the general science journal

You can fool all the people some of the time, and some of the people all the time, but you cannot fool all the people all the time
Abraham Lincoln

Postulate of Light Speed Invariance is Wrong in Principle

Gennadiy Sokolov, Vitali Sokolov
sokolovg@yahoo.com vitali.sokolov@gmail.com

More than 100 years there is a theory of relativity, and all this time, numerous critics have unsuccessfully tried to disprove it. With the advent of the Internet, the number of articles criticizing this theory is growing rapidly. Two obvious tendencies are observed: the majority of authors who criticize the general theory of relativity (GRT) recognize the validity of the special theory (STR), and the authors, trying to disprove SRT, pay attention only to the so-called "consequences" of STR. And everyone is trying to disprove the theory of relativity, or to create alternative theories with the help of mathematics or logic, but no one tries to disprove the very basis of this theory-the postulate of the invariance of the speed of light and the Lorentz transformations, since it is believed that they are confirmed with the highest accuracy by numerous experiments and observations. It is shown below that, in fact, the postulate itself, firstly, is derived with an obvious violation of logic and, secondly, the independence of the speed of light from the motion of the observer does not have any (!) experimental confirmation. Therefore, criticizing the "consequences" of the postulate does not make any sense. If we assume that the postulate of the invariance of the speed of light is correct, logic is powerless against the "consequences" logically flawlessly derived from this postulate. Only convincing experiments in which the observer moving towards the beam measures the speed of light and receives the speed of light greater than C can disprove the postulate of invariance and the special theory of relativity based on this postulate.

Historically, the supporters of SRT have managed to convince many that the speed of light does not depend either on the motion of the light source or on the movement of the observer measuring this speed. The independence of the speed of light on the motion of the source is confirmed by numerous experiments and observations. And **if** the speed of light does not depend not only on the motion of the source, as is the case, for example, in the propagation of sound, but also does not depend on the motion of the observer, it remains only to recognize the validity of the postulate of the constancy of the speed of light and the special relativity theory based on this postulate. But this is only **if** the speed of light does not depend on the motion of the observer…

Only if, in fact, the speed of light turned out to be independent on the observer's motion, and both observers, motionless and moving towards the beam, received the same value C = 299 792 458 m / s when measuring the speed of light, it would be logically it is consistent to abandon the usual concepts and agree that the speed of light is really

unique and has a strange, not explicable by any logic property of invariance, that is, it would have to agree with Einstein and his postulate of invariance. But this is only in the case of **"If"**…

What is the postulate of the invariance of the light speed.

The postulate of invariance or constancy of the speed of light asserts that the speed of light is the same in all inertial frames and does not depend on the motion of the light source or on the motion of the observer measuring this speed. In other words, this means that:

- the light emitted by a source moving relative to this inertial frame with speed V in all directions propagates in an ideal void with the same speed C = 299 792 458 m / s,

- the observer moving towards the beam with speed V and measuring the speed of light also receives the same value C = 299 792 458 m / s .

On the basis of these two absolutely incompatible conditions, Einstein in 1905 created a special theory of relativity and predicted three famous "consequences" of this theory: in an inertial frame moving with speed V relative to our "fixed" system, in the direction of motion, the linear dimensions of bodies contract, time slows down and the masses increase.

They say that these strange "consequences" are confirmed experimentally, and therefore they attract the attention of researchers more than the postulate itself. But we will consider not the "consequences", but the very postulate from which these "consequences" follow, and arguments that certainly prove the fallacy of this postulate.

Arguments against the postulate of invariance

The fallacy of the postulate of the constancy of the speed of light is proved by the following two arguments:

1 Einstein, trying to extend Galileo's principle of relativity to optical phenomena, did not understand the essence of the classical postulate and made the fundamental mistake "extending" the principle of relativity to optical signals coming from one frame to another, that is, signals external to the inertial frame.

2 The second argument is that the postulate of the constancy of the light speed, oddly enough, does not actually have any experimental confirmation.

Each of these arguments is sufficient to refute the postulate of constancy of light

speed. Let's consider these arguments in more detail.

Argument first:
The erroneous extension of the relativity principle to external signals

The classical principle of relativity, discovered by Galileo as early as the 16th century, claims that in all moving uniformly and rectilinearly frames of reference, which Newton later called inertial, all mechanical processes and phenomena proceed in the same way. On the example of a ship moving at a constant speed, Galileo showed that no mechanical experiments carried out in the hold of the ship make it possible to determine in what direction and at what speed the ship is moving. For example, the objects released from the hands fall vertically relative to the moving ship. Similarly, vertically with respect to the ship, objects fall if they are released from hands in a stationary ship or in any another ship moving at a different speed.

At the same time, Galileo specifically emphasized that the principle of relativity is valid only for closed frames: only experiments conducted inside the frame do not allow determining the motion of the frame, but this movement can be determined if external signals, that is, the signals that go from other moving frames, are used in experiments or observations. If you leave the hold on deck, says Galileo, and look at the shore, you will see in what direction and at what speed your ship is moving. That is, Galileo strictly marked the most important feature of the principle of relativity - this principle is valid only within the inertial frame and therefore cannot be used in analyzing external signals coming from one moving frame to another.

Galileo's transformations based on this principle allow, without violation of logic, to determine all coordinates when moving from one frame to another. The Galilean view of inertial frames allows us to better understand what "movement" is. Remember, for example, the famous paradox of Zennon "Achilles and the Turtle." If we consider a situation that is slightly simpler than that of Zenon, when object A is moving with some speed past the observer O, and past the object T stationary in this inertial frame, no paradox is observed. In this case, the object A passes at a constant speed past the stationary object T. But in the paradox of Zennon, not two but three inertial frames are simultaneously considered: the observer O is in inertial frame 1, an object T is immovable in a certain frame 2 moving with constant speed V1 and the object A is immovable in a frame 2 moving with the speed V2. And the observer concludes that object A cannot overtake object T. But no paradox arises if to imagine that the observer O is in inertial frame 2, that is, is moving along with the object T. In the same way as in the situation described above, the observer in this case sees that object A moves with constant speed (V2-V1) past immovable object T.

Einstein decided to generalize the principle of Galileo and to extend it to all

electromagnetic and optical phenomena.

Let's try to imagine what in fact can mean such a generalization of the principle of relativity to all electromagnetic phenomena. If we correctly understand the essence of this principle, the generalization of the principle of relativity can mean only that not only mechanical, but also optical and any electromagnetic experiments and phenomena observed **inside** the inertial frame, cannot determine whether this frame moves with respect to any other frame. With this understanding of the extended principle of relativity, these phenomena, just like mechanical ones, will obey the principle of relativity and will not allow us to determine the motion of inertial frame. It is this extended principle of relativity that Michelson's experiment confirms: his interferometer does not allow us to determine the motion of this inertial frame, since the light source and the measuring device are inside this frame, that is, in an atmosphere moving with the Earth and no external signals are used in the device. Similarly, the Michelson interferometer, if placed inside an interplanetary space station, in full accordance with the principle of relativity, will in no way react to the movement of the station and will not determine in what direction and at what speed the station is moving.

There are many examples of electromagnetic experiments conducted inside the inertial frame and confirming that they cannot determine the motion of this frame. If, for example, two balls, connected by an elastic, to charge positively, they will pushing back and be at some specific distance from each other. The interaction of charged balls and the distance between them will remain the same if they are inside the interplanetary station. The movement of the station will not affect this simple experience in any way

But Einstein, trying to extend Galileo's principle of relativity to optical phenomena, did not understand the essence of the principle of relativity, which consists in the fact that optical and electromagnetic experiments and phenomena observed only within the inertial frame do not allow to determine whether this frame moves with respect to any other frame or not. In all the justifications for its special theory of relativity, not the experiments conducted inside the inertial frame are considered, but the experiments in which external signals are analyzed, that is, signals that go from one frame to another. Look carefully: in the "Einstein’s train", and in spaceships flying toward each other, and in all other "mental" experiments of the SRT, observers are in different inertial frames moving relative to each other and exchange light signals.

And it is assumed that the speeds of optical signals (in accordance with the postulate of Einstein) do not depend on the speeds with which observers move. This erroneous understanding of the essence of the principle of relativity by Einstein allowed him adopt the Lorentz transformations and create the special relativity with its global conclusions about length contraction, mass increase and time dilation in moving inertial frames.

Argument second:
Postulate of light speed invariance has no experimental confirmation

Relativists in each work on the special relativity primarily emphasize that the invariance of the light speed is confirmed by numerous experiments and observations that prove the independence of the speed of light from the motion of the source. And the independence of the speed of light and from the movement of the observer supposedly follows naturally from the fact that - in accordance with the principle of relativity - the movement of the observer is equivalent to the motion of the source. And they modestly silent about the fact that the independence of the speed of light from the movement of the observer in fact has no one convincing confirmation by experiment or observation.

Let us first consider the first part of the postulate - the **independence** of the speed of light **from the motion of the source**.

No one is surprised that the speed of sound does not depend on the fact that the sound source moves relative to the air in which this sound is spreading. And since in the 19th century the wave hypothesis of light dominated and light was represented as vibrations propagating in the ether, the independence of the speed of light from the motion of the source seemed quite natural and was confirmed by experiments and observations.

The most convincing confirmation of the independence of the speed of light from the motion of the source is the observation of double stars, made after the creation of the SRT, when De Sitter discovered that the light from each of the moving stars of the binary system goes to the Earth at the same speed. At a time when, as Einstein had already done, they already abandoned the ether hypothesis and imagined that light from stars to the Earth was traveling in absolute emptiness, De Sitter's observations were seen as an indisputable proof of the validity of the strange postulate of light speed invariance.

In fact, de Sitter's observations do not confirm the postulate of invariance and the independence of the speed of light from the motion of the source in absolute emptiness, since light from stars goes to the Earth not in absolute emptiness, but in a real gaseous medium transparent for light. And with regard to this medium, which differs from the Earth's atmosphere only in the composition and density of the gas, the light travels at the same speed, independent of the motion of the stars. The refractive index of the interstellar medium is close to unity, and therefore the photons move relative to this medium with the speed practically equal to C. Similarly, the independence of the speed of light from the motion of the source is explained by the influence of the medium in all other experiments and observations, since in none of them light does move in an ideal void.

An experiment with the light of stars, which is commonly considered as the first **experiment with the movement of the observer**, was conducted at the beginning of the

19th century by D. Arago. Observing the light of the star through the prism, Arago hoped to detect a change in the angle of refraction of the prism, since he assumed that, because of the motion of the Earth, the light traveling from stars meets the prism at a speed greater than C. Arago did not detect any influence of the Earth motion.

This experiment is also simply explained by the influence of the medium on the speed of light. The observer in this experiment actually moves in the direction of the light source and relative to the moving Earth the light of the star goes with a speed greater than C. But as soon as photons enter the moving with the Earth atmosphere, they are re-emitted by atoms of atmosphere and change their speed. Relatively to the Earth, the re-emitted photons travel already at the same speed of C / n, as well as any other photons emitted by the source on the Earth. Therefore, instead of the speed C + V, from which light travels to the Earth before entering the atmosphere, the observer always sees the changed speed, that is, the same speed C / n. The information about the speed greater than C is lost and about the change in speed can be judged only by the Doppler frequency change that occurs when the photons enter the atmosphere.

Thus, the Arago experiment cannot be considered as evidence of the independence of the speed of light from the motion of the observer. It only confirms the well-known fact that relative to the atmosphere all photons move with the same speed C / n. The photons would move relative to the Arago prism at a speed greater than C, if the moving Earth had no atmosphere. It is possible that a similar experiment can be carried out on the Moon that moves with the orbital speed of the Earth and has practically no atmosphere.

But the main experimental proof of the independence of the light speed both from the motion of the source and from the motion of the observer is usually considered Michelson's experiment.

Throughout the 19th century, optics was dominated by wave theory, and light was considered as the oscillations of the ether. Fresnel, trying to explain the result of Arago's experiment, put forward the hypothesis of partial dragging of ether by moving bodies, and Fizeau's experiment with the light dragging by moving water, as is commonly believed, confirmed this hypothesis. Michelson tried to detect with his interferometer an "ethereal wind" arising when the Earth moved through the ether.

Many times repeated and performed with high accuracy, the experiment gave a negative result and Michelson came to the conclusion that there is no ether at all. However, Fitzgerald, Larmor, Lorentz, Poincaré and others, trying to save the ether hypothesis, put forward a new hypothesis, according to which the length of moving bodies is reduced and the time in moving inertial frame slows down.

However, some of them, especially Poincaré, emphasized that this hypothesis has only a mathematical and not a physical meaning. Trying to give Maxwell's equations the same form in all inertial reference frames and erroneously explaining the result of the Michelson experiment with the ether hypothesis, Lorentz obtained transformations from

one inertial frame to another. Lorentz transformations are obtained under the condition that the speed of light does not depend on the speed of the source or on the speed of the observer's movement.

In fact, Michelson's experiment in no way confirms the independence of the speed of light from the motion of the light source, nor the independence of the speed of light from the motion of the observer, since in this experiment the observer and the source do not move relative to each other or relative to the inertial frame in which they are.

Michelson's experiment only confirms that the beams relative to the atmosphere and relative to the interferometer in all directions go with the same speed C / n and this speed does not depend on the orbital motion of the Earth. Therefore, using the Michelson interferometer in full accordance with the principle of relativity, the motion of the Earth cannot be determined.

Refusing the ether, but at the same time using Lorentz's transformation in his special theory of relativity, Einstein stated that the transformations have not only a mathematical but also a physical meaning, and in fact mean that the length of moving bodies is shortened, the masses increase and the time slows down.

Conclusion

The use by Einstein in his extended principle of relativity of signals external to inertial frames and the absence of experiments and observations confirming the independence of the light speed from the motion of the observer make it possible to draw an unambiguous conclusion that the postulate of the invariance of the speed of light and the special relativity theory based on this postulate are wrong. Recognition of the fact that the special theory of relativity is wrong will remove the restrictions on carrying out numerous scientific experiments contradicting this theory and will fundamentally change modern ideas about cosmology, allowing a radical revision of the cosmological scale of distances and therefore abandoning the hypothesis of the expansion of the universe and the associated myth of the Big Bang.

Note: The erroneousness of the postulate of the invariance of the speed of light and based on it special relativity is confirmed by following our works:

1 Optical Fizeau Experiment with Moving Water Without Fresnel's Aether Drag Hypothesis
Sokolov Gennadiy, Sokolov Vitali
http://gsjournal.net/Science-Journals/Research%20Papers-Mechanics%20/%20Electrodynamics/Download/6557

2. The proposal for experimental test of relativistic length contraction. Sokolov V., Sokolov G.
http://gsjournal.net/Science-Journals/Research%20Papers-Relativity%20Theory/Download/2007

3 Experiment with Two Interplanetary Space Ships Gennadiy Sokolov, Vitali Sokolov
http://gsjournal.net/Science-Journals/Research%20Papers-Relativity%20Theory/Download/6315

4. The Global Positioning System (GPS) and The Invariability of Light Speed V. Sokolov, G. Sokolov
http://gsjournal.net/Science-Journals/Research%20Papers-Mechanics%20/%20Electrodynamics/Download/5716

5 The Sagnac Effect (An Addition) Gennadiy Sokolov, Vitali Sokolov
http://gsjournal.net/Science-Journals/Research%20Papers-Mechanics%20/%20Electrodynamics/Download/5342

6 Orbital Experiment with a Femtosecond Laser for Testing Light Speed Invariance
Vitali and Gennady Sokolov
http://gsjournal.net/Science-Journals/Research%20Papers-Mechanics%20/%20Electrodynamics/Download/2017

7 Star Aberration and the Transverse Doppler Effect. Gennady Sokolov, Vitali Sokolov
http://gsjournal.net/Science-Journals/Research%20Papers-Astrophysics/Download/2003

8 The Doppler Effect and the Cosmological Red Shift Vitali Sokolov, Gennady Sokolov
http://gsjournal.net/Science-Journals/Research%20Papers-Astrophysics/Download/2005

9 Einstein's Theory of Relativity and the Experiment to Disprove It G. Sokolov, V. Sokolov
http://gsjournal.net/Science-Journals/Research%20Papers-Relativity%20Theory/Download/6234

10 An Orbital Interference Experiment for the Detection of Light Speed Greater than C.
G. Sokolov, V. Sokolov
http://gsjournal.net/Science-Journals/Research%20Papers-Mechanics%20/%20Electrodynamics/Download/2015

11 The Doppler effect in Optics: The experiment for ISS. Gennady Sokolov, Vitali Sokolov
http://gsjournal.net/Science-Journals/Research%20Papers-Mechanics%20/%20Electrodynamics/Download/2019