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A NEW LOOK AT THE SPECIAL THEORY OF RELATIVITY

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Einstein's special theory of relativity involving the Lorentz transformation is a result of the following considerations:

(1) Conviction that absolute uniform motion is not detectable;

(ii) Velocity of light should be independent of the velocity of the source (relative to the detector), to preserve the invariance of Maxwell's equations with reference to Galillean transformation and the conviction that the beauty of the invariance should be a feature of nature;

(iii) The negative result of the Michelson–Morley experiment is harmonised with (ii) above, by imposing the Lorentz transformation to time and space.

The consequences are the relativity of time, space and of simultaneity. A new approach has been made here to remove these features by making a different set of postulates, for which some justification will be given in a later part of the paper. This new set of postulates are given below;

(1) Absolute motion is undetectable;

(ii) Light consists of photons, which are shot out at fixed velocity C relative to the source. (A reflector or scattering centre is also a source);

(iii) If the source has a velocity v relative to the detector, the latter experiences a velocity C_v for the photons, where

$$C_v = C + v;$$

(iv) Under these conditions, the (dielectric) permittivity ε_v and the (magnetic) permeability μ_v of free space are given by the relation:

$$(1) \qquad \frac{\epsilon_v}{\varepsilon} = \frac{\mu_v}{\mu} = \frac{C}{C_v},$$

where

$$(2) \qquad \mu = \mu_v \text{ and } \varepsilon = \varepsilon_v$$

when v is zero.

The general Maxwell equation can be written as follows. Let E_x, E_y, E_z and H_x, H_y, H_z be the components of electric and magnetic intensities at the point (x, y, z). Then

$$(3) \qquad \frac{\partial E_x}{\partial x} + \frac{\partial E_y}{\partial y} + \frac{\partial E_z}{\partial z} = 0,$$

$$(4) \qquad \frac{\partial H_x}{\partial x} + \frac{\partial H_y}{\partial y} + \frac{\partial H_z}{\partial z} = 0,$$

$$(5) \qquad \frac{\partial H_z}{\partial y} - \frac{\partial H_y}{\partial z} = \frac{\epsilon_v}{C_v} \cdot \dot{E}_x,$$

$$(6) \qquad \frac{\partial E_z}{\partial y} - \frac{\partial E_y}{\partial z} = \frac{\mu_v}{C_v} \cdot \dot{\mu}_x,$$

with each of these equations repeated cyclically with z, y, x, It is easily seen that

$$(7) \qquad \varepsilon_v \mu_v = \varepsilon\ \mu\ \frac{C^2}{C_v^2} = \frac{1}{C_v^2}.$$

Thus the equations are invariant to any Galillean transformation.

They reduce to the normal Maxwell equations if v is zero.

The consequences may be listed as follows:

1. Photons behave like material particles with ragard to the experience of the detector, when the source is moving relative to the detector;
2. Time, length and simultaneity are absolute;
3. ε_v and μ_v depend on the velocity of the source relative to the detector;
4. The negative result of the Michelson-Morley experiment gets a straight interpretation;
5. Absolute uniform motion is not detectable.

A few comments are recorded regarding the plausibility of the above consequences.

Consequences 1, 2, 4 and 5 are obviously plausible. The dependence of ε_v and μ_v on velocity of the detector needs justification. Normally, ε_v and μ_v are assumed to be fixed properties of the free space. This ignores the basic fact that the photon is analogous to a "wave packet"

moving in space. The wave packet has a spatial dimension which can be judged and evaluated by determining the longitudinal and transverse coherent length measurements. It is also associated with a frequency. In all probability, the photon is like a vortex of wavelets. The interaction with the successive wavelets in the packet with the detector would, therefore, be connected with the velocity of the photon towards the detector. This justifies the variability. the quantitative relation has been adjusted to get the invariance of Maxwell,s equations.

The other aspects of this theory are proposed to be covered in future communications.