Reply to referee reports on L. E. Szabó: Does special relativity theory tell us anything new about space and time?

This is just a *scientific* reflection to the referee reports. I am aware of the editor's decision not to publish the paper.

Both referee reports are based on the following questions/remarks:

1. These claims are ultimately based on a set of operational ("empirical") definitions in Section 2 that perhaps require a bit more motivation than is given. (referee 1)

2. It's not clear why an operationalist would allow such differences in the first place. Why, in other words, would an operationalist have such pre-theoretic prejudices? (referee 1)

3. For instance, why not adopt the definitions advocated by Einstein himself (and reproduced in Section 5.2, pg. 15, of the current article) that initially make no distinction between classical physics and special relativity? If these Einsteinian definitions are adopted, then the "weak" operationalist will be led to the conclusion that SR and classical physics say different things about space and time, as is the standard view. (referee 1)

4. Given that the author's thesis crucially depends on the claim that the Galilean transformation in classical physics is part of the operational definition of space and time tags in moving frames there needs to be some defense of this claim. Why, again, should we not think of classical physicists as defining space and time tags in moving frames via transports of initially at rest rods and clocks? (referee 2)

5. What is it that the relativist is calculating? How are we, operationally, to think about what the relativist says about classical space time? Once again, I would have thought that anything the relativist says about space and time would necessarily have to refer to quantities that are defined in his theory. (e.g in equation 16: why would the relativist say that any quantity in a moving frame relates to those in the rest frame via the Galilean transformations?) (referee 2)

I believe, all of the above questions are answered in the paper. In brief, it is not important **why** classical physics (Lorentz theory) applies empirical definitions like D5, and – if there is any reason to say about a definition – whether it is "correct" or not. It is a matter of fact that **it applies definition D5.** That is, whenever the Lorentz theory says "time" and "space", its means time and space in the sense of D5. (The motivation is also clearly explained in the paper. At the very moment when we are aware of the contraction of the measuring rod – even if you do not believe me that also relativity theory is aware of this physical distortion, Lorentz and similar figures were, no doubts, aware of this fact – we have to make a choice, how to define the length in the moving frame K'. If we transport the *etalon* measuring rod from K into K', it suffers deformation. Now, there are two possible definitions:

1) measure the lengths with the distorted measuring rod and take into account distortion of it, that is take into account that its length is only $\sqrt{1-\frac{v^2}{c^2}}$ meter (this is the classical/Lorentzian definition)

2) measure the lengths with the distorted measuring rod and do not care with its distortion (this is Einstein's definition)

One might argue for this or that choice, but it is not the point here. What is important is that the two theories define "length" differently. (In order to be brief I am simplifying the situation. Actually we have to deal, at the same time, with the time measurement, too.)

Now, as to the question 5, I don't see any difficulty in the claim, that if a theory is capable to tell us the value of the quantity defined in 2) then it is also capable to calculate the value of the quantity defined in 1), and *vice versa*.

Whit many thank for dealing with the manuscript,
Laszlo E. Szabo