

PHYSICAL SCIENCES

TIME TRAVEL USING TIME ZONES ON EARTH¹

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Abstract

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

A corrected version of the SRT is presented and it is explained that the argument 'speed' in the corrected relativistic formulas is, in accordance with Newton's first law, the fourth spatial dimension. The principle of the physical reality of imaginary numbers is experimentally proven, which refutes the principle of not exceeding the speed of light. It is shown that the 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 mutually invisible, since they are in different dimensions, universes and anti-universes, which are dark matter and dark energy. This explains the well-known properties of dark matter and dark energy - their invisibility and the absence of corpuscular content. Therefore no studies at the Large Hadron Collider can explain the phenomena of dark matter and dark energy.

It is explained also that in the anti-universes of such an invisible Multiverse there is anti-matter and anti-time. Therefore, time travel is possible in it. Time travel is also available to people on Earth.

Keywords: special relativity theory, relativistic formulas, Multiverse, anti-universe, antimatter, anti-time, arrow of time, internal time, external time, time zones of Earth, time travels

1.Introduction

The 20th century in physics was rich in new interesting scientific ideas. But some of them, although they were called theories, have not yet received experimental confirmation. And one of them is the special relativity theory (SRT) [1]-[3], which was nominated for the Nobel Prize 66 times. However, due to the lack of experimental confirmation, she never received it. And the Nobel Committee turned out to be right, since in the 21st century, its indisputable experimental refutations were published. Nevertheless, this version of SRT is

now studied in all physics textbooks used in the educational process even in the most prestigious universities.

2. The version of SRT taught in all physics textbooks is incorrect The generally accepted version of SRT is incorrect because the relativistic formulas obtained by its creators – Jo

seph Larmor [4], Nobel laureate Hendrik Anton Lorentz² [5], Jules Henri Poincaré [6], Nobel laureate Albert Einstein³ [7] and other outstanding scientists – are incorrect:

¹ This is reprint of the article "Antonov A. A. 2025. Dark matter and dark energy are mutually invisible universes and anti-universes of the hidden Multiverse. German International Journal of Modern Science № 113."

² Who received his Nobel Prize in 1902 for explaining the Zeeman effect.

³ Who received his Nobel Prize in 1921 for studying the photoelectric effect.

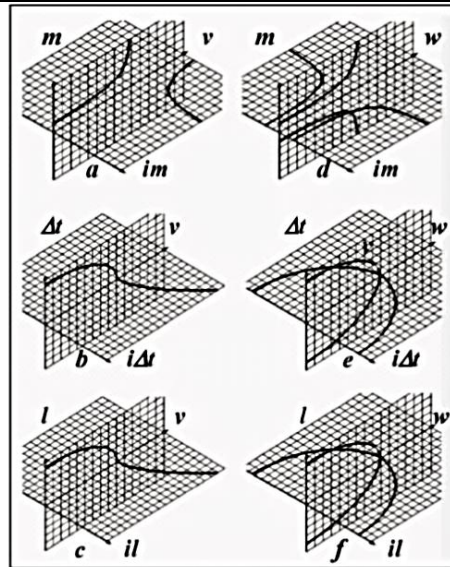


Fig 1. Graphs of functions $m(v)$, $\Delta t(v)$, $l(v)$, corresponding to the existing and corrected versions of SRT in the subluminal $v < c$ and hyperluminal $v > c$ ranges

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

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

$$l = l_0 \sqrt{1 - (\frac{v}{c})^2} \quad (3)$$

Moreover, the creators of SRT could not even explain these formulas. And there fore much of what they did later was done incorrectly:

- First, they did not understand that the value v in these formulas, in accordance with Newton's first law, is the fourth spatial dimension, in addition to length, width, and height. Therefore, relativistic formulas had to be explained not only in the sublight $v < c$ range, but also in the hyperlight $v > c$ range. However, this was not done.

- Second, not understanding the physical meaning of the imaginary values of the quantities $m(v)$, (v) , $l(v)$ in the hyperlight $v > c$ range of speeds, the authors of STR, in order not to explain their relativistic formulas in this range, introduced into STR a postulate called the principle of not exceeding the speed of light. And based on this postulate, it is now sometimes even claimed that Albert Einstein understood that nothing in the Universe can move faster than the speed of light. And that the speed of light is not just a number, but a physical limit. The same as, for example, absolute zero at a temperature of minus 273.15 degrees Celsius.

- Thirdly, in the 21st century, despite the fact that the attempt to disprove the STR by the OPERA experiment [8] at the Large Hadron Collider was unsuccessful, it was nevertheless experimentally proven that imaginary numbers are physically real [9]-[20], and therefore the principle of not exceeding the speed of light and the STR itself are incorrect [21]-[49].

- Fourthly, it turned out that formula (1) in the hyperlight $v > c$ range corresponds to a physically unstable process that cannot exist in nature at all.

Therefore, the conclusions made in the generally accepted version of the SRT from these incorrect formulas using the incorrect principle of not exceeding the speed of light are also incorrect:

- about the existence of our only visible universe in nature;
- about the physical unreality of imaginary numbers.

And, ultimately, this incorrect version of the SRT, as a result of the struggle for survival, instead of being corrected in the future, ended up being canonised – a conviction formed in the community of relativistic physicists and in public opinion about its infallibility, about the inadmissibility of its criticism and any subsequent corrections. Therefore, for example, in the USSR, criticism of the SRT was prohibited three times: in 1934 by a resolution of the Central Committee of the All-Union Communist Party (Bolsheviks) on the discussion of relativity, in 1942 by a resolution of the Presidium of the Academy of Sciences of the Soviet Union on the theory of relativity, and in 1964 by a secret resolution of the Presidium of the Academy of Sciences of the Soviet Union, which prohibited any criticism of Albert Einstein's theory. This ban has not been lifted to this day.

Unfortunately, prohibiting criticism of certain scientific theories is not a new phenomenon. For example, Nicolaus Copernicus, who spent 40 years in the 16th century developing his heliocentric model of the universe, prudently chose to publish his theory 'On the Revolutions of the Celestial Spheres,' which refuted Claudius Ptolemy's geocentric model, after his death, so as not to fall foul of the Inquisition. Giordano Bruno and Galileo Galilei, who unwisely supported Copernicus' theory, had already dealt with the Inquisition. Giordano Bruno was even burned alive at the stake. Therefore, the common-sense process of creating scientific theories by identifying certain shortcomings in them as a result of experimental research and subsequently correcting them does not always go smoothly.

3. Evidences of the physical reality of imaginary numbers

And so as not to be unfounded, we will provide one of the proofs of the physical reality of imaginary numbers with using the interpretation of Ohm's law for linear alternating current electrical circuits proposed by Charles Proteus Steinmetz⁴ in 1893 [50]. This formulation of Ohm's law⁵ proposed even before Einstein and Poincaré published the now universally accepted version of the special theory of relativity in 1905. And now, millions of electrical and radio engineers around the world use this formulation of Ohm's law in Steinmetz's interpretation in their daily work. This, of course, proves its validity. However, physicists, unable to refute this proof, continue to ignore it.

To understand whether physicists are right, let's take a closer look at this situation. In Steinmetz's formulation of Ohm's law, it is stated that not only resistors have electrical resistance, but also capacitors and inductors (also called inductance coils). But the resistance of resistors is measured by real numbers R , while the resistance of capacitors C and inductors L is measured by imaginary numbers $-1/j\omega C$ and $j\omega L$.

Therefore, linear electrical LCR -circuits of any configuration have resistance measured by complex numbers. Consequently, its value and the value of the current flowing through such a circuit, according to Ohm's law as interpreted by Steinmetz, depend on the frequency ω of the voltage applied to this electrical circuit.

And this makes it possible to perform a simple but very important experiment that will allow us to confidently answer the question of whether imaginary numbers are physically real. After all, if the imaginary resistances of capacitors and inductors, since they are measured by imaginary numbers, are physically unreal, then their inclusion in electric circuits should not affect the results of measuring the resistance of the LCR -circuit in any way. The resistance of the LCR -circuit in this case will always be measured by real numbers and will not depend on the frequency. And vice versa, if the imaginary resistances $-1/j\omega C$ and $j\omega L$ are physically real, then when the frequency of the voltage applied to the LCR -circuit changes, the value of the current flowing through it will change due to the change in its resistance.

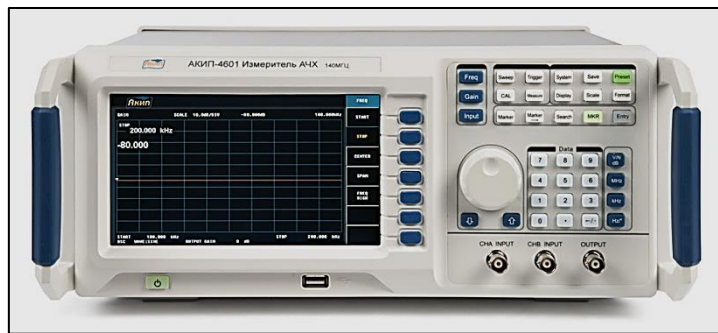


Fig. 2. For several decades now, every radio engineering laboratory has had instruments called frequency response meters, which by their very existence prove the physical reality of imaginary and complex frequencies, and therefore of any other imaginary and complex numbers. And thus, they rendered the OPERA experiment unnecessary.

And all engineers know that the resistance of LCR circuits always depends on the frequency of the voltage applied to them, which is why the current value in such an experiment will always change. Therefore, devices for recording such measurements have long been created and are mass-produced – oscilloscopes, frequency response meters, spectrum analyzers, etc. Even many radio amateurs have the simplest of such devices – a tester (also sometimes called a multimeter). And this circumstance, i.e. the ability to measure imaginary parameters of electrical circuits with such devices, irrefutably proves their physical reality. After all, it is possible to measure only what really exists in nature. Therefore, most of what we know about the world around us, we learned precisely with the help of devices – in physics, and in biology, and in chemistry, and in all other sciences.

Consequently, if the version of SRT studied in physics textbooks were correct, then neither electrical engineering, radio engineering, nor computer engineering should exist, since these sciences use Ohm's law as interpreted by Steinmetz. But these sciences and the corresponding electrical and radio engineering products do exist. Moreover, electrical engineering and radio engineering existed even before the creation of SRT.

Other proofs of the physical reality of imaginary numbers have also been published [51]–[54].

4. Revised version of SRT; invisible universes and anti-universes, hidden Multiverse

Since, as has just been proven, imaginary numbers are physically real, the relativistic formulas of SRT, taking this circumstance into account, need to be explained in full, since the creators of this theory explained them only in the range of sublight speeds $v < c$,

⁴ In the United States, the Institute of Electrical and Electronics Engineers (IEEE) has established an annual award in his name.

⁵ In its original interpretation, this law for direct current electrical circuits was formulated by Georg Simon Ohm in 1826 after nine years of experimental research, at a time when no

electrical measuring instruments existed. In 1828, Ohm was dismissed from his job by order of the Minister of Education for publishing his research. A high-ranking official at the time believed that the use of mathematics in physics was unacceptable.

in which the values m , Δt and l took values measurable by real numbers. But in the range of hyperlight speeds $v > c$, these values m , Δt and l already took values measurable by open [55] Scipione Del Ferro, Niccolò Fontana Tartaglia, Gerolamo Cardano, Lodovico Ferrari and Raffaele Bombelli 400 years before the creation of SRT as imaginary numbers, the physical meaning of which, however, was incomprehensible to them and was not explained. And perhaps even earlier than them, imaginary numbers were discovered by Paolo Valmes

[56], who was burned alive at the stake for this by order of the inquisitor Tomás de Torquemada. Even Isaac Newton, in order to avoid trouble, preferred not to use imaginary numbers at that time⁶.

However, in order to explain the physical meaning of imaginary numbers, relativistic formulas must first be corrected so that they correspond to physically feasible processes. To do this, relativistic formulas (1)-(3) in the range $v > c$ must be such that the graphs of the functions

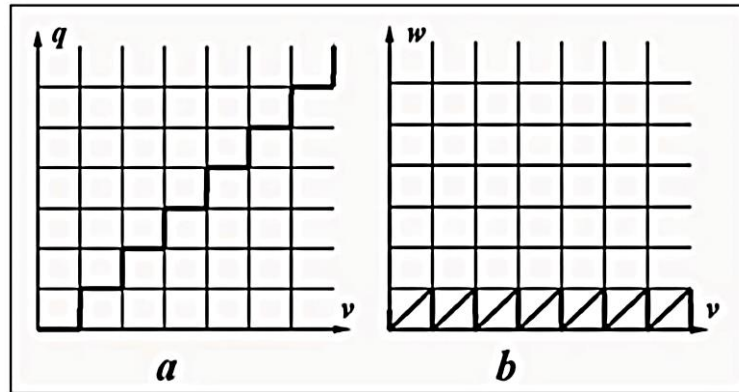


Fig. 3. Graphs of functions $q(v)$ and $w(v)$, illustrating the meaning of the 'floor' function in discrete mathematics

$m(v)$, $\Delta t(v)$, $l(v)$ (Fig. 1d,e,f) are similar to the graphs of the same functions $m(v)$, $\Delta t(v)$, $l(v)$ (Fig. 1a,b,c) in the range $v < c$. To do this, we need to introduce the function i^q into formulas (1)-(3)

$$m(q) = m_0 i_1^q / \sqrt{1 - (\frac{v}{c} - q)^2} \quad (4)$$

$$\Delta t(q) = \Delta t_0 i_1^q \sqrt{1 - (\frac{v}{c} - q)^2} \quad (5)$$

$$l(q) = l_0 i_1^q \sqrt{1 - (\frac{v}{c} - q)^2} \quad (6)$$

where $q(v) = [v/c]$ – the 'floor' function of discrete mathematics from the argument v/c (its graph is shown in Fig. 3a), which is the fourth spatial dimension;

$w = v - qc$ – local velocity in all universes (its graph is shown in Fig. 3b).

This function i^q in formulas (4)-(6), which defines the essence of each universe, for integer values ⁷ $q(v)$, equal to $0, 1, 2, 3, 4, 5$, takes the values $+1, +i, -1, -i, +1, +i, \dots$ etc. And the value $q(v) = 0$ in formulas (1)-(3) for the sublight speed range $v < c$ corresponds (since $i^0 = 1$) to our visible universe, which we will call the tardion⁸

universe for the sake of clarity. The value $q(v) = 1$ in the hyperlight speed range $2c > v > c$ corresponds (since $i^1 = i$) to some other invisible universe, since it is beyond the event horizon. For clarity, we will therefore call it the tachyonic⁹ universe. Then the value $q(v) = 2$ in the speed range $3c > v > 2c$ will correspond to (since $i^2 = -1$) an invisible tardion anti-universe, and the value $q(v) = 3$ in the speed range $4c > v > 3c$ will correspond to (since $i^3 = -i$) an invisible tachyonic anti-universe, the value $q(v) = 4$ in the speed range $5c > v > 4c$ will correspond (since $i^4 = +1$) to another (and therefore also invisible) tardionic universe, the value $q(v) = 5$ in the speed range $6c > v > 5c$ will correspond (since $i^5 = +i$) to another tachyon universe. And so on.

That is, according to formulas (4)-(6), there is not one visible universe, as claimed in the generally accepted version of SRT, but also a multitude of mutually invisible other universes and anti-universes, forming a Multiverse, which we will therefore call hidden. Such a hidden Multiverse, whose structure is winding, is shown in Fig. 4. And in this structure of the hidden Multiverse, the distribution of material content in each three-dimensional parallel universe and anti-

⁶ And his friend William Whiston, in the atmosphere of the omnipotence of the Inquisition, was stripped of his professorship and expelled from Oxford University for some of his careless remarks.

⁷ And for non-integer values of q , it is undefined.

⁸ Tardion universe is a term used by Isaak Asimov in his short story 'Take a Match'.

⁹ Tachyon universe is a term used by Isaak Asimov in his short story 'Take a Match'.

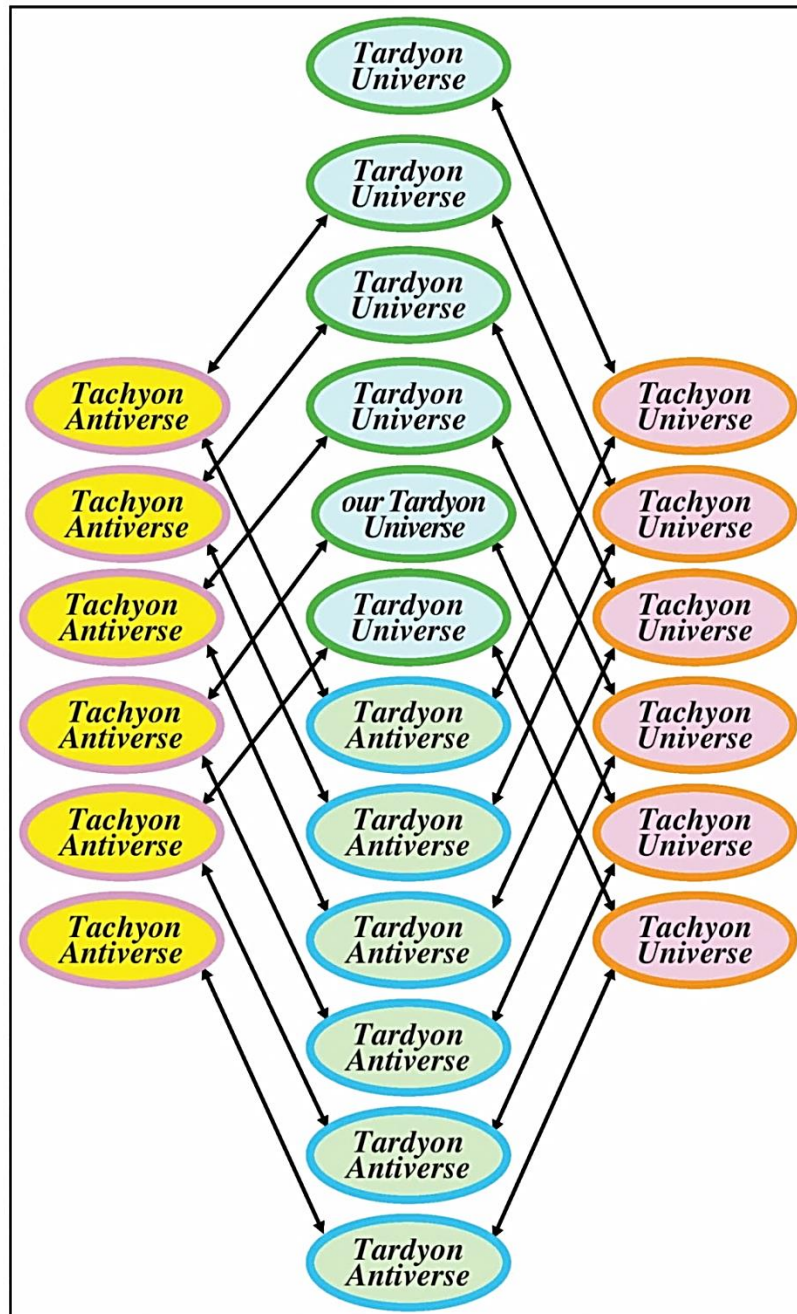


Fig. 4. Structure of the hidden Multiverse corresponding to the principle of physical reality of complex numbers

universe will be determined by its function $f_q(x, y, z)$, and the value iq will be the coordinate of these universes. That is, the hidden multiverse will be described by the formula $f_q(x, y, z) + iq$.

5. Analysis of data obtained by the WMAP and Planck spacecraft

But having proven the existence of mutually invisible parallel¹⁰ universes and anti-universes, necessary to find out how they are placed in the hidden Multiverse. Or, in other words, what is the structure of this hidden Multiverse? It is also necessary to understand what dark matter and dark energy are, so named because of their incomprehensibility, since no chemical elements have been found in them, and also because

they do not absorb, emit, reflect or refract any electromagnetic radiation, and are therefore invisible.

Moreover, dark matter and dark energy account for more than 95% of all mass-energy in the cosmos. More precisely, according to data obtained by the WMAP spacecraft [57], the mass-energy of our visible universe (actually a 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 [58], the entire universe (again, in fact, the entire hidden Multiverse) consists of 4.9% baryonic matter, 26.8% dark matter, and 68.3% dark energy.

Therefore, naturally, the reliability of other knowledge in modern physics, which is unable to explain the phenomena of dark matter and dark energy, is

¹⁰ Since they do not intersect

questionable. And since it has been proven beyond doubt that nature does not consist of a single universe, but a Multiverse, then, in addition to the still unsuccessful search in the microcosm for the nature of dark matter and dark energy phenomena at the Large Hadron Collider, it is necessary to begin searching for their explanation in the macrocosm of our hidden multiverse. After all, Albert Einstein himself wrote: *'It is meaningless to keep doing the same thing and expect different results'*. The ancient Chinese philosopher Confucius¹¹ said the same thing: *'The most difficult thing is to find a black cat in a dark room, especially if it is not there'*.

The search for a solution to this problem in the hidden Multiverse allows us to assume that [59]-[72]:

- dark matter and dark energy are most likely the rest of our hidden Multiverse, apart from our visible universe, tardion and tachyon universes and anti-universes, which are invisible to us because they exist in other dimensions;
- and since the universes and anti-universes of dark matter and dark energy are actually outside our visible universe, they manifest themselves in it only as phenomena (presumably in the form of gravitational shadows) generated by the existence of other invisible parallel universes and anti-universes of the hidden Multiverse¹²;
- dark matter is a phenomenon caused by the existence of invisible parallel universes and anti-universes in the hidden Multiverse neighbouring our visible universe.
- dark energy is a phenomenon generated by the existence of other universes besides our visible universe and its neighbouring invisible universes and anti-universes, other invisible parallel universes and anti-universes of the hidden Multiverse.

Therefore, dark matter and dark energy have no corpuscular content¹³. And they will never be detected at the Large Hadron Collider.

This explanation of the phenomena of dark matter and dark energy also provides information about the structure of the hidden Multiverse. Indeed, given that the mutually invisible universes and anti-universes of the hidden Multiverse are connected to each other by numerous portals through which they exchange their material contents, it can be argued that over billions of years of their existence, in accordance with the law of communicating vessels, their mass-energy has practically completely equalised. And then:

- according to experimental data obtained by the WMAP spacecraft, the entire hidden multiverse consists of 100% / 4.6% = 21.8 parallel universes, and according to data obtained by the Planck spacecraft, it consists of 100% / 4.9% = 20.4 parallel universes;

- dark matter, according to experimental data obtained by the WMAP spacecraft, consists of 22.4% / 4.6% = 4.9 parallel universes, and according to data obtained by the Planck spacecraft, consists of 26.8% / 4.9% = 5.5 parallel universes;

- according to experimental data obtained by the WMAP spacecraft, dark energy consists of 73.0% / 4.6% = 15.9 parallel universes, and according to data obtained by the Planck spacecraft, it consists of 8.3% / 4.9% = 13.9 parallel universes.

6. Corrected version of SRT, explanation of the phenomena of dark matter and dark energy

As can be seen, the experimental data obtained by the WMAP and Planck spacecraft did not confirm the above conclusions about the structure of the hidden multiverse, since our visible universe in this structure has not two neighbouring invisible parallel universes – one tachyon universe and one tachyon anti-universe – but five or six.

Therefore, it is obvious that there was some error in the previous reasoning. And it turns out that we were wrong in assuming that there is only one additional dimension q in the hidden Multiverse and, consequently, its correspondence to physically real complex numbers containing only one imaginary unit. In order for six¹⁴ other parallel universes – three tachyon universes and three tachyon anti-universes – to coexist with our visible universe in the actually existing hidden multiverse, it is necessary to have three additional dimensions q , r , s and the relativistic formulas must be corrected again as follows [73]-[81]

$$m(q, r, s) = \frac{m_0 i_1^q i_2^r i_3^s}{\sqrt{1 - [\frac{v}{c} - (q + r + s)]^2}} \quad (7)$$

$$\Delta t(q, r, s) = \Delta t_0 i_1^q i_2^r i_3^s \sqrt{1 - [\frac{v}{c} - (q + r + s)]^2} \quad (8)$$

$$l(q, r, s) = l_0 i_1^q i_2^r i_3^s \sqrt{1 - [\frac{v}{c} - (q + r + s)]^2} \quad (9)$$

where $q(v) = [v_q/c]$ – the ‘floor’ function of discrete mathematics from the argument v_q/c , which is one of the orthogonal coordinates q of the fourth spatial dimension v ;

$r(v) = [v_r/c]$ – the ‘floor’ function of discrete mathematics from the argument v_r/c , which is another orthogonal coordinate r of the fourth spatial dimension v ;

$s(v) = [v_s/c]$ – the ‘floor’ function of discrete mathematics from the argument v_s/c , which is one more orthogonal coordinate s of the fourth spatial dimension v ;

¹¹ Confucius was an ancient Chinese philosopher and statesman who lived more than two thousand years ago and remains the most famous Chinese person to this day. For a long time, Confucianism was as important in China as Buddhism. It forms the basis of modern state ideology.

¹² Similarly, for example, you may search unsuccessfully for a ringing telephone in the room you are in, when it is actually in the next room.

¹³ Like shadows on a sunny day.

¹⁴ Or less. Then some parallel universes of our hidden Multiverse may be absent and replaced by universes of neighbouring Multiverses.

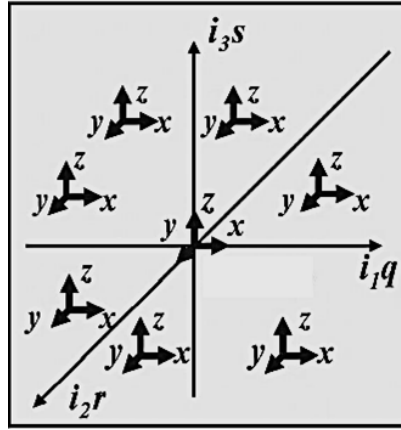


Fig. 5. Six-dimensional space of the hidden Multiverse, where q, r, s are the coordinates of invisible parallel universes, and x, y, z are the coordinates of the matter content in each parallel universe

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

Consequently, the space of such a hidden multiverse will be six-dimensional (see Fig. 5). And its structure will correspond to the quaternions $\sigma + i_1\omega_1 + i_2\omega_2 + i_3\omega_3$, i.e. hyper complex numbers [82] containing precisely three imaginary units i_1, i_2, i_3 , which are related to each other by the following relations

$$i_1^2 = i_2^2 = i_3^2 = -1 \quad (10)$$

$$i_1 i_2 i_3 = i_2 i_3 i_1 = i_3 i_1 i_2 = -1 \quad (11)$$

$$i_1 i_3 i_2 = i_2 i_1 i_3 = i_3 i_2 i_1 = 1 \quad (12)$$

In such a quaternion structure of the hidden Multiverse [83], [84], unlike its structure considered earlier (in Fig. 4), the distribution of material content in each three-dimensional parallel universe will be determined by a function $f_{q,r,s}(x, y, z)$, and the coordinates of these universes will be determined by the values i_1q, i_2r и i_3s . That is, the hidden Multiverse will be described by the

formula $f_{q,r,s}(x, y, z) + i_1q + i_2r + i_3s$. This is exactly what Lisa Randall predicted: 'We could be living in a three-dimensional pocket of higher dimensional space.'

And from formulas (7)-(9) it follows that such a hidden Multiverse still has a winding structure. In this case, it is possible to move from a tardion universe to a tardion antiuniverse and from a tardion antiuniverse to a tardion universe in different ways, but not in an arbitrary way, but only in such a way (see Fig. 6) that the value of i^q will successively take 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 $\oplus$ is the symbol of the logical operation of discrete mathematics 'exclusive OR'. In this case, different trajectories of movement from one universe (or antiuniverse) to another can differ only due to the replacement of some tachyon universes from i_1, i_2, i_3 with others and some tachyon antiuniverses from i_1, i_2, i_3 with others. Therefore, the tachyon universes i_1, i_2, i_3 in the hidden Multiverse are located parallel to each other. The tachyon antiuniverses i_1, i_2, i_3 are also located parallel to each other for the same reasons. And therefore, in the hidden Multiverse, when moving from any tardyon universe to a tardyon antiuniverse and then to another tardyon universe, parallel universes and antiuniverses must alternate in the following sequence – 'tardyon universe', 'one of the tachyon universes', 'tardyon antiuniverse', 'one of the tachyon antiuniverses', 'tardyon universe', 'one of the tachyon universes', etc.

One of the simplest explanations for such possible quaternion structures of the hidden multiverse is shown in Fig. 6. It differs from the structure shown in Fig. 4 in that it contains several parallel tachyon universes and anti-universes corresponding to the three imaginary units i_1, i_2, i_3 . Another difference is the presence in such a multiverse structure not only of bidirectional portals corresponding to formula (7) and marked with double-headed arrows, but also of unidirectional portals¹⁵, corresponding to formulas (8) and (9) and marked with single-headed arrows.

Moreover, naturally, the movement from our tardyon universe to the tardyon antiuniverse through some tachyon universe – for example, i_1 – does not necessarily have to proceed further through the tachyon antiuniverse i_1 . It can proceed further through the tachyon antiuniverses i_2 and

¹⁵ Why in such portals movement is possible only in one direction - from the entrance to the exit - is difficult for us, living in a space in which movement in nature is possible in any direction, to imagine. The processes that determine the possibility of such movement in nature are yet to be understood.

But for visitors who find themselves in such one-way portals, they are more dangerous than two-way portals, since it is impossible to return from them to your universe. Although in the metro with one-way movement on escalators we still encounter. But the metro is not nature.

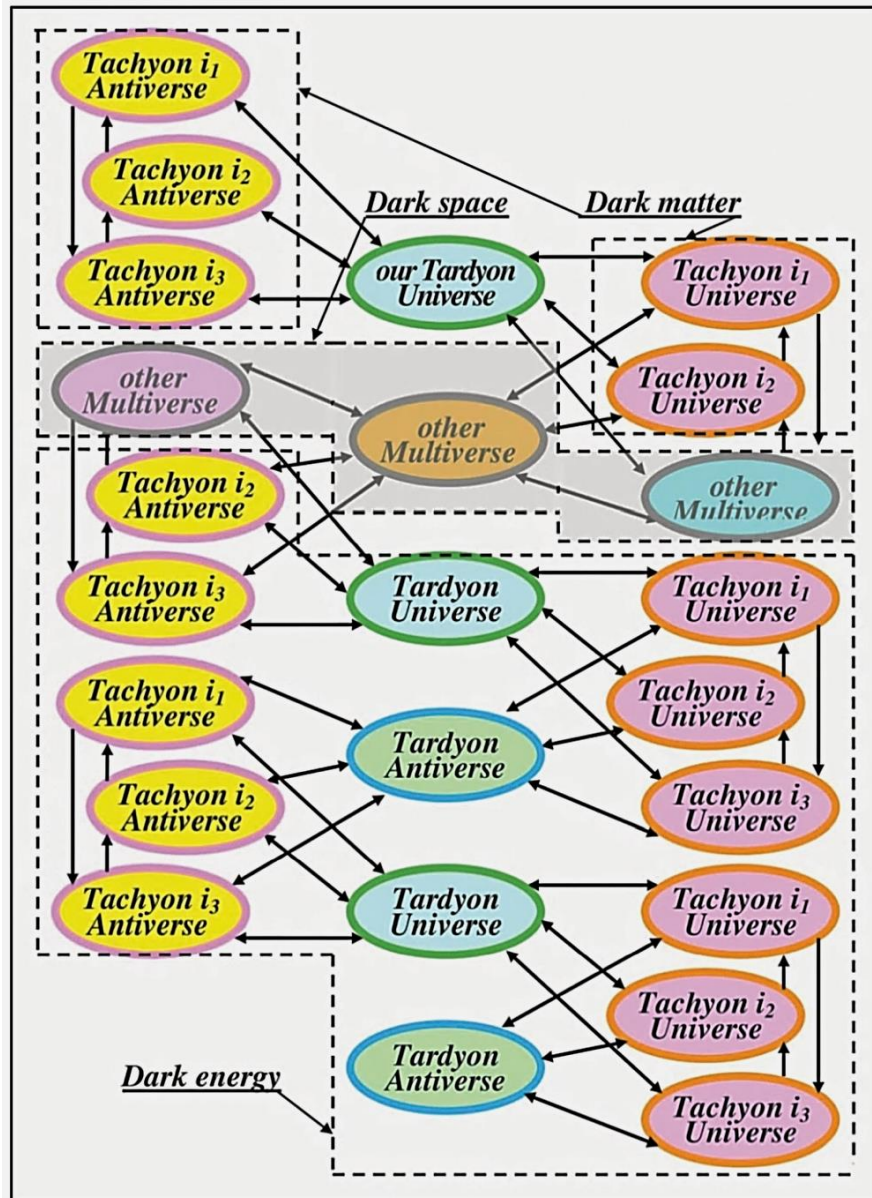


Fig. 6. Possible quaternion structure of the hidden Multiverse containing twenty-two parallel universes, including six invisible universes adjacent to our visible universe

i_3 . The same reservation applies to the situation if the movement from the tardyon universe to the tardyon antiuniverse begins through the tachyon universes i_2 and i_3 . All these transitions are shown

in Fig. 6. Moreover, since the data obtained by the WMAP and Planck spacecraft correspond to open helical structures of our hidden Multiverse, united through the corresponding portals with other Multiverses, then all of them together form the Hyperuniverse.

7. How to see invisible universes and antiuniverses

But to verify that these invisible universes really exist, we need an appropriate experiment that allows us to see them [85]-[98]. And to understand what this experiment might be like, we need to remember that in formulas (7)-(9), the parameters q , r , s are orthogonal coordinates of the fourth spatial dimension v , in which mutually invisible parallel universes somehow drift relative to each other. Therefore, they touch each other

and even slightly immerse into each other, forming corresponding transitions through which their material contents are exchanged. These transitions are usually called portals [99],[100]. And the entrances to them appear to be, at least, some of the anomalous zones, of which there are more than two hundred thousand on Earth. [101]-[104].

And since in other universes the constellations in the sky inevitably differ from the constellations in our earthly sky, when travelling through a portal from Earth to a neighbouring universe or anti-universe, the map of the starry sky in the portal will gradually transform into a map of the starry sky of that neighbouring universe or anti-universe. And if a telescope is placed in such a portal (or at least at its entrance in the anomalous zone), then by comparing the position of the stars in the sky in the portal and outside the portal, changes in the position of the stars can be detected. And if these differences turn out to be too small, then the telescope will have to be moved deeper into the portal. After all, Sir Arthur Stanley Eddington moved his telescope much further

for his famous experiment in the early 20th century – from England to the island of Principe in the Atlantic Ocean [105].

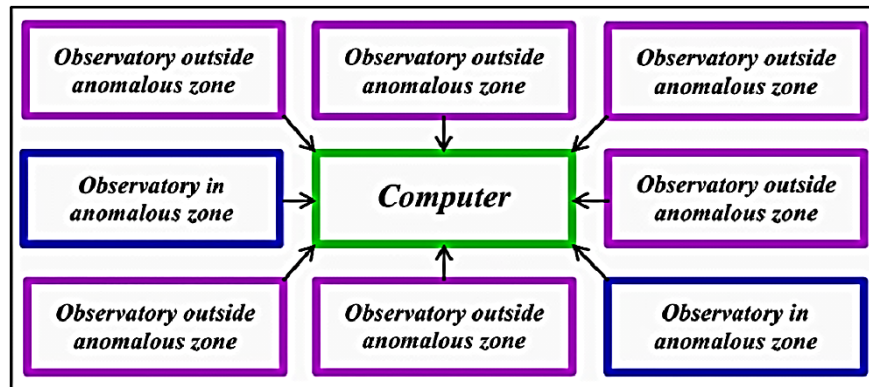


Fig. 7. Scheme of an astronomical experiment to detect invisible universes

These other constellations in the starry sky in the portals will serve as experimental proof of the existence of invisible universes and anti-universes outside the portals. The corresponding experiments (Fig. 7) are very inexpensive and easy to implement. Moreover, some observatories are already located in anomalous zones. For example, the Main Astronomical Observatory of the National Academy of Sciences of Ukraine is located 12 km from the centre of its capital, Kiev, in the Holosiivskyi Forest.

8. Antimatter and anti-time, external and internal time

Having convinced ourselves that the existence of the hidden Multiverse can be proven experimentally, let us continue to extract new knowledge from the revised version of SRT.

First, the structure of the hidden Multiverse already allows us to explain a problem that is currently inexplicable within the framework of physics textbooks: where is antimatter located [106]? It is clear that it cannot be found in our visible universe, since its annihilation with matter would cause our universe to cease to exist. But the fact that antimatter does exist has been proven experimentally. In 1995, a sensational result was obtained at CERN – scientists managed to obtain nine atoms of antihydrogen, which existed for about forty billionths of a second. And just one gram of such antihydrogen would cost 662.5 trillion (i.e. a thousand billion) dollars. Thus, the existence of antimatter has been experimentally proven.

This experiment can also be considered proof that, in accordance with formulas (7)-(9), antimatter can exist in nature, but only in the invisible tardion and tachyon anti-universes of the hidden Multiverse and Hyper-universe. (see Fig. 6), since they are the antipodes of invisible tardion and tachyon universes.

Secondly, the existence in the hidden Multiverse of not only tardion and tachyon universes, but also anti-universes, makes it possible to travel not only in space, but also in time [107]-[127]. This refutes the claim of physicists who, although they recognise the hypothetical possibility of

time travel in certain exotic situations in special¹⁶ and general¹⁷ relativity and in quantum physics¹⁸, but deny the possibility of human time travel even in the distant future.

That is why the concept of the “arrow of time” [128], proposed at the beginning of the 20th century by Sir Arthur Stanley Eddington, even appeared in physics. And here is what Stephen William Hawking [129] wrote on this subject: *‘In everyday life, there is a huge difference between moving forward and backward in time. Imagine that a cup of water falls off the table and breaks into pieces. If you film this fall, it will be immediately clear when watching the film whether the film is being played forwards or backwards. If it is being played backwards, we will see the shards lying on the floor suddenly come together and, forming a whole cup, jump back onto the table. And you can say that the film was being played backwards, because in everyday life this does not happen. Otherwise, all the pottery factories would have to be closed down.’*

However, the existence of anti-time in the hidden Multiverse makes the use of the concept of ‘arrow of time’ unnecessary.

And finally, thirdly, it is easy to notice that in all the relativistic formulas (1)-(3); (4)-(6); (7)-(9) mentioned in the article, in addition to the functional dependencies of the quantities m , Δt , l on the argument v , there is another relativistic dependence – the quantity Δt on the argument l

$$\Delta t = \Delta t_0 l / l_0 \quad (10)$$

That is, it turns out that in nature there are not only the relativistic dependencies of physical quantities m , Δt , l on the velocity v that have already been identified and studied in the generally accepted version of STR, but also another relativistic dependency of external time Δt on the spatial coordinate l , perpendicular to the time zones, generated by the rotation of the Earth around its axis. And this external time differs from the internal (or, in other words, biological) time used in everyday life, which cannot flow backwards and people in it cannot return to their childhood. Unlike external time, which can flow both into the future and into the

¹⁶ For example, in the ‘twin paradox’

¹⁷ For example, in the region of ultra-high gravity near the event horizon of a black hole

¹⁸ For example, as a result of teleportation, instead of information, physical objects

past, since airplanes can cross time zones in both the western and eastern directions.

Moreover, unlike internal time, which always and everywhere flows at the same speed, this external time, measured by time zones, can flow at different speeds, depending on the speed of the aircraft and the size of the time zones.

Therefore:

- at the equator 1 time zone is equal to $\Delta l = 40075 \text{ km} \times \cos 0^\circ / 24 = 1700 \text{ km}$;
 - at the latitude of Santiago 1 time zone is equal to $\Delta l = 40075 \text{ km} \times \cos 33.45^\circ / 24 = 1426 \text{ km}$;
 - at the latitude of Buenos Aires 1 time zone is equal to $\Delta l = 40075 \text{ km} \times \cos 34.60^\circ / 24 = 1427 \text{ km}$;
 - at the latitude of Melbourne 1 time zone is equal to $\Delta l = 40075 \text{ km} \times \cos 37.82^\circ / 24 = 1358 \text{ km}$;
 - at the latitude of New York 1 time zone is equal to $\Delta l = 40075 \text{ km} \times \cos 40.72^\circ / 24 = 1269 \text{ km}$;
 - at the latitude of Reykjavik 1 time zone is equal to $\Delta l = 40075 \text{ km} \times \cos 64.15^\circ / 24 = 734 \text{ km}$;
 - at the latitude of Murmansk 1 time zone is equal to $\Delta l = 40075 \text{ km} \times \cos 69^\circ / 24 = 601 \text{ km}$;
 - at the latitude of Kirkenes 1 time zone is equal to $\Delta l = 40075 \text{ km} \times \cos 69.73^\circ / 24 = 599 \text{ km}$.
- Then the distance of 1 time zone an airplane with a speed of, for example, 800 km per hour, will fly:
- at the equator in $\Delta t = 1700 \text{ km} / 800 \text{ km per hour} = 2.125 \text{ hours}$ of internal (biological) human time;
 - at the latitude of Santiago in $\Delta t = 1426 / 800 \text{ km per hour} = 1.783 \text{ hours}$ of internal (biological) human time;
 - at the latitude of Buenos Aires in $\Delta t = 1427 / 800 \text{ km per hour} = 1.784 \text{ hours}$ of internal (biological) human time;
 - at the latitude of New York in $\Delta t = 1586 / 800 \text{ km per hour} = 1.983 \text{ hours}$ of internal (biological) human time;
 - at the latitude of Reykjavik for $\Delta t = 734 / 800 \text{ km per hour} = 0.918 \text{ hours}$ of internal (biological) human time;
 - at the latitude of Murmansk for $\Delta t = 601 / 800 \text{ km per hour} = 0.751 \text{ hours}$ of internal (biological) human time;
 - at the latitude of Kirkenes for $\Delta t = 599 / 800 \text{ km per hour} = 0.749 \text{ hours}$ of internal (biological) human time.

This happens because external time is the time outside the plane, determined by processes in the external environment, and internal time is the time measured by the watches of passengers and crew. And, it turns out, they are different. Therefore, after the plane lands, passengers have to change their watches to local time. And, as you can see, in order to travel to the past or the future, the plane's flight during its round-the-world trip must take place around the nearest pole close enough to it.

9. Revised version of SRT; how to verify the feasibility of travelling to the past and future

Moreover, even internal time itself can vary. Internal time may or may not depend on the distance a per-

son has travelled. For example, on a passenger aeroplane, it depends on this distance, but in a helicopter, it does not. But how much does it depend or not depend?

To answer this question, one would need to take a round-the-world trip by aeroplane. And after completing it and arriving in a city with the same name as the city from which the aeroplane departed, one would need to answer another obvious question: is it the same city or a different one? On a globe, it is, of course, the same city, but in reality, it is most likely a different city, since some changes have taken place in that city during the flight. And at the same time, these two (and if we also consider that the plane could have flown not only to the West, i.e. into the past, but also to the East, i.e. into the future, then even three) cities, which are already different in some ways, cannot exist in nature as they do on the globe. But if two such flights (one to the past, the other to the future) took off from the same aerodrome at the same time and arrived at the same time, could these two different aerodromes coexist?

The answer to this question is simple. At the point of arrival, they may also meet their double. And if they exist, then twin cities also exist – both in the past and in the future. Then, naturally, the Earth is somehow more complex than a globe.

Therefore, formula (10) in SRT will have to be corrected. Perhaps as follows

$$\Delta t = \Delta t_0 i^{1/10} l / l_0 \quad (11)$$

where $\Delta t_0 = 24$ – the length of a day in hours (and the number of time zones);

Δt – duration of travel in time in hours;

l_0 – length of travel in space with the crossing of 24 time zones;

l – length of travel in space with the crossing of the required number of time zones.

10. Conclusion

Our visible world is still largely unknown, as confirmed by numerous scientific discoveries made over the past decades. But this visible world is immersed in a vast and almost completely unknown invisible world, which some scientists, however, do not even want to acknowledge or study. For example, relativistic physicists, for career reasons, still refuse to acknowledge the physical reality of imaginary numbers, which experimentally prove that the generally accepted version of the special theory of relativity is incorrect. And they are not even bothered by the fact that if the generally accepted version of SRT were correct, then neither electrical engineering, nor radio engineering, nor computer engineering, nor many other things would exist. Even church bells would not be able to sound, and swings would not be able to swing in playgrounds.

But nevertheless, this incorrect version of SRT is currently studied in all physics textbooks. These textbooks are used in the educational process all over the world, even in the most prestigious universities, and have been hindering the development of science for over 100 years. Therefore, it is not surprising that the phenomena of dark matter and dark energy, discovered in the 20th century, which are experimental refutations of the incorrect version of SRT, have still not been explained in textbooks. And they will never be explained by experiments at the Large Hadron Collider, since no

such explanation exists in the microcosm. In reality, as follows from the analysis of experimental data obtained by the WMAP and Planck spacecraft, dark matter and dark energy are not objects of the microcosm that everyone is looking for at the Large Hadron Collider, but objects of the macrocosm, which are mutually invisible universes and anti-universes of the hidden Multiverse.

Analysis of these experimental data not only explained the phenomena of dark matter and dark energy, but also revealed the quaternion structure of the hidden Multiverse, whose anti-universes contain anti-time. Thus, in the manner described above, the concept of the "arrow of time" is corrected, proving not only the possibility but also the actual use of time travel by humans. This applies not only to space but also to Earth, using its existing time zones. This refutes the categorical assertion of physicists that time travel is impossible for humans to use in their practical activities

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