Absurd Accusations that the Special Theory of Relativity is, Generally, Logically Inconsistent

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Abstract: It is obvious that the Special Theory of Relativity (SR) applies only to systems containing physical inertial reference systems, each equipped with a physical clock initially synchronized with other clocks. This leads to the conclusion that it is easy to prove that SR is logically inconsistent when we try to describe, via SR, a system in which listed above two conditions, i.e. inertia and initial synchronization, are simultaneously not satisfied. Contrary to the SR based on the Lorentz Transformation, the SR based on the law of conservation of spin shows that we cannot synchronize clocks separated spatially with non-zero relative velocity (both theories lead to the same formulae). Here we described the initial conditions which must be satisfied to obtain a system composed of physical inertial reference systems with initially synchronized physical clocks. In previous papers we showed why SR sometimes leads to formulae which do not concern Nature - it applies to the SR contraction in length and phenomena in which, apart from radial velocities automatically appear, due to flows in the Einstein spacetime, transverse velocities also.

1. Introduction

The Einstein Special Theory of Relativity (SR) does not concern all phenomena – this theory can be applied to selected phenomena that do not violate the SR initial conditions. The SR initial conditions say that we can apply this theory only to systems containing physical inertial reference systems, each equipped with a physical clock initially synchronized with other clocks. This leads to the conclusion that it is easy to prove that SR is logically inconsistent when we try to describe a system in which listed above two conditions, i.e. inertia and synchronization, are simultaneously not satisfied.

Here we described the initial conditions which must be satisfied to obtain a system composed of physical inertial reference systems with initially synchronized physical clocks.

In previous papers we showed why SR sometimes leads to formulae which do not concern Nature – it concerns the SR contraction in length [1] and phenomena in which, apart from radial velocities automatically appear, due to flows in the Einstein spacetime, transverse velocities also [2], [3].

The Scale-Symmetric Theory (SST) [4], [5], shows that SR acts correctly only when the initially synchronized reference systems know the state of the underlying dark energy or

Einstein spacetime (ES) [2]. Moreover, SST shows that SR can act correctly only when the ES is gravitating and grainy whereas the spins of stable particles are invariant [1]. It means that SR is physically an incomplete theory. Without the SST, the SR is not well understood so there are accusations that SR is logically inconsistent. But the truth is much simpler – just SR is an incomplete theory.

2. Synchronization of physical clocks

In the Einstein synchronization procedure from 1905, a light signal is sent from clock A to clock B and immediately back because of a mirror. But there must be satisfied two additional conditions to synchronize A and B: no redshift and valid the Reichenbach's round-trip condition [6]. SST shows that due to the quantum entanglement, the speed of light c is in relation to source of light or to a last-interaction object [5] – it means that the mirror leads to redshift. On the other hand, the inspiralling Einstein spacetime near and inside the neutron black holes [3] causes that the Reichenbach's round-trip condition is invalid. Just we can synchronize clocks only when they are initially moving with the same velocity i.e. we can synchronize clocks in the same reference system.

According to SST, Nature can be synchronized due to the superluminal quantum entanglement [4] so there can be in existence synchronized very-big/cosmic regions – even it can concern the whole Universe because the characteristic speed for quantum entanglement, $v_{entanglement}$, is about $2.4 \cdot 10^{59}$ times higher than the speed of light in "vacuum" c i.e. $v_{entanglement} = 0.72 \cdot 10^{68}$ m/s [4]. But contrary to Nature, we can not control quantum entanglement in bodies composed of big number of particles which masses depend on speed.

If D denotes size of the clocks then the lower limit for time to change a state of a clock, Δt_{clock}, is $\Delta t_{clock} = D / v_{entanglement}$. Due to the superluminal quantum entanglement, we can not control states of the physical clocks (we will call them clocks). An observer can synchronize clocks with the upper limit for speed equal to c as it is in SR. The lower limit for time of synchronization of clocks, $\Delta t_{synchronization}$, is $\Delta t_{synchronization} = L / c$, where L denotes distance between clocks, and this time must be shorter than Δt_{clock} i.e. $L < D\, c / v_{entanglement} \rightarrow 0$ (notice that even for the interactions with the speed c, i.e. there instead $v_{entanglement}$ is c, is $L < D$ i.e. to synchronize clocks, initial distances between clocks must be smaller than their sizes). It leads to conclusion that initially all clocks, which we want to synchronize, must be in the same physical inertial reference system (we will call it reference system). Using the mathematical language, we can say that initially the zero-points of all geometrical frames of reference (we will call them frames of reference) must overlap. Initial separation of the zero-points of frames of reference leads to the incorrect conclusion that SR is logically inconsistent.

We should as well describe a phenomenon that is not directly associated with synchronization of clocks but which shows that relativity concerns the inner clocks of the clocks we want to synchronize. Assume that somebody, via sent photons, can see apparent states of separated spatially clocks with non-zero relative velocities i.e. can see the time indicated by such clocks. We showed that due to the redshift, we can not synchronize such clocks. The physical clocks are built of zero-spin and non-zero-spin particles. In SR is assumed that speed c is invariant so it should concern the particles the physical clocks are built of also. It means that in moving clocks, the spin speeds of particles depend on the relative velocities of the clocks – higher relative velocity of a clock means lower spin speed of particles it consists of [1]. Since period of spinning of a particle (it must be treated as inner unit of time) depends on relative velocity of clocks so we can not control the inner clocks of the particles the clocks consist of i.e. we can not control the inner clocks of the clocks. Just

the used light signals can not see the different states of the inner clocks of, for example, nucleons – such inner clocks in different physical clocks are going in different way.

3. How to create a system containing separated inertial reference systems, each equipped with a clock initially synchronized with other clocks?

We can solve this problem assuming that the initial reference system, i.e. the frame of reference of observer (the "stationary system" K [7]), has mass, M_K, much higher than the reference systems, m_k, which embark on a journey i.e. the "moving systems" k [7] – then, the "moving systems" k practically can not change velocity of the "stationary system" K so it still is the inertial reference system. It as well solves the reciprocation of the SR time dilation (each observer in K and k claims that the moving clocks are time dilated) or the reciprocation of the real relativistic mass [1]. For example, both observers in two inertial reference systems with non-zero relative velocity claim that in the other reference system time is dilated in the same way – it is a logical inconsistency. We can eliminate such reciprocation assuming that $M_K >> m_k$.

Notice as well that, in reality, the "rest masses" of particles in the "stationary system" K depend on speed of K in relation to the underlying ES or/and dark energy (the aether) if, of course, inertial reference systems know the state of the aether [2]. SST shows that the aether is superfluous when propagating objects do not know the state of the underlying aether – it concerns, for example, the electromagnetic waves far from black holes but it does not concern, for example, rotating neutron black holes [5].

Next problem associated with the synchronization of clocks within SR based on the Lorentz Transformation (LT), i.e. within SR-LT, follows from the superluminal quantum entanglement. SST shows that due to the entanglement of emitted light with its source or a last-interaction object (it can be a detector), the speed of light c is the speed in relation to source or a last-interactions object – such is the correct interpretation of the Michelson-Morley experiment – just detectors always measure speed of light equal to the c but it does not mean that speed of light is invariant simultaneously in relation to all reference systems with non-zero relative velocities. We can say that the invariance of c follows from the quantum entanglement of photons with detectors that detect them. But this problem is not important when we investigate real properties of particles moving in relation to a dominating inertial reference system i.e. when masses of particles are much lower than theirs emitters – then the formulae for relativistic mass or time dilation derived within SR-LT or SR based on the law of conservation of spin (LCS), i.e. within SR-LCS, are still valid.

4. Why the SR contraction in length does not concern Nature [1]?

Contrary to SR-LT, the SR-LCS does not lead to length contraction. Within SR-LCS we showed that when relative velocity of a body increases then its relativistic mass increases as well and is real whereas its mean size is invariant but volume of accelerated body increases. It leads to conclusion that there is an upper limit for relativistic mass. SR-LCS shows that in experiments we should not observe the length contraction predicted within SR-LT so we can test the SR-LCS.

5. Why transverse velocities violate SR?

Within SST we showed that, for example, in a free-fall on a "black hole", near to its Schwarzschild surface and inside it, due to the inspiralling Einstein spacetime, there appear transverse velocities also [1], which do not appear in SR-LT. It leads to conclusion that SR-LT is an incomplete theory.

6. Summary

The Special Theory of Relativity applies to systems containing physical inertial reference systems, each equipped with a physical clock initially synchronized with other clocks.

We showed that it is easy to prove that SR-LT is logically inconsistent when we try to describe, via SR-LT, a system in which listed above two conditions, i.e. inertia and initial synchronization, are simultaneously not satisfied.

SR is an incomplete theory because it says nothing about internal structure of particles, of dark matter, dark energy, spacetime, and interactions of them.

Here, applying the SR based on the law of conservation of spin (it leads to the same formulae as the SR based on the Lorentz Transformation), we showed that synchronization of clocks separated spatially with non-zero relative velocities is impossible. We showed as well how we can produce a system composed of inertial reference systems with synchronized clocks. There is described a synchronization procedure showing that if distance between clocks is zero $L = 0$, i.e. the clocks are together, all observers agree that clocks are synchronized, whereas if $L > 0$ then not all observers agree that clocks are synchronized [8].

SST shows that the SR energy-momentum relation, the SR formula for relativistic mass, and the formula for time dilation in regions far from a black hole, are correct – we derived them on the basis of the law of conservation of spin of particles [1], not on the basis of the Lorentz Transformation [7].

SST shows also that SR leads indirectly to the gravitating grainy Einstein spacetime [1].

In SR-LT we agree that clocks are synchronized – it is only a convention. This means that the logical consistency of SR based on LT is independent from synchronization procedures that sometimes can be logically inconsistent.

SST shows the weak points of all synchronization procedures. Behaviour of clocks is relative i.e. depends on velocity and position. SST shows that contrary to SR-LT, in SR-LCS we eliminated the problems concerning the synchronization of clocks.

We used the word “generally” in the title of this paper because there are phenomena beyond the SR-LT that can not be fully described within such theory – then we must apply SST and SR-LCS.

Relativity of simultaneity follows from the assumption that c is the invariant maximum speed in Nature. But SST shows that the superluminal speed characteristic for quantum entanglement is much, much higher. It means that upper limit for time to exchange information in the observed Universe is $\sim 10^{-42}$ s – we can say that due to the superluminal quantum entanglement (and tachyons [4]), the relativity of simultaneity is practically not valid for Nature but is valid for observers using light signals.

The reciprocation leads to conclusion that SR-LT is unreal. On the other hand, time dilation has been tested a number of times and the experimental data concerning the time dilation suggest that SR-LT is real. Is it a logical inconsistency of SR-LT? No. Reciprocation is eliminated by the assumption that clocks are synchronized. Here we showed that such assumption points which of the inertial reference systems dominates. Just the correct synchronization procedure leads to one dominating field and fields which can be neglected. We can neglect fields of inertial reference systems which start on a journey (we can call them dwarf reference systems) i.e. which practically do not change velocity of the dominating reference system (we can call it massive reference system). Then SR describes properties of the dwarf systems in relation to the inertial massive system.

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