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An elementary proof of the inconsistency of special relativity

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Abstract.-The FitzGerald-Lorentz contraction in the direction of relative motion is the starting point of a short and simple argument that formally proves the inconsistency of the theory of special relativity.

Keywords: Special relativity, relativistic length contraction, relativistic time dilation, relativistic phase difference in synchronization, principles of special relativity.

1. False relativistic deformations

Let RF_o be the inertial reference frame of a hollow rod B_o of, for example, 1 m in length, whose thin walls are 0.25 mm thick and made of non-deformable, fragile glass. B_o is attached at its center to a metal shaft that causes it to rotate slowly in the plane X_oY_o at a uniform rotational speed of, for example, 5 rpm. In addition, B_o has an internal device that continuously measures its length and sends the result of each measurement to a digital display external to B_o, which always displays 1 m. This indicates that the slow rotation of the rod does not change its length. This is to be expected because, apart from the force that causes it to rotate, no other force acts on B_o that could cause changes in its size., which, on the other hand, would be impossible given its non-deformability and fragility. There are also no thermal contractions/expansions because the temperature at RF_o remains constant, for example at 20º C.

Let RF_v be another inertial reference frame whose axes coincide at a certain instant with the axes of RF_o, which moves relative to RF_v at a uniform velocity of, for example, $v = 0.435889894\,c$ parallel to the axis X_v of RF_v. In RF_v the bar B_o moves parallel to the axis X_v while rotating in the plane X_vY_v of RF_v. According to special relativity, and being θ_v the variable angle that B forms with the axis X_v of RF_v, in RF_v the length of the rotating bar is given by $L_v = \gamma^{-1}L_o\,\cos\theta_v$. This implies that with each rotation the rod successively lengthens by 10 cm and shortens by 10 cm, which is impossible given its non-deformability and fragility.

Therefore, it must be concluded that the periodic deformations of the bar observed from RF_v can only be apparent, i.e. false deformations. As false as the apparent daily rotation of the Sun around the Earth; or as false as the apparent refractive deformation of a little rod partially and adequately submerged in a glass of water. Therefore, the relativistic contraction of lengths and distances in the direction of relative motion is a false contraction; so that $L_v = (1 - v^2/c^2)^{1/2}L_o = L_o$, which implies $v = 0$; i.e. only measurements of lengths and distances can be true in the proper reference frames of those lengths and distances ($v = 0$).

Let us consider again the two previous inertial reference frames, RF_o and RF_v. And now let us assume that RF_o is the proper reference frame of a source S emitting photons. If a photon a^* emitted by S travels in RF_o a distance d_o in a time t_o, in RF_v, that distance will be d_v and that time t_v. According to the Second Principle of Special Relativity we will have:

$$c = \frac{d_o}{t_o} = \frac{d_v}{t_v} \tag{1}$$

And since $d_v = d_0$, it must also be that $t_v = t_o$:

$$t_v = \gamma t_o + \gamma\frac{L_o v^2}{c^2} = t_o \tag{2}$$

Which, given that $c > 0$, $\gamma \geq 1$ and $v \geq 0$, is only true if $v = 0$ and, consequently, $\gamma = 1$. So, as with lengths and distances, the only valid measurements of time are those made in the proper reference frames of the objects involved ($v = 0$).

2. Conclusion

Relativistic deformations (special relativity) of space and time are only apparent, i.e., false deformations. Consequently, the theory of special relativity is an inconsistent theory. Increases in mass and the relationship $E = mc^2$ are excluded from this argument because both can be deduced outside of the theory of special relativity [2] [3] [1, 15-10, 15-11], summarized in [4, p. 127-128].

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