Volume 16 Issue 29
Originally issued as A4

Global Journal of Science Frontier Research: a Physics and Space Science
Volume 16 Issue 4 Version 1.0 Year 2016
Type : Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4626 & Print ISSN: 0975-5896

Verifiable Multiverse

By Alexander Alexandrovich Antonov

Abstract- Up to the present time a lot of interesting hypotheses of Multiverses have been offered. However, their common shortcoming is the fact that even in the distant future they will not be able to obtain experimental confirmation. They can not be refuted either. In other words, they are unverifiable. I.e. they are in fact non-existent for us. As opposed to them, the hypothesis of the hidden Multiverse considered in the article is completely verifiable, because its physical reality can be confirmed experimentally already now. This hypothesis is based on the principle of physical reality of imaginary numbers repeatedly proven by the author, which has allowed establishing a number of fundamental errors in the generally accepted version of the special relativity theory. Eliminating these errors allowed to offer a corrected relativistic formula, based on which the hidden Multiverse hypothesis was created, named in such a way because all the parallel universes included in it are mutually invisible. The reason for their invisibility is explained. It is established that such invisible universes are dark matter and dark energy. It is shown where in the hidden Multiverse the different types of antimatter are located. The data obtained by WMAP and Planck spacecrafts allowed to determine the parameters and structure of the hidden Multiverse, which proved to be a quaternion.

Keywords: *multiverse, dark matter, dark energy, imaginary numbers, the special relativity theory.*

GJSFR-A Classification : *PACS Number: 95.30.-k, 95.35+d, 95.36.+x, 98.80.-k*

VERIFIABLEMULTIVERSE

Strictly as per the compliance and regulations of :

© 2016. Alexander Alexandrovich Antonov. This is a research/review paper, distributed under the terms of the Creative Commons Attribution-Noncommercial 3.0 Unported License http://creativecommons.org/licenses/by-nc/3.0/), permitting all non commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Verifiable Multiverse

Alexander Alexandrovich Antonov

Abstract- Up to the present time a lot of interesting hypotheses of Multiverses have been offered. However, their common shortcoming is the fact that even in the distant future they will not be able to obtain experimental confirmation. They can not be refuted either. In other words, they are unverifiable. I.e. they are in fact non-existent for us. As opposed to them, the hypothesis of the hidden Multiverse considered in the article is completely verifiable, because its physical reality can be confirmed experimentally already now. This hypothesis is based on the principle of physical reality of imaginary numbers repeatedly proven by the author, which has allowed establishing a number of fundamental errors in the generally accepted version of the special relativity theory. Eliminating these errors allowed to offer a corrected relativistic formula, based on which the hidden Multiverse hypothesis was created, named in such a way because all the parallel universes included in it are mutually invisible. The reason for their invisibility is explained. It is established that such invisible universes are dark matter and dark energy. It is shown where in the hidden Multiverse the different types of antimatter are located. The data obtained by WMAP and Planck spacecrafts allowed to determine the parameters and structure of the hidden Multiverse, which proved to be a quaternion.

Keywords: multiverse, dark matter, dark energy, imaginary numbers, the special relativity theory.

I. Introduction

In what physical world we live in - it is one of the main problems which has always occupied the minds of people. What is the organization of the macrocosm and the microcosm? Do we live in Monoverse or Multiverse? Is this or that hypothesis of the universe verified? What is dark matter and dark energy? Where is the antimatter located? In fact, there is still no recognizable and distinct evidentiary response to these and many other questions, like thousands of years ago, despite the optimistic statements of some scholars.

Indeed, the theory of relativity (Einstein, 1920; Bohm,1965), which is the basic theory of the macrocosm, and quantum physics (Kaku, 2008), which is the basic theory of the microcosm, contradict each other in every way. And the string theory (Kaku, 2012) which was trying to combine them was unable to solve the task set.

A few decades ago, dark matter and dark energy (Freeman, McNamara, 2006; Nicolson 2007) have been discovered in the macrocosm, which even seemed to deny the modern atomic molecular concept of a microcosm, as none of the known chemical elements were found in dark matter and dark energy.

Even none of the known subatomic particles. And experiments on the Large Hadron Collider, the Tevatron collider and other accelerators, aiming at resolution of the relevant fundamental issues of physics, perhaps, have generated even more questions than gave answers. An example of this is unsuccessful experiments of MINOS (Adamson, Ashby, Bumgarner, 2014) and OPERA (Adam, T., Agafonova, N., Aleksandrov, A. et al. 2011). That is why the problem of explaining dark matter and dark energy is so important in science.

However, the solution to this problem has been found. It is explained further.

II. Fundamental Errors of Special Relativity Theory

Established in the early 20th century, special relativity theory (SRT), in contrast to the generally accepted in physics throughout its history experimentally based approach, uses axiomatic approach previously accepted only in mathematics. Out of two of its postulates the second (Antonov, 2014a) is subjected to most criticism, which is now called the principle of the constancy of the speed of light. But in the following years as supposedly identical wording[1] it became known as the principle of non-exceeding of the speed of light, the need for which arose in connection with the fact that the creators of SRT did not know how to explain some provisions of their theory. And they thought they made unnecessary the need an explanation of the principle of non-exceeding of the speed of light.

The fact is that according to the formulas of relativistic formulas of SRT at hyperlight speeds STO the mass, time, and other physical values are measured by imaginary numbers discovered 500 years ago, whose physical meaning over all those years even the most outstanding scientists by their own admission were not able to explain. But in SRT this problem can not be solved at all, because otherwise this theory would not have been recognized by the scientific community. Therefore, the principle of non-exceeding of the speed of light was in fact postulated (as it was nowhere proved), which was justified as follows. According to the formula of Lorentz-Einstein

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

Aurhor: Research Centre "Telan Electronics", Kiev, Ukraine.
e-mail: telan@bk.ru

[1] In any other science, except for SRT, the use of several different formulations of axioms, theorems, postulates, laws is nonaccepted

© 2016 Global Journals Inc. (US)

where m_0 is the rest mass of the moving body;
m is relativistic mass of the moving body;
v is the speed of movement of the physical body;
c is the speed of light;

relativistic mass m of a moving body approaching the speed of light adopts an infinitely large value, i.e. $\lim_{v \to c} m(v) = \infty$. Therefore, it is stated in SRT that the light-speed barrier can not be overcome, as it requires an infinitely larger energy. And if it can not be overcome, it was concluded that there is nothing behind this barrier. And, therefore, it becames no longer necessary to explain for this situation the meaning of imaginary mass imaginary, time, and other imaginary values.

However this justification is easily refuted even at the mundane level. For example, everyone knows that the inability to get into the next room of one's home, breaking the barrier separating them in the form of the wall does not mean that this room with all of its content behind the wall does not exist and that it is impossible to get there otherwise - through the door. The situation is similar with many other barriers.

Thus, a fundamental error of STR (in the form of the principle of the speed of light nonexceedance) entailed two other fundamental errors (in the form of denial of other than ours, universes, as well as the denial of the physical reality of imaginary numbers). These allegations will be proven further.

III. The Reasons of Fundamental Errors of STR

But first let us note that, despite the opinion of the Nobel Prize winner Albert Einstein that *"No single idea, which I would be sure that it will stand the test of time"*, the supporters of STR currently completely ignore the criticism to its address. I.e. they believe that SRT development is completely finished. Although there are quite a lot of noteworthy critical publications (Logunov, 1987; Galeczki, Marquard, 1997; Arteha, 2003; Atsyukovsky, 2003).

To some extent this is due to the fact that in the first half of the 20th century the criticism of SRT was often politically engaged. Therefore the supporters of SRT acquired some immunity to it. This is explained by the peculiarities of the human psyche as well and that the people are much more inclined to protest than to accept (Le Bon, 1898). Finally, in the words of Winston Churchill; "*The history written by the victors*". And they do not need criticism. And SRT is the winning theory nowadays.

Nobel Prize winner Max Planck wrote on this subject: "*New ideas do win not by heated discussions, as a result of which the creators of the new persuade their opponents. Old ideas give way to the new in a way that the carries of the old are dying, a the new generation is brought up in the new ideas, taking them for granted*".

The existing version of SRT, as it is shown in this article, still is not quite perfect and requires some correction. Therefore, one can not but agree with the author of the concept of 'open society' Karl Raimund Popper (Popper, 1972) that "*the struggle of opinions in scientific theories is inevitable and is a necessary prerequisite for the development of science*".

IV. Correction of The Fundamental Errors of STR

a) Evidence of physical reality of the imaginary numbers

Since mathematics is a universal language of science, then in relation to physical problems (for example, to refute the principle of speed of light non-exceedance) it is quite unnecessary to prove the reality of imaginary numbers by physical means - such as it was done in experiments of MINOS and OPERA. Therefore, the author has used the analysis of oscillating processes in linear electric circuits for this purpose, as a result of which he has proved that:

- Resonance in fact does exist not in the real frequencies, as it is stated[2] in all textbooks on the theory of linear electric circuits, but in complex frequencies (Antonov, 2010a; 2015a; 2016a). This proves that the complex frequencies of resonant vibrations are physically real. Consequently, physically real are other complex (in particular, imaginary) numbers as well.
- Oscillatory transient phenomena (including shock waves) exist at physically real complex frequencies (Antonov, 2010b; 2016a). Therefore, naturally occurring shock fluctuations - the tsunami, the sound of church bells, the tuning fork, musical instruments and even the swings swinging after the parents push - prove the physical reality of complex and imaginary numbers as well.
- Finally, the physical reality of imaginary numbers is most simply and convincingly proven by Ohm's law (Antonov, 2015b; 2015c; 2016a; 2016b) in the interpretation of Charles Proteus Steinmetz (Steinmetz, 2010), as the imaginary electric resistance of induction coils and capacitors is measured by existing devices[3].

The specified studies can be repeated and verified in any radio-electronic or electrotechnical laboratory. So they, in contrast to the OPERA and MINOS experiments, absolutely, are quite reliable and conclusive.

[2] Under the dominant influence of SRT

[3] Likewise, i.e. as a result of the use of devices the people have ascertained the real physical existence of radioactivity and the magnetic field, infra- and ultrasound, atoms and molecules, dark matter and dark energy, and many other physical entities, not perceived by our sensory organs

© 2016 Global Journals Inc. (US)

b) *The refutation of the principle of nonexceeding the speed of light, a proof of the existence of the Multiverse*

Since the physical reality of imaginary numbers is proved, in the corrected version of STR it is now necessary to do what its creators could not do - to abandon the principle of non-exceeding of the speed of light and to explain the physical meaning of imaginary mass, imaginary time, and other imaginary physical values that appear in the relativistic formulas on hyper-light speeds.

And this is explanation is the following (Antonov, 2014b). Since, when $v > c$ the relativistic mass m in the formula (1) becomes imaginary and the physical reality of imaginary numbers have just been proven, the corresponding material objects - such as tachyons (Tanaka, 1960; Feinberg, 1967) are not in our universe, but somewhere else. And we shall call this other place the tachyonic universe to be definite. Moreover, in view of the condition $v > c$ the tachyonic universe is behind the event horizon and therefore is invisible from our universe. And our universe we shall call the tardyonic universe (by the name of elementary particles traveling at sub-light speeds).

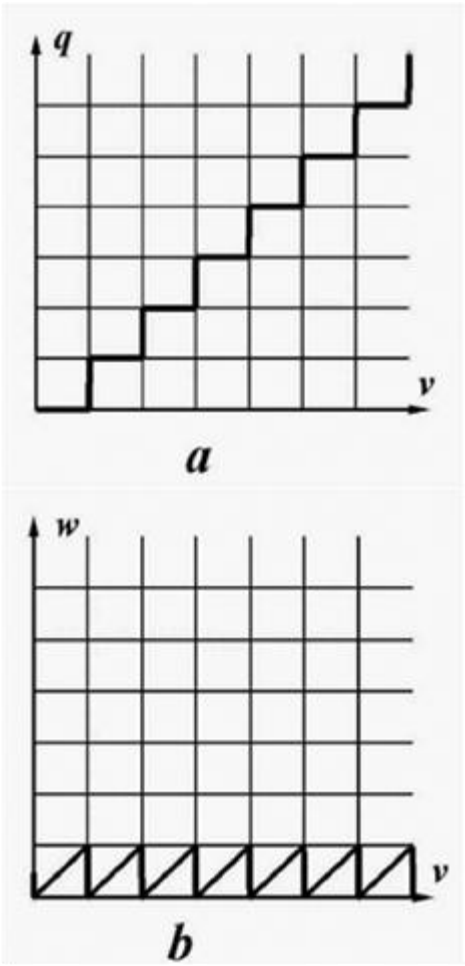

Fig. 1: Graphs of functions $q(v)$ and $w(v)$

Then it is quite permissible to assume that in tachyonic universe act the same physical, chemical, biological and other laws as in our universe and that it has its own inhabitants having high intelligence. And this tachyonic universe is the inertial reference system according to the first postulate of SRT.

However, the formula (1) does not comply with this assumption as at the intervals of the argument variation $v < c$ and $v > c$ the character of variation of the value $m(v)$ is different. In our tardyonic universe, when the argument v increases the relativistic mass m increases, and in tachyon universe when the argument v increases the relativistic mass m decreases. Therefore, the Lorentz-Einstein formula should be corrected as follows (Antonov, 2011; 2012a; 20121b)

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

where $q = \lfloor v/c \rfloor$ is "floor" function (its graph is shown in the Fig. 1a) of the argument v/c;

$w = v - qc$ its own local for each universe speed (its graph is shown in the Fig. 1b), that can only take values in the range of $0 \le w < c$;

v is the speed, measured from our tardyonic universe, which we shall call tardyonic velocity for this reason.

Other relativistic formula of SRT can be corrected in a similar manner.

Thus, it clearly appears from the above mentioned that we do not live in Monoverse, but in Multiverse.

V. The Structure of the Hidden Multiverse

As follows from the formula (2) this Multiverse may include (and later it is shown that are included) more than two universes, i.e. the value q can take meanings and larger units, which corresponds to larger number of universes in the hidden Multiverse. In this case, the value $q = 2$ will correspond to tardyonic Antiuniverse (since $i^2 = -1$), the value $q = 3$ will correspond to tachyon Antiuniverse (since $i^3 = -i$), the value $q = 4$ will correspond to the other tardyonic universe (since $i^4 = 1$), the value $q = 5$ will correspond to another tachyon universe (since $i^5 = -i$), etc. And these parallel universes, called in such a way because, despite their immensity, they never intersect with each other, form (see Fig. 2) a structure in the form of a helically-formed ring.

© 2016 Global Journals Inc. (US)

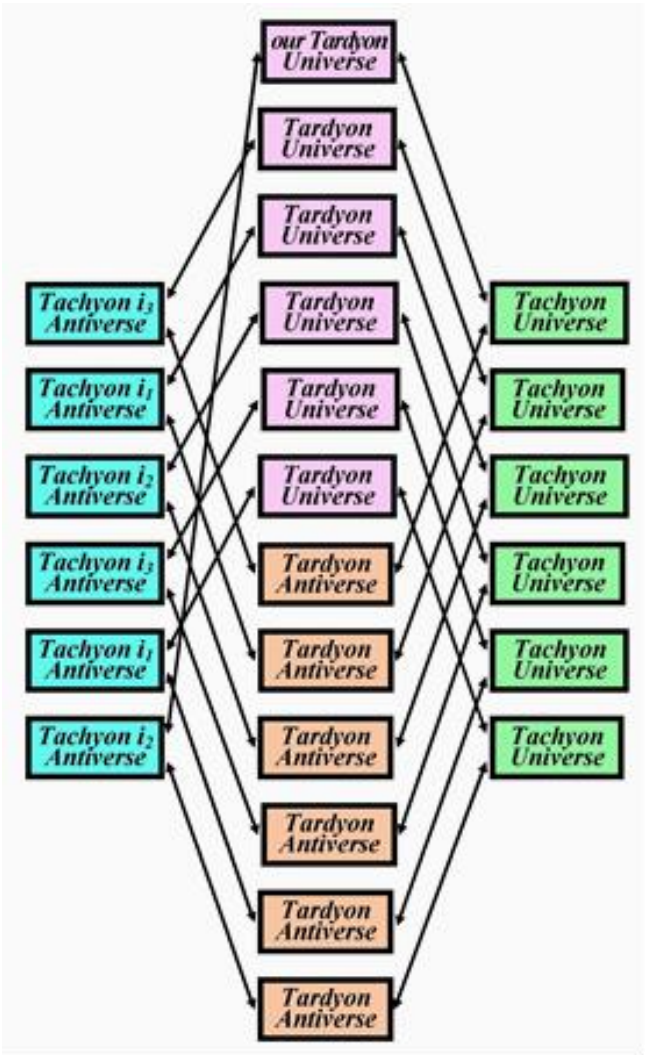

Fig. 2: Estimated structure of the hidden Multiverse, corresponding to the principle of the physical reality of complex numbers

And as in the Multiverse under review the different parallel universes, for the reasons explained above are mutually invisible, then it can be called hidden.

If the value *q* in the formula (2) is to be considered an independent variable, then it can be stated that different parallel universes of the hidden Multiverse are in different dimensions. And floating in the multidimensional space, parallel universes in some places sometimes or even at all times touch each other, and even sink in each other a little, forming certain transition zones (Antonov,2016c) which are referred to in the fiction as portals or stellar gates (shown in the Fig. 2 with single double-headed arrows). On Earth, these are the so-called anomalous zones. And they have nothing in common with the transitions in the form of so-called wormholes, referred to in the general relativity theory.

VI. Explanation of the Phenomenon of Dark Matter and Dark Energy

Any hypothesis of the Multiverse is unfinished, if it does not explain the phenomenon of dark matter and dark energy. But to explain this phenomenon certainly within the hypothesis of Monoverse corresponding to the current erroneous version of STR, despite intensive research, until now in no way can be managed.

And the reason for that is obviously in the wrong formulation of the problem.

As Albert Einstein wrote: *"Insanity: doing the same thing over and over again and expecting different results"*.

The same opinion was held by Confucius: *"The hardest thing of all is to find a black cat in a dark room, especially if there is no cat"*.

If you change the formulation of the problem and seek an explanation of the phenomenon of dark matter and dark energy within the concept of the hidden multiverse, it is not necessary to look for it - it is obvious (Antonov, 2015d; 2015e; 2015f; 2015g; 2015h; 2015j; 2016d; 2016e):

- Dark matter and dark energy are the rest, except ours, invisible universes of the hidden Multiverse;
- At the same time dark matter are the adjacent to our universe invisible universes of the hidden Multiverse
- Dark energy are the rest except our and the universe and the universes forming dark matter, invisible universes of the hidden Multiverse;
- It is impossible to determine the chemical composition of the content of dark matter and dark energy because this content is located outside of our universe.

Of course, the proposed option of the phenomenon of dark matter and dark energy explaining is very unusual. But Sir Isaac Newton wrote: "*No great discovery was done without a bold assumption*".

VII. Antiuniverses Discovery

After creation of the big bang theory, as the result of which not only matter but also antimatter would have to be formed in equal amounts, the physicists have wondered - where that antimatter is located (Alfvén, 1966; Frazer, 2004). And at present it is no less a mystery than the phenomenon of dark matter and dark energy. Many outstanding physicists - Arthur Schuster, Paul Dirac, Rolf Landua, Walter Ehlert, Andrei Sakharov and others tried to solve this puzzle, but their research was mainly focused on the creation of anti-particles using the Large Hadron Collider and other accelerators.

However, the attempts to solve the problem of detection of antimatter in the microcosm, although after the big bang it had to exist in the macrocosm in the form of galaxies and even universes, do not look quite logical. Even the impression is created that in modern physics

© 2016 Global Journals Inc. (US)

the scientists compared with the entire previous history of its development have kept for themselves almost the only way of its perception - by using increasingly large colliders.

But this is not so, as evidenced by the fact that *antimatter is already discovered* (Antonov, 2015d; 2015e; 2015f; 2015g; 2015h; 2015j; 2016d; 2016e). As shown above, in the hidden Multiverse, there are two pairs of matter and antimatter (it is shown below that in fact there are even four pairs of them). And they exist in the hidden Multiverse, precisely because there are several matters and antimatters. And this is specifically due to the above-mentioned interlace (see Fig. 2) of matter and antimatter both the tardyonic, and the tachyonic - that their annihilation is for sure excluded.

VIII. Correction of the Hidden Multiverse Hypothesis According to the Data of WMAP and Planck Spacecrafts

The data received by WMAP (Hinshaw, Larson, Komatsu et al., 2012) and Planck (Adam, Ade, Aghanim et al., 2015) spacecrafts allow to substantially supplement our knowledge on the hidden Multiverse. According to the data obtained by these crafts the total mass-energy of the whole universe (in fact of the hidden Multiverse) consists by 4.9% from the ordinary (baryonic) matter (the previous estimate of WMAP - 4,6%), by 26.8% from dark matter (according to the data of WMAP - 22.4%) and by 68.3% from dark energy (according to the data of WMAP - 73%). Therefore it can be concluded as following:

- According to WMAP data the hidden Multiverse contains *100%/ 4,6%= 21,7* universes or according to the later Planck data contains *100%/ 4,9%= 20,4* universes.
- According to WMAP data the dark matter contains *22,4%/ 4,6%= 4,9* universes or according to Planck data contains *26,8%/ 4,9%= 5,5* universes.
- According to WMAP data the dark energy contains *73,0%/ 4,6%= 15,9* universes or according to Planck data contains *68,3%/ 4,9%= 13,9* universes.

As can be seen, these results do not correspond to the structural scheme shown in the Fig. 2. Therefore, they require adequate explanation and a structural scheme in the Fig. 2 needs corresponding corrections.

A non-integer number of universes, of course, can be attributed to the measurement error.

The most important difference is the number of neighboring to the tardyonic universes tachyonic universes (corresponding to dark matter) which is not equal to two, but to five or six. And this difference can be explained by the fact that the hidden Multiverse does not correspond to the principle of the physical reality of complex numbers as we previously thought, but to the principle of the physical reality of quaternions, i.e. hypercomplex numbers (Kantor, Solodovnikov,1989), containing three imaginary units i_1 ,i_2 ,i_3 , that are related to each other like

$$i_1^2 = i_2^2 = i_3^2 = -1 \tag{3a}$$

$$i_1 i_2 i_3 = i_2 i_3 i_1 = i_3 i_1 i_2 = -1 \tag{3b}$$

$$i_1 i_3 i_2 = i_2 i_1 i_3 = i_3 i_2 i_1 = 1 \tag{3c}$$

Therefore, the Lorentz-Einstein formula applied to the quaternion structure of the hidden Multiverse appears in the form

$$m = \frac{m_0 (i_1)^q (i_2)^r (i_3)^s}{\sqrt{1 - [v/c - (q + r + s)]^2}} = \frac{m_0 (i_1)^q (i_2)^r (i_3)^s}{\sqrt{1 - (w/c)^2}} \tag{4}$$

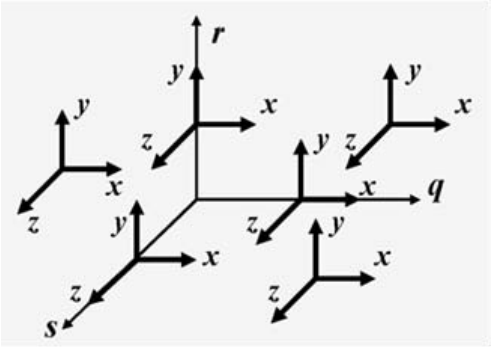

Fig. 3: The six-dimensional space of the hidden Multiverse

where we use the notation similar to notations in the formula (2). Other relativistic formulas of SRT can be corrected in a similar manner.

Therefore, the structure of the multidimensional space in which there are parallel universes of such hidden Multiverse is determined by three independent variables *q* , *r* and *s*. Therefore, the space of the hidden Multiverse (excluding the time) is six-dimensional (see Fig. 3): the three coordinates *x*, *y* and *z*, are the measurements within each universe, and the other three coordinates *q*, *r* and ***s*** are the measurements that define the mutual spatial position of parallel universes to each other.

Thus, as seen in Fig. 4, not all tardyonic universes have a full set of six neighboring tachyonic universes and anti-verses: some tardyonic universes have five neighboring tachyonic universe and anti-verses. So the question arises - what is located beyond the edges of the hidden Multiverse, corresponding to absent neighboring tachyonic universes and / or antiuniversse. And the most plausible answer to this question is the statetement that there are other hidden

© 2016 Global Journals Inc. (US)

Multiverses (inaccessible to our observations, not only by electromagnetic but also by gravitational manifestations), which together form Supermultiverse. It is possible even that such Supermultiverses form yet larger structures.

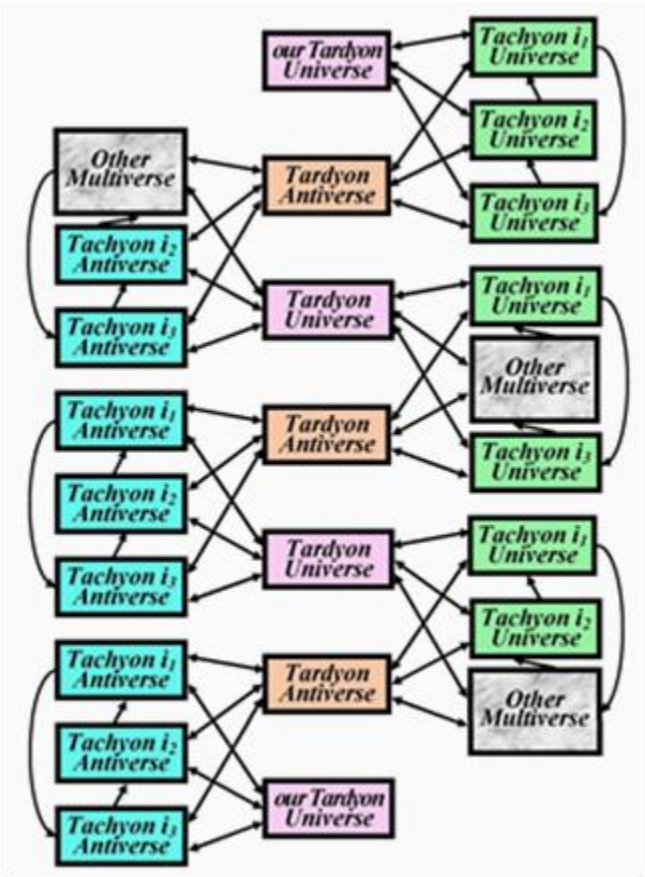

Fig. 4 : The most probable structure of the hidden Multiverse, corresponding to the principles of physical reality of quaternions

In the structural scheme shown in the Fig. 4 the multiple portals between the neighboring universes are shown with single bidirectional arrows (for bilateral portals) corresponding to the formula 3a, or single unilateral arrows (for unidirectional portals) corresponding to the formulas (3b) and (3c). And unidirectional portals are obviously more dangerous for researchers, because you can not go back through them. In general, as a result of law of communicating vessels the parameters of habitat in fore-portal and over-portal areas are almost identical, the visit of neighboring universes through the portals can be fairly safe occupation (as far as unknown can be safe).

Thus, the assumption made in the article on the correspondence of the dark matter and dark energy to the invisible parallel universes of the hidden multiverse meets the criterion of "Occam's Razor." That is why, because it explains everything, it is quite possible. And the meaningfulness of this scientific result is characterized by the saying of the famous American astrophysicist Professor Michio Kaku (Kaku, 2006): "*Of course, a whole bunch of Nobel Prizes awaits the discerning scientists who will be able to unravel the mysteries of dark energy and dark matter*".

IX. Verifiability of Hidden Multiverse Hypothesis

The outlined hypothesis of the hidden quaternionic Multiverse as opposed to other hypotheses of the Multiverses (Deutch, 1998, 2012; Steinhardt, Turok, 2007; Vilenkin, 2007; Kaku, 2008; Weinberg, 2008; Carr, 2009; Greene, 2010, 2011; Lucash, Mikheyeva, 2010; Tegmark, 2015) is verifiable, since:

- Experimental proof of its physical reality is the existence of dark matter and dark energy.
- The proof of its physical reality is also all those experiments on the Large Hadron Collider and other accelerators, as a result of which there was a mass defect. This result is explained by the tachyons formation and consequently the existence of tachyonic universes and anti-verses.
- Its indisputable experimental evidence will be the detection of portals and visiting of the neighboring universes through them (if we are allowed to do so by their inhabitants).

X. Conclusion

Consequently, the existing version of SRT applies only to our tardyonic universe, and the corrected version of SRT - to all the hidden Multiverse. And in this is adjusted SRT the principle of non-exceeding of the speed of light turned out to be unnecessary.

The proposed in the article corrected version of STR allowed to create a hidden Multiverse hypothesis, which is verifiable, and which explains the phenomenon of dark matter and dark energy. And practical discovery of the hidden Multiverse and establishing contacts with existing in them civilizations (Antonov, 2015k) by their consequences for our human civilization will considerably surpass the results of the discovery of America by Columbus.

XI. Acknowledgements

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.

References Références Referencias

1. ADAM R., ADE P.A.R., AGHANIM N. et al. 2015 Plank 2015 results. 1. Overviev of products and scientific results. arXiv:1502.01582v2 [astro-ph.CO]
2. ADAM T., AGAFONOVA N., ALEKSANDROV A. et al. 2011 Measurement of the neutrino velocity with the

© 2016 Global Journals Inc. (US)

OPERA detector in the CNGS beam, arxiv:1109.4897v4 [hep-ex],
3. ADAMSON P., ASHBY N., BUMGARNER R. 2014 Measurement of the Velocity of the Neutrino with MINOS, arXiv:1408.6267v1 [physics.acc-ph],.
4. ALFVÉN H. 1966 Worlds-Antiworlds: Antimatter in Cosmology. W. H. Freeman & Co, San Francisco.
5. ANTONOV A. A. 2010a Oscillation processes as a tool of physics cognition. American Journal of Scientific and Industrial Research. 1(2) 342 – 349.
6. ANTONOV A. A. 2010b Solution of algebraic quadratic equations taking into account transitional processes in oscillation systems. General Mathematics Notes. 1(2), 11-16.
7. ANTONOV A. A. (2011) Structure of the Multiverse. British Journal of Science. 2(2) 51-60.
8. ANTONOV A. A. 2012a, Earth, portals, parallel universes. American Journal of Modern Physics. 3(6): 464-473.
9. ANTONOV A. A. 2012b Multiverse. Time Travels. International Journal of Pure and Applied Sciences and Technology. 12(2) 43-56
10. ANTONOV A. A. 2014a Verification of the second postulate of the special relativity theory. Global Journal of Science Frontier Research: A Physics and Space Science. 14(3) 51-59
11. ANTONOV A. A. 2014b Correction of the special theory of relativity: physical reality and nature of imaginary and complex numbers. American Journal of Scientific and Industrial Research. 5(2) 40-52.
12. ANTONOV A. A. 2015a Physical reality of complex numbers is proved by research of resonance. General Mathematics Notes. 31(2) 34-53
13. ANTONOV A. A. 2015b Ohm's Law explains astrophysical phenomenon of dark matter and dark energy. Global Journal of Physics. 2(2) 145-149
14. ANTONOV A. A. 2015c Adjustment of the special theory of relativity according to the Ohm's law. American Journal of Electrical and Electronics Engineeing. 3(5). 124-129.
15. ANTONOV A. A. 2015d Principles and structure of the real Multiverse: explanation of dark matter and dark energy phenomena. American Journal of Modern Physics. 4(1). 1-9.
16. ANTONOV A. A. 2015e Hidden Multiverse. International Journal of Advanced Research in Physical Science. 2(1). 25-32.
17. ANTONOV A. A. 2015f Hidden Multiverse: Explanation of Dark Matter and Dark Energy Phenomena. International Journal of Physics 3(2) 84-87.
18. ANTONOV A. A. 2015g Explanation of dark matter and dark energy phenomena. Global Journal of Science Frontier Research: A Physics and Space Science. 15(1) 33-38.
19. ANTONOV A. A. 2015h Why dark matter and dark energy are invisible? Optics. 4(6), 43-47.
20. ANTONOV A. A. 2015i Hidden Multiverse: explanation of dark matter and dark energy. Cosmology. 19. 40-61.
21. ANTONOV A. A. 2015k Where to look for alien civilisations. Cosmology. Commentaries: Stephen Hawking's Aliens. The Search for Intelligent Extraterrestrial Life. Project Breakthrough Listen.
22. ANTONOV A. A. 2015j The astrophysical phenomenon of dark matter and dark energy proves the existence of the hidden Multiverse. American Journal of Modern Physics. 4(4) 180-188
23. ANTONOV A.A. 2016a Physical Reality and Nature of Imaginary, Complex and Hypercomplex Numbers. General Mathematics Notes. In press.
24. ANTONOV A. A. 2016b Ohm's law is the general law of exact sciences. Ponte. 72(7) 131-142.
25. ANTONOV A A 2016c Stargate of the hidden multiverse. Philosophy & Cosmology. 6 11-27
26. ANTONOV A. A. 2016d Hypothesis of the hidden multiverse explains dark matter and dark energy. Journal of Modern Physics.
27. ANTONOV A. A. 2016e Hypothesis of the hidden multiverse explains dark matter and dark energy. Journal of Modern Physics. 7 1228-1246
28. ARTEHA S. N. 2003 Critique of the relativity theory foundations. Editorial URSS, Moscow
29. ATSYUKOVSKY V. A. 2003 General etherodynamics. Energoatomizdat. Moscow.
30. BOHM D. 1965 The special theory of relativity. Benjamin. NY
31. CARR B. ed. 2009 Universe or Multiverse? Cambridge Univ. Press.
32. DEUTCH D. 1998 The Fabric of Reality: The Science of Parallel Universes and Its Implications. Penguin Books. NY
33. DEUTSCH D. 2012 The Beginning of Infinity: Explanations That Transform the World. Reprint Edition. Penguin Books.
34. EINSTEIN A. 1920 Über die spezielle und allgemeine Relativitätstheorie (gemeinverständlich). F. Vieweg, Braunschweig.
35. FEINBERG G. 1967 Possibility of faster-than-light particles. Physical Review. 155(5). 1089-1105
36. FRAZER G. 2004. Antimatter: The Ultimate Mirror. Cambridge University Press, Cambridge,
37. FREEMAN K., MCNAMARA G. 2006 In Search of Dark Matter. Springer, NY.
38. GALECZKI G., MARQUARD P. 1997 Requiem für die spezielle Relativität. R I P - Relativität ist Passe ! Haag + Herchen Verlag, Frankfurt am Main.
39. GREENE B. 2010 The Elegant Universe: Superstrings, Hidden Dimensions, and the Quest for the Ultimate Theory. W W Norton & Co Inc.

© 2016 Global Journals Inc. (US)

40. GREENE B. 2011 The Hidden Reality: Parallel Universes and the Deep Laws of the Cosmos. Random House Inc.
41. HINSHAW G., LARSON D., KOMATSU E. et al. 2012 Nine Year Wilkinson Anisotropy Probe (WMAP) Observations: Cosmological Parameter Results. arXiv: 1213.5226 [astro-ph/CO]
42. KANTOR I. L., SOLODOVNIKOV A. S. 1989 Hyper complex numbers. Springer Verlag, Berlin,
43. KAKU M. 2006 Parallel Worlds. A journey through creation, higher dimensions, and the future of the cosmos. Doubleday. NY
44. KAKU M. 2008 Physics of the impossible: a scientific exploration into the world of phasers, force fields, teleportation, and time travel. Doubleday. NY
45. KAKU M. 2012 Physics of the future: how science will shape human destiny and our daily lives by the year 2100. Doubleday. NY
46. LE BON G. 1898 The Psychology of peoples. MacMillan. NY
47. LOGUNOV A. A. 1987 Lectures on the relativity theory and gravitation. Nauka, Moscow
48. LUCASH V. N., MIKHEYEVA E. V. 2010 Physical cosmology. Physmathlit, Moscow.
49. NICOLSON I. 2007 Dark Side of the Universe: Dark Matter, Dark Energy, and the Fate of the Cosmos. Johns Hopkins University Press, Baltimore.
50. POPPER K. R. 1972 Conjectures and Refutations. The Growth of Scientific Knowledge. Routledge and Kegan Paul, London and Henley.
51. STEINHARDT P. J., TUROK N. 2007 Endless Universe: Beyond the Big Bang. Doubleday.
52. STEINMETZ C. P. 2010 Theory and Calculation of Electric Circuits. Nabu Press. Charleston SC.
53. TANAKA S. 1960 Theory of matter with superlight velocity. Progress of Theoretical Physics (Kyoto). 24(1), 171-200.
54. TEGMARK M. 2015 Our Mathematical Universe: My Quest for the Ultimate Nature of Reality. Vintage.
55. VILENKIN A. 2007 Many Worlds in One: The Search for Other Universes. Macmillan.
56. WEINBERG S. 2008 Cosmology. Oxford University Press. NY.

© 2016 Global Journals Inc. (US)