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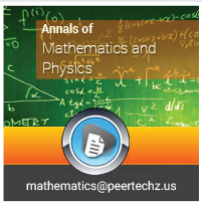

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Review Article

Proof of Einstein's postulates

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Abstract

Based on the assumption that the experiment confirms the STR, it is shown that the value of the speed of light is a very slowly decreasing function of its frequency, so that at a frequency of $2.2989.10^{-18}$ S^{-1}, the speed of light becomes zero. Such light represents resting particles – *photonics* that could serve as the Absolute Reference System, but due to their negligible mass, do not have a noticeable effect on the processes taking place. This explains Einstein's principle of relativity. The formulas for the change in the speed and frequency of light during the transition from one IRS to another, within the measurement error, remain unchanged, which proves the postulate of the constancy of the speed of light in any IRS. It is shown that all STR formulas include not the speed of light, but the fundamental constant C, equal to the speed of light with a frequency v = ∞. The proposed explanation of the correctness of Einstein's postulates is logically, apparently, the only possible one.

Introduction

The Special Theory of Relativity (STR) on Einstein's principle of relativity (first postulate) and the principle of the constancy of the speed of light (second postulate) was based [1]. All the basic formulas of STR, although confirmed by experiment, since the derivation of these formulas on postulates is based, doubts remain about their truth, since such a coincidence may be accidental, especially since many consequences of STR are paradoxical.

On the other hand, there is an experiment, the results of which obey the formulas that we accept as true, and, with some error, coincide with the STR formulas. For this reason, I will use some STR formulas, considering them, although empirical, but giving confidence to their truth.

The fundamental constant C, arising in the Lorentz transformations, has the meaning of the *limiting* speed of movement of material bodies, the limiting speed of signal transmission (interaction). It is believed that it numerically coincides with the speed of light, but there is no direct evidence of this. For example, the monograph by M.G. Lobanovsky [2] substantiates that the speed of interaction is $\sqrt{2}$ times greater than the speed of light. Therefore, it makes sense to distinguish between the fundamental constant – the speed C and the speed of light c. The first constant reflects the general properties of space and time, while the second is associated with the properties of a specific interaction [3].

The Lorentz transformations used in STR were originally derived based on the postulate of the nonrelativistic law of addition of velocities without using the postulate of the maximum speed of light [4,5]. After Einstein built STR based on only the first postulate, many researchers tried to abandon the use of the second postulate altogether [6-9]. These works describe methods of obtaining (up to an indefinite constant of Lorentz transformations without using the second postulate. The general approach to the problem is to obtain the corresponding functional equation, the solution of which leads to the formula for the addition of parallel velocities [9]. It should be noted, however, that the experimental "Calculating" the sign of an indefinite constant is equivalent to the assumption of the presence of a maximum speed, that is, in essence, to the second postulate.

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Nevertheless, attempts at axiomatization, including without the second postulate, were made later by other researchers. There are also axiomatic that do not use the principle of relativity - but only the principle of the constancy of the speed of light. More details can be found in the monograph by A.K. Guts [10].

The purpose of this work is to find the value of the fundamental constant C, to find the dependence of the speed of light on frequency, the formula for the change in the frequency of light in the transition to another Inertial Reference System (IRF) and to prove, within the accuracy of modern research methods, the truth of the SRT postulates, called Einstein's postulates

Postulates of einstein

Let us recall two main provisions of STR, which are Einstein's postulates [3].

Postulate 1: *The laws of nature are the same in all coordinate systems moving rectilinearly and uniformly relative to each other.* This means that the form of dependence of physical laws on space-time coordinates should be the same in all IRS, that is, the laws are invariant with respect to transitions between IRS. The principle of relativity establishes the equality of all IRS. It follows from this that there is no "privileged" system among the IRS and it is impossible to detect the state of absolute motion. Absolute space does not exist. This postulate is also called "Einstein's principle of relativity", although this principle was first published by Poincaré [5].

Postulate 2: *The principle of the constancy of the speed of light.* The speed of light in a vacuum is the same in all coordinate systems moving rectilinearly and uniformly relative to each other. It immediately follows from this postulate that the speed of light in a vacuum does not depend on the speed of the source, since an inertial system can be associated with the source [3]. An important consequence of the second postulate is that the speed of light does not depend on its wavelength and frequency.

Involution of photons

Fritz Zwicky back in 1929 put forward a hypothesis of light aging, according to which light loses energy, which entails a decrease in its frequency with subsequent redshift [11]. In papers [12,13], theoretical analysis and classification of hypotheses about the redshift in the spectra of galaxies, as the main reason for the aging of photons, were carried out.

From ether-dynamic hypotheses V.A. Atsyukovsky [14] and S.A. Nikolaev [15] it follows that with each wave oscillation the photon emits a subquantum in the direction of its motion, which is either absorbed by the environment [14] or decays with the formation of etheric particles - photonics. The frequency of the light decreases accordingly. In the proposed version of the theory of involution of photons, there is no decay of a photon, but an expansion of the space of the Universe, as a result of which the wavelength of the photon increases, and due to the fact that the speed of light in the process of this expansion remains the same, the frequency of the photon decreases accordingly. This process continues until the photon degrades into a photonic, so that as a result, from each photon over time, as a result of the expansion of the Universe, only one photonic will appear.

Based on the Hubble law for the redshift of lines in the spectra of galaxies [14-16], we have:

$$Z = \frac{\lambda - \lambda_0}{\lambda_0} = H\frac{R}{c} = \frac{\nu_0 - \nu}{\nu} = \frac{E_0 - E}{E} = -H\frac{\Delta R}{c} \quad (1)$$

Where z is the redshift index, E_0,V_0,λ_0 and E, V, λ are the energy, frequency, and wavelength of the photon emitted by the light source and the light received by the observer, respectively; c is the speed of light; R is the distance from the light source to the observer; H=(2.2989±0.0035).10^{-18} c^{-1} =70.91±0.11$KM/c/M\Pi K$- is the Hubble constant [17]. Equalities (1) yield the equation

$$\frac{dE}{E} = -H\frac{dR}{c} \quad (2)$$

Integrating (2) and taking into account that if R = 0, then $E = E_0$, we obtain

$$E = E_0 e^{-Ht} \text{ и } \nu = \nu_0 e^{-Ht} \quad (3)$$

Thus, a natural exponential law of decay of energy and, accordingly, photon frequency is obtained.

The energy E_f and the mass m_f of hypothetical photonics are determined by the ratio of the change in the photon energies to the corresponding number of oscillations N per a given change in frequencies:

$$E_f = m_f c^2 = \frac{h(\nu_0 - \nu)}{N}, m_f = \frac{h(\nu_0 - \nu)}{Nc^2} \quad (4)$$

The number of oscillations made by a photon during time t, taking into account formula (3), is

$$N = \int_0^t \nu dt = \int_0^t \nu_0 e^{-Ht} dt = \frac{\nu_0}{H}\left(1 - e^{-Ht}\right). \quad (5)$$

The experimentally observed change in the frequency of light from objects moving away from the observer with a speed v, regardless of the nature of this speed, obeys the formula corresponding to the Doppler effect [18]:

$$\nu = \nu_0 \frac{\sqrt{1-\beta^2}}{1+\beta}, \quad (6)$$

Where $\beta = v / c$ whence

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$$v_0 - v = v_0\left(1-\sqrt{\frac{1-\beta}{1+\beta}}\right). \quad (7)$$

The redshift of the K lines in the spectra of galaxies is the additive sum of the displacements:

$$K = K_1 + K_2, \quad (8)$$

Where K_1 is the displacement of the lines arising from the movement of the light source relative to the observer; K_2 displacement of lines due to the expansion of the space of the Universe. For this reason, the velocity value that could be found from formula (7) would be the total radial velocity of the object relative to the observer and the expansion rate of the space of the Universe

$$v = v_1 + v_2, \quad (9)$$

Where v_1 is the radial velocity of the proper motion of the light source relative to the observer; v_2 the rate of change in the distance between the object and the observer due to the expansion of the space of the Universe. Substituting expressions (5) and (7) into formula (4), we get:

$$m_f = \frac{hH\left(1-\sqrt{\frac{c-v}{c+v}}\right)}{c^2\left(1-e^{-Ht}\right)}. \quad (10)$$

Using Einstein's formula

$$m_f c^2 = h\nu_s, \quad (11)$$

Where ν_s S is the frequency of the corresponding sub quanta from equality (10) we obtain

$$\nu_S = \frac{H\left(1-\sqrt{\frac{c-v}{c+v}}\right)}{1-e^{-Ht}} \quad (12)$$

It can be seen from formula (11) that if the radiation source is at rest, i.e. if the Universe is not expanding, then the frequency of sub quanta is zero, i.e. just no sub quanta are emitted, and photons do not age. From formula (12) it follows that at the initial moment of emission of photons of any frequency by an object at $t \cong 0$, the frequency of the generated sub quanta is extremely high, then over time the photons form sub quanta of the average frequency, and in the limit of their aging $t \to \infty$, if the Universe expands with constant velocity v_{const}, the frequency of the generated sub quanta in the limit does not depend on the frequency of the parent photons:

$$\nu_s^{\infty} = H\left(1-\sqrt{\frac{c-v_{const}}{c+v_{const}}}\right). \quad (13)$$

Such sub quanta can already be considered as photonics with mass

$$m_f^{\infty} = \frac{hH}{c^2}\left(1-\sqrt{\frac{c-v_{const}}{c+v_{const}}}\right) \quad (14)$$

It also follows from formula (12) that at an expansion rate equal to the speed of light, the frequency of sub quanta is determined by the formula

$$\nu_c = \frac{H}{1-e^{-Ht}}. \quad (15)$$

As $t \to \infty$ formula (15) allows calculating the frequency of limiting sub quanta

$$\nu_f = \nu_c^{\infty} = H = H = \left(2.2989 \pm 0.0035\right).10^{-18}\ s^{-1}, \quad (16)$$

Which corresponds to radiation in the X-ray range. Since the mass of such sub quanta found by the Einstein formula

$$m_f = m_c^{\infty} = \frac{hH}{c^2} \approx 1.7.10^{-68}\ kg \quad (17)$$

does not depend either on the frequency of the primary radiation or on the speed of its source, then such sub quanta, naturally, should be considered limiting particles - photonics. Photonics are obviously inert particles and therefore will fill the space of the Universe.

If in the aetherdynamic theories [14,15], in the aging process, photons decay into sub quanta is assumed, and therefore formally this contradicts the works of M.P. Bronstein [19-21], then in the discussed theory of involution of photons no decay occurs, but instead the expansion of the Universe occurs, which leads to a decrease in the frequency of photons and their degeneration to photonics.

Universal constant C

$$v_{CA} = f\left(v_{CB}, v_{BA}\right) \quad (18)$$

Where v_{CA}, v_{CB}, v_{BA} are the speeds of bodies A, B, C, relative to each other, the law of addition of parallel speeds was found

$$w = \frac{v+u}{1+Kvu}, \quad (19)$$

Where K is a formal constant. This constant cannot have a negative value, since, otherwise, the addition of two positive velocities, each of which is greater than $\left(-K\right)^{-0.5}$, would result in a net negative velocity. The value K = 0 leads to the Galilean addition form

$$w = v + u, \quad (20)$$

and the value $K = \frac{1}{C^2}$ to the addition formula of the STR

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$$w = \frac{v+u}{1+\frac{vu}{C^2}}, \tag{21}$$

Where C is a fundamental constant with the dimension of speed. Other values of K lead to other types of STR. Einstein's STR uses a formula (21) and other corresponding formulas, the value of C which remains unknown.

Since a photon emits photonics, the photon itself can be considered as consisting of an integer number of photonics. However, photonics being a part of a photon, apparently, form a single homogeneous, or some other substance, and not a discrete structure, which is a simple set of photonics. Therefore, a photon is represented as a photonic moving with a speed v, the frequency of which is equal to the frequency of the photon ν_v:

$$h\nu_v = m_f^v C^2, \tag{22}$$

The mass of a moving photonic are, respectively, equal to:

$$m_f^v = \frac{m_f}{\sqrt{1-\frac{v^2}{C^2}}}, \tag{23}$$

Where m_f is the mass of the resting photonic?

Substituting (23) into (22), we obtain

$$h\nu_v = \frac{m_f C^2}{\sqrt{1-\frac{v^2}{C^2}}}, \tag{24}$$

Whence the speed of the photonics, and, therefore, the speed of light (photon) with the frequency ν_v is equal to:

$$v = C\sqrt{1-\frac{m_f^2 C^4}{h^2 \nu_v^2}}. \tag{25}$$

From equality (25) it follows that the dependence of the speed of light on its frequency is an increasing function: the greater the frequency of light, the greater its speed, and at $\nu_v = \infty$ the speed of light is maximum:

$$v = v_{max} = C. \tag{26}$$

Formula (22) as applied to a resting photonic will be as follows:

$$h\nu_f = m_f C^2, \tag{27}$$

and formula (25) taking into account (27) will look like this:

$$v = C\sqrt{1-\frac{\nu_f^2}{\nu_v^2}} \tag{28}$$

According to the experimental data, visible light with a frequency of 10^{15} s has a speed [22]:

$$v_0 = 299792458 \pm 0.4 m/s \tag{29}$$

Equality (29) shows that if we change the value of the velocity v_0 within the measurement error by the value

$$|\alpha| = 2,65.10^{-66}\, m/s \ll \pm 0.4\, m/s, \tag{30}$$

Then it will remain true. Therefore, for the sake of convenience of calculations, we will choose the speed of visible light equal to

$$v \cong 299792458 m/s - 2,65.10^{-66} m/s \pm 0.4 m/s \tag{31}$$

Substituting this value ν into equality (28) and solving it with respect to C, we find

$$C = 299792458 \pm 0.4 m/s \tag{32}$$

Conclusion

All STR formulas include not just the speed of light, but the fundamental constant C, equal to the speed of light with a frequency $\nu=\infty$.

Proof of Einstein first postulate

From formula (25), taking into account (16), we find the frequency ν_{min} at which the speed of light v is equal to zero:

$$h^2 \nu_{min}^2 = m_f^2 C^4 \tag{33}$$

$$\nu_{min} = \frac{m_f C^2}{h} = 2.2989.10^{-18} s^{-1} = \nu_f \tag{34}$$

The obtained frequency is many orders of magnitude lower than the frequencies, the corresponding light of which can be detected by modern methods. Photonics, i.e., has zero speed and nonzero frequency (34). The well-known formula for the dependence of the speed of light on its wavelength λ and frequency ν

$$c = \lambda \nu \tag{35}$$

for photonics that is at rest, the wavelength turns out to be zero. For this reason, the expansion of the space of the Universe has no effect on photonics. Their sizes remain zero. The set of resting photonics is a "standing" light that can serve as the Absolute Reference System (ARS).

Suppose that at the moment of the Big Bang (BB) a very large, but finite number n of photons with an average frequency $\nu_\gamma = 10^{22} s^{-1}$ in the range of γ-rays were formed. In the work of Bukalov A.V. [23] derived the exact formula for the mass of the Universe and estimated its value:

$$M_U = \frac{\pi}{\sqrt{2}}.3^{128}.m_{Pl} = 5.701405.10^{53} kg \tag{36}$$

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Where $m_{Pl} = 2,17610^{-8}\ kg$ is the mass of the Planck particle.

Assuming that the mass of the Universe at the moment of BB was the same as now, and assuming that even if the entire mass of the Universe consisted of photons, then the number of photons can be estimated from the equality

$$nh\nu_{\gamma} = M_U C^2, \quad (37)$$

Where

$$n = \frac{M_U C^2}{h\nu_{\gamma}} = 7.7.10^{81}\ Photonics. \quad (38)$$

The age of the Universe according to the results of work [17] is equal to:

$$T = 1/H = 13.799 \pm 0.021\ Billion\ years \sim 4.35.10^{17}\ s \quad (39)$$

The radius of the Universe is determined by the distance traveled by the light released at the moment of the BB up to the present time:

$$R = cT \approx 1.3.10^{23}\ km \quad (40)$$

The volume v and the density ρ of photons in the Universe, respectively, are equal

$$V = \frac{4}{3}\pi R^3 = 9.2.10^{69}\ km^3 \quad (41)$$

$$\rho = \frac{n}{V} = \frac{7.7.10^{81}}{9.2.10^{69}} \approx 8.10^{11}\ Photonics/km^3 = 800\ photonics/m^3 \quad (42)$$

So that the photonic mass density ρ_m is equal to:

$$\rho_m = \rho m_f = 1.36.10^{-65}\ kg/m^3 \quad (43)$$

Obviously, such a negligible mass density of photonics at the modern level of science and technology practically does not allow detection of the influence on the motion of bodies and the processes occurring in the Universe. This makes it possible to ignore the existence of ARS, which makes it fair within the accuracy of measuring the parameters of the observed phenomena and confirms the truth of Einstein's first postulate, which asserts that in any IRS all processes occur according to the same laws.

Proof of Einstein second postulate

Table 1 shows the values of the speed of light, depending on its frequency, calculated by the formula (28).

The evolution of photons is easily seen from Table 1. This table shows that the dependence of the speed of light on frequency in the range of frequencies available for observation from 10^4 to $10^{22} S^{-1}$ to decreases very weakly, so that such light can be considered practically not frequency dependent. This

Table 1: The dependence of the speed of light ν m/s on its frequency $\nu_{\nu}\ S^{-1}$.

$\nu_{\nu}\ S^{-1}$	ν m/s	Type of radiation
∞	C =299792458	Ultimate light
10^{22}	(1-10^{-80}) C	γ-rays
10^{18}	(1-10^{-72}) C	X-rays
10^{15}	(1-10^{-66}) C	Visible light
10^{11}	(1-10^{-58}) C	Infrared light
10^{8}	(1-10^{-52}) C	Radio waves
10^{4}	(1-10^{-44}) C	Ultra-long radio waves
1	(1-10^{-36}) C	Unobservable
10^{-10}	(1-10^{-16}) C	- 0 -
10^{-15}	0.99999739	- 0 -
10^{-16}	0.99973546	- 0 -
10^{-17}	0.97319062 C = 291757739	- 0 -
8. 10^{-18}	0.95778066 C = 287135418	- 0 -
5. 10^{-18}	0.88791891 C = 266191393	- 0 -
2.35. 10^{-18}	0.39191835 C = 117494165	- 0 -
2.31 .10^{-18}	0.09294766 C = 27865009	- 0 -
2.2989. 10^{-18}	0	Photonics

confirms the consequence of Einstein's second postulate, which states that the speed of light does not depend on its frequency in the range of frequencies of light available for observation. However, at frequencies less than ~ $10^{-16}\ S^{-1}$, the value of the speed of light begins to decrease noticeably, in the frequency range less than ~ $5.10^{-18}\ S^{-1}$. speed light already sharply decreases, and at a frequency of 2.2989. $10^{-18}\ S^{-1}$ becomes equal to zero, which corresponds to the state of resting photonics.

Application of the formula for the addition of velocities (21), which follows from STR, since it is considered confirmed by experiment, but in our analysis, it acts as an empirical truth if the speed of light is in the range of frequencies possible for observation by modern methods is equal to $v \approx C$ for any values u, allows you to write the equality:

$$w = \frac{v+u}{1+\frac{vu}{C^2}} = \frac{C+u}{1+\frac{u}{C}} = C \approx v\ , \quad (44)$$

Where v is the speed of light in IRS-1 and u is the speed of IRS-2 relative to IRS-1. From (44) it can be seen that whatever the relative speed of different ISO from each other, the resulting speed of light in both IRS if the frequency of light is in the region of the observed frequency range, is the same. This proves Einstein's second postulate, which states that the speed of light is the same in all IRS.

Discussion of results

Now it is necessary to explain the reason why the formula for the addition of parallel velocities of STR is realized in nature in accordance with the principle of relativity of Einstein (21), and not Galileo (20) [24]. Let us consider how the frequency of light changes when it passes to another IRS. From formula (25) we find the frequency of light in IRS-1

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$$v_v = \frac{mC^3}{h\sqrt{C^2 - v^2}} \tag{45}$$

In IRS-2, moving with a speed u relative to IRS-1, the frequency of light will be determined, respectively, by the formula

$$v_w = \frac{mC^3}{h\sqrt{C^2 - w^2}} \tag{46}$$

Substituting the value of w from (21) into (46), we obtain

$$v_w = \frac{mC^3\left(C^2 + vu\right)}{hC\sqrt{\left(C^2 + vu\right)^2 - C^2\left(v + u\right)^2}} \tag{47}$$

Dividing expression (47) by (45), we find:

$$v_w = \frac{v_v}{C}\sqrt{\frac{C^2 - v^2}{1 - C^2\left(\frac{v+u}{C^2+vu}\right)^2}} \tag{48}$$

It is easy to verify by simple substitution of the values $0 \le v$, $u \le C$ and the data in Table. 1 into formula (48), that if IRS-2 moves relative to IRS-1, then in IRS-2 the frequency of light will be higher. For example, if we choose $v = u = C/2$, then we get that the frequency of light in IRS-2 will be greater than in IRS-1:

$$v_w = 5/\sqrt{12}v_v \approx 1,445v_v . \tag{49}$$

That the frequency of light in its transition to a moving frame of reference increases, which, from the point of view of an observer from IRS-2, leads to a blue shift. Accordingly, the light moving in IRS-2, from the point of view of an observer from a relatively resting IRS-1, will experience a redshift.

Formula (48) provides one more proof of the validity of Einstein's second postulate within the frequency of light, which can still be recorded by modern devices. Indeed, if the light in IRS-1 had speed and frequency, respectively, v and v_v, then when it switches to moving relative to IRS-1, IRS-2, its frequency becomes V_w. But if the light corresponding to the parameters possible for observation, then the speed of such light W, found from formula (25) or from the data in Table. 1, will be practically the same $v \approx w$ within the measurement error. This proves that the speed of light in all IRS is the same.

All of the above is related to light. But the formula for the addition of velocities (21) is applicable to any material bodies if by frequency we mean the frequency of De Broglie waves. We write formula (48) at the speed of light $v = o$, in this case $v_v = v_f$:

$$v_w = \frac{v_f}{\sqrt{1 - \frac{u^2}{C^2}}}, \tag{50}$$

V_w is the frequency of light, measured in IRS-2, moving at a speed u relative to IRS-1. For a material body resting in IRS-1, you can write

$$v_0 = \frac{m_0 C^2}{h}, \tag{51}$$

where v_o is the de Broglie frequency, m_o is the rest mass of the body, and if the body moves with the speed μ, then

$$v_u = \frac{m_u C^2}{h}. \tag{52}$$

Let us write (50) taking into account (51) as applied to a material body:

$$v_u = \frac{v_0}{\sqrt{1 - \frac{u^2}{C^2}}} \tag{53}$$

We equate (52) and (53):

$$\frac{m_u C^2}{h} = \frac{v_0}{\sqrt{1 - \frac{u^2}{C^2}}}. \tag{54}$$

Substituting (51) in (54), we obtain a formula for the mass of a moving body, which coincides with a similar STR formula:

$$m_u = \frac{m_0}{\sqrt{1 - \frac{u^2}{C^2}}}. \tag{55}$$

As can be seen from the above, the answer to the question about the truth of the formula for the addition of velocities (21) for light is explained by the fact that during the transition to the IRS-2, moving relative to the IRS-1, the energy of the relative motion of the IRS does not transform only into a change in the speed of light, but is redistributed between a change in frequency and a change in the speed of light, and change in accordance with formulas (21) and (48). In the case of other material bodies, the redistribution of the added energy occurs between the speed of the body (25) and the mass of the body (55), as well as the de Broglie frequency (51, 52), which differs from the bodyweight-only by the presence of the proportionality coefficient. If it were not for this redistribution, then Galileo's principle of relativity would operate (20). The question of why this is exactly the case remains open.

The photonics themselves form "standing light" and fill the space of the Universe, thereby creating an Absolute Reference System, and the speed and frequency of light, albeit to an insignificant degree, are within the range of observed frequencies but depend on each other. Therefore, Einstein's postulates are proven only in a pragmatic sense. If we judge in principle, then they are not true. However, for solving many problems, the use of these postulates and STR can serve as

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a hint for finding even more accurate solutions based on the existence of ARS, and vice versa, solutions from the point of view of the Theory of Absoluteness (TA), in some cases, may turn out to be simpler and clearer than those in STR. In fact, it turned out that the results of applying STR and TA, within the range of light frequencies from 10^{-16} to 10^{22} S^{-1} and more, do not differ.

Dialectics of Einstein postulates

The basic provision of the article is the existence of photonics, the reality of which is hypothetical. However, this applies only to one of the postulates. At the same time, the validity of the postulates, as well as the Special Theory of Relativity, is proved by experiment. Therefore, the conclusion follows that not only the theory of photonics confirms this postulate, but the postulate itself, which has already been confirmed by experiment, thereby testifies in favor of the truth and confirms the involution of photons with the formation of photonics. Einstein's other postulate is not at all connected with photonics, which allows us to consider this postulate proven.

An exclusive feature of photonics, as the limit of involution of photons, is that it is in Absolute rest in absolutely all frames of reference! This allows us to assert that photonics can form the basis for the Absolute Reference System, and for this reason, ARS still exists. Nevertheless, the experiment shows that the laws of the Special Theory of Relativity operate in our Universe. But, for example, the formulas for the addition of velocities (20) and (21) in STR and in the Theory of Absoluteness (TA), based on the existence of ARS, are completely different. The question arises: which of these formulas should be used in practice? The available knowledge gives us a hint: since reality practically and theoretically confirms the validity of STR, then STR formulas should operate in ARS, in particular, formula (21) should be the true formula for the addition of velocities. Indeed, ARS is only one of many IRS. The derivation of the formula (20) [3], by default, assumes that time in the frames of reference moving relative to each other flows in the same way, and therefore the result is a formula that is valid only at low relative velocities of the systems. If we take into account the change in the speed of the rate of time and the length of the paths traversed by the test body in each of the systems, then, obviously, formula (21) should be obtained.

Conclusions

1. It is shown that due to the expansion of the Universe, photons degrade to sub quanta, called photonics with mass m_f= 1.7. 10^{-68} kg, frequency vf=(2,2989±0.0035).10^{-18} S^{-1}) and zero wavelength.

2. The dependence of the speed of light on its frequency has been established, from which it follows that within the frequency range from $10^{-16}$to 10^{22} S^{-1}, including the range from ultra-long radio waves to γ-rays, is practically constant, but the speed of light with a frequency less than 10^{-17} S^{-1} sharply decreases, so that at a frequency vf = 2.2989. 10^{-18} S^{-1} , equal to the frequency of photonics, becomes equal to zero.

3. Photonics has zero dimensions and are in Absolute rest. The expansion of the Universe has no effect on them.

4. The set of resting photonics can be considered as the Absolute Reference System, which, however, due to their small mass, has practically no effect on the processes occurring in the Universe. This proves the validity of Einstein's first postulate.

5. Derived a formula for the change in the frequency of light in the transition to another IRS.

6. It is proved that the speed of light within the frequency range from 10^{-16} to 10^{22} S^{-1} and the accuracy of modern methods of its measurement is practically the same in all IRS. This is proved by Einstein's second postulate.

7. It is concluded that the reason for the nonlinearity of the formula for adding velocities is that the energy of the relative motion of one IRS in relation to another is redistributed between the change in speed and frequency - in the case of light, and speed and mass in the case of another material body.

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