\, m \tag{62}$$

So, the equivalent NEGATIVE displacement Δy is antigravitational within the Earth's gravity well is,

$$\Delta y = y_0 - y_1 = -5.0981 \times 10^{-6}\, m \tag{63}$$

The maximum time-future velocity $v_{x\max}$ within the Earth's gravity well is,

$$v_{x\max} = \sqrt{-\frac{2\, G\, M_E}{y_0}} = \sqrt{-\frac{2\left(6.67260 \times 10^{-11} \; N\, m^2/kg^2\right)\left(5.9787 \times 10^{24} \; kg\right)}{\left(6.3781 \times 10^{6}\, m\right)}} \tag{64}$$

$$v_{x\max} = 1.11846\, j \times 10^{4} \; m/\sec \gg v_x \tag{65}$$