New concept of Special Relativity

Ilgaitis Prūsis[1], Peteris Prūsis[2]

Abstract

Now the Special Relativity Theory (SRT) is the cornerstone of contemporary physics. The comprehension of SRT is based on the presumption that all what one sees, hears, measures or in some other way perceives is reality. It leads to inexplicable paradoxes such as twin, Ehrenfest, spaceship and other paradoxes of relativity. The article discloses a different view, i.e., the measured values of physical items are apparent and the SRT allows to calculate real actual values. There are no paradoxes in this case.

Keywords: Special relativity, energy, EM wave, space, gravitation, Unified Field Theory, electric field, magnetic field, conservation of energy, General physics, particle physics, philosophy of science

PACS Classification codes:

01.55.+b General physics; 03.30.+p. Special relativity; 03.50.-z Classical field theories; 12.10.-g Unified field theories and models

Apparent and actual values

The SRT [1, 2] presumes that physical properties measured to moving objects are real and dependent on the velocity of an object. It is based on the ability of the SRT to

[1] Independent researcher;

[2] Independent researcher

predict the result of measurement if the properties of an object at rest and the velocity are known.

In reality there are many possibilities that what we see or measure is just an illusion. Above all it applies to non-contact distant measurements which are used in the SRT. For example, the result of brick length measurement depends on the angle between the brick surface and tape measure (Fig. 1.).

a b

Fig. 1. Non-contact measurement of brick.

a) The brick seems to be approximately a square (3” x 3,5”).
b) The edge which seems shorter (3”) actually is longest (12”).

It is possible to derive a simple formula for calculating the brick length depending on the angle between the tape measure and the surface of the brick. However, there is no reason to claim that the length of the brick depends on the turning angle. This is similar to what the SRT claims, i.e., the length depends on the relative velocity between the object and the observer.

Length contraction

As predicted by the SRT, length contraction is a phenomenon according to which the length of moving objects is measured to be shorter than their proper length at rest.

The simple analysis shows that length contraction is apparent. The moving object sends a signal to the observer in the direction **b** perpendicular to the direction of movement (Fig. 2). The real path of the signal is **c**.

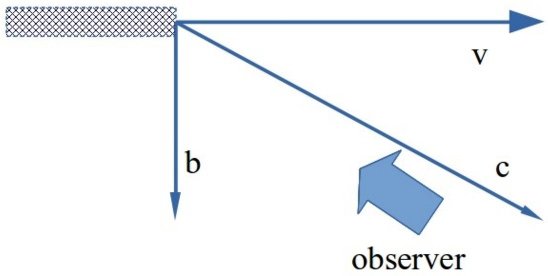

Fig. 2. Direction of signal from moving object to observer.
v – velocity and direction of object;
b – initial direction of signal;
c – real direction and velocity of signal.

The real velocity of the signal cannot exceed the speed of light c [3] and therefore the vector b < c.

For this reason, the observer sees the object at the acute angle (Fig. 3) and the length of the object seems smaller than it is in reality.

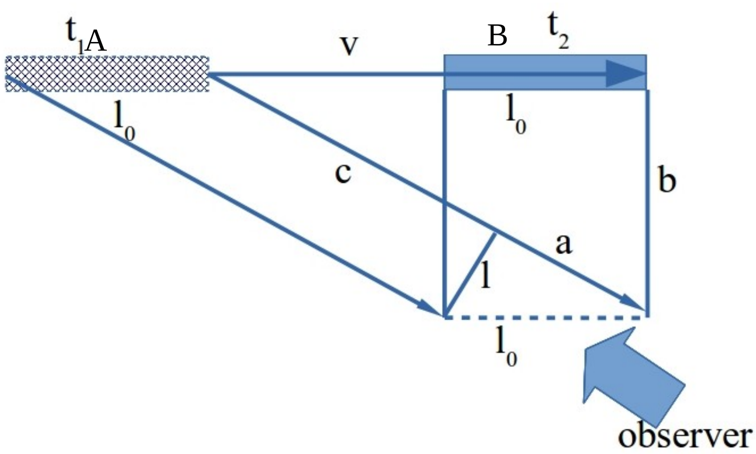

Fig. 3. Apparent length contraction of moving objects.

A – position of object at the time moment t_1 when signal is sent;
B – position of object at time moment t_2 when signal reaches observer;
v – velocity of object;
l_0 – real length of object;
l – length of object as observer sees it.

At the time moment t_1 the object emits or reflects a signal. The signal from the object travels to the observer at the speed of light c. At the moment when the signal reaches the observer the actual position of the object is B. The observer sees the object in the position A with length l. The real length of object l_0 remains constant.

The triangle (**l, l_0, a)** is similar to triangle (**b, c, v)**.

Therefore: $l/l_0 = b/c$. (1)

For right triangle: $b = (c^2 - v^2)^{1/2}$. (2)

From equations (1, 2) it follows: $l = l_0 /(1 - v^2/c^2)^{1/2}$. (3)

As the result, one gets the basic equation (3) of the relativity theory. It shows only the apparent length of the object as the observer sees it (Fig. 2.). In reality the length of objects remains unchangeable at any speed.

Therefore the right interpretation of length measurement from the position of the observer is:

$$l_0 = l\,(1 - v^2/c^2)^{1/2} , \qquad (4)$$

where: l – measured value of length,
l_0 – real value of length,
v – speed of object,
c – speed of light.

Time dilatation

Length and time can be expressed in the following way:

$$l = v\,t \quad \text{and} \quad l_0 = v\,t_0 , \qquad (5)$$

where: t – apparent time;
t_0 – real time,
v – velocity of object.

From equations (3 and 4) one gets: $v\,t = v\,t_0 /(1 - v^2/c^2)^{1/2}$, therefore:

$$t = t_0 /(1 - v^2/c^2)^{1/2} \qquad (6)$$

According to the relativity theory it is the basic equation of time [4]. The time dilatation (6) is apparent because it is obtained from the apparent length contraction l (Fig. 3).

Therefore the time flow is independent [5] from the relative speed of the object according to the observer and the right interpretation of the relative time equation is:

$$t_0 = t\,(1 - v^2/c^2)^{1/2}\,, \qquad (7)$$

where: t – measured value of time,
t_0 – real value of time,
v – speed of object,
c – speed of light.

Relativistic mass and energy

The well-known equation of relativistic mass

$$m = m_0\,/(1 - v^2/c^2)^{1/2}, \qquad (8)$$

usually is interpreted as the increasing of mass with the increasing of the relative speed of the object according to the observer. In reality the mass is independent from the velocity of the object. The equation (8) shows only the relation of the apparent mass to the real mass. Therefore it should be written as:

$$m_0 = m\,(1 - v^2/c^2)^{1/2}\,, \qquad (9)$$

where: m – measured value of mass,
m_0 – real value of mass,
v – speed of object,
c – speed of light.

Multiplying equation (9) by v^2 one gets the equation of energy:

$$m_0\,v^2 = m\,v^2\,(1 - v^2/c^2)^{1/2}\,, \qquad (10)$$

$$E_0 = E\,(1 - v^2/c^2)^{1/2}\,, \qquad (11)$$

where: E – measured (apparent) value of energy,
E_0 – real value of energy,
v – speed of object,
c – speed of light.

Conclusions

The Special Theory of Relativity (STR) is a powerful tool for the calculation of real values from apparent measured ones. The interpretation of the measured values as real is unreasonable. There is no unquestionable experimental evidence that velocity can affect an object. Even the slowdown [6] of atomic clocks is not sufficient proof. There are many experiments which show that processes in atoms are affected by the gravity field of the Earth and other agent actions [7, 8].

References

1. Laub, J. Über die experimentellen Grundlagen des Relativitätsprinzips. *Jahrbuch der Radioaktivität und Elektronik. (1910) 7: 405–463.*

2. Michelson, A. and Morley, E. On the Relative Motion of the Earth and the Luminiferous Ether. *American Journal of Science. (1887),* ***34*** *(203): 333–345.* *doi:10.2475/ajs.s3-34.203.333*

3. Prūsis I. and Prūsis P. Nature of Photon. https://ia601504.us.archive.org/31/items/natureofphoton/Nature%20of%20Photon.pdf

4. Kennedy, R. and Thorndike, E. Experimental Establishment of the Relativity of Time. *Physical Review. (1932)* ***42*** *(3): 400–418. Bibcode:1932PhRv...42..400K*

5. Prūsis I. and Prūsis P. Time Dilatation Real or Apparent. https://ia601503.us.archive.org/15/items/TimeDilatationRealOrApparent/Time%20Dilatation%3A%20Real%20or%20Apparent.pdf

6. Ives, H. and Stilwell, G. An experimental study of the rate of a moving atomic clock. II. *Journal of the Optical Society of America. (1941)* ***31*** *(5): 369. Bibcode:1941JOSA...31..369I*

7. Prūsis I. and Prūsis P. Space Curvature and Shnoll Effect. https://ia601509.us.archive.org/29/items/spacecurvatureandshnolleffect/Space%20Curvature%20and%20Shnoll%20Effect.pdf

8. Prūsis I. and Prūsis P. About Tests of Special Relativity. https://ia601506.us.archive.org/3/items/abouttestsofspecialrelativity/About%20Tests%20of%20Special%20Relativity.pdf

Acknowledgements: We are very grateful to Ieva Mazere and Valda Kalniņa for valuable discussions and assistance.

Correspondence and requests for materials should be addressed to I.P. (ilgaitis@gmail.com).