The Real Meaning of Special Relativity

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Einstein's Special Relativity (SR) is the biggest advance of the 20th century in theoretical physics. Let us say Einstein hit the gold.

A. Einstein was a talented physicist, but he also had a talent in how to hide the gold to prevent it from being stolen. He elaborately misrepresented the discovery so that even today nobody really understands its true meaning. And I mean it. Even the people on the top of the mainstream theoretical physics, who acquired an excellent mathematical background, do believe that SR is not a classical theory, that it uncovers a symmetry called "Lorentz invariance", and to go forward one has to look for another possible symmetry/invariance in physics. Notice that contemporary theory of elementary particles is based on symmetry groups considerations. It is taken from the Lorentz invariance idea. No wonder that the opposition to mainstream with lower math background does not understand SR either.

SR comes from Maxwell's equations. It is not a "physical" theory and not a "mathematical" theory either. The mathematics it uses was well known in 19th century. It is about how to describe a physical reality in theoretical physics correctly. The main result of SR is rewriting the Newton's Dynamics equation into the "Relativistic Dynamics equation". After the "rules of correct representation" (it is actually SR) are established, all the so called "physical consequences of SR" are in fact the consequences of Maxwell's equations and Relativistic Dynamics equation. That confirms that SR is not a physical theory.

SR gives us a "rules of correct representation", which is 4-d mathematics. That means that any other representation (like 3-d space + independent time) can be correct only by chance (Maxwell's equations can be correctly written in 3d and 4d forms). SR actually delivers us from making logical/mathematical mistakes (Newton wrote down the equation that works only at low velocities because he used incorrect math and did not know SR rules). In this capacity SR is definitely a classical theory.

Yes, SR is difficult to comprehend. To explain that I need to make some statements.
Statement 1: Theoretical physics is a **numerical** description of physical reality.
Statement 2: Mathematics is a science about **mathematical objects** (in particular **numbers)**.

It is important to notice that mathematical objects are constructed only from digits and letters of alphabet. Mathematics is a continuation of linguistics. Physical objects

can not serve as a math objects. It is an imperative that the mathematics that is used in theoretical physics should be separable and should be completely understood by a researcher.

The 3d physical geometry that is taught in schools said to be mathematics, but it is not. 3D physical geometry is theoretical physics of unmoving physical objects. It has inseparable mathematics and interrelated with blueprints and physical models that also are used as a means of description of physical reality. The separate mathematical apparatus (3-d Riemann geometry) can be provided but never taught.

To understand SR one has to study the separate mathematical apparatus of 3d geometry first. Actually the 3d numbers (and n-d numbers) have to be introduced (points, scalars, vectors, tensors). One has to keep in mind that same words are used in mathematics and in theoretical physics where they have a different meaning. Actual SR puts an exact boundary between mathematics and physics. It looks completely different compare to Einstein's presentation.

What is wrong in Einstein's presentation?

1. Both Einstein's postulates are not a starting points, they are consequences of SR.
2. Einstein's concepts of "observers" and "frames" that supposedly connected to the coordinate systems are clear tricks because coordinate systems are not physical – they exist only in our heads. One can build unnecessary frame – it will be a physical object, but it will be not a coordinate system.
3. Separate coordinates (time an example) have no physical meaning. One needs 4 coordinates to express something physical (event). Time dilation and space contraction are just Einstein's intention to make coordinates look physical.
4. Lorentz Transformation (LT) and Lorentz Metric (LM) tensor can be obtained one from the other. The "inertial coordinate system in SR" is the one that uses Lorentz metric tensor. The straight line (like x=at+b) in this system has zero acceleration. To describe the physical world in this system one do not need another inertial coordinate system and constantly perform LT between them (Einstein's way). But one has to use LM in the first coordinate system (Minkovski's way).
5. And, of course, the word "Relativity" is the most misleading one. If some physical phenomena/experiment is described in one coordinate system, then the physical results of this description will be the same in any coordinate system (they are invariant). So, actually it is a theory of "Absolutity".

SR states that physical world can be described by mathematical objects (numbers in particular). Mathematical objects has to be valid mathematically (they must be unique). 4-d math point is unique and can be used to represent a physical event. If one wants to use 3-d math point + independent time, one is mistaken because this combination is 2 unique math constructions. a) It is not appropriate to use 2 math identities where is

necessary only one. b) This combination does not allow a coordinate transformation that depends on time (otherwise the 3-d point is lost its independence – one can not recover it without knowing time).

In SR (4-d coordinate system with LM) the physical space is represented by math space (multitude of all the 4-d points when all coordinates change from –inf. to +inf.). From math point of view space is unique (because all the points are unique). From physical point of view the space constitute an "indestructible" physical category. It is physically unique but can not be done away with. The metric tensor represent the "indestructible" properties of this space, but it can not represent any "distractible" properties (like gravitation that can be big, small, or absent. That means that GR is nonsense and this conclusion is due to SR). All other physical objects are "distractible" and represented by scalars, vectors, and tensors that can be put to zero.

About aether. Any material substance is distractible and can not be the same in any location. Of course, aether can not ensure incorrect 3-d space + independent time representation. Still, aether can be present as some distractible material substance and can be described in 4-d coordinate system. My opinion is that electromagnetic 4-potential A^k actually represent conserving aether (because the 4-divergence of it is zero (so-called Lorentz gauge)). One can claim that the coordinate system where A0 is not zero, but A1=A2=A3=0 is locally at rest. This could be the reason why we can experimentally detect the "absolute" velocity of Earth in space.