79(3): Counter Gravitation from the ECE Wave Equation.

Consider the ECE wave equation:

$$\Box \phi = R \phi, \quad -(1)$$

which can be deduced from the tetrad postulate of Cartan geometry. More generally:

$$\Box A^{\mu} = R A^{\mu} \quad -(2)$$

where A^{μ} is the four potential

$$A^{\mu} = \left(\frac{\phi}{c}, \underline{A} \right) \quad -(3)$$

Eqs. (1) and (2) are special cases of:

$$\Box A^{a}_{\mu} = R A^{a}_{\mu} \quad -(4)$$

where

$$A^{a}_{\mu} = A^{(0)} q^{a}_{\mu}. \quad -(5)$$

Here q^{a}_{μ} is the Cartan tetrad. The scalar curvature R has the units of m^{-2}.

Eq. (1) is:

$$\frac{1}{c^2} \frac{\partial^2 \phi}{\partial t^2} - \nabla^2 \phi = R \phi \quad -(6)$$

and has the solution:

$$\phi = \phi_0 \exp\left(i \left(\omega t - \underline{\kappa} \cdot \underline{r} \right) \right) - (7)$$

in which:

$$\frac{\omega^2}{c^2} - \kappa^2 = R \quad -(8)$$

Using:

$$E = \hbar \omega, \quad \underline{p} = \hbar \underline{\kappa} \quad -(9)$$

and
$$R = \left(\frac{\hbar}{mc}\right)^2 \quad -- (10)$$

Eq. (8) becomes the Einstein energy equation:
$$E^2 = c^2p^2 + m^2c^4 \quad - (11)$$

i.e
$$E = \gamma mc^2 \quad - (12)$$

where
$$\gamma = \left(1 - \frac{v_0^2}{c^2}\right)^{-1/2} \quad - (13)$$

is the Lorentz factor. Here $\underline{v}_0$ is the Newtonian velocity in the observer frame.

If ϕ is assumed to have no time dependence, then
$$\left(\nabla^2 + R\right)\phi = 0 \quad - (14)$$

where
$$\phi = \phi_0 \exp\left(-i\underline{\kappa}\cdot\underline{r}\right) - (15)$$

Euler Bernoulli resonance is produced from Eq (14) if:
$$\left(\nabla^2 + R\right)\phi = A\cos \underline{\kappa}\cdot\underline{r} \quad - (16)$$

which
$$R = \kappa_0^2 \quad - (17)$$

The solution of Eq. (16) in one dimension Z is the solution of
$$\frac{\partial^2\phi}{\partial Z^2} + \kappa_0^2\phi = A\cos\kappa Z \quad - (18)$$

and is:

$$\phi = \frac{A \cos \kappa Z}{\kappa_0^2 - \kappa^2} \quad -(19)$$

At resonance:

$$\kappa = \kappa_0 \quad -(20)$$

and

$$\phi \to \infty \quad -(21)$$

This is the explanation of the absorption of electromagnetic radiation by an electron beam, in which:

$$m = 9.10953 \times 10^{-31} \text{ kg} \quad -(22)$$

$$c = 2.9979 \times 10^{8} \text{ ms}^{-1} \quad -(23)$$

$$\hbar = 1.05459 \times 10^{-34} \text{ Js} \quad -(24)$$

and where the Compton wavelength is:

$$\lambda = \frac{\hbar}{mc} = 2.426309 \times 10^{-12} \text{ m} \quad -(25)$$

The electron wavefunction is:

$$\phi = \phi_0 \exp\left(-i \frac{mc}{\hbar} Z\right) \quad -(26)$$

So absorption occurs when the electromagnetic wavenumber κ is tuned to the wavenumber κ_0 of the electron beam. Therefore absorption can be understood as an Euler-Bernoulli resonance.

In three dimensions eq. (18) is:

$$\frac{\partial^2 \phi}{\partial X^2} + \frac{\partial^2 \phi}{\partial Y^2} + \frac{\partial^2 \phi}{\partial Z^2} + \kappa_0^2 \phi = A \cos(\kappa_X X + \kappa_Y Y + \kappa_Z Z) \quad -(27)$$

and eq. (27) can be solved by computer algebra.

) From Eqs. (15) and (19):

$$\phi = \phi_0 \cos \kappa_0 Z = \frac{A \cos \kappa Z}{\kappa_0^2 - \kappa^2} \quad -(28)$$

for the electron wave function. Here ϕ is the electron potential, and κ is an electromagnetic wavenumber. Similarly, for the electron wave function:

$$\phi = \phi_0 \cos \kappa_0 Z = \frac{A \cos \kappa Z}{\kappa_0^2 - \kappa^2} \quad -(29)$$

Eqs. (28) and (29) are generally applicable resonance equations for the interaction of any system with a small driving force.

For example, if an electromagnetic driving force is applied to a gravitational potential derived by the gravitational ECE wave equation:

$$(\square + R)\,\Phi = 0 \quad -(30)$$

then

$$\Phi = \Phi_0 \cos \kappa_0 Z = \frac{A \cos \kappa Z}{\kappa_0^2 - \kappa^2} \quad -(31)$$

and counter gravitation occurs at:

$$\kappa_0 = \kappa. \quad -(32)$$

If the gravitational potential is assumed to be:

$$\Phi = \Phi_0 \exp\left(-i \underline{\kappa} \cdot \underline{r}\right) = -\frac{MG}{r} \quad -(33)$$

$$= \Phi_0 \cos \kappa_0 Z$$

5) Then

$$K_0 = \frac{1}{Z} \cos^{-1}\left(- \frac{mG}{\Phi_0 Z} \right) \quad - (34)$$

To estimate Φ_0, use:

$$|\Phi| = \left(\Phi_0 \Phi_0^* \right)^{1/2} = \frac{mG}{r} \quad - (35)$$

so

$$\Phi_0 = \left(\frac{mG}{r} \right) = \left(\frac{mG}{Z} \right)^{1/2} \quad - (36)$$

so

$$K_0 = \frac{1}{Z} \cos^{-1} \left(-1 \right) \quad - (37)$$

$$\boxed{k_0 = \frac{\pi}{Z}} \quad - (38)$$

Therefore resonance occurs when the electromagnetic K is tuned to π / Z.

In three dimensions:

$$\Phi = \Phi_0 \exp\left(-i \left(K_x X + K_y Y + K_z Z \right) \right)$$
$$= - \frac{mG}{\left(X^2 + Y^2 + Z^2 \right)^{1/2}} \quad - (39)$$