Review of: "Paradigm shift in Special Relativity: From the Michelson-Morley experiment, Lorentz and light speed invariance, to the reciprocal linear Sagnac effect and conservation of simultaneity"

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Although investigation and research into the fundamental problems of physics are always respectable, regardless of how much they lead to solving the problems in conventional models, this article is also very interesting and challenging, in my opinion. I have also read the opinions of other respected reviewers, and I confirm them, so I do not see the need to repeat them here. I am only criticizing and reviewing from another point of view. I hope it is useful.

What prompted, in my opinion, Einstein to choose the Lorentz transformations as the physical observers of his special theory of relativity was that Maxwell's electromagnetic equations were based on the experiments of Faraday, Ampere, and others who discovered and established its experimental foundations in the 18th century. In fact, under LT, the Maxwell equations remain the same, and Lorentz found it for the first time to introduce ethereal (hypothetical) observers. In fact, the right mind says that the laws of physics should be independent of the positions of the observers and also have a simple form (in principle). It means to follow the principle of general covariance. This is why Einstein's theory of general relativity seems more simple and principled than Newton's theory of gravity. In other words, Einstein abandoned Galileo's coordinate transformations, which established the symmetry of Newtonian mechanics at lower speeds (with respect to the speed of light), and introduced them based on physically incomprehensible principles (I.e., the transfer of gravitational force in the form of an instant without the duration of time and the existence of a universal time without being tied to specific spatial regions).

Although Einstein took the first step to generalize the theory of his special relativity to accelerated observers and introduce general relativity based on special relativity, but due to the complexity (which, according to the accepted principles in theoretical physics, means to be understandable in principle), he chose the reverse method: GR should build its own as an independent theory and, in the case of the limit according to Bohr's correspondence principle, lead to the theory of special relativity.

Now, let's go back to paradoxes such as twins or Sagnac. Whether in the uniform circular motion of observers (with constant centripetal acceleration) or in uniform back-and-forth motions, the paradox is solved by introducing the concept of acceleration and the weak equivalence principle in GR, in which gravitational acceleration is equivalent to inertial acceleration. In this view, even if we accept the constancy of the speed of light as a universal quantity, both in special

relativity and general relativity, it can be described. In the case of Sagnac's experiment, it is possible to explain it via general relativity conceptually and the equivalence of trajectories in the spatial direction with trajectories in the time direction (the unique space-time in which this symmetry is regarded just in the LT but not in the LTA) in which the light speed is a universal constant but is moving on curved trajectories (the geodesics).

The fact is that if we want to use atomic clocks (atomic transition wavelengths) or interferometers to explain these paradoxes, the stretching or contraction is only in time (Doppler frequency) or in space (Doppler wavelength)) happens, but not at a speed which is a quantity dependent on both space and time.

However, it is future observations and experiments that will prove which of the alternative theoretical models is according to the physical nature.

According to the above-mentioned ((i.e., keeping a constant universal speed for the light ray (waves) and accepting general covariance for the laws of physics and the deviation of LT via the acceleration of observers and the weak equivalence principle in GR)), it is obvious that the LT (with relative simultaneity) is not equivalent to the LTA (with absolute simultaneity), and they are two different concepts.

Most importantly, according to the Copernican principle in cosmology and astronomy, we do not recognize any central point as the center of the universe in order to refer to that point in conducting various experiments, and we must follow the relative changes in the study of physical phenomena by regarding the principle of relativity. Hence, in my opinion, the description of the Sagnac phenomena or other paradoxes by GR is more understandable vs. the LTA (in the presence of a reference-dependent velocity for the light ray, and, same as the Galilean transformations, the breaking of the symmetry of time-space trajectories in the LT frames) . Comparing LT and LTZ reminds me of the challenge between the heliocentric and the geocentric systems in astronomy, which the history of physics has left us to evaluate the validity of each one. I think LT is more compatible with principles and logic than LTA (although the future will prove its correctness).

Sincerely yours

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