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SERVICES FOR SCIENCE AND EDUCATION

Time Travels are Already Possible Nowadays

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ABSTRACT

The theme of time travels has now been successfully mastered mainly by science fiction writers. The official position of science on this problem is as follows: although the possibility of time travels by the laws of physics is not excluded – teleportation in quantum mechanics, "twin paradox" in the special theory of relativity, "mole burrows" in the general theory of relativity, etc. – it will not be possible to create a time machine either now or in the distant future. However, this article provides descriptions of time travel realisations that are already physically feasible on Earth now.

INTRODUCTION

The XX century in physics was rich in new interesting scientific ideas. But many of them, even called theories, have not yet received experimental confirmation. And one of such scientific theories studied now in all physics textbooks is the special theory of relativity (STR) [**1**]-[**3**], which has been nominated 66 times for the Nobel Prize, but due to the lack of its experimental confirmation has not received it.

And the article proven that this version of STR is incorrect, as relativistic formulas received in it are incorrect, they are incorrectly explained with use of incorrect principle of non-exceeding of speed of light and from them incorrect conclusions about physical unreality of imaginary numbers, and also about that in the nature there is only our visible universe.

In the article also the basic provisions of the corrected version of STR [**4**]-[**11**] are stated, from relativistic formulas of which and new scientific knowledge received after creation of the incorrect version of STR, it follows that in the nature there exists not only our visible universe, but also many other mutually invisible universes and antiverse. And in addition to matter, space and time in the universes. antimatter, anti-space and anti-time exist in the antiverse. Therefore, travelling is possible not only in space, but also in time. The article explains how to realise them.

TIME TRAVELLING WITH USING THE NATURE OF THE EARTH

The purpose of this publication is an attempt to show that time travel for people on Earth is already quite feasible. At the same time, let us specify at once what kind of time we are talking about. About the fact that for each person there are two different kinds of time – his internal biological time, as a resource independent of the environment, and external time for the processes occurring around him in the environment. And it is possible to travel only in external time. Internal time cannot flow backwards. A person cannot return to his childhood.

But the situation in the external environment in which a person is, can change in the most incredible way, including under the influence of people. And in this external environment it is possible to move both to the future and to the past time. And even short-term movements in

time can be very useful. For example, if you get an opportunity to look into the future at least for a short time, you can make a better choice in the present. Or, by travelling to the past, you can fix something. And such external time for people on the Earth exists. These are 24 time zones, which are generated by the rotation of the Earth around its axis. Moving through them in space, people also move in time. And depending on the direction of movement in space – to the West or to the East – they can move both to the past and to the future time. This is well known to everyone, but it is not used in human activity yet.

And it's a free resource for solving the problem of human time travel that isn't even difficult to use. In fact, to travel back in time, for example, 24 hours, all you have to do is move east 24 time zones. To travel into the future, you would have to do the same thing, but only by travelling west. All this is not difficult to do. It is also necessary to take into account that crossing one time zone will take less time, the closer to the pole – regardless of which one, north or south – the transport route of time travellers will run. Therefore, it will be more favourable to lay it closer to the poles (for example, at a distance of 100-300 km from the pole around the pole).

In this variant of time travelling everything is clear. Therefore, the experiment on its realisation can be done as follows. *Suppose that in one of the South American countries the president is assassinated. Then the head of the security service gets on a plane and, having flown around Antarctica in 24 time zones, lands a day in the past at the same aerodrome from which he took off. The external time for him changed into the past by 24 hours, and the internal biological time changed into the future, for example, by 20 hours. That is, the head of the security service arrived in time 4 hours before the attempt on the president's life. And then during this time he will have time to take the necessary measures to save the president*[1] *and arrest the criminals.*

And if the result of this simple experiment turns out to be positive, there will be a great interest in the practical use of time travel. Then the problem of creating a time machine capable of comfortably realising more complex and longer time travel routes will inevitably become urgent. But at the same time it will be necessary to recognise that the generally recognised version of the special theory of relativity (STR) studied in all physics textbooks is incorrect, as it states that there is only our visible universe in nature, in which there are no portals.

THE VERSION OF STR TAUGHT IN ALL PHYSICS TEXTBOOKS IS INCORRECT

Since STR, created more than 100 years ago, is now studied in all universities, even the most prestigious ones, and is used in very expensive scientific research (including the Large Hadron Collider), its criticism must be impeccably evidentiary. So, let's prove on such conditions that the generally recognised version of STR is incorrect [12]-[40], since:

- the relativistic formulas obtained in it are incorrect;
- they are incorrectly explained using the incorrect principle of non-exceedance of the speed of light;
- from the wrong relativistic formulas the wrong conclusions about existence in the nature of our only visible universe and physical unreality of imaginary numbers are made.

[1] It is possible that President Kennedy could have been saved in a similar way at one time.

Indeed, after the creators of STR got their relativistic formulas,

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

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

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

in which m_0 - is the rest mass of a moving body (for example, an elementary particle):

- m - relativistic rest mass of a moving body;
- t_0 - the rest time of the moving body;
- t - relativistic time of a moving body;
- l_0 - rest length of a moving body;
- l - relativistic length of a moving body;

much of what they did afterwards had already been done incorrectly.

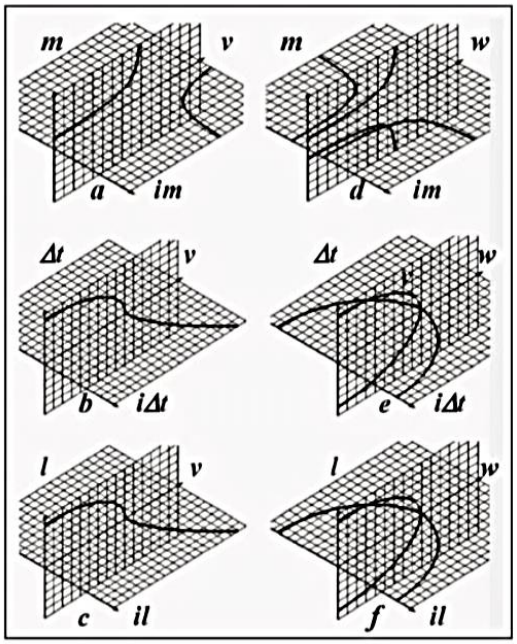

Fig 1: Graphs of functions m(v), Δt(v), l(v) corresponding to the existing and corrected versions of STR in the sublight v < c and hyperlight v > c ranges

Firstly, the authors of STR did not realise that the value v appearing in these formulas according to Newton's first law is the fourth, besides length, width and height, spatial dimension. And therefore relativistic formulas necessarily should be explained not only in sublight $v < c$, but also in hyperlight $v > c$ ranges.

Secondly, not being able to explain the physical meaning of imaginary values of quantities *m(v), Δt(v), l(v)* in the hyperluminal range *v > c* and in order not to admit it[2], they introduced into STR an incorrect postulate called the principle of unexceeded speed of light.

Thirdly, they did not pay attention to the fact that the formula (1) in the hyperluminal *v > c* range corresponds to a physically unstable process, which cannot exist in the nature. And, consequently, the relativistic formulas (1)-(3) are incorrect.

Fourthly, as it will be proved further, the statement of STR about physical unreality of imaginary numbers is incorrect, and therefore the following from it principle of non-exceeding of speed of light and the statement about existence in the nature of our only visible universe are also incorrect. And therefore, the version of STR studied in all physics textbooks is incorrect.

And, although it was never written about[3], in fact, the universally recognised version of the STR was refuted before its creation by Charles Proteus Steinmetz's interpretation of Ohm's[4] law for alternating current circuits published in 1893 [41], which is now used daily by millions of electrical and radio engineers around the world in their practical activities.

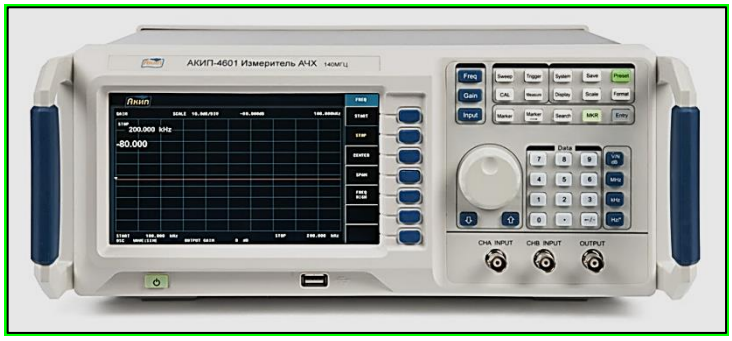

Fig 2: In any radio-technical laboratory there are devices called frequency response meters, which by their mere existence prove the physical reality of complex frequency responses and, consequently, of any other imaginary and complex numbers. And thus they make the failed OPERA experiment unnecessary.

At the same time, of course, proving its validity. Indeed, in the formulation of Ohm's law proposed by Steinmetz, it is stated that not only resistors, but also capacitors and inductors (also called inductance coils) have electrical resistance. But the resistance of resistors is measured by real numbers *R*, and the resistances of capacitors and inductors are measured by imaginary numbers[5] *-1/jωC* and *jωL*.

[2] Since no one would want a theory that even its authors couldn't explain.

[3] Because in 1893-1905. STR didn't exist yet.

[4] And in the original author's interpretation of this law for electric circuits of direct current Georg Simon Ohm was formulated after 9 years of experimental research in 1826, when there were not yet any electrical measuring devices. And in 1828 Ohm was dismissed from his job by the Minister of Education for publishing his research. The high-ranking official believed that the use of mathematics in physics was unacceptable.

[5] In electrical engineering and radio engineering, the imaginary unit is denoted by the letter j, since the letter i denotes electric current.

Therefore, linear electric *LCR*-circuits of any configuration possess resistance measured by complex numbers. Consequently, its value and the value of the current flowing through such a circuit in accordance with Ohm's law in the interpretation of Steinmetz depend on the frequency ω of the sinusoidal voltage applied to this electric circuit. And this makes it possible to perform a very simple but very important experiment, which will allow us to confidently answer the question whether imaginary numbers are physically real. After all, if imaginary resistances of capacitors and inductance coils are physically unreal, their inclusion in electric circuits should not affect the results of *LCR*-circuit resistance measurements. The measured resistance of the *LCR*-circuit in this case will always be measured in real numbers and will not depend on frequency. Conversely, if the imaginary resistances $-1/j\omega C$ and $j\omega L$ are physically real, then when the frequency ω of the voltage applied to the *LCR*-circuit changes, the magnitude of the current flowing through it will change due to the change in the value of its resistance. And all electrical and radio engineers know that the resistance of *LCR*-circuits always depends on the frequency of the voltage applied to them. Which proves the physical reality of imaginary numbers in the most indisputable way. After all, it is only possible to measure what actually exists in nature. Therefore, most of what we know about the world around us, we have learnt with the help of instruments – in physics, biology, chemistry and all other sciences. And in radio engineering, instruments for recording such measurements have long been created and commercially produced - oscilloscopes, frequency response meters, spectrum analysers and others. Even many radio amateurs possess the simplest of such devices - a tester, which allows to measure the capacitor capacitance value. In fact, in accordance with Ohm's law as interpreted by Steinmetz, the tester measures the imaginary value of electrical resistance of the capacitor and recalculates it into the capacitance value. There are other proofs of physical reality of imaginary numbers [42]-[53].

And from the experimentally proved principle of physical reality of imaginary numbers it follows that the postulate about not exceeding the speed of light and the conclusion made with its use about the existence in nature of our only visible universe, in which everything is measured only by real numbers, are incorrect.

CORRECTED VERSION OF STR

Therefore, the relativistic formulas (1)-(3) should be explained in the hyperluminal velocity range $v > c$ also. Moreover, since they are incorrect in this speed range, they need to be fixed first. And remembering Newton's first law, it's clear how the formulas (1)-(3) must be corrected. To make them look like the graphs in Fig. 1d,e,f, similar to the graphs in Fig. 1a,b,c in the range $v < c$, a multiplier i^q must be introduced into them.

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

$$\Delta t(q) = \Delta t_0 i^q \sqrt{1-(v/c-q)^2} = \Delta t_0 i^q \sqrt{1-(w/c)^2} \tag{5}$$

$$l(q) = l_0 i^q \sqrt{1-(v/c - q)^2} = l_0 i^q \sqrt{1-(w/c)^2} \quad (6)$$

where $q(v) = \lfloor v/c \rfloor$ is the "floor" function of discrete mathematics (see Fig. 3a) of the argument *v/c; w = v – qc* is the local velocity for each universe (see Fig. 3b).

This is a convenient function[6] to explain, since for integer values of the argument *0,1,2,3,4,5,…* it takes the alternating values we need *+1,+i,-1,-i,+1,+i,…* corresponding to four different types of universes alternating in space. The value *q=0* corresponds to our visible universe (since for it $i^0 = 1$). And the value *q=1* corresponds to another universe (since for $i^1 = i$), which is invisible to us due to the condition *v > c*, since it is located beyond the event horizon. Stephen William Hawking wrote about imaginary time in such a Multiverse: "Imaginary time is a new dimension, at right angles to ordinary real time". And thus, with his research, he confirmed the validity of the hypothesis of a hidden Multiverse considered below. For the sake of certainty, we will call this corresponding $i^1 = i$ universe tachyon[7], since it contains tachyons, which are understood to be subatomic particles moving at a speed exceeding the speed of light. But many physicists believe that they should not exist in nature (understood to be the Monouniverse corresponding to the generally accepted interpretation of STR), since they violate the principle of causality. And since tachyons are actually not in our universe, but in the tachyon universe (or antiuniverse), they do not actually violate the principle of causality. And, therefore, they do exist.

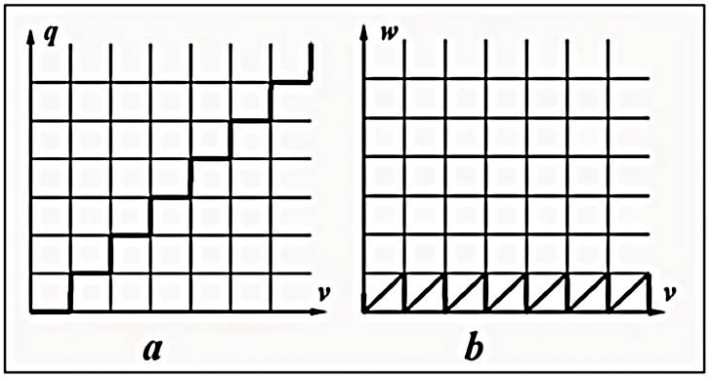

Fig 3: Graphs of the functions q(v) and w(v), illustrating the meaning of the "floor" function of discrete mathematics

For similar reasons, we will call our universe tardyon[8]. And then it will be logical to assert (see Fig. 4) that the value *q=2* corresponds to an invisible tardyon antiuniverse (since for it $i^2 = -1$),

[6] But the i^q function has the disadvantage that it is defined only for integer values 0,1,2,3,4, 5,… of the argument q. Nevertheless, since for these same argument values the Euler formula $e^{iq\pi/2} = \cos(q\pi/2)+i\sin(q\pi/2)$ also takes the same values, then for non-integer argument values the i^q function can be calculated by the formula $i^q = \cos(q\pi/2)+i\sin(q\pi/2)$. The latter formula has a very important advantage – it introduces into the mathematics of hypercomplex numbers a mathematical operation of raising imaginary numbers to a non-integer power, which was absent until now.

[7] The term tachyon universe was coined by Isaac Asimov in his short story "Take a Match".

[8] The term tardion universe was also coined by Isaac Asimov in his short story "Take a Match".

the value *q=3* corresponds to an invisible tachyon antiuniverse (for which $i^3 = -i$), the value *q=4* corresponds to an invisible other tardyon universe (for which $i^4 = 1$) the value *q=5* corresponds to an invisible other tachyon universe (for which $i^5 = i$). And so on.

We will therefore call such an invisible Multiverse hidden [**54**]-[**70**]. Its open helical structure distinguishes it from numerous other Multiverses, some of which are described in [**71**]-[**79**].

Then a natural question arises for her: what is beyond these edges? And this question is similar to the question that arose even among ancient people - what is beyond the edges of our flat, as they believed then, Earth. But the answer to the latter question was never received, since the Earth, as it later turned out, has an almost spherical shape. More precisely, the shape of an ellipsoid of rotation, i.e. a geoid. Therefore, it has no edges. But our questions remain - so what is beyond the edges of the screw structure of the hidden Multiverse. And it will be logical to assume that beyond the edges of the hidden Multiverse, shown in fig. 4, there are other Multiverses, not shown in the figure for simplicity.

It is also time to answer one more natural question - in what space such parallel universes of the hidden Multiverse exist, if they do not intersect? The answer to it can be only one - in the space having more than three dimensions. This circumstance in formulas (4)-(6) is taken into account by the parameter *q,* which is the fourth spatial dimension (since it is a quantity proportional to velocity *v*). In such a four-dimensional space three dimensions *x, y, z* determine the distribution of material contents in each universe and antiverse, and the fourth dimension *q* determines the mutual spatial position of different parallel universes and antiverses.

And since in formulas (4)-(6) the value *q*, is an additional spatial dimension, it can be stated that in the four-dimensional space of such a hidden Multiverse the parallel universes, continuously drifting relative to each other, touch each other all the time and even often slightly sink into each other, forming a set of bidirectional transition zones or portals, which in Fig. 4 are indicated by single two-sided arrows. On Earth the entrances to the portals [**80**],[**81**] are probably at least some of the so-called anomalous zones [**82**]-[**85**]. And on Earth they can be on its surface, above and below its surface, on the surface of rivers, lakes, seas, oceans and in their depths. These anomalous zones can have different sizes and manifest themselves in different ways. And through these portals neighbouring universes can exchange with each other their material contents, including living inhabitants. Therefore, the mass/energy of parallel universes and antiverses in the hidden Multiverse, no matter how they appeared, must have averaged significantly over billions of years of their existence.

Albert Einstein did not exclude such a correction of STR in the future. He wrote: *"There is no idea in which I would be sure that it will stand the test of time".*

But we have one question left unanswered. As is easy to see, the structure of the hidden Multiverse shown in Fig. 4 has the disadvantage that it does not take into account the existence of the phenomena of dark matter and dark energy, which are not explained in any way. However, they are explained further.

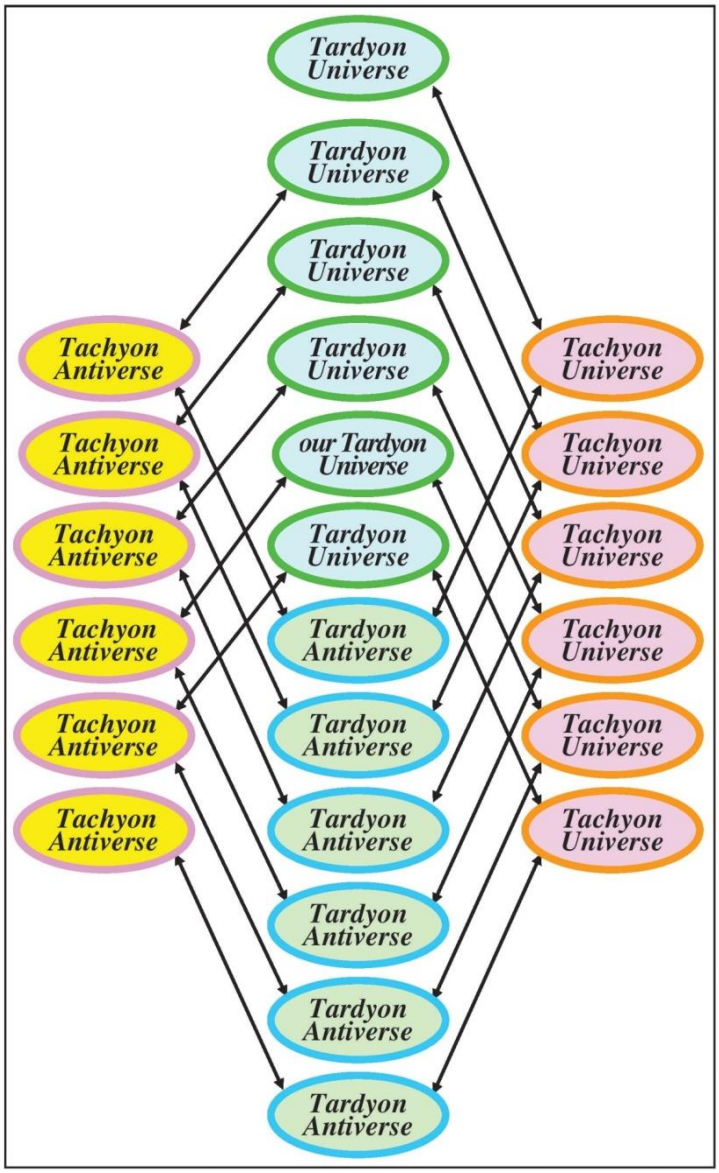

Fig 4: The proposed open-loop screw structure of the hidden Multiverse, corresponding to the principle of physical reality of complex numbers

USING EXPERIMENTAL DATA OBTAINED BY THE WMAP AND PLANCK SPACECRAFT

In the twentieth century, two extremely important scientific discoveries were made in astrophysics. One of them, made in 1932-33 by Jan Hendrik Oort [86] and Fritz Zwicky [87], was called dark matter. The other, called dark energy, was made in 1998-1999 by Saul Perlmutter [88], Brian Schmidt [89] and Adam Riess [90], who were awarded the Nobel Prize for it. Emphasizing the significance of these discoveries, Adam Riess wrote: *"Humanity stands on the threshold of a new physics of the Universe. Whether we like it or not, we will have to accept it."*

According to these discoveries, the mass/energy of dark matter and dark energy is about twenty times greater than the mass/energy of our visible universe, making the problem of explaining them extremely relevance. But these discoveries turned out to be very inexplicable

Indeed, in any range of electromagnetic waves, dark matter and dark energy are invisible, since they do not radiate these waves, do not absorb or reflect. Therefore, they are inaccessible to direct observation. In addition, neither molecules, nor atoms, nor subatomic particles were found in the composition of dark matter and dark energy[9]. Over the past decades, searches for an explanation of the phenomena of dark matter and dark energy were given very much attention and a very large amount of scientific research was done. But the phenomena were not explained. Sol Perlmutter on this occasion noted: *"The Universe consists mainly of dark matter and dark energy, but we can't imagine what it is".*

And, of course, this situation prompts to think about what is the reason for this result? What is not taken into account? What can be the directions of possible alternative scientific research in accordance with the remark of Albert Einstein: *"It is pointless to continue to do the same and expect other results."* And the reason for the inexplicability of the phenomena is that the names of these scientific discoveries were understood too literally. Although due to the incomprehensibility of the subject of discoveries, it was impossible to give them more correct names. Nevertheless, the names of these discoveries and what was known about them, as if prompted that the explanation of dark matter and dark energy should most likely be to look somewhere in the microworld of our world, in some of its new structure. Since due to the hypothesis of the Monouniverse, which is in a hundred consequence of the principle of non-exceedance of the speed of light, an explanation of dark matter and dark energy, it would seem, was nowhere else to look for. Therefore, the Nobel Prize laureate Stephen Weinberg suggested: *"I hope that it will be possible to open particles of dark matter and that some manifestations of super-symmetry will be discovered. Perhaps, that a* superparticle *will be disco-vered, which is just a particle of dark matter. It will be simply remarkable if this happens".* They are still looking for this superparticle.

EXPLANATION OF THE PHENOMENA OF DARK MATTER AND DARK ENERGY

Therefore, in the article offered to the attention of readers, an attempt was made to outline the basic principles of a probable alternative explanation of the phenomena of dark matter and dark energy. Moreover, this explanation even implies the existence of another previously unknown phenomenon – the phenomenon of dark space [91], [92].

The structure of the hidden Multiverse can be clarified using data obtained by the WMAP spacecraft, launched in 2001 by the National Aeronautics and Space Administration (NASA) and operating until 2010 [93], as well as the Planck spacecraft, launched by the European Space Agency (ESA) in 2009 and operating until 2013 [94]. According to data obtained by the WMAP spacecraft, the entire universe (in fact, the entire 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, 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. As you can see, these results do not differ much. And this gives rise to confidence that they are correct. But what dark matter and dark energy themselves are has never been explained. It is for this incomprehensibility that these physical entities were called dark.

[9] This alone was supposed to suggest that dark matter and dark energy may not be material physical entities, but are only unusual images of something like a gravitational shadow.

And since it was proven above in the most indisputable way that in nature there is not a Monoverse, but a hidden Multiverse, then dark matter and dark energy must somehow be present in it. And it is possible that the phenomena of dark matter and dark energy are somehow generated by the entire structure of the hidden Multiverse and are due to the mutual influence of the invisible universes on each other. This alternative assumption we will further consider. Then, if we abandon the condition of seeking an explanation of dark matter and dark energy within the framework of the Monoverse hypothesis and seek it in the hidden Multiverse, then this allows us to quite clearly and convincingly explain the main features of these phenomena that have remained unexplained until now – their invisibility and undetectable corpuscular content:

- dark matter and dark energy are not actually some kind of material physical entities, but merely phenomena (something like a gravitational image) generated by the existence, in addition to our visible tardion universe, of other invisible parallel universes and antivrtsrs of the hidden Multiverse;
- dark matter is a phenomenon generated by the existence of invisible parallel universes and antivrtsrs neighbouring our universe in the hidden Multiverse;
- dark energy is a phenomenon generated by the existence of others, except our visible universe, neighbouring invisible parallel universes and antiverse of the hidden Multiverse;
- and precisely because dark matter and dark energy are just phenomena, they have no material content, and therefore they are invisible in themselves.

That is, there is no unusual material content in dark matter and dark energy in nature. Just as there is no material content in our shadow on a sunny day.

Such explanation of these phenomena also allows to understand the structure of the hidden Multiverse. Indeed, assuming the mass of different invisible parallel universes and antiverses in the hidden Multiverse with a high degree of accuracy due to the presence between them of a large number of portals existing for billions of years is almost the same, it is possible to determine:

- how many parallel universes and antiverses make up the hidden Multiverse. And according to the above data obtained by the WMAP spacecraft, their number is 100% / 4.6% = 21.74. And according to the data obtained by the Planck spacecraft, their number is 100% / 4.9% = 20.41. Consequently, their real number is presumably equal to 20...22 universes and antiverses. I.e. besides our visible universe there are 19 ... 21 invisible universes and antiverses.
- how many parallel universes and antiverses are neighbouring our universe and give rise to the phenomenon of dark matter. According to the data obtained by the WMAP spacecraft, their number is 22.4 %/ 4.6 %= 4.87. And according to the data obtained by the Planck spacecraft, their number is 26.8% / 4.9% = 5.47. Consequently, their real number is most likely equal to 5...6 parallel universes and antiverses.
- how many parallel universes and antiverses give rise to the phenomenon of dark energy. And according to the data obtained by the WMAP spacecraft, their number is 73.0% / 4.6% = 15.87. And according to the data obtained by the Planck spacecraft, their number is 68.3% / 4.9% = 13.94. Consequently, their real number, presumably, is equal to 14...16 parallel universes and antiverses.

STRUCTURE OF THE HIDDEN MULTIVERSE

And then the discrepancy of the obtained results of these calculations with the structure of the hidden Multiverse given above in Fig. 4 is immediately striking. which cannot be explained by inaccurate measurements of WMAP and Planck spacecraft, because the difference between the results of calculations and experimental data is too great. Neighbouring with our universe other parallel universes appeared not two, but five or six. But such a number of them does not fit into the structure shown in Fig. 4.

Moreover, the above calculations allowed us to determine only statistical average datas. And since there are more than two hundred thousand anomalous zones and, consequently, portals on the Earth, it is not excluded that some small number of portals on the Earth can connect it with a larger number of neighbouring universes. Therefore, the astro-geophysical studies of portals mentioned below will presumably provide very valuable information about other universes of the hidden Multiverse.

Then it is logical to assume that the previous reasoning contained some mistake. And this error consists in the fact that earlier for simplicity we assumed in the hidden Multiverse the existence of only one additional dimension and, consequently, its correspondence to physically real complex numbers containing only one imaginary unit. And for six other parallel universes – three tachyon universes and three tachyon antiverses – to neighbour our universe it is necessary to have three additional dimensions *q, r, s,* by which their position in space will be determined. Consequently, the space of such a hidden Multiverse will be six-dimensional (see Fig. 5). And its structure will correspond to quaternions $\sigma + i_1\omega + i_2\omega + i_3\omega$, i.e. hypercomplex numbers [**95**], containing just three imaginary units i_1, i_2, i_3, which are related to each other by relations

$$i_1^2 = i_2^2 = i_3^2 = -1 \tag{7}$$

$$i_1 i_2 i_3 = i_2 i_3 i_1 = i_3 i_1 i_2 = -1 \tag{8}$$

$$i_1 i_3 i_2 = i_2 i_1 i_3 = i_3 i_2 i_1 = 1 \tag{9}$$

In such a quaternionic structure of the hidden Multiverse, the distribution of material contents in each three-dimensional parallel universe and antiverse will be determined by some function $f_{qrs}(x,y,z)$, and the values i_1q, i_2r, i_3s are the coordinates of these universes and antiverses (see Fig. 5). I.e. the structure of the hidden Multiverse is described by the formula $f_{qrs}(x,y,z) + + i_1q + i_2r + i_3s$. This is what Lisa Randall meant: *"Perhaps we live in a three-dimensional pocket of multidimensional space".*

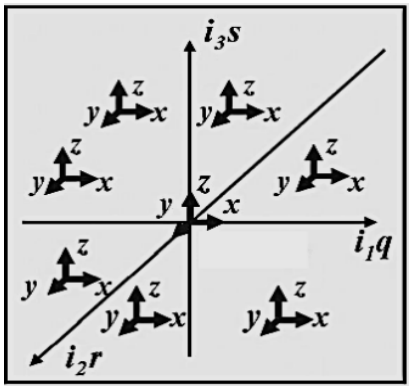

Fig 5: Six-dimensional space of the hidden Multiverse, in which q, r, s – are coordinates of invisible parallel universes and antiverse, and x, y, z – are coordinates of material contents in each such parallel universe and antiverse

Therefore, relativistic formulas (4)-(6) should be once again corrected as follows

$$m(q,r,s) = \frac{m_0 i_1^q i_2^r i_3^s}{\sqrt{1-[v/c-(q+r+s)]^2}} \tag{10}$$

$$\Delta t(q,r,s) = \Delta t_0 i_1^q i_2^r i_3^s \sqrt{1-[v/c-(q+r+s)]^2} \tag{11}$$

$$l(q,r,s) = l_0 i_1^q i_2^r i_3^s \sqrt{1-[v/c-(q+r+s)]^2} \tag{12}$$

where $q(v) = \lfloor v_q/c \rfloor$ is the "floor" function of discrete mathematics from the argument *v/c*, which is the fourth spatial dimension;

- $r(v) = \lfloor v_r/c \rfloor$ is the "floor" function of discrete mathematics from the argument *v/c*, which is the fifth spatial dimension;
- $s(v) = \lfloor v_s/c \rfloor$ is the "floor" function of discrete mathematics from the argument *v/c*, which is the sixth spatial dimension;
- $v_q, v_r\ v_s$ are projections of velocity vector v on orthogonal coordinates *q, r, s*.

Therefore from formulas (10)-(12) follows a very important conclusion - the velocity v mentioned in Newton's first law, which serves in the uncorrected version of STR as the fourth spatial dimension, turns out to be not scalar, but vector quantity, determining in orthogonal coordinates i_1q, i_2r, i_3s the position in the cosmic space of universes and antiverse of the hidden Multiverse.

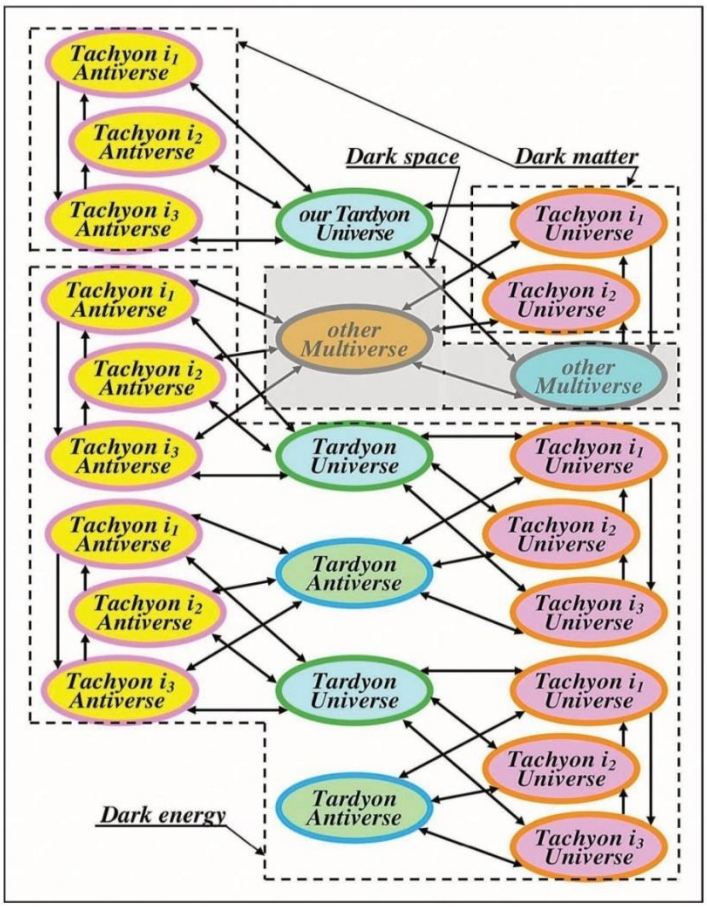

Fig 6: The proposed open-loop screw structure of the hidden Multiverse, corresponding to the principle of physical reality of hypercomplex numbers

And the information about the screw structure of such hidden Multiverse is contained in formulas (7)-(9). It follows from them that it is possible to move to the tardion antiverse from the tardion universe and to the tardion universe from the tardion antiverse in different, but not arbitrary ways, but only in such a way that the value i_1^q, i_2^r, i_2^s will successively take the values $+1, +i_1 \oplus +i_2 \oplus +i_3, -1, -i_1 \oplus -i_2 \oplus -i_3, +1, \ldots$ etc.., where $\oplus$ is the symbol of the logical operation of discrete mathematics 'exclusive OR'. In this case, different trajectories of travelling from one universe (or antiverse) to another can differ only by replacing one tachyon universe i_1, i_2, i_3 by another and one tachyon antiverse i_1, i_2, i_3 by another. Hence, the tachyon universes i_1, i_2, i_3 in the hidden Multiverse are placed parallel to each other. The tachyonic antiverse i_1, i_2, i_3 are also placed parallel to each other for the same reasons. And so in the hidden Multiverse parallel universes and antiverse must alternate in the following sequence - 'tardion universe', 'one of the tachyon universes', 'tardion antiverse', 'one of the tachyon antiverse', 'tardion universe', 'one of the tachyon universes', etc. An example of the quaternionic structure of such a hidden Multiverse is given in Fig. 6.

Thus, one difference of the structure shown in Fig. 6 structure from the structure shown in Fig. 4 is the presence in it of several different parallel included tachyon universes and antiverses corresponding to three imaginary units i_1, i_2, i_3. Another difference of the Multiverse structure,

due to formulas (7)-(9), is the presence in this structure of the Multiverse not only of bidirectional portals corresponding to formula (7) and denoted by bilateral arrows, but also of unidirectional portals[10] corresponding to formulas (8), (9) and marked by unilateral arrows.

HOW TO EXPERIMENTALLY PROVE THE EXISTENCE OF PORTALS?

The above information is quite convincing. But only if the portals actually exist. And only experiments can give full confidence in this. So it's time to describe such an experiment. And the proposal to conduct an inexpensive but very convincing experiment has already been published [96]-[113].

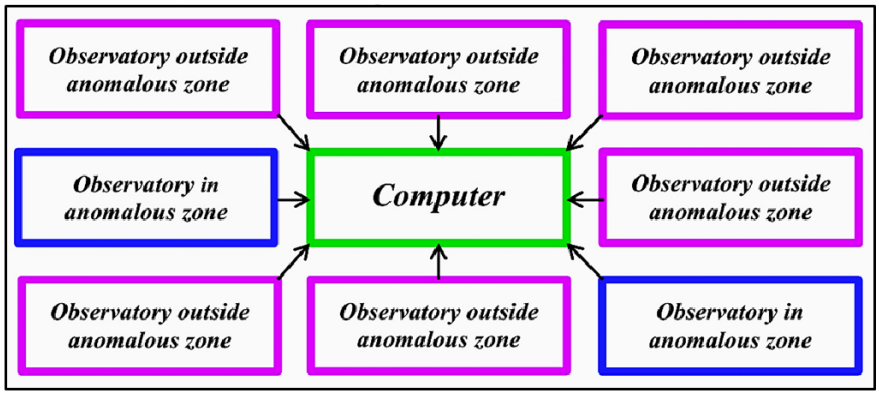

Fig 7: Scheme of an astronomical experiment to detect invisible universes

As can be seen in Fig. 6, all portals begin and end at different astronomical objects. Consequently, on the starry sky at the entrance and exit of portals will always be observed completely different constellations. Therefore, when travelling through the portals, the map of the starry sky will gradually change, eventually gradually replacing some constellations with others. And the fact that constellations, never observed outside the portals, will be observed in the portals will allow to detect the portals. And not only portals, but also neighbouring universes[11], which will allow the structure of our hidden universe to be clarified. And even to determine the possible presence of neighbouring universes and antiverse, which are not included in the hidden Multiverse. But forming together with the hidden Multiverse the Hyperuniverse, to which corresponds the phenomenon of dark space.

And the entrances to the portals are the so-called anomalous zones, of which there are many on our planet - more than two hundred thousand. And in some of these anomalous zones, observatories have already been located. Like, for example, the Main Astronomical Observatory of the National Academy of Sciences of Ukraine, which is located in the Goloseevsky forest just 12 km from the center of the capital of Ukraine, Kyiv.

[10] Due to what circumstances in such portals movement is possible only in one direction - from entrance to exit - it is difficult for us, living in a space in which movement is possible in any direction, even to imagine. And the processes that make such movement possible in nature are yet to be understood. But they are more dangerous than bidirectional portals for visitors who have entered such unidirectional portals, because it is impossible to return to one's own universe from them. Though in the underground with unidirectional movement on escalators we do meet them. But the underground is not nature.

[11] In the same way, we can see the adjacent invisible room (or at least the edge of it, to make sure it exists) next to our visible room, which we are currently in, only if we go into the corridor between these rooms.

But people avoid going into the portals. And rightly so, because portals are labyrinths and they're invisible. So, if you accidentally once you've entered a portal, it's almost impossible to get out. But it's possible to create equipment for orientation in portals is possible. It's also possible to use unmanned remotely piloted vehicles using unmanned, remote-controlled robotic vehicles. You just have to want to. It is even possible not to go far into the portals, but to limit ourselves to the use of anomalous zones. Although in anomalous zones, i.e. at the very edge of the portals, the change in the appearance of the constellations we know is very small, still can be detected by comparing on the computer (Fig. 7) observations of the same areas of the starry sky by different observatories located both in the anomalous zones and outside the anomalous zones in the same region.

And if these differences are too small, the telescope will have to be moved deeper into the portal. After all, Sir Arthur Stanley Eddington [114] was able to carry out his famous experiment, which confirmed the predicted by the general theory of relativity deviation of light rays in the gravitational field of the Sun back in 1919, to move his telescope much further – from England to the island of Principe in the Atlantic Ocean.

THE RELEVANCE OF ASTRO-GEOPHYSICAL RESEARCHES OF PORTALS NEEDED TO CREATE A TIME MACHINE

Thus, the above allows us to consider it proven that:

- the hidden Multiverse really physically exists;
- the hidden Multiverse has a quaternionic structure and contains, in addition to our visible tardionic universe, about twenty more mutually invisible tardionic and tachyon universes and antiverse, connected with each other by bidirectional and unidirectional portals;
- the tardion and tachyon universes contain matter, space and time, and the tardion and tachyon antiverse contains anti-matter, anti-space and anti-time;
- travelling through the hidden Multiverse in space is accompanied by time travel.

It follows that in the hidden Multiverse it is possible to create different time-travelling routes in the hidden Multiverse by setting the corresponding routes of travelling through this Multiverse in space. But we will not do it, because the research of such routes in the hidden Multiverse would be too expensive. And it is not necessary, as for creation of time machines we need only information which can be received by geophysical researches of portals [115]-[132]. And not even the research of portals on full depth, but only the research of their relatively small entrance areas, because, most likely, their geophysical parameters will be the same along the entire length of the portals from the entrance to the exit.

CONCLUSION

In the article examples of practically useful and realisable on the Earth time travels with the use of time zones are given.

In the article it is also proved that the version of STO studied in all physics textbooks is incorrect because:

- the relativistic formulas obtained in it are incorrect;

- they are incorrectly explained using the incorrect postulate about the non-exceeding of the speed of light;
- from incorrect relativistic formulas wrong conclusions about physical unreality of imaginary numbers and about existence of our only visible universe in nature are made.

Therefore, the corrected version of STO was created, in which;

- the principle of physical reality of imaginary numbers is experimentally proved and theoretically explained, by which the postulate about non-exceeding of the speed of light is refuted;
- the corrected relativistic formulas explained with the use of the principle of physical reality of imaginary numbers are obtained;
- from the corrected relativistic formulas the conclusion about existence in Nature of quaternionic structure of the hidden Multiverse, containing besides our visible Universe about twenty mutually invisible tardionic and tachyon universes and antiverses, connected with each other by bidirectional and unidirectional portals, was made.

The article describes experiments that allow by geophysical researches to experimentally prove the existence of portals. And the knowledge obtained in such geophysical research will allow the creation of time machines.

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