68(3) : Structure of the Interaction Coulomb law

The basic structure is given by:

$$\underline{\nabla} \cdot \underline{E}^a = \rho / \epsilon_0 - (\underline{\omega}^a{}_b)_{int} \cdot \underline{E}^b \quad -(1)$$

As shown in paper 66 the electric field is a vector boson with labels:

$$a = 1, 2, 3 \quad -(2)$$

so:

$$\underline{\nabla} \cdot \underline{E}^1 = \rho^1 / \epsilon_0 - (\underline{\omega}^1{}_b)_{int} \cdot \underline{E}^b \quad -(3)$$

$$\underline{\nabla} \cdot \underline{E}^2 = \rho^2 / \epsilon_0 - (\underline{\omega}^2{}_b)_{int} \cdot \underline{E}^b \quad -(4)$$

$$\underline{\nabla} \cdot \underline{E}^3 = \rho^3 / \epsilon_0 - (\underline{\omega}^3{}_b)_{int} \cdot \underline{E}^b . \quad -(5)$$

Now assume that only the diagonal elements of the interaction spin connection exist, so that:

$$\left(\underline{\nabla} + (\underline{\omega}^1{}_1)_{int} \right) \cdot \underline{E}^1 = \rho^1 / \epsilon_0 \quad -(6)$$

$$\left(\underline{\nabla} + (\underline{\omega}^2{}_2)_{int} \right) \cdot \underline{E}^2 = \rho^2 / \epsilon_0 \quad -(7)$$

$$\left(\underline{\nabla} + (\underline{\omega}^3{}_3)_{int} \right) \cdot \underline{E}^3 = \rho^3 / \epsilon_0 \quad -(8)$$

From paper 66 we know that:

2)

$$\underline{E}^1 = -\underline{\nabla}\phi + \underline{\omega}\phi \quad -(9)$$

$$\underline{E}^2 = -\underline{\nabla}\phi \quad -(10)$$

$$\underline{E}^3 = -\underline{\nabla}\phi - \underline{\omega}\phi. \quad -(11)$$

From eqns. (6) to (11):

$$\left(\underline{\nabla} + (\underline{\omega}^1{}_1)_{int}\right)\cdot\left(-\underline{\nabla}\phi + \underline{\omega}\phi\right) = \rho^1/\epsilon_0 \quad -(12)$$

$$\left(\underline{\nabla} + (\underline{\omega}^2{}_2)_{int}\right)\cdot\left(-\underline{\nabla}\phi\right) = \rho^2/\epsilon_0 \quad -(13)$$

$$\left(\underline{\nabla} + (\underline{\omega}^3{}_3)_{int}\right)\cdot\left(-\underline{\nabla}\phi - \underline{\omega}\phi\right) = \rho^3/\epsilon_0 \quad -(14)$$

So there are three possible resonance equations. The labels 1, 2, 3 on the charge density indicate in general that there are three different charge densities possible, but for simplicity and illustration it may be assumed that:

$$\rho = \rho^1 = \rho^2 = \rho^3 \quad -(15)$$

Also, for simplicity, it may be assumed that:

$$\underline{\omega}_{int} = (\underline{\omega}^1{}_1)_{int} = (\underline{\omega}^2{}_2)_{int} = (\underline{\omega}^3{}_3)_{int} \quad -(16)$$

So the final equations are:

3)

$$\nabla^2 \phi + \underline{\omega}_{int} \cdot \underline{\nabla} \phi - \underline{\nabla} \cdot (\underline{\omega} \phi) - \underline{\omega}_{int} \cdot \underline{\omega} \phi = -\rho / \epsilon_0 \quad -(17)$$

$$\nabla^2 \phi + \underline{\omega}_{int} \cdot \underline{\nabla} \phi = -\rho / \epsilon_0 \quad -(18)$$

$$\nabla^2 \phi + \underline{\omega}_{int} \cdot \underline{\nabla} \phi + \underline{\nabla} \cdot (\underline{\omega} \phi) + \underline{\omega}_{int} \cdot \underline{\omega} \phi = -\rho / \epsilon_0 \quad -(19)$$

These are three different equations and would give three different resonance patterns for ϕ. The interaction of electromagnetism and gravitation is represented by $\underline{\omega}_{int}$. Initially this may be very small, but at resonance there is an amplification in ϕ and as a secondary effect, this causes an amplification in the interaction between the electromagnetic and gravitational fields.