

## **Quantum Mechanics and the Meaning of Life**

*“The chance encounter of a sewing machine  
and an umbrella on the operating table”.*

### **The Loss of Meaning**

Living in a vast, infinite, unknown universe, human communities have ever surrounded themselves with spheres of symbols: myths and religions, knowledge and illusions, values and the seductive beauty of the arts; i.e. with a brilliant construct: civilization. Within the „bubble” of their civilization, they could find a certain degree of safety, freedom, and dignity and could cherish the hope, or the illusion, that their lives had significance and meaning.<sup>1</sup>

For a certain period of time each civilization we know had the power to answer the everyday and the ultimate questions of human life. But after having reached their zenith, they, all, were doomed to decline. The “bubble” burst and people were left alone and unprotected in a chaotic or empty universe void of meaning.

There were communities, which perished in the crisis, or were absorbed by another civilization. And there were others, which got involved in a „defiant creation of meaning”<sup>2</sup>, in the construction of “a shield against terror”, in the “enterprise of building [again] a humanly meaningful world” for themselves.<sup>3</sup>

At present, it seems to be the turn of the modern age, the threatening burst of the “bubble” of modernity. The most sensitive minds of our civilization felt the first signs of this decadence already in the second half of the 19<sup>th</sup> century, starting with Baudelaire and Nietzsche, and then, in the 20<sup>th</sup> century this experience overwhelmed some of the best mind of the West.<sup>4</sup>

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<sup>1</sup> See for instance the ideas of Max Scheler, Ernst Cassirer, Géza Roheim, Mircea Eliade, Clifford Geertz, Ernest Becker, Eric Voegelin, Franz Borkenau, Peter Berger and others. See also Schlagel (1985), Henry (2012).

<sup>2</sup> Becker (1973, pp. 4–5, 7)

<sup>3</sup> Becker (1973, pp. 22-24)

<sup>4</sup> Let me mention only Spengler, Sorokin, Toynbee, Freud, Kafka, Jaspers, Heidegger, Sartre, Gadamer, Musil, Russell, Monod, Kuhn, Löwith, Derrida,

The situation seems to be critical. Outstanding scholar and leading scientists have spoken of “the living death of modern material civilization”,<sup>5</sup> „the crisis of human existence itself”,<sup>6</sup> „the loss of transcendence”,<sup>7</sup> „a historic crisis”,<sup>8</sup> the „abyss of darkness”,<sup>9</sup> a “nightmare of meaninglessness”.<sup>10</sup> Even Bertrand Russell, one of the most rational and sober minds of the 20th century was shocked by „the loneliness of humanity amid hostile forces” in an infinite, fearful universe, in a „cavern of darkness” and described human life – in almost O’Neillian terms – as „a long march through the night”.<sup>11</sup>

The loss of meaning, the “modern soul’s distress”<sup>12</sup> felt with increasing intensity also by hundreds of millions of people around the world may become one of the most dramatic experiences, and one of the major problems to be dealt with, in the 21<sup>st</sup> century. It may grow into an at least as serious a problem as the so much discussed economic, ecological or safety problems.<sup>13</sup> In different forms, though, it may hit both the developed and developing societies.<sup>14</sup>

This means that to explore the possibilities of how to construct a new framework within which human beings will again find safety and feel that their lives have significance and meaning will and should be one of the great challenges of the social, human and natural sciences in the coming decades.<sup>15</sup>

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Foucault, Rorty, Sloterdijk, Cioran, Gide, Camus, O’Neill, Beckett, Tillich, Caputo, and others.

<sup>5</sup> T. S. Eliot (1934, pp. 60).

<sup>6</sup> Jaspers (1965 [1932], pp. 76)

<sup>7</sup> Camus (1971 [1951])

<sup>8</sup> Hobsbawm (1994, pp. 584)

<sup>9</sup> Monod (1971, pp. 170).

<sup>10</sup> Berger 1990 [1967], pp. 22),

<sup>11</sup> Russell (1948, pp. 56, 57, 59, 60, 61)

<sup>12</sup> Davies (1992, pp.170-971.

<sup>13</sup> In the last few decades economists have more and more discovered the importance of the „human factor”. See for instance the emergence of „social economics”, „behavioral economics”, „cultural economics”, „identity economics”, the concept of the „human capital”, „quality of life research, etc.

<sup>14</sup> Miyanaga (1991), Inglehart 1997, 2010), Ames et al. (1998), Beck (1999), Lee et al. (1999), Mack (2000), Hofstede (2001), Berger and Huntington (2002), Etzioni (2004), Sassen (2007), Featherstone et al. (1995), Anand et al. (2010), Diener et al. (2010).

<sup>15</sup> A rich scholarly literature illustrates the importance of the meaning-of-life question. For a quick introduction see the following collection of essays: Sanders–Cheney (1980), Klemke (1981), Klemke–Kahn (2008). Further readings: Adler (1929, 1937, 1972, 1992), Ayer (1990), Baumeister (1991), Becker (1971), Belshaw (2005), Berger and Luckmann (1995), Britton (1969), Camus (1955), Casey (2002), Cottingham (2003), Davies (1992, 1999), Dennett (1995), Ferry (2002), Flanagan (1996), Frankl (1963), Lehmkuhl–Sasse–Wahl (2007), McGrawth (2005), Reker–Chamberlain (2000), Ross, Floyd (1952), Runzo–Martin (2000), Sartre (1948), Singer (1992), Sloterdijk (2009), *The Meaning of Life* (2009), Wong–Fry (1998), Young (2003).

So far so good. But what has quantum mechanics got to do with all this? It has got a lot.

## **Increasing difficulties**

The question is how a new framework, a new civilization may emerge, a new “bubble” may blow up, and what it will be like. How the concepts of Good and Evil, Justice and Injustice, Truth and Beauty will fill again up with meaning; how the main principles of human behavior will take shape; how people will again be able to face mutability and death; how and where they will discover the sources of the meaning of their lives.

It is difficult to answer these questions. It was not easy either to answer it in the early centuries of Christianity, or when the age of modernity was emerging, but it promises to be exceptionally difficult to do so now, when what will probably be called the “quantum universe” is slowly taking shape.

Why would it be more difficult now than it was before?

In earlier ages the cosmic visions that surrounded human communities were in a close and direct contact with the lives of people.

- The magic cosmos of the early tribal life was full of friendly and hostile spirits, ghosts, demons, who could be more or less handled by the help of traditional rites and ceremonies.
- This is true also of the mythical cosmos of the Greeks and other early cultures. Plato’s universe, for instance, was governed by the harmony of eternal ideas, forms”, which were meaningful for thoughtful human beings even if they could not fully grasp the essence of these ideas.
- In the transcendental universe of Judaism, Christianity and the Islam humankind had a central, significant, meaningful position.
- The Copernican revolution shattered this safe position<sup>16</sup> but some of the leading minds of the emerging age of modernity, philosophers and scientists, have discovered a strong harmony between the cosmos and the life and destiny of human beings. Newton and Kant, for instance, were fascinated by the crystalline harmony of the motion of stars and argued that this cosmic harmony may be translated into the everyday lives of people. To live according to the laws of reason and virtue may render human lives as perfect and harmonious as the motion of the celestial bodies.

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<sup>16</sup> Goethe thought that this was one of the greatest mental/spiritual shocks humankind has ever suffered.

- Other 18<sup>th</sup> and 19<sup>th</sup> century scholars and scientists, if they cared at all, surrounded people with an almost religious faith in the glorious progress of humankind.<sup>17</sup>
- But what to begin with Einstein's spacetime as a new framework of human life? Where to find the place of humankind in its warps?<sup>18</sup> How to find any moral rules, or the hidden sources of the meaning of human lives in a universe of  $E = mc^2$ ?
- And the situation has got even worse with the vision of an emerging quantum universe. Human beings do not live any more under the protective dome of the starry skies. They are caught in the cosmic explosion of electrons, quarks, bosons, leptons, strings and hyper-strings. They are drifting in a dark, infinite universe of billions of galaxies expanding into the unknown and the incomprehensible. How could they find their place, their identity and their function, the purpose and meaning of their lives in this "icy solitude", in a universe, which is "deaf to their music and indifferent to their hopes as well as their sufferings or crimes"?<sup>19</sup> How would they be able to read the hidden message of mathematical, physical, cosmological equations about the meaning of human life, if there is any message in them?

What could human beings and communities do in this situation?

There have been countless attempts at establishing links between quantum physics and cosmology, on the one hand, and human life, on the other.<sup>20</sup> All these are no more than the first timid and audacious steps on a long way to go. To find humankind's place in the quantum universe, to build a meaningful human world in a universe probably void of meaning is a fearsome and, at the same time, fascinating task.

For everyday people an easy, but not necessarily expedient solution has been just to ignore the problem and go on to live at the very center of the traditional, illusionary – Ptolemaic – universe. Or, on the contrary, they could try to find their place, and the meaning of their lives, within the new quantum universe. There is an amazing, feverish proliferation of blogs, YouTube posts, Facebook debates, popular conferences where participants try to find clues within quantum mechanics which would permit them to suppose that human life has a place and meaning even in the quantum universe.<sup>21</sup>

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<sup>17</sup> It is this „bubble” that was burst later by the horrors of the 20th century.

<sup>18</sup> Nelson (2005)

<sup>19</sup> Monod (1971, pp. 172-173).

<sup>20</sup> There is an amazingly rich literature trying to find contacts and affinities between quantum mechanics and human life. For a quick introduction see Evans and Thorndike (2007), Chiao et al. (2011), Brockman (1995, 2002). – Dozens of further books will be quoted here below.

<sup>21</sup> Here are a few characteristic blog and YouTube titles: “Philosophy of Quantum Mechanics” – “Why is Quantum Mechanics Like the Trinity?” – “Quantum Physics

## The scientist's dilemma

Scientists, scholars, philosophers, theologians, too, had to respond to this challenge. The variety of their responses is fascinating, though all their hypotheses and theories taken together are only the first attempts at establishing links between the equations of quantum physics and the problems of human life. They are still far from building a “humanly meaningful world” within the quantum universe. However, surveying some of their efforts may help coordinate future research work in this field. In what follows I shall briefly describe some of their strategies to bridge the gap between quantum physics and human life.

**Dismissal.** The meeting of quantum mechanics and the meaning of human life could seem to a physicist or cosmologist as the surrealist encounter of “a sewing machine and an umbrella on the operating table?” (At least if they had read the famous lines in the 6<sup>th</sup> Canto of *Les chants de Maldoror* (1870) of the French poet, Lautréamont.) -- Anyway most of them have declined to deal with the question of a hypothetical contact between the realms of quantum mechanics and the meaning of human life.<sup>22</sup>

**„Science war”.** They had the excuse that the so-called „science war” (which had raged in the second half of the 20th century between the natural sciences, on the one hand, and traditional philosophical interpretations of the world, on the other) turned out to be more or less futile.

**Neutrality.** They could also wave the flag of neutrality and state that being physicists and cosmologists, their business was only to discover the laws of the universe and had nothing to do with such “soft variables” as the meaning of human life. They have to focus on their scientific work and ignore the philosophical implications of quantum mechanics.

**Slipping out of the dilemma.** A good example of how one can fend off the question and fill the gap between dead and living matter, sciences and human destiny, is the final, poetic rather than scientific conclusion of Dawkins's famous book, *The God Delusion*:

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and Eastern Religions” – “Does Quantum Physics Make it Easier to Believe in God?” – “Science and Religion: Many Worlds Hypothesis and Quantum Mechanics” – “Consciousness beyond Life” – “The Fun Way of Physical Immortality” – “Eternal Life is Like What?” – “Quantum Physics and Buddhism.” And so on.

<sup>22</sup> From among the hundreds of scientists who reject any possibility for cooperation between the two realms, let me quote only a few outstanding names: Bertrand Russell (1929a, 1948), Jean Monod (1971), Richard Dawkins (1994, 2006), Hawking (1998, 2002), Stenger (2007, 2009), Avise (2010a, 2010b), Hawking és Mlodinow (2010), Dennett and Plantinga (2011).

„ But couldn't be – he asks -- that God clutters up a gap that we'd be better off filling with something else? Science perhaps? Art? Human friendship? Humanum? Love of this life in the real world...?”<sup>23</sup>

**Split consciousness.** If none of these strategies work, scientists can still take refuge in developing a split consciousness, being, on the one hand, a scholar investigating the universe with strict rationality and, on the other hand, being a mortal human being trying to find the meaning of her life in her community, and ultimately in the universe.

Famous physicist, Hilary Putnam is an outstanding example. In the autobiographical introduction of one of his books (2008), he admits that he had two different parts of himself, „a religious part and a purely philosophical part, but I had not truly reconciled them”. „I simply kept these two parts of myself separate.”<sup>24</sup>

## Building bridges

In spite of the enormous difficulties, there are many physicists, cosmologists and biologists, on the one hand, and philosophers, theologians, scholars, on the other, who try to build bridges between hard sciences (eminently quantum mechanics) on the one hand, and the problems of human life and destiny, on the other.<sup>25</sup> These attempts vary a great deal in their scholarly level but are full of ideas that may later be developed into genuine scientific paradigms.

## Discovery, Knowledge Eureka

The discovery of the hidden harmony of mathematical laws of the universe has been, in itself, a fascinating adventure, an overwhelming experience for many scientists. It filled their lives with significance and (the illusion) of meaning.<sup>26</sup> Einstein speaks, with almost religious awe, of the “great and eternal mysteries” of the universe the discovery of which gives one “inner

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<sup>23</sup> 2006, p. 388. For a detailed discussion of the question see Egan 2009.

<sup>24</sup> See also Putnam 1965, 2005.

<sup>25</sup> See for instance Alfred N. Whitehead (1920, 1933 a and b), Theodosius Dobzhansky (1954, 1967), Freeman Dyson (1979), C. P. Snow (1969), Paul Davies (1992, 1996, 1999, 2007), Barrow et al. (2004), John C. Polkinghorne (2005, 2010), Michael J. Heller (2003), Heller–Coyne (2008), Norriss S. Hetherington (1993).

See also Tipler (1994), Krag (1996), Ó'Murchú (1997), Gregersen and van Huyssteen (1998), Gould (1999), Miller (1999), Griffin (2000), Ruse (2001), Manson (2003), Gaál (2003), Kurtz (2003), Küng (2005), Campbell (2006), Fuller (2007), Scott (2009), Bowker (2009).

<sup>26</sup> Wheeler and Ford (1994).

freedom and safety”.<sup>27</sup> Wolfgang Pauli is convinced that nuclear physics proves the existence of a “cosmic harmony” (“*Weltharmonie*”).<sup>28</sup>

According to Nobel prize laureate Steven Weinberg “[t]he effort to understand the universe is one of the very few things that lifts human life a little above the level of farce, and gives it some of the grace of tragedy”.<sup>29</sup> According to another laureate, Jean Monod (1971, p. 180), „truth is a transcendental value, something beyond us, and thus the search for it may satisfy the profound human striving for something beyond what is already present and given.”

Throughout his famous book, “The Elegant Universe” (1999) Brian Greene’s argument is strictly scientific but at the end of the book, in the last paragraph, he suddenly switches over to a few confession-like philosophical statements. He asks the question why we, humans, are here in this universe. Though this “why” refers only to the physical causes of the emergence of the universe and of human life – and not to any “purpose” or “meaning” of human life --, but the efforts of scientists to answer this question provides a role for the human being and “enriches her soul”. Concluding, Greene sings the ode of science and of the human mind’s glorious progress *ad astra*.<sup>30</sup>

**Cosmic order.** The amazing power of the human mind to discover the hidden order of the universe may fill our souls with the feeling, or illusion, that we, humans are at home in this universe.<sup>31</sup> In the same way, mathematical, physical, and cosmic laws of quantum mechanics lend themselves to a (questionable) comparison with Plato’s eternal Forms or Ideas.<sup>32</sup> This relationship may suggest that our lives are governed by the same laws as the universe. The contact is established: we are at home in this universe even if the meaning of our lives may remain beyond our understanding.

**Cosmic consciousness.** There is a significant number of great scientists -- Pauli, Schrödinger, Heisenberg, Eddington, Jeans, Hoyle, Paul Davies, and others – who believe that there is, or may be, a „cosmic mind” behind/beyond the physical universe. They argue that only the existence of a cosmic consciousness could explain a universe ruled by the brilliance of mathematical laws. “In some sense man is a microcosm of the universe; therefore what man is, is a clue to the universe. We are enfolded in the

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<sup>27</sup> Einstein (1955).

<sup>28</sup> Fischer (2004).

<sup>29</sup> See Weinberg’s answer in Moorhead (1988, p.155).

<sup>30</sup> Greene (1999).

<sup>31</sup> Among many other works see Wheeler (1994), Close (2011).

<sup>32</sup> Whitehead (1920, 1933 a and b).

universe.”<sup>33</sup> The controversy about the existence or nonexistence of an “intelligent design” behind the empirical world is still going on.<sup>34</sup>

### **Human consciousness**

Consciousness may be the major link between humankind and the universe. For centuries, the character of this relationship has been one of the most discussed issues in philosophy without ever reaching a conclusion. There is a growing conviction nowadays (though not shared by many scientists) that quantum mechanics may bring a breakthrough in the study of this relationship and in the discovery of the hitherto unknown specific laws governing the human mind.<sup>35</sup> The question to be answered is how we can understand the outside world, how it is possible that the mathematical equations discovered or constructed by the human mind are able to reflect the working of the universe.<sup>36</sup>

There are scholars who go farther and argue that with the emergence of human consciousness a new quality of major importance appeared in the universe. Paul Davies (1992, p. 232), for instance, concludes his book on *The Mind of God* by the following statement:

„I cannot believe that our existence in this universe is a mere quirk of fate, an accident of history, an incidental blip in the great cosmic drama. Our involvement is too intimate. The physical species *Homo* may count for nothing, but the existence of mind in some organism on some planet in the universe is surely a fact of fundamental significance. Through conscious beings the universe has generated self-awareness. This can be no trivial detail, no minor by product of mindless, purposeless forces. We are truly meant to be here.”

Several outstanding physicists and cosmologists -- Freedman Dyson (1979, 1985, 2004), Fred Hoyle (1975, 1984), James H. Jeans (1976 [1932]), Arthur S. Eddington (1928, 1929), Teilhard de Chardin (1959), Roger Penrose (1989, 1994), -- would argue that this is actually the case.<sup>37</sup> There are scholars who are convinced that quantum mechanics will be able to prove the cosmic

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<sup>33</sup> David Bohm [http://www.brainyquote.com/quotes/authors/d/david\\_bohm.html#wyj0UTwhRQbeFPd5.99](http://www.brainyquote.com/quotes/authors/d/david_bohm.html#wyj0UTwhRQbeFPd5.99)

<sup>34</sup> See, for instance, Moreland (1994), Dawkins (1994), Dennett (1995), Brockman (2006), Stenger (2011), Hawking and Mladinow (2010).

<sup>35</sup> Wolf (1981, 1996), Penrose (1989, 1994), Wilson (1990), Danach and Marshall (1990), Talbot (1988), Bohm and Hiley (1993), Wheeler (1994), Wheeler and Ford (1998), Hameroff et al. (1999), Satinover (2001), Bohm (2002), Franks (2003), Lindorff and Fierz (2004), Ivancevic and Ivancevic (2008), Penrose et al. (2011), Rosenblum and Kuttner (2011), Mensky (2011), Loewenstein (2013).

<sup>36</sup> See for instance, the famous debate between Jean-Pierre Changeux and Alain Connes (1998).

<sup>37</sup> Here we are not very far from those theologians, who believed that the human soul is „a codetermining force in the universe shaping the destiny of the universe. See for instance Dietrich Bonhoeffer’s or Karl Rahner’s views.

importance of human consciousness. Long before them Carl Jung predicted that psychology and quantum mechanics would converge in the not too far future.<sup>38</sup>

John Wheeler (1994), Barrow and Tipler (1986) and several other leading physicists go even further when they state that by observing the physical processes, humans „bring to the Universe into being.”<sup>39</sup> If this proves to be true, human beings could really feel themselves at home in this universe.<sup>40</sup> – Though the majority of physicists and cosmologists do not really believe in this distinguished role of human mind.

**Ex oriente lux.** It is tempting also to relate some features of quantum physics to far eastern religious and philosophical thought, especially Buddhism.<sup>41</sup> Book titles like *The Self-Aware Universe: How Consciousness Creates the Material World*<sup>42</sup> may illustrate this type of thinking. Even the Dalai Lama’s thoughts were published under the title of *"The Universe in a Single Atom: The Convergence of Science and Spirituality"*.<sup>43</sup>

**Spiritualization of the universe.** With the progress of particle physics, matter, as traditionally conceived, has more and more disappeared, and the universe has become more and more something like “a thought”, the immaterial sparkling of mathematical laws. Physicist James H. Jeans (1976 [1932], p. 137) writes:

„The stream of knowledge is heading towards a non-mechanical reality; the Universe begins to look more like a great thought than like a great machine. Mind no longer appears to be an accidental intruder into the realm of matter... we ought rather hail it as the creator and governor of the realm of matter.”<sup>44</sup>

If in the future the findings of quantum mechanics would support this view, human beings would have a safe place and a meaningful role in the universe. (Though, on the contrary, a universe of pure mathematical laws could also be a universe cold, barren and alien for a humankind in quest for significance and meaning.)

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<sup>38</sup> Roth (1992), Radin (1997, 2006), Mindell (2000), Lindorff and Fierz (2004), Gieser (2005).

<sup>39</sup> Barrow and Tipler (1986, p. 23). See also Goswami et al. (1993), Franks (2003), Stapp (2007), Penrose et al. (2011), Turok (2012).

<sup>40</sup> By the way, the title of Wheeler’s famous book is: *At Home in the Universe* (1994).

<sup>41</sup> See, for instance Goswami (2004, 2008), Goswami et al. (1993), Walker (2000), Mindell (2000), Ricard and Thuan (2001), Chopra and Mlodinow (2012).

<sup>42</sup> Goswami, Amit, Reed and Goswami, Maggie (1993).

<sup>43</sup> The Dalai Lama (2005).

<sup>44</sup> Eddington (1928) assumes that “[t]he stuff of the world is mind-stuff.” Disputing Laplace’s and Dawkins’ mechanistic interpretation of the world, physicist-theologian John C. Polkinghorne (2005, 2010) argues that the universe is much more „cloud-like” than clock-like.

**Simplicity and beauty.** Einstein, Planck, Greene and several of their colleagues found peace and joy in the simplicity and beauty of the cosmic constellation of mathematical/physical laws.<sup>45</sup> This amazing simplicity and beauty does not mean that humankind has any significance in the universe, or that the personal human life has a meaning. But, to a certain degree, it may alleviate the anxiety of people (mainly of scientists) of being alone in a cold and indifferent universe void of any message or meaning for humankind.

**God.** The concept of God is a plausible link between quantum physics and human life. If quantum physics does not exclude, or it even supports, the hypothesis of the existence of God, then there is a fair chance that human lives may have purpose and meaning. The traditional concept of the God of Judaism, Christianity and the Islam ignores the possibility that God may have created a universe in which humans may exist but their existence is insignificant and their lives have no meaning. A great number of theologians, philosophers and even scientists have tried to show that divine acts and laws, on the one hand, and the laws of quantum mechanics, on the other, mesh smoothly and beautifully.<sup>46</sup> And there are even scholars who contend that quantum physics opens a better road to God than traditional religions.<sup>47</sup>

Though those scientists are in majority who reject any such possibility.<sup>48</sup> And there are those, who leave this question open: Phil Dowe (2005, p. 183) writes:

“So, from the perspective of physics, is it possible that God brings about the events that quantum mechanics deems to be the result of chance? There are two possible answers to this question – either it is possible or it is not.”

### ***The God of the Gaps.***

The relationship of God and the world has been discussed for thousands of years. The question to answer was how an eternal God, and a pure spirit, can interact with a temporal and material world. Several theologians have argued that God is able to bridge the gap.<sup>49</sup> One of the staple answers has been that God is omnipotent and so He can suspend the causality and the natural order of things and interfere with secular processes.<sup>50</sup>

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<sup>45</sup> Heisenberg (1971), Penrose (1989), Henneaux et al. (2009), Mlodinow (2011).

<sup>46</sup> Schindler (1986), Grenz and Olson (1992), Tipler (1994), Ross, Hugh (2000, 2010), Satinover (2001), Hodgson (2003), Shults et al. (2009), Lennox (2011), Stump and Pagett (2012).

<sup>47</sup> See, for instance, Hodgson 2003.

<sup>48</sup> Bertrand Russell, Stephen Jay Gould, Richard Dawkins, Jean Monod, Victor J. Stenger.

<sup>49</sup> See, for example, Stump and Padgett (2012).

<sup>50</sup> For a good introduction to this type of argument see Shults, Murphy, and Russell (2009). This collection of essays contains chapters on „Divine action in the world”,

There are scholars who assume that chance and probability may be the realm of a God, who may have created the universe by “tossing the dice”. – Though the majority of physicists and cosmologists strictly reject these “... theories of divine tinkering in the crevices of physical uncertainty.”<sup>51</sup>

Hypothetically, God may bridge also other „gaps” that modern natural sciences have not yet been able to bridge. These are, for instance, gaps between dead matter and life, the human brain and the human mind, the pre-Big-Bang vacuum, chaos, “nothing” and the emergence of time, space, the cosmic constants, energy, etc.

### ***Creatio continua***

The so-called process philosophers and theologians proposed another solution. According to Alfred Northrop Whitehead (1978 [1929] God has two „natures”, a „primordial” and a „consequential” one. In the same spirit, Charles Hartshorne (1984a and b) speaks of God’s „bi-polarity”. On the „abstract pole”, there is God’s eternal self-identity, on the „concrete pole” the ever changing world. In this way the unchanging laws of the quantum universe might interact with the changing world of humankind within God’s person.

### ***The experimenting God***

Reading the Genesis (maybe reading it in the wrong way), one may have the impression that God was uncertain during the process of Creation. He stopped each evening, and only when he saw that what He had created “was good”, did he continue on the next day. As if he did not know what may come out of what he had done.<sup>52</sup> One of the leading process theologians, Charles Hartshorne (1967, p. 597) argues that in the continuous process of creation God is „groping through cosmic processes towards an uncertain self-fulfillment.” – There may be a vague resemblance between this primordial uncertainty and the probabilistic processes of the quantum universe.<sup>53</sup>

### ***God beyond God***

In contemporary theology, the mythical figure of a personal God has been deconstructed. In the vision of a Paul Tillich or a John Caputo, God exists in

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„How does God communicate with humanity”, “Creation, providence and quantum chance”, etc.

<sup>51</sup> Campbell (2006, p. 266).

<sup>52</sup> Genesis Book One, 10, 12, 18, 21, 25, 31. -- 3 “And God said, Let there be light: and there was light. 4 And God saw the light, that *it was* good: and God divided the light from the darkness.” Etc.

<sup>53</sup> See also Whitehead (1978), Hartshorne (1971, 1984)

the mysterious realm of the unknown, in a realm beyond human comprehension. It is a transcendental power, spirit, thought, phenomenon, a mystery, a secret. These existentialist or postmodern scholars are on the quest for a God beyond God, for a divinity beyond the comprehension of human mind. Their radical doubt, breaking taboos and questioning the unknown, is not very far from the uncompromising investigation of the unknown by natural scientists, who, themselves too, struggle with nagging doubts.

There are scholars who contend that in this sphere of doubts people coming from the human world of philosophy, theology and the humanities may meet with scientists coming from the quantum universe. Exchanging their experiences, visions, doubts, plans might help discover and define the place of the human being in the universe and the meaning of her/his life. It cannot be ruled out that joint efforts of looking for links between the mystery of the transcendental and the quantum universe full of secrets may generate important research projects.

**Mythology.** In contrast to the clear, transparent, “rational” world of classical physics and cosmology, the quantum universe -- with its whirling particles, mysterious black holes, exploding stars, quantum fluctuations, “red giants”, “white dwarfs” -- has the character, or semblance, of a mythic vision. This may relate it – in people’s minds – to the mythic visions of early civilizations, in which human communities did find their place and significance. The conversations of Carl G. Jung and Wolfgang Pauli are certainly thought-provoking.<sup>54</sup>

**Beyond the rational.** In the same way, the fact that the behavior of particles and waves in the sub-nuclear world (non-locality, action-at-a-distance, entanglement, etc.) seems to be beyond the comprehension of our traditional rationality may protect, to a certain extent, mythic and religious thinking against the traditional criticism of being irrational.<sup>55</sup>

**A probabilistic quantum universe.** If probability and chance are crucial features of the quantum universe, one cannot exclude the possibility of the emergence of conditions favorable for the generation of meaningful human existence. The probability of such an emergence would be certainly much greater here than in a traditional universe of strict mechanical causality. The emergence of human life and consciousness may be a “lucky [or unlucky?] accident”.

**Non-causality.** The publication of Heisenberg’s uncertainty principle gave a slightly more scientific underpinning to this argument by stating that in the sub-nuclear realm causality may not work, or – interacting with the principle of probability -- it does work in a different way than in the macro-world.<sup>56</sup>

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<sup>54</sup> Gieser (2005). See also Radin (1997, 2006), Lindorff and Fierz (2004).

<sup>55</sup> See, for instance, Redhead (1987), Talbot (1988), Penrose (1994), Franks (2003), Radin (1997, 2006), Lindorff and Fierz (2004).

<sup>56</sup> See, for instance, Lindorff and Fierz (2004).

Further discussions of, and uncertainty about, the validity of the principle of causality in quantum physics has freed philosophers and theologians from the cage of the strict causal determinism of classical physics. A world of uncaused, random events may be full of hidden, yet unknown possibilities for the human being and even for the emergence of free will and a meaningful human life.<sup>57</sup>

**The Multiverse theory.** Quantum cosmology may prove the existence of an undefined number of universes. This may be good, neutral or bad news for humankind.<sup>58</sup>

Good news: Even if our own universe ultimately turns out to be void of meaning, there may, or must, be somewhere another universe, or several universes, in which life may have purpose and meaning.

Bad news: If there are several universes, we lose the illusion of our central place in the world, and of having a significant role in the universe.

Neutral news: The multiverse theory is a strictly scientific cosmological theory, which has nothing to do whatsoever with humankind, let alone the meaning of human life.

**Theory of everything.** There are philosophers who argue that a possible *Theory of Everything* must reconcile, unify, comprise not only the laws of the theory of general relativity, the theory of gravity, and the laws of quantum mechanics but also those of the realm of human (or cosmic) consciousness.

An ultimate equation which the human mind can understand and handle: this would be an extremely strong link between the quantum universe and the human mind, even if it did not mean that individual human lives have meaning.

**Reductio ad infinitum.** Physicists started in the macro world, bored down to the world of atoms, descended to the particles within the atom, electrons, protons, neutrons, quarks, gluons, leptons, the strings and superstrings, and recently they have arrived in the vicinity of the Higgs particle, called the „God particle”, or „Goddam particle” as Leon Lederman and Dick Teresi (2006 [1993], p. 22) have called it. But, beyond the Higgs field, there still looms the (perhaps infinite) realm of the unknown. Would it be absurd to assume that in this realm of the faraway unknown, quantum physics and philosophy may meet as parallels meet in the infinite?

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<sup>57</sup> Eddington (1928, 1929), Danah and Marshall (1990), Maudlin (2011), Chiao et L. (2011), Rosenblum and Kuttner (2011), Stump and Padgett (2012).

<sup>58</sup> Out of the rich literature see, for instance: Wolf (1988), Davies (1996), Lewis (1986), Deutsch (1997), Harrison (2003), Tegmark (2004), Kaku (2005), Stapp (2007), Carr (2007), Hawking and Mlodinow (2010), Rosenblum and Kuttner (2011).

**The ontological question.** Quantum mechanics may have its scope and limits. Even if an “ultimate theory” entirely explained the working of the universe, everything that has ever happened and may happen in the future (if the concept of future is at all be relevant in a quantum universe), would it also answer the question what it means that this universe “exists”? Would it explain what “Being” and “Non-Being” mean? Would it answer the question “why” the universe emerged from Nothing, or from an unknown Something? And would it answer the age-old question of “why is there something rather than nothing?”<sup>59</sup>

These unanswered questions open a realm where quantum physics, philosophy and even theology might meet as equals.<sup>60</sup>

## The program

It is not only sufficient food, safe shelter, clear water with which the global system cannot supply several billions of people around the world. Significant roles, which would fill people’s live with purpose and meaning are also in dramatic shortage.

What we know at present about the emerging quantum universe is not very promising. As a matter of fact, in this respect it makes even more difficult for people to find their place, their role, their identity in a world that has become more and more incomprehensible. The loss of their traditional fix points of orientation, the growing uncertainty of their lives in an infinite and incomprehensible universe, may drain off their intellectual and emotional energies and brake the dynamism of human communities. People who feel that their lives are point- and meaningless would, and will, be less able to respond to the challenges of the 21st century.

To explore the possibilities of how an emerging new civilization may generate significant roles and meaningful lives for people may become one of the primary tasks of the social, human and natural sciences in the coming decades, if they are able and willing to cooperate.

As we have seen in this paper, there have been important attempts in this field. Scientists like Whitehead, Jeans, Hoyle, Pauli, Penrose, Davies and others made serious efforts to establish (possible and impossible) links

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<sup>59</sup> Krauss (2012).

<sup>60</sup> See, for instance Whitehead (1920, 1933 a and b), Greene (1999), Heisenberg (1971, 2007), Dyson (1979), Hoyle (1984), Bohr (1987), Laurikainen (1988), Davies (1992), Bohm and Hiley (1993), Wheeler (1994), Dennett (1995), Bitbol (1996), Feynman (1998, 1999), Hawking and Penrose (1996), Hawking (1998, 2002), Barbour (2000), Barrow (2000); Gould (1999), Harrison (2003), Epperson (2004), Lindorff and Fierz (2004), Fischer (2004), Gieser (2005), Lederman and Teresi (2006), Barad (2007), Hawking–Mlodinow (2010), Maudlin (2011).

between the quantum universe and humankind, and, in some cases, even the meaning of human life. Their attempts have been the first important steps to decode the hidden message a quantum universe may have for humankind.

But in spite of all these efforts, the quantum universe is still far from becoming a protective framework within which human beings could feel that they are at home in this world, could enjoy a relative safety and might feel that their lives have significance and meaning.

This is a major social and human problem. Why? Because losing purpose and meaning, one loses also one of the main motive forces of one's life. Adding up millions of meaningless lives, whole societies may lose their momentum and, as a consequence, may seriously underperform. Let alone the fact that the meaninglessness of one's life may, and has already become, a major source of mental suffering.

There are many economic, social, and cultural causes behind this decreasing ability of traditional western civilization to create a cosmic home for its citizens. The advance of quantum mechanics is only one among them but, nevertheless, it would be a grave mistake not to pay increasing attention to its potential role in this field.

The problem is that scholars outside the natural sciences do not really understand what quantum mechanics tells them about the secrets of the universe. The only way to solve this dilemma would be a close and systematic cooperation between physicists, cosmologists, philosophers, theologians, cultural anthropologists, psychologists, historians of ideas, artists, and others. Closing a smoldering "science war", a genuine dialogue should be started in which participants would try to understand one another's language and way of thinking.<sup>61</sup>

Only such common efforts would have any chance to interpret the quantum cosmos also as a symbolic framework within which human beings could find relative safety and could feel that their lives had significance and meaning.

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<sup>61</sup> There are philosophers and scientists – Russell, Weinberg, Monod and many others – who do not believe in the relevance of such a dialogue. They do not believe that human life has a "meaning" in the traditional sense of the word. They are convinced that the universe "does not speak" (Rorty), it has no message whatever for humankind. Though they admit that the existence of humankind may have a certain significance, because -- as far we know – it is only the human mind that is able to discover and understand the laws governing the universe.