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# TRINITY PROBLEM AND ITS CONTEXT IN THEORETICAL PHYSICS

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(Received 9 January 2017, revised 22 February 2017)

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## Abstract

What is the substance of the Trinity phenomenon? The Substance of the Trinity phenomenon is the existence of modulus ‘3’ (most often a mysterious one) in our knowledge of our world. This modulus is characteristic for Christian religion – the existence of the Holy Trinity (God the Father, God the Son and God the Holy Spirit). A similar phenomenon has crystallized in last years in the secular field too. Modern Physics has found out that in the fundament of our Universe there exist three families of quarks and leptons as a basis of all matter. There are also three fundamental interactions (gravitational, strong and electro-weak), i.e. some type of ‘Trinitarian principle’ arisen also in the real material world. It is an interesting question whether these two categories of Trinity are random similarity only or there could be a deeper correlation.

*Keywords:* Holy Trinity, self-similarity, fractal, deterministic chaos, theory of everything

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## 1. Introduction

The main aim of this paper is to present necessary information concerning the problem mentioned in the question ‘What is the substance of the Trinity phenomenon?’ following from the Bible as well as from ‘the book of nature’. Many Christian thinkers advocate the opinion that Holy Trinity is a great mystery and therefore it is impossible to explain this phenomenon using human language. On the other side there are some famous thinkers to whom it makes sense to look for an analogy of this phenomenon in the real world [1]. Their activity is supported by a phrase written in Catholic Catechism: “God left some footprints of His Trinitarian substance in the world He created”. Starting from physical theory named GUT (grand-unification theory) a well-known English physicist and theologian J. Polkinghorn writes: “In Christian theology the counterpart of the physicist’s GUT is the doctrine of the Trinity“ [2]. He leans on three interactions observed in nature only but it is necessary to add that our nature offers plenty of other appearances exhibiting modulus ‘3’, e.g. a Trinitarian principle. As it will be pointed out at the end of this paper, this trend

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can converge to a surprising result formulated by J. Polkinghorne according to which the Trinitarian theology could represent the theory of everything.

## **2. A short history of the Trinity phenomenon in religions**

It is possible to find modulus '3' in old Hinduism which had three dominant gods Brahma, Shiva and Vishnu. These gods were presented as autonomous beings not forming a unity. Judaism has always been strictly monotheistic. From the beginning Jews imagined their God as an indivisible person. The 'indivisibility' of God was first observed in Christian religion and the first theologian who used the term Trinity was probably Theophilus of Antioch (around 170 AD).

In the first Christian centuries there were many definitions and interpretations of this phenomenon. The main question was whether there is any 'subordination' among the three 'persons' forming the Holy Trinity. This controversy was inspired by the phrase written in Saint John's Gospel: "... my father is greater as I" (John 14.28). We shall mention now some of the best known points of view concerning this problem coming from the earliest years of Christian religion [3, 4]. We shall start with the so called 'gnostic schools'.

In the 'Basiliidian system' the unbegotten Father sends out his Son called Christ as Saviour. The role of Christ, i.e. the role of the crucified, is taken over by Simon Cyreneus. In this interpretation, Jesus ascended to the unbegotten Father. In the 'Saturnian system' one of the angels is the Jewish God who stood up against the Father. In this teaching, Jesus, as a seeming man, has the role of Saviour. The oldest form of the Ophitic Gnosticism is the teaching of Justin. In this teaching, the opposite of the perfect primeval being is the Elohim, the father of the created, i.e. Demiurge. The third part of the trio is Eden, the female principle. Crucified Jesus is the Saviour. For Irenaeus, the first Man is the Father of All, Ennoia is the Son of Man and the Holy Spirit is called the First Woman.

There were many schools of thought, both Orthodox and heterodox, that did not belong to the gnostic stream. The Ebionites, whose name in Hebrew means "the poor ones" [5], believed the nature of Christ was purely human. They believed that Christ was a human being who by strictly observing the Testament accepted the Spirit as his christening and became a Messiah on the basis of his deeds. The Ebionites "believed that they were the true Israel, the true Messianic Church" [5, p. 56]. The Ecclesiastes portrayed Christ as a higher spirit, angel, the highest angel, an incarnation of an ideal Adam – primal man. Ignatius of Antioch emphasizes that Christ is the true God and true man and points out Trinity as the only and indivisible divinity. Athenagoras of Athens writes about the unity of the divinity in power and about its dissimilarity in succession. Son is the Logos of the Father and as such comes from eternity. The Holy Spirit is God's emanation. According to Justine the Martyr, Christ is a son of the true God and within the hierarchy stands behind God and before the Holy Spirit.

Monarchianism came with very specific theories regarding Trinity. According to dynamic monarchianism, Christ was a man born out of a virgin and filled with divine power but he was not God. The divine power within him was not personal. He was the Son of God only by adoption. Modal monarchianism asserts that Christ himself is the Father, i.e. the Father himself was born, He himself suffered and died. The Father is thus identical with the Son. Sabellius, the chief proponent of modal monarchianism, introduced the term Son-Father. He taught that God consists of three persons (prosopon). These persons, however, have to be perceived only as names since they are not separate persons.

Origen introduced the basic idea of eternal procreation of the Son from the Father's substance into Theology. For Origen, the Son was subordinate. The Spirit was subordinate to both the Father and the Son. So, in the teaching of Origen, Trinity had hierarchical structure.

The opinions of Arius on Trinity were very specific. He basically denied Trinity. The Son was created at the time and God was in fact a monad. According to Arius, the Son is the first and best creature elevated to the level of the Son of God by a strange act of mercy. Based on this viewpoint he can be called God. In reality, however, he is God on moral level only. The largest opponent of Arius was Athanasius of Alexandria. The Son was born out of God's substance and what is born out of substance is identical with it. In any case, the "theological method based primarily on theological deduction is open to and jeopardized by theological and metaphysical speculation" [6, p. 8], which can and often does lead to false teaching [7, p. 28].

Discussions about possible subordination in the Holy Trinity were formally finished at the Councils of Nicaea (325) and Constantinople (381) where it was proclaimed that there was only one God and all three persons are equal in their divinity. This point of view has been generally accepted in Christian philosophy up to modern times and, maybe, it should be interesting to mention only two modern interpretations of the Holy Trinity – (1) J. Polkinghorn [8]: Father is God above us, Son is God alongside us and Holy Spirit is God within us and (2) F.J. Tipler [9]: Father is a Final Singularity, Son is All-Present Singularity and Holy Spirit is an Initial Singularity of our world.

### **3. Phenomena and processes observed in nature that exhibit the modulus '3'**

As an illustrative example for further analysis we can use the well-known problem of dynamics of the climatic systems. A famous climatologist E.N. Lorenz reached a conclusion [10] that this dynamics can be described (on the lowest level of simulation) by three differential equations. A mathematical analysis of these equations showed that the image of evolution of such systems exhibits in the space phase specific forms characterized by 'self-similarity' which means a 'fractal' structure. The consequence of these facts is very interesting - climatic systems 'work' in the regime of 'deterministic chaos'. This

is a real reason why long-time prediction of weather is impossible (known as ‘the butterfly effect’).

Such chain of causalities can be, however, observed in many other systems too. H. Haken proved [11] that analogical situation exists in lasers. Presence of such phenomenon was demonstrated also in astrophysical systems as well as in many other processes of determining transport of electric charge and heat in material objects. In all these cases the analysis starts with three basic equations. In general, it is possible to prove mathematically that the existence of a regime of deterministic chaos is conditioned by the existence of at least three-parametric system, i.e. by at least three independent differential equations describing it. So, it is clear that one can find a specific Trinitarian principle on the lowest level of simulation of complex systems producing a regime of deterministic chaos.

Besides the examples mentioned above a mysterious modulus ‘3’ can be seen in plenty of other phenomena existing in our nature. The most interesting of them are the following ones:

- 3 dimensions of our universe (in terms of empirical sensory without time dimension);
- 3 kinds of energies determining all dynamics in universe (normal matter, dark matter and dark energy);
- 3 fundamental symmetries (C, P, T);
- 3 kinds of U quarks (u, c, t);
- 3 kinds of D quarks (d, s, b);
- 3 kinds of leptons (electron, muon and tauon);
- 3 distinct flavours of quarks;
- 3 distinct colour charges (red, white and blue);
- 3 kinds of matter (normal, charm and heavy);
- 3 fundamental interactions (gravitational, strong and electro-weak);
- 3 fundamental particles (proton, neutron and electron);
- 3 mechanical principles (Newton’s principles),
- 3 laws of conservation (energy, linear and angular momentum);
- 3 fundamental constants (gravitational, Planck’s and velocity of light);
- 3 kinds of living systems (archaea, eukaryotes and bacteria);
- 3-letter code of all biomolecules;
- 3 kinds of eukaryotes (plants, mushrooms and animals);
- 3 entities of human beings (body, soul and spirit);
- etc.

It is also well known that in our universe there are precisely three quantities which are conserved in all processes (as well as in black holes). They are mass, electric charge and angular momentum.

It could be interesting to mention here some questions formulated by many known physicists, e.g. by G. Kane [12]: “Why are there three families of fundamental particles when it seems only one is needed to describe the world we

see?” or “If having three families is essential, then it is a clue whose significance is currently not understood”.

It seems natural to ask whether the existence of this enormous variety of mysterious modulus ‘3’ has not a common source. Modern Physics shows that the medium responsible for such a phenomenon should be physical vacuum. What is it?

#### **4. The question of the existence of physical vacuum as a real basis of our Universe - if this vacuum is a genuine substance of Universe, may the mysterious modulus ‘3’ be present within it or not?**

In the history of Natural sciences there were many hypotheses expressing the idea that in the spawn of our real world there exists some mysterious medium determining all processes within it. Most often it was the famous ether which had to be a fundamental basis for electromagnetic waves as well as a relational system for describing of all motions in the Universe. However, the interest in this medium was suppressed in last decades especially after discovering that electromagnetic waves do not need a special supporter. Recent years, however, have witnessed renewed interest in the medium. This happened due to observation that our Universe is in the state of expansion characterized by acceleration. Responsibility for this phenomenon was attributed to the energy localized in physical vacuum. It was also possible to measure the density of this ‘dark energy’ and the measured value of global dark energy localized in vacuum shocked all scientific community. Within it there is about 73% of the total energy of our Universe. This acknowledgement correlated very well with Einstein’s intuitive interference into his fundamental equation of general relativity when he incorporated the famous ‘cosmological term’ in this equation.

The world we live in has probably two basic entities: physical vacuum as fundamental basis and our material world which was generated (by an unknown mechanism) from this basis 13.68 billion years ago. More information concerning these problems can be found in publication [13]. Regarding physical vacuum, we can recommend a book [14] written by Nobel Prize winner F. Wilczek. He named this physical vacuum ‘the Grid’. He wrote “... empty space is in reality a dynamic medium full of structures and activity” [14, p. 180]. He expressed explicitly some most interesting properties of the Grid too.

If physical vacuum is a genuine basis of our Universe, then a logical deduction could be the assumption that the mysterious modulus ‘3’ is by some way implemented directly into this Grid. Such a postulate can be supported by two facts: (1) Russian physicist G. Shipov elaborated a hypothetical theory of everything by formally connecting Quantum physics and Theory of relativity [15] and demonstrated that this theory of physical vacuum must be formulated on the basis of three fundamental equations. (2) In their paper [16] physicist J. Ambjorn and his colleagues presented the idea that physical vacuum should have a fractal-like structure.

Last ideas lead to an interesting experiment. By trying to find a regime of deterministic chaos in the 'work' of physical vacuum scientists tried to gain, using the logic mentioned above, a confirmation (or acknowledgement) of the presence of a Trinitarian principle functioning in the Grid. It can be said now that the procedure was applied recently with remarkable success [17].

The main problem in proposed experiment was to find out whether vacuum generates stochastic or deterministic chaos. Fortunately, P. Grassberger, I. Procaccia [18] and others elaborated a reliable solution to this problem. It was only necessary to find a convenient phenomenon exhibiting the influence of physical vacuum and convenient material for measurement. Radioactive decay seemed to be a convenient phenomenon and radioactive iodine was selected as the best material for measurement. Atomic decay in this material is caused by transformation of neutrons into protons and electrons with the assistance of bosons generated by the Grid. Experimental data concerning the numbers of decays (about 300,000) were analysed using the method published in [18]. The result of this analysis showed undoubtedly that investigated system exhibits a deterministic chaotic mode. At the same time this might strengthen a general belief that the theory of everything can really exist because the regime of deterministic chaos requires the existence of related deterministic equations of its dynamics. On the basis of logic presented above we can now proclaim with high probability that a mysterious modulus '3' has been really implemented into our Grid at the beginning of its existence. Of course, this result must be proved by further experiments.

## **5. Conclusions**

Trinitarian problem in Christian religion was always present in history but intensive effort to find a good correlation between Christian understanding of the Holy Trinity and its reflection in the real world was not very successful [19]. One of the most active in this field was Saint Bonaventura. He saw the division of tasks of single persons of the Holy Trinity as follows: God the Father offers creation of the world, God the Son offers wisdom and God the Holy Spirit offers love. He defined the footprints, image and similarity as clear manifests of the Holy Trinity in the real world. The well-known philosopher, Nicolaus of Kues, was searching for an analogy to the Holy Trinity and he found a triangle as a basic object for this analogy. Triangle has three angles and three sides but it is only one object.

J. Kepler was one of the most famous scientists who were looking with enormous intensity for traces of the Holy Trinity in our solar system but without success. Swiss theologian K.H. Reich [20] has invested a lot of effort into investigation of reflections of the Holy Trinity. He emphasizes mainly the following features of the Holy Trinity which should have their place in our everyday life: supertemporality and eternity, unity and diversity, reason and faith, simplicity and complexity, etc. It is clear, however, that the above facts do not fulfill criteria for acceptance of objective existence of footprints of the Holy

Trinity in our world in the sense formulated in Catholic Catechism. Nevertheless, this doctrine pertains to each and every one of human individuals, created in the image of God. Each human subject “is anchored horizontally (in the social fabric of his community) and vertically (in the transcendent and yet fiercely immanent narrative of divine self-revelation in the acts of creation, redemption, and sanctification). The meaning of life cannot be truly understood apart from narrative ethics’ interpretation of the doctrine of creation and redemption” and sanctification [21]. The meaning of the story of the Trinitarian Christian creed summarizes “the vision and purpose of life as a gift of God in the narrative framework [22, 23] of the story of creation, redemption, and fulfillment” [24].

It seems now that one can define the cause of the failure of all previous attempts to find traces of Trinity – the mentioned correlation was actually the searching in well evolved natural systems and structures and it is very well known that practically whatever modulus could have been produced in the evolution as a result of chaotic dynamics. It should be more natural and logical to expect that such correlation takes place only in some genuine basis of our universe and, as we have seen, it could be the Grid. According to F. Wilczek, this Grid “affects the properties of everything within it that is everything” [14, p. 180] including the Trinitarian aspect of our reality. From this point of view the supposition that modulus ‘3’ was in a way implemented into such Grid seems to be very probable. It is necessary to see the importance of the possibility to understand more easily the theologically correct but difficult to interpret dogma ‘three hypostases in one ousia’ (three substances in one essence) in such physical acknowledgements. In physics there exists an analogical claim that three specific forces ‘work’ (apparently autonomously) in our nature. They ‘work’ as components of the originally unified force and this claim does not cause any troubles to physicists. The same result can be gained by analysis of many other phenomena exhibiting the modulus ‘3’, therefore it should be possible to proclaim with J. Polkinghorn: “The physical world looks more and more like a universe that would be fitting creation of the Trinitarian God” [8, p. 104]. The same result can be gained by analysis of many other phenomena exhibiting the modulus ‘3’, therefore it should be possible to proclaim with J. Polkinghorn. Further development of Physics will show if the statement of John Polkinghorn “I believe that the true Theory of everything is not superstrings, as physicists are sometimes moved bombastically to proclaim, but it is actually Trinitarian theology” [8, p. 104], is close to the truth or not. In any case, the theory of superstrings has not convinced us experimentally about it.

## **Acknowledgement**

This paper was written as part of the tasks of the ‘Selected philosophical and ethical consequences of theoretical physics’, supported by institutional grants IG-KSV-01/2016/2.1.5.

Authors wish to thank Dr. Stoyan Tanev for useful discussion.

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