‘Twin-like’ experiment without acceleration discloses that “Everything is measured Relative” does not mean “Everything is Relative”

by

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Abstract

With Einstein’s interpretation, “everything is relative”, the so-called twin experiment discloses what is called a paradox, when the travelling twin returns and they compare watches (and aging). Some assign the solution to acceleration, which they claim should be taken into account so that the paradox evaporates. However, it’s easy to construct an experiment in which any acceleration lays outside the considered part of the experiment, so that within the measured part we have only constant velocities. We can then have one observer at rest, and two travelers who run through the travelling twin’s route, but without acceleration. Within a hypothetical absolute underlying medium, particles oscillate slower for an observer who moves through the Aether than they do for an observer at rest. An acceleration free experiment can be made in which all three agree on that. The conflict appears if the traveling ‘twins’ measure how fast the first observers clock runs, based on their respective lines of simultaneity, because then the travelling ‘twins’ then insist that A’s particles oscillate slower than their own. Even without the physical experiment, the thought experiment itself discloses that the twin-paradox is a product of the “everything is relative” interpretation.

Keywords: Special Relativity, Lorentz Transformations, Twin paradox, Absolute Aether, lines of simultaneity

1. Introduction

Classically, particles has been taken as tiny hard ‘ball-like’ objects, which moved through the Aether, in analogy to a macroscopic body moving through the Air. Following that analogy, the movement through the assumed Aether should result in some measurable distortions of light, which the Michelson-Morley experiments should disclose [1]. The null result from these experiments led to the conclusion that no Aether could exist. Meanwhile, the ‘ball-like’ particle understanding prevailed.

Lorentz could explain the MM outcome from the assumption that particles became contracted along the direction of movement, as expressed in the set of famous equations (LT) [2].

Later, Einstein put forward his theory later known as Special Relativity (SR) [3], which included not only the Lorentz Transformations, but in addition the famous equation $E=mc^2$. Here, Einstein noted that Aether was not needed. Although he later insisted on some Aether to account for his General Relativity (GR), then the community of physicists had already adopted the ‘no Aether’ understanding.

When the so-called twin paradox emerged [4], some tried to explain it as being due to acceleration, although it’s easy to design a twin-like experiment without acceleration within the interesting part of the travelers route.

2. A wave model of particles

If we, hypothetically imagine particles as (roughly) spherical waves of the Aether (instead of being ball-like), then interesting things emerge. The wave model discussed in the following should only be taken as generalized waves.

Each particle (fermion) then supposedly consist of a spherical wave system with simultaneous incoming and outgoing waves, which propagate through the Aether with the speed of light. When such a wave system moves, the center for each incoming wave is dislocated a little relative to the center for the previous wave, and the meeting between incoming and outgoing waves then transform from spheres into ellipsoids. Here, while the wave with the speed of light travels the full major axis, the particles center has moved the shorter distance between focal points. Such an object can therefore never reach or exceed the speed of light. Measuring the speed of light in any direction, here result in a certain number of crests (length) divided by the same number of oscillations (time), which always give the same value 1.

The substance has earlier been published [5] (unfortunately including severe flaws). However, an improved version is available [6].

3. How the MM experiments and the Lorentz Transformations emerge from the wave model

From this model, the constancy of the measured speed of light directly explains the null-results from the MM experiments.

Analyzing the behavior in x-t diagrams, we further find the full symmetry described in the Lorentz Transformations. In the absolute frame 'behind the scene', we do not have symmetry, however in the measurable frame we do have symmetry, albeit is sounds contradictory that a moving contracted observer B should measure the observer A at rest as being length contracted. Nevertheless, x-t diagrams disclose that not only is B length contracted his own measurement sticks are distorted even more. B therefore measures A length contracted and that A's particles oscillate slower.

Thereby, from this wave model, the hundred-year-old conflicts regarding Aether existence disappear. The classical particle understanding is to blame, because in that, particles are foreign objects in the Aether. With particles being wave-like objects of the medium, they are not foreign objects and we find no measurable Aether reaction as we do when a macroscopic body moves through for example air.

Analyzing the ellipsoid behavior, we find Einstein's equation $E=mc^2$, too.

4. Twin-like experiment without acceleration

Consider a twin-like experiment without acceleration, meaning straight lines in x-t diagrams.

From A "at rest", B departs towards right, and when B has travelled a year, C departs from A towards left. One month later both turns around and accelerate towards A. Before (the now right travelling) C passes A, he stops his acceleration, and (the now left travelling) B too stops his acceleration. (Relativistic effects are taken into consideration to ensure rough synchronization.) The two travelers B and C now move with the same constant speed (relative to A). We have then three meetings, all three short and tight, so the meeting time can be arbitrarily small. When the right travelling C passes A, both start a watch. When C later passes the left travelling B, at the point D, C stops his watch while B starts a watch. When B later passes A, both stop their watches. B and C now send information to A of their respective clocking of the route between A and D respectively between D and A. Now, A compare the clocks.

Let's consider the outcome from two oppositely bases; within a hypothetical absolute frame, respectively without any such underlying frame.

Consider first A at rest within a hypothetical absolute frame.

The two travelers B and C have experienced the same time (same amount of oscillations), and without incorporating relativistic effect, they would experience half as many oscillations as A at rest. However, taken relativistic effects into consideration, B's and C's moving particles oscillate slower. As an example, A counts 100 oscillations on his own watch, while B and C both counts 40 oscillations on their respective clocks.

Solid measurements, on which all three agree when they meet again.

They also agree that relativistic effects must be taken into account for B and C.

Consider then the opposite case, without any underlying frame, and from the "everything is relative" understanding.

Now the traveling B and C measure how fast A's clock runs, based on their respective *lines of simultaneity*, which is central in the "Everything is relative" understanding. Doing this, B and C now insist that A's particles oscillate slower than their own.

However, using his lines of simultaneity, (the approaching) B insist that the B-C meeting took place only long after A's own understanding of that meeting. Actually, B says that from the meeting took place, A’s watch performed only 32 oscillations until B passed A, while B’s own clock performed 40 oscillations.

On the other hand, C insist that the B-C meeting to place long before A’s own understanding of that meeting. Actually, C says that from he passed A, until the B-C meeting took place, A’s watch had performed only 32 oscillations, while C’s own clock performed 40 oscillations.

When they all meet again, B and C realize that A experienced 100 oscillations, instead of 2*32, while they together experienced 80 oscillations.

They also realize that the contradiction emerge from the “everything *is* relative” understanding, where measurements are based on lines of simultaneity.

The mystery disappears if one assume some underlying absolute frame and instead say that, when we measure things using lines of simultaneity, “Everything is *measured* relatively”.

Nevertheless, this twin-like experiment does not *prove* the existence of an absolute underlying frame; we obtain the same result if A belongs to any moving inertial system. We can therefore only conclude that, using lines of simultaneity, we find relative measurements. Without some absolute underlying frame, however we are still left with the question; when lines of simultaneity do not show the reality, what is then the reality?

5. Discussions

From Einstein’s SR, the so-called twin paradox is well known. Here, measurements implies the radar-rule, and in the twin-experiment, this method results in a gap. The term paradox is due to the understanding that seen from the traveler, it’s the twin left back who experience time dilation. Some claim that the conflict is due to that acceleration is not taken into account. However, we can construct a twin-like experiment in which we have no acceleration within the measured part of the experiment, and here the conflict remains, if one take the interpretation “everything is relative” literally.

In a wave model, based on some hypothetical underlying absolute medium (Aether for short), this experiment is seen in another light.

Here, since we operate with an *absolute Aether*, each of the three observers is subject to an *absolute time dilation*, that ONLY depend on the observer’s own absolute velocity (speed) through the Aether.

However, while the experiment is far from easy to carry out, the thought experiment itself discloses that the twin-paradox is a product of the “everything is relative” interpretation, based on *lines of simultaneity*.

6. References

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