Abstract Submitted
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Electromagnetism in a gravity field for the quaternion gravity proposal DOUG SWEETSER, None — Gravity effects everything, almost. The electromagnetic field strength tensor has no dependence on a metric tensor because

$$A^{\mu,\nu} - A^{\nu,\mu} = A^{\mu;\nu} - A^{\nu;\mu}.$$

The energy density of an electromagnetic field is invariant in a gravity field. Photons as a quantum are effected by gravity as shown through light bending and red shift experiments suggesting a conflict between theory and experiment. The space-times-time invariance as gravity proposal uses quaternions instead of tensor calculus. Two observers look at two different events. They calculate the difference, then take the square:

$$(dt, dx/c, dy/c, dz/c)^2 = (dt^2 - (dx^2 + dy^2 + dz^2)/c^2, 2dtdx/c, 2dtdy/c, 2dtdz/c).$$

The first term is an interval, the other three space-times-time. If the two observers agree on the interval, a constant velocity exists between the two. If the two observers agree on the three space-times-time values, that invariance is the quaternion gravity proposal. The electric field will remain invariant in a gravity field, but not the magnetic field. Why? The electric field is the number of quantum electric charges, unchanged by a gravitational field. The magnetic field is those charges in motion. Motion is changed by gravity. Quaternion gravity may be more consistent for electromagnetism than GR.

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None

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