Notes on Relativity

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In 1916 Sommerfeld derived the formula for the fine structure of the hydrogen atom spectrum. He applied relativity to Bohr's postulates (conditions for the Bohr model) and obtained a precession of the periprotonion of an electron with rate of the fine structure constant. This is analogy to the precession of the perihelion of Mercury derived from general relativity theory but situated in an electromagnetic field. The energy spectrum was the same as that derived from the Dirac equation, which is a relativistic version of Schrödinger's equation. Now Simulik and Krivsky[1] obtained the energy levels formula on the basis of generalized Maxwell equations without appealing to Dirac's equation. The classical interpretation (without probabilities) iindicates that it is possible the wave function is an electromagnetic field. In stationary states, the hydrogen atom does not emit Pointing radiation as in Sommerfeld model. It is shown that the Lamb shift is a polarization of the medium and not a polarization of an abstract vacuum. Al-Haidari [2] showed that position-dependent mass and potential has the same influence on energy levels (if a non-relativistic charge Z is substituted for the relativistic $(Z+\mu)\varepsilon$). So the energy of any field in any interaction is equivalent to mass and to frequency and vice versa.

The Lorentz transformations are similar for space and time because they are connected by the conventional constant, the speed of light in a vacuum. This defines the metre for length measurement. But coordinate time dilatation is different than proper length contraction due to the human factor in the selection of the frame of reference. The speed of light is constant in the vacuum (there is only one eigen absolute value for speed in the Dirac theory - the speed of light in vacuo). Imagine a metamaterial built up from cavities (atoms). Light bounces back and forth creating delays as though in a medium, but it is in a vacuum. The index of refraction of the medium is a change in the optical path (the interpretation for continuous wave) but it also is a change in "optical time" (for pulses travelling through the medium). For a heterodyne-counting interferometer the measurement beat radio frequency is proportional to movement and is dependent on the index of refraction of the medium around a moving "cornercube". Permitivity and permeability can be interpreted as potential as well (e.g. states and tunnelling in optical fibres).

Relativistic acceleration relations applied to the electric field force lead to the Lorentz force. Magnetism is the relativistic effect of transformation and has a fictitious force (and does not perform work) such as the Coriolis effect. Imagine two charges with same polarity co-propagating side by side with the same speed in the same direction with some distance between them. The electric field will cause a repulsion but the magnetic field will cause an attraction as the current of charges flows. Attraction will compensate repulsion for the speed of light movement of the charges. It can also be interpreted as an interaction where the speed is unable to catch up to the source. The magnetic field becomes significant when charge is compensated, such as in a neutrally charged wire (note that objects with the same polarity could be attracted when more charge is transferred with a speed close to that of light inside them). The inverse square law for magnetic monopoles [3] has the same behaviour as for electric and gravitational "charges" with the same speed of propagation in a vacuum. So no one can distinguish between a pseudo-process and a real process (dark matter is not necessary). Babak and Grishchuk [4] derived equations for a non-linear tensor field in flat space-time that are fully equivalent to Einstein's geometrical equations. Curved space-time is unnecessary, as well as fields for interaction. Mathematics tools predetermine physical reality interpretations – statistics, (quantum-mechanical statistical interpretations), analysis (field theories), algebra (the Heisenberg matrix picture), geometry (general relativity space-time interpretation, string theory) and others. All of them are

equivalent. The observed acceleration of any interaction can be transformed into potential and transformed into its sources (and vice versa). This transformation is a definition only, and not law. The universe is based on random positions, velocities and accelerations only (or on random space-time curvatures or...). Laws are artifacts raised from a belief in causality. E.g. definition of resistance, R=U/I by conversion becomes Ohm's law, U=RI.

And more. There is no evidence to believe in the existence of physical quantities because there is no natural language and no possibility to convert physical reality to human (or computer) language. Every quantity can be converted to any other quantity by multiplication or division by fundamental constants (it is possible to find phenomena that will make this conversion physical). Fundamental constants are empirical and everything can be expressed in terms of only one quantity (it is necessary to give a name to the single quantity). There is no experimental evidence that quantities exist. Inputs and outputs of every experiment are space-time relations. Quantities such as charge are always inside that black box. Equations and experimental results work with numbers only (ratios of samples to units of standards realized by the same physical way). Every law, definition and theory can be converted to every other. For example, if the identity,

$$\hbar = \frac{e^2}{4\pi\varepsilon_0\alpha} \cdot \frac{1}{c} \qquad\qquad \text{(in SI units)}$$

is valid, thus the quantum mechanical limit $h \to 0$ is equivalent to relativistic limit $c \to \infty$. So substitutions implemented by this identity transforms quantum mechanics into the theory of relativity and vice versa.

Reasoning is the way to be freed of delusions.

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