1)

THE INHOMOGENEOUS FIELD EQUATION

Differential Form Notation

$$\boxed{d \wedge \tilde{F}^a = A^{(0)} \left(\tilde{R}^a{}_b \wedge q^b \right)_{grav}}$$

THE COULOMB LAW (VECTOR NOTATION)

$$\boxed{\underline{\nabla} \cdot \underline{E}^a = \frac{\rho^a}{\epsilon_0} = \mu_0 c J^{a0}}$$

where:

$$\boxed{J^{a0} = -\frac{A^{(0)}}{\mu_0} \left(R^a{}_1{}^{01} + R^a{}_2{}^{02} + R^a{}_3{}^{03} \right)_{grav}}$$

THE AMPÈRE-MAXWELL LAW (VECTOR NOTATION)

$$\boxed{\underline{\nabla} \times \underline{B}^a = \frac{1}{c^2} \frac{\partial \underline{E}^a}{\partial t} + \mu_0 \underline{J}^a}$$

$$J_x^a = -\frac{A^{(0)}}{\mu_0} \left(R^a{}_0{}^{01} + R^a{}_2{}^{21} + R^a{}_3{}^{31} \right)_{grav}$$

$$J_y^a = -\frac{A^{(0)}}{\mu_0} \left(R^a{}_0{}^{02} + R^a{}_1{}^{12} + R^a{}_3{}^{32} \right)_{grav}$$

$$J_z^a = -\frac{A^{(0)}}{\mu_0} \left(R^a{}_0{}^{03} + R^a{}_1{}^{13} + R^a{}_2{}^{23} \right)_{grav}$$

2)

Notes

1) The R tensor elements appearing in these equations are elements of the Riemann tensor of the Einstein field theory of gravitation. Therefore charge density and current density do not exist in the absence of gravitation.

2) The equations are given in the absence of polarization and magnetization.

3) The equations were derived on the assumption that there is no gravitational torsion present, and on the assumption that the free space geometry of the electromagnetic field is not changed by field matter interaction. This is a type of minimal prescription, i.e. a standard assumption.

4) It is clear that gravitation influences electromagnetism. It is not possible to analyze this influence in the standard model.