Comments on Special Relativity

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Abstract

This is a brief, informal discussion of what I see as the key problems of Special Relativity, many aspects of which have been touched directly or tangentially, arrived at by different paths and partly expressed in numerous papers on this forum and in other criticisms of it. I provide no formal justification for my views, other than what I have given in other papers on this forum. My purpose is rather to get at what I see as the essence of Einstein's mistakes, as well as the physical behavior that Special Relativity, ironically, to some extent uncovers, but at the same time completely misrepresents. It seems to me that the question of the more correct nature of this underlying physics is the issue that both critics and defenders of Special Relativity must ultimately face. Einstein's errors are too numerous and egregious, in my view, to remain much longer generally denied. But until they are recognized, no truer understanding of the underlying physics can be achieved.

The foundation of Special Relativity is the Lorentz transformations, a set of coordinate transformations between coordinate systems moving at a constant velocity relative to one another. Einstein, it seems to me, got them initially by assuming a spherical light pulse retained its spherical shape when viewed in a moving coordinate system, and which he believed therefore represented in some kind of general way his idea of relativity—an idea that appears to me to have little validity on even a cursory examination of a few physical situations, and one to which Einstein evidently gave very little real thought. This case is physically different, but formally the same as the one treated by Lorentz, which is that of a light pulse having a constant velocity when traveling in a fixed medium, and retaining that constant velocity when viewed in a coordinate system moving relative to the fixed medium. Einstein claimed that these are a set of universally applicable coordinate transformations between coordinate systems moving at a constant velocity relative to one another.

The problem with both cases, however, is that neither correctly represents the behavior of light--that is, the behavior of a photon as it is generally recognized today. So when one attempts to apply the Lorentz transformations as coordinate transformations in apparently realistic physical situations, they generally don't work. In fact, it is difficult to see where the Lorentz transformations would work correctly. Einstein's derivation of them using an average of the time of travel of light pulses moving in opposite directions is full of significant errors, and cannot be taken seriously, it seems to me. Other more general derivations, at least the ones I have seen, lack any specific measurement assumptions applicable to a physical example, and therefore cannot be judged as to their validity. So that leaves open the question of what is the significance of the Lorentz transformations. I don't think there is a single, or perhaps simple, answer. Obviously they have some validity. But what that is, and why, seems to me only discernable by an examination of specific physical situations, with specific measurement assumptions. Otherwise they are merely a set of mathematical functions without any clear physical significance, applied blindly and therefore without any knowledge of their meaning or accuracy.

But the real significant result of Special Relativity seems to me the modification of the classical expressions for kinetic energy and momentum. Einstein derived them almost embarrassingly incorrectly, consistent neither with relativity nor the classical model; one truly has to marvel that he could have arrived at anything remotely close to a physically correct result. To me, his derivation gives "miraculous" a new meaning. But that, again, leaves open the question of the real significance of the "relativistic" expressions. Einstein examined them in the context of the electromagnetic interaction, and they seem to be a modification of the interaction at high relative velocities—a modification one would expect, given the dependence of the interaction on relative velocity from the Doppler effect. That is, one cannot treat the kinetic energy or momentum of a charge, which represent its interactive capacity, the same as in the classical expressions where such an effect is not taken into account.

But this still leaves open the issue of the vast amount of experimental evidence purporting to confirm Special Relativity. And that, it seems to me, raises the larger question of how much of physicists' experimental evidence represents results that they merely want to find, how much that they find but misinterpret, how much legitimate errors, and how much that really represents some truth. Until physicists can face these issues, it seems to me that they will often merely go round in circles, blindly repeating and perpetuating the same mistakes over and over again, perhaps convincing themselves and an ignorant public of the value of what

they are doing, but in reality often merely indulging in a mathematical and physical fantasy, and preventing any larger or deeper truth from emerging.