OBSERVATION OF ORBITAL TORQUE GENERATED BY A STATIC ELECTRIC FIELD AND EXPLANATION WITH EINSTEIN CARTAN EVANS UNIFIED FIELD THEORY.

by

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ABSTRACT

An applied static electric field is observed to produce orbital torque in sodium chloride powder contained in a Petrie dish. The axis of the orbital torque is parallel to that of the applied electric field, and is observed by the rotational motion of the powder. There is no explanation for this phenomenon in the standard model but it is explained straightforwardly from the basic ansatz of Einstein Cartan Evans (ECE) unified field theory.

Keywords: Einstein Cartan Evans (ECE) unified field theory, orbital torque produced by a static electric field.

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1. INTRODUCTION

Recently {1} it has been observed by Thomson that a static electric field produces a tornado like structure in sodium chloride powder contained in a Petrie dish. A rotational motion is induced in the powder about an axis parallel to the applied field. In this paper a simple explanation for this phenomenon is given using the basic ansatz of the Einstein Cartan Evans (ECE) field theory {2-7}. This ansatz is

$$F^a = A^{(0)} T^a \qquad -(1)$$

where F^a is the field form $A^{(0)}$ is a scaling constant where $cA^{(0)}$ has the units of voltage, and T^a is the Cartan torsion form {8}. In Section 2 a review of the theory of unified classical dynamics and electrodynamics in ECE is given, and it is shown there that a static electric field is proportional to the orbital part of the Cartan torsion, which in turn is proportional to an orbital torque. In Section 3 the experimental details are summarized, showing that the experiment is repeatable and reproducible.

2. REVIEW OF THE THEORY OF UNIFIED CLASSICAL DYNAMICS AND ELECTRODYNAMICS.

Using vector notation the equations of classical electrodynamics in ECE theory are as follows. The Gauss Law of magnetism is:

$$\underline{\nabla} \cdot \underline{B}^a = \mu_0 \tilde{j}^{a0}_{em} \qquad -(2)$$

The Faraday law of induction is:

$$\underline{\nabla} \times \underline{E}^a + \frac{\partial \underline{B}^a}{\partial t} = \mu_0 \underline{\tilde{j}}^a_{em} \qquad -(3)$$

The Coulomb law is:

$$\underline{\nabla} \cdot \underline{E}^a = \mu_0 c \tilde{J}^{a0}_{em} \quad -(4)$$

and the Ampère Maxwell law is:

$$\underline{\nabla} \times \underline{B}^a - \frac{1}{c^2}\frac{\partial \underline{E}^a}{\partial t} = \frac{\mu_0}{c} \underline{\tilde{J}}^a_{em} . \quad -(5)$$

Here $\underline{B}^a$ is the magnetic flux density in tesla, $\underline{E}^a$ is the electric field strength in volts per meter, μ_0 is the S.I. vacuum permeability. Here $\tilde{j}^{a0}_{em}$ and $\underline{\tilde{j}}^a_{em}$ are parts of the four-vector:

$$\tilde{j}^{a\mu}_{em} = A^{(0)} \tilde{j}^{a\mu} = A^{(0)}\left(\frac{1}{c}\tilde{j}^{a0}, \underline{\tilde{j}}^a\right) - (6)$$

and $\tilde{J}^{a0}_{em}$ and $\underline{\tilde{J}}^a_{em}$ are parts of the four-vector:

$$\tilde{J}^{a\mu}_{em} = A^{(0)} \tilde{J}^{a\mu} = A^{(0)}\left(\frac{1}{c}\tilde{J}^{a0}, \underline{\tilde{J}}^a\right) - (7)$$

where $A^{(0)}$ is the constant of proportionality from Eq. (1). The index a comes from Cartan geometry and is well understood as a polarization index {2-7}.

The equations of rotational dynamics in ECE theory are similar in structure to the equations of electrodynamics and are expressed in terms of an orbital torsion vector $\underline{T}^a_L$ and a spin torsion vector $\underline{T}^a_S$ as follows:

$$\underline{\nabla} \cdot \underline{T}^a_S = \tilde{j}^{a0} / c \quad -(8)$$

$$\underline{\nabla} \times \underline{T}^a_L + \frac{1}{c}\frac{\partial \underline{T}^a_S}{\partial t} = \underline{\tilde{j}}^a \quad -(9)$$

$$\underline{\nabla} \cdot \underline{T}^a_L = \tilde{J}^{a0} \quad -(10)$$

$$\underline{\nabla} \times \underline{T}^a_S - \frac{1}{c^2}\frac{\partial \underline{T}^a_L}{\partial t} = \underline{\tilde{J}}^a - (11)$$

Eq. (9) describes the gravitational equivalent of the Faraday law of induction as observed recently { 9 } in spinning superconductors. Eq. (10) is the gravitational equivalent of the Coulomb law of ECE theory, Eq. (4).

It is seen that the static electric field (volts / meter) is directly proportional to the orbital torsion as follows:

$$\underline{E}^{a} = c A^{(0)} \underline{T}_{L}^{a} . \quad -(12)$$

This is precisely what is observed in the Petrie dish experiment, where a static electric field produces a swirling motion of sodium chloride salt in a Petrie dish. The axis of the swirling motion is parallel to that of the applied electric field. Eq. (9) shows that if the vector curl of the orbital torsion is non-zero, a spin torsion may be induced. The spin torsion is proportional to magnetic flux density as follows:

$$\underline{B}^{a} = A^{(0)} \underline{T}_{S}^{a} \quad -(13)$$

so if a spin torsion is induced a magnetic flux density ought to be observable in the experiment, and could be detected by a digital magnetometer or similar device in future work. This is the simplest possible explanation of the experiment, more complicated motions are produced in general, and the electric field may produce sparking across the terminals if the charge density is sufficiently high. The rotational motion is only roughly analogous to a tornado. However, the experiment illustrates a rotational motion of the sodium chloride salt that cannot be explained in the standard model but can be explained in ECE theory. In the standard model the Coulomb law is an eighteenth century empirical law, there is no notion of space-time. If there is spin connection resonance {2-7} present the orbital torque may be enhanced considerably, but the mechanism of spin connection resonance has not been used in this paper.

3.EXPERIMENTAL DETAILS