3. DISCUSSION OF THE INTERACTION OF ELECTROMAGNETISM AND GRAVITATION.

It is important to realize that in the Evans field theory the currents j and J are a logical consequence of differential geometry, and also govern the way in which electromagnetism influences gravitation and vice versa. In the older MH theory the current j is not recognized to exist, and J is introduced empirically without reference to geometry as required in general relativity. The Evans field theory therefore has fundamental advantages over the MH field theory. It is proved as follows that if j is zero experimentally to high precision, then J is non-zero as also observed experimentally.

It is required to prove that if:

$$R^a{}_b \wedge q^b = \omega^a{}_b \wedge T^b \quad -(37)$$

then:

$$\tilde{R}^a{}_b \wedge q^b \neq \omega^a{}_b \wedge \tilde{T}^b . \quad -(38)$$

In tensor notation Eq. (37) is:

$$R^a{}_{b\mu\nu} q^b_\rho + R^a{}_{b\rho\mu} q^b_\nu + R^a{}_{b\nu\rho} q^b_\mu = \omega^a{}_{b\mu} T^b_{\nu\rho} + \omega^a{}_{b\rho} T^b_{\mu\nu} + \omega^a{}_{b\nu} T^b_{\rho\mu} \quad -(39)$$

and this is equivalent {3-32} to:

$$\tilde{R}^a{}_b{}^{\mu\nu} q^b_\mu = \omega^a{}_{\mu b} \tilde{T}^{\mu\nu b} . \quad -(40)$$

It follows from Eq. (40) that in general:

$$\tilde{R}^a{}_{b\mu\nu} q^b_\rho + \tilde{R}^a{}_{b\rho\mu} q^b_\nu + \tilde{R}^a{}_{b\nu\rho} q^b_\mu \neq \omega^a{}_{b\mu} \tilde{T}^b_{\nu\rho} + \omega^a{}_{b\rho} \tilde{T}^b_{\mu\nu} + \omega^a{}_{b\nu} \tilde{T}^b_{\rho\mu} \quad -(41)$$

So the proof is complete (q.e.d.) and rigorously geometrical in nature. In the Evans field theory it has been proven rigorously that if j ~ 0 experimentally then J is not zero. This proof then shows the origin of charge current density (J) in general relativity or objective physics.

The Einsteinian theory of gravitation uses the Christoffel symbol, as discussed already, and in this theory there is no influence of gravitation on electromagnetism. The use of a Christoffel symbol implies:

$$R \wedge q = 0 \qquad -(42)$$

which is the familiar Bianchi identity:

$$R_{\sigma\mu\nu\rho} + R_{\sigma\nu\rho\mu} + R_{\sigma\rho\mu\nu} = 0 \qquad -(43)$$

of the Einstein theory. Eq. (42) implies that electromagnetism is described in objective physics with the use of an anti-symmetric gamma connection in the HE:

$$\begin{aligned} d \wedge F^a &= R^a{}_b \wedge A^b - \omega^a{}_b \wedge F^b \qquad -(44) \\ &= \mu_0 j \sim 0. \end{aligned}$$

There is no contribution from gravitation, so the latter, self consistently, does not influence electromagnetism in the Einstein limit.

When there is interaction between gravitation and electromagnetism, the gamma connection is in general asymmetric in the HE and IE equations. This means that the gamma connection is a sum of antisymmetric and symmetric components, a conclusion which follows from the well known theorem that an asymmetric matrix is always the well defined sum of a symmetric matrix and an anti-symmetric matrix. This INTERACTION between gravitation and electromagnetism is the critically important factor in extracting electric power from Evans spacetime in situations where the standard model fails qualitatively. The standard model is not capable of describing this interaction, so is not capacble of describing the critically important extra source of electric power that appears in general in both j and J.

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