The Theory of Relativity – Einstein's greatest mistake?

W.Nawrot

Abstract

The Theory of Relativity is almost certainly based on a serious error that led to the unnecessary complication of the model of space-time and practically stopped the development of science for 100 years. The essence of the error is the assumption that the reality looks exactly as we perceive it. Authors of the Theory of Relativity ignored the analysis of the process of observation which may make the observed shape of the reality different from its real shape.

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The discovery of the fact that the reality is four dimensional was, at the beginning of 20-th century, such a great event that nobody thought to ask why the fourth dimension differs from the remaining three. Experience teaches us that the reality takes the simplest possible form, so if the reality is four dimensional, then the four dimensions should have identical properties. If our perception of the various dimensions is different, then the first thing we should do is to look for an explanation, not by complicating the model of reality to match its observed shape, but by seeking a mechanism of observation responsible for the fact that the four dimensional reality we observe is built of three dimensions with identical properties and one slightly different fourth dimension. After all, it wasn't that long ago that mankind remained in error for centuries claiming that the Sun revolves around the Earth just because it was in accordance with everyday observations.

And again, when defining the base of the Theory of Relativity, oblivious to centuries' worth of experience we made the same mistake of assuming, contrary to logic, that the observed dimensions must be identical to the dimensions which create the reality that surrounds us. And instead of taking one more step a hundred years ago and looking at the process of observation of reality responsible for this particular picture of reality, physicists stopped halfway and began to develop complex covariant notation - just like our ancestors, in the past, developed the theory of epicycles.

The theory constructed this way is incomprehensible for physicists which led to even the most renowned journals publishing articles [1-3] that proved correctness of the theory of relativity in a manner contradictory with the theory of relativity [4,5]. The articles were positively reviewed and the experiments described there are currently cited in handbooks. I would even suggest that all this time we've had to deal with the logic of Andersen's children's tale about the naked emperor. Nobody understands the Theory of Relativity, but no one will admit it.

Meanwhile, instead of building nightmarish metrics, justifying that the dimensions stretch but do not stretch, time slows down but does not slow down etc., it was enough to take a closer look at reality. If we know that in the local coordinate system the space dimensions are perpendicular to the time dimension, we already have half of the solution of the problem of observation. We can see that the body moves along one direction and interprets a path travelled along this direction as the time flow, and it is sending signals into three remained directions perpendicular to each other.

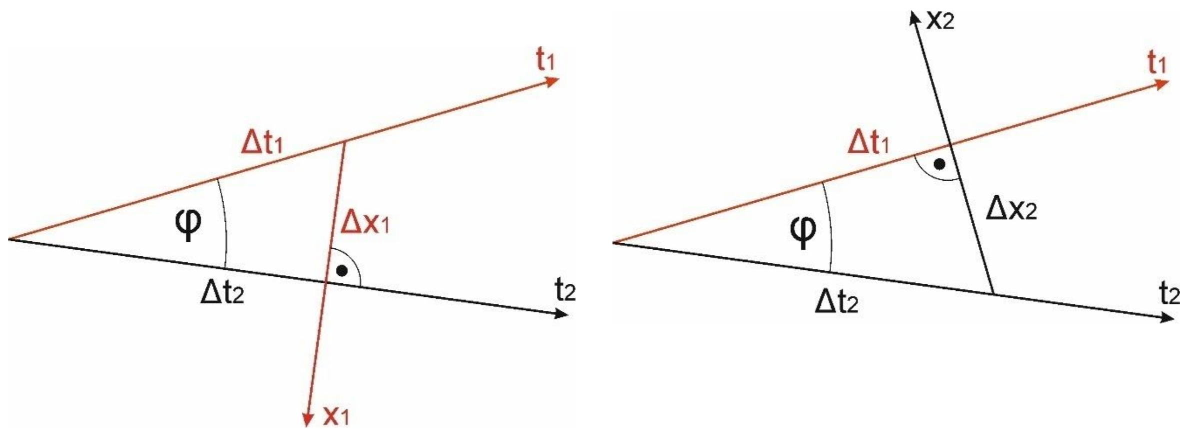
At this point we should consider what we really see while observing the reality (or, what aspects of reality we perceive as the dimensions of time or space, and why). We do not observe the reality. We do not observe the dimensions. The reality and the dimensions are abstract concepts. The only things we can see are bodies moving in relation to us. And we observe these bodies with the help of signals which these bodies emit perpendicularly to directions THEY are moving along. If we observe the motion of a body, then we do not observe motions along directions perpendicular to the direction we are moving along (our own time axis). Rather, we perceive all the changes of positions of bodies along directions along which we receive the signals emitted by these bodies and these directions are perpendicular to the direction the observed body moves along (its time axis in the four dimensional space) and not to the direction we move along. A detailed description of the model of exchanging signals, justifying the above mechanism, will be a subject of an upcoming article.

The observation of bodies gives us an idea of the existence of space and the movements of bodies give us an idea of dimensions of space. We receive this information along the directions perpendicular to the direction along which the observed bodies move in the four dimensional reality. At first, this may seem like nonsense - because if we observe two different bodies moving in four dimensional reality along different directions, then while watching each of these bodies we will interpret two different sets of directions as the spatial dimensions. Is it possible? Actually, yes. While observing different bodies we are interpreting different directions as our space dimensions and it is these differences of directions interpreted by us as the space dimensions, and not any 19th century idea of deformation of space, which are the true source of relativistic effects.

And now it is time for some examples of how it works.

Let us put the above thoughts in a more precise terms:

In the four dimensional Euclidean space bodies move along certain directions at a constant speed (for the purposes of this article, let us leave the notion of speed to our intuition – it is described in detail in [6,7]) –wherein a distance travelled along these directions is interpreted by the bodies as the flow of time. The observer interprets directions perpendicular to the direction of motion of the observed body as the space dimensions. This is illustrated in Fig. 1. Notice that due to the fact that the all dimensions are in the same scale, the diagrams are drawn for the case when the speed of light equals one: C=1.



a b

Fig. 1 Two bodies moving in relation to each other. The only measure of the relative motion is the angle between the trajectories of bodies. The angles of trajectories in the four dimensional reality may be arbitrary and all trajectories are equivalent – to underline this fact, in the Figure none of the dimensions are distinguished as vertical or horizontal. Which of the bodies is being observed is indicated by the choice of the space axis of the observer's frame, which is perpendicular to the *trajectory of the observed body. In Fig. 1a the observed body is body 2, in Fig. 1b the observed body is body 1. It should also be noted that unlike the STR, both cases of mutual observation can be shown in the same Figure – it's enough to put Figure a over Figure b. It is possible because axes of both frames are at the same scale. The case of mutual observation was divided into two Figures – a and b - only for better readability.*

From the above we can draw the following conclusions:

1. Definition of the velocity as a sine of the angle of inclination of the trajectories.

   (1) $$V = \frac{\Delta x_i}{\Delta t_i} = \sin\varphi$$

   Where $i=1,2$

   And this automatically results in the natural limitation of velocity to the value V=1 – namely the speed of light. What does this limitation really mean? It means that we are not able to observe bodies moving along trajectories inclined to the trajectory of the observer at an angle greater or equal to 90^0. However, this is a limitation regarding only observation. While accelerating, a body can reach a direction inclined at an angle greater than 90^0 to the direction of motion of the observer but then we will not be able to observe such a body. So, what will we be able to observe then? We will be able to indefinitely observe the body accelerating to the speed of light. Travelling along such trajectories could be a solution in case of long-distanced space travels, where it could probably be possible to travel in time shorter than the time the light needs to pass this distance; however, we will never observe exceeding the speed of light.
2. The time dilation also results instantly from Fig.1 and is described with the following formulas:

   (2a) $$\Delta t_2 = \Delta t_1 \cos\varphi = \Delta t_1 \sqrt{1-\sin^2\varphi} = \Delta t_1 \sqrt{1-V^2}$$ for Fig. 1a

   and

   (2b) $$\Delta t_1 = \Delta t_2 \cos\varphi = \Delta t_2 \sqrt{1-\sin^2\varphi} = \Delta t_2 \sqrt{1-V^2}$$ for Fig. 1b

As we can see the problem is symmetrical for both observers and it remains symmetrical as long as both observers are moving along straight trajectories. The condition ***required*** to change the observed, symmetrical time dilation into the real one is the change of direction of motion by the body whose time in its reference frame is to flow slower. [5-7]

One spectacular proof of the model of observation described above could be the phenomenon of the recession of galaxies. If we assume that we interpret the directions perpendicular to the direction of motion of the galaxies/bodies as the space dimensions, it turns out that in this space the well-known formula for velocity, taught as one of the first formulas during physics lessons, allows to describe all the properties of the phenomenon of recession of galaxies, such as the increase of the velocity proportionally to the observed distance from the galaxy, the relations between the Hubble's constant and the age of the Universe, and decreasing of the Hubble's constant with time.

(3) $$V_i = \sin\varphi_i = \frac{r_i}{t_0} = Hr_i$$ (Fig. 2)

Where t_0 is the age of the Universe and H – Hubble constant, $i=1,2,$ r_i – the observed distance from a galaxy.

And all of this can be figured out without hypothetical dark energy, without complicated cosmological models etc. The problem the recession of the galaxies is explained in Fig. 2.

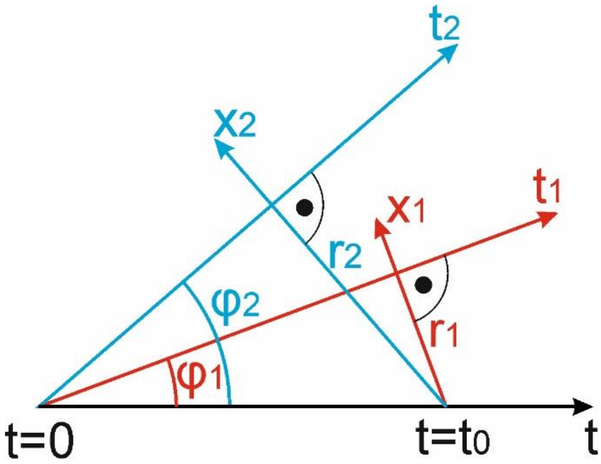


Fig. 2. Two observed galaxies and an observer are moving along trajectories with a common origin – the Big Bang. An observer moving along the trajectory t observes two galaxies moving along trajectories t_1 and t_2. Since the observer interprets the directions perpendicular to the trajectory of each observed galaxy as its space dimensions, for observation of each of the galaxy he interprets different directions as its space dimensions – for the galaxy moving along the trajectory t_1 it is the axis x_1, for the galaxy moving along the trajectory t_2 it is the axis x_2. In other words, for each of the observed galaxies the observer defines another coordinate system – the coordinate system x_1,t for the galaxy travelling along trajectory t_1 and the coordinate system x_2,t for the galaxy travelling along the trajectory t_2. Therefore, the observer measures the distances from these galaxies - r_1 and r_2 - along coordinate axes x_1 and x_2, respectively. In this figure the observer is in point t_0 on its time axis. It is the distance from the Big Bang – in other words this time is equal to the age of the Universe and it increases with time, of course.

It's enough to slightly change our ideas about the reality and the problems that previously required long studies and advanced mathematics will become clear and simple even to students whose mathematical knowledge is limited to basic operations and basic trigonometric functions.

The new approach, apart from providing trivially simple solution for the problems previously considered to be very complicated, allows to draw new conclusions [8-10] which may be an experimental test [11] of the correctness of this new approach to the problem of structure of space and to confirm or deny, the first sentence of this article regarding the errors of the Theory of Relativity. The new proposals also allow to expand the capacity of the model and foresee many new phenomena and capabilities [6-14].

The article presents only the basic assumptions of the model and therefore it uses shortcuts, generalizations and concepts which are not fully defined. More detailed information on the topics discussed in this article can be found in [9,13,14].

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