

75(3): ECE Explanation of the ESA Experiment

With reference to M. Tajmar et al., gr-qc/0603033
The London moment is supplemented by a large gravitomagnetic field \underline{B}_g which has the units of angular velocity, so:

$$\underline{B} = -\frac{2m}{e} \underline{\omega} - \frac{m}{e} \underline{B}_g \quad - (1)$$

Then \underline{B}_g induces an acceleration due to gravity by:

$$\underline{\nabla} \times \underline{g} + \frac{d\underline{B}_g}{dt} = \underline{0} \quad - (2)$$

Eq. (2) is confirmed experimentally in the ESA experiment, widely reported in the media. Its experimental value is:

$$\underline{B}_g = 1.84 \times 10^{-4} \underline{\omega} \quad - (3)$$

and is indicated by a mass increase in Niobium Cooper pairs. It is many orders of magnitude greater than the Earth's \underline{B}_g :

$$\underline{B}_g (\text{Earth}) = 10^{-14} \text{ rad s}^{-1} \quad - (4)$$

ECE Explanation

Equation (1) is a direct consequence of:

$$\underline{B}^a = \underline{\nabla} \times \underline{A}^a - \underline{\omega}^a{}_b \times \underline{A}^b \quad - (5)$$

thus:

$$\underline{B}_g^a = \frac{e}{m} \underline{\omega}^a{}_b \times \underline{A}^b \quad - (6)$$

Equation (2) in ECE theory is eq. (177) of paper SS:

$$\underline{\nabla} \times \underline{T}_L^a + \frac{1}{c} \frac{d\underline{T}_S^a}{dt} = \underline{j}^a \quad - (7)$$

with:

$$\underline{j}^a = \underline{0}, \quad - (8)$$

i.e.

$$\underline{\nabla} \times \underline{T}_L^a + \frac{1}{c} \frac{d\underline{T}_S^a}{dt} = \underline{0} \quad - (9)$$

For each a:

$$\underline{\nabla} \times \underline{T}_L + \frac{1}{c} \frac{d\underline{T}_S}{dt} = \underline{0} \quad - (10)$$

This:

$$\underline{g} = \underline{T}_L, \quad \underline{B}g = \frac{1}{c} \underline{T}_S \quad - (11)$$

The ECE theory does not use the Higgs mechanism because there is no Higgs boson. The photon and graviton mass are rigorously non-zero in ECE. The graviton discovered by Tejmar et al. is the tetrad e_μ^a governed by:

$$(\square + kT) e_\mu^a = 0 \quad - (12)$$

3) The explanation is ECE for the gigantic value of \underline{B}^a is spin current resonance. This is applied to magneto-statics in paper 65, whose results can be used directly for the ESA experiment. At resonance, \underline{A}^b in eq (1) is greatly amplified, so \underline{B}^a is greatly amplified, and \underline{g} in eq. (2) is greatly amplified. \underline{I}_L of niobium Cooper pairs, the structure of the superconductor is such as to define the condition for resonance to occur.

Using the ECE Ansatz, eq. (9) is equivalent to :

$$\underline{\nabla} \times \underline{E}^a + \frac{\partial \underline{B}^a}{\partial t} = \underline{0} \quad - (13)$$

↓ ECE Ansatz

$$\underline{\nabla} \times \underline{I}_L^a + \frac{1}{c} \frac{\partial \underline{I}_S^a}{\partial t} = \underline{0} \quad - (14)$$

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$$\underline{\nabla} \times \underline{g} + \frac{\partial \underline{B}^a}{\partial t} = \underline{0} \quad - (15)$$