General Relativity Applied to Electricity, an Introduction. v1.

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Abstract

This article applies General Relativity (GR) to energy stored in a charge configuration termed, "potential energy of a system of charges", as it affects gravitation and space-time. All mass and energy is expressible as, and convertible to electrical energy, as grams are equivalent to electron-volts.

The analysis predicts gravitational radiation to be radiated and propagated as Electro-Magnetic Radiation (EMR), therefore gravitational radiation is equivalent to EMR.

GR Applied to a Charge Couple

Consider charges 'a' and 'b' in isolation, each detectable only by relation to other charges, separated by a Cartesian Radius R, assumed to be measured by a light signal with a constant velocity c and assumes c is in a perfect vacuum, conventionally expressed,

$$Mc^2 = ab/R,$$

M is the Mass of the electrical couple. The Cartesian R is expressible by time,

$$R = ct = x^0, \qquad \text{Equation (1),}$$

in place of R, the refinement of a physical light Signal is used, wherein the velocity of light is not constant but instead subject to the effect of the charges, refined to,

$$Mc^2 = ab/S.$$

Let G be Newton's gravitational constant, $K = G/c^4$, and r be an arbitrary radius from mass M to a point in space, the time metric tensor component of a Mass is,

$$g_{00} = 1 - 2GM/rc^2 = 1 - 2K(ab/S)/r, \qquad \text{Equation (2).}$$

The 'space time interval' is conventionally written,

$ds^2 = g_{\mu\nu} dx^{\mu}\ dx^{\nu}$, that becomes clearer written as,

$$ds^2 = (dS_{time})^2 - (dS_{space})^2$$

For brevity, setting $dS = dS_{time}$ and in view of Equation (1),

$dS^2 = g_{00} dx^0 dx^0 = g_{00} dR^2$.

Charge Couple Relation

Consideration of a simple pair of charges gives straight forward conceptualization and can be summed to macroscopic bodies applications.

Setting $r = S$ in Equation (2), charges a and b relate to each as,

$g_{00} = 1 - 2Kab/S^2$, and $S^2 = S^2 g_{00} + 2K\ ab$,

Solving g_{00} in terms of R and S provides, $R^2 = S^2 g_{00}$, and

$S^2 = R^2 + 2K\,ab$, Equation (3),

and $dR/dS = S/R$.

Equation (3) predicts the Signal distance depends on polarity. For a given R , S (repulsion) > S (attraction), producing a greater Coulomb magnitude of attractive force than repulsive force though calculated at the same locations, due to the different Signal distance. The speed of light propagates more slowly in a greater energy density between repulsive charges than attractive charges explaining gravitation as a secondary electrical effect in GR.

GR expressed using Planck's constant

Planck's constant h is expressible in terms of charge 'e' employing the von Klitzing constant R_K as, $h = R_K\, e^2$ The product of charges 'a' and 'b' give $ab = \pm e^2$, yielding $ab = \pm h/R_k$ where the sign depends on the relative polarity of 'a' and 'b'
By expressing g_{oo} (Equation 2), in terms of Quantum Theory, proves its general applicability to all ponderable matter and energy.

G- wave equivalence to EMR

Expressing the Electric field of charge b at location of charge a as,

$E_b = b/S^2$, produces,

$g_{00} = 1 - 2K\,a\,E_b$ with a time derivative w.r.t. x^0,

$g_{00,0} = -2Ka\ \partial E_b/\partial x^0$.

The term $\partial E_b/\partial x^0$ is the Maxwell Equation predicting EMR, commonly written as $1/c\ \partial E/\partial t$. For example, a wave propagating in direction ***x*** is characterized by,

$g_{22,0} = -g_{33,0}$ and therefore, $K\,\partial E_y/\partial(ct) = -K\ \partial E_z/\partial(ct)$

proving propagation of gravitational radiation is equivalent to and measurable as EMR.

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