THE VACUUM CURRENT IMPLIED BY CONSERVATION OF ANTISYMMETRY

by

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ABSTRACT

It is shown that conservation of antisymmetry in ECE2 physics, notably electrodynamics, leads to the inference of a spacetime, aether or vacuum current density. The spin connection is calculated for any material vector potential $\underline{A}$ by using the antisymmetry equations to give unique solutions of an exactly defined equation set. The vacuum current is defined by the Ampère and Gauss laws of ECE2 magnetostatics. Sample results are computed and graphed.

Keywords: ECE2 physics, electrodynamics, conservation of antisymmetry, vacuum current.

UFT 386

1. INTRODUCTION

In immediately preceding papers of this series {1 - 12} the ECE2 field equations have been solved with conservation of antisymmetry, a fundamental law of physics first inferred in UFT131. It was shown in UFT131 ff. that the standard model of electrodynamics (the Maxwell Heaviside (MH) theory) violates antisymmetry. The entire standard model of electrodynamics, the electroweak field, and of the Higgs boson for example is refuted by violation of antisymmetry. By now, the obsolescence of the standard model of physics is well known and accepted. On a philosophical plane, violation of antisymmetry is a disaster akin to violation of any other conservation law. On the ECE2 level, antisymmetry is conserved.

This paper is a brief synopsis of extensive calculations posted in the notes accompanying UFT386 on www.aias.us. Notes 381(1), 386(2), 386(4) and 386(5) are preliminary calculations, the final version of which is given in Note 386(9) and used in Section 2 of this paper. Note 386(3) provides an example of a magnetic material potential $\underline{A}$, which is translated in the note from spherical polar to Cartesian coordinates. Notes 386(6) and 386(7) give a convenient revision from UFT131 of the proof of violation of antisymmetry in the standard physics.

Section 2 is based on Note 386(9), and solves the antisymmetry equations of ECE2 electrodynamics for the three components of the spin connection. Therefore antisymmetry is conserved by this procedure for any material vector potential $\underline{A}$. The ECE2 Gauss and Ampère laws of magnetostatics are used to calculate a novel spacetime, vacuum or aether current density $\underline{J}$(vac). The spin connection is shown to be the intermediary between $\underline{A}$ and $\underline{J}$(vac). The latter provides energy from spacetime and does not exist in the MH theory.

Section 3 uses computer algebra to provide solutions which are graphed and discussed.

2. DERIVATION OF THE SPACETIME CURRENT

Consider the ECE2 antisymmetry equations {1 - 12}:

$$\frac{\partial A_Z}{\partial Y} + \frac{\partial A_Y}{\partial Z} = \omega_Y A_Z + \omega_Z A_Y \quad -(1)$$

$$\frac{\partial A_X}{\partial Z} + \frac{\partial A_Z}{\partial X} = \omega_Z A_X + \omega_X A_Z \quad -(2)$$

$$\frac{\partial A_Y}{\partial X} + \frac{\partial A_X}{\partial Y} = \omega_X A_Y + \omega_Y A_X \quad -(3)$$

where $\underline{A}$ is the usual material vector potential. Eqs. (1) to (3) are exactly determined and give unique solutions for the three Cartesian components of the spin connection vector:

$$\underline{\omega} = \omega_X \underline{i} + \omega_Y \underline{j} + \omega_Z \underline{k}. \quad -(4)$$

Using computer algebra, these solutions are:

$$\omega_X = -\frac{1}{2A_Y A_Z}\left[A_X\left(\frac{\partial A_Z}{\partial Y} + \frac{\partial A_Y}{\partial Z}\right) - A_Y\left(\frac{\partial A_Z}{\partial X} + \frac{\partial A_X}{\partial Z}\right) - A_Z\left(\frac{\partial A_Y}{\partial X} + \frac{\partial A_X}{\partial Y}\right)\right] \quad -(5)$$

$$\omega_Y = \frac{1}{2A_X A_Y}\left[A_X\left(\frac{\partial A_Z}{\partial Y} + \frac{\partial A_X}{\partial Z}\right) - A_Y\left(\frac{\partial A_Z}{\partial X} + \frac{\partial A_X}{\partial Z}\right) + A_Z\left(\frac{\partial A_Y}{\partial X} + \frac{\partial A_X}{\partial Y}\right)\right] \quad -(6)$$

$$\omega_Z = \frac{1}{2A_X A_Y}\left[A_X\left(\frac{\partial A_Z}{\partial Y} + \frac{\partial A_X}{\partial Z}\right) + A_Y\left(\frac{\partial A_Z}{\partial X} + \frac{\partial A_X}{\partial Z}\right) - A_Z\left(\frac{\partial A_Y}{\partial X} + \frac{\partial A_X}{\partial Y}\right)\right] \quad -(7)$$

Therefor the spin connection vector $\underline{\omega}$ can be calculated uniquely for any $\underline{A}$, Q. E. D.

Note carefully that if any more equations are added to Eqs. (1) to (3) the system becomes over determined and there is no solution. Eqs. (1) to (7) can be translated into any coordinate system using computer algebra.

Therefore in any problem of ECE2 electrodynamics, gravitation and fluid dynamics the spin connections are always defined by Eqs. (5) to (7). This procedure conserves antisymmetry, Q. E. D.. For example, the ECE2 field equations of magnetostatics are:

$$\underline{\nabla} \cdot \underline{B} = 0 \quad - (8)$$

$$\underline{\nabla} \times \underline{B} = \mu_0 \underline{J} \quad - (9)$$

$$\underline{B} = \underline{\nabla} \times \underline{A} - \underline{\omega} \times \underline{A}, \quad - (10)$$

where $\underline{B}$ is the magnetic flux density, μ_0 is the S. I. Vacuum permeability, and $\underline{J}$ is the material current density. Here, $\underline{A}$ is the material vector potential. From Eq. (9):

$$\underline{A} = \frac{\mu_0}{4\pi} \int \frac{\underline{J}(\underline{x}')}{|\underline{x} - \underline{x}'|} d^3x'. \quad - (11)$$

Therefore $\underline{A}$ can be calculated or computed from any current density $\underline{J}(\underline{x}')$ using Eq. (11). There are well known analytical solutions, for example a circular current loop and a magnetized sphere, but using a fast desktop, mainframe or supercomputer $\underline{A}$ can be computed for any current density $\underline{J}$.

Having found $\underline{A}$ from any $\underline{J}$, any spin connection vector $\underline{\omega}$ can be found from Eqs. (5) to (7).

For example, in a well defined approximation {1 -12}, a magnetic current loop gives a material vector potential component in spherical polar coordinates:

$$\underline{A} = \frac{\mu_0 I a^2}{4r^2} \sin\theta \, \underline{e}_\phi \quad - (12)$$

This is translated into Cartesian coordinates in Note 386(3)

$$\underline{A} = \frac{\mu_0 I a^2}{4}\left(\frac{-Y\underline{i}}{(x^2+y^2+Z^2)^{3/2}} + \frac{X\underline{j}}{(x^2+y^2+Z^2)^{3/2}}\right). \quad -(13)$$

Here I is the current in a loop of radius a. Computer algebra can be used to compute the spin connection from Eqs. (5), (6), (7) and (13). This procedure rigorously conserves antisymmetry. Similarly $\underline{\omega}$ can be computed from any $\underline{A}$ and examples are given in Section 3. In general the solutions for $\underline{A}$ of a circular current loop are given in Note 386(5).

From the Gauss law (8), it follows that:

$$\underline{\nabla} \cdot (\underline{\omega} \times \underline{A}) = 0 \quad -(14)$$

because:

$$\underline{\nabla} \cdot \underline{\nabla} \times \underline{A} = 0. \quad -(15)$$

It follows from Eq. (14) that a spacetime, vacuum or aether vector potential $\underline{\alpha}$ can always be defined:

$$\underline{\nabla} \times \underline{\alpha} := \underline{\omega} \times \underline{A} \quad -(16)$$

It follows that:

$$\underline{\nabla} \cdot \underline{B} = \underline{\nabla} \cdot (\underline{\nabla} \times \underline{A} - \underline{\nabla} \times \underline{\alpha}) = 0. \quad -(17)$$

So the ECE2 Gauss law (8) is obeyed Q. E. D.

The concept of $\underline{\alpha}$ does not exist in MH theory.

The spacetime, vacuum or aether current density $\underline{J}$(vac) is defined by

$$\underline{\alpha} = \frac{\mu_0}{4\pi} \int \frac{\underline{J}(vac)(\underline{x}')}{|\underline{x} - \underline{x}'|} d^3x \quad - (18)$$

and by the vacuum Ampère law of ECE2 electrodynamics:

$$\underline{\nabla} \times \underline{B}(vac) = \mu_0 \underline{J}(vac) \quad - (19)$$

where $\underline{B}$(vac) is the vacuum, aether or spacetime magnetic flux density. Again this concept does not exist in MH theory. It follows that:

$$\underline{J}(vac) = \frac{1}{\mu_0} \underline{\nabla} \times (\underline{\nabla} \times \underline{\alpha}) = \frac{1}{\mu_0} \underline{\nabla} \times (\underline{\omega} \times \underline{A}) \quad - (20)$$

Q. E. D. So $\underline{J}$(vac) can be computed from any material $\underline{A}$. Clearly, the spin connection vector $\underline{\omega}$ is the intermediary between the material $\underline{A}$ and the vacuum current $\underline{J}$(vac).

Conservation of ECE2 antisymmetry implies the existence of a vacuum current $\underline{J}$(vac).

3. COMPUTATION AND GRAPHICS

(Section by Dr. Horst Eckardt).

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