HOW TO CONTROL

GRAVIMETRIC MASS FLUCTUATIONS

FOR

ENERGY

AND

PROPULSION

TECHNOLOGIES

REV. 1.1

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OCCAM'S RAZOR

"All things being equal, the simplest explanation tends to be the correct one".

ABSTRACT

The purpose of this paper is to reveal a side of classical physics that contains an intrinsic *relativistic* phenomenon called Gravimetric Mass Fluctuations.

A correlation is established between mass, inductors, and capacitors, thereby linking electromagnetism and gravity.

A simplified relativity model is presented that correlates Einstein's Special Relativity to gravitational frames of reference, thereby creating a new "Principle of Equivalence".

An aether model composed entirely of NEGATIVE Gravimetric Energy which acts to repel common condensed matter is also presented.

This paper discloses the presence of NEGATIVE RESISTANCE, the production of NEGATIVE ENERGY, and the control of (Anti)Gravity simply by fluctuating the mass of an object. The theory presents a conceptual breakthrough in energy and high-speed field propulsion technology, and explores solutions based almost entirely in classical physics.

MUTUAL EXCLUSION PRINCIPLE FOR METRICS OF SPACE-TIME

For **Kinetic-based** systems, the following metrics are invariant within any gravitational frame g_{Υ}:

1. Mass, M.
2. Energy equivalent of Mass, E_M.
3. Inductance, L.
4. Capacitance, C.
5. Electromagnetic energy stored in Mass, $\mathcal{E}$.

However, for **Gravimetric-based** systems and given a common gravitational frame of reference, the same metrics fluctuates across many gravitational frames.

The mutual exclusion principle is mathematically expressed as follows,

$$z(t) = \frac{d}{dt}(x\,y) = x\frac{dy}{dt} + y\frac{dx}{dt} = \underbrace{y\,\dot{x}}_{\text{KINETIC COUPLING TERM}} + \underbrace{x\,\dot{y}}_{\text{GRAVIMETRIC COUPLING TERM}}$$

So, for a **Kinetic-based**, or mass invariant system, either,

$$z(t) = y\,\dot{x}$$

Or, for a **Gravimetric-based**, or mass fluctuating system,

$$z(t) = x\,\dot{y}$$

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GRAVIMETRIC MASS FLUCTUATION

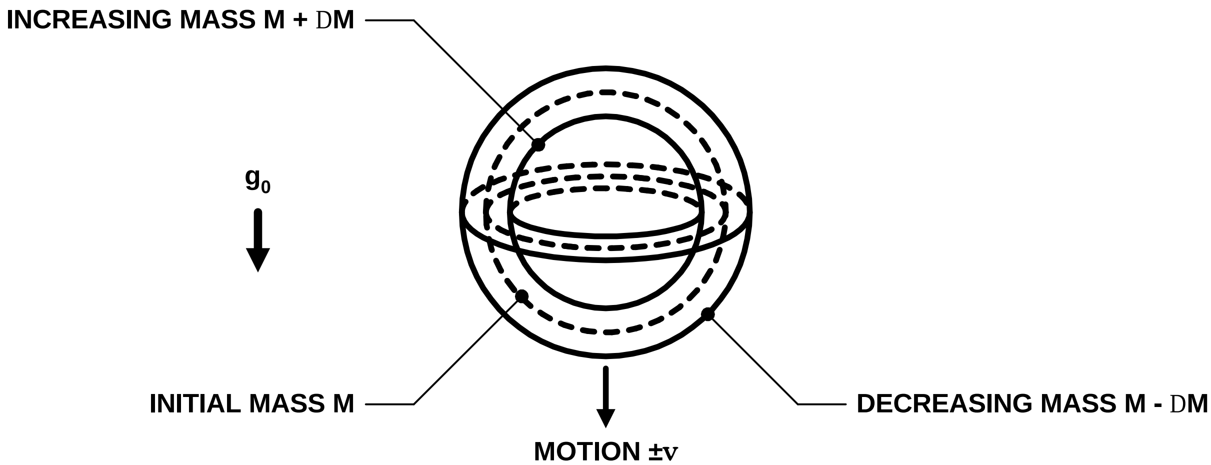

Figure 1. An ideal fluctuating mass M ± DM, moving at velocity ±v.

The *complete* ideal momentum model is composed of two terms,

$$f_M(t) = \frac{d}{dt}(M\mathbf{v}) = M\frac{d\mathbf{v}}{dt} + \mathbf{v}\frac{dM}{dt} = \underbrace{M\dot{\mathbf{v}}}_{\text{KINETIC COUPLING TERM}} + \underbrace{\mathbf{v}\dot{M}}_{\text{GRAVIMETRIC COUPLING TERM}} \qquad 1$$

Where,

Kinetic Coupling Term: Mass M, is invariant within any gravitational frame, g_{Y}.

Gravimetric Coupling Term: Changing mass $\dot{M}$, fluctuates across many gravitational frames.

For a "mass invariant" system, the **Gravimetric Coupling Term** is,

$$f_M(t) = \mathbf{v}\dot{M} = 0 \text{ N} \qquad 2$$

However, for a "mass fluctuating" system, the **Gravimetric Coupling Term** is NOT zero newtons. Given a mass moving at constant velocity, it follows the **Kinetic Coupling Term** is,

$$f_M(t) = M\dot{\mathbf{v}} = 0 \text{ N} \qquad 3$$

This removes the **Kinetic Coupling Term**, leaving only the **Gravimetric Coupling Term**,

$$f_M(t) = \mathbf{v}\,\dot{M} \qquad 4$$

Since $\dot{M}$ has units of resistance in Nsm/m^2, its direction of change could either be positive or negative. If $\dot{M}$ is decreasing, it has units of "NEGATIVE" resistance or,

$$\dot{M} < 0 \text{ Nsm/m}^2 \qquad 5$$

Now, the instantaneous gravimetric power of a fluctuating mass $\dot{M}$ is,

$$P_M(t) = \mathbf{v}\, f_M(t) = \mathbf{v}^2\,\dot{M} \qquad 6$$

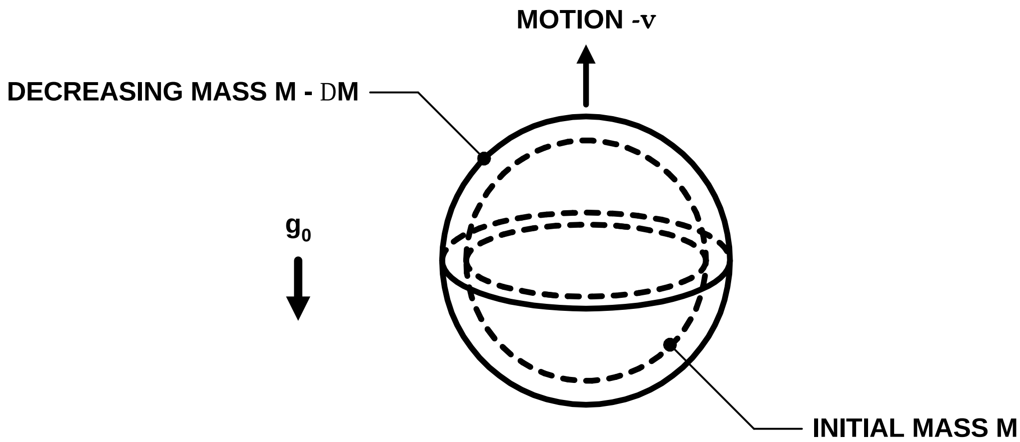

Figure 2. An ideal decreasing mass M - DM.

So, for certain values of $\dot{M}$, the total instantaneous power can be NEGATIVE or,

$$P_M(t) < 0 \text{ Watts} \qquad 7$$

So, integrating P_M with respect to time when the total power is less than zero watts results in NEGATIVE energy of mass M or,

$$E_M(t) = \int P_M \, dt = \mathbf{v}^2 \int \dot{M} \, dt = M(t) \, \mathbf{v}^2 < 0 \text{ Joules} \qquad 8$$

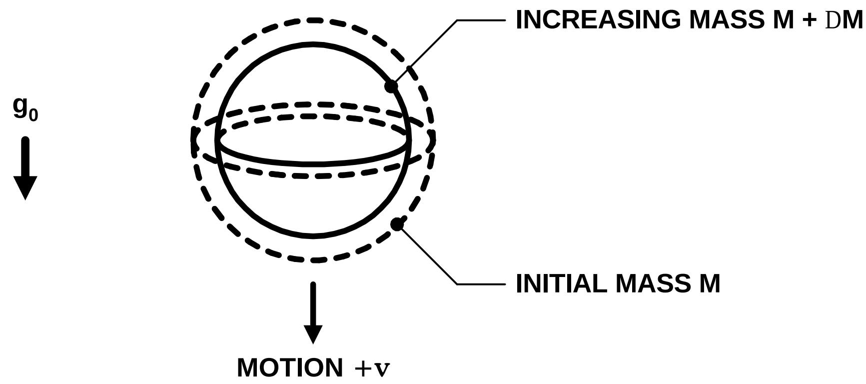

Figure 3. An ideal increasing mass M + DM.

If $\dot{M}$ is increasing, it has units of "POSITIVE" resistance or,

$$\dot{M} > 0 \text{ Nsm/m}^2 \qquad 9$$

Now, the instantaneous gravimetric power of a fluctuating mass $\dot{M}$ is,

$$P_M(t) = \mathbf{v}\, f(t) = \mathbf{v}^2\, \dot{M} \qquad 10$$

So, for certain values of $\dot{M}$, the gravimetric power can be POSITIVE or,

$$P_M(t) > 0 \text{ Watts} \qquad 11$$

So, integrating P_M with respect to time results in excess POSITIVE energy of mass M or,

$$E_M(t) = \int P_M\, dt = \mathbf{v}^2 \int \dot{M}\, dt = M(t)\, \mathbf{v}^2 > 0 \text{ Joules} \qquad 12$$

Letting $\mathbf{c} = \mathbf{v}$, the energy equivalent of mass (**gravimetric energy**) is,

$$E_M(t) = M(t)\,\mathbf{c}^2 \qquad 13$$

Or, the mass equivalent of energy is,

$$M(t) = \frac{E_M(t)}{\mathbf{c}^2} \qquad 14$$

The fluctuating mass equivalent of energy is,

$$\dot{M} = \frac{\dot{E}_M}{\mathbf{c}^2} \qquad 15$$

So,

$$f_M(t) = \dot{M}\mathbf{v} = \frac{\dot{E}_M}{\mathbf{c}^2}\mathbf{v} = \frac{\dot{E}_M}{\mathbf{v}} \qquad 16$$

Letting $\dot{\mathbf{y}} = \mathbf{v}$, the **Gravimetric Mass Coupling Term** is,

$$f_M(t) = \dot{M}\,\dot{\mathbf{y}} \qquad 17$$

And, the **Gravimetric Energy Coupling Term** is,

$$f_M(t) = \frac{\dot{E}_M}{\dot{\mathbf{y}}} \qquad 18$$

Or,

$$\dot{M} = \frac{f_M(t)\,\dot{\mathbf{y}}}{\mathbf{c}^2} \qquad 19$$

GRAVIMETRIC INDUCTIVE MASS FLUCTUATION

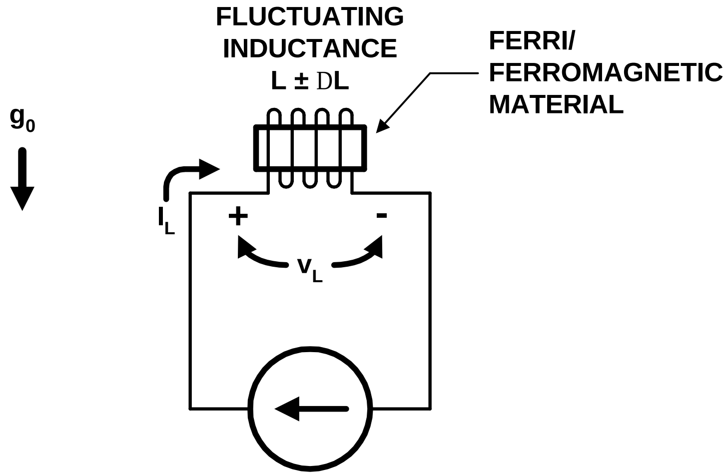

Figure 4. An ideal fluctuating inductor L ± ΔL, with constant current I_L.

The *complete* ideal inductor model is composed of two terms,

$$v_L(t) = \frac{d}{dt}(L\,I_L) = L\frac{dI_L}{dt} + I_L\frac{dL}{dt} = \underbrace{L\dot{I}_L}_{\text{KINETIC COUPLING TERM}} + \underbrace{I_L\dot{L}}_{\text{GRAVIMETRIC COUPLING TERM}} \qquad 20$$

Where,

Kinetic Coupling Term: Inductance L, is invariant within any gravitational frame, g_Ψ.

Gravimetric Coupling Term: Changing inductance $\dot{L}$, fluctuates across many gravitational frames.

For an "inductive invariant" system, the **Gravimetric Coupling Term** is,

$$v_L(t) = I_L \dot{L} = 0 \text{ Volts} \qquad 21$$

However, for an "inductive fluctuating" system, the **Gravimetric Coupling Term** is NOT zero volts. By applying a constant current through inductor L, it follows the **Kinetic Coupling Term** is,

$$v_L(t) = L\dot{I}_L = 0 \text{ Volts} \qquad 22$$

This removes the **Kinetic Coupling Term**, leaving only the **Gravimetric Coupling Term**,

$$v_L(t) = I_L \dot{L} \qquad 23$$

Since $\dot{L}$ has units of resistance in ohms, Ω, its direction of change could either be positive or negative. If $\dot{L}$ is decreasing, it has units of "NEGATIVE" resistance or,

$$\dot{L} < 0\ \Omega \qquad 24$$

Now, the instantaneous gravimetric power of a fluctuating inductor $\dot{L}$ is,

$$P_L(t) = I_L v_L(t) = I_L^2 \dot{L} \qquad 25$$

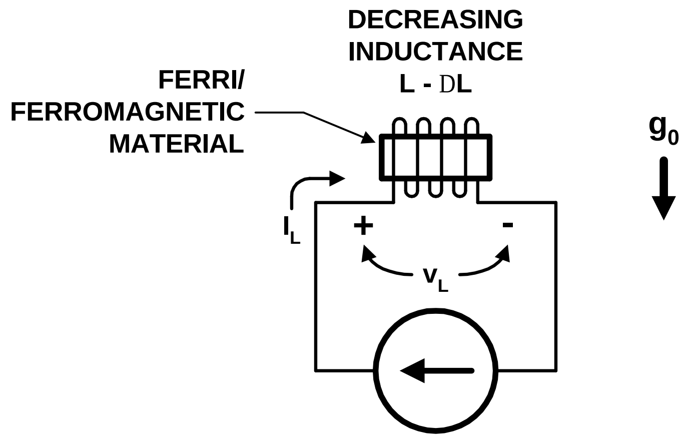

Figure 5. An ideal decreasing inductor L - ΔL.

So, for certain values of $\dot{L}$, the real instantaneous power can be NEGATIVE or,

$$P_L(t) < 0 \text{ Watts} \qquad 26$$

So, integrating P_L with respect to time when the total power is less than zero watts results in NEGATIVE energy of inductor L or,

$$E_L(t) = \int P_L \, dt = I_L^2 \int \dot{L} \, dt = L(t)\, I_L^2 < 0 \text{ Joules} \qquad 27$$

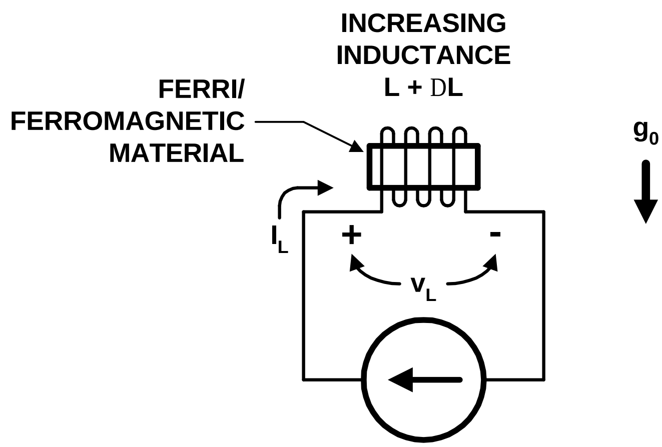

Figure 6. An ideal increasing inductor L + DL.

If $\dot{L}$ is increasing, it has units of "POSITIVE" resistance or,

$$\dot{L} > 0\ \Omega \tag{28}$$

Now, the instantaneous gravimetric power of a fluctuating inductor $\dot{L}$ is,

$$P_L(t) = I_L v_L(t) = I_L^2 \dot{L} \tag{29}$$

So, for certain values of $\dot{L}$, the gravimetric power can be POSITIVE or,

$$P_L(t) > 0 \text{ Watts} \tag{30}$$

So, integrating P_L with respect to time results in excess POSITIVE energy of inductor L or,

$$E_L(t) = \int P_L\, dt = I_L^2 \int \dot{L}\, dt = L(t)\, I_L^2 > 0 \text{ Joules} \tag{31}$$

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Equate to the energy equivalent of mass,

$$E_M(t) = E_L(t) \qquad 32$$

So,

$$M_L(t)\, \mathbf{c}^2 = L(t)\, I_L^{\,2} \qquad 33$$

Or, the mass equivalent of energy is,

$$M_L(t) = \frac{L(t)\, I_L^{\,2}}{\mathbf{c}^2} \qquad 34$$

The fluctuating mass equivalent of energy is,

$$\dot{M}_L = \frac{I_L^{\,2}\, \dot{L}}{\mathbf{c}^2} \qquad 35$$

So,

$$f_L(t) = \dot{M}_L \mathbf{v} = \frac{I_L^{\,2}\, \dot{L}}{\mathbf{c}^2} \mathbf{v} = \frac{I_L^{\,2}\, \dot{L}}{\mathbf{v}} \qquad 36$$

Letting $\dot{\mathbf{y}} = \mathbf{v}$, the **Gravimetric Inductive Energy Coupling Term** is,

$$f_L(t) = \frac{I_L^{\,2}\, \dot{L}}{\dot{\mathbf{y}}} \qquad 37$$

Or,

$$\dot{L} = \frac{f_L(t)\, \dot{\mathbf{y}}}{I_L^{\,2}} \qquad 38$$

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GRAVIMETRIC CAPACITIVE MASS FLUCTUATION

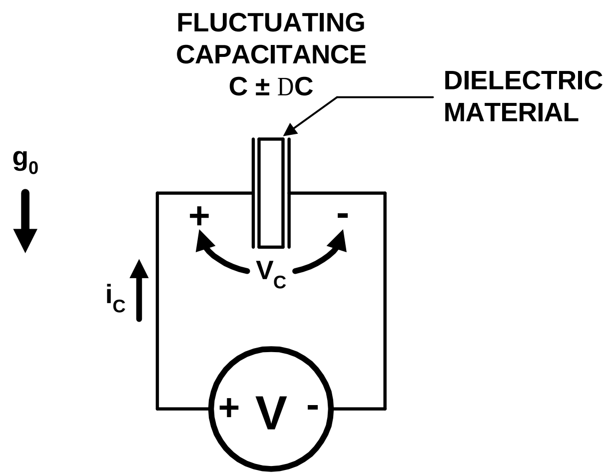

Figure 7. An ideal fluctuating capacitor C ± ΔC, with constant voltage V_C.

The *complete* ideal capacitor model is composed of two terms,

$$i_C(t) = \frac{d}{dt}(C\,V_C) = C\frac{dV_C}{dt} + V_C\frac{dC}{dt} = \underbrace{C\dot{V}_C}_{\text{KINETIC COUPLING TERM}} + \underbrace{V_C\dot{C}}_{\text{GRAVIMETRIC COUPLING TERM}} \qquad 39$$

Where,

Kinetic Coupling Term: Capacitor C, is invariant within any gravitational frame, g_{Y}.

Gravimetric Coupling Term: Changing capacitance $\dot{C}$, fluctuates across many gravitational frames.

For a "capacitive invariant" system, the **Gravimetric Coupling Term** is,

$$i_C(t) = V_C\dot{C} = 0 \text{ Amps} \qquad 40$$

However, for a "capacitive fluctuating" system, the Gravimetric Coupling Term is NOT zero amps. By applying a constant voltage across capacitor C, it follows the **Kinetic Coupling Term** is,

$$i_C(t) = C\dot{V}_C = 0 \text{ Amps} \qquad 41$$

This removes **Kinetic Coupling Term** is removed, leaving only the **Gravimetric Coupling Term**,

$$i_C(t) = V_C\dot{C} \qquad 42$$

Since $\dot{C}$ has units of conductance in mhos, ℧, its direction of change could either be positive or negative. If $\dot{C}$ is decreasing, it has units of "NEGATIVE" conductance or,

$$\dot{C} < 0\ ℧ \qquad 43$$

Now, the instantaneous gravimetric power of a fluctuating capacitor $\dot{C}$ is,

$$P_C(t) = i_C(t)V_C = V_C^2\dot{C} \qquad 44$$

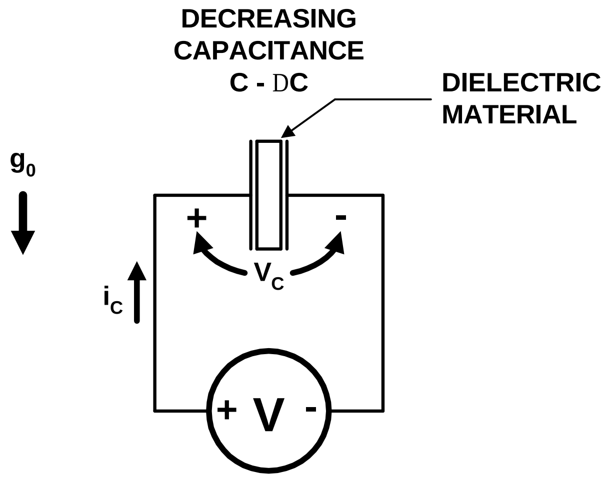

Figure 8. An ideal decreasing capacitor C - DC.

So, for certain values of $\dot{C}$, the total instantaneous power can be NEGATIVE or,

$$P_C(t) < 0 \text{ Watts} \qquad 45$$

So, integrating P_C with respect to time when the total power is less than zero watts results in NEGATIVE energy of capacitor C or,

$$E_C(t) = \int P_C\, dt = V_C^2 \int \dot{C}\, dt = C(t)\, V_C^2 < 0 \text{ Joules} \qquad 46$$

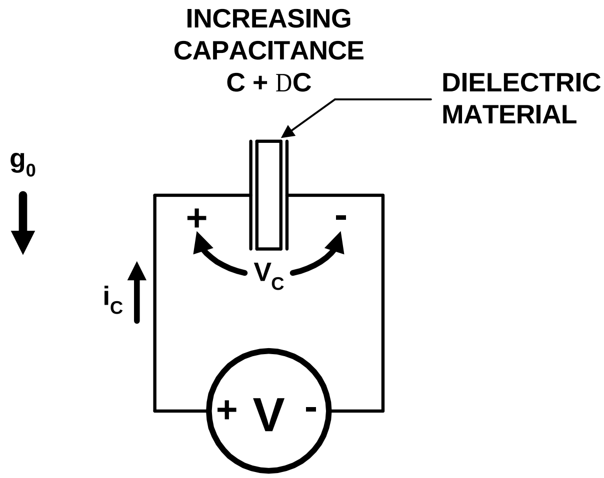

Figure 9. An ideal increasing capacitor C + DC.

If $\dot{C}$ is increasing, it has units of "POSITIVE" conductance or,

$$\dot{C} > 0 \mho \qquad 47$$

Now, the instantaneous gravimetric power of a fluctuating capacitor $\dot{C}$ is,

$$P_C(t) = i_C(t) V_C = V_C^2 \dot{C} \qquad 48$$

So, for certain values of $\dot{C}$, the gravimetric power can be POSITIVE or,

$$P_C(t) > 0 \text{ Watts} \qquad 49$$

So, integrating P_C with respect to time results in excess POSITIVE energy of capacitor C or,

$$E_C(t) = \int P_C \, dt = V_C^2 \int \dot{C} \, dt = C(t) \, V_C^2 > 0 \text{ Joules} \qquad 50$$

Equate to the energy equivalent of mass,

$$E_M(t) = E_C(t) \qquad 51$$

So,

$$M_C(t)\,\mathbf{c}^2 = C(t)\,V_C^2 \qquad 52$$

Or, the mass equivalent of energy is,

$$M_C(t) = \frac{C(t)\,V_C^2}{\mathbf{c}^2} \qquad 53$$

The fluctuating mass equivalent of energy is,

$$\dot{M}_C = \frac{V_C^2\,\dot{C}}{\mathbf{c}^2} \qquad 54$$

So,

$$f_C(t) = \dot{M}_C\mathbf{v}(t) = \frac{V_C^2\,\dot{C}}{\mathbf{c}^2}\mathbf{v} = \frac{V_C^2\,\dot{C}}{\mathbf{v}} \qquad 55$$

Letting $\dot{\mathbf{y}} = \mathbf{v}$, the **Gravimetric Capacitive Energy Coupling Term** is,

$$f_C(t) = \frac{V_C^2\,\dot{C}}{\dot{\mathbf{y}}} \qquad 56$$

Or,

$$\dot{C} = \frac{f_C(t)\,\dot{\mathbf{y}}}{V_C^2} \qquad 57$$

THE GRAVIMETRIC COUPLING OF A FLUCTUATING MASS

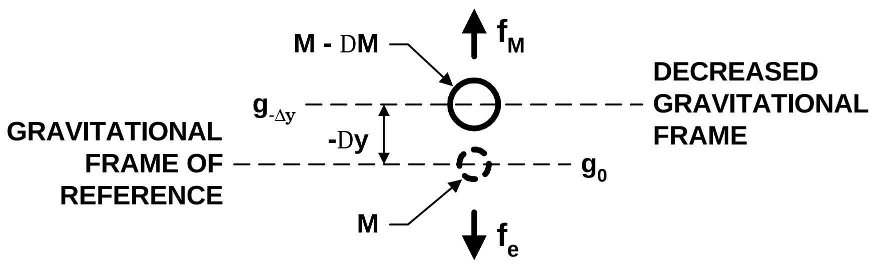

Figure 10. Gravity coupled with an object of mass M.

Gravity acting upon an object of mass M, at the surface of the earth produces a force,

$$f_e(t) = \frac{GM_e}{r_e^{\,2}} M(t) = g_0 M(t) \qquad 58$$

For a fluctuating mass $\dot{M}$, let,

$$f_M(t) = f_e(t) \qquad 59$$

Since,

$$\dot{M} = \frac{f_M(t)\,\dot{\mathbf{y}}}{\mathbf{c}^2} \qquad (19)$$

Then,

$$\dot{M} = \frac{g_0\,M(t)\,\dot{\mathbf{y}}}{\mathbf{c}^2} \qquad 60$$

So, the BLUE SHIFT (RED SHIFT) is,

$$\frac{\dot{M}}{M(t)} = \frac{\dot{E}_M}{E_M(t)} = \frac{g_0\,\dot{\mathbf{y}}}{\mathbf{c}^2} \qquad 61$$

The difference form of a fluctuating mass is,

$$\Delta M = \frac{g_0 M \Delta \mathbf{y}}{\mathbf{c}^2} \qquad 62$$

So, the difference form of BLUE SHIFT (RED SHIFT) is,

$$\frac{\Delta M}{M} = \frac{\Delta E_M}{E_M} = \frac{g_0 \Delta \mathbf{y}}{\mathbf{c}^2} \qquad 63$$

The Pound and Rebka experiment used Mossbaurer spectroscopy to measure the electromagnetic RED SHIFT (BLUE SHIFT) of 14.4 keV gamma rays emitted from Fe^{57}. They showed the RED SHIFT was within one percent of this result,

$$\frac{g_0 \Delta \mathbf{y}}{\mathbf{c}^2} = \frac{(9.80665 \text{ m/sec}^2)(22.6 \text{ m})}{(2.99793 \text{ m/sec})^2} = 2.466 \times 10^{-15} \qquad 64$$

Now, for a fluctuating inductor $\dot{L}$, let,

$$f_L(t) = f_e(t) \qquad 65$$

Since,

$$\dot{L} = \frac{f_L(t)\, \dot{\mathbf{y}}}{l_L^2} \qquad (38)$$

Then,

$$\dot{L} = \frac{g_0 M_L(t)\, \dot{\mathbf{y}}}{l_L^2} = \frac{g_0 L(t)\, \dot{\mathbf{y}}}{\mathbf{c}^2} \qquad 66$$

So, the BLUE SHIFT (RED SHIFT) is,

$$\frac{\dot{L}}{L(t)} = \frac{\dot{E}_L}{E_L(t)} = \frac{g_0\,\dot{\mathbf{y}}}{\mathbf{c}^2} \qquad 67$$

The difference form of a fluctuating inductor is,

$$\Delta L = \frac{g_0\,L\,\Delta\mathbf{y}}{\mathbf{c}^2} \qquad 68$$

So, the difference form of BLUE SHIFT (RED SHIFT) is,

$$\frac{\Delta L}{L} = \frac{\Delta E_L}{E_L} = \frac{g_0\,\Delta\mathbf{y}}{\mathbf{c}^2} \qquad 69$$

Now, for a fluctuating capacitor $\dot{C}$, let,

$$f_C(t) = f_e(t) \qquad 70$$

Since,

$$\dot{C} = \frac{f_C(t)\,\dot{\mathbf{y}}}{V_C{}^2} \qquad (57)$$

Then,

$$\dot{C} = \frac{g_0\,M_C(t)\,\dot{\mathbf{y}}}{V_C{}^2} = \frac{g_0\,C(t)\,\dot{\mathbf{y}}}{\mathbf{c}^2} \qquad 71$$

So, the BLUE SHIFT (RED SHIFT) is,

$$\frac{\dot{C}}{C(t)} = \frac{\dot{E}_C}{E_C(t)} = \frac{g_0\,\dot{\mathbf{y}}}{\mathbf{c}^2} \qquad 72$$

The difference form of a fluctuating capacitor is,

$$\Delta C = \frac{g_0 C \Delta \mathbf{y}}{\mathbf{c}^2} \qquad 73$$

So, the difference form of BLUE SHIFT (RED SHIFT) is,

$$\frac{\Delta C}{C} = \frac{\Delta E_C}{E_C} = \frac{g_0 \Delta \mathbf{y}}{\mathbf{c}^2} \qquad 74$$

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NATURAL RELATIVITY THEORY

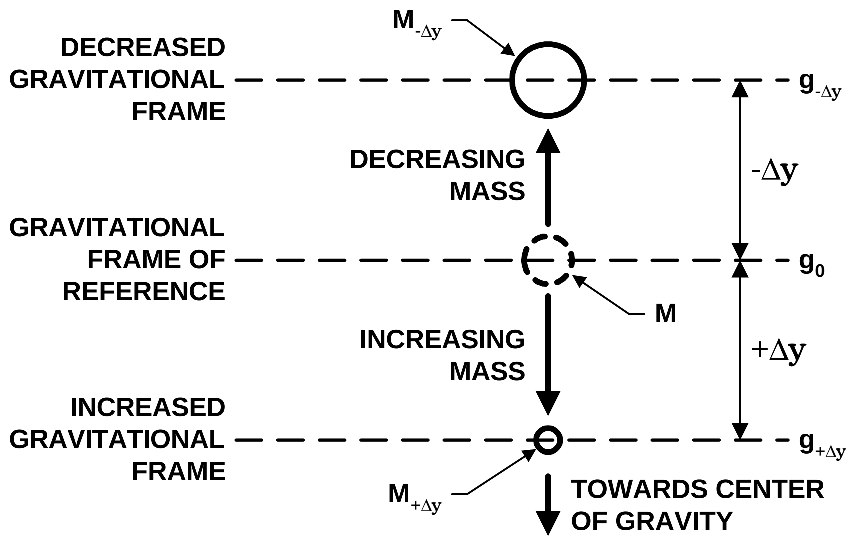

Figure 11. An ideal fluctuating mass M ± DM, in a gravity field.

The following metrics of space-time are invariant within any gravitational frame g_Y,

1. Mass M.
2. Energy equivalent of mass E_M. Also known as **Gravimetric Energy**.
3. Inductance L.
4. Capacitance C.

The same metrics change as a function of distance Δy, from a given gravitational frame of reference g_0.

Given this common frame of reference g_0, an increase in gravity causes a *relativistic* increase in mass, energy equivalent of mass (**gravimetric energy**), inductance, and capacitance. Likewise, a decrease in gravity causes a *relativistic* decrease in the same metrics.

In addition, an increase in gravity causes a *relativistic* decrease in electromagnetic energy $\mathcal{E}$ stored in mass, inductors, and capacitors. And it follows a decrease in gravity causes a *relativistic* decrease in electromagnetic energy $\mathcal{E}$ stored in the same.

Since the difference form of a fluctuating mass is,

$$\Delta M = \frac{g_0 M \Delta \mathbf{y}}{\mathbf{c}^2} \qquad (62)$$

Compute the new mass at position $+\Delta \mathbf{y}$,

$$M_{+\Delta \mathbf{y}} = M + \Delta M = M \left(1 + \frac{g_0 \Delta \mathbf{y}}{\mathbf{c}^2} \right) \qquad 75$$

And, compute the new mass at position $-\Delta \mathbf{y}$,

$$M_{-\Delta \mathbf{y}} = M - \Delta M = M \left(1 - \frac{g_0 \Delta \mathbf{y}}{\mathbf{c}^2} \right) \qquad 76$$

Compute the new energy equivalent of mass (**gravimetric energy**) at position $+\Delta \mathbf{y}$,

$$E_{+\Delta \mathbf{y}} = E_M + \Delta E_M = E_M \left(1 + \frac{g_0 \Delta \mathbf{y}}{\mathbf{c}^2} \right) \qquad 77$$

And, compute the new energy equivalent of mass (**gravimetric energy**) at position $-\Delta \mathbf{y}$,

$$E_{-\Delta \mathbf{y}} = E_M - \Delta E_M = E_M \left(1 - \frac{g_0 \Delta \mathbf{y}}{\mathbf{c}^2} \right) \qquad 78$$

Since the difference form of a fluctuating inductor is,

$$\Delta L = \frac{g_0 L \Delta \mathbf{y}}{\mathbf{c}^2} \qquad (68)$$

Compute the new inductance at position $+\Delta \mathbf{y}$,

$$L_{+\Delta \mathbf{y}} = L + \Delta L = L \left(1 + \frac{g_0 \Delta \mathbf{y}}{\mathbf{c}^2} \right) \qquad 79$$

And, compute the new inductance at position $-\Delta \mathbf{y}$,

$$L_{-\Delta \mathbf{y}} = L - \Delta L = L \left(1 - \frac{g_0 \Delta \mathbf{y}}{\mathbf{c}^2} \right) \qquad 80$$

Since the difference form of a fluctuating capacitor is,

$$\Delta C = \frac{g_0 C \Delta \mathbf{y}}{\mathbf{c}^2} \qquad (73)$$

Compute the new capacitance at position $+\Delta \mathbf{y}$,

$$C_{+\Delta \mathbf{y}} = C + \Delta C = C \left(1 + \frac{g_0 \Delta \mathbf{y}}{\mathbf{c}^2} \right) \qquad 81$$

And, compute the new capacitance at position $-\Delta \mathbf{y}$,

$$C_{-\Delta \mathbf{y}} = C - \Delta C = C \left(1 - \frac{g_0 \Delta \mathbf{y}}{\mathbf{c}^2} \right) \qquad 82$$

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THE EQUIVALENCE THEOREM

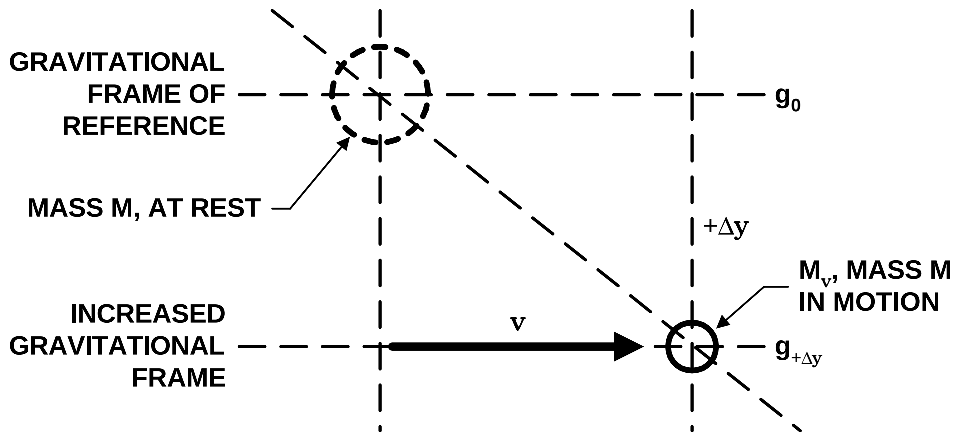

Figure 12. An object of mass M, moving at constant velocity v.

The new mass $M_{\mathbf{v}}$ of an object moving through an invariant gravity field is,

$$M_{\mathbf{v}} = M\left(1 - \frac{\mathbf{v}^2}{\mathbf{c}^2}\right)^{-\frac{1}{2}} \qquad 83$$

Using the 1st order term of the binomial expansion of the equation above where $\mathbf{v} << \mathbf{c}$,

$$M_{\mathbf{v}} = M\left(1 + \frac{\mathbf{v}^2}{2\,\mathbf{c}^2}\right) \qquad 84$$

Or,

$$M_{\mathbf{v}} = M + \Delta M \qquad 85$$

So,

$$\Delta M = \frac{M\,\mathbf{v}^2}{2\,\mathbf{c}^2} \qquad 86$$

And,

$$\Delta M = \frac{g_0\,M\,\Delta\mathbf{y}}{\mathbf{c}^2} \qquad (62)$$

Determine the **Equivalence Theorem**,

$$\frac{\mathbf{v}^2}{2} = g_0\,\Delta\mathbf{y} \qquad 87$$

Given position $\Delta\mathbf{y}$, compute equivalent velocity $\mathbf{v}$,

$$\mathbf{v} = \left(2\,g_0\,\Delta\mathbf{y}\right)^{\frac{1}{2}} \qquad 88$$

Position $\Delta\mathbf{y}$ MUST be positive and in free fall.

Given velocity $\mathbf{v}$, compute equivalent position $+\Delta\mathbf{y}$,

$$\Delta\mathbf{y} = \frac{\mathbf{v}^2}{2\,g_0} \qquad 89$$

Virtually no radiation reaction is produced by an object traveling distance $+\Delta\mathbf{y}$ in free fall and the same object moving at a constant velocity $\mathbf{v}$ at right angles to free fall. Therefore, both scenarios are considered equivalent.

The difference form of a moving fluctuating energy equivalent of mass (**gravimetric energy**) is,

$$\Delta E_M = \frac{E_M \mathbf{v}^2}{2 \mathbf{c}^2} \qquad 90$$

Compute the new energy equivalent of mass (**gravimetric energy**) at velocity $\mathbf{v}$,

$$E_{\mathbf{v}} = E_M + \Delta E_M = E_M \left(1 + \frac{\mathbf{v}^2}{2 \mathbf{c}^2} \right) \qquad 91$$

The difference form of a moving fluctuating inductor is,

$$\Delta L = \frac{L \mathbf{v}^2}{2 \mathbf{c}^2} \qquad 92$$

Compute the new inductance at velocity $\mathbf{v}$,

$$L_{\mathbf{v}} = L + \Delta L = L \left(1 + \frac{\mathbf{v}^2}{2 \mathbf{c}^2} \right) \qquad 93$$

The difference form of a moving fluctuating capacitor is,

$$\Delta C = \frac{C \mathbf{v}^2}{2 \mathbf{c}^2} \qquad 94$$

Compute the new capacitance at velocity $\mathbf{v}$,

$$C_{\mathbf{v}} = C + \Delta C = C \left(1 + \frac{\mathbf{v}^2}{2 \mathbf{c}^2} \right) \qquad 95$$

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HOW GRAVITY AFFECTS THE VOLUME OF OBJECTS

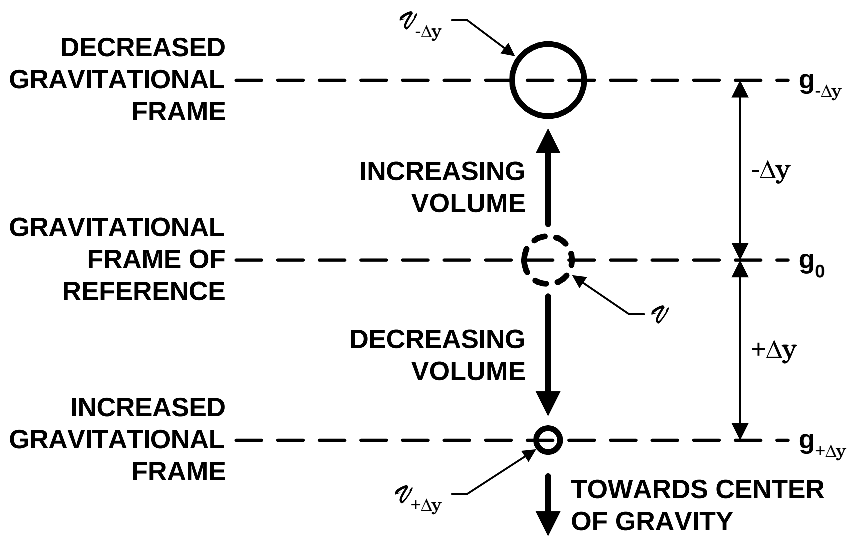

Figure 13. An ideal fluctuating volume $\mathcal{V} \pm D\mathcal{V}$, in a gravity field.

As gravity g_Y increases, the volume $\mathcal{V}$, or length $\mathcal{L}$, width $\mathcal{W}$, and height $\mathcal{H}$, of an object with mass M contracts,

$$\Delta\mathcal{L} = \frac{g_0 \mathcal{L}\, \Delta \mathbf{y}}{\mathbf{c}^2} \quad 96$$

$$\Delta\mathcal{W} = \frac{g_0 \mathcal{W}\, \Delta \mathbf{y}}{\mathbf{c}^2} \quad 97$$

$$\Delta\mathcal{H} = \frac{g_0 \mathcal{H}\, \Delta \mathbf{y}}{\mathbf{c}^2} \quad 98$$

So, compute the new volume at position $+\Delta \mathbf{y}$,

$$\mathcal{L}_{+\Delta y} = \mathcal{L} - \Delta\mathcal{L} = \mathcal{L}\left(1 - \frac{g_0\, \Delta \mathbf{y}}{\mathbf{c}^2}\right) \quad 99$$

$$\mathcal{W}_{+\Delta y} = \mathcal{W} - \Delta\mathcal{W} = \mathcal{W}\left(1 - \frac{g_0\, \Delta \mathbf{y}}{\mathbf{c}^2}\right) \quad 100$$

$$\mathcal{H}_{+\Delta y} = \mathcal{H} - \Delta\mathcal{H} = \mathcal{H}\left(1 - \frac{g_0\, \Delta \mathbf{y}}{\mathbf{c}^2}\right) \quad 101$$

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And, compute the new volume at position -$\Delta\mathbf{y}$,

$$\mathcal{L}_{-\Delta\mathbf{y}} = \mathcal{L} + \Delta\mathcal{L} = \mathcal{L}\left(1 + \frac{g_0\,\Delta\mathbf{y}}{\mathbf{c}^2}\right) \quad 102$$

$$\mathcal{W}_{-\Delta\mathbf{y}} = \mathcal{W} + \Delta\mathcal{W} = \mathcal{W}\left(1 + \frac{g_0\,\Delta\mathbf{y}}{\mathbf{c}^2}\right) \quad 103$$

$$\mathcal{H}_{-\Delta\mathbf{y}} = \mathcal{H} + \Delta\mathcal{H} = \mathcal{H}\left(1 + \frac{g_0\,\Delta\mathbf{y}}{\mathbf{c}^2}\right) \quad 104$$

HOW VELOCITY AFFECTS THE VOLUME OF OBJECTS

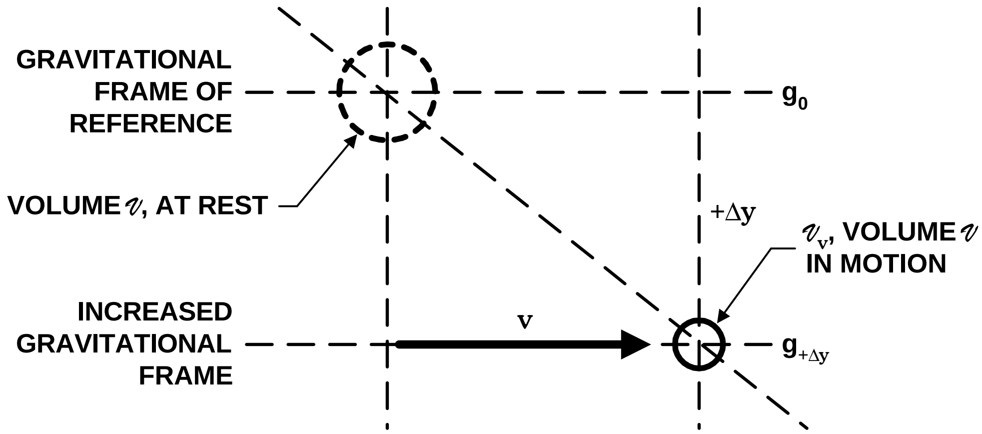

Figure 14. An object of volume $\mathcal{V}$, moving at constant velocity v.

As velocity $\mathbf{v}$ increases, the volume $\mathcal{V}$, or length $\mathcal{L}$, width $\mathcal{W}$, and height $\mathcal{H}$, of an object with mass M contracts,

$$\Delta\mathcal{L} = \frac{\mathcal{L}\,\mathbf{v}^2}{2\,\mathbf{c}^2} \qquad 105$$

$$\Delta\mathcal{W} = \frac{\mathcal{W}\,\mathbf{v}^2}{2\,\mathbf{c}^2} \qquad 106$$

$$\Delta\mathcal{H} = \frac{\mathcal{H}\,\mathbf{v}^2}{2\,\mathbf{c}^2} \qquad 107$$

So, compute the new volume at velocity $\mathbf{v}$,

$$\mathcal{L}_\mathbf{v} = \mathcal{L} - \Delta\mathcal{L} = \mathcal{L}\left(1 - \frac{\mathbf{v}^2}{2\,\mathbf{c}^2}\right) \qquad 108$$

$$\mathcal{W}_\mathbf{v} = \mathcal{W} - \Delta\mathcal{W} = \mathcal{W}\left(1 - \frac{\mathbf{v}^2}{2\,\mathbf{c}^2}\right) \qquad 109$$

$$\mathcal{H}_\mathbf{v} = \mathcal{H} - \Delta\mathcal{H} = \mathcal{H}\left(1 - \frac{\mathbf{v}^2}{2\,\mathbf{c}^2}\right) \qquad 110$$

HOW GRAVITY AFFECTS AN INTERVAL OF TIME

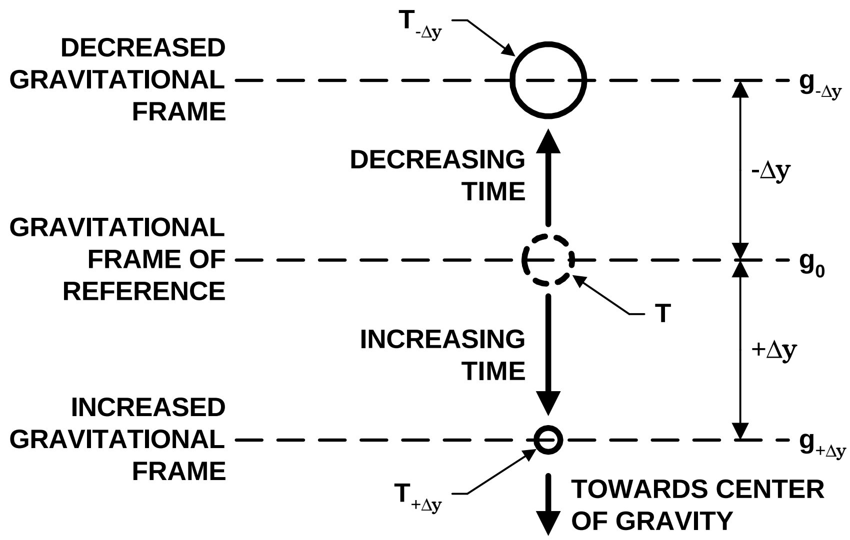

Figure 15. An ideal fluctuating interval of time T ± DT, in a gravity field.

An interval of time T_Y in an increasing gravity field g_Y, dilates, or slows down,

$$\Delta T = \frac{g_0 T \Delta y}{c^2} \qquad 111$$

Compute the new time interval at position $+\Delta y$,

$$T_{+\Delta y} = T + \Delta T = T\left(1 + \frac{g_0 \Delta y}{c^2}\right) \qquad 112$$

However, an interval of time T in a decreasing gravity field g_Y, contracts, or speeds up. So, compute the new time interval at position $-\Delta y$,

$$T_{-\Delta y} = T - \Delta T = T\left(1 - \frac{g_0 \Delta y}{c^2}\right) \qquad 113$$

HOW VELOCITY AFFECTS AN INTERVAL OF TIME

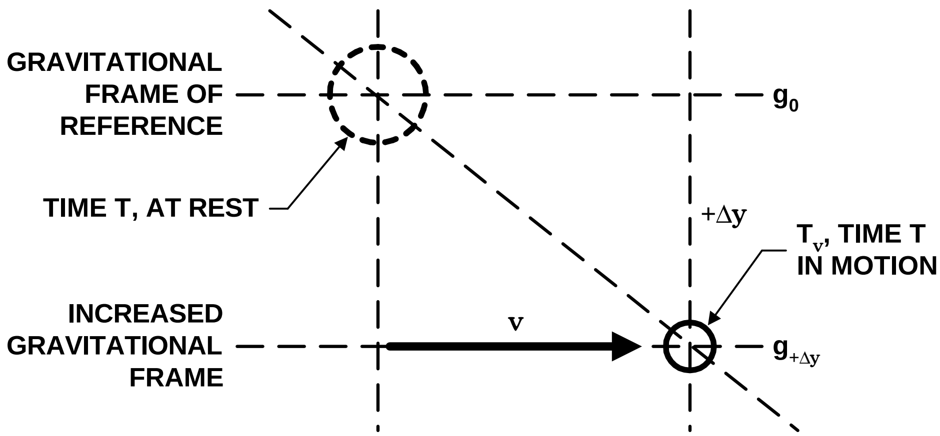

Figure 16. An ideal fluctuating interval of time T ± DT, moving at constant velocity v.

An interval of time $T_{\mathbf{v}}$ moving at constant velocity $\mathbf{v}$, dilates, or slows down,

$$\Delta T = \frac{T\,\mathbf{v}^2}{2\,\mathbf{c}^2} \qquad 114$$

Compute the new time interval moving at velocity $\mathbf{v}$,

$$T_{\mathbf{v}} = T + \Delta T = T\left(1 + \frac{\mathbf{v}^2}{2\,\mathbf{c}^2}\right) \qquad 115$$

HOW GRAVITY AFFECTS ELECTROMAGNETISM

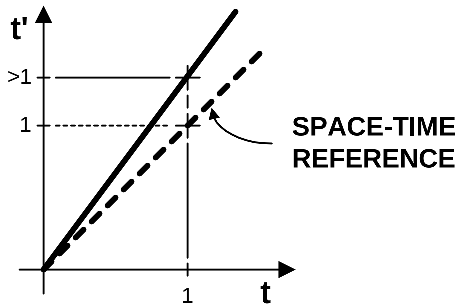

Figure 17. Rarefaction of space-time media.

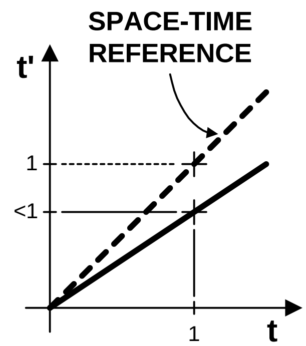

Figure 18. Compression of space-time media.

The media of space-time is modeled as an aetheric gas. Therefore, compression or rarefaction of this media is described as a GRAVITY GRADIENT. This change occurs in the time dimension, and therefore, can't be directly measured using spatial metric techniques.

As shown above, the flow of time inside compressed media is faster than outside of the same media. Likewise, the flow of time inside rarefied media is slower than outside of the same. Space and time are referenced from outside compressed or rarefied media.

The space-time media in a rarefied state means that gravity is increased, which causes light to be attenuated in energy and decreased in frequency from the original source. However, the same media in a compressed state means that gravity is decreased, which causes light to be amplified in energy and increased in frequency from the same original source.

THE GRAVIMETRIC COUPLING OF AN ELECTROMAGNETIC WAVE

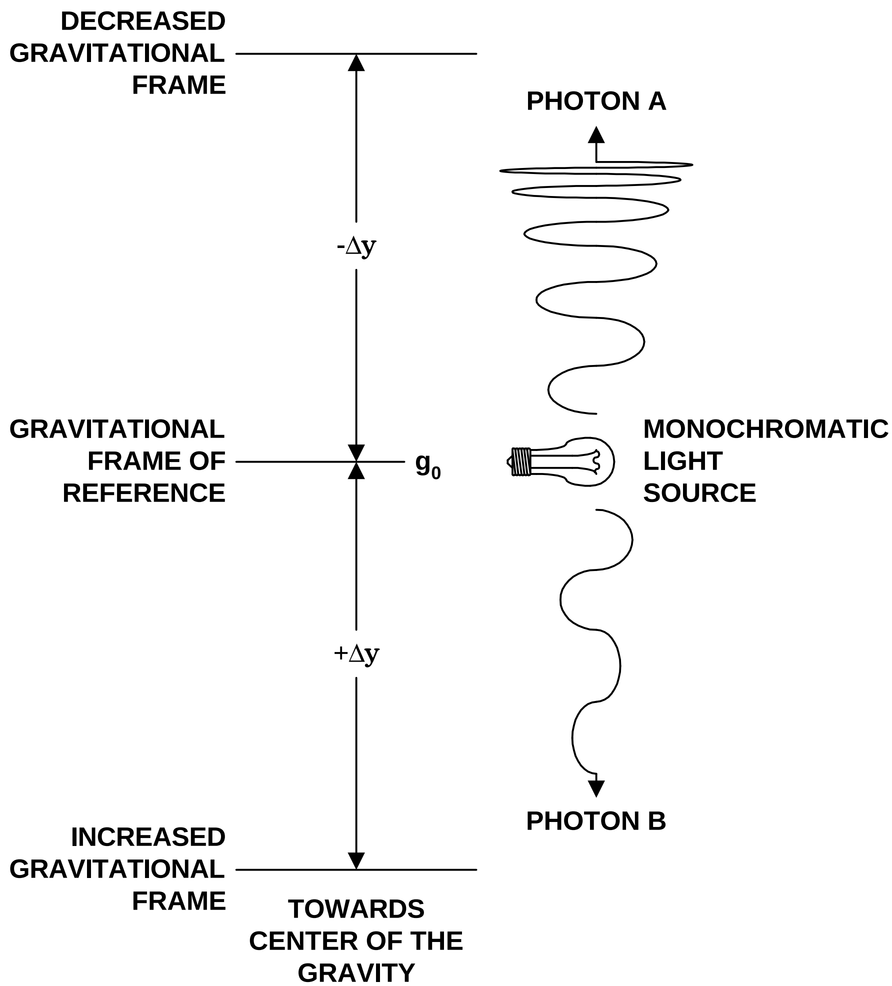

Figure 19. Electromagnetic waves propogating through a gravity field.

As shown above, relative to the gravitational frame of reference, PHOTON A increases in energy and frequency as it propogates through decreasing gravity. Likewise, PHOTON B decreases in energy and frequency as it propogates through increasing gravity.

The speed of light is shown to be invariant in ALL gravitational frames.

Based on the Pound and Rebka experiment which used Mossbaurer spectroscopy to measure the electromagnetic RED SHIFT (BLUE SHIFT) of 14.4 keV gamma rays emitted from Fe^{57}. They showed the RED SHIFT was within one percent of this result,

$$\frac{g_0 \Delta \mathbf{y}}{\mathbf{c}^2} = \frac{(9.80665 \text{ m/sec}^2)(22.6 \text{ m})}{(2.99793 \text{ m/sec})^2} = 2.466 \times 10^{-15} \qquad (64)$$

Given,

$$\frac{\Delta E_M}{E_M} = \frac{g_0 \Delta \mathbf{y}}{\mathbf{c}^2} \qquad (63)$$

It follows the difference form of fluctuating energy $\mathcal{E}$ of an electromagnetic wave propogating through a gravity field $g_{\mathbf{Y}}$ is,

$$\Delta \mathcal{E} = \frac{g_0 \mathcal{E} \Delta \mathbf{y}}{\mathbf{c}^2} \qquad 116$$

Compute the new electromagnetic energy at position $+\Delta \mathbf{y}$,

$$\mathcal{E}_{+\Delta \mathbf{y}} = \mathcal{E} - \Delta \mathcal{E} = \mathcal{E} \left(1 - \frac{g_0 \Delta \mathbf{y}}{\mathbf{c}^2} \right) \qquad 117$$

Compute the new electromagnetic energy at position $-\Delta \mathbf{y}$,

$$\mathcal{E}_{-\Delta \mathbf{y}} = \mathcal{E} + \Delta \mathcal{E} = \mathcal{E} \left(1 + \frac{g_0 \Delta \mathbf{y}}{\mathbf{c}^2} \right) \qquad 118$$

Since the energy $\mathcal{E}$ of a single photon is,

$$\mathcal{E} = \mathbf{h} \, f \qquad 119$$

Where $\mathbf{h}$ is Planck's constant and f is the frequency.

Then, the difference form of a fluctuating frequency f of an electromagnetic wave propogating through a gravity field g_Y is,

$$\Delta f = \frac{g_0 f \Delta \mathbf{y}}{\mathbf{c}^2} \qquad 120$$

Compute the new electromagnetic frequency at position $+\Delta\mathbf{y}$,

$$f_{+\Delta \mathbf{y}} = f - \Delta f = f\left(1 - \frac{g_0 \Delta \mathbf{y}}{\mathbf{c}^2}\right) \qquad 121$$

Compute the new electromagnetic frequency at position $-\Delta\mathbf{y}$,

$$f_{-\Delta \mathbf{y}} = f + \Delta f = f\left(1 + \frac{g_0 \Delta \mathbf{y}}{\mathbf{c}^2}\right) \qquad 122$$

The difference form of a fluctuating wavelength λ of an electromagnetic wave is,

$$\Delta\lambda = \frac{g_0 \lambda \Delta \mathbf{y}}{\mathbf{c}^2} \qquad 123$$

Compute the new wavelength λ at position $+\Delta\mathbf{y}$,

$$\lambda_{+\Delta \mathbf{y}} = \lambda + \Delta\lambda = \lambda\left(1 + \frac{g_0 \Delta \mathbf{y}}{\mathbf{c}^2}\right) \qquad 124$$

Compute the new wavelength λ at position $-\Delta \mathbf{y}$,

$$\lambda_{-\Delta \mathbf{y}} = \lambda - \Delta\lambda = \lambda \left(1 - \frac{g_0 \Delta \mathbf{y}}{\mathbf{c}^2} \right) \qquad 125$$

Since the speed of light is,

$$\mathbf{c} = \lambda f \qquad 126$$

At position $+\Delta \mathbf{y}$, the wavelength increases and frequency decreases by the same ratiometric amount or,

$$\mathbf{c}_{+\Delta \mathbf{y}} = \mathbf{c} \qquad 127$$

And at position $-\Delta \mathbf{y}$, the wavelength decreases and frequency increases also by the same ratiometric amount or,

$$\mathbf{c}_{-\Delta \mathbf{y}} = \mathbf{c} \qquad 128$$

This shows the speed of light $\mathbf{c}_{\mathbf{Y}}$, is **invariant in ALL gravitational frames** or,

$$\mathbf{c}_{\mathbf{Y}} = 2.99792458 \times 10^8 \text{ m/sec} \qquad 129$$

Since Planck's constant $\mathbf{h}$ is,

$$\mathbf{h} = \frac{\mathcal{E}}{f} \qquad (119)$$

At position $+\Delta\mathbf{y}$, the electromagnetic energy decreases and frequency decreases by the same ratiometric amount or,

$$\mathbf{h}_{+\Delta y} = \mathbf{h} \qquad 130$$

And at position $-\Delta\mathbf{y}$, the electromagnetic energy increases and frequency increases also by the same ratiometric amount or,

$$\mathbf{h}_{-\Delta y} = \mathbf{h} \qquad 131$$

This shows the Planck's constant $\mathbf{h}_{Y}$, is **invariant in ALL gravitational frames** or,

$$\mathbf{h}_{Y} = 6.6260755 \text{ x } 10^{-34} \text{ Joule sec} \qquad 132$$

A TYPICAL ELECTROMAGNETIC WAVE

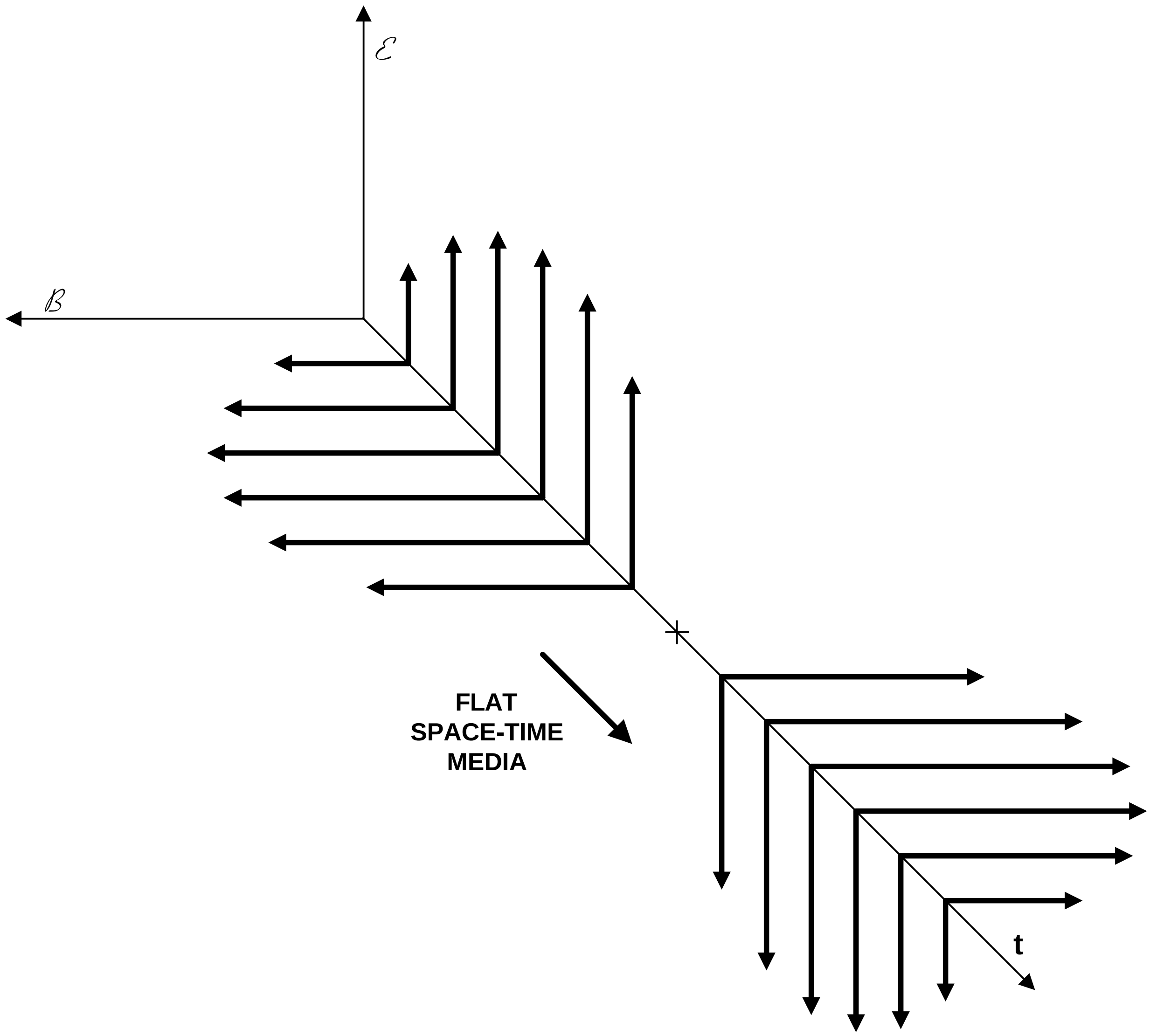

Figure 20. Propogation of electromagnetic wave in flat space-time.

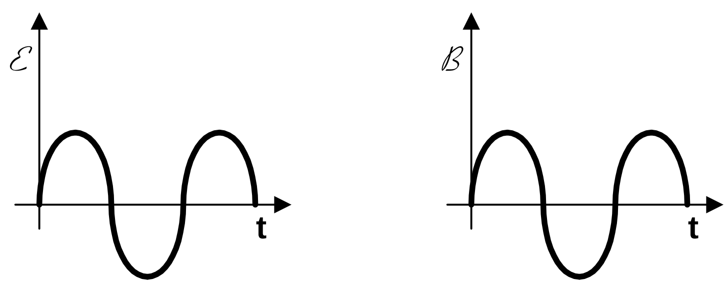

Figure 21. Typical ℬ and ℰ Fields.

AN AMPLIFIED ELECTROMAGNETIC WAVE

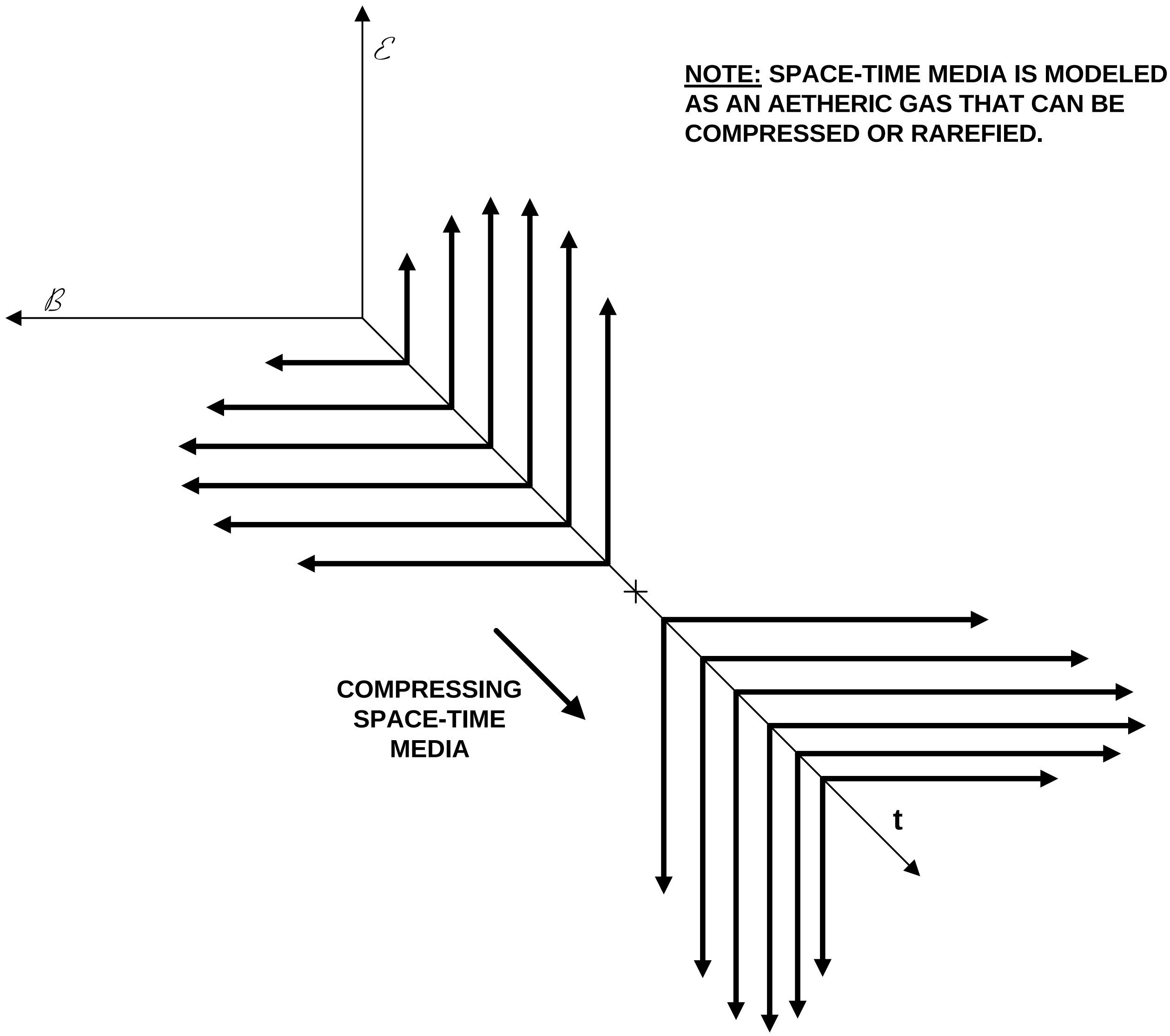

Figure 22. Propogation of electromagnetic wave in rarefied space-time.

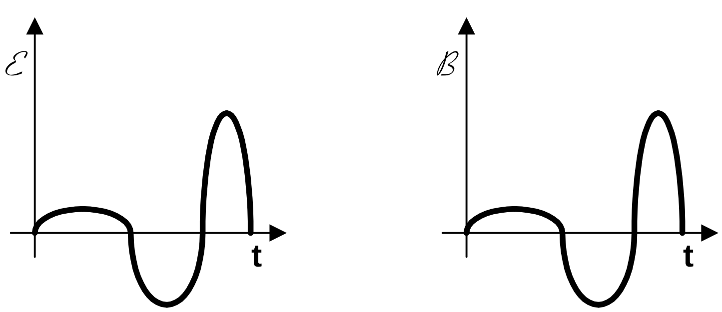

Figure 23. Increasing magnitude and frequency of $\mathcal{B}$ and $\mathcal{E}$ Fields by gravimetric function.

AN ATTENUATED ELECTROMAGNETIC WAVE

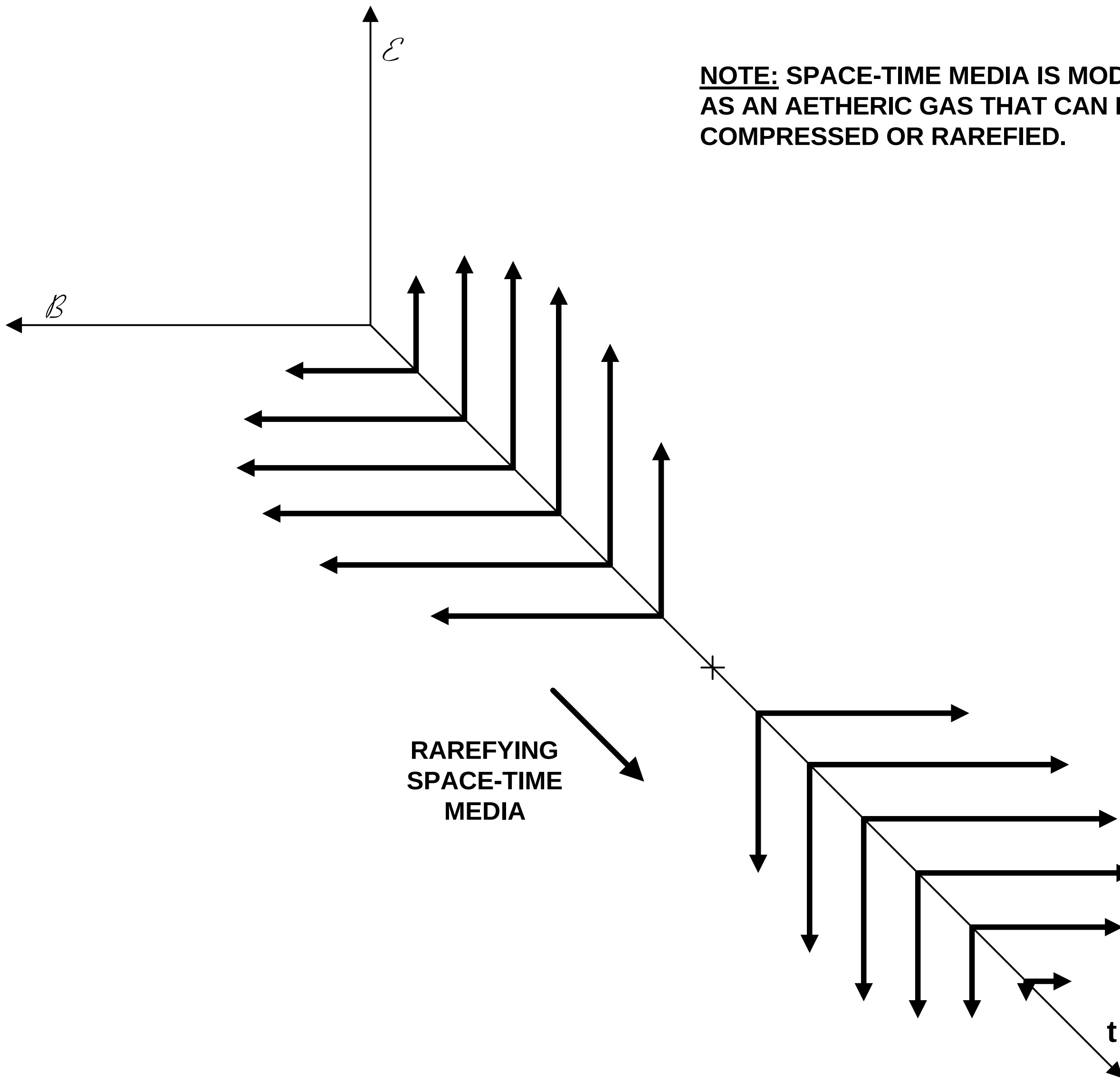

Figure 24. Propogation of electromagnetic wave in rarefying space-time.

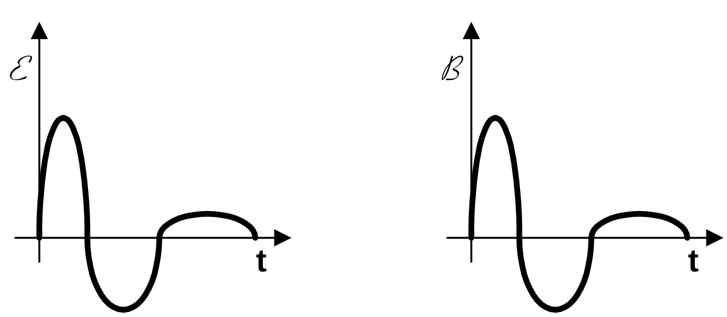

Figure 25. Decreasing magnitude and frequency of ℬand ℰFields by gravimetric function.

GRAVIMETRIC NUCLEAR BINDING FORCE

Since it has been shown the speed of light $\mathbf{c}$ and the Planck constant $\mathbf{h}$ are invariant in all gravitational frames, Newton's Gravitational Parameter (Constant) $G_{\mathbf{n}}$ differs greatly between weak macroscopic and strong microscopic scales of universal mass attraction.

So, given a weak macroscopic parameter $G_{\mathbf{w}}$ = 6.67259 x 10^{-11} N kg^{-2} m^{2}, the macroscopic Planck mass $\mathbf{M_{Pw}}$ is,

$$\mathbf{M_{Pw}} = \left(\frac{\mathbf{hc}}{2\pi G_{\mathbf{w}}}\right)^{\frac{1}{2}} = 2.17671 \times 10^{-8} \text{ kg} \qquad 133$$

The macroscopic Planck length $\mathbf{L_{Pw}}$ is,

$$\mathbf{L_{Pw}} = \frac{\mathbf{h}}{2\pi \mathbf{c} \mathbf{M_{Pw}}} = \left(\frac{\mathbf{h}G_{\mathbf{w}}}{2\pi \mathbf{c}^3}\right)^{\frac{1}{2}} = 1.61605 \times 10^{-35} \text{ m} \qquad 134$$

However, given a strong microscopic parameter $G_{\mathbf{s}}$ = 3.80995 x 10^{34} N kg^{-2} m^{2}, the microscopic Planck mass $\mathbf{M_{Ps}}$ is,

$$\mathbf{M_{Ps}} = \left(\frac{\mathbf{hc}}{2\pi G_{\mathbf{s}}}\right)^{\frac{1}{2}} = 9.10939 \times 10^{-31} \text{ kg} \qquad 135$$

This is the rest mass of an electron. The microscopic Planck length $\mathbf{L_{Ps}}$ is,

$$\mathbf{L_{Ps}} = \frac{\mathbf{h}}{2\pi \mathbf{c} \mathbf{M_{Ps}}} = \left(\frac{\mathbf{h}G_{\mathbf{s}}}{2\pi \mathbf{c}^3}\right)^{\frac{1}{2}} = 3.86159 \times 10^{-13} \text{ m} \qquad 136$$

So, the microscopic Planck time $\mathbf{T}_{\mathbf{Ps}}$ is,

$$\mathbf{T}_{\mathbf{Ps}} = \frac{\mathbf{L}_{\mathbf{Ps}}}{\mathbf{c}} = \left(\frac{\mathbf{h}G_{\mathbf{s}}}{2\pi\mathbf{c}^5}\right)^{\frac{1}{2}} = 1.28809 \times 10^{-21} \text{ sec} \qquad 137$$

The microscopic Planck frequency $\mathbf{f}_{\mathbf{Ps}}$ is,

$$\mathbf{f}_{\mathbf{Ps}} = \frac{1}{\mathbf{T}_{\mathbf{Ps}}} = 7.76344 \times 10^{20} \text{ Hz} \qquad 138$$

The microscopic Planck velocity $\mathbf{v}_{\mathbf{Ps}}$ is,

$$\mathbf{v}_{\mathbf{Ps}} = \frac{\mathbf{L}_{\mathbf{Ps}}}{\mathbf{T}_{\mathbf{Ps}}} = \mathbf{c} = 2.99792458 \times 10^{8} \text{ m/sec} \qquad 139$$

Since the Planck mass is inversely related to the Planck length, it follows that as mass increases, length decreases, and therefore its volume decreases, which is consistant with Natural Relativity theory.

Also, since the Planck velocity is the speed of light, and therefore is gravitationally invariant, the Planck length is directly related to the Planck time. So, it follows that as length increases, time increases. Again, this is consistant with Natural Relativity theory.

In regards to Newton's Gravitational Parameter $G_{\mathbf{n}}$, this Parameter is inversely related to the Planck mass. So, it follows that as $G_{\mathbf{n}}$ increases, mass decreases. And as mass decreases, volume increases.

Finally, calculate the mass attractive Planck Gravimetric Binding Force F_g between two electrons separated by the Planck length using Newton's Law of Gravitation,

$$F_g = \frac{G\,M^2}{r^2} = 2.1201 \times 10^{-1}\ \mathrm{N} \qquad 140$$

where,

F_g = Mass attractive gravitational force.
$G = 3.80995 \times 10^{34}$ N kg^{-2} m^2
$M = 9.10939 \times 10^{-31}$ kg
$r = 3.86159 \times 10^{-13}$ m

Calculate the like-charge repulsive Electric Force F_e between the same electrons separated by the Planck length using Coulomb's Law,

$$F_e = \frac{1}{4\pi\varepsilon_0}\frac{q^2}{r^2} = 1.54714 \times 10^{-3}\ \mathrm{N} \qquad 141$$

where,

F_e = Electric charge repulsive force.
$1/4\pi\varepsilon = 8.98755 \times 10^9$ m F^{-1}
$q = 1.60218 \times 10^{-19}$ C
$r = 3.86159 \times 10^{-13}$ m

The mass attractive Planck Gravimetric Binding Force exceeds the like-charge repulsive Electric Force by over two orders of magnitude. This allows a stable formation of charge clusters held together by a gravito-electric force.

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THE GRAVIMETRIC
COLD FUSION PROCESS

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Tesla's "Space-Time Compressor" Technology, Analysis Of N. Tesla's US Patent 568,176

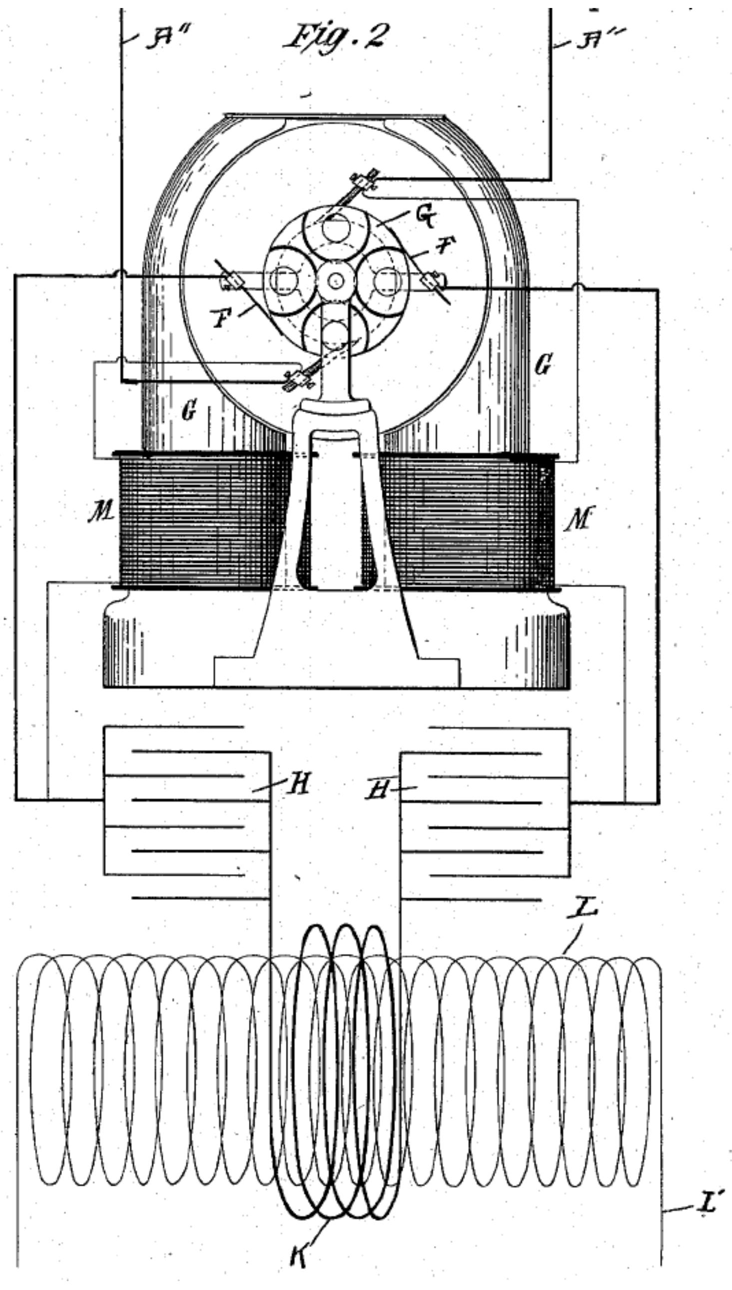

Figure 20. Tesla's Apparatus for Producing Electric Currents of High Frequency and Potential.

Tesla's "Space-Time Compressor" Technology, Analysis Of N. Tesla's US Patent 568,176

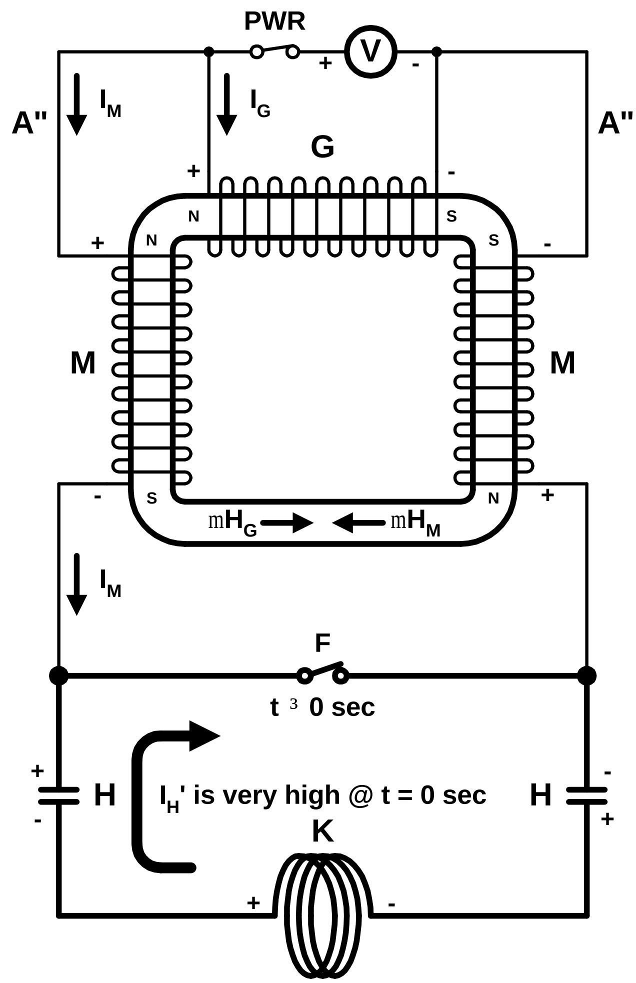

Figure 21. Equivalent Circuit.

At the moment of switch "F" closure, or t = 0 sec, capacitors "H" are almost instantly dischanged into the primary coil "K". Tesla's method of capacitor discharge delivered a very high input-to-output power product ratio, hence, the name "amplifying transmitter".

Tesla's technology "rarefies" the spacetime media, thereby amplifying electromagnetic effects and enhancing spatial distortion.

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DETECTING GRAVITY WAVES

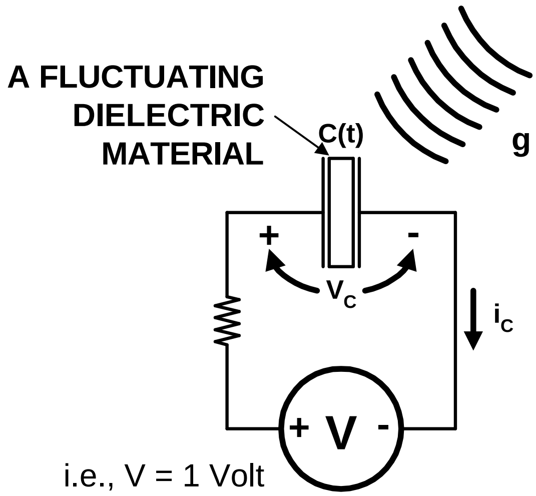

Figure 22. Gravity Wave Detector.

The detection of GRAVITY WAVES can be achieved by measuring the change of energy stored in a *fully charged* capacitor. The capacitor *must* have a sufficiently large capacity because the wave will also influence, or fluctuate, the surrounding circuitry simultaneously.

The **Gravimetric Capacitive Mass Fluctuation** term is,

$$M(t) = \frac{C(t)\, V_C^2}{\mathbf{c}^2} \qquad (47)$$

So, the change in voltage is related to the change in capacitance, which is related to the change in mass,

$$\Delta V_C^2 \Leftrightarrow \Delta C \Leftrightarrow \Delta M \qquad 58$$

A microcontroller can easily perform this function in real-time.

THE BARKHAUSEN EFFECT

The encyclopedia Britannica describes the Barkhausen effect as:

Series of sudden changes in the size and orientation of ferromagnetic domains, or microscopic clusters of aligned atomic magnets, that occurs during a continuous process of magnetization or demagnetization. The Barkhausen effect offered direct evidence for the existence of ferromagnetic domains, which previously had been postulated theoretically.

Heinrich Barkhausen, a German physicist, discovered in 1919 that a slow, smooth increase of a magnetic field applied to a piece of ferromagnetic material, such as iron, causes it to become magnetized, not continuously but in minute steps. The sudden, discontinuous jumps in magnetization may be detected by a coil of wire wound on the ferromagnetic material; the sudden transitions in the magnetic field of the material produce pulses of current in the coil that, when amplified, produce a series of clicks in a loudspeaker. These jumps are interpreted as discrete changes in the size or rotation of ferromagnetic domains. Some microscopic clusters of similarly oriented magnetic atoms aligned with the external magnetizing field increase in size by a sudden aggregation of neighbouring atomic magnets; and, especially as the magnetizing field becomes relatively strong, other whole domains suddenly turn into the direction of the external field.

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FERROMAGNETIC MASS FLUCTUATIONS

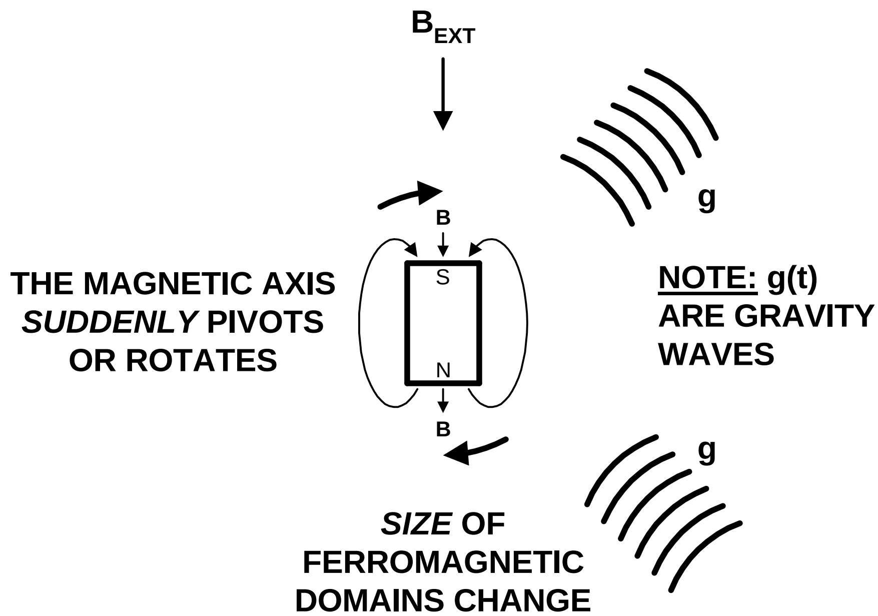
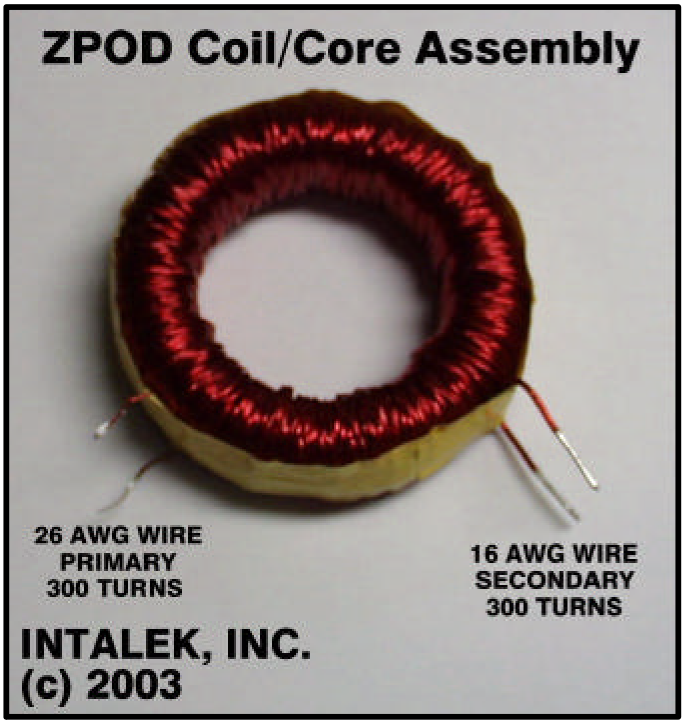


Figure 23. The Ferromagnetic Domain.

These "sudden, discontinuous jumps in magnetization" and the "increase in size" are interpreted as MASS FLUCTUATIONs, which in turn, launch GRAVITY WAVES. These GRAVITY WAVES may either be emitted or absorbed by the mass depending upon how mass is fluctuating, thereby compressing or rarefacting the potential of free-space.

Since the ferromagnetic material is under the influence of an external magnetic field, EM energy is already present, and therefore amplified by the GRAVITY WAVE event. The purpose now is to collect the GRAVITY WAVE enhanced EM energy in the MOST efficient means possible.

The SmartPAK™ / ZPOD SYSTEM



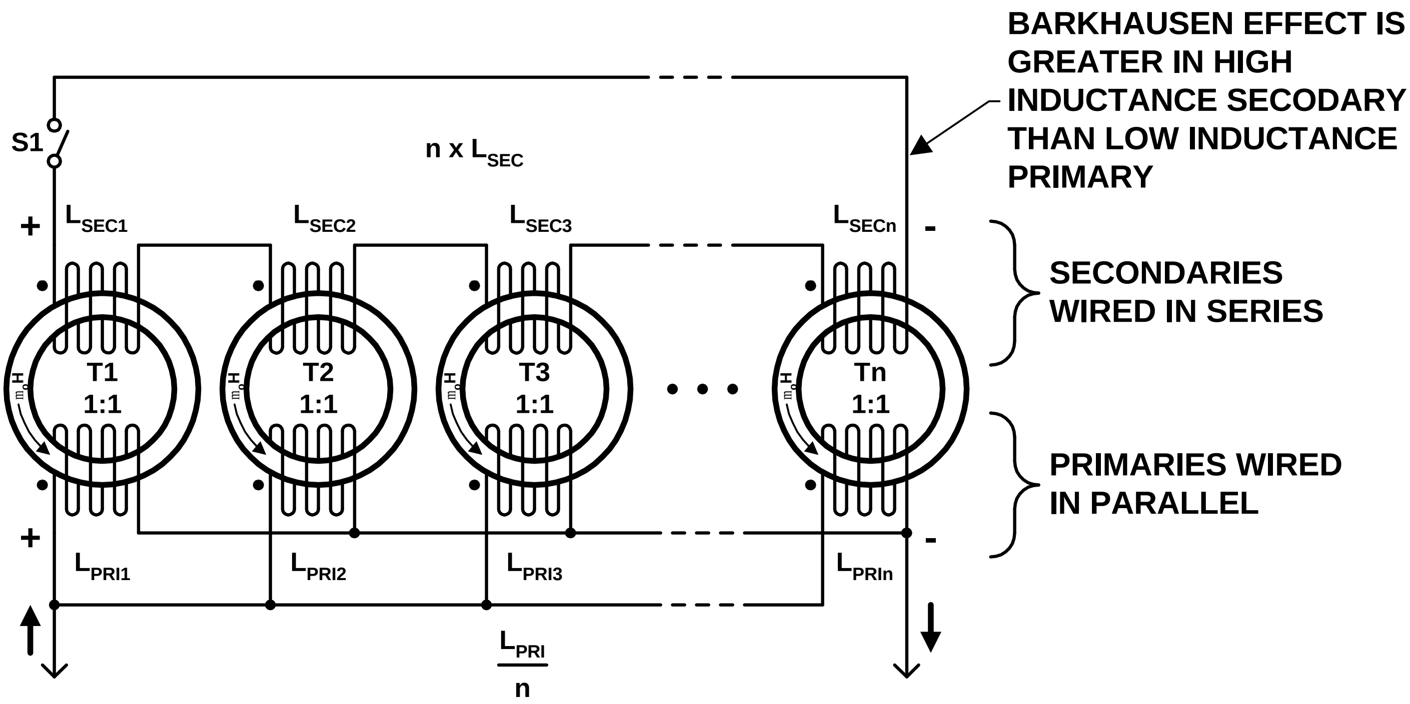


Figure 24. Electrical diagram of the ZPOD.

The SmartPAK / ZPOD system efficiently collects the Barkhausen GRAVITY WAVE "amplified" EM energy in the high inductance secondary coil, as shown above.

As with the capacitor example shown previously, the inductor must have a sufficiently large inductance because the wave will also influence, or fluctuate, the surrounding circuitry simultaneously.

The **Gravimetric Inductive Mass Fluctuation** term is,

$$M(t) = \frac{L(t)\, I_L^{\,2}}{c^2} \qquad (31)$$

So, the change in current is related to the change in inductance, which is related to the change in mass,

$$\Delta I_L^{\,2} \Leftrightarrow \Delta L \Leftrightarrow \Delta M$$

59

THE SmartPAK™ CONTROLLER

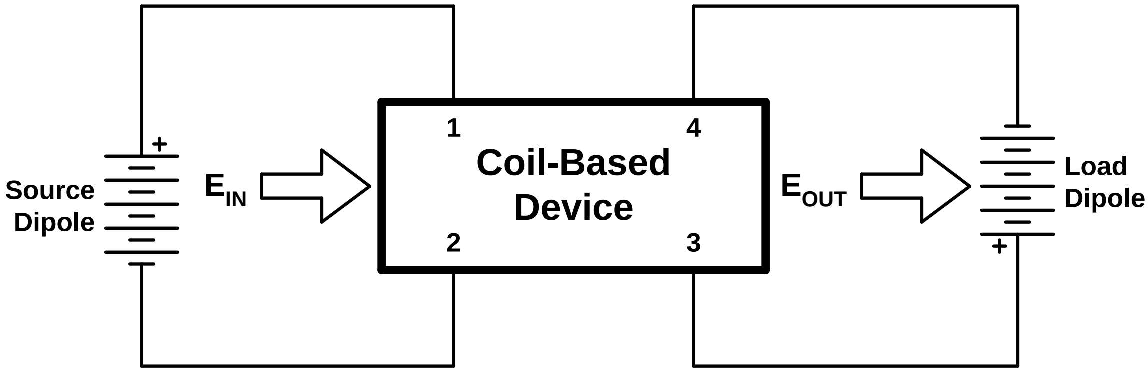
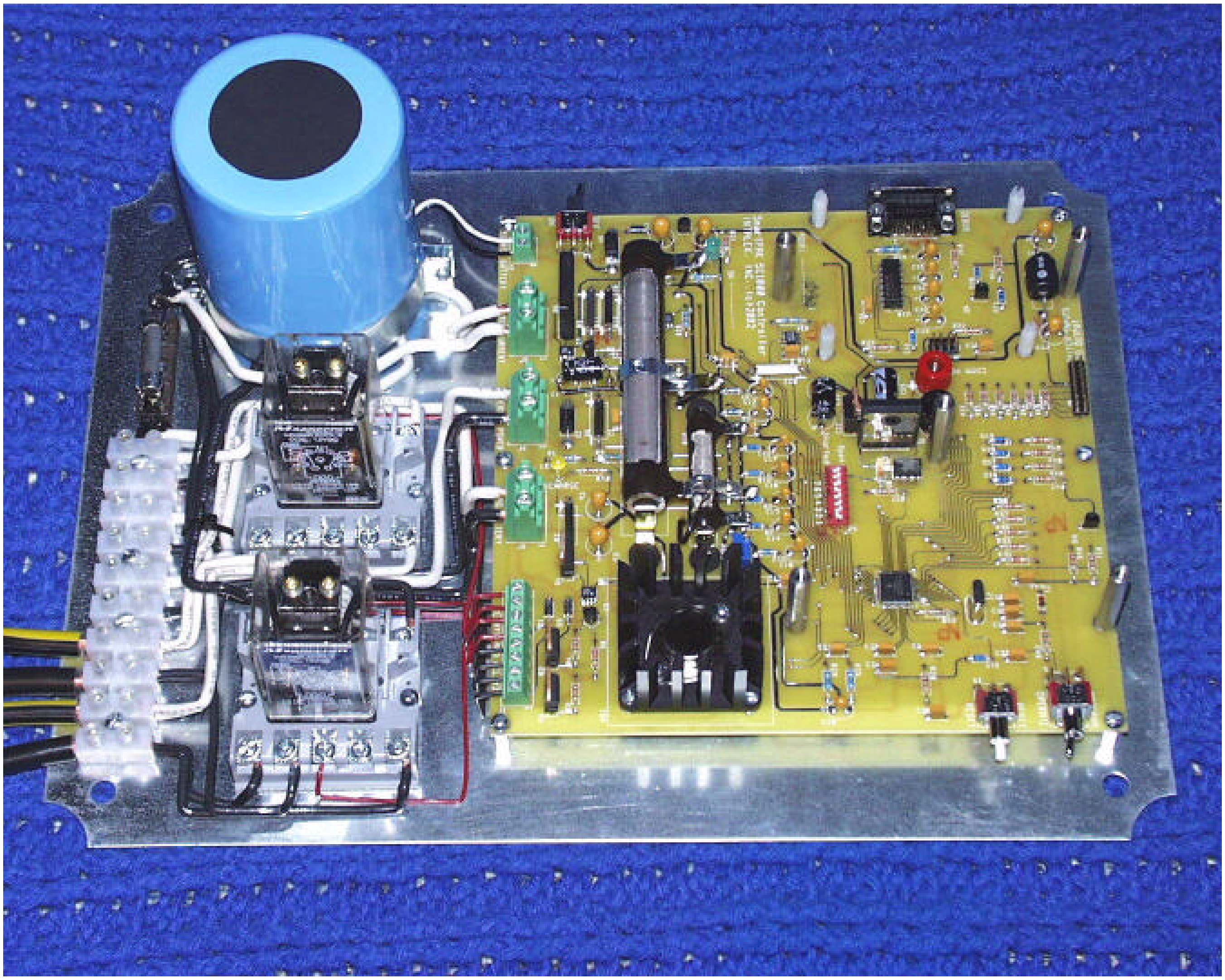


Figure 25. SmartPAK is a four terminal device.



FUNCTIONAL BLOCK DIAGRAM

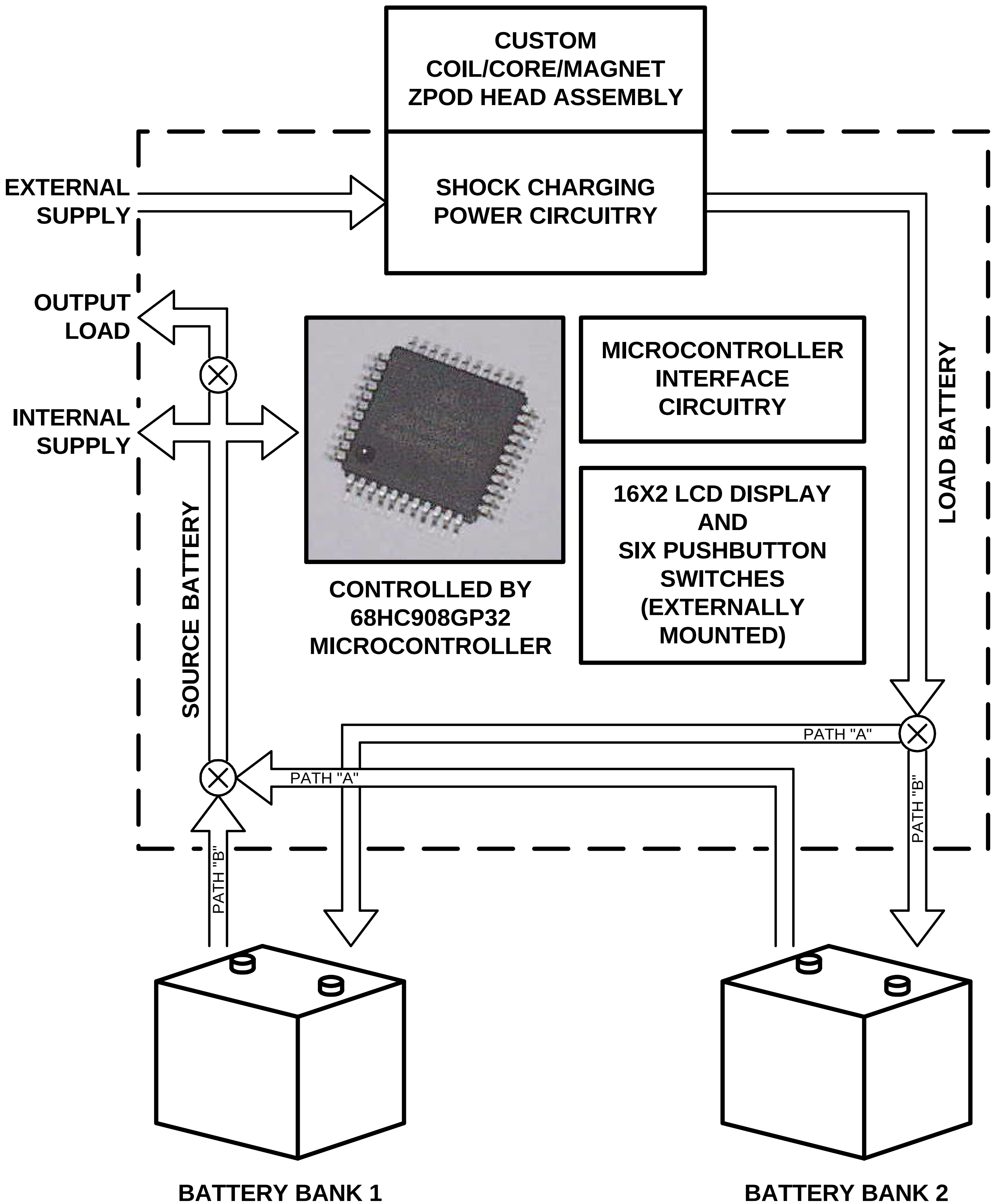


Figure 26. SmartPAK functional block diagram.

THE CLASSIC "PHOTON" IS A SIMPLE MASS FLUCTUATOR

A photon can be modeled as a fluctuating mass where its velocity can be calculated as follows,

$$f(t) = \mathbf{v}(t)\,\dot{M} \qquad (16)$$

Or,

$$f(t) = \mathbf{c}(t)\,\dot{M} \qquad 60$$

$$\mathbf{c}(t) = \frac{f(t)}{\dot{M}} \qquad 61$$

The velocity, **c**, can be regarded as an average velocity, and is directly related to how the mass, M, is fluctuating. Since its mass is fluctuating, its rest mass is considered *zero*.

The photon has *no inertia* in the classic sense because there is no inertial frame for it to act in. However, it does exert a force as shown above.

Since a property of mass is present in the photon, albeit a fluctuating mass, it reacts to gravity. The sign of its fluctuation will determine if it reacts *gravitationally* or *anti-gravitationally*, and therefore, a *photon*, or *anti-photon*.

Since the mass of a photon is fluctuating, its energy is also fluctuating,

$$f(t) = \frac{\dot{E}}{\mathbf{c}(t)} \qquad 62$$

CONCLUSION

Since a classic photon can be modeled as a simple mass fluctuator, I conclude that a "machine" could be built that can transform the fixed mass of an object to a fluctuating mass like that of a photon, as shown below. In order to achieve high speed *inertialess* transport, it is imperative that the entire mass of the object fluctuates. The rate of mass fluctuation must be sufficiently *negative* to overcome the *push* of gravity. I call this type of space drive, "The Photonic Space Drive".

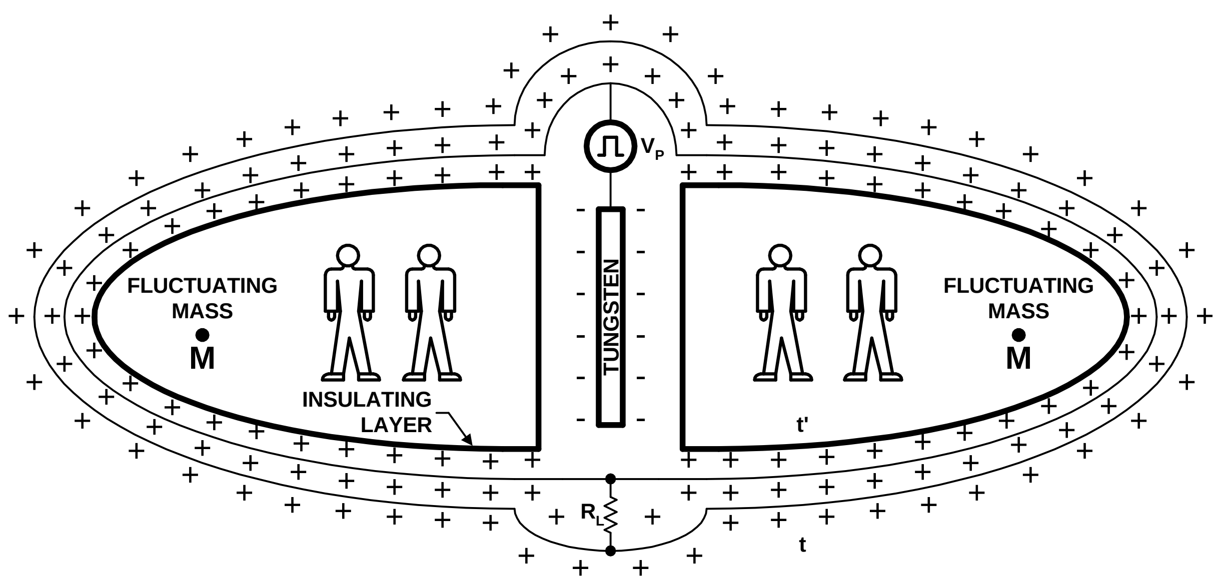


Figure 27. Cutaway view of a fluctuating capacitor space drive

Now, if only the space drive is mass fluctuating as shown on the next page, then the crew and their equipment will experience inertia. This is because their mass isn't fluctuating, or is regarded as constant.

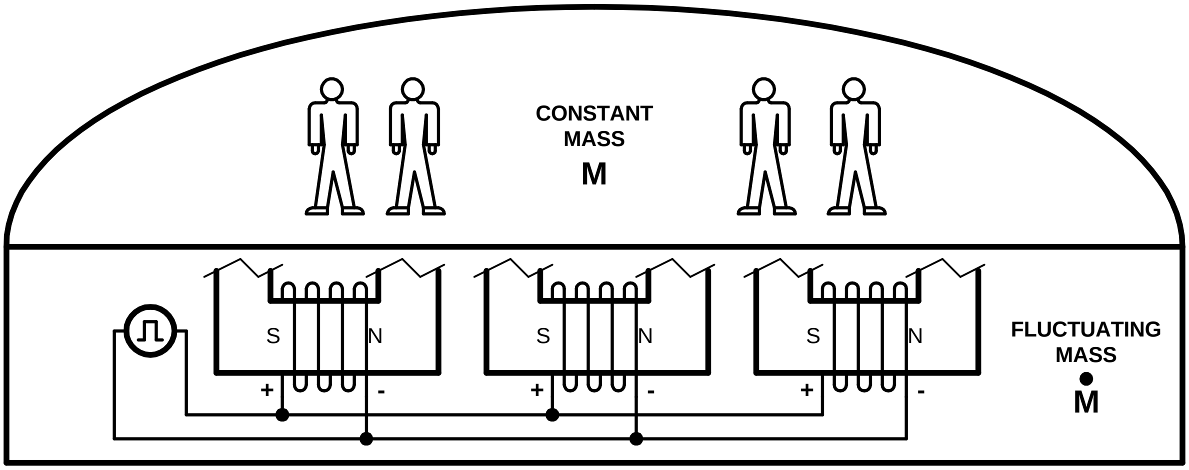


Figure 28. Cutaway view of a fluctuating inductor space drive

In summary, the *complete* ideal momentum model can be re-identified as follows,

$$f = \frac{d}{dt}(M\mathbf{v}) = M\frac{d\mathbf{v}}{dt} + \mathbf{v}\frac{dM}{dt} = \underbrace{M\dot{\mathbf{v}}}_{\text{MASS FLOW TERM}} + \underbrace{\mathbf{v}\dot{M}}_{\text{PHOTON FLOW TERM}} \qquad (1)$$

Again, both the kinetic (mass flow) term and the gravimetric (photon) flow term are mutually exclusive. So the force is either,

$$f(t) = M\dot{\mathbf{v}} \qquad (4)$$

Or,

$$f(t) = \mathbf{v}\dot{M} \qquad (5)$$

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