

Science and Theology: The Prospects for Fruitful Mutually Beneficial Cooperation

▼ **ABSTRACT** The main scientific problems of our time — the hard problem of consciousness, the problem of completing the second quantum revolution and the problem of the ‘great silence’ of the Universe — can be solved by turning to theological tradition. The fact is that modern physics builds a model of the world through the introduction of numerical values. These values allow us to compare the elements of the real physical world with mathematical objects — numbers. This mapping exists in the process of realising procedures of measurement, which is a study of the relation of one physical element to another. Thus objective science describes the world not as it is ‘in itself’, but only via the projection of different elements of the world on devices of measurement. The physical theories that result from this practise are thus theories of relations. By virtue of the ‘relativity’ of mathematical (structural) theories, the physical theories are opened up to substantive interpretations. The uniqueness of the current situation is that today we seem to have reached the limits of structural knowledge. ‘Deeper’ structures of the Universe that could be accounted for in the formal language of mathematics are not there. Thus it follows that the structures of the Universe that we can observe now are fundamental, ontological. But does this achievement mean that we have reached the limits of knowledge? Not at all! Further movement is possible in the direction of filling the mathematical syntactic structure with semantic existential content. As science originated as the study of the text of the Book of the World, complementary to that of the Bible, then when one searches for the semantic interpretation of the mathematical structures revealed by science it is reasonable to turn to the Bible as a source of meanings for filling formal mathematical structures of the physical world. The problem of interpreting (mathematical) texts is a hermeneutic problem

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and, therefore, traditionally theological. It is logical to presume that the correspondence between the internal mathematical ('psychical') model and the external physical world is not limited to only the structural similarity but can be extended to the ontological sphere. This will make it possible to create a new conceptual 'two-dimensional' language. Such a language would allow us to describe both the objectivity of the 'external' physical world – quantum world and the world of the Universe as a whole – and the subjectivity of the 'inner' psychological world.

D'où venons nous? Que sommes nous? Où allons nous? — Where do we come from? What are we? Where are we going? — such is the name of one of Paul Gauguin's (1848–1903) most famous paintings, one which he considered to be the culmination of his creative work. Indeed, no one can regard such questions with indifference. They are the questions theology seeks to answer. And they are the principle questions set forth by science. These days science, especially natural science, and primarily physics, are supposed to bring about practical results, to create advanced technologies and to open up new prospects for financial investment. But this is not what is most important. Well-known American physicist, Nobel Prize winner Richard Feynman (1918–98) argued that 'Physics is like sex: sure, it may give some practical results, but that's not why we do it'. One of the twentieth-century's leading physicists, Erwin Schrödinger (1887–1961) argued that the principle aim of science can be laid out in the words of the Delphic oracle: Γνῶθι σεαυτόν — '*Know thyself*'.¹ Schrödinger was convinced that none of the Sciences separately, but only all of them together, could resolve the main issue: to answer the question of man's place in the Universe and the meaning of his existence.

Cosmology as the main science

Just such a universal science combining different fields of knowledge, is, in essence, what cosmology is. Its object of investigation is the Universe, *Universum* — 'all that is'. As Karl Popper (1902–99) wrote, all science is essentially cosmology as it sets forth the problem of understanding the world in general, a problem which includes understanding ourselves and our knowledge of the world as entities which are a part of this world.

And here arises the problem, named 'the Great Silence of the Universe', or the Fermi paradox, stated in 1950 by the preeminent physicist Enrico Fermi (1901–95),² an American physicist of Italian origin. The so-called Copernican principle states that the Universe has no privileged locations. The Earth is thus not unique and in space



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- 1 Erwin Schrödinger, *Science and Humanism* (Cambridge: Cambridge University Press, 1996).
 - 2 Eric M. Jones, "*Where Is Everybody?*" *An Account of Fermi's Question* (Los Alamos: Los Alamos National Laboratory, 1985).

there should be plenty of star systems and planets with conditions that are similar to ours. This principle has been amply supported by recent discoveries of exoplanets. Thus nothing should prevent the origin of life and emergence of intelligence in other places in the Universe in the same manner as it has done on earth. Since the Universe is about fourteen billion years old, somewhere in space there must exist a technological civilisation far superior to ours; yet, for some reason, it has not been observed. The *SETI* (*Search for Extra-Terrestrial Intelligence*) project has not found anything that resembles signals from extraterrestrial civilisations after more than 50 years of searching. ‘The great silence’ of the Universe suggests that there is something fundamentally important about the Universe that we do not understand. ‘The great silence of the Universe, the Fermi paradox, is not just a crisis of individual physical theories (like General Relativity or the Grand Unification Theory), it is a crisis of civilisation’, so Vladimir Lipunov (Владимир Липунов), Professor of Astrophysics and Stellar Astronomy of the Physics Department at Moscow State University, has argued.³

One of those who tried to resolve the Fermi paradox, the Russian Victoriy Schwartzman (Викторий Фавлович Шварцман, 1945–98), was one of the more forward-thinking astrophysicists of his time. When his country was still under the thrall of Soviet materialism he asserted that the greatest challenge lies not in receiving the signal but in understanding that what we have received is a message. From his point of view, the problem of the search for life in the Universe is not merely a technological one that can be solved by increasing the sensitivity of the receiver or the time span of observations. It is, in fact, a cultural problem. He argued that, perhaps we are already seeing what could be called the *signal*, but we cannot interpret it as a message. The thing is that, as Schwartzman noted, the essence of the cultural message is inseparable from the message’s form.⁴ In cultural studies this fact is formulated in the form of Marshall McLuhan’s (1911–98) aphorism ‘*The medium is the message*’⁵. The message of Gauguin’s painting *D’où venons nous? Que sommes nous? Où allons nous?* is not only *who* and *what* is depicted on it but *how exactly* it was done. The message of the Universe to man is inseparable from the form of the message, Schwartzman believed. The identification of this form as having a meaning that is invested in the content of the message is, according to Shwartzman, the most important problem of all human culture. Indeed, only by understanding the message of the Universe, can we understand the world in which we live, and the place that world occupies.

It is noteworthy that when, in 2005, the journal *Science* marked its 125th anniversary with twenty-five questions which were considered the most pertinent for the beginning

3 Владимир Липунов, *От Большого Взрыва до Великого Молчания* [*From the Big Bang to the Great Silence*] (Москва: Издательство АСТ, 2018).

4 Викторий Шварцман, ‘Поиск внеземных цивилизаций — проблема астрофизики или культуры в целом?’ [‘The search for extraterrestrial civilizations — the problem of astrophysics or culture in general?’], *Проблема поиска жизни во Вселенной: Труды Таллинского симпозиума 7–11 дек. 1981 г.* [*The problem of finding life in the Universe: Proceedings of the Tallinn Symposium, 7–11 Dec. 1981*] (Москва, 1986), p. 236 <www.pereplet.ru/text/shwartzman.html>.

5 Marshall McLuhan, *The Medium is the Message: An Inventory of Effects* (Penguin Books, 1967).

of the third millennium. Characteristically, the first question was *What is the Universe Made of?* and the second, *What is the Biological Basis of Consciousness?*⁶ Despite their apparent heterogeneity, these two questions are extremely close to each other.

Indeed, the first question relates to the fact that most of the world is a 'unknown thing'. As it has turned out the 'normal', or baryonic, matter known to us represents less than 5% of the mass of the Universe. The remainder is the so-called 'dark matter' and 'dark energy' about which we know almost nothing. If one stops to consider this it is shameful! Claims that physics and cosmology are exhaustive descriptions of the Universe are questionable when through them we understand less than 5% of reality.

The hard problem of consciousness

The second question relates to the so-called 'hard problem of consciousness', as David Chalmers lightly termed it.⁷ Its essence lies in the following: we traditionally understand the world to be made up of the totality of material *bodies*. Yet in the world of *material bodies* there is, in fact, no place for *the psychical*. Indeed, in contrast to objectively existing 'bodies', consciousness is subjective, we *live it*. And it is completely incomprehensible how the subjective could appear in the objective world. Chalmers formulated the main question related to the problem of consciousness in the following manner: Why do objective processes in the brain not 'plunge into darkness' but are 'accompanied' by subjective experience? If the brain could process the incoming information and transform it into action without any subjective experience, then why should subjectivity be needed at all?

Another difficulty is connected with the fact that the psychical, in distinction from the physical, is always *directed* to something *intentionally*. If a physical body simply *exists*, then consciousness is always *about something*: I think about something, I experience something for some reason, that is the cause of my disturbance. But if the brain and neurons are physical bodies how could they generate the subjectivity and intentionality inherent in the human psyche? One of the most influential contemporary American philosophers, John Searle asked: 'How ... can atoms in the void represent anything?'⁸

It is thus clear that we first must answer questions about the nature of the Universe and consciousness so as to answer those most important questions: *Where do we come from? What are we? Where are we going?*

John Searle, considered to be a 'living classic in the philosophy of mind', proposes that the basic orientation of philosophy of mind over the last seventy-five years has been manifestly wrong. In Searle's opinion, Cartesian dualism and materialistic

6 Charles Seife, 'What is the Universe Made of?', *Science*, 309 (2005), p. 78; Greg Miller, 'What is the Biological Basis of Consciousness', *Science*, 309 (2005), p. 79.

7 David Chalmers, 'Moving forward on the problem of consciousness', *Journal of Consciousness Studies*, 4, № 1 (1997), pp. 3–46.

8 John Searle, *Minds, Brains and Science* (Cambridge, Massachusetts: Harvard University Press, 1984), p. 16.

monism are equally wrong. Dualism, according to Searle, does not agree with the modern scientific view of the world, whilst materialistic monism, despite its obvious inability to resolve the problem of consciousness, is the most widely held view. Yet this is rather more for reasons of a psychological character. Persistent attempts to solve the problem of consciousness were undertaken in the context of a materialist paradigm, not for scientific but for 'ideological' reasons — fear of the possibility of admitting the reality of 'the psychical' is only one step away from accepting the reality of 'the spiritual'.

Today colossal resources are being devoted to brain research and the 'hard problem' of consciousness. A number of large projects have been launched. Among these must be mentioned the American *BRAIN Initiative*, the European-led *Human Brain Project*, the Japanese *Brain/MINDS*, and the eponymous *China Brain*. But the answer to the question of what consciousness is and how it might be related to brain function has yet to be given. This search is being taken along the path of finding the 'material substrate' of consciousness — a search which, according to Searle and a number of other prominent researchers, is utterly misled. And the cost of failure is very high: expenditures on brain research projects are in the billions of dollars and such false starts are turning out to be very costly for their investors!

I am convinced that describing psychical reality demands a fundamentally new approach — a view 'from the inside' that is typical to theological discourse.

The prominent Russian mathematician, Professor Igor Shafarevich (Игорь Ростиславович Шафаревич, 1929–2017), noted that the question of the possibility of a computer simulation of the brain activity is, in fact, a restatement of the question about the materiality of the Universe.⁹ Since the middle of the twentieth century, researchers have been promising that *AI* would be around the corner, 'in the next ten years'. The chronic failure of all these attempts attests to the fact that our materialistic notions about the Universe are patently false. Only by widening the scope of scientific investigation and including theological discourse into its orbit shall we be able to overcome the materialistic 'blindness' that pose to the study of consciousness an objective obstacle.

It is noteworthy that the famous American physicist of Russian origin Andrei Linde (Андрей Дмитриевич Линде) thinks that consciousness may be as fundamental as space, time and matter. Furthermore, the problem of consciousness may be closely connected with the problem of the birth, life and death of the Universe itself.¹⁰

More than half a century ago, the prominent American mathematician, physicist and Nobel laureate Eugene Wigner (1902–99) noted the close relationship between these two problems — the problems of physical reality and the problem of consciousness. He argued that physics and psychology represent the two most important disciplines

9 Игорь Шафаревич, *Один народ, одна страна, и один Бог, и одна Церковь* [One people, one country, and one God, and one Church] <<https://pravoslavie.ru/4531.html>>.

10 Andrei Linde, *Particle Physics And Inflationary Cosmology*, p. 232 <<https://arxiv.org/pdf/hep-th/0503203.pdf>>.

that together shape a mutually complementary picture of the world. Physics accounts for an objective world external to the perceiving subject, psychology the reality of the internal world. He is convinced that a complete image of the Universe requires that both of these views be in agreement.¹¹ Wigner hoped that in future physics and psychology would be combined into one deeper discipline, and today we can hope to arrive at the realisation of his aspirations.

Just such a holistic view of the Universe where the objective language for describing the external physical world was organically combined with the subjective language describing internal mental reality was the project of two of the twentieth century's most influential scientists: the physicist and Nobel laureate Wolfgang Pauli (1900–95) and the founder of analytical psychology Carl Gustav Jung (1875–1961). After more than a quarter-century of collaborative research, Jung and Pauli concluded that the physical and psychic are two interrelated properties (two 'aspects') of a single entity lying at the base of the whole of reality.

Adherents to this perspective, called *neutral monism*, include such thinkers as Benedictus de Spinoza (1632–67), William James (1842–1910) and Bertrand Russell (1872–1970), the aforementioned Carl Gustav Jung and Wolfgang Pauli, and contemporary adherents such as John Searle and David Chalmers. Unfortunately, Pauli's untimely death in 1958 prevented him from completing his work with Jung. Today the problematics Jung and Pauli together brought to the fore have been receiving more and more attention.¹² The groundwork they laid may be one of the 'points of growth' in interdisciplinary research programmes in physics, cosmology, psychology and theology.

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- 11 Eugene Wigner, 'The Limits of Science', *Proceedings of the American Philosophical Society*, 94 (1950), pp. 422–27.
- 12 Kalervo Vihtori Laurikainen, *The Message of the Atoms: Essays on Wolfgang Pauli and the Unspeakable* (Heidelberg: Springer 1997); *Atom and Archetype: The Pauli/Jung Letters, 1932–95*, ed. by C. A. Meier and translated by David Roscoe (Princeton, NJ: Princeton University Press, 2001); Suzanne Gieser, *The Innermost Kernel: Depth Psychology and Quantum Physics* (Heidelberg: Springer, 2004); David Lindorff, *Pauli and Jung: The Meeting of Two Great Minds* (Wheaton, IL: Quest Books, 2004); Arthur I. Miller, *Deciphering the Cosmic Number: The Strange Friendship of Wolfgang Pauli and Carl Jung* (New York: Norton, 2009); Harald Atmanspacher and Hans Primas, *Recasting Reality: Wolfgang Pauli's Philosophical Ideas and Contemporary Science* (Heidelberg: Springer, 2009); Charles Paul Enz, *No Time to be Brief: A Scientific Biography of Wolfgang Pauli* (Oxford: Oxford University Press, 2010); Arthur I. Miller, *137: Jung, Pauli, and the Pursuit of a Scientific Obsession* (New York: Norton, 2010); Kirill Kopeikin, 'По следам Юнга и Паули в поисках соприкосновения физического и психического миров' ['In the Footsteps of Jung and Pauli in Search of a Contact Between the Physical and Mental Worlds'], in *Известные и неизвестные открытия XX века [Known and Unknown Discoveries of the Twentieth Century]* (St Petersburg: Publishing House of the St Petersburg State University, 2016, pp. 85–97; *The Pauli-Jung conjecture: and its impact today*, ed. by H. Atmanspacher and C. Fuchs (Exeter: Imprint Academic, 2014); Massimo Teodorani, *Synchronicit : le rapport entre physique et psych  de Pauli et Jung   Chopra* (Cesena: Macro  ditions, 2015); *L'arri re-monde ou l'inconscient neutre: psychologie des profondeurs et physique quantique selon C. G. Jung et W. Pauli*, ed. by Bruno Traversi (Avion: Ed. du Cenacle de France, 2018).

Hermeneutics of the Book of Nature

What sort of language could be built that would be able to organically combine an objective means of describing the physical world and the subjective, personal means of describing psychical reality? Here we can say that the most characteristic feature of the objective language of science comes to our aid. The fact is that modern physics builds a model of the world through the introduction of numerical *values*. These values allow us to compare the elements of the real physical world with mathematical objects — *numbers*. This mapping exists in the process of realising procedures of *measurement*, which is a study of the relation of one physical element to another. Thus objective science describes the world not as it is ‘in itself’, but only via the *projection* of different elements of the world on devices of measurement. The physical theories that result from this practice are thus *theories of relations*. By virtue of the ‘relativity’ of mathematical (structural) theories, the physical theories are opened up to substantive *interpretations*.

The ‘minimalist’ interpretation of classical physics is a materialistic one. Indeed, Kant’s careful analysis of the prerequisites of modern European science showed that, from the Modern period onward, the metaphysics of nature has transformed into a *metaphysics of matter*. Until the early twentieth century, the materialistic interpretation of physics had been confirmed. But after the emergence of the theory of relativity and, especially, quantum mechanics, the situation radically changed.

In classical physics the concepts of mass, space, time and force seemed intuitively clear (although thanks to relativity it was found that this is not so). In quantum mechanics the mathematical representation of reality is a wave function or state vector. Despite the tremendous predictive efficiency of quantum mechanics we have absolutely no understanding of the *physical* reality that must correspond to this *mathematical* construct. It is a scandal! Almost a hundred years have passed since the development of quantum mechanics and what it is actually ‘about’ we still do not know. This was the reason why the leading Russian physicist and the Nobel laureate, Prof. Vitaly Ginzburg (Виталий Лазаревич Гинзбург, 1916–2009) regarded the matter of interpreting nonrelativistic quantum mechanics among the ‘three great problems of modern physics’; until these questions are explained ‘we can be sure about nothing.’¹³

The uniqueness of the current situation is that today we seem to have reached the limits of structural knowledge. For this there are two confirmations: both theoretical and experimental. The theoretical basis that we have reached the limit of structural knowledge was given by eminent Russian mathematician Professor Ludwig Faddeev (Людвиг Дмитриевич Фаддеев, 1934–2017). He proved that, from a mathematical point of view, the revolutions of quantum mechanics and of the special theory of relativity in physics are deformations of unstable algebraic structures into stable ones

13 Vitaly Ginzburg, ‘On Superconductivity and Superfluidity (what I have and have not managed to do), as well as on the “physical minimum” at the beginning of the XXI century’, *Physics Uspekhi*, 47 (1), (2004), 1155–170 (pp. 1169–170).

with the parameters of deformation \hbar and $1/c^2$. ‘Thus we are led to an important conclusion: whereas the change of classical mechanics into the quantum one is fully justified, we have no reasons to predict any change of the latter in the future’¹⁴. The stability of the mathematical structures of quantum mechanics and the theory of relativity means that equilibrium has been reached and further movement along the former path of searching for deeper and deeper structures is impossible.

The experimental confirmation of the achievement of the limits of structural knowledge is that quantum mechanics testifies to the impossibility of the detecting deeper structures. The eminent Irish physicist John Bell (1928–99) reflecting on the Einstein-Podolsky-Rosen paradox in 1964 wrote of certain inequalities which, if experimentally confirmed, would conclusively decide whether there are or there are not local hidden parameters that are observable¹⁵.

The technical capabilities of the 1960s and 70s did not yet allow for such experiments to be designed. Subsequently, a number of experiments, the most decisive of which was a 1982 test led by the French experimental physicist Alain Aspect, showed a clear violation of Bell’s inequalities. This completely unexpected result means that not only are we unable to discover the deeper structure of the Universe due to inadequate technical capabilities or because of a lack of energy — these deeper structures *simply do not exist*.

Famous American physicist Henry Stapp claims that ‘Bell’s theorem is the deepest discovery of science’, and eminent American physicist and philosopher Abner Shimony (1928–2015) asserts: ‘The philosophical significance of Bell’s Inequalities, in my opinion, is that they permit a near decisive test of those world views which are contrary to that of quantum mechanics. Bell’s work made possible, therefore, some near-decisive results in experimental metaphysics.’ The winner of the 2009 Templeton Prize, Bernard d’Espagnat (1921–2015), agrees with Shimony that we have seen in the tests of Bell’s inequalities ‘our first steps in the elaboration of an experimental metaphysics’¹⁶.

The violation of Bell’s inequalities means that we have reached the limits of structural knowledge. ‘Deeper’ structures of the Universe that could be accounted for in the formal language of mathematics are not there. Thus it follows that the structures of the Universe that we can observe now are fundamental, ontological. But does this achievement mean that we have reached the limits of knowledge? Not at all! Further movement is possible in the direction of examining the content of these ontological structures by studying the process of their emergence.

Let me explain. As is well known today, modern science arose in the context of the conception that the Bible is the first Book of God and Nature the second.

14 Ludwig Faddeev, ‘A Mathematician’s View of the Development of Physics’, *Proceedings of the 25th Anniversary Conference — Frontiers in Physics, High Technology and Mathematics 31 October — 3 November 1989*, ed. by H. A. Cerdeira, S. O. Lundqvist (Singapore: World Scientific Publishing Co, 1990), pp. 238–46.

15 John Bell, ‘On The Einstein — Podolsky — Rosen Paradox’, *Physics*, 1, № 3 (1964), pp. 195–200.

16 Bernard d’Espagnat, ‘Toward a Separable “Empirical Reality”?’, *Foundations of Physics*, 20, № 10 (1990), p. 1172.

Between them there can be no contradiction as they have been composed by one and the same Author. Furthermore, as one of the founding fathers of modern science, Francis Bacon (1561–1626), argued, study of the Book of Nature can be the key to a deeper understanding of the Bible.

What has research into the second Word of God given us? The principal conclusion of natural science, first formulated by Galileo, is as follows: the Book of Nature is written in the language of mathematics. But most importantly, as Galileo noted, when a person begins to describe the world with the help of mathematics, his knowledge becomes equal to the knowledge of God. It is truly extraordinary! It is mean, that the ‘ideal’ mathematics gives the most true description of physical reality And that it is mathematics that can give the key to the Bible. But what is mathematics and what is its nature?

Mathematics as a Universal Language

Among the many views on the nature of mathematics, one can identify two extreme positions. The first and, arguably, the most widespread is that mathematics is the result of abstracting from reality. The second view is, rather, the one more typical of working mathematicians: the amazing ‘flexibility’ of mathematical constructions requires us to propose that they actually exist, but exist in some sort of ‘ideal’ realm. Unfortunately, neither of these opposing views allow for the explanation of the status of mathematical objects. They also make it impossible to understand the causes of ‘the unreasonable effectiveness of mathematics’ in describing physical reality.

A sober look at mathematics inevitably leads to the conclusion that mathematical objects exist in our psychic reality, in the human mind. In this sense mathematics is ‘subjective’ and ‘ideal’ — in the real physical world there is no mathematics. On the other hand, mathematics is universal in the sense that it is the same for all entities employing it. Indeed, the above mathematical properties apply to all persons regardless of ethnic or religious affiliation. In this sense mathematics is ‘objective’. However, mathematics does not exist in the ‘head’ of those who work with it. It is generated through effort, sometimes great effort. It is logical to presume that the universality and ‘objectivity’ of mathematics testify to the fact that the (psychical) forces which created mathematical reality are the same in all people.

By ‘objectifying’ mathematics we alienate it from ourselves and ‘deaden’ its. But one may try to look at mathematics not just as a static construction that exists outside of time, but to examine the process of its generation in the psyche of the mathematician-creator and thus fill it with a ‘living’, dynamic, and ‘psychical’ content.

How would this be possible? Investigating the process by which mathematics is generated in the mind of its creator extremely difficult. The fact of the matter is that we are merged with our psyche, we cannot go beyond its boundaries and regard it from the outside. But we can look at the traces that the dynamics of psychic life leave behind. As has already been said, this is firstly that mathematics is at once ‘subjective’ (located in psychic reality) and ‘objective’ (by virtue of its universal application. Secondly this is the sacred texts, the Bible among them. The Bible can and should be viewed not so much as a story about *events*, but as a narrative about the history

of mankind's 'internal' world, and thus as story about the nature of the human soul. When the biblical narrative is taken as a cosmological theory or mythological history it actually amounts to a projection of the psyche's archetypal structures. Of course this is the case with all sacred texts. Our appeal to biblical narrative is due to the fact that modern science arose in the context of the European intellectual tradition, a tradition rooted in the biblical worldview.

The Bible begins with the Six Days of Creation, the story of God creating by means of His word out of nothing — *ex nihilo*. If the Bible is a Revelation, than this means that the Creator shows us his view of the Universe. If mankind wants to understand this text, he must attempt to put himself in the position of the creator, *in the image and likeness* of He who made him. Is there something in human experience that can be compared with creation *by the word*, creation *ex nihilo*? Of course, any literary, or poetic creativity is creation by word. But this is yet still creation 'out of something' — out of the accumulation of life experience, emotions, and the like. The only creation familiar to me that takes place 'out of nothing' is, indeed, mathematics!

Admittedly, initially mathematics arose out of certain practices that were, in some sense, 'experimental'. Along the course of this 'experimental' construction of mathematics, ideal mental objects were created. They began to live their own lives, ever striving toward 'pure', ideal knowledge. The 'pure' creation of mathematics sought by the 'perfect' mathematician is a withdrawal from any of the concepts arising from interaction with external reality. In fact, the 'pure creation' of mathematics is synonymous with the creation '*ex nihilo*'.

A mathematician beginning his creation with 'pure' mathematics rejects all the external and turns his own consciousness to the void as it arises in his soul. The very statement of the problem of the awareness of this purity gives birth to the idea of 'nothing' which is no longer 'nothing' but which is a certain 'something', namely the *empty set* \emptyset . The creation of the *empty set* \emptyset is *out of nothing* indeed is the first act of creation. The French philosopher Alain Badiou emphasises the exclusiveness of this act: in distinction from all other axioms the axiom that attests to the existence of the empty set clearly postulates that its *existence* is the existence of *nothing*¹⁷.

Subsequent acts in the creation of the mathematical universe are not creation out of nothing, but acts built upon previous mathematical constructs. This work is done by the mathematician by acts conceived through his creativity and free will according to certain laws, laws enabled through the structure of the *forces* of his soul. In all likelihood, the nature of these (psychical) forces that create mathematical reality are, as has been noted, the same for all people. Only in this way may one account for how 'subjective' mathematics can be so universal and universally valid.

The mode of action of these forces is described in the language of set theory, which is the foundation of modern mathematics. Thus one may pose the question: to what extent do these forces not only have structure but also content? To answer this question one can compare the acts of creation in the mathematical universe with the dynamics of the Six Days of Creation. We can appeal to an existential reading of the Genesis narrative in the 'mathematical' context of the creation of mathematics

17 Alain Badiou, *L'Être et l'Événement* (Paris: Seuil, 1988).

by the word of mathematician-Creator *ex nihilo*. Thus we will be able to fill out the mathematical syntactic structure with semantic existential content and create new conceptual ‘two-dimensional’ language. Such a language would allow us to describe both the objectivity of the ‘external’ physical world and the subjectivity of the ‘inner’ psychical world. I would term such a project *Mind T(h)e(chn)ology*.

The Universe as the ψυχή of God

Let us recall the theological context that gave birth to modern scientific thought: man is created *in the image and likeness* of God the Creator, and therefore able to understand His creation and to build suitable models of reality. It is logical to presume that the correspondence between the internal mathematical (‘psychical’) model and the external physical world is not limited to only the structural similarity but can be extended to the ontological sphere.

This shocking suggestion finds in itself an unexpected confirmation. The famous American psychologist Donald Hoffman from University of California, Irvine, believes that the reason why the problem of consciousness still defies solution that we are starting off with the wrong premise: we believe that reality is what we see, i.e. it consists of physical ‘bodies’. In fact, he argues, what we see is only the ‘interface reality’ and not reality itself. He maintains that the reason for the failure of neuroscience to explain the nature of human consciousness is that neuroscientists and philosophers have ignored the progress made in fundamental physics. ‘And then [neuroscientists] are mystified as to why they don’t make progress. They don’t avail themselves of the incredible insights and breakthroughs that physics has made. Those insights are out there for us to use’¹⁸.

What sorts of insights regarding the fundamental nature of the Universe occurred in the twentieth century? In 1905 Albert Einstein published the article ‘Does the Inertia of a Body Depend on its Energy Content?’ There Einstein concludes that the ‘mass of a body is the measure of its energy-content’, which suggests what is perhaps the most famous formula of all physics: $E_0 = mc^2$. If you consider it, the implications of this formula are staggering. Mass, in fact, represents a measure of matter. Being substance, matter exists by itself. Matter and its measurement — mass — is an absolute value. Physics has discovered that matter converts into energy. Energy is a characteristic, not a substance but a *process*. Furthermore, energy relies on a system of references and thus cannot be a characteristic of a substance. Nor can mass be a characteristic of a substance since it is equivalent to energy. Thus all substantial (materialistic) philosophy lies in ruins. That matter (as a substance) does not exist — is the main conclusion that can be drawn from the special theory of relativity!

Quantum mechanics was to become the next colossal breakthrough in our comprehension of the nature of *ultimate reality*. George Greenstein and Arthur Zajonc, authors of the book ‘*The Quantum Challenge: Modern Research on the Foundations of Quantum Mechanics*’, have emphasised that the quantum universe forces upon

18 Donald Hoffman, ‘Conscious Realism and the Mind-Body Problem’, *Mind & Matter*, 6(1) (2008), pp. 87–121.

us a radical revision in our conception of the physical world, a revision which has by no means been achieved¹⁹. Before it was believed that the whole was made up of ‘objectively existing’ physical ‘bodies’ that obeyed immutable natural laws. In examining the universe we uncover the laws that govern these bodies. Indeed we may so ‘delicately’ observe nature so as to make no disturbances in the system under observation. But in quantum mechanics the situation turned out to be completely different. It is even impossible to ‘spy’ on the behaviour of a given system when measuring its parameters radically changes its behaviour. This is clearly demonstrated, for example, in delayed-choice experiments. They leave behind the impression that the particles examined are ‘conscious’ of the fact of their observation, that they have a psychical property. Hoffman, who calls himself a ‘conscious realist’, makes the same claim. He says that the reality represents the totality of acts of consciousness — something like Leibniz’s monadistic universe. And it is not only Hoffman that thinks so. Erwin Schrödinger, Roger Penrose, David Chalmers — all are inclined toward the concept of panpsychism.

Such a strange conclusion can easily be understood in a theological context. As has already been stated, modern science arose on the basis that the world is the Book of God, compliment to the Bible. Yet if the world is the book of the Creator, a book He composed, then what type of ontological reality does it have? What conclusion can we draw in attempting to make sense of contemporary science in the substantive context of its origins, the context of Biblical Revelation? Opening the Bible to the Book of Genesis presents us with God’s creation of the world out of nothing though His very Word. In the Niceo-Constantinopolitan Creed, God is called the Creator, *Ποιητής*, literally, the *Poet* of the Universe. If the world is a text, then *where* does it exist? When Tolstoy composed *War and Peace*, where did his creation come from? Without a doubt, in his internal reality, in the reality of his psyche (*ψυχή*)!

If we at once are giving logical sense to all that is clear to us thanks to the ‘elements’ of the *poetry* of the Book of Nature, and we can also recall the theological context from which the formulation of modern science came, then we will have to arrive at an unambiguous conclusion: ‘The world is the *ψυχή* of the Creator’, ‘For in Him (*ἐν αὐτῷ*) we live and move and have our being’ (Acts 17.28). The Universe is *ψυχή* of God in this sense that, firstly, the world does not consist of dead ‘matter’, but a living and logos-endowed fabric of existence, and, secondly, God needs no ‘organ’ in order to touch the world. He has *immediate* access to it just as we have immediate access to our *ψυχή*.

The presumption of a psychical nature to being opens the way to resolving the problem of interpreting quantum mechanics as well as to the completion of the ‘second quantum revolution’, a movement which is extremely relevant in today’s world.

Now the EU is launching another project the *Quantum Technology Flagship*.²⁰ In an attempt not to fall behind America and China, in 2018 it intends to initiate an initiative



19 George Greenstein and Arthur Zajonc, *The Quantum Challenge: Modern Research on the Foundation of Quantum Mechanics*, (Jones & Bartlett Publishers, 2005).

20 <<https://ec.europa.eu/digital-single-market/en/policies/quantum-technologies#Article>>.

in quantum technologies with a billion euros of financing.²¹ This could place Europe on the cusp of a ‘second quantum revolution’ and lead to a radical transformation of the sciences, industry and society. The essence of a ‘second quantum revolution’ consists in mastering the effects associated with the possibility of manipulating single quantum objects. This should lead to a new technological breakthrough, in particular, the creation of quantum computers, absolutely protected channels of quantum communication, supersensitive quantum sensors, etc. Two years earlier, the *Quantum Europe 2016* conference in Amsterdam²² adopted the *Quantum Manifesto*.²³ This formulates a general strategy intended to set Europe as the avant-garde of the second quantum revolution.

George Greenstein and Arthur Zajonc, authors of *The Quantum Challenge: Modern Research on the Foundations of Quantum Mechanics*, note that quantum mechanics arose and developed not as a description of *reality*, but as a description of *the results of observations*. This recalls Ptolemy’s geocentric system: perfectly explaining the observable movement of the planets from earth, but not the physical reality. Achieving a breakthrough in quantum information technologies, establishing an effective means of quantum cryptography and quantum computers knowing only quantum formalism is about the same as launching an artificial satellite from Earth using the Ptolemaic system. In this connection, the question arises: is the ‘Copernican revolution’ possible in the microcosm?

I am certain that a ‘Copernican revolution’ in the world of sub-atomic particles will become possible by resorting to the biblical tradition that presents its view of the ‘interior’ of being²⁴. As already mentioned, this will create a new conceptual ‘two-dimensional’ language, capable of describing not only the ‘external’ structure of the Universe, but also its internal dynamics.

The surprisingly deep correspondence of the mathematical (‘psychic’, ‘internal’) model of the Universe to the outside world compels us to pose the question not only about the structural, but also about the ontological nature of this correspondence. Remembering the philosophical and theological context in which modern European scientific investigation arose, it is logical to assume that the correspondence between the internal ‘psychic’ mathematical model and the external physical world is not limited to their structural likeness, but can be extended into the realm of ontology. This allows one to resolve the problem of the interpretation of nonrelativistic quantum mechanics and move from a description of the *results of observations* to a description of *reality itself*. This approach allows us to include psychic reality in the scientific picture of the world and to complete the second quantum revolution. I would term such a project *Quantum T(h)e(chn)ology*.

21 <<https://www.nature.com/news/europe-s-billion-euro-quantum-project-takes-shape-1.21925>>.

22 <<https://qutech.nl/quantumeurope/>>.

23 <https://qutech.nl/wp-content/uploads/2016/05/93056_Quantum-Manifesto_WEB.pdf>.

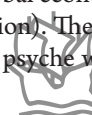
24 Kirill Kopeikin, ‘The Orthodox Tradition and a Personal View on the Universe “from Within”’, *Orthodox Christianity and Modern Science: Tensions, Ambiguities, Potential*, ed. by Vasilios N. Makrides and Gayle E. Woloschak, SOC, 1 (Turnhout, 2019), pp. 237–46.

The Glass Bead Game with the Universe

The presumption of the psychical nature of being opens up the way to resolving the problem of the ‘Great Silence of the Universe’. Once we view the Universe as the $\psi\upsilon\chi\eta$ of the Creator, and that we exist as a part of His psyche, we must radically transform the discourse that relates our understanding of the world. The first thing that comes to mind is that the large-scale structure of the universe is remarkably similar to the structure of the brain.

Furthermore, as has already been stated, physical theories are *theories of relations*, which are open to content-full *interpretation*. As science originated as the study of the text of the Book of the World, complementary to that of the Bible, then when one searches for the semantic interpretation of the mathematical structures revealed by science it is reasonable to turn to the Bible as that which lies at the foundation of the three Abrahamic religions — Judaism, Christianity and Islam. The concept of the project *Universal T(h)e(chn)ology* is that one must apply an art interpretation to the fundamental laws of the universe as they are observed from the study of the Book of Nature in the context of the biblical, Abrahamic tradition. This project resembles the *Game* as described by the famous German writer and Nobel laureate Hermann Hesse (1877–1962) in the novel *The Glass Bead Game* (*Das Glasperlenspiel*, 1943). If the fundamental laws of the Universe as observed in science ‘speak’ in the language of culture (as Carl Gustav Jung and Wolfgang Pauli tried to do in the mid-twentieth century), then scientific theories which have been ‘instruments of influence’ on the external world will become the means by which the world — and thus, in a sense, the Creator Himself — answers us and thus affects our inner world. This will be the longed-for ‘signal from space’, the ‘language of the stars’, of which the *budetlyanin* Velemir Khlebnikov (Велемир Хлебников, 1885–1922) dreamt, one of the brightest representatives of this futurist direction of thought that has been given the name ‘Russian cosmism’²⁵.

A fundamental change in our understanding of the Universe and of our means of interacting with it allows us to resolve yet another vital issue — that of developing new methods of harmonising the human psyche by expanding its resources and enhancing its cognitive capabilities. These days this issue is becoming more and more important owing to ever-increasing psychological burdens, the ever-increasing flow of information, the increase in the number of psychological diseases, and the growth in life expectancy and its attendant risks of neurological disorders. According to assessments of the World Health Organisation, one out of every four individuals has suffered at least once in their life from a psychological illness. On a yearly basis three hundred million people suffer from depression and eight hundred thousand commit suicide. The annual loss to the global economy owing to mental illness amounts to one trillion US dollars (€860 billion). The development of new methods to aid in the harmonisation of the human psyche will set the groundwork for the effective



25 George M. Young, *The Russian Cosmists: The Esoteric Futurism of Nikolai Fedorov and His Followers* (New York: Oxford University Press, 2012).

use of human potential and permit, at least in part, for the resolution of a whole set of these problems.

It seems to me that three of these research projects I have proposed — *Mind T(h)echnology*, *Quantum T(h)echnology* and *Universal T(h)echnology* — are quite able to fit into the contemporary scientific mainstream and can become a ‘point of growth’ for a renewed, fruitful interaction between theology and science.

