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New Information Technology - Time Travels - is Already Technically Feasible And Commercially Ready For Use

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Abstract

The article proves that the version of the special theory of relativity (SRT), which is studied in all physics textbooks, is incorrect, since all the relativistic formulas obtained in it are incorrect and they are incorrectly explained using the incorrect principle of not exceeding the speed of light. From them also incorrect conclusions were drawn about the physical unreality of imaginary numbers and the existence in nature of our only visible universe.

A corrected version of SRT is provided, which explains that the argument 'velocity' in its relativistic formulas, in accordance with Newton's first law, is the fourth spatial dimension⁴. This made it possible to obtain corrected relativistic formulas and explain them correctly. The principle of the physical reality of imaginary numbers is experimentally proven, which refutes the unproven statement of the version of SRT studied in all physics textbooks about the physical unreality of imaginary numbers and refutes the principle of not exceeding the speed of light. It is shown that the generally accepted version of SRT, on the one hand, and radio engineering, electrical engineering and computer engineering, on the other hand, mutually refute each other. It is explained that in nature, in addition to our visible universe, there are many other mutually invisible universes and anti-universes that are in different dimensions. They give rise to the phenomena of dark matter and dark energy, the explanation for which is now being unsuccessfully sought at the Large Hadron Collider in the microcosm of our only visible universe. It is also explained that in the antiuniverses of such an invisible Multiverse there are antimatter and anti-time.

Therefore, time travel is possible in the invisible Multiverse. And although the generally accepted version of SRT claims that time travel on Earth is possible only in some exotic situations⁵, in fact, such travel is now carried out every day by millions of air passengers, since after their planes land they always change their watches to local time, different from the local time at the airport of departure. But since such time travel of air passengers is combined with inevitable movements over long distances, they are not currently used. Therefore, in order to make air travel through time suitable for practical use, the space factor in them should be eliminated by using round-the-world flights. Then in such flights the resulting movement in space becomes zero. But an analysis of such time travel - for example, into the past⁶ - leads to the conclusion that as a result of any flight around the world, planes will still fly to another (but with the same name) airfield, since even within a day many little things will inevitably change at any airfield. Therefore, the space factor cannot be completely zeroed out, but it can be significantly minimized. And this allows for real time travel.

But since there is no place for these other airfields on the globe-like three-dimensional Earth, it is logical to conclude that our planet Earth is somehow more complex than modern science explains. Therefore, our Earth actually exists in more than three-dimensional space. Perhaps in four dimensional space, the existence of which follows from Newton's first law.

- 4 Not to be confused with the fourth dimension in four-dimensional space-time (Minkowski space).
- 5 For example, in the 'twin paradox'
- 6 Because it's easier to verify this

DECISIONS OF THE XV CONGRESS OF THE RUSSIAN PHYSICAL SOCIETY

Moscow, April 16, 2016

1. To elect forever Honorary Members of the Russian Physical Society:

- Beatrix Wilhelmina Armgard* (Netherlands),

- Alexander Alexandrovich Antonov (Ukraine).

Russian Physical Society

Journal of the Russian Physical and Chemical Society, Volume 88, Issue 2 (2016), Page 5

* Former Queen of the Netherlands who abdicated in favor of her son Willem-Alexander on April 30, 2013. After abdication, she bears the title of Princess of the Netherlands.

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Introduction

So that what is written in the article is perfectly understandable, let us remember one fundamental truth: *"We have only one nature and it is indivisible. It cannot be divided into contradictory parts."* Therefore also: *"We have only one science and it is also indivisible. It cannot be divided into contradictory parts"*. Norbert Wiener, who received his Ph.D. in Harvard University at the age of 16, wrote about this: *"Important research is sometimes delayed due to the fact that in one area results that have long since become classic in a related area are unknown"*. Consequently, all scientists, regardless of specialty, should strive to ensure that their theories do not contradict those of scientists in other specialties. This is written because the special theory of relativity, which is now being studied in all textbooks of physics, does not meet this criterion of its truth. It contradicts scientific knowledge and practical activities in radio engineering, electrical engineering, computer technology and even physics itself.

Therefore, when describing a new information technology - time travels - the author was forced not only to transfer this information technology from the science fiction genre to modern science and technology, but also to explain that the generally accepted version of the special theory of relativity (SRT) is largely incorrect. Since readers may notice that some fragments of the article refute what is written in physics textbooks. For example, the special and general theories of relativity state that time travels are only possible in some exotic situations, and is forever impossible for people on Earth. However, this time travels are not only possible on Earth, but is already performed by millions of air passengers every day, since air passengers, after landing their planes, always set their watches to a local time that is different from the local time at the departure airport. However, due to certain circumstances, such time travel is not currently used. And the article explains how such air travel through time can be used. Even tomorrow.

The Generally Accepted Version of the SRT is Incorrect

Due to the use of the principle of relativity in it, the special theory of relativity (SRT) [1]-[3] is rightly considered to be an outstanding scientific achievement of physics of the twentieth century. But due to the lack of necessary scientific knowledge in this SRT at the beginning of the twentieth century, the derivation of relativistic formulas was not completed, and because of this, the resulting relativistic formulas turned out to be incorrect and could not be explained. Therefore, naturally, this version of SRT itself turned out to be incorrect in many respects [4]-[8]. And since the theory, which even its creators could not explain, would be of no use to anyone, in order to make it explainable and necessary, a postulate was introduced into it, called the principle of not exceeding the speed of light.

And from this postulate a conclusion was drawn (which actually has no evidentiary force) about the physical unreality of imaginary numbers. Moreover, as the creators of this version of SRT argued, there are no processes in nature⁴ that prove the physical reality of imaginary numbers. Which made it possible to somehow explain⁵ the uncorrected relativistic formulas.

4 In fact, they exist, there are many of them, and they are known to everyone. For example, tsunamis, church bells ringing and playgrounds swings swinging

5 However, this explanation turned out to be incorrect, since the principle of not exceeding the speed of light is incorrect

This is the form in which SRT is still presented in physics textbooks. And later, already in the XXI century, the OPERA experiment [9] was carried out at the Large Hadron Collider for 15 years⁶ (2003-2018), which aimed to prove the physical reality of imaginary numbers, but failed to do this. And thereby only created the impression needed by the authors of the SRT that imaginary numbers are physically unreal.

However, back in 1687 Isaac Newton, in his "Mathematical Principles of Natural Philosophy" published the 1st law of classical mechanics, which he formulated as follows: *"Every body continues to be maintained in its state of rest or uniform and rectilinear motion until and unless it is compelled by applied forces to change that state"*. The modern formulation of Newton's 1st law is somewhat different: *"In an inertial frame of reference, material points, when no forces act on them (or mutually balanced forces act), are in a state of rest or uniform linear motion"*. But, as can be seen, in both formulations there are no restrictions on the speed. Therefore, Isaac Newton's 1st law and Albert Einstein's principle of not exceeding the speed of light mutually refute each other. And for more than a hundred years after the creation of the SRT, no one commented on this situation. Nobody wanted to refute either Newton or Einstein. However, it is necessary to find out which of them is right. Since, let us remember, *"we have only one science, and it is indivisible; it cannot be divided into contradictory parts"*.

Let us also remember that in 1897, i.e. again, even before the creation of SRT [10], [11], Charles Proteus Steinmetz published [12] the theory of linear electrical circuits of alternating current, in which, in accordance with his proposed interpretation of Ohm's law⁷, the physical reality of imaginary numbers was actually affirmed, since the imaginary resistance of capacitors $-j/\omega C$ and inductors $+j\omega L$ were assumed to be really physically existing, and in radio engineering and electrical engineering laboratories there were instruments that confirmed this assumption, since they measured these imaginary physical quantities.

Therefore, if imaginary numbers actually turned out to be physically unreal, as follows in the generally accepted version of SRT from the principle of not exceeding the speed of light, then it would be necessary to recognize Ohm's law in the interpretation of Steinmetz and his theory of alternating current electrical circuits as incorrect. And then neither radio engineering, nor electrical engineering, nor computer technology would exist in nature.

Nevertheless, not a single textbook on the theory of linear electrical circuits, theoretical radio engineering or theoretical electrical engineering has yet written that imaginary numbers are physically real. Therefore, since the debate about whether the SRT is true or false continues, they even tried to stop it through administrative action. For example, in the USSR, decisions to ban criticism of the special theory of relativity were made three times: by a resolution of the Central Committee of the All-Union Communist Party (Bolsheviks) in 1934, by a resolution

6 And any radio engineer will prove this using the instruments available in his laboratory in less than one hour

7 Ohm's law was discovered as a result of nine years of experimental research in 1826, when no electrical measuring instruments yet existed. Therefore, Ohm himself formulated this law only in relation to direct current electrical circuits. And in 1828, Ohm, on the instructions of the Minister of Education, was fired from his job for this discovery. A high-ranking official at the time considered the use of mathematics in physics unacceptable

8 In radio engineering, electrical engineering and computer engineering, the imaginary unit is usually denoted by the letter j , since the letter i denotes electric current

of the Presidium of the Academy of Sciences of the Soviet Union in 1942, and by a secret resolution of the Presidium of the Academy of Sciences of the Soviet Union in 1964.

This issue has not yet been resolved. And Albert Einstein never received Nobel Prize for the creation of the special theory of relativity⁹, even though he was nominated for the Nobel Prize 66 times, since the truth of his version of SRT was not experimentally proven. And this incorrect version of SRT [13]-[29] is still presented in all physics textbooks.

Evidence of the Physical Reality of Imaginary Numbers

And since physics textbooks state without proof that from the principle of not exceeding the speed of light in SRT implies the physical unreality of imaginary numbers, we will prove that this statement is false, since the physical reality of imaginary numbers is experimentally provable. In addition, the conclusion from the principle of not exceeding the speed of light about the physical unreality of imaginary numbers cannot serve as proof at all, since this principle is just a postulate, that is, an unproven assumption. Therefore, the generally accepted version of SRT is largely incorrect.

Let us provide experimental evidence of this. Moreover, for greater persuasiveness, we will prove the physical reality of imaginary numbers even several times. And in general, everything written in this article is an experimentally provable refutation of the version of STR studied in physics textbooks, which asserts the physical unreality of imaginary numbers. But naturally, some of this evidence turned out to be more complex and more difficult to understand than others.

The principle of not exceeding the speed of light is refuted by Ohm's law in Steinmetz's interpretation

In the first of these proofs [30]-[35], we will use the above-mentioned Ohm's law in the interpretation of Charles Proteus Steinmetz, according to which the resistance of any electrical *LCR*-circuit is described by complex numbers. Therefore, if imaginary numbers are physically unreal, the devices will measure their resistance of electrical *LCR*-circuit, which is described by real numbers and does not depend on the frequency of the applied voltage. And if imaginary numbers are physically real, the devices will measure resistance of electrical *LCR*-circuit, which is described by complex numbers and therefore depends on the frequency of the applied voltage. Consequently, an experiment that proves or disproves the physical reality of imaginary numbers will be elementary simple. You will just need to change the frequency of the voltage applied to any electrical *LCR*-circuit and measure the amount of current flowing through it. If it changes, then imaginary numbers are physically real. Unless changed, imaginary numbers are physically unreal. Unlike very complex research at the Large Hadron Collider, in such a simple experiment it is impossible to make a mistake. Therefore, all engineers who have held a soldering iron in their hands know the answer to this question - in this experiment, the electric current always changes. And this most indisputably proves the physical reality of imaginary numbers not only in electrical engineering and radio engineering, but also in physics and all other sciences.

And if the statement of SRT, studied in physics textbooks, about the physical unreality of imaginary numbers turned out

to be true, then Ohm's law in the interpretation of Steinmetz and his theory of linear electrical circuits of alternating current would have to be recognized as incorrect. And therefore, there should therefore be no radio, electrical, or computer technology. But they exist and by their existence they prove the physical reality of imaginary numbers.

The principle of not exceeding the speed of light is refuted by the existence of oscillatory transient processes

The fact is that the solution to any differential equations describing processes in linear electrical circuits, which are a very convenient object of experimental research, always contains two terms, called the forced and transition components. The forced component, as its name suggests, arises due to an external influence on the electric *LCR*-circuit under study. In this case, almost always the initial value of the forced component of the response to an external influence, determined by the mathematical solution of the differential equation, turns out to be non-zero. And because of this, a transition component also appears in the response to external influence, which, summed with the forced component, makes the initial state of the response zero.

And this transition component is very easy to find. First, an algebraic so-called characteristic equation is solved, the order and coefficients of which are equal to the order and coefficients of the original differential equation. For example, second order

$$ap^2 + bp + c = 0 \quad (1)$$

where a , b , c are constant coefficients of the original differential equation;

p is the so-called complex frequency.

This equation is then solved, resulting in the two roots p_1 and p_2 of this quadratic equation. And depending on their magnitude, it is determined what the transition process will be. It can be of only three types:

$$\text{if } p_1 = -\sigma_1 \text{ and } p_2 = -\sigma_2, \text{ then } U = Ae^{-\sigma_1 t} + Be^{-\sigma_2 t} \quad (2a)$$

$$\text{if } p_{1,2} = -\sigma_0, \text{ then } U = (A+Bt) e^{-\sigma_0 t} \quad (2b)$$

$$\text{if } p_{1,2} = -\sigma_0 \pm j\omega_0, \text{ then } U = e^{-\sigma_0 t} [A \cos(\omega_0 t) + B \sin(\omega_0 t)] \quad (2c)$$

where U is the forced component of the response of the electric *LCR*-circuit to external influence,

and the quantities A and B are the so-called integration constants, which are found from the initial conditions.

And as you can see, aperiodic (2a) and borderline (2b) transient processes exist under any circumstances. Oscillatory transient processes can exist only under the condition that imaginary numbers actually physically exist [36]-[42]. But oscillatory transients do actually exist. These include, for example, shock oscillations such as tsunamis, the ringing of church bells, piano music, and swings swinging on playgrounds. This proves the physical reality of imaginary numbers.

The principle of not exceeding the speed of light is refuted by the existence of resonance

The third proof [43]-[54] of the physical reality of imaginary numbers using resonance is the most difficult. And therefore, it will take more time from the reader. Because of this, also despite the fact that the phenomenon of resonance was discovered by Galileo Galilei back in 1602 [55], a correct theory of resonance still does not exist. And only in 1916, the professor of the Imperial Moscow Technical School, Karl Adolfovich Krug,

⁹ And Albert Einstein received his Nobel Prize in Physics in 1921 for the discovery of the photoelectric effect and for other work in the field of theoretical physics that had nothing to do with SRT

proposed a mathematical description of this phenomenon in electrical circuits using approximate formulas, given in his electrical engineering textbook. Which was later included in all electrical and radio engineering textbooks.

But this description is not flawless. Indeed, in all these textbooks it is written that in second order *LCR*-electrical circuits resonance has the following signs:

- there is one single resonant frequency, which is measured by a real number;
- at this resonant frequency the modulus of complex resistance (or conductivity) takes on an extreme value;
- at the same resonant frequency, the imaginary component of the complex resistance (or conductivity) takes on a zero value;
- there is a single frequency of free vibrations, which is also measured in a real number, and which is equal to the resonant frequency.

However, in fact, resonance only exhibits such signs in electrical *LC*-circuits, which are of limited practical interest. And when analyzing resonance in electrical *LCR*-circuits, it is always tacitly assumed that all the same signs of resonance are valid for it as in electrical *LC*-circuits. In reality, this never happens in *LCR*-circuits. The indicated signs of resonance in *LCR*-circuits correspond to reality only approximately, that is, when using approximate formulas and inaccurate measurements. And it is precisely with the use of only such approximate formulas that the theory of resonance is always presented in textbooks

In fact, if the corresponding exact formulas are derived for second-order electrical *LCR*-circuits, it turns out that all of

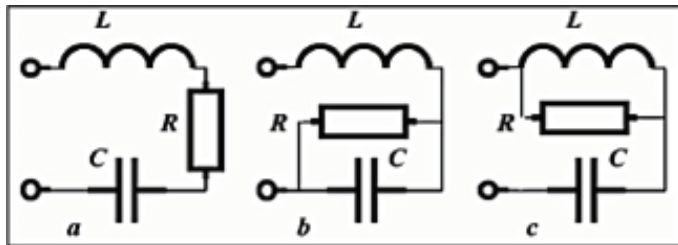


Fig. 1. The simplest electrical *LCR*-circuits

the above signs of resonance are incorrect. In most cases, two different resonant frequencies corresponding to each sign of resonance in the same electrical circuit will be obtained. And the formulas for resonant frequencies for different electrical *LCR*-circuits will also turn out to be different. Finally, resonant frequencies will never be equal to the frequencies of free vibrations. Consequently, it turns out that a correct theory of resonance still does not exist.

Let's see for ourselves. In Fig. 1 shows three simplest electrical *LCR*-circuits containing a minimum number of elements. Let's analyze one of them. For example, shown in Fig. 1b. Its complex resistance is

$$Z(j\omega) = L \frac{\omega \frac{1}{RC} + j\left(\omega^2 - \frac{1}{LC}\right)}{\omega - j \frac{1}{RC}} = L \frac{\omega 2\sigma_0 + j(\omega^2 - \omega_0^2)}{\omega - j 2\sigma_0} \quad (3)$$

$$\text{where } \omega_0 = 1/\sqrt{LC}; \quad 2\sigma_0 = 1/RC$$

The modulus of the complex resistance of this series oscillating *LCR*-circuit is equal to

$$|Z(j\omega)| = L \sqrt{\frac{4\sigma_0^2 \omega^2 + (\omega^2 - \omega_0^2)^2}{\omega^2 + 4\sigma_0^2}} \quad (4)$$

By examining its radical expression for an extremum, i.e. solving the equation

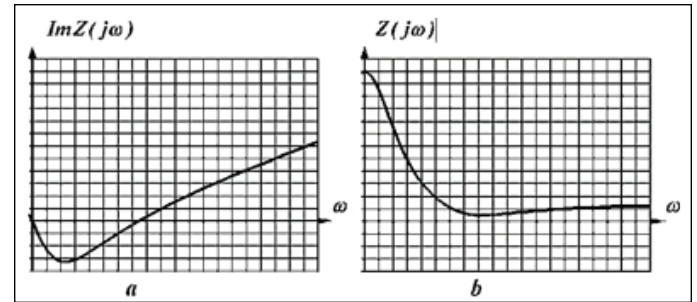


Fig. 2. Frequency characteristics of the serial oscillatory *LCR* circuit shown in Fig. 1b, which has two points of intersection of the function $\text{Im}Z(j\omega)$ with the axis ω and two extrema of the function $|Z(j\omega)|$. Therefore, the electrical *LCR* circuit under study has two resonant frequencies, corresponding to both the first and second signs of resonance

$$\frac{2\omega[\omega^4 + 8\sigma_0^2 \omega^2 + (16\sigma_0^4 - 8\sigma_0^2 \omega_0^2 - \omega_0^4)]}{(\omega^2 + 4\sigma_0^2)^2} = 0 \quad (5)$$

we find two resonant frequencies (since the graph in Fig. 2b has two extrema), corresponding to the first sign of resonance

$$\begin{aligned} \omega'_{res2} &= 0 \\ \omega''_{res2} &= \sqrt{\omega_0 \sqrt{\omega_0^2 + 8\sigma_0^2} - 4\sigma_0^2} = \omega_0 \frac{\sqrt{Q\sqrt{Q^2 + 2} - 1}}{Q} \neq \omega_0 \end{aligned} \quad (6)$$

And equating its imaginary component to zero, we find another set of two resonant frequencies (since the graph in Fig. 2a has two points of intersection with the axis ω) corresponding to the second sign of resonance

$$\begin{aligned} \omega'_{res1} &= 0 \\ \omega''_{res1} &= \sqrt{\omega_0 - 4\sigma_0^2} = \omega_0 \frac{\sqrt{Q^2 - 1}}{Q} \neq \omega_0 \end{aligned} \quad (7)$$

The resulting graphs (Fig. 2) are explained as follows. At frequencies ω , lower than the resonant frequencies ω'_{res1} and ω''_{res2} , the predominant value is the capacitive reactance, which at $\omega \rightarrow 0$ takes on an infinitely large value. But since a resistor R is connected in parallel with the capacitor C , their resulting resistance at becomes almost equal R . Therefore, the resistance $|Z(j\omega)|$ at $\omega \rightarrow 0$ becomes equal to R , as a result of which at this frequency $\text{Im}Z(j\omega) \rightarrow 0$ (Fig. 2a), and $|Z(j\omega)|$ has an extremum (Fig. 2b). At frequencies higher than the resonant frequencies ω'_{res1} and ω''_{res2} , the capacitive resistance at becomes significantly smaller in magnitude than the resistor R . Therefore, the shunting effect of the resistor no longer appears and the nature of the change in $\text{Im}Z(j\omega)$ and $|Z(j\omega)|$ turns out to be the same as in the *LC*-circuit.

But why there were two resonant frequencies corresponding to each sign of resonance, and why these resonant frequencies ω'_{res1} and ω''_{res2} , corresponding to different signs of resonance, turned out

to be different in the electrical LCR -circuit under consideration, the existing theory of resonance at real frequencies cannot explain.

Further, for the same electrical LCR -circuit shown in Fig. 1b, we also find the frequency of free oscillations. The processes in it are described by the differential equation indeed, not equal to any of the found resonant frequencies.

$$\frac{1}{L} \frac{dU(t)}{dt} + \frac{U(t)}{LCR} = \frac{d^2 I(t)}{dt^2} + \frac{1}{RC} \frac{dI(t)}{dt} + \frac{I(t)}{LC} \quad (8)$$

The corresponding characteristic algebraic equation has the form

$$p^2 + \frac{1}{RC} p + \frac{P}{LC} = p^2 + 2\sigma_0 p + \omega_0^2 = 0 \quad (9)$$

whose roots are equal $p_{1,2} = -\sigma_0 \pm j\sqrt{\omega_0^2 - \sigma_0^2}$

Therefore, the frequency of free oscillations turns out to be equal to

$$\omega_{free} = \text{Im } p_{1,2} = \sqrt{\omega_0^2 - \sigma_0^2} = \omega_0 \frac{\sqrt{4Q^2 - 1}}{2Q} \neq \omega_0 \quad (10)$$

This situation is in no way consistent with common sense. It is not at all clear why the same phenomenon - resonance - when viewed from different points of view, leads to the existence of different resonant frequencies. Moreover, they are not equal to the frequency of free vibrations. Moreover, as is easy to see, similar results are obtained from the study of other electrical LCR -circuits. But the attempt [56] made by Leonid Isaakovich Mandelstam in 1932 to explain this situation was unsuccessful. And since then there have been no more people willing to explain it.

Table 1. Resonant frequencies corresponding to different signs of resonance for the linear electrical LCR circuit under study

Q	$\omega_{free}^{(10)}$	$\omega_{res1}'' / \omega_0 \quad (7)$	$\omega_{res2}'' / \omega_0 \quad (6)$
2	0,9682458	0,8660254	0,9872917
3	0,9860133	0,9428090	0,9972114
4	0,9921567	0,9682458	0,9990797
5	0,9949874	0,9797959	0,9996152
6	0,9965217	0,9860133	0,9998123
7	0,9974457	0,9897433	0,9998979
8	0,9980450	0,9921567	0,9999399
9	0,9984556	0,9938080	0,9999624
10	0,9987492	0,9949874	0,9999752
20	0,9996875	0,9987492	0,9999984
30	0,9998611	0,9994443	0,9999997
40	0,9999219	0,9996875	0,9999999
50	0,9999500	0,9998000	1,0000000
60	0,9999653	0,9998611	1,0000000
70	0,9999745	0,9998980	1,0000000
80	0,9999805	0,9999219	1,0000000
90	0,9999846	0,9999383	1,0000000
100	0,9999875	0,9999500	1,0000000

It should be noted, however, that the differences between the resonant frequencies ω_{res1}'' and ω_{res2}'' as well as the frequency of free oscillations ω_{free} and the frequency ω_0 revealed during the

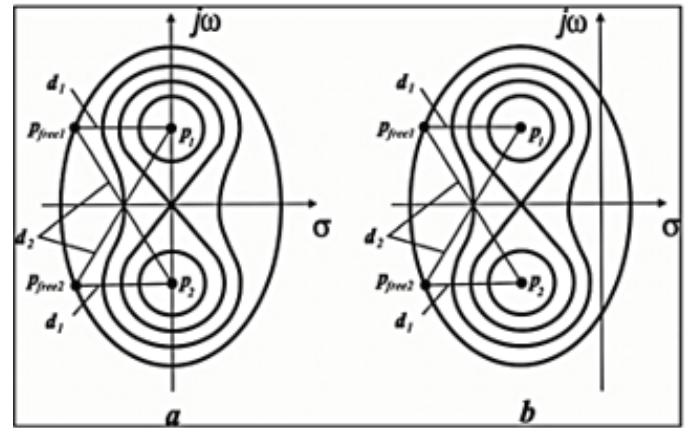


Fig. 3. Cassini ovals, which prove that resonance exists precisely at complex frequencies. Indeed, as can be seen, the value $d \rightarrow 0$ only under the condition that $p_{1,2} \rightarrow p_{free1,2}$, i.e. when approaching due to $d_1 \rightarrow 0$ complex frequencies of influence and free damped oscillations.

study of oscillatory LCR -circuits, are relatively very small (see Table 1¹⁰) and do not exceed the experimental error. Therefore, this circumstance eluded the attention of engineers for a long time. Or, as it seemed to them, it was of no practical interest. However, the detected differences in resonant frequencies exist and require an explanation.

From which, by the way, it is clearly seen that these differences are really very small and there is no point in taking them into account in practical engineering activities. In science, it sometimes happens that barely noticeable and laboriously obtained refinements of experimental results lead to serious theoretical consequences. For example, Cherenkov radiation was discovered in a similar way [56], for the discovery and explanation of which Pavel Alekseevich Cherenkov, Igor Evgenievich Tamm and Ilya Mikhailovich Frank received the Nobel Prize in 1958.

Therefore, let us ask ourselves a simple question - what is the real reason for the resonance? To answer the question posed, consider the formula (4) obtained above, obtained for the one shown in Fig. 1b electrical LCR circuit. And let's compare it with similar formulas that can be obtained for electrical LCR circuits shown in Fig. 1a and Fig. 1c.

$$|Z(j\omega)| = L \sqrt{\frac{4\sigma_0^2 \omega^2 + (\omega^2 - \omega_0^2)^2}{\omega^2 + 4\sigma_0^2}} \quad (4a)$$

$$|Z(j\omega)| = L \sqrt{\frac{4\sigma_0^2 \omega^2 + (\omega^2 - \omega_0^2)^2}{\omega^2}} \quad (4b)$$

$$|Z(j\omega)| = \frac{1}{C} \sqrt{\frac{4\sigma_0^2 \omega^2 + (\omega^2 - \omega_0^2)^2}{\omega^2 (\omega^2 + 4\sigma_0^2)}} \quad (4c)$$

It is easy to see that information about the root cause of resonance is contained in the expression $4\sigma_0^2 \omega^2 + (\omega^2 - \omega_0^2)^2$, which can be rewritten as $4\sigma_0^2 \omega^2 + (\omega^2 - \omega_{free}^2 - \sigma_0^2)^2$

And it turns out that this same expression appears in the Cassini oval equation [57], [58].

10 From which, by the way, it is clearly seen that these differences are really very small and there is no point in taking them into account in practical engineering activities

$$4\sigma_0^2\omega^2 + (\omega^2 - \omega_{free}^2 - \sigma_0^2)^2 = d^4 \quad (11)$$

which can be written in the form

$$\begin{aligned} & [j\omega - (-\sigma_0 + j\omega_{free})] \times [-j\omega - (-\sigma_0 - j\omega_{free})] \times \\ & [j\omega - (-\sigma_0 - j\omega_{free})] \times [-j\omega - (-\sigma_0 + j\omega_{free})] = \\ & (p_1 - p_{free1})(p_2 - p_{free2})(p_1 - p_{free2})(p_2 - p_{free1}) = d_1^2 d_2^2 = d^4 \end{aligned} \quad (12)$$

where $p_{free1,2}$ – complex conjugate frequencies of free sinusoidal oscillations in the LCR-circuit under study;

$p_{l,2}$ – complex conjugate frequencies of sinusoidal oscillations of influence.

The last expression completely explains the geometric meaning of the Cassini ovals, which, as can be seen (Fig. 3a), represent the geometric locus of points $p_{free1}(-\sigma_0 + j\omega_{free})$ и $p_{free2}(-\sigma_0 - j\omega_{free})$ on the complex plane $\sigma, j\omega$, the product of the squares of the distances d_1^2 и d_2^2 from two other points $p_l(0, +j\omega)$ и $p_2(0, -j\omega)$ is a constant quantity equal to d^4 .

And in Fig. 3b, corresponding to the Cassini ovals

$$\begin{aligned} & (p_1 - p_{free1})(p_2 - p_{free2})(p_1 - p_{free2})(p_2 - p_{free1}) = \\ & [-\sigma + j\omega - (-\sigma_0 + j\omega_{free})] \times [-\sigma - j\omega - (-\sigma_0 - j\omega_{free})] \\ & \times [-\sigma + j\omega - (-\sigma_0 - j\omega_{free})] \times [-\sigma - j\omega - (-\sigma_0 + j\omega_{free})] = \\ & = d_1^2 d_2^2 = d^4 \end{aligned} \quad (13)$$

The physical image of points $p_{free1}(-\sigma_0 + j\omega_{free})$ и $p_{free2}(-\sigma_0 - j\omega_{free})$ are free damped oscillations, and the physical image of the points $p_l(-\sigma, +j\omega)$ и $p_2(-\sigma, -j\omega)$ – input undamped oscillations, we can conclude that resonance in LCR-circuits is always

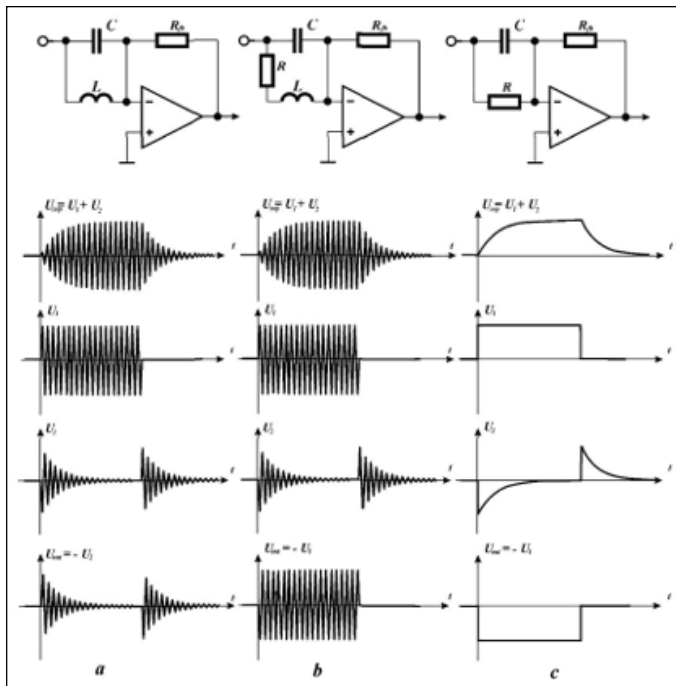


Fig. 4. As can be seen, these complex-frequency filters reliably distinguish between exponential and rectangular radio pulses and video pulses whose spectra overlap significantly. Consequently, this task cannot be accomplished using real-frequency filters.

due to a decrease in the value of d^4 . Those condition that it is the complex frequencies p_1, p_2 и p_{ca1}, p_{ca2} equal to each other. Consequently, true resonance exists not at real frequencies, but at complex frequencies. And this is another proof of the physical reality of imaginary numbers.

Thus, from the already flawlessly correct theory of resonance given above, it follows that resonance actually exists at complex frequencies and these complex resonant frequencies are physically real.

Experimental evidence of resonance at complex frequencies

The description of resonance at complex frequencies presented in the previous sections — owing to the use of more complex mathematical reasoning than in the preceding two sections — may appear less convincing and raise doubts regarding its physical validity. Therefore, we present experimental evidence for the actual physical existence of resonance at complex frequencies.

To do this, let us consider several filter circuits. In the circuit shown in Fig. 4a, a parallel LC-circuit is connected to the inverting input of the operational amplifier. The transfer function of this electrical circuit is

$$k(p) = -R_{fb}C \frac{p^2 + \omega_0^2}{p} \quad (14)$$

where p is the complex frequency;

ω_0 is the resonant frequency of the electrical LC-circuit;

C is the capacitance of the capacitor in the resonant circuit;

L is the inductance of the inductor in the resonant circuit;

R_{fb} is the resistance of the feedback resistor connected between the output and the inverting input of the operational amplifier.

Therefore, when an impulse radio signal with strained $U_{inp}(t)$ is fed into this circuit, we receive a signal at the exit in the form of exponential radio pulses $U_2(t)$. This is because such an input signal $U_{inp}(t)$ is actually the sum of two signals of a sinusoidal radio pulse with round fronts $U_1(t)$ at complex-coupled frequencies $p = \pm j\omega_0$ and an exponential radio pulse $U_2(t)$ at complex-coupled frequencies $p = -\sigma_0 \pm j\omega_0$. But the value of the transducer function of the investigated circuit at complex-coupled frequencies $p = -\sigma_0 \pm j\omega_0$ is zero. Therefore the sinusoidal radio pulse $U_1(t)$ does not pass to the exit. The value of the transmission function at complex-coupled frequencies $p = -\sigma_0 \pm j\omega_0$ is not equal to zero. This explains why only inverted exponential radio pulses pass at the exit, i.e., $U_{out}(t) = -U_2(t)$.

In the electrical circuit shown in Fig. 4b, conversely, rectangular radio pulses $U_1(t)$ pass to the output, whereas exponential radio pulses $U_2(t)$ do not, since its transfer function has the form

$$k(p) = -R_{fb}C \frac{p^2 + 2\sigma_0 p + \omega_0^2}{p} \quad (15)$$

Therefore, at the complex-conjugate frequencies. $p = -\sigma_0 \pm j\omega_0$, this transfer function is zero, i.e., $k(-\sigma_0 \pm j\omega_0) = 0$, whereas at the complex-conjugate frequencies $p = \pm j\omega_0$, it is non-zero, i.e. $k(0, \pm j\omega_0) \neq 0$, which explains the result obtained

As can be seen, in both electrical circuits the desired result is achieved by tuning the input res-onant circuit—connected to the inverting input of the operational amplifier—to resonate at the

frequency of the signal that is to be blocked from reaching the output. Consequently, both of the electrical circuits considered are complex-frequency filters. Moreover, these are filters that achieve a result which would be impossible using known real-frequency filters, as the Fourier spectra of the rectangular radio pulse $U_1(t)$ and the exponential radio pulse $U_2(t)$ overlap significantly.

It is interesting to note that a similar result can be obtained by using video pulses instead of radio pulses. Indeed, the transfer function of the electrical circuit shown in Fig. 4c, in which a parallel electrical RC-circuit is connected to the inverting input of the operational amplifier, is equal to

$$k(p) = -R_b C(p + \sigma_0) \quad (16)$$

where $\sigma_0 = 1/RC$.

Therefore, when video pulses U_{inp} with prolonged edges are applied to its input, we obtain video pulses U_{out} with steep edges at the output. This occurs because such an input signal is in fact the sum of two signals, $U_{inp} = U_1(t) + U_2(t)$, i.e. rectangular video pulses with steep edges $U_1(t)$ at the complex frequency $p = 0$ and exponential video pulses $U_2(t)$ at the complex frequency $p = -\sigma_0$. However, the magnitude of the transfer function of the circuit under consideration at the complex frequency $p = -\sigma_0$ is zero, and therefore the exponential video pulses $U_2(t)$ do not pass through to the output. At the same time, the magnitude of the

frequency $p = -\sigma_0$. Similarly, there is resonance at frequencies $p = \pm j\omega_0$ in the LC-circuit connected to the inverting input of the operational amplifier in Fig. 4a, and resonance at frequencies $p = -\sigma_0 \pm j\omega_0$ in the LCR-circuit connected to the inverting input of the operational amplifier in Fig. 4b, and this proves the existence of resonance at all complex frequencies $p = \pm j\omega_0$, $p = -\sigma_0 \pm j\omega_0$, $p = -\sigma_0$, and, consequently, the physical reality of imaginary numbers.

Other evidence of the physical reality of imaginary numbers

Other proofs of the physical reality of imaginary numbers have also been published [59]–[62]

An alternative version of an incorrect SRT in which the principle of not exceeding the speed of light would be unnecessary

The authors of SRT missed the opportunity to create an alternative version of STR that does not require the use of the principle of not exceeding the speed of light. And, therefore, not requiring proof that imaginary numbers are physically unreal. And as a temporary version, until a corrected version of SRT is created, it would be the best substitute for the version currently used in physics textbooks.

In such an alternative version of SRT, in order to get rid of the need to explain inexplicable relativistic formulas in the range of hyperluminal speeds $v > c$, one could use the fact that in the expression $m(v)$ (14) these relativistic formulas

$$m = \frac{m_0}{\sqrt{1 - (v/c)^2}} \quad (17)$$

$$\Delta t = \Delta t_0 \sqrt{1 - (v/c)^2} \quad (18)$$

$$l = l_0 \sqrt{1 - (v/c)^2} \quad (19)$$

where m_0 is the rest mass of a moving body;

m is the relativistic mass of a moving body;

Δt_0 is the rest time of a moving body;

Δt is the relativistic time of a moving body;

l_0 is the rest length of a moving body;

l is the relativistic length of a moving body; v – speed of movement of a moving body; c – speed of light

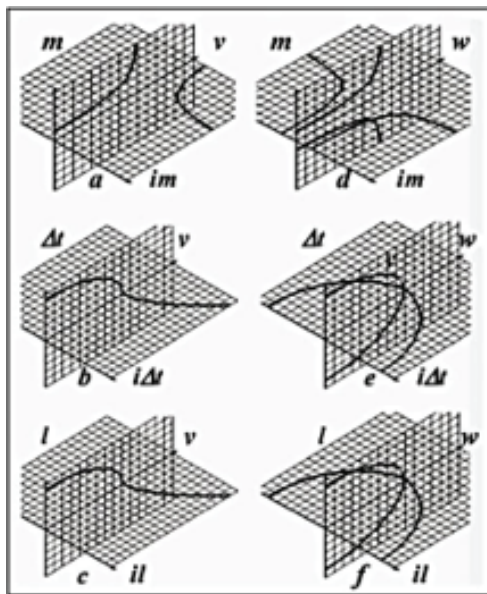


Fig. 5. Graphs of functions $\Delta t(v)$ and $l(v)$, corresponding to the generally accepted incorrect and corrected versions of SRT in the subluminal $v < c$ and hyperluminal $v > c$ speed ranges

transfer function of the same circuit at the complex frequency $p = 0$ is not zero. Consequently, inverted square-wave video pulses with steep edges, $U_1(t)$, pass through to the output. This result cannot be explained by the theory of electrical circuits at real frequencies, since the Fourier spectra of the signals $U_1(t)$ and $U_2(t)$ overlap; therefore, these signals cannot be separated by real-frequency filters. This result proves the existence, in the electrical RC-circuit connected to the inverting input of the operational amplifier in Fig. 4c, of resonance at the complex

describe an unstable process that cannot exist in nature. indeed, if a material body located at any point on the graph of this function (see Fig. 5a) in the range $v > c$, for some reason, reduces the speed of its movement in space, then its mass will increase. And therefore, with a constant magnitude of force influencing this body to move, its speed will decrease even more. Which will lead to a further increase in its mass. Etc. And if the same body somehow accidentally increases the speed of its movement in space, its mass will decrease. And this will lead to a further increase in its speed. In other words, if for any reason this material body leaves its initial position on the graph of the relativistic formula (15), it will not return to this position. Consequently, any position of a material body in the range $v > c$

is unstable. Therefore, this graph interval cannot exist in nature.

However, in the next section it will be proven that this version of SRT is also incorrect.

Corrected version of STO

Introduction

From the relativistic formulas (17)-(19) given in physics textbooks it follows that the argument v in them, in accordance with Newton's first law, is the fourth (in addition to length, width and height) spatial dimension [63]-[71]. And, therefore, in nature, in addition to our visible universe, there are mutually invisible universes located in other dimensions. Thus, refuting the version of STR studied in physics textbooks, which states that our visible universe is the only one. Therefore, in order to take this circumstance into account, the graphs of these relativistic formulas $m(v)$, $\Delta t(v)$ and $l(v)$ (in Fig. 5a,b,c) must be corrected as shown in Fig. 5d,e,f, i.e. in the sublight and hyperlight speed ranges they should be the same. And to do this, it is necessary to introduce the factor¹¹ i^q into formulas (17)-(19)

$$m(q) = \frac{m_0 i^q}{\sqrt{1 - (v/c - q)^2}} = \frac{m_0 i^q}{\sqrt{1 - (w/c)^2}} \quad (20)$$

$$\Delta t(q) = \Delta t_0 i^q \sqrt{1 - (v/c - q)^2} = \Delta t_0 i^q \sqrt{1 - (w/c)^2} \quad (21)$$

$$l(q) = l_0 i^q \sqrt{1 - (v/c - q)^2} = l_0 i^q \sqrt{1 - (w/c)^2} \quad (22)$$

where $w = v - qc$ is the local speed in all universes;

$q(v) = [v/c]$ – discrete mathematics function “floor” from the argument v/c ;

But since the fourth spatial dimension v is a vector quantity in three-dimensional space, formulas (20)-(22) can be corrected again¹². To do this, three factors i^q , i^r and i^s must be introduced

$$m(q, r, s) = \frac{m_0 i^q i^r i^s}{\sqrt{1 - [v/c - (q + r + s)]^2}} \quad (23)$$

$$\Delta t(q, r, s) = \Delta t_0 i^q i^r i^s \sqrt{1 - [v/c - (q + r + s)]^2} \quad (24)$$

$$l(q, r, s) = l_0 i^q i^r i^s \sqrt{1 - [v/c - (q + r + s)]^2} \quad (25)$$

where $q(v) = [v/c]$ is the “floor” function of discrete mathematics from the argument v/c , corresponding one of the orthogonal components of the fourth spatial dimension v ;

$r(v) = [v/c]$ – discrete mathematics “floor” function of the argument v/c , corresponding to another orthogonal component of the fourth spatial dimension v ;

$s(v) = [v/c]$ – discrete mathematics “floor” function of

¹¹ In the theory of functions of a complex variable, the function i^q is defined only for integer values of the argument q . However, it can be further defined as follows. For integer values of the argument

... -2, -1, 0, +1, +2, +3, +4, +5, ... the function i^q is equal to ... -1, -i, +1, +i, -1, -i, +1, +i, ... But for the same integer values of the argument ... -2, -1, 0, +1, +2, +3, +4, +5, ... to the same values ... -1, -i, +1, +i, -1, -i, +1, +i, ... is also equal to the function $e^{iq\pi/2}$, which, in accordance with Euler's formula $e^{iq\pi/2} = \cos(q\pi/2) + i\sin(q\pi/2)$, is also defined for non-integer values of the argument q . Therefore, the function i^q can be further defined for any values of the argument q by the formula $i^q = \cos(q\pi/2) + i\sin(q\pi/2)$, similar to Euler's formula. This formula will allow you to determine the value of the function i^q for any, including non-integer values of the argument q . And it will be needed in astrophysical studies of portals, which will be discussed further.

¹² Both formulas (17)-(19) and formulas (20)-(22) are correct, since the speed v can be called the fourth and fourth-sixth additional spatial dimension

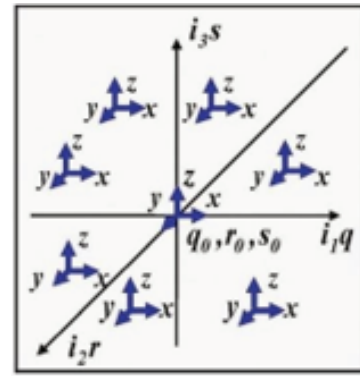


Fig. 5. Six-dimensional space of the hidden Multiverse, where q, r, s are the coordinates of mutually invisible parallel universes and antiuniverses, and x, y, z are the coordinates of the material contents of these parallel universes and antiuniverses

the argument v/c , corresponding to the third orthogonal component of the fourth spatial dimension v ;

v, v_r, v_s – projections of the velocity vector v onto the orthogonal coordinates q, r, s (see Fig. 5).

This function i^q (as well as the functions i^r and i^s) in formulas (23)-(25), which determines the essence of each universe, for integer values of the argument $q(v)$, equal to ... 0, 1, 2, 3, 4, 5, ..., sequentially takes the values ..., +1, +i, -1, -i, +1, +i, ..., etc. Its value $q(v) = 0$ ¹³ in formulas (23)-(25) for the range of sublight speeds $v < c$ corresponds (since $i^0 = 1$) to our visible universe, which for definiteness we will call the tardyon universe¹⁴. The value $q(v) = 1$ in the hyperluminal speed range $2c > v > c$ corresponds (since $i^1 = i$) some other and already invisible universe, since it is located beyond the event horizon. For definiteness, we will therefore call it the tachyon universe¹⁵. Then the value $q(v) = 2$ in the speed range $3c > v > 2c$ will correspond (since $i^2 = -1$) to an invisible tardyon anti-universe¹⁶. The value $q(v) = 3$, in the speed range $4c > v > 3c$ will correspond (since $i^3 = -i$) to an invisible tachyon antiverse. The value $q(v) = 4$ in the speed range $5c > v > 4c$ will correspond (since $i^4 = +1$) to another (and therefore also invisible) tardyonic universe. The value $q(v) = 5$ in the speed range $6c > v > 5c$ will correspond (since $i^5 = +i$) to another tachyon universe. Etc.

Consequently, in nature there exist not only, as stated in the generally accepted version of SRT, our visible universe corresponding to formulas (17)-(19), but also many other mutually invisible¹⁷ universes corresponding to formulas (23)-(25). And these mutually invisible universes, together with our visible universe, form the invisible Multiverse [72]-[79], which we therefore called hidden.

Explanation of the phenomena of dark matter and dark energy

Therefore, having explained the meaning of the basic concepts we need, it would seem that it is time to find out what the structure of the hidden Multiverse is. However, at present, no explanation of the structure of the Multiverse can be

¹³ If we start counting the value of q from our visible universe.

¹⁴ The term “tardion universe” is borrowed from Isaac Asimov's short story “Take a Match.”

¹⁵ The term “tachyon universe” is borrowed from Isaac Asimov's short story “Take a Match.”

¹⁶ This is a kind of cosmic antipode of another universe

¹⁷ Since they are all beyond the event horizon for us

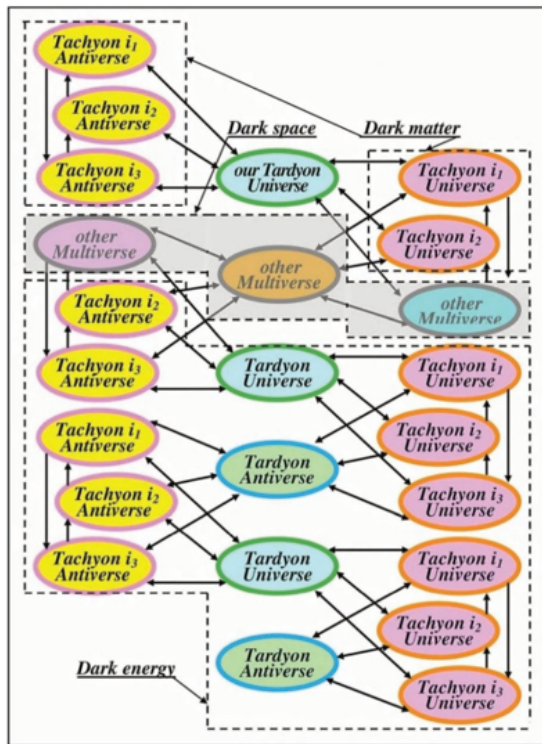


Fig. 6. Example of a hidden Multiverse structure

considered any convincing if it does not explain the phenomena of dark matter and dark energy discovered in the 20th century. Which are so named because of their incomprehensibility [80]-[85], since not a single chemical element has been found in them, and also because they do not emit, absorb, reflect or refract electromagnetic radiation and, therefore, are invisible. And persistent searches for dark matter and dark energy, which account for more than 95% of all mass-energy contained in the hidden Multiverse, exclusively in the microcosm of our only visible universe at the Large Hadron Collider, are inconsistent with common sense.

A more plausible assumption would be that dark matter and dark energy are all but our visible universe, the mutually invisible universes and the antiuniverses of the hidden Multiverse. In this case, dark matter is the invisible universes and antiuniverses neighboring our visible universe, and dark energy is the remaining invisible universes and antiuniverses of the hidden Multiverse. Therefore, the phenomena of dark matter and dark energy will be a gravitational shadow¹⁸ on our visible universe from the remaining mutually invisible universes and antiuniverses included in the hidden Multiverse. This assumption explains all the incomprehensibility of the phenomena of dark matter and dark energy simply and clearly. That's why we will use it.

Then, assuming that over the billions of years of its existence, the mass-energy of all universes and antiuniverses of the hidden Multiverse, due to the presence of a huge number of portals between them according to the law of communicating vessels, has been largely averaged, it becomes possible, using the data obtained by the WMAP and Planck spacecraft, to determine the structure of the hidden Multiverse. And according to data obtained by the WMAP spacecraft [86], the mass-energy of our

visible universe (in fact, our hidden Multiverse) consists of 4.6% baryonic matter, 22.4% dark matter and 73.0% dark energy. And according to more recent data obtained by the Planck spacecraft [87], the mass-energy of our visible universe (again, in fact, our hidden Multiverse) consists of 4.9% baryonic matter, 26.8% dark matter and 68.3% dark energy. As you can see, these data differ little from each other, which proves their truth. Therefore, it is permissible to assert that:

- our hidden Multiverse, according to data obtained by the WMAP spacecraft, consists of $100\% / 4.6\% = 21.8^{19}$ parallel universes and antiuniverses, and according to data obtained by the Planck spacecraft, it consists of $100\% / 4.9\% = 20.4$ parallel universes and antiuniverses;
- dark matter, according to experimental data obtained by the WMAP spacecraft, consists of $22.4\% / 4.6\% = 4.9$ parallel universes and antiuniverses, and according to data obtained by the Planck spacecraft, it consists of $26.8\% / 4.9\% = 5.5$ parallel universes and antiuniverses;
- dark energy, according to experimental data obtained by the WMAP spacecraft, consists of $73.0\% / 4.6\% = 15.9$ parallel universes and antiuniverses, and according to data obtained by the Planck spacecraft, it consists of $8.3\% / 4.9\% = 13.9$ parallel universes and antiuniverses;
- and our visible universe, naturally, is only one.

Structure of the hidden Multiverse

Figure 6 gives an example corresponding to the results of these calculations, a possible structure of the hidden Multiverse [88]. In this structure, the hidden Multiverse distribution of material content in each unseen and antiviral universe will be determined by some function $f_{q,r,s}(x,y,x)$, and the coordinates of these universes are i_q, i_r , and i_s .

I.e., such a hidden multiverse will be six-dimensional (see figure 6) and would be described by a quaternion $f_{q,r,s}(x,y,x) + i_q + i_r + i_s$, where the imaginary units i_1, i_2, i_3 are related by ratios [89]

This is what Lisa Randall²⁰ predicted: "We may be living in the three-dimensional pocket of a higher-dimensional space."

It follows from equations (23)–(25) that such a hidden multiverse has a helical structure, and its mutually invisible universes and anti-universes (apart from our visible universe) constitute dark matter and dark energy. In this context, it is possible to move from the tardion universe to the tardion anti-universe, and from the tardion anti-universe to the tardion universe, in various but not arbitrary ways; rather, only in such a way that the quantity i^q successively takes the values $+1, +i_1 \oplus i_2 \oplus i_3, -1, -i_1 \oplus i_2 \oplus i_3, +1, \dots$ and so on, where $\oplus$ denotes the logical operator 'exclusive OR' in discrete mathematics. In this context, different trajectories of movement from one universe (or anti-universe) to another may differ only by the substitution of certain tachyon universes from i_1, i_2, i_3 with others, and certain tachyon anti-universes from i_1, i_2, i_3 with others. Consequently, the tachyon universes i_1, i_2, i_3 in the hidden Multiverse are arranged in parallel to one another. The tachyon anti-universes i_1, i_2, i_3 are, for the same reasons, also

¹⁹ Naturally, the number of universes and antiuniverses is an integer, and a non-integer number was obtained only due to experimental errors, including due to failure to take into account unknown factors influencing the result of the experiment

²⁰ Lisa Randall is a professor in the Department of Physics at Harvard University, a member of the American Academy of Arts and Sciences, as well as the US National Academy of Sciences.

¹⁸ Therefore, they do not contain, like our shadow on a sunny day, a single chemical element.

arranged in parallel to one another. And so, in the hidden Multiverse, when transitioning from any tardion universe to a tardion anti-universe and then on to another tardion universe, parallel universes and anti-universes must alternate in the following sequence – ‘tardion universe’, ‘one of the tachyon universes’, ‘tardionanti-universe’, ‘one of the tachyon anti-universes’, ‘tardion universe’, ‘one of the tachyon universes’, and so on.

Moreover, the portals in such a structure of the Multiverse are not only bidirectional – corresponding to equation (26) and indicated by double-headed arrows but also unidirectional, corresponding to equations (27) and (28) and indicated by single-headed arrows. And since the structure of our hidden Multiverse, as shown in Fig. 6, is open in certain places, it is connected to other Multiverses at these points via the corresponding portals. Together, they all form the Hyperuniverse.

How to See Invisible Universes and Anti-universes

However, in science, any proof, even the most mathematically impeccable one, can be trusted only if it is experimentally confirmed. Nobel Prize winner Steven Weinberg spoke very clearly on this matter: “*Scientific theories cannot be created by purely mathematical reasoning*”. Such experimental proof of the existence of invisible parallel universes and anti-universes (adjacent to our visible Universe and shown in Fig. 6) can be obtained in the more than two hundred thousand anomalous zones existing on Earth [90]–[94], which serve as entrances to portals leading to planets in different star systems. Most portals likely lead to astronomical objects within our own Universe or even our Solar System. A smaller number of portals connect us to other universes and antiuniverses within the hidden Multiverse. Some portals may even link us to astronomical objects in other Multiverses within the Hyperuniverse. All these options are illustrated in Fig. 6. The classification of anomalous zones after astro-geophysical studies of the corresponding portals will help

Table 2. Flight performance specifications of certain business jets that can be used for time travel.

Aircrafts	Maximum range	Cruising speed	Hourly rates	Seats
Citation Latitude	5 300 km	815 km/h	3 500 €/hour	8
Citation Longitude	7 400 km	910 km/h	5 000 €/hour	12
Challenger 300	5 700 km	850 km/h	4 900 €/hour	8
Challenger 350	5 926 km	850 km/h	4 000 €/hour	9
Challenger 600	5 500 km	850 km/h	4 600 €/hour	12
Challenger 3500	6 297 km	985 km/h	5 500 €/hour	10
Falcon 20	4 200 km	987 km/h	3 900 €/hour	8
Falcon 50/50 EX	5 600 km	850 km/h	4 900 €/hour	8-10
Global 5500	10 927 km	900 km/h	8 000 €/hour	16
Gulfstream G150	5 200 km	850 km/h	3 900 €/hour	6-8
Gulfstream G200	5 000 km	870 km/h	6 200 €/hour	8
Hawker 850 XP	4 800 km	750 km/h	3 400 €/hour	6-8
Hawker 900 XP	5 400 km	865 km/h	3 700 €/hour	6-8
Hawker 4000	5 280 km	890 km/h	5 400 €/hour	10
Learjet 70	3 815 km	967 km/h	3 500 €/hour	7
Legacy 450	5 370 km	860 km/h	3 300 €/hour	8
Practor 600	7 400 km	850 km/h	6 000 €/hour	12

Table 3. The value of external time at different latitudes

Location of departure and arrival airfields	Geographic coordinates of the airfield	Size of 24 time zones for a round-the-world flight	Size of one time zone.
Santiago de Chile	33,45° S.	33422 km	1393 km
Buenos Aires	34,60° S.	33021 km	1375 km
Melbourne	37,82° S.	31339 km	1306 km
New York City	40,72° N.	30456 km	1269 km
Reykjavík (Iceland)	64,15° N.	17616 km	734 km
Murmansk (Russia)	69,58° N.	14424 km	601 km
Kirkenes (Norway)	69,73° N.	14376 km	599 km
Longyearbyen (Norway)	78,13° N.	8184 km	341 km
Alert (Canada)	82,5° N.	5230 km	218 km

determine where each portal leads.

And possible mistrust in the statement that anomalous zones are entrances to portals can be eliminated by astronomical observations [95]–[112] of the starry sky in anomalous zones. To do this, it will be necessary to compare on a computer maps of the starry sky observed in the anomalous zones and somewhere nearby outside the anomalous zones. Moreover, some observatories are already located in anomalous zones. Like, for example, the Main Astronomical Observatory of the National Academy of Sciences of Ukraine, which is located 12 km from the center of its capital, Kyiv, in the Goloseyevsky forest. And if such differences are discovered, this will be proof that the portal corresponding to this anomalous zone leads to another planet in our solar system or somewhere further. After all, the starry sky of all planets in all star systems is different..

Where are antimatter and anti-time located?

And now let's pay attention to another very poorly understood object of study in physics – antimatter [114]–[119]. The most interesting thing is that, despite the incomprehensibility, its existence is not denied. Moreover, in 1995, CERN scientists carried out a sensational experiment, as a result of which nine antihydrogen atoms were obtained, which lasted for about forty billionths of a second. And just one gram of such antihydrogen



Fig. 7. One of the business jets

would cost 662.5 trillion dollars. And thus the existence of antimatter in nature was experimentally proven. Where does it exist then? After all, all physics textbooks state that our only visible universe exists in nature. Nevertheless, it cannot exist in our visible universe, since due to its annihilation with matter, our universe would then cease to exist. But it must exist somewhere. This means that our universe is not the only one in nature.

Therefore, the experiment carried out at CERN can be considered another proof that the version of SRT taught in textbooks is incorrect.

And in accordance with formulas (23)-(25) of the corrected version of STR, antimatter in nature exists in the invisible tardyon and tachyon antiuniverses of the hidden Multiverse. Moreover, in these invisible tardyon and tachyon antiuniverses, anti-time also exists [119]-[127].

Time travels

The physical feasibility of time travels

Time travels, which until recently belonged to the genre of science fiction, as it turned out in the 21st century, is now feasible for people on Earth. Although they are according to the special theory of relativity studied in physics textbooks is possible only in some situations that are not of practical interest. And for people on Earth, such a possibility is forever categorically denied in textbooks. However, the corrected version of SRT²¹ [128]-[135] created in the XXI century claims that time travel for people on Earth is now quite feasible [136]-[149]. Nevertheless, these time travels are not currently used in any way due to the fact that, in accordance with the relativistic formulas of SRT (24) and (25), such time travel is inevitably associated with travel in space, and even over long distances. And from these formulas it follows:

$$\Delta t = \Delta t_0 (l / l_0) \quad (29)$$

where Δt is external²² time in hours;

$\Delta t_0 = 24$ hours, since there are 24 time zones on Earth;

l – path length in the direction perpendicular to time zones;

l_0 is the length of a circle intersecting 24 time zones at a given latitude.

Moreover, during airplane flights, this ratio is always satisfied, since airplanes during flights cross time zones that exist due to the rotation of the Earth around its axis. But this seemingly fatally insoluble problem of the inevitable correspondence of time travel to formula (29) is completely solvable, since in fact it is possible to travel in time, ignoring formula (29). To do this, it is only necessary during such trips to fly around the world around the north or south pole, landing at the same airfield from which the plane took off.

Indeed, in this case, the distance that the plane will ultimately fly from the airfield from which it took off will always be zero, regardless of the length and duration of the flight. In this case, the plane, since it will cross twenty-four time zones as a result of its round-the-world flight, will find itself one day in the past or in the future. And this technology makes time travels confidently possible. Even tomorrow, since everything

necessary for this is already there.

There are 22.000-24.000 privately owned small jet aircraft, called business jets, in operation on Earth (see Fig. 7). The flight performance characteristics of some business jets are shown in Table 2. They are used to transport according to individual orders with a high level of comfort for a limited number of passengers (usually from 6 to 20) - businessmen, high-ranking officials and other VIPs. And these business jets are quite suitable for time travel.

And since the round-the-world flights of business jets necessary for time travel must necessarily be carried out around the northern or southern poles, the most profitable shortest routes for such flights, naturally, should be laid as close to the north or south pole as possible (they are further from the south pole). And the airports closest to poles for such routes are given in Table 3.

Technical feasibility of time travels

When explaining time travel that is actually feasible on Earth, it is necessary to take into account the existence in nature, in addition to internal time, which we always use, also external time, which we have never used before. But now you have to use it. Moreover, these two different times are generated by different circumstances and have different characteristics. Internal time can be called biological time, since one second is one contraction of the human heart. And internal time cannot flow backwards. A person cannot return to his youth or childhood. External time is determined by processes occurring in the external environment. Namely, the rotation of the Earth and the existence of time zones. One revolution of the Earth corresponds to 24 time zones. And by changing the direction of our movement in space, we can move both into the past and into the future external time. Consequently, time travel is always movement only in external time.

But since there are no round-the-world flights in the history of aviation, let's mentally take such an air trip. Let us assume that two identical aircraft simultaneously took off from the same airfield with the aim of making their round-the-world trips (with refueling in the air or at intermediate airfields). Moreover, one of them always flies to the west, and the other to the east. And if we assume that the Earth does not rotate, i.e. There is no external time, then they will arrive at the same airfield from which they took off almost simultaneously, since they will fly the same distance at the same speed, without crossing time zones. Which do not exist on the still earth. It is also possible, on a stationary Earth, with the same two planes to make semicircular trips around the world and at the same time fly to the antipode airfield.

However, if such travel is made on a rotating Earth, then one of these planes will always fly into the past time, and the other into the future time, since they will cross time zones. And therefore, they will inevitably arrive at the same time (since they will spend internal time on flights of equal length) to airfields with the same name, but different, since yesterday's airfield and tomorrow's airfield will inevitably differ in some way. And therefore, they are not compatible. Moreover, these airfields exist in the past and future tense, regardless of whether we fly to them or not. Moreover, in the past and in the future, not only these airfields exist, but also other airfields, and all other cities, deserts, mountains, seas and oceans shown on the map. Those in the past and future there are parallel worlds in which you and I also find ourselves. And if we fly

21 Not recognized by official science (but not refuted by anyone), since it refutes the version of STR studied in physics textbooks

22 The concepts 'external time' and 'internal time' are explained below.

into the past and/or into the future, we will probably be able to meet ourselves. Moreover, these worlds in the past and future coexist with our world in the present time. Those. these worlds form a kind of unified whole, structured somehow differently than we now imagine our Earth to be.

And yet, although the airfield from which our plane departed in the present time and the airfields in the future and/or past time at which our planes will arrive are different, they will differ only slightly. Therefore, the space factor in such quasi-round-the-world flights will be reset to zero just as successfully as in round-the-world flights. Therefore, such flights would make time travel feasible.

And if you need to return now, you will simply need to fly along the same route in the opposite direction.

Commercial availability of time travels

And it's not difficult to verify all this. To do this, such time travel must actually be done.

Moreover, this opportunity is accessible, just as, for example, you can go to work not only by your own car, but also by public transport. For time travel, you also can use not only business jets, but planes on commercial flights.

Let's give an example of such time travel. But since, dear reader, neither the author, nor you, nor anyone else has ever flown around the world, we will make such an air trip in time mentally. Let's say you fly from New York to Tokyo and after landing you set your watch back 11 hours.

Then you flew from Tokyo to London and after landing, you set your watch back another 8 hours. Finally, after landing in London, you boarded a plane to New York. And after landing in New York, you once again set your watch back 5 hours. Thus, ultimately you will travel in external time into the past by $11 + 8 + 5 = 24$ hours, i.e. for a day. And this trip in external time will be quasi around the world, since you actually arrived not at the airfield from which you flew away, but at yesterday's airfield. And he's a little different. But all the flights you took were regular commercial ones. And your trip did not cause any surprise among other air passengers, since no one knew anything about your around-the-world intentions. However, you will eventually move back 24 hours,

i.e. took a real trip into the past.

And again we ended up in New York. But at a different time. You were convinced of this by buying a newspaper. Moreover, the newspaper seller knew nothing about the present time from which you arrived. None of the passers-by knew about this either. Then you called your home and agreed to meet with yourself. And we talked to ourselves. They also discussed how we could then maintain contact with each other. For example, by telephone through friends who live somewhere between the New York of today and the New York of yesterday. After all this, having made sure that you really visited yesterday's New York on the return flights New York-London, London-Tokyo and Tokyo-New York, you returned to your current New York.

And having convinced yourself of the feasibility of flights in time, you may also want to visit tomorrow's New York in order to also establish a connection with yourself, who lives there. So that, as a result together (i.e., together with your two copies in the future and in the past), you can make your life more successful.

Moreover, as time travel is mastered, sooner or later someone will inevitably realize that it can be done not only on airplanes,

but also via radio communication lines that everyone will use if they just need to transmit a message to the past and/or future time. And such round-the-world communication lines of time travels will certainly be created, which will make informational time travel quite accessible to people

Planet Earth is more complex than is explained by modern science

Such time travel will create many situations that are not obvious and incomprehensible to current human knowledge and life experience. Although, by observing the arrival of different planes at the airport at different times, we will never see problems in communication between the passengers arriving on these planes, as well as with the people who met them, due to the difference in arrival time. Nevertheless, it is clear that for residents of, for example, New York, Tokyo or London, located in today's, tomorrow's and/or yesterday's time, the material reality surrounding them will be somewhat different. Somewhere, for example, in yesterday's New York, unlike today's New York, a new subway station has not yet been opened, your car has not yet been repaired, and something else has not been done. Therefore, today's New York and yesterday's New York (as well as tomorrow's New York) are incompatible not only in time, but also in space, since they differ in many small details. Moreover, these two different New Yorks, to one of which one plane flew with you, and from the other another plane flew out with you, exist on Earth regardless of whether you flew into them or not. It is also clear that these two different New Yorks (as well as all other cities, countries and their inhabitants), nevertheless, are located on the same Earth. Then, it is obvious that our planet Earth is not at all what we and modern science imagine it to be like a globe [150]-[155]. In fact, this is some kind of three-dimensional (that is, volumetric) spiral structure²³ in the four-dimensional space we mentioned at the beginning of the article, the existence of which follows from Newton's first law. And our science now has to deal with the knowledge of this other world.

Moreover, this other world is quite possibly even much more complex - it may include, in addition to the above-mentioned worlds of yesterday and tomorrow, also the day before yesterday and other inhabited worlds that are more distant from our world today. And to get there you will only need to make several quasi-round-the-world flights.

Nevertheless, in any case, using round-the-world flights (if the structure of the Earth is what modern science believes it to be) or quasi-round-the-world flights (if the structure of the Earth is different), time travel is feasible. And then it becomes possible to foresee disasters, accidents, bankruptcies and much more. And therefore, somehow it will be possible to avoid them or otherwise minimize the unpleasant consequences associated with this. Since we will have our doubles in the future and in the past, from whom we can receive and use reliable information about the future and past. Therefore, we will actually now exist not only in today's time, but also in yesterday's and tomorrow's time. Then, by communicating with our doubles, we will be able to make our lives much more successful. Presumably it will now even be possible to bring

23 A one-dimensional (in the form of a line) spiral in two-dimensional space (for example, on a sheet of paper) is the well-known Archimedes spiral. A two-dimensional (in the form of a tape) Archimedes spiral in three-dimensional space is, for example, a medical bandage. And our Earth is supposedly a three-dimensional Archimedes spiral made in a similar way in four-dimensional space, the existence of which follows from Newton's first law.

back to life people who died due to accidents or as a result of crimes. For example, in a similar way, after an attempt on his life, President Kennedy could probably have been saved [156]-[166]. And due to the increased information transparency of human activity, now its immoral and criminal manifestations will gradually decline. Many other things will happen that are difficult to predict right now.

Conclusions

Thus, our physical world in many ways turned out to be different from the way it is explained in the version of SRT studied in physics textbooks. And over the past hundred years since the creation of this SRT, the content of the sections of physics textbooks that present this theory has hardly changed. Let us recall that its main difference from pre-existing classical physics, which is why it is rightly generally recognized as an outstanding scientific achievement, is its use of the principle of relativism. But all the formulas obtained in this SRT nevertheless turned out to be incorrect. And even the creators of this theory themselves could not explain them. Moreover, these formulas are not explained in physics textbooks even now, since their explanation using an incorrect postulate, called the principle of not exceeding the speed of light, is incorrect. Therefore, in his version of SRT, Albert Einstein, in order to make it explainable, needed to prove the physical unreality of imaginary numbers. And for this he needed this physical unreality of imaginary numbers to follow from something indisputably true. And as such an initial supposedly indisputably truth, the postulated principle of not exceeding the speed of light was used. This is confirmed by the supposedly complete absence in the physical world in which we live of anything described by imaginary numbers. And such an incorrect version of SRT is still present. ed in physics textbooks.

But one of the most influential philosophers of science of the 20th century, Sir Karl Raymund Popper, argued that "... the struggle of opinions in scientific theories is inevitable and is a prerequisite for the development of science." And over the past 100 years, the version of STR currently studied in physics textbooks has been constantly criticized.

In presenting his version of the STR, Albert Einstein, probably because of ignorance, ignored the fact that there are actually many known processes in nature - tsunamis, Indian summers, the ringing of church bells, music created by pianos and even swings on playgrounds swinging after a push from parents - proving the physical reality of imaginary numbers and, therefore, refuting the physical unreality of imaginary numbers. He also ignored the theory of linear alternating current electrical circuits created by Charles Proteus Steinmetz before the publication of SRT, which served as the theoretical foundation of electrical and radio engineering, the existence of which also experimentally proves the physical reality of imaginary numbers.

And in the XXI century, a fully experimentally confirmed corrected version of STR was created, in which corrected relativistic formulas were obtained and explained. And from these relativistic formulas it was concluded that, in addition to our visible universe, there are numerous mutually invisible other universes and antiuniverses. Which, in turn, made it possible to explain the phenomena of dark matter and dark energy. It is also explained how these universes and antiuniverses can be seen by astronomical observations in portals (and even in anomalous zones that are entrances to

portals, of which there are more than 200.000 on Earth).

And therefore, despite the fact that Albert Einstein was nominated for the Nobel Prize 66 times for creating the version of SRT that is currently studied in all physics textbooks, he never received it for this theory due to the complete absence of any experimental evidence of its truth.

The corrected version of SRT also made it possible to explain how it is possible on Earth, although this possibility is denied by the generally accepted version of SRT, to carry out time travel that is quite accessible to people. The article also explains how, using time travel, it is possible to experimentally prove that our Earth is structured differently than is explained by modern science. Presumably, this is a complex structure in four-dimensional space, the existence of which follows from Newton's first law.

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