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SERVICES FOR SCIENCE AND EDUCATION

# Dark Matter and Dark Energy, Which are Inexplicable in the Microcosm, are Mutually Invisible Universes and Anti-universes of the Hidden Multiverse*

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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. These formulas also lead to 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.

## 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.

* *This is corrected 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".*
† *Not to be confused with the fourth dimension in four-dimensional space-time (Minkowski space).*

## THE VERSION OF SRT TAUGHT IN ALL PHYSICS TEXTBOOKS IS INCORRECT

The generally accepted version of SRT is incorrect because are incorrec obtained by its creators – Joseph Larmor [4], Nobel laureate Hendrik Anton Lorentz‡ [5], Jules Henri Poincaré [6], Nobel laureate Albert Einstein§ [7] and other outstanding scientists – the relativistic formulas:

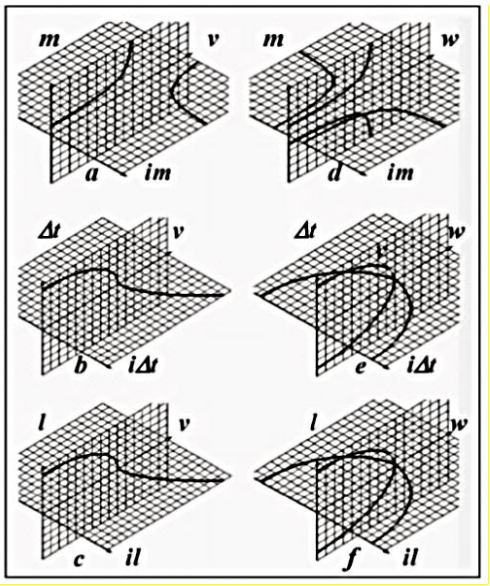


**Fig 1: Graphs of functions m(v), Δt(v), l(v), corresponding to the existing and corrected versions of SRT in the subluminal v < c and hyperluminal v > c ranges**

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

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

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

Where

$m_0$ is the rest mass of a moving body (e.g., an elementary particle);
$m$ is the relativistic mass of the moving body;
$\Delta t_0$ is the rest time of the moving body;
Δt is the relativistic time of the moving body;
$l_0$ is the rest length of the moving body;
$l$ is the relativistic length of the moving body;.
$v$ is the speed of a moving body;
$c$ is the speed of light.

‡ *Who received his Nobel Prize in 1902 for explaining the Zeeman effect.*
§ *Who received his Nobel Prize in 1921 for studying the photoelectric effect.*

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 velocity *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 $\boldsymbol{v} < c$ range, but also in the hyperlight $\boldsymbol{v} < c$ 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 SRT, in order not to explain their relativistic formulas in this range, introduced into SRT 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, 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;
- Fourthly, despite the fact that the attempt to disprove the SRT 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 SRT itself are incorrect [21]-[49].

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, 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) based on the results of the discussion 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.

Prohibiting criticism of 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

[**] *However, this unproven statement is incorrect, as it is refuted by the experimentally confirmed conclusion about the existence of the hidden Multiverse, in which different values of the fourth spatial dimension v correspond to numerous mutually invisible universes and anti-universes* [85]-[98].

Inquisition. But 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.

Unfortunately, hitherto the process of creating new scientific theories does not always proceed in accordance with common sense in result of experimental research and subsequent corrections of the identified shortcomings of these thepries. Shortcomings are sometimes long and stubbornly ignored

## 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 lawfor linear alternating current electrical circuits proposed by Charles Proteus Steinmetz[††] in 1893 [50]. This formulation of Ohm's law[‡‡] 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.

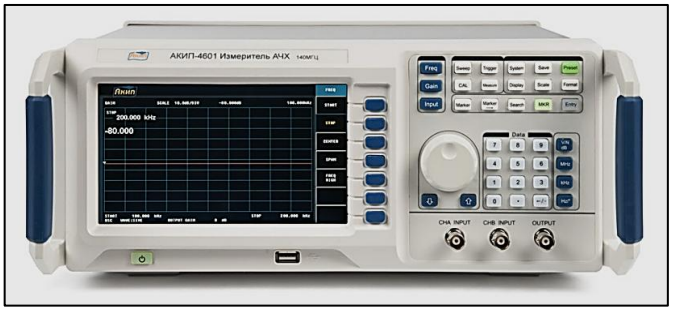


**Fig. 2: For several decades now, every radio engineering laboratory has had instruments called frequency responses meters, which by their very existence prove the physical reality of imaginary and complex frequencies, and therefore of any other imaginary and complex numbers. And thus, they rendered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

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

[‡‡] *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.*

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.

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 devices 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].

## CORRECTED 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. After all, the creators of this theory explained them only in the range of sublight speeds $v<c$, in which the physical values $m$, $\Delta t$ and $l$ took values measurable by real numbers. But in the range of hyperlight speeds $v>c$, these values $m$, $\Delta t$ 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, by 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 time[§§].

However, in order to explain the physical meaning of imaginary numbers, relativistic formu-las 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 $m(v)$,

*[§§] 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.*

*Δt(v), l(v)* (Fig. 1d,e,f) are similar to the graphs of the same functions *m(v), Δt(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)

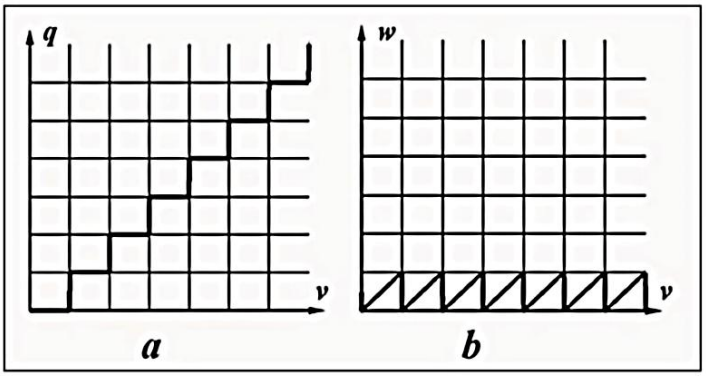


**Fig. 3: Graphs of functions q(v) and w(v), illustrating the meaning of the 'floor' function of discrete mathematics**

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

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

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

where $q(v) = \lfloor v/c \rfloor$ – the 'floor' function of discrete mathematics from the argument $v/c$ (its graph is shown in Fig. 3a), which is the fourth spatial dimension; $w = v - q$c – 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 *q(v)*, equal to *0,1,2,3,4,5*, takes the values *+1, +i, -1, -i, +1, +i,* … etc. And he 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 tardion††† 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 tachyonic‡‡‡ universe. Then the 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

*** *However, the $i^q$ function has the disadvantage that, in the theory of complex variable functions, it is defined only for integer values 0,1,2,3,4,5,… of the argument q. Therefore, considering that for integer values of the argument q the same values as the $i^q$ function are taken by Euler's formula $e^{iq\pi/2}=\cos(q\pi/2)+i\sin(q\pi/2)$, the author proposes the formula $i^q=\cos(q\pi/2)+i\sin(q\pi/2)$ for non-integer values of the argument q. The latter formula has an important dignity, it introduces a mathematical operation into complex number mathematics that was previously absent, namely, raising imaginary numbers to non-integer powers.*

††† *Tardyon universe is a term used by Isaak Asimov in his short story 'Take a Match'.*

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

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.

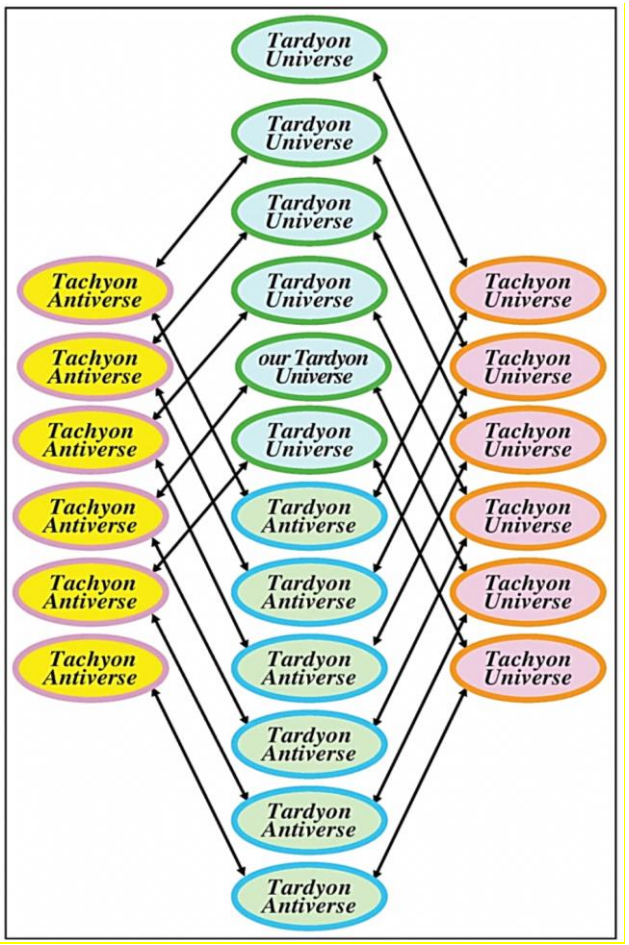


**Fig. 4: Structure of the hidden Multiverse corresponding to the principle of physical reality of complex numbers**

That is, according to formulas (4)-(6), there is not one visible universe, as claimed in the generally accepted version of SRT, but a multitude of mutuall invisible other universes and anti-universes, forming a Multiverse, which we will therefore call hidden. Such a hidden Multiverse, whose structure is helical, 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-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 $f_q(x,y,z) + iq$ .

## ANALYSIS OF DATA OBTAINED BY THE WMAP AND PLANCK SPACECRAFT

But having proven the existence of mutually invisible parallel[§§§] universes and anti-univer-ses, 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

[§§§] *Since they do not intersect*

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 unab-le to explain the phenomena of dark matter and dark energy, is 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 Confucius[****] 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, besides our visible universe, the tardion and tachyon universes and anti-universes of our hidden Multiverse, which are invisible to us because they are 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 Multiverse[††††];
- 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 content[‡‡‡‡]. And they will never be detected at the Large Hadron Collider.

[****] *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.*

[††††] *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.*

[‡‡‡‡] *Like shadows on a sunny day.*

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 therefore:

- 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.

## 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.

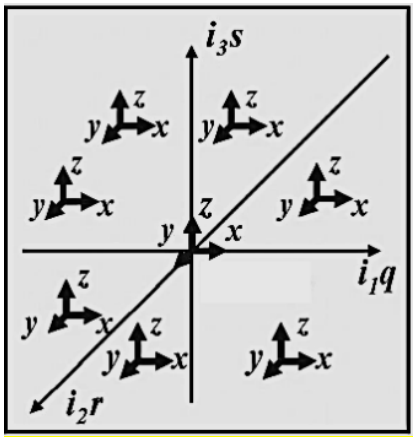


**Fig. 5: Six-dimensional space of the hidden Multiverse, where q, r, s are the coordinates of invisible parallel universes, and x, y, z are the coordinates of the matter content in each parallel universe**

Therefore, 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 six[§§§§] other parallel universes – three tachyon universes and three tachyon anti-universes – to coexist with our visible universe in the actually existing hidden

[§§§§] *Or less. Then some parallel universes of our hidden Multiverse may be absent and replaced by universes of neighbouring Multiverses.*

Multiverse, it is necessary to have three additional dimensions *q, r, s* and the relativistic formulas must be corrected again as follows [73]-[81]

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

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

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

Where

- $q(v) = \lfloor v_q/c \rfloor$ – 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***;
- $r(v) = \lfloor v_r/c \rfloor$ – the 'floor' function of discrete mathematics from the argument $v_q/c$, which is another orthogonal coordinate *r* of the fourth spatial dimension ***v***;
- $s(v) = \lfloor v_s/c \rfloor$– the 'floor' function of discrete mathematics from the argument $v_s/c$, v_q/c, which is one more orthogonal coordinate *s* of the fourth spatial dimension *v*;
- $v_q$, $v_r$, $v_s$ – 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 three imaginary units i1, i2, i3, 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 $i_1 q$, $i_2 r$ и $i_3 s$**.** That is, the hidden Multiverse will be described by the formula $f_{q,r,s}(x,y,z) + i_1 q + i_2 r + i_3 s$. And 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 has a helical 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 antiuniverse in different ways, but not in an arbitrary way, but only in such a way (see Fig. 6) that the function $i^q$ will successively take the values $+1$, $+i_1 \oplus +i_2 \oplus +i_3$, $-1$, $-i_1 \oplus -i_2 \oplus -i_3$, +1, … 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.

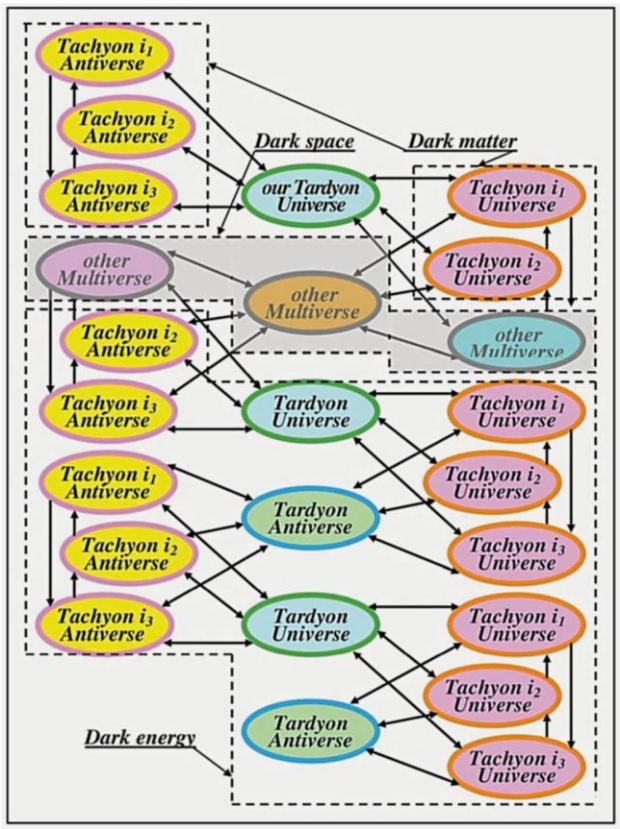


**Fig. 6: Possible quaternion structure of the hidden Multiverse corresponding to the principle of physical reality of hyper-complex numbers**

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 portals[*****], 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 $i_3$. 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.

## HOW TO SEE INVISIBLE UNIVERSES AND ANTI-UNIVERSES

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]. 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].

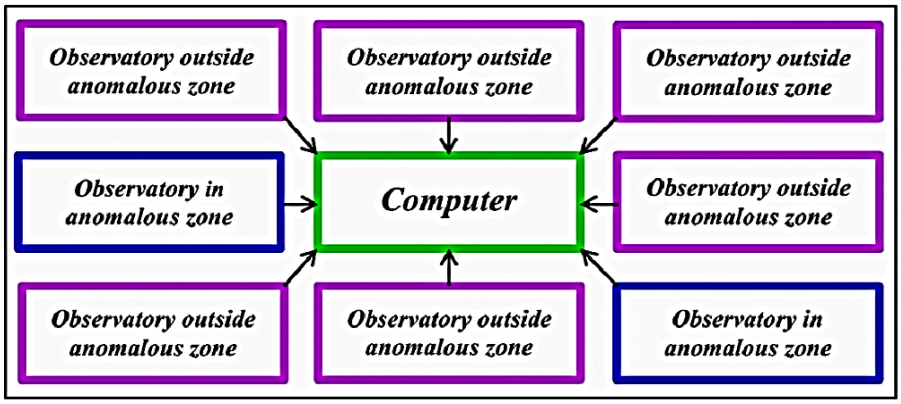


**Fig. 7: Scheme of an astronomical experiment to detect invisible universes**

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

[*****] *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.*

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].

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.

## 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 corrected 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 Hyperuniverse. (see Fig. 6), since they are the antipodes of invisible tardion and tachyon universes. Matter/antimatter pairs can also exist in tachyon universes/antiuniverses. Moreover, in these invisible tardion and tachyon antiuniverses, anti-time and anti-space also exist [107]-[116].

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 special[†††††] and general[‡‡‡‡‡] relativity and in quantum physics[§§§§§], but deny the possibility of human time travel even in the distant future. Because in the generally accepted version of STR studied in physics textbooks, the existence of anti-universes is also denied.

[†††††] *For example, in the 'twin paradox'*

[‡‡‡‡‡] *For example, in the region of ultra-high gravity near the event horizon of a black hole*

[§§§§§] *For example, as a result of teleportation of physical object instead of information*

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. 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 (2),(3); (5),(6); (8),(9) mentioned in the article, in addition to the relativistic dependencies of the quantities *m, Δt, l* on the argument *v*, there is another functional dependence – the quantity *Δt* on the argument *l*

$$\Delta t = \Delta t_0 \, l / l_0 \qquad (13)$$

That is, it turns out that in nature there are not only relativistic dependencies of physical quantities m, Δt, l on velocity v, which have already been identified and studied in the generally accepted version of SRT, but also another functional dependence of external time *Δt* on spatial coordinate *l,* perpendicular to time zones. And this external time differs from the internal (or, in other words, biological) time which cannot flow backwards, and people cannot return to childhood in it. Unlike external time, which can flow both into the future and into the past, as aeroplanes can cross time zones in both the westbound and eastbound 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 Δl = 40075 km x cos $0^0$ / 24 = 1700 km;
- at the latitude of Santiago 1 time zone is equal to Δl = 40075 km x cos 33.45° / 24 = 1426 km;
- at the latitude of Buenos Aires 1 time zone is equal to Δl = 40075 km x cos 34.60° / 24 = 1427 km;
- at the latitude of Melbourne 1 time zone is equal to Δl = 40075 km x cos 37.82° / 24 = 1358 km;
- at the latitude of New York 1 time zone is equal to Δl = 40075 km x cos $40.72^9$/ 24 = 1269 km;
- at the latitude of Reykjavik 1 time zone is equal to Δl = 40075 km x cos 64.15° / 24 = 734 km;
- at the latitude of Murmansk 1 time zone is equal to Δl = 40075 km x cos $69^0$ / 24 = 601 km;

- at the latitude of Kirkenes 1 time zone is equal to Δl = 40075 km x cos 69.73° / 24 = 599 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 Δt = 1700 km / 800 km per hour = 2.125 hours of internal (biological) human time;
- at the latitude of Santiago in Δt = 1426 / 800 km per hour = 1.783 hours of internal (biological) human time;
- at the latitude of Buenos Aires in Δt = 1427 / 800 km per hour = 1.784 hours of internal (biological) human time;
- at the latitude of New York in Δt = 1586 / 800 km per hour = 1.983 hours of internal (biological) human time;
- at the latitude of Reykjavik for Δt = 734 / 800 km per hour = 0.918 hours of internal (biological) human time;
- at the latitude of Murmansk for Δt = 601 / 800 km per hour = 0.751 hours of internal (biological) human time;
- at the latitude of Kirkenes for Δt = 599 / 800 km per hour = 0.749 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. Therefore, after the plane lands, passengers have to change their watches to local internal 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 (since the time zones there are smaller).

## HOW TO VERIFY THE FEASIBILITY OF TIME TRAVELLING TO THE PAST AND FUTURE?

From the calculations given in the previous section, it follows that if an airplane crosses, for example, one time zone on Earth in an external time exactly equal to one hour, then the watches of the passengers and crew of the airplane after landing will show other local time - greater, equal, or less than one hour. This means that after the plane lands, passengers and crew of the plane will need to set their watches forward or back. Consequently, as a result of the flight, they will actually move not only in space, but also into their biological future or past time.

And with such a flight, the concept of an "arrow of time" [127] will be refuted. Thus, people on Earth are already traveling through time, despite physicists' belief that it is impossible. Moreover, they are simultaneously traveling through space. But this makes such time travel unnecessary. And therefore unused.

However, presumably people on Earth can travel through time. If, as a result of such a journey, the aeroplane returns to the same aerodrome from which it departed. In particular, for example, as a result of a round-the-world trip, since as a result of flying in one direction and the other along the same route, time travel will not work. But if you fly in the same direction all the time – to the West or to the East – then during such a long flight you can get time travel.

Such time travel, of course, will be expensive, but sometimes it can still be accomplished (if necessary), since the planes and airfields needed for this already exist. However, even in this case, not everything is clear. It is not clear where the plane will land as a result of such time travel. Although he usually flies to the same airfield from which he took off. And now planes almost always return to the same airfield from which they took off. So what's the problem? The problem is that aeroplanes have not yet made round-the-world trips. And therefore it is unknown what complications may arise.

Therefore, for now we will try to solve this problem speculatively. Let's assume that two planes take off from the same airfield at the same time. But one of them flew to the West, i.e. in the past time, and the other to the East, i.e. in the future tense. Therefore, one plane will land at the same airfield from which it took off almost a day earlier, and the other plane will land almost a day later. Does everything seem simple and clear?

Not at all. It is completely incomprehensible why two identical planes, simultaneously taking off from the same airfield and flying at the same speed over the same distance, will arrive at the same airfield at different times. Moreover, with a time difference of more than a day. This cannot be explained by any reference to different weather conditions due to different routes. So perhaps the reason is that our Earth is somehow more complex than a globe. And in order to understand this problem, such a round-the-world experimental flight will need to be actually carried out on at least one aircraft. After which the problem of time travel, most likely, can be solved.

And such a journey could be very useful [117]-[126]. Especially if it turns out that it will be physically possible to talk on the phone from the present with other people who are in the past or future. This would be proof of the parallel physical existence of our past and future alongside the present. Then we'll have to admit that we on Earth live not in a four-dimensional space, but in a five-dimensional one: its three spatial coordinates are the well-known length, width, and height; the fourth spatial coordinate is the *'velocity*' argument in the relativistic formulas of the revised version of SRT; and the fifth coordinate is also time, but not continuous, as in Minkowski space, but a discrete (with a resolution of one Earth rotation) space-time coordinate, determining the position of a multitude of temporal realizations of the Earth's surface. And the phenomenon of 'déjà vu' confirms this assumption. In other words, it seems that our Earth is structured much more complexly than a globe.

## CONCLUSION

Our visible world is largely unknown, which is confirmed by numerous scientific discoveries made over the past decades. But this visible world is immersed in a huge and almost completely unknown invisible world, which, however, some scientists do not want to recognize or study.

For example, relativistic physicists still refuse to acknowledge the physical reality of imaginary numbers, which experimentally proves that the generally accepted version of SRT is incorrect. And they are not even bothered by the fact that if the generally accepted version of SRT were correct, then electrical engineering, radio engineering, computer engineering, and many other things would not exist. Even church bells would not ring, and swings would not swing in playgrounds [9]-[20], [51]-[54].

The generally accepted version of SRT is also incorrect due to the fact that in the incorrect relativistic formulas obtained in it, the fact that the speed v in them, in accordance with Newton's first law, is the fourth spatial dimension [117]-[126] is ignored. Moreover, unable to explain the physical meaning of imaginary numbers, the authors of the incorrect SRT introduced in it the incorrect principle of not exceeding the speed of light, which even prohibits the recognition of the existence of a fourth spatial dimension v in it. And thus they forbade physicists in the future from even guessing in the SRT about what they themselves had not guessed.

In addition, the incorrect conclusion made by the creators of this SRT from the incorrect principle of not exceeding the speed of light about the existence of only our visible universe in nature, has for almost 100 years now has made it impossible to explain the phenomena of dark matter and dark energy. Therefore, their explanations are forced to be sought only in the microcosm at the Large Hadron Collider. But they will never be found, because dark matter and dark energy actually are not objects in the microcosm, but are mutually invisible universes and anti-universes in a hidden Multiverse [59]-[72], the existence of which is denied by the generally accepted version of STR.

Finally, only the existence of a hidden Multiverse can explain where antimatter and tachyons [107]-[116] are located. But in the existing version of SRT, which recognizes the existence of only one our visible universe, this is impossible to do, since antimatter is located in the antiuniverses of the hidden Multiverse, and tachyons are located in its tachyon universes and antiuniverses adjacent to our visible tardyon univers. And the existence of anti-time in antiuniverses allows us to assert that in the hidden Multiverse travel is possible not only in space, but also in time [117]-[126]. Moreover, time travel for people, denied by modern physics, is possible not only between universes and antiuniverses of the hidden Multiverse, but even on Earth.

Thus, the generally accepted version of the SRT [21]-[49], which is now studied in all physics textbooks, has made it impossible to explain many problems in physics that remain unexplained to this day. Nevertheless, these textbooks to this day are used in the educational process all over the world, even in the most prestigious universities. That is why they have been hindering the development of science for over 100 years. Although a corrected version of the SRT has already been created [73]-[84].

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