PHYSICAL SCIENCES

RELATIVISTIC FORMULAS OF THE EXISTING VERSION OF THE SPECIAL THEORY OF RELATIVITY ARE INCORRECT, THEY ARE INCORRECT EXPLAINED AND INCORRECT CONCLUSIONS ARE DRAWN FROM THEM

Antonov A.A.
Ph.D, HonDSc, HonDL, H.ProfSci, ResProf,
Independent Researcher,
Kiev,Ukraine
DOI: 10.24412/2701-8377-2021-4-1-38-47

Abstract

The article shows that the relativistic formulas of the existing generally acknowledged version of the special theory of relativity (STR) are incorrect; they have been incorrectly explained by using the incorrect principle of light speed non-exceedance and entailed wrong conclusions consisting in existence of only our visible universe and physical non-existence of concrete imaginary numbers. Therefore, the existing version of the STR is incorrect and it was not created in the 20th century. Moreover, it could not be created at that time, since the experimental data required for this were obtained only in the 21st century.

Therefore, an alternative version of SRT, free from the indicated disadvantages, is presented. It is based on:

- experiments carried out in the 21st century that prove the general scientific principle of physical reality of imaginary numbers refuting the principle of light speed non-exceedance;
- data obtained by the WMAP and Planck spacecraft, which allow us to determine the metrics and structure of the space in which our hidden Multiverse exists;
- proposal for astronomical observations in anomalous zones, which will allow, by registering constellations in their starry sky, to experimentally prove the existence of invisible universes..

The alternative version of the STR has made it possible to explain the phenomenon of dark matter and dark energy, as well as the existence of antimatter that does not annihilate with matter and tachyons that do not violate the principle of causality.

Keywords: imaginary numbers; special theory of relativity; dark matter; dark energy; dark space; Multiverse; Hyperverse; invisible universes; anomalous zones.

1. Introduction

Creation of the special theory of relativity (STR) [1] - [3] was the most outstanding scientific achievement of 20th-century physics. The STR has been represented in all university and even school physics textbooks. Ironically, the existing physics of real numbers can't explain the main result of the theory, its relativistic formulas. At hyperlight speeds, when $v > c$, the formulas

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

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

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

where m_0 is the rest mass of a physical body;

m is the relativistic mass of a moving physical body;

Δt_0 is the rest time of a physical body;

Δt is the relativistic time of a moving physical body;

l_0 is the rest longitudinal length of a physical body;

l is the relativistic longitudinal length of a moving physical body;

v is the velocity of a moving physical body;

c is the speed of light

actually lead to the results that are measured by imaginary numbers discovered 500 years ago, but unexplained until very recently. And no one can explain what is, for example, $2i$ kilograms, $3i$ seconds, $5i$ meters (where $i = \sqrt{-1}$ is the imaginary unit) in our space of real numbers.

However, the creators of the STR couldn't actually admit that they didn't know how to explain the relativistic formulas of their theory, since the theory would no longer be necessary. Therefore, the principle of light speed non-exceedance turned out to be in demand in the STR. Moreover, the principle has been proved in the STR neither theoretically nor experimentally. Thus, it has been just a postulate, i.e. unproven assumption. As shown below, it turned out to be wrong.

Besides, the formulas (1) - (3) were misexplained with the use of the incorrect principle of light speed non-exceedance. This led to wrong conclusions about the absence of any physical content in imaginary numbers and the uniqueness of our visible universe.

In 1958 Pavel Alekseevich Cherenkov, Igor Evgenievich Tamm and Ilya Mikhailovich Frank received the Nobel Prize for the discovery and interpretation of

Cherenkov radiation [4], emitted when charged particles move through a transparent medium at a speed greater than the speed of light in that medium. Apparently, the discovery refuted the principle of light speed non-exceedance in its original formulation. However, the situation was saved by correcting the formulation of the principle of light speed non-exceedance. It was clarified that the principle implied movement of a physical body only in a vacuum.

This, of course, raised doubts about the truth of the principle of light speed non-exceedance. There were also natural doubts about its infallibility, despite the almost triumphant recognition of the STR. Even Albert Einstein wrote: *"There is no single idea, which I would be sure that it will stand the test of time".* Over time the doubts only strengthened due to failure to explain many fundamental astrophysical problems, such as the phenomenon of dark matter and dark energy, the existence of antimatter and tachyons, etc, using the STR. And the development of the STR ceased.

Therefore, there emerged a necessity of an experiment that would dispel doubts and either confirm or refute the principle of light speed non-exceedance and the physical reality of concrete[1] imaginary numbers. The highly publicized OPERA experiment that was meant to detect superluminal neutrinos seemed to be the right one. On September 23, 2011, the OPERA collaboration published a sensational report [5] on registration of such neutrinos and refutation of the STR. However, on March 15, 2012, the ICARUS collaboration published a no less sensational report [6] on refutation of the OPERA experiment. That has even created illusion of irrefutability of the STR.

2. The principle of physical reality of imaginary numbers

As evidenced by facts, creation of such illusion was likely to be the true goal of the OPERA and ICARUS experiments. Thus, results of alternative experimental studies of processes in linear electric circuits [7] - [12] that indisputably proved physical reality of imaginary numbers were actually published in 2008-2010, i.e., prior to publication of OPERA experiment results. And since *"mathematics is an experimental science"* as according to Oliver Heaviside, the language of mathematics is the common language of all exact sciences. Therefore, the principle of physical reality of imaginary numbers is both general scientific and physical. Besides, the experimental studies that have proved the principle of physical reality of imaginary numbers are simple and can be repeated and verified in any radio engineering laboratory. Consequently, they are quite reliable and convincing, unlike the unsuccessful OPERA experiment. They even made the OPERA experiment unnecessary. The OPERA and ICARUS collaborations have not commented on either these or subsequent radio engineering experimental studies [13] - [23]. Nevertheless, these studies have never been refuted.

Publications [11] - [26] covered even three different experimental proofs in favour of the principle of physical reality of imaginary numbers:

- A proof resulting from the study of oscillatory resonant processes [11] - [10], [12], [14], [15], [16], [23]. It implied that there would be neither television, nor radiolocation, nor GPS trackers, nor mobile phones, nor many other things without which modern life would be unthinkable, if the STR assertion that imaginary numbers weren't physically real were true;
- A proof resulting from the study of oscillatory transient processes [12], [13], [15], [16], [23] in linear electric circuits. It implied that church bells and pianos would not sound, there would be no tsunami, and even children's swing wouldn't sway after being pushed by parents, if the STR assertion that imaginary numbers weren't physically real were true;
- A proof resulting from the use of Ohm's law in the interpretation of Steinmetz [17] - [23]. It implied that the principle of light speed non-exceedance could be refuted even before creation of the STR.

How much dogmatic the modern higher physical education is, that people who received it turned out to be incapable of understanding all this, in particular, the world created by nature and engineers, the world they live in and the word that refutes dogmas they have learned, at every turn, whenever they turn on the TV or start talking on a cell phone, whenever they hear music or a bell ring, whenever they see a child on swing or use a GPS tracker in their car to get to work quicker. And one can't but wonder how people with such an education can be able to think so creatively as to understand the structure of distant universes and processes taking place therein, if they do not understand things that surround them, even things taught at another college or at another faculty of their college.

3. Relativistic formulas of the existing version of the STR are incorrect

That is why it has not been understood so far that the relativistic formulas (1) - (3) of the existing version of the STR are actually incorrect. But since the principle of physical reality of imaginary numbers proved in radio engineering is generally scientific, it is obligatory for use in physics as well. Therefore, both branches on the graphs of relativistic formulas (see Fig. 1 a, b, c), on the interval $0 \le v < c$ and on the interval $c \le v < \infty$, must be explained. If the graphs of the relativistic formulas (1) - (3) do not correspond to the laws of nature and therefore are inexplicable on the interval $c \le v < \infty$, then the formulas are incorrect. "Tertium non datur (Lat.)", i.e. there is no in-between.

[1] I.e. provided with references to units used to measure parameters of corresponding physical objects and processes

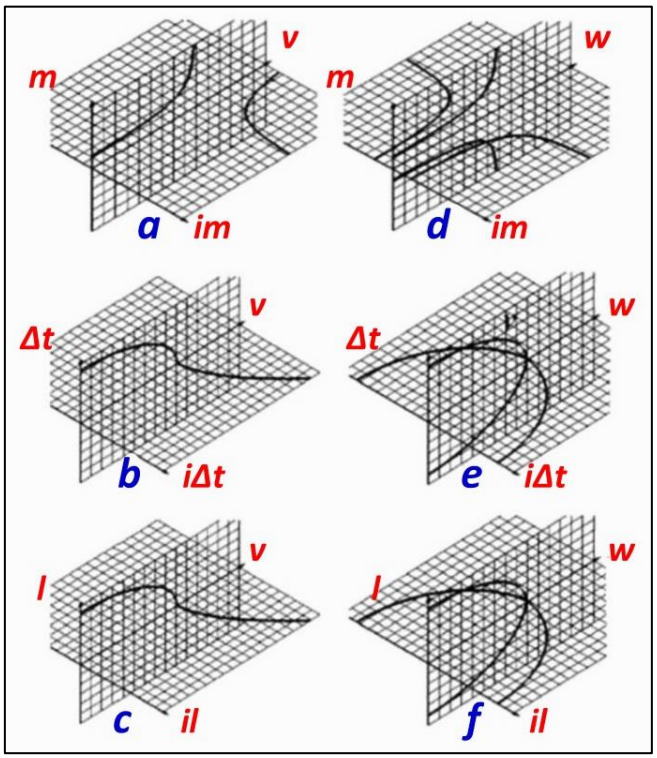

Fig. 1. *Graphs of functions (1) - (3) corresponding to the existing version of the STR, and (7) - (9) corresponding to its alternative version*

4. Refutation of the principle of light speed non-exceedance

Since the graphs of relativistic formulas (1) - (3) corresponding to the interval $c \le v < \infty$ might be physically real despite their inexplicability, the principle of light speed non-exceedance is also incorrect. There can be no other conclusion. Experiments inevitably refute postulates. Although in all other respects the existing version of the STR is mathematically flawless, it collapses like a house of cards without the principle of light speed non-exceedance.

And this is precisely the reason for persistent disregard of all the mentioned experimental proofs of the principle of physical reality of imaginary numbers. On the one hand, they can't be refuted, and, on the other hand, corporate interests do not allow acknowledging them, as it would mean declaring the STR version described in textbooks incorrect. Then it would require creation of an alternative version of the STR.

5. Relativistic formulas of the alternative version of STR

What kind of version could be alternative? Answers to this question can be widely different. And, perhaps, the only thing that is beyond doubt in this new theory is that it should stipulate existence of our visible universe. Since something physically real must correspond to the interval $c \le v < \infty$, it is logical to assume that our universe is one of many similar universes. Therefore, graphs of relativistic formulas for unknown worlds corresponding to the interval $c \le v < \infty$ should bear a resemblance to the graphs shown in Fig. 1 a, b, c. For example, as in Fig. 1 d, e, f, for which relativistic formulas take the following form

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

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

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

where $q = \lfloor v/c \rfloor$ is the 'floor' function of argument v/c;

$w = v - qc$ is the local velocity for each universe, which can take values only in the range $0 \le w < c$;

v is the velocity measured from our universe.

The parameter q in these formulas is the fourth spatial dimension[2], whose integer values correspond to the coordinates of different parallel[3] universes. Herewith, the quantity $q = 0$ corresponds to our visible universe, since it is on the interval $0 \le v < c$ on the graphs 1 d, e, f, and the quantity $q = 1$ corresponds to the adjacent invisible universe[4], since it is on the interval $c \le v < 2c$ on the same graphs and, thus, beyond

[2] Therefore, each universe in such a hidden Multiverse has two adjacent universes in the dimension q

[3] Since they do not intersect despite their infinity

[4] Consequently, the physics of imaginary numbers is the physics of an invisible world, whereas the physics of real numbers is the physics of a visible world. However, an invisible world exists; for example, in the form of the next room with all its contents, invisible from the room we are in at the moment

the event horizon. Let's, therefore, call it a tachyon universe by the name of eponymous faster-than-light particles. By a similar argument our universe should be referred to as tardyon universe. Subsequently, the quantity $q = 2$ corresponds to a tardyon antiverse invisible on the interval $2c \le v < 3c$, since $i^2 = -1$ for it. The quantity $q = 3$ corresponds to a tachyon antiverse invisible on the interval $3c \le v < 4c$, since $i^3 = -i$ for it. The quantity $q = 4$ corresponds to another tardyon universe[5] invisible on the interval $4c \le v < 5c$, since $i^4 = 1$ for it. The quantity $q = 5$ corresponds to another tachyon universe invisible on the interval $5c \le v < 6c$, since $i^5 = i$ for it, etc. Thus, the relativistic formulas (4) - (6) of the alternative STR imply that there exists a Multiverse consisting of mutually invisible parallel universes (and, therefore, referred to as hidden), rather than a Monoverse, as claimed by the existing version of the STR.

Moreover, invisible parallel universes have actually no fixed location in the hidden Multiverse. They slowly drift, touch each other and even slightly penetrate into each other, generating a sort of transitional zones, usually called portals or star gates [24] - [27].

6. Use of data obtained by the WMAP and Planck spacecraft

Although the WMAP and Planck spacecraft were launched for the purpose that was not related to the issues discussed in the article, valuable data obtained by them allowed determining the metric of the space we live in and clarifying the structure of the hidden Multiverse. Therefore, we recall that according to WMAP data [28] total mass/energy of the entire universe (actually the hidden Multiverse) consists of 4.6% of ordinary (baryonic) matter, 22.4% of dark matter and 73.0% of dark energy. And according to more recent Planck data [29], total mass/energy of the entire universe (actually, again, the hidden Multiverse) consists of 4.9% of ordinary (baryonic) matter, 26.8% of dark matter and 68.3 % of dark energy.

However, it is still unclear what dark matter discovered by Jan Hendrik Oort [30] and Fritz Zwikky [31] in 1932-33, as well as dark energy discovered by Saul Perlmutter [32], Brian Schmidt [33] and Adam Riess [34] (who were awarded the Nobel Prize for their discoveries) in 1998-1999 are.

The phenomenon of dark matter and dark energy has been called as such for its incomprehensibility [35] - [38]. It is unclear why dark matter and dark energy are completely invisible in all ranges of electromagnetic oscillations and registered only by their gravitational manifestations. It is even more unclear why neither molecules, nor atoms, nor even subatomic particles have been found in dark matter and dark energy, although their total mass/energy is about twenty times greater than the mass/energy of our visible universe. And this completely does not comply with modern concepts of physical chemistry about the essence of matter. Many other things are as well incomprehensible.

Therefore, explanation of the phenomenon of dark matter and dark energy is the most important issue in physics. In this regard, Nobel laureate Professor Adam Riess believes: *"Humanity is on the verge of a new physics of the Universe. Whether we want it or not, we will have to accept it".*

Nobel laureate Professor Albert Einstein explained the reasons for incomprehensibility of this phenomenon very clearly: *"Insanity: doing the same thing over and over again and expecting different results"*. Sir Isaac Newton was of the same opinion: *"No great discovery was ever made without a bold guess".*

In fact, when seeking an explanation for the phenomenon of dark matter and dark energy, only one of all the possible solutions to this problem has been considered so far; and it should certainly correspond to the existing version of the STR, which states that we live in the Monoverse.

If one makes a bold assumption and tries to solve this problem differently, for example, using the hypothesis of the hidden Multiverse, the solution would be surprisingly simple and clear [39] - [47]:

- dark matter and dark energy are invisible because they are generated by invisible universes of the hidden Multiverse, provided that dark matter is generated by invisible universes adjacent to our visible universe and dark energy is generated by other invisible universes of the hidden Multiverse more distant from our visible universe;
- neither molecules, nor atoms, nor subatomic particles can ever be detected in dark matter and dark energy, because dark matter and dark energy are just an image (gravitational, rather than optical and still less electromagnetic), a sort of a shadow, rather than a material substance.

In accordance with the Occam's razor criterion suggesting that the simplest explanation is the most correct, the above explanation of the phenomenon of dark matter and dark energy is most probably true here.

Therefore, taking into account the data obtained by the WMAP and Planck spacecraft and believing that the mass/energy of each invisible universe become almost the same as the mass/energy of our visible universe due to presence of portals and exchange of physical content with other universes through them, we can conclude that:

- the entire hidden Multiverse consists of ***100%/4.6%=21.8*** invisible parallel universes according to the WMAP data and ***100%/4.9%=20.4*** invisible parallel universes according to the Planck data, i.e. the hidden Multiverse contains approximately ***20...22*** invisible parallel universes;
- dark matter is generated by ***22.4%/4.6%=4.9*** invisible parallel universes according to the WMAP data and by ***26.8%/4.9%=5.5*** invisible parallel universes according to the Planck data, i.e. approximately ***5...6*** invisible parallel universes;
- dark energy is generated by ***73.0%/4.6%=15.9*** invisible parallel universes according to the WMAP data and by ***68.3/4.9%=13.9*** invisible parallel universes

[5] It is shown below that our Multiverse contains more than twenty mutually invisible parallel universes

according to the Planck data, i.e. approximately ***14...16*** invisible parallel universes.

And it was naturally impossible to guess such results by any postulates. Therefore, the Nobel laureate Steven Weinberg spoke very clearly about postulate-based theories: *"Scientific theories cannot be created by purely mathematical reasoning."*

7. Relativistic formulas of the alternative version of the STR (continued)

However, the results do not correspond to the relativistic formulas (4) - (6), since according to the WMAP and Planck data, our tardyon universe has five-six adjacent universes, rather than two. Consequently, the hidden Multiverse has actually three extra dimensions, rather than one.

Therefore, relativistic formulas of the STR (4) - (6) should be once more corrected as follows

$$m=\frac{m_0(i_1)^{q-q_0}(i_2)^{r-r_0}(i_3)^{s-s_0}}{\sqrt{1-[{}^{v}\!/_{c}-(q+r+s-q_0-r_0-s_0)]^2}}=\frac{m_0(i_1)^{q-q_0}(i_2)^{r-r_0}(i_3)^{s-s_0}}{\sqrt{1-({}^{w}\!/_{c})^2}} \quad (7)$$

$$\Delta t=\Delta t_0(i_1)^{q-q_0}(i_2)^{r-r_0}(i_3)^{s-s_0}\sqrt{1-[{}^{v}\!/_{c}-(q+r+s-q_0-r_0-s_0)]^2}=\Delta t_0(i_1)^{q-q_0}(i_2)^{r-r_0}(i_3)^{s-s_0}\sqrt{1-({}^{w}\!/_{c})^2} \quad (8)$$

$$l=l_0(i_1)^{q}(i_2)^{r}(i_3)^{s}\sqrt{1-[{}^{v}\!/_{c}-(q+r+s-q_0-r_0-s_0)]^2}=l_0(i_1)^{q}(i_2)^{r}(i_3)^{s}\sqrt{1-({}^{w}\!/_{c})^2} \quad (9)$$

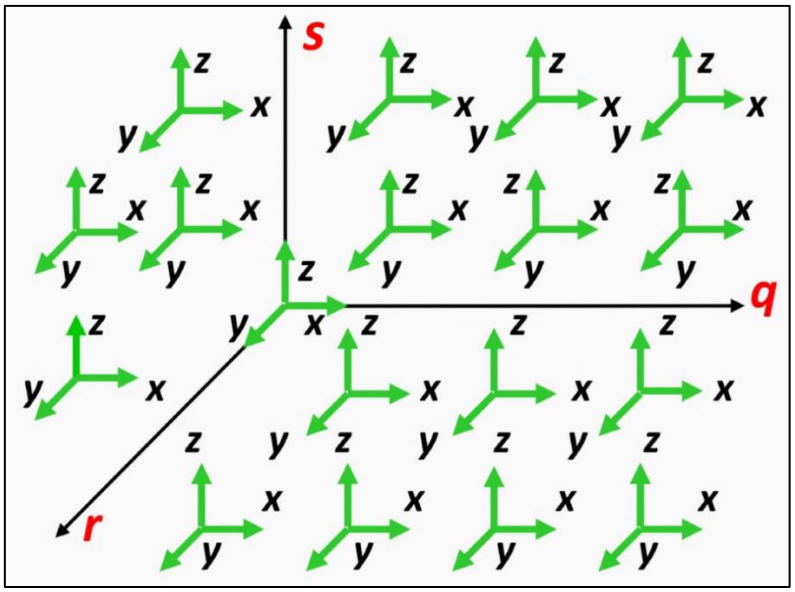

Fig. 2. *Six-dimensional space of the hidden Multiverse*

where q, r, s are the extra dimensions;

q_0, r_0, s_0 are the coordinates of our visible universe in the hidden Multiverse;

v is the velocity measured relative to our visible tardyon universe;

c is the speed of light;

$w = v-(q+r+s-q_0-r_0-s_0)c$ is the local velocity of the universe corresponding to the coordinates q, r, s, that can take values only in the range $0 \le w \le c$;

i_1, i_2, i_3 are the imaginary units in hypercomplex numbers [48], called quaternions, that are interconnected by the following relations

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

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

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

Consequently, metric of space (see Fig. 2) of the hidden Multiverse [49] is determined by the formula $f_{q,r,s}(x,y,z)+i_1 q+i_2 r+i_3 s$, where

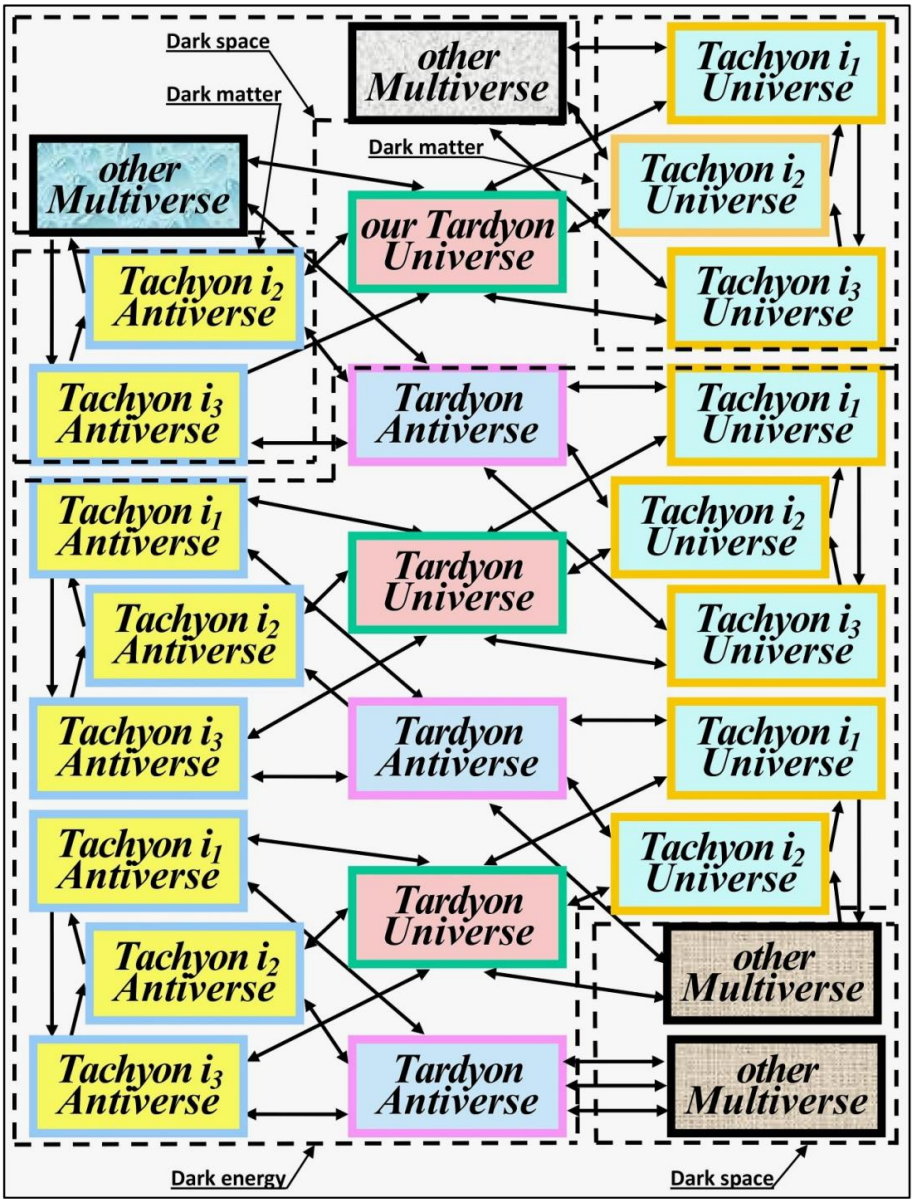

***Fig. 3**. An example of the quaternion structure of the hidden Multiverse*

Fig. 3 shows an example of the structure of the hidden Multiverse corresponding to the results of mathematical processing of data obtained by the WMAP and Planck spacecraft and containing twenty-two parallel universes. As can be seen, the structure is screw. In this structure, tardyon universes and antiverses alternate with tachyon universes and antiverses i_1, i_2, i_3. According to the formula (7) they are interconnected by numerous bidirectional portals shown by single bidirectional arrows. According to the formulas (8) and (9) tachyon universes and antiverses are interconnected by unidirectional portals shown by single unidirectional arrows. Thus, invisible tachyon universes and antiverses adjacent to our tardyon universe evoke the phenomenon of dark matter, whereas other invisible universes of the hidden Multiverse evoke the phenomenon of dark energy. Besides, some universes of our hidden Multiverse are connected through their portals to invisible universes located outside the hidden Multiverse and evoking the phenomenon of dark space [50] - [52].

8. How to see invisible universes

Thus, the alternative version of the STR has come in useful in solving the problem of explaining the phenomenon of dark matter and dark energy.

It turns out to be no less useful in solving the problem of existence of antimatter that does not annihilate with matter [53]. In the hidden Multiverse, matter and antimatter are in tardyon and tachyon universes and antiverses, respectively, and do not annihilate because they are alternate with each other (see Fig. 3), i.e. are in different dimensions. That is way the problem could not be solved within the idea of Monoverse corresponding to the existing version of the STR. The problem of existence of tachyons, not violating the principle of causality, in the hidden Multiverse is solved by the fact that tachyons are located in tachyon, rather than in tardyon universes and antiverses, i.e. in different dimensions. Therefore, it can be assumed that the alternative version of the STR would be useful in solving other astrophysical problems.

Nevertheless, the alternative version of the STR could be considered complete, only when experimental evidence of existence of invisible universes of the hidden Multiverse is received. And it turns out to be possible [54] - [56]. This requires the same thing we do at home, for example, after hearing a strange noise in the invisible room next to us. We should approach the door of the room and look inside to see what is going there. In the same way, we should look inside the adjacent invisible universe through a portal to see its constellations in the starry sky. However, this is not easy. Firstly, nobody has invited us there and so it is not clear how we'll be met. Secondly, the transition through the portal can be quite long and you can get lost in it, since the portals are, presumably, invisible labyrinths And thirdly, it just does not need to be done. The fact is that constellations in the starry sky of different universes by which they can be confidently identified are extremely different. And the starry sky map would change gradually, but distinctly during transition through portals. Therefore, even with slight penetration into the portals, constellations would change so much that they could probably be registered. ***Such registered changes in constellation configuration would be the most indisputable experimental evidence of existence of universes that are invisible outside the portals.***

Fig. 4. Main Astronomical Observatory of the National Academy of Sciences of Ukraine

And some portals for such a shallow and, therefore, safe penetration into them are available and they are described in the literature [57]. Moreover, in some anomalous zones, which are the entrances to the portals, there are even observatories. As, for example, the Main Astronomical Observatory of the National Academy of Sciences of Ukraine, located 12 km from the center of its capital Kiev.

Such an experimental evidence of existence of invisible universes would be much more sensational than the similar experiment conducted by Sir Arthur Stanley Eddington [58] in 1919 or the discovery of America by Columbus.

9. About relativistic physics

However, despite the fact that Albert Einstein failed to complete creation of the STR and, as shown in this article, the created STR version turned out to be incorrect, we can't overestimate his merits in creating the alternative version of the STR. The alternative version of the STR would not have probably been created soon, if the existing, albeit erroneous, but universally recognized version of the STR had not been created, published in textbooks, and so successfully promoted. Albert Einstein failed to create a correct version of the STR, just because he was ahead of his time. Experimental data required for creating a correct version of the STR was not yet known in the 20th century:

- no experimental evidence of physical reality of concrete imaginary numbers was obtained (for 400 years before Albert Einstein);
- the spacecraft WMAP and Planck did not receive data that made it possible to determine the metrics and structure of space in the hidden Multiverse;
- no one knew how astronomical observations in the anomalous zoness could experimentally prove existence of mutually invisible universes of the hidden Multiverse.

He had to guess all this by postulates. However, the postulate of light speed non-exceedance turned out to be erroneous. Therefore, all the relativistic formulas of the STR turned out to be incorrect.

What is much more important is that the principle of relativity proposed by Albert Einstein in the STR laid the foundation for creation of a physics of the future, the relativistic physics, where, unlike in classical physics, some physical quantities can depend on others. In the STR, this is velocity dependence. Other similar dependencies will inevitably be revealed in the future. Moreover, not only quantitative, but also qualitative[6] changes can correspond to the dependencies. While in the existing version of the STR, all relativistic dependencies are only quantitative, in the alternative version

[6] For example, when water is being heated to 99 °C its temperature is rising; however, when water reaches 100 °C it turns into steam

of the STR qualitative change (transition to another dimension) is added, when a moving body reaches the speed of light.

10. Conclusion

Thus, the version of the STR created in the 20th century turned out to be just a draft of the theory. And this is quite natural, since it takes a lot of time, specifically, more than human life, to create such an outstanding and very serious theory. Therefore, Albert Einstein and his contemporaries tried to anticipate, ahead of their time, experimental data that weren't available in 20th-century science by postulates. However, they did not guess all the postulates. Very important and necessary for explaining the relativistic formulas obtained was the principle of the physical reality of imaginary numbers, which has not yet been discovered at that time. And this prevented the physics of real numbers existing until very recently from becoming the physics of complex and hypercomplex numbers, which would allow completing the STR.

Nevertheless, the STR version created in the 20th century laid foundation for a new physics, the relativistic physics, in which, unlike in the classical physics that existed before the 20th century, some physical quantities may, under certain conditions, depend on other physical quantities. And the dependencies can be guessed by no postulates. Therefore, experimental studies are the most important thing in physics. They alone allow obtaining reliable knowledge. Postulates are useful only in trying to guess the most promising trends of experimental studies.

Acknowledgement

The author is grateful for participation in the discussion of the paper to Olga Ilyinichna Antonova, whose criticism and valuable comments contributed to improvement of the article.

Conflicts of Interest

The author declares no conflict interest regarding the publication of this paper.

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UNCONVENTIONAL SOURCES OF RENEWABLE ENERGY (SURVEY PAPER)

Kozlov V.N.
Doctor of Technical Sciences
Independent Scholar
St. Petersburg, Russia
DOI: 10.24412/2701-8377-2021-4-1-47-55

НЕТРАДИЦИОННЫЕ ИСТОЧНИКИ ВОЗОБНОВЛЯЕМОЙ ЭНЕРГИИ (ОБЗОРНАЯ СТАТЬЯ)

Козлов В.Н.
Доктор технических наук
Независимый специалист
Санкт-Петербург, Россия

Abstract

The article examines the water resource as an unconventional source of electric energy. Water as a dipole liquid consists mainly of H_2O molecules, one mole of which contains approximately 10^4 C/mole of electricity. The development of water electricity began with the Kelvin water-drop electrostatic generator (1867). Currently, many laboratories and research centers around the world are working on devices for generating electric current from water droplets using the balloelectric and triboelectric effects. The power produced by such generators is insignificant, however it is sufficient for home and street lighting, recharging of wearable electronics. Applying balloelectric and triboelectric effects to easily available water resources will lead to the creation of autonomous electric generators to replace the currently used hydrocarbon, nuclear ones, etc.

Аннотация

В статье рассматривается водный ресурс как нетрадиционный источник электрической энергии. Вода как дипольная жидкость, состоит преимущественно из молекул H_2O, 1 моль которых содержит приблизительно 10^4 Кл/моль электричества. Освоение электричества воды началось с капельницы Кельвина (1867 года). В настоящее время многие лаборатории мира разрабатывают генераторы для получения электрического тока из капель воды, используя баллоэлектрический и трибоэлектрический эффект. Получаемые мощности таких генераторов незначительные, но достаточные для домашнего и уличного освещения, подзарядки носимой электроники. Применение баллоэлектрического и трибоэлектричество эффектов к легкодоступным водным ресурсам позволит привести к созданию автономных электрических генераторов взамен используемых в настоящее время углеводородных, ядерных и др.

Keywords: Renewable sources of energy, water structure, balloelectric and triboelectric effects, electric current generators.

Ключевые слова: Возобновляемые источники энергии, структура воды, баллоэлектрический и трибоэлектрический эффекты, генераторы электрического тока.

Введение

Растущий в мировой экономике спрос на электрическую энергию обусловливает необходимость поиска новых энергоносителей и создания новых технологий получения и передачи электричества. Это связано с тем, что существующая структура энергетического комплекса не является совершенной для развивающейся электрификации всех видов транспорта и декарбонизации мировой энергетики. Необходимость ограниченного применения традиционной энергетики с использованием углеводородного топлива и ядерной энергетики возникла в связи с загрязнением окружающей среды, потеплением климата, исчерпаемостью невозоб-