REPORT #2

Report on: "On the meaning of Lorentz covariance", by L.E. Szabo.

The author is right that the principle of relativity is not always used in a correct way; confusing statements about contractions etc. can be found in the literature. The main source of confusion is that it is sometimes thought that the Lorentz transformations, and the relativity principle, say something about what happens when a physical system that is at rest in system K is accelerated in such a way that it becomes at rest in another system K'. However, the Lorentz transformations say nothing about this. These transformations are only about the relations between systems that already were at rest in K and K', respectively; and that are in the same conditions as judged from their respective rest frames. What happens in the case of accelerations depends on the details of the process, involving thermodynamic considerations among other things. It is not at all guaranteed, for example, that a measuring rod, when accelerated to velocity v, will become Lorentz contracted.

Unfortunately, the author's paper adds to this confusion. It does not formulate the relativity principle in a correct way, and points out things like the above to conclude that Lorentz covariance is not fundamental. That is completely wrong.
Moreover, it also discusses examples that are irrelevant to the questions under discussion (like the transformation of the motion of a set of points that start simultaneously in K and not simultaneously in K').

I think that the author should rewrite his paper thoroughly. He should make it much clearer what the purposes of his examples are, and in what way they cause problems for the relativity principle. Of course, this can only be done if a very precise and concrete formulation of the relativity principle is given first.

As far as I can see, the only thing that would survive such a rewriting is the issue indicated in my first paragraph above. I should add that it is not true that the relativity principle is only valid for equilibrium states: the same non-equilibrium states that are possible in K are also possible in K', and that is all that is required by the relativity principle.