89(2): Interaction of Euler Bernoulli Equations

Denote the electromagnetic Euler Bernoulli equation by:

$$(\nabla^2 + \kappa_e^2)\phi = A_e \cos \underline{\kappa}_e \cdot \underline{r} \quad -(1)$$

and the gravitational Euler Bernoulli equation by:

$$(\nabla^2 + \kappa_g^2)\Phi = A_g \cos \underline{\kappa}_g \cdot \underline{r} \quad -(2)$$

Here ϕ is the electromagnetic scalar potential and Φ is the gravitational scalar potential.

The parameters κ_e^2 and κ_g^2 are defined by:

$$\kappa_e^2 \phi = \rho_e / \epsilon_0 \quad -(3)$$

and

$$\kappa_g^2 \Phi = 4\pi G \rho_m \quad -(4)$$

and by:

$$R_e = -\kappa_e^2 \quad -(5)$$

$$R_g = -\kappa_g^2 \quad -(6)$$

Here ϕ is the electromagnetic scalar potential and this is defined in terms of the electromagnetic charge density ρ_e. In eq. (4) ρ_m is the mass density. The two relevant ECE wave equations are

$$(\Box + R_e)\phi = 0 \quad -(7)$$

and

$$(\Box + R_g)\Phi = 0 \quad -(8)$$

Here:

$$A_e \cos \underline{\kappa}_e \cdot \underline{r} = \frac{1}{c^2}\frac{\partial^2 \phi}{\partial t^2} \quad -(9)$$

and

$$A_g \cos \underline{\kappa}_g \cdot \underline{r} = \frac{1}{c^2}\frac{\partial^2 \Phi}{\partial t^2} \quad -(10)$$

Eqs. (9) and (10) transform the wave equations (7) and (8) into the Euler Bernoulli equations (1) and (2).

Adding eqs. (1) and (2):

$$(\nabla^2 + \kappa_e^2)\phi + (\nabla^2 + \kappa_g^2)\underline{\Phi} = A_e \cos \underline{\kappa}_e \cdot \underline{r} + A_g \cos \underline{\kappa}_g \cdot \underline{r} \quad - (11)$$

so

$$(\nabla^2 + \kappa_g^2)\underline{\Phi} = A_e \cos \underline{\kappa}_e \cdot \underline{r} + A_g \cos \underline{\kappa}_g \cdot \underline{r} - (\nabla^2 + \kappa_e^2)\phi \quad - (12)$$

Consider now the Euler Bernoulli resonance in the equation:

$$(\nabla^2 + \kappa_g^2)\underline{\Phi} = A_e \cos \underline{\kappa}_e \cdot \underline{r} + \ldots\ldots \quad - (13)$$

The driving force on the right hand side is electromagnetic, while on the left hand side appears the gravitational potential $\underline{\Phi}$ and κ_g^2. Therefore an electromagnetic driving force can cause resonance in the gravitational potential $\underline{\Phi}$.

If $\underline{\Phi}$ is engineered so that g becomes positive at resonance, then counter gravitation occurs at resonance. Therefore the resonance must cause $\underline{\Phi}$ to become positive.

The negative valued gravitational potential of the earth is:

$$\underline{\Phi}(\text{earth}) = -\frac{MG}{r} \quad - (14)$$

so

$$\underline{g}(\text{earth}) = -\underline{\nabla}\,\underline{\Phi}(\text{earth}) = -\frac{MG\,\underline{r}}{r^3} \quad - (15)$$

In Cartesian coordinates:

$$\underline{r} = X\underline{i} + Y\underline{j} + Z\underline{k} \quad -(16)$$

and

$$\underline{\kappa}_g = \kappa_{gX}\underline{i} + \kappa_{gY}\underline{j} + \kappa_{gZ}\underline{k} \quad -(17)$$

Therefore:

$$\left(\frac{\partial^2}{\partial X^2} + \frac{\partial^2}{\partial Y^2} + \frac{\partial^2}{\partial Z^2} + \kappa_{gX}^2 + \kappa_{gY}^2 + \kappa_{gZ}^2\right)\underline{\Phi} \quad -(18)$$

$$= A_e \cos\left(\kappa_{eX}X + \kappa_{eY}Y + \kappa_{eZ}Z\right) + \cdots$$

Eq. (18) can be solved by computer algebra to find the resonant solution for $\underline{\Phi}$ in general.

To illustrate the problem consider the one dimensional equation:

$$\frac{\partial^2\underline{\Phi}}{\partial Z^2} + \kappa_{gZ}^2\underline{\Phi} = A_e \cos \kappa_{eZ} Z \quad -(19)$$

The solution is:

$$\underline{\Phi} = \frac{A_e \cos \kappa_{eZ} Z}{\kappa_{gZ}^2 - \kappa_{eZ}^2} \quad -(20)$$

and at resonance:

$$\kappa_{gZ}^2 = \kappa_{eZ}^2 \quad -(21)$$

so

$$\underline{\Phi} \rightarrow \infty \quad -(22)$$

and counter-gravitation occurs.

4) In the limit of special relativity, the gravitational wave equation becomes:

$$\left(\Box + \left(\frac{m_g c}{\hbar} \right)^2 \right) \Phi = 0 \quad -(23)$$

so

$$\kappa_g^2 = \left(\frac{m_g c}{\hbar} \right)^2 \quad -(24)$$

where m_g is the mass of the graviton.

So resonance is observed when:

$$\boxed{\kappa_{ez} = \frac{m_g c}{\hbar}} \quad -(25)$$

If it is assumed that:

$$\kappa_{ez} = \frac{\omega_e}{c} \quad -(26)$$

then

$$\boxed{\omega_e = \frac{m_g c^2}{\hbar}} \quad -(27)$$

The mass of the graviton is given as:

$$m_g = 1.909 \times 10^{-61} \text{ kgm} \quad -(28)$$

by I. Haranas and I. Gkigkitzis, Int. Sci. Res. Notes, ID 718251 (2014), so:

$$\omega_e = 1.622 \times 10^{-10} \text{ rad s}^{-1}, \quad -(28)$$

so a very low frequency e/m field is needed.