The Non-Relativistic Models of the Relativistic Bell's Paradox

V. N. Matveev and O. V. Matvejev
Sinerta Closed Joint-Stock Company: Vilnius, Lithuania
matwad@mail.ru

Here the so-called Bell's accelerating rockets paradox is examined. The non-relativistic models of Bell's effect are presented, where likewise the theory of special relativity the proper distance between two rockets following one another is increased them being accelerated on identical programmes. It becomes clear that the proper distance increase is determined by Einstein's simultaneity of the moments of the start of the programmes execution on the rockets. It is also shown that Einstein's relative simultaneity does not ensure reversibility of the proper distance between the rockets upon their joint return to their initial state. The reversibility is only achieved by the introduction of the assigned reference frame (not necessarily absolute!) and of the universal time (not necessarily absolute!) in all inertial reference frames.

The behaviour of accelerating rockets in ether and circular models treated above as well as its simulation in aqueous medium physically differs from their behaviour on the theory of special relativity. In all the three models, there is an assigned reference system K at rest, and there are inertial or, as is the case of the circular model, pseudo-inertial systems moving relative to the assigned reference system K. The rockets of these models moving at a speed v within the dedicated reference frame K, possessing actual length $L_0\sqrt{1-(v/c)^2}$, become actually shorter at a further increase in speed within the reference frame K, and they are actually expanded to the maximum value of rest the speed decreasing. During the further run of the engines the rockets having slowed down to zero velocity start gaining speed again within the reference frame K at rest, though in an opposite direction, which accounts for the shortening of the rockets again. When applying uniform simultaneity of an assigned reference frame in all reference systems, an increase in distance between the rockets, seemingly perceived by observers, is coherent with the actual shortening of the rockets.

Therefore, the seeming distance between the rockets increases provided they accelerate within the reference frame K, and decreases up to the value equal to L_0 if they are slowed down to a state of rest (in system K). During the further run of the engines and the acceleration of the rockets the seeming distance between the rockets increases.

Such a specific behaviour of rockets in models with an assigned reference frame would seem essentially incompatible with their behaviour in the ether-less world. However, upon close examination of the model of the ether-less universe and the non-relativistic models one may notice that the behaviour of the rockets is determined not by our ideas of assigned reference frames, but by synchronization of the clocks. The representations regarding assignment of a reference frame are used only for justification of one or the other synchronization. Going beyond such justifications and applying an identical synchronization in different models, it is possible to obtain identical behaviour of rockets in different models.

If in the ether-less model for purely practical purposes we conditionally introduced the assigned inertial reference system and applied universal (not absolute, but,

explicitly, conditionally universal!) time and uniform scales of physical quantities in other reference frames, then such a model would mathematically describe the behaviour of the material world, as though in the ether model this assigned reference frame were rigidly fixed to the ether, while the other systems were moving in relation to it. Thus an invariance of mathematical notation of physical laws is broken, but there emerges an invariance of physical quantities in different reference frames. For example, the longitudinal length of a rod moving relative to an assigned reference frame and which has shrunk Lorentz-wise will be identical in all reference frames.

On the other hand, if in the ether model, having introduced an artificial requirement of equality of the velocity of light in opposite directions, one should refuse an assigned reference frame and equalize all reference systems, there will emerge an invariance of mathematical notation of physical laws and the imaginary relativity of physical quantities (Lorentz ether theory with Poincare-Lorentz transformations). All this could be understood having analysed the results of the simulation of kinematics related to the theory of special relativity stated in the works [1].

References

1. V.N. Matveev, O.V. Matvejev. Simulation of Kinematics of Theory of Relativity. http://arxiv.org/abs/1201.1828