Arguments and Model for Quantum Consciousness, Modification of Quantum Collapse, and Panpsychism

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Abstract. As first, a mechanism how quantum coherence in the brain can last long enough is shown. This mechanism is based on very light elementary particles. Then the arguments follow as why consciousness should be a quantum phenomenon and how such an introduction of quantum consciousness modifies the formalism of quantum mechanics. This can also be tested by an experiment. Without use of quantum mechanics it is shown how to atomize consciousness and how to explain the Libet experiment, and why a location of feeling of consciousness is an important paradox. It is also shown that panpsychism is an answer to many questions about consciousness. The author claims that consciousness is physically so fundamental that it is not a result of some complex phenomena, but it is so fundamental as quantum physics and space-time.

Keywords: Quantum consciousness, Quantum information, Free will, Libet experiment, Qualia, Ontology, Stapp, Setup of an experiment, Quantum Zeno effect, Quantum computer, Reticular formation, Conway, Correlates of consciousness, atomization, Quantum randomness, Paranormal phenomena, Ockham razor, Heisenberg choice, Quantum coherence, Panpsychism, Emergentism, Physicalism, Dualism, p-zombie, Sense without consciousness, Epiphenomenon, Tononi, Differentiation, Integration, Complexity, Memory, Ego, Dimensionless physical quantities, Tegmark, Unicellular organism, Himba tribe, Primary decision moment, Very light elementary particles, Quantum smell, Quantum photosynthesis, Movement and consciousness, Quantum randomness, Wigner's friend, Schrödinger cat, Imagination of quantum mechanics, Fundamental consciousness, Independent observers, Direct measurement, Decision, Motivators, Location of consciousness, Abstractedness, Quantum gravity, Randi, Relaxation, Nonlinear phenomena

Curriculum vitae

The author graduated in Physics in 1989 and then he has been working in steel industry. His field of work are physical measurements, simulations of cooling of steel, phase changes, magnetic properties, statistical analyses, writes computer programmes and analyzes in Excel and SQL, etc. In young age he had also competed in chess. In secondary school he also obtained some prizes in country level competitions in mathematics and physics. In free time he developed some theories in fundamental physics and theories of consciousness. He found some formulae for the masses of elementary particles, he offers a partial explanation of three space dimensions, he developed one step toward quantization of gravity, and generalization of the principle of uncertainty. In connection with this he also tries to simplify explanations of the fundamental theories of physics. He is waiting for valuation of his theories. His papers are [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17].‡

1. Introduction

Our present scientific world is much closer to answer to fundamental physical questions as, for instance, 100 years ago. We were born into this world and we hope that these questions will be solved during our life time.

Consciousness is among the most fundamental unsolved problems in physics, and possibly, among the most fundamental quantities in physics.

Today's problems of explanation of consciousness are:

1. It is unknown, how processes in the brain lead to consciousness and explain it.
2. The principle, how consciousness can be built up by processes in a computer is unknown.
3. It is not known precisely how to locate consciousness physiologically and to search correlates of consciousness.
4. All physiological processes and decisions in brains are not explained, even when consciousness is ignored.
5. It is not known precisely what a free will decision is.
6. Physical foundations of consciousness are not yet known.
7. Consciousness is not yet atomized.

Neuroscientists try to find correlates of consciousness. They found, for instance, that the reticular formation in the brainstem is essential for consciousness [18]. It is one of the phylogenetically oldest portions of the brain, thus all or almost all animals with brains possess it. It is also logically to assume that all animals with brains are conscious. The reticular formation also manages with phenomena primitively connected with consciousness, such as wakefulness, feeling or ignorance of a pain, etc.

‡ Paper [5] was proven as wrong, but the idea of infinite speed of light at very small distances remains.

Centromedian nucleus in thalamus is also important. A bilateral lesion of this nucleus leads to permanent coma.

By Koch [19, 20, 21, 22, 23, 24], various conscious experiences occupy various neurons in the brain, whereas a coalition of pyramidal neurons linking the back and the front of the cortex fires in a unique way, and neurons for one observed object all fire in synchronization. There are still other models for correlates of consciousness [24].

One important unexplored aspect of consciousness is also free will. It became important after the Libet experiment [25, 26], which gives hope to those who do not believe in free will. However, the Libet experiment suggests that "*that conscious volition is exercised in the form of 'the power of veto' (sometimes called 'free won't' [27, 28]); the idea that conscious acquiescence is required to allow the unconscious buildup of the readiness potential to be actualized as a movement.*" Batthyany's answer [28] is that it is not known enough, what was happening prior readiness potential: "*One cannot passively wait for an urge to occur while at the same time being the one who is consciously bringing it about.*"

The second such a paradox of free will is when magnetic field stimulates determined a location in brain cortex, what causes a shift of a hand [29]. Tested persons claimed that they move a hand consciously. It is also supposed by some people that consciousness and all human reactions are the consequence of physiology of brains, thus they are not a consequence of free will. But, a conclusion of Conway gives indirectly that free will does exist [30].

Beside of correlates of consciousness and free will, atomization of consciousness should also be searched; therefore the most primitive units of consciousness should be searched. The success of physics is that their concepts such as space-time, matter and information are very atomized; therefore they are linked and briefly described. For instance, the formula $E = mc^2$ links energy with mass and reduces a number of free parameters. E means rest energy of a body, c means speed of light and m means mass of a body. The space-time is background free; therefore space-time without rest mass does not exist [31, p. 138], [32, sec. 4 or 5]§. Gravity means curved space-time and thus a number of free parameters is reduced. The Brukner-Zeilinger interpretation of quantum mechanics (BZI) gives that the essence of quantum mechanics (QM) is in information [33]. Duff claims that the units kilogram, meter and second are redundant [34, 35]. Here only quantum gravity theory (QG) fails to enable description and calculation of all the main physical quantities, as the elementary particle masses and the *fine structure constant* are. Thus, it seems that in principle we are close to this. On the other hand, such atomization has not yet been succeeded with consciousness, it is not known anything about a principle how consciousness arises. It is known only something about correlates of consciousness in brains.

The idea of quantum consciousness (QC) arose also because of some analogies:

§ The title of the section is 'A connection between matter and space-time'. In a new version it will be written in section 5.

(i) A decision is very similar to collapse of wave function,

(ii) fundamentality of quantum randomness appears as the obvious physical analogy for a free will decision,

(iii) resultant of forces on some body is analogical as an influence of motivators on a decision,

(iv) and paranormal phenomena, as they are described, are similar to quantum phenomena.

Otherwise, QM was related with consciousness already by von Neumann [36], by Wheeler and by others. They say that consciousness causes wave function collapse. One of indirect oppositions is also given by Einstein, or by Stenger [37], that *moon had existed although no one observer had existed*, therefore that QM and wave function collapses have existed always, independently of observers. A common anti-argument against QC is also that, probably, it is not good at Ockham razor, for instance Zeilinger's claim‖ [39, p. 197].

Stapp widens von Neumann model [40] and he divides quantum consciousness process into three steps. Process *one* is the choice on the part of an experimenter about how s/he will act. This choice is sometimes called the *Heisenberg Choice*. Process *two* is time evolution of wave functions, described with the Schrödinger equation. Process *three* is sometimes called the *Dirac Choice*. This is, of course, collapse of wave function, which is random. Thus, setting of an experiment is the essence of Stapp's idea, how an observer influences on a result of measurement. It is also important that the process *one* also has not absolute analogy in classical physics, therefore this is a process, typical for QM. From interpretation of this process, Stapp also concludes that a momentary decision is not enough for movement of a finger, but it needs thought effort, because it is necessary to try many times that a wished quantum collapse will happen. Experiences of human beings also give that thought effort is a more realistic answer than a momentary decision. As explanation of this, Stapp includes the *quantum Zeno effect* [41], for which he claims that mind holds the brain in a superposition of states using it. (It slows evolution of the wave function.)

The most known model of QC is created by Hameroff and Penrose, which suggests that quantum coherence is maintained in *microtubules* [42, 43, 44, 45, 46]. Tegmark rejects their model [47]. He shows that the brain temperature is too high what causes that quantum coherence could not last any substantial time, for instance one second, but it lasts many size classes less. His claim is very frequently used as a proof for rejection of QC.

‖ "*Has one's awareness an active, dynamic influence on the wave function? Such or similar positions were proposed by several physicists, but in my opinion they would all fall victim to Occam's razor: Entia not sunt multiplicanda praeter necessitatem. It is the beauty of Copenhagen interpretation that it operates with a minimal set of entities and concepts. Furthermore, any position that would necessitate a change of the quantum formalism [38] in the sense that it leads to a change of its predictions in my opinion is, at the least, highly improbable in view of the excellent agreement of methods of experiment and theoretical prediction.*"

Another example is the Eccles-Beck approach, which concentrates on a process when calcium ions trigger *exocytosis* in a synaptic cleft [48]. They propose one effect when statistics of wave function collapse is modified, thus in distinction with Stapp, it influences on the process *three* above.

Goldstone bosons are also one model for QC [49].

The paranormal phenomena are also tried to be explained by QM [50, 51]. One of counter-arguments is given by Stenger [37].

Of course, those are not the only quantum models [52, 53, 54] and arguments against QC [55, 56].

Philosophical approaches to consciousness include panpsychism and its opposition emergentism [57]. Panpsychism means that consciousness is everywhere, whereas emergentism means that consciousness arises only at some level of complexity. Another dipole is physicalism against dualism as its opposition. Physicalism means that consciousness is a consequence of physics (matter and its interactions), whereas dualism means that consciousness does not come from physics. In this paper physicalism will be defended, but also panpsychism will be defended. The third bone of contention is linked to some substance at physics and consciousness, named also ontology. Mainstream physicists claim that ontology in physics does not exist. A philosophical zombie (p-zombie) is often used in Turing thought experiments in debates about origin of consciousness. Her/his reactions and functioning are the same (or almost the same) as functioning of an ordinary person, but s/he is not conscious.

It is typically for Koch [19, 20, 21, 22, 23, 24], Tononi's model [58, 59] and mainly for other models of consciousness [60] that they treat consciousness as a complex phenomenon, which does not exist as something primitive.

A conclusion that free will does not exist is also confirmed by the conviction that all decisions are consequences of physiology of brains, thus of material processes, and thus they are not consequences of free will. The materialistic view needs less parameters than dualistic one. Therefore, the results of the Libet experiment seem logical to some neuroscientists and philosophers. But, all this is not enough to conclude that free will does not exist, because also our intuition and common sense give us that it does exist. Additionally, if free will does not exist, we (people and animals) are only observers of our bodies. In such a case it is not suggested, what is sense of consciousness. The author's model does not need dualism and it does not threat mind as an epiphenomenon, as it will be seen in the next sections.

Simplified descriptions of ontology of consciousness are qualia; one quale is, for instance, an experience of the red colour [61]. The present physics cannot describe qualia.¶ At the other side, ontology is also an unsolved problem of physics. According

¶ For instance, Capra writes: "*To make it possible for scientists to describe nature mathematically, Galileo postulated that they should restrict themselves to studying the essential properties of material bodies - shapes, numbers, and movement - which could be measured and quantified. Other properties, like color, sound, taste, or smell, were merely subjective mental projections which should be excluded from the domain of science.*" [61]

to BZI, it seems very much that the mathematical foundation of physics is information [33]. But, it is not known what ontological foundation for this type of information is. As a possible explanation of this, physicists claim that physics is based on mathematics, so physics is what can be calculated, and therefore it does not need ontology [62]. For instance, Feynman had persisted on denying of ontology with his "*Shut up and calculate!*", caused by his disdain for philosophy [63]. He had come very deeply in physics, but he had not reached QG. The elementary particles create space-time with help of gravity, and gravity creates the elementary particles, but this was ignored too much by Feynman. The reason is, maybe, because he had not asked himself enough about physical foundations and about ontology. Namely, space-time without matter does not exist. Only the dimensionless numbers which describe elementary the particles remain. Because we come to the naked (dimensionless) numbers, we are close to the end of physics. Thus we should ask ourselves, what the space dimensions are, and what information is. Besides, it is necessary to ask ourselves, where the role of consciousness is (what is described in this paper).

Lyre [64] and Barbour [65] do not ignore ontology. Even Zeilinger is not sure.[+] The claim that physics does not need ontology is premature also because mathematical explanations of physics and consciousness have not yet come to the end; thus ontology cannot be enough clearly excluded. We (people) are also directly aware of ontology of consciousness. Consciousness seems also more realistic than the other physical parameters (such as space-time and elementary particles). It is easier to say that space around us is an illusion than that a pain is only an illusion, because our feelings are more primordial to us than the physical world around us. Additionally, matter without the existence of consciousness losses sense.

The most frequently used arguments for non-mainstream explanations of consciousness are qualia, indistinguishability between a p-zombie and a common person,[*] and that ontological explanation of emergentism is unknown.

In the second section, a new view on atomization of consciousness is presented; it is claimed that consciousness is not only a matter of a complex structure. QM is almost not used at the reasoning. In the third section, a model for quantum coherence in brains is presented, which should be lasting enough that it can support QC. This model bypasses Tegmark's argument [47] that the brain is too hot for quantum coherence. Thought experiments with a p-zombie are described in the fourth section. They argue why consciousness should be a quantum phenomenon. In the fifth section it is presented, how those arguments for QC demand modification of QM. In the sixth section it is shown that even study of feeling of a location of consciousness gives some interesting

[+] "*Absolutely! I don't want to be misunderstood being an antirealist. All I'm saying is that there is - obviously - something out there that we can perceive with our mathematical descriptions. All I want to say is, that we can in fact only make statements about our observations. And whatever we say about reality is a mental construction, and we have to be very cautious when we do that. Basically, we should only do it with crossed fingers.*" [66]

[*] The claim of David Chalmers.

conclusions. Still opinion about paranormal phenomena is presented in the seventh section.

2. Atomization of consciousness

A model of QC (or any physical explanation of consciousness) needs atomization of consciousness or, in other words, needs an analysis, what more primitive units of consciousness are. The atomization should tell us, for instance, if a feeling of a pain is divisible and how.

One aspect of consciousness is also ego. One of essences of an ego is memory. Theoretically, one could become a new person if s/he forgot everything from his/her past life before yesterday. An ego can be more or less partially divided inside one person (a person with a split personality or a person with the divided *corpus callosum* [59]). On the other side, two people can be theoretically one ego if they are connected with a lot of connections, nerves, etc.♯ Neurons are special regarding other body cells, above all because they have a lot of connections among them. These connections are essential for memory. (*Mirror neurons*, *amygdala* and chemical *oxytocin* are also examples of tools for closer connections among people, despite without mutual nerves as a linking tool.)

Thus, a conclusion is that an ego is a connection of various primitive consciousnesses connected with memory. If it is so, some sort of consciousness is stored already in an unicellular organism. Only level of consciousness is lower because levels of duration and expanse of memory are lower. This can be noticed at behaviour of a *paramecium*, for instance [52]. It is possible to go still further in a matter of the non-biological world, and there can be also some very low memory (but extremely low one) and a short duration of it.

If it is assumed that consciousness exists outside the biological world, panpsychism is obtained, where consciousness is everywhere. If consciousness is a quantum phenomenon, it should really exist everywhere. Thus, the known sentence can be paraphrased: "*Moon does not exist if no one looks it, but moon is looking itself.*"

Let us assume that consciousness of a woman Cindy is detected as much directly as possible, thus it is not necessary for her to speak about her feelings and memories, or to show us some body signs. Thus, consciousness would be located much easier and it would be easier to tell about its essence. However, in reality, this is not the case. Such shortcoming of detection tells us that it is not known enough about detection of consciousness. But, despite this lack of knowledge, researchers are too sure in some models for consciousness [58, 59]. When such tools for detection of consciousness would exist, observers could know more about Cindy's consciousness than she does. Or more precisely said, an external observer would know more about her consciousness, than she can remember, because every testimony about consciousness is remembering of consciousness. This consciousness can be arbitrarily short and fast forgotten in contrast

♯ This is one type of relativity theory of ego.

to today, when consciousness is equated too much with attention and later memory recall of this consciousness of this person.

However, one realistic proposal for more direct detection of consciousness exists. Namely, every conscious state is connected with certain emotions. It is not possible to be conscious and completely without emotions. As an idea, when one is emotional, some chemicals secrete in blood, for instance, neurotransmitter *adrenaline* and this is theoretically possible to measure.

Tononi has built up a mathematical model for consciousness [58, 59]. According to the theory, consciousness corresponds to the capacity of a system to integrate information. This claim is motivated by two key phenomenological properties of consciousness: differentiation - the availability of a very large number of conscious experiences; and integration - the unity of each such experience.

In principle, Tononi's theory is similar to the author theory. We should be aware that human memory, as we imagine it, is mainly memory of qualia. Memory works on a principle of associations, namely, the larger a number of options of qualia is, more instant qualia are linked to a memory from past. (With larger memory, ego is also more distinctive.)

Let us look at the differences between the author's model and the Tononi's one. As first, dreams can be considered. The differentiation and integration of qualia in dreams is not small, probably it is comparable with a waking state. But, events in dreams are much more disconnected than in the waking state; therefore dreams are forgotten much more fast. Let us assume that there is a woman Desiree who is never awake and only dreams. As a consequence, her ego would be weaker. Thus, this is one hint that differentiation and integration are important only because of memorizing of qualia. For bigger stability of an ego, stability of events is important. Constancy of ego is correlated with memory, as a tool for connections of qualia. (Stability of events in dreams is much smaller.)

Additionally, let us also imagine that until her 20 years of age a woman called Emma had lived in some building where red colour and its hues do not exist. Then she came out and saw also the red colour and its hues. Does consciousness enlarged in the moment, when she saw a red colour or it enlarged later? Or maybe it was the same all the time? By Tononi's theory (and its calculation of Φ), consciousness was enlarged at the moment when she came out of the building, whereas, by the author's theory, consciousness is enlarged some time later, maybe some hours or days, when memory for the red colour is formed and memory connections of this new quale are established.

Thus, the author's model gives that an ego is a connection of tiny primitive pieces of consciousness, whereas Tononi's model does not need sub-units, it only needs connections. These are also differences; otherwise both theories are very similar. Subconscious learning and subconscious memory also exist, whereas they are not anti-arguments against memory of qualia.

However, all this does not explain the deepest question of qualia, which is where the feeling of red colour comes from. Another question is whether feeling of a fourth basic

colour exists, and so on. For instance, a kestrel also sees ultraviolet rays and some crabs see larger number of basic colours. If qualia would be atomized as physics is, a smaller number of elementary qualia can be expected; thus it seems that some relations among elementary qualia exist, the examples are relations among three qualia for colours. It also seems that intensity of qualia can be partially numerated; this is partially contrary to the Capra sentence. Feeling of time is also a quale. In [32, sec. 4 or 5], it made one step toward a physical description of it.

To answer these suppositions, it is maybe possible to find what crab's and kestrel's correlates for qualia of colours are. A hint toward research of elementary colour qualia is also an example with the Himba tribe, who have differently grouped elementary colours, as we have [67]. Some hues, which can be distinguished easily by us, they do not distinguish and vice versa. Maybe colour denomination influences on qualia and thus qualia are not independent, for instance for red, blue and yellow colour.

Search for the atomization of consciousness is important, because these questions are not solved enough. Actual knowledge about consciousness can suddenly turn out as wrong in its foundations; this knowledge is not so fixed as physical knowledge.

The above explanation of importance of memory on ego can also be used for explanation of the Libet experiment [25, 26]. Thus, a decision for movement of a finger had happened before a subject remembered this as a decision, but s/he did not remember the primary decision moment, because it did not give enough memory initiations. Thus, this is the author's addition to Batthyany [28].

Experiment [29] gives that stimulation of some areas in brain gives illusion of free will movement. Due to an experiment [29], it is additionally concluded by some neuroscientists that free will is only an illusion. Admittedly, it is not enough clearly distinguished, what a free will decision is and what a physiological cause is. One example is a very addicted alcoholic Frederich, who decides to drink a glass of whiskey. It is not yet distinguished, what a free will decision is and what a need of his organism for alcohol is. It is still ever possible that Frederich's free will also influences on his decision. Maybe it is a minor part of other influences, but it influences. Thus, the experiments [25, 26, 29] or their conclusions are not enough to refute free will. Not only use of the existence of *free won't* [28], we need also the existence of free will.

3. A possible existence for larger coherence time in brains

Theory of Penrose and Hameroff [42, 43, 44, 45, 46] is mainly mentioned as the main QC theory. It treats the brain as a quantum computer and suggests how quantum coherence can be prolonged. This model is not accepted in mainstream science, above all, because of Tegmark's calculation [47] that brains are too warm for enough lasting quantum coherence if consciousness behaves as a quantum computer. But, a model which solves this problem, can be found very easily. Let us assume that in biological organisms there are also elementary particles which are much lighter than the electron. It is known that quantum coherence time lasts longer at a lower temperature, and it

is dependent also from a mass of particles. The formula for a critical temperature T_c of Bose-Einstein condensate is $T_c = k/m$, where m is the mass per boson and other quantities are collected in k [68]. The Bose-Einstein condensate needs temperature 10^{-7} K or less, but if a mass of a particle is small enough, this can happen also at the brain temperature. Some such light particles are even known, these are the electron-neutrino, the muon-neutrino, and the tau-neutrino. It is also very probably that many other types of light particles exist, and it is possible that black matter is built up from such light particles.††

Admittedly, it is not known how tiny these particles are. It is even not known, how this matter can interact with the common matter. But, the most important is that the principle exists, which avoids Tegmark's argument. One thing is that something is forbidden, whereas a step forward is that it is only not known how precisely it can be realized. Principles are the first important things in physics, a detailed realization is a secondary one. Better than at Hameroff and Penrose [42, 43, 44, 45, 46], new physics is not necessary here. Even, we are not on zero knowledge about new light elementary particles, that is, the neutrinos masses are approximately estimated, and black matter is perceived indirectly.

Despite the eventual existence of such particles, it remains a question of their interaction with the common matter, which is known to us. For instance, neutrinos interact very weakly with the common matter. The author speculates that such interaction is prolonged if ordinary matter has some longer lasting quantum coherence. Some quantum coherence of biological matter is found in the present time. The examples are Turin's quantum smell [69], coherence at photosynthesis [70, 71], navigation of the bird *European robin* in the Earth's magnetic field [72], and folding of proteins [72]. It is also not precisely known, how entropy behaves at small scales [73]. Functioning of the brain is very similar to functioning of other biological organs and systems. If quantum coherence is found in any organ, it will be also found in the brain, probably. It is also possible that such matter interacts better with ordinary matter than neutrinos do.

It is even possible to theoretically test the above speculation whether any theoretical mechanism exists that quantum coherence can be an improvement of detection of neutrinos. Here word 'theoretically' means that it is not necessary to do such a measurement and that it is possible to be luxurious in choice of an experimental setup. This means, for instance, that neutrinos are at rest and that they build up one structure.

4. Arguments for QC

Not only that enough long coherence time should be assumed, but also other reasons for QC should be explained.

In the next derivations, physicalism will be assumed as much as possible. It is desirable to compose such a consciousness model that a number of new elements in it

†† A similar 'additional cause' theory is also given by Libet that '*conscious mental field*' exists [28].

is as small as possible, thus new physics is as less as possible, thus the Ockham razor is as good as possible [39, p. 197].

Something physical should exist what makes a distinction between a p-zombie and a common person, because the interpretation of QM claims that things which cannot be measured cannot exist. Therefore, if the distinction between a p-zombie and a common person cannot be noticed, this distinction could not exist and thus a p-zombie could not exist. Because such conclusion is given by the interpretation of QM, this is the first argument for quantum essence of consciousness. (Of course, the option also remains here that consciousness is not a part of physics.)

Due to its influence on movement, consciousness is a part of physics, because everything what exists in physics is movement. At least, it can be assumed that we are not only observers of movements and reactions of our bodies. At the same time it can be asked what sense of consciousness is if it does not influence on anything. (However, either to be decisions makers or observers, our experiences give that consciousness exists, thus it should not be ignored.)

Contemplating functioning of the brain or a computer it can be found that every computer is built up on a principle of some movements which are a result of its calculations; input, working principle, and output of a computer are movements. If initial conditions are the same for a p-zombie and a common person, their movements are distinct, otherwise consciousness would not influence on movement. Let us neglect for some rows that initial conditions should be distinct, because a p-zombie is unconscious and a common person is conscious. Now let us look at two p-zombies with equal initial conditions. According to classical physics, their movements will be the same. But, according to QM, their movements will be distinct because of influence of the uncertainty principle. (Here it is necessary to mention that these p-zombies follow only to QM laws, thus their consciousness can be ignored, and it either can or cannot exist.) It is only an essential conclusion that QC is not necessarily something outside of physical laws, but non-quantum consciousness is outside of the physical laws.

Although, according to classical physics, consciousness of a common person changes initial conditions according to a p-zombie, it is still not yet known what those initial conditions, which mean consciousness, are. Differently asked, what consciousness physically is and what movement equations because of consciousness are. (However, different physicality because of consciousness cannot be ignored, because we (people) know that consciousness exists. Thus it should be explained physically.)

Therefore, a physical phenomenon similar to consciousness does not exist in the classical physics. In QM, randomness of quantum collapse is very similar to a conscious decision. Consciousness should be something physical and quantum randomness can be an imitation of a conscious decision. Thus, this distinction between a p-zombie and a common person can solve physical strangeness of influence of consciousness, so it helps that consciousness can be described inside of physics and it is not necessary to include dualism.

At the same time, it is important that physical properties are enough to recognize

a p-zombie, but a detailed procedure of brain working is not so essential.

If larger coherence time is included, physical distinction between a quantum p-zombie (or a quantum conscious common person) and a p-zombie of classical physics is still bigger.

Thus, the first time repeated conclusion is that consciousness is a quantum phenomenon.

This reflection can also be reversed. As first, a model can be built up, where QM is deterministic. This model really exists [74]. It was righteously criticized by Conway, because it does not let us a free space for a free will.† If it is assumed that movements of the fingers are caused only by precedent causes, then free will does not exist. If it exists, Conway's free will is the only physical analogy for people's one.

Above stated is explained with a help of uncertainty principle. Tello explains this more directly with a help of quantum coherence [75]. He writes that Turing experiment can be made by help of a *Wigner's friend*, who is once a conscious person and another time a p-zombie. Let us say that the *Wigner's friend* is called Alice. Let us imagine that Alice observes a box with the *Schrödinger cat*. Bob observes her sometimes. At the end, Bob observes Alice and the cat and notices whether the cat is dead or alive. Let us say that it is dead. Now Bob asks Alice when she noticed that the cat is dead. If Alice is a conscious person, she noticed that the cat is dead before Bob took a look and she will tell this to Bob. If Alice is a p-zombie, the cat cannot be dead before Bob looked at Alice. Therefore, Alice's testimony will tell Bob whether she is a conscious person or a p-zombie. This distinction will be on a quantum base; therefore consciousness is also on a quantum base. This is the second time repeated conclusion that consciousness is a quantum phenomenon.

Admittedly, a problem of this Tello's thought experiment is that it is not known for sure, what causes wave function collapse, consciousness or any measurement. Therefore it is not possible to be absolutely sure, what can be a result of such an experiment.

If all stated above is ignored, there are additional arguments for QC:

1. If consciousness is not a quantum phenomenon, it is not known, how to measure qualia physically. (Admittedly, only suggestions are in this paper, but it is not absolutely clear, how to measure qualia.)
2. Supporters of emergentism claim that consciousness emerges at some level of complexity. If this is true, consciousness can arise at some level of complexity of a quantum computer, because it is claimed that a quantum computer and a classical one are not distinct in principle. Thus, if an enough complex quantum computer exists, QC also exists. If QC exists on such a way, classical consciousness also exists.

† Quotation 1: "*The theorem states that, given the axioms, if the two experimenters in question are free to make choices about what measurements to take, then the results of the measurements cannot be determined by anything previous to the experiments.*" [30]

Quotation 2: "*The world it presents us with is a fascinating one, in which fundamental particles are continually making their own decisions. No theory can predict exactly what these particles will do in the future for the very good reason that they may not yet have decided what this will be!*" [30]

So it is necessary to explain why two types of consciousness exist, why not simply only one type. Admittedly, it is said that a quantum computer calculates the same as classical computer. But it can be asked, what is so special on a classical computer that consciousness should be classical. Besides, a classical and a quantum computer are not absolutely the same, the speed difference is also physically important, and a quantum p-zombie cannot be simulated by a classical p-zombie. Additionally, classical information is always composed from quantum one.

3. Some people even claim that some level of complexity of a quantum computer cannot be exceeded. Really, this is almost a zero supported claim [76]. But, if this is true, it forbids the existence of QC, according to the above reasoning. If it is not true, this is another little argument for QC.
4. Some people think that a non-quantum computer, which could repeat all logical thinking of a human being, could also be conscious. But, this is analogously as that we wrote to a computer the letter 'S', which is an ASCII character, and its value in a hexadecimal record equals to '53'; and so the computer would consciously imagine this as the letter 'S'. Of course, this is not true, because background logic of the letter 'S' is also important. This background should be a quale. At a classical computer, it is surely not a quale. Thus, it is necessary to look physically, not only as some computer information and logic. This physical aspect should include quantum background. Probably, information from BZI is important, not one classical, composed, information given by a common computer.
5. When the author was ten years old, he tried to answer with which principles it is possible to make a robot similar to a human being. The only unknown principle for him was how to make consciousness of such a robot. When he began to learn QM, did not believe in principle of uncertainty. But later he has changed the opinion and the principles of QM have become for him the only way how to explain consciousness and how to give consciousness into the above robot. Such an experience is also an argument.
6. Equality of mass and energy can also be shown by a simple thought experiment: let us squeeze a lump of clay. The lump resists to this squeezing, otherwise it should not exist. This shows that every mass has its own energy. Consequently this also leads to $E = mc^2$. This can be interpreted also on the quantum level: the lump resists to squeezing because it should give same information about its existence, otherwise the lump should not exist. This can also be interpreted on the level of consciousness: someone or something must be aware of this squeezing, otherwise the lump should not exist.
7. The argument of some people is that because consciousness is in brains, the matter is the cause for consciousness and not something outside of matter. Probably, many of them also agree that information is the essence of matter. The author also claims that consciousness is in matter not outside of it. More precisely said, the essence

of matter are dimensionless masses of elementary particles μ_i.‡§ But, we should to ask ourselves, what is matter, because information and matter without consciousness (and qualia) are empty, and without sense.

8. QM is not perfect, because it does not include QG and QC. It is not important if QC either exists or not, because consciousness is not yet explained.
9. Many physicists claim that preciseness, effectiveness and great success of QM are enough and that interpretation of QM is not necessary. This claim is also hidden in Feynman's "*Shut up and calculate!*". But, connections of QM with the fundamental physical elements should be explained. One of the fundamental physical elements is consciousness (and this is explained above). Additionally, we (people) are accustomed on the classical physics, what we imagine as the physical world, but QM is also necessary, because it helps to do physics dimensionless [34, 35]. If QM would not need interpretation, then consciousness, dimensionless nature of physics, and BZI would not clarify it any more. But, they clarify it. QC also makes QM less contradictory and strange.
10. We do not imagine QM enough [77]. Due to this reason, its deeper meaning is not connected enough with everyday physics, with QG, and with consciousness.
11. Besides, consciousness needs physical explanation, and foundation of physics is QM.
12. Free will and consciousness also seem as something very fundamental, more fundamental than matter, thus consciousness cannot be treated only as an epiphenomenon.
13. If free will is not a physiological reaction, and it is not Conway's (quantum) free will, the physical explanation for free will is deeply unknown.
14. Binary decisions [33] give a new hint for explanation of qualia. Thus instead of intensity of red color, comparisons of different values of red color are more fundamentally comparable with binary decisions than with continuous values.

5. Redefinition of QM due to the arguments for QC

Let us assume that such macroscopical wave function is built up that its collapse can be observed directly, not only via a measurement device. (One known theoretical example is the *Schrödinger cat*.) For instance, a human being can notice more than approximately 90 photons [78]. Thus, it is possible to make a quantum superposition between 200 photons and *zero* photons and this superposition can be directly noticed by a human being.‖ Precisely said, when a human being would look at this superposition, s/he would cause quantum collapse to 200 photons or to *zero* photons.¶

‡ $\mu_i^2 = m_i^2 G/(\hbar c)$, c is the speed of light, G is the gravitational constant, $\hbar$ is the Planck constant, and m_i are the masses of various elementary particles.

§ Thus, BZI is not a final act of physics, because it does not operate with μ_i, therefore with QG.

‖ One similar superposition, but non-applicable to this example, was made in [79].

¶ A better possibility is superposition of 200 photons of one colour and 200 photons of a little different colour. The difference of colours is such that a human being can distinguish the difference. (It would

As further, let us assume that an eye does not behave as an external measuring device; therefore a location of consciousness is also in eyes. In truth, this is unknown; it is also unknown whether consciousness is located locally, or it is dispersed on more locations in the brain. It seems, that the centre of consciousness is in the reticular formation in the brain [18].

In the section 4, a model can be deciphered, where quantum collapse is a conscious decision. If this is true, in the example above a person can consciously influence on a result of a quantum collapse, thus that a view on a source of photons would give 200 photons and never *zero* photons. This is not a new idea [50, p. 76], [51, p. 8]. If this would be true, this would mean that anyone can consciously change statistics of quantum collapse, thus that mathematical apparatus of QM is modified.

Let us say that the common wave function of *zero* or 200 photons is

$$|\Psi(0)| = \sqrt{2}/2 \qquad |\Psi(200)| = \sqrt{2}/2 \tag{1}$$

Thus, probabilities are

$$p(0) = |\Psi(0)|^2 = 1/2 \qquad p(200) = |\Psi(200)|^2 = 1/2 \tag{2}$$

But a direct observer can influence, for instance, that

$$|\Psi(0)| < \sqrt{2}/2 \qquad |\Psi(200)| > \sqrt{2}/2 \tag{3}$$

$$p(0) = |\Psi(0)|^2 < 1/2 \qquad p(200) = |\Psi(200)|^2 > 1/2 \tag{4}$$

and at the extreme example

$$|\Psi(0)| = 0 \qquad |\Psi(200)| = 1 \tag{5}$$

$$p(0) = |\Psi(0)|^2 = 0 \qquad p(200) = |\Psi(200)|^2 = 1 \tag{6}$$

We can ask how to insert here mathematical influence of consciousness, so that the mathematical essence of QM remains simple. Namely, everything is already described with wave functions Ψ, and thus it seems that nothing simple can be inserted here [39, p. 197]. If we read [80], it can be deciphered, that wave functions (amplitudes) are important because of their similarity to electromagnetic fields and because of their linear impact. But, the above binary description with formulae 1 to 2 do not need this linearity. Thus, it is a better description with probabilities $p_{1,2}$ in [33]$^+$. Now consciousness only completes missing information, thus it changes values of $p_{1,2}$. But, let us assume that independent observers have the independent wishes, *zero* or 200 photons. Thus their average remains the same, thus $i = p_1 - p_2$ are not changed, in principle.

If some theory (model) disagrees with the rules of QM, it is immediately suspected that such a theory is wrong. One possible apology for the above model would be that this happens only at a direct measurement, but not at a measuring device, which is an intermediator between them. (An intermediator is like an unconscious *Wigner's friend*.) Because a direct measurement of quantum collapse has never been done, maybe changed rules of QM have never been noticed.

be still more evident to directly observe polarization of light, but human eyes cannot do this.)

$^+$ There is description with information $I = I_1 + I_2 + I_3$, respectively with $i = p_1 - p_2$.

Thus, it is assumed that a lot of primitive consciousnesses exist whose influence on collapse of wave function exists, but they are mainly unconnected, therefore they do not give any sign in known measurements that disagreements of rules of QM exist.

Let us name the above new type of wave function collapse the causal one, because an observer decides according to the earlier information, which result of the collapse s/he wants. This differs with the common collapse of wave function, which is non-causal. A common explanation for both mechanisms is that mechanism of functioning of consciousness is such that it influences on a wave function collapse, but if any previous information does not exist here, these collapses are statistical, and thus wave function collapse is non-causal for an external observer.

It is also evidently that this is an improvement and simplification of the Stapp model, which is not completed enough. (Stapp avoids answering precisely what is an agent which influences process *one*, and this is not known.) Thus, this model equalizes its processes *one* and *three*, therefore process *one* can also be accidental one (if connections with other decisions are not established) and, on the other side, statistics of quantum collapse (process *three*) can be modified, as it is described above. In the opposite case, if processes *one* and *three* are not equalized, process *one* still ever behaves as out of physics, thus as an epiphenomenon.

In truth, the above experiment can be performed more directly if mechanism of working of consciousness in a brain would be known and, of course, if consciousness is a quantum phenomenon. In this case there is no need for a coherent state of *zero* and 200 photons. Let us assume that a mechanism and a location of a conscious decision of a finger movement are known, the same for the final decision of this movement, that intermediate mechanisms from the final decision to the movement of a finger are known, and let us assume that a decision is a quantum phenomenon. For instance, permanent decisions for only one movement are this violation of quantum randomness. If all this is known, this has the same effect as the above experiment with the photons number collapse. It is easier that this process can be determined than to carry out the above experiment with the photons.

If everything would agree, always the same movement of the finger would be analogous with only one option of collapse of the wave function, for instance only spin up happens, although spin down is also possible. Maybe, if wave function collapse is not a decision, but is accidental one, movements of a finger would be accidental. If human's consciousness would be from unconnected short pieces, let us say that memory lasts only one second, the above decisions would be very accidental, thus collapses would be very statistical, and movements of a finger would be very accidental.

To find such a mechanism from a decision to movement of a finger, a model should also be developed, which distinguishes conscious decisions from physiologically caused reactions. This is what should be clarified at the Libet experiment.

Let us assume that unicellular organisms are conscious. They are much simpler than humans and animals; maybe such a model can be built up easier, and the modification of common QM can be observed easier.

This example distinguishes two examples of consciousness, these are free will and qualia. Stapps's process *one* is more important at free will than at qualia.

Returning to the common QM, it is also additionally interesting that not only a setup of an experiment is a subjective decision, but also time of measurement is. If the wave function collapse would be completely a random process, maybe time of collapse would be a random process. This is not yet enough mathematically formulated in the common QM, because, of course, an agent is not defined enough.

BZI, which otherwise explains a lot, has not yet explained randomness of quantum collapse convincingly enough [33].* But, this is hinted in this section. So, interpretation of QM is also clearer, because the randomness of QM is the main mystical secret of interpretation of QM. Besides, two unexplained parameters of physics, consciousness and quantum randomness, give at most one unexplained parameter.

However, the above derivation claims that free will is a clear quantum phenomenon, thus, it means that quantum coherence is on our reach, the same follows for qualia.

Thus there are three options:

(i) Consciousness is not quantum one.

(ii) Consciousness follows from the common quantum physics.

(iii) Explanation of consciousness means the modification of the common quantum physics.

The author is sure that option (i) is not true, but admittedly, he is not sure whether either option (ii) or option (iii) is correct. For instance, a possible explanation for (ii) is that free will is composed and intertwined from a small part of quantum randomness and larger part of motivators (physiological influence), what gives a feeling for free will. Otherwise, this random part is free will, but the motivators increase probability for quantum collapse in their direction. A part of those motivators can be also named Stapp's though effort [40]. Therefore, quantum randomness (alias free will) is not based on old memories, only motivators are.

However, if we assume panpsychism and some of the above reasoning, then research of the brain and so explanation of consciousness will tell cheaper conclusions about fundamental physics, than CERN tells, for instance.

Whatever things are, because the knowledge how to explain consciousness physiologically is very poor, this opens possibilities of quantum explanation, because, the most probably, explanation of free will does not exist out of quantum world.

* " *The information content of a quantum system is finite.* With this we mean that a quantum system cannot carry enough information to provide definite answers to all questions that could be asked experimentally. Then, by necessity the answer of the quantum system to some questions must contain an element of randomness. This kind of randomness must then be irreducible, that is, it cannot be reduced to 'hidden' properties of the system. Otherwise the system would carry more information than what is available. Thus, without any additional physical structure assumed, we let the irreducible randomness of an individual event and complementarity, be a consequence of the finiteness of information."

6. A location of feeling of consciousness

Beside the question where in a head the consciousness is located, a big question is also where people feel consciousness. The author guesses that a location of consciousness is not felt. It seems to us, that we feel it in brains, but the question is whether this feeling is only a consequence of sense organs, as eyes, ears, etc. People look through the eyes which are probably the main sense organ. If one closes the eyes, either s/he feels consciousness in prefrontal cortex, or, maybe, this feeling is only a substitute for eyes. This is a question to which someone blind from birth should answer. But, an analogy for eyes are ears. People feel treatment of sounds in ears, not in prefrontal cortex, for instance. Let us assume that a human is completely without sense organs. Is it possible to feel a location of consciousness inside of a body? Let us imagine that our eyes and ears are on the fingers. By the author's supposition, we would feel consciousness in the fingers. We also feel our space before eyes and consciousness is felt in connection with it. Let us imagine that we never see space behind our heads. It is a question how this would influence on our feeling of a location of consciousness in space and in our body. Surely, orientation of consciousness is defined with orientation of the eyes and the direction of gravity. One example of a location of consciousness is also a pain in a toe, which is felt in the toe, not in the head.

Besides, space around us is an illusion from another aspect that it is made by our sense organs. For instance, insects feel much different space around them. At the end, only survival intention and functionality give form of this space. Admittedly, picture of this space-time should be real according to survive purpose, but what is real picture, is relative.

Consciousness means to be aware of something. Let us try to understand this literally. Consciousness thinks about environment, (therefore about senses), or about something fictitious, or abstract things (abstract things also form one space). If one looks at landscape, his/her consciousness is partially also there. If one feels a pain in a toe, his/her consciousness is also there. The essence of consciousness is what it thinks about, not where it is located.

The principle of a human brain is very similar to a computer. Let us imagine that a conscious computer is located in USA, but it processes momentary visual information from one place in Europe. Where its consciousness is located? Another option is that visual information is from one place in Europe and from one place in Japan. For this computer these two places are close together. It is also possible that the left side of visual field of an European observer is transmitted from Japan, let say with a camera. For this person these two places are close together. But, if two distant places are close together for all computers and persons, these places are really close together. This is one generalization of the principle of relativity with inclusion of information. As the word 'computers', all brains and all conscious beings are also mentioned here. Due to the existence of this relativization it can be still more asked, where is a real location of consciousness.

Consciousness entered into QM over the 'measurement problem', thus it is possible that consciousness should be a key element for a collapse of the wave function. Additionally, a location of consciousness has no direct sense. This is very similar to some supposed principles of QG, where space-time is a secondary product [81]. Analogically, it can be said that consciousness entered in QG over the '*location of consciousness problem*'.

QM can be very abstract, as it is known. Due to the author assumes that physics is a product of consciousness, it should not be less abstract than consciousness. Abstractedness of consciousness is more connected with abstractedness of QM than with concreteness of the classical (Newtonian) physics. The claim, that consciousness is always about something, shows on a similarity to QM, (because events do not happen without observers). It is still better to find such connection with QG, because classical physics and QM are put in space, whereas QG itself creates space, thus it is not put in space, similarly as consciousness is not put in space. (But, if we are more precise, special relativity [32, sec. 4 or 5] and general one [31, p. 138] also show space-time as an emergent phenomenon. QM is also based on explanation of virtual reality [82, 83], thus that space is an emergent phenomenon. But the author believes that QG will show still more perfectly that space-time is emergent, for instance [81].)

Despite and therefore, a paradox of a location of consciousness in the brain is important; maybe it is so inconceivable as qualia. Thus, here we can decipher a QG phenomenon which is always close to our eyes. Additionally, the section before gives that qualia and free will are QM phenomena, close to our eyes. Those three things mean a promise that an experimental proof for QC is close to us.

7. Opinion about paranormal phenomena

When consciousness will be explained or close to explanation, it is logically to expect, that something will be possible to tell about the existence of paranormal phenomena.

In his essay, Stenger writes heading 'Myth of Quantum Consciousness', but more he criticizes the theory of paranormal phenomena which is based on quantum physics [37]. For instance, Bohm claims that all events in the universe are momentarily connected [84]. Stenger criticizes this with help of special relativity which claims that even events one radius of nuclei apart cannot be simultaneously connected. But, still ever, it is unknown how it is with distribution of speed of light in short space and time intervals. For smaller radius this is true only for macroscopic average. The Scharnhorst effect gives a hint about this [85] and Feynman also gives a hint [80, p. 52]. Maybe QG is based on the principle of the average speed of light, because space-time is only a secondary product of reactions among the elementary particles. Thus, a possibility exists that communication faster than c is a microscopical building principle of our macroscopical space-time. Admittedly, instant connections between any points of space (or space-time) does not seem trustworthy; but this is not necessary for the author.

Stenger criticizes also the *universal field*, which is very similar to *aether*, but special

relativity theory shows that *aether* does not exist. The above paper does not use *universal field*. (Even contrary to general opinion, it seems to the author that even the elementary particles are more fundamental than field.) But what is true will be recognized after the *quantum field theory* will be upgraded into QG.

Stenger criticizes also the Bohmian interpretation of QM [86], which uses hidden variables. But he was not clear and honest enough, because the demonstration of the Bell inequality violations via experiment has proven that no theory of local hidden variables can reproduce the predictions of QM. However, the Bohmian mechanics is a nonlocal hidden variables theory, so it is not addressed by Bell's theorem at all. But, it is true that the Bohmian interpretation is too complicated, where nature should be simple. It gives too little conclusions in comparison, for instance, with BZI. But the author's model avoids hidden variables and it changes the external parameter, consciousness, into an internal parameter, and thus it simplifies physics.♯

The author's model also does not demand universal continuity, which is criticized by Stenger.

However, it can be expected that a better theory demands simplicity, as less parameters as possible and explanation of all physical phenomena. This is enabled by the author's theory, or at least, it is not in contradiction with this.

Today many people refer to Randi's one million dollars paranormal challenge for scientifically repeatable paranormal experiment, because it has not yet been awarded to anyone. Therefore, they suppose that paranormal phenomena are only illusion.

But, it is not so simple. It is said that paranormal phenomena are the most powerful in dreams and in relaxation. It is not clear how to make repeatable paranormal phenomena in dreams. Thus, they are also not tested by the Randi foundation.

Let us imagine progress of physics in last century if physicists were not paid for their work, only that they would be promised by one million dollars rewards. The most probably the progress would be much smaller than today.

It is also not easy to test phenomena only statistically, without physical model.

Thus, it is necessary to be cautious for quick judgments.

However, measurements of paranormal phenomena can be more repeatable, and so verifiable, if body relaxation can be measured as an additional parameter. It can be measured with EEG, with lie detectors, etc. An enough number of measurements is only necessary. This is one proposal for further measurements.

Parapsychological phenomena should also be a consequence of associative thoughts. It is also a challenge, how to validate them statistically.

Because a theory of everything is not yet known, it is not yet known what fundamental physical nature of time is. Thus we cannot model precognition, either confirm it or reject it. Physicists are almost sure that it is known enough to reject precognition, but this will not be true, until QG will not be known. Even, time is one of the main problems at explanation of QG [87]. If it is assumed that paranormal

♯ Author's suspicion: "*But, if the Copenhagen interpretation is really better than the Bohmian interpretation, it needs some sort of experimental confirmation.*"

phenomena exist, then it is also needed something what avoids Tegmark's rule, so that coherence time should be long enough or even extremely long. Thus, matter from tiny elementary particles is also needed.

Thus, prejudices against paranormal phenomena follow from conviction in enough large knowledge of physical foundations of nature. But, despite all successes of scientific approach, it is necessary to be aware, that science is made by subjective people, as all of us are. Thus, in the process of development of theories, experiments and acceptance of papers, scientists show their subjective nature. For instance, admittedly, someone who makes research inside a university has larger probability to find something good, because of positive selection inside a university, because of more time, money and more help than outside a university. Let us concoct, for instance that this probability is, illustrative, 10% for university people and 0,1% for people outside of a university, thus 10% : 0,1%. But, prejudices at acceptance of papers for publications still much reduce this probability; let us say to 10% : 0,01%. At the same time, some papers inside of a university are estimated as good ones, although they are not.

The next nonlinear phenomenon is influence of majority on minority, similarly as big companies swallow small one, ideas of big groups delete ideas of small groups or individuals. Another such an example of nonlinearity is threshold at elections. It causes that parties who have small probability to come to a parliament get still less votes, because a voter is aware whether a voted party does not come to a parliament, it is the same as that s/he did not vote, thus a vote is thrown away.

Another simple nonlinear influence is, that many people wrongly think that the probability falls to *zero* outside of a university. Namely, our intuition gives wrong feeling of zero probability. Similar *zero* probability estimations happens also in other areas of human activities. For instance, when we drive at the morning to the job, we think that probability for a car accident is *zero*. But in true it is around 10^{-8} per kilometer. It is is similarly as the Gaussian curves is everywhere different as zero, but we ignore their tails as equal to zero. Additionally, if we calculate with a lot of parameters at once and we ignore tails of Gaussian curves, the mistake can be important. Thus physical reviews reject papers outside universities, which are also without endorsers, with bad language, etc. But thus it can be considerable probability, that they reject some correct ideas.

These are some of such nonlinear phenomena, which reduce objectivity of the scientific system.

This topic about consciousness is important not only for physics and live sciences, but also for ideological debates, for instance about life-after-dead. This is also a paranormal phenomenon. Such tiny matter should maybe survive death of a body, made from the common matter.

8. Conclusions

As first, the author shows that consciousness is based on memory and thus it can be atomized. This can also be used for explanation of the Libet experiment. Then

he tries to prove, that QC is not forbidden. Tegmark's argument, which is one of the main arguments against QC, is avoided with the use of tiny elementary particles. Afterward, he shows why consciousness should be a quantum phenomenon. Admittedly, this influences modification of formalism of QM. But this does not influence on any known QM experiment, thus a true contradiction does not appear. An experiment is also suggested. All this includes panpsychism, which enables the explanations above. It is also shown that analysis of a feeling of location of consciousness gives some interesting conclusions. The model for consciousness is so simple that the Ockham razor [39, p. 197] is no more a problem.

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Appendix A. Summary with pools for quick overview which physical theories are behind

This means summary of ideas in a paper, that it is possible to see fast, to which known ideas in the physics the paper belongs, and which are contradictory to them.†† The principle is that every contestant answers to pool questions about where the paper belongs. If pool questions do not define physics behind papers enough, contestants give his/her own pool questions. This means, the pools define the space of physical theories. Answers on pools define a location of an actual paper in this map, and it is possible to estimate how any other paper is different.

1. Information is more fundamental than matter.
2. Consciousness is more fundamental than information and matter.
3. Matter without consciousness losses sense.
4. The author defends panpsyschism, not emergentism, thus one form of consciousness is everywhere.
5. If no one looks at moon it does not exist.
6. The moon has its own primitive consciousness.
7. Moon looks itself, thus moon exists without people and animals.
8. The author defends physicalism and not dualism.
9. Ontology is also important at physics, not only mathematics.
10. Ego is relative.
11. Ego is based on memory.
12. If someone forgets everything from past, s/he becomes a new person.
13. Therefore, it is possible to atomize consciousness, and it should be atomized.
14. Qualia should be atomized.
15. The quale for feeling of time can be connected with special relativity.
16. Free will exists.
17. The author defends QC.
18. Quantum coherence in a brain exists.
19. The author suggests a model which avoids Tegmark's calculation [47].
20. There are options that either QC means modification of quantum physics or not. The author discusses both options, but it is not sure, which option is better.
21. Some tiny elementary particles exist, which help to explain quantum coherence in a brain.
22. The Stapp theory is either correct or something close to a correct one.
23. It is necessary to define precisely, what free will is and what physiologically caused reactions are.

†† This system was suggested by the author for easier overview of papers in FQXi contest [12].

24. A detailed explanation of steps from decision to movement of a finger would be an 'experiment' for the definition and proof of QC.
25. Quantum randomness and QC are either similar or the same phenomena.
26. QC is favorable according to the Ockham razor.
27. A quantum p-zombie and a conscious person can be distinguished.
28. If something cannot be perceived on any way, it does not exist.
29. According to the classical physics, a p-zombie and a conscious person cannot be distinguished.
30. Theory of Brukner and Zeilinger is very promising [33].
31. Physics is dimensionless [34, 35].
32. Because physics is dimensionless, it demands quantum physics and relativity theory.
33. It is needed that the theory of Brukner and Zeilinger is prolonged to dimensionless masses of elementary particles μ_i and the *fine structure constant*.
34. According to classical physics, a location of consciousness cannot be defined.
35. Location of consciousness is not felt.
36. The problem of a location of consciousness is similar to explanation of a location in quantum gravity theory.
37. Experiments for paranormal phenomena do not exploit the parameter of relaxation enough.
38. Use of the parameter of relaxation can prove the existence of paranormal phenomena.