Quantum gravity and consciousness, the most fundamental physical unknowns

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Let us imagine that now we are in the year 2116.

The knowledge of fundamental physics is growing still ever according to Moore's law of growth. Time is measured to 25 decimal places precisely. The number of the atoms in the silicon sphere can be counted to one atom precisely. Those spheres can be made automatically, perfectly, cheap and in short time. The masses of the elementary particles are measured much more accurately than 100 years ago. It is similar with the other elementary constants. A huge sphere of a pure monocrystalline lead is put into outer space. On it, the gravitational constant, G, is measured with the help of the quantum atomic interferometry. At least one new elementary particle is perceived every ten years. All spectrum of Higgs bosons has also been perceived. The big success was also a direct measurement of the mass of the electron neutrino.

Gravitational waves and neutrinos are giving more accurate picture of the universe. Universe is full of hidden structures and of new physical knowledge. More than 100 years of measurements of neutrinos, gravitational waves and other universe measurements have already revealed a lot of new structures and new physical knowledge. Even measurements of G revealed dark matter and other new phenomena around earth.

High temperature superconductivity was explained. A precise map of brain functioning is done to the cell level. Correlations of brain processes with DNA were revealed and were explained. For the Libet experiment, it is confirmed that it means only “free won't”, not “free will”. Quantum smell, quantum sensing of magnetic fields [1], and quantum photosynthesis are confirmed. The number of phenomena on area on quantum biology exploded over 1000. Tegmark [2] was disproved a long time ago.

Quantum computers achieved mature age, and so do artificial intelligence and robotics. This helps at calculations and experiments in physics.

In the process of fundamental physical research, some new discoveries appear which were not even imagined before. A part of those discoveries is dropping by time, but even in the next 100 years it will not drop to zero. Even a calculation for dependency of this part over time was found.

Presentations of complicated theories such as general relativity, quantum mechanics, and quantum field theory advanced to the level they can be explained even for clever children in elementary schools. Newtonian physics is learned from birth, because every movement that we see, is Newtonian physics; similarly, it is possible to learn general relativity and quantum physics. All those complicated equations are presented with pictures, videos, solid objects, and with detailed help for many specific questions and for many types of knowledge background. Thus, systematics of physical of internet achieved a new level.

Interestingly, one of the most breakthrough measurements 100 years ago was the measurement of the speed of the neutrinos. However, a lot of time it was remembered only because of the mistake at the measurement. As second, at the measurement of the G it was found that the value of G is dependent on the cycle of six years, therefore number of measurements was also important, not only accuracy of measurements. Also because of this, the level of tolerance to physical papers in now less strict and more advanced.

The theory of quantum gravity, QG, has also progressed with some thought experiments. One of them is the experiment of the measurement of the G, [3, 4 Sec. 5]. Namely, the most accurate of all possible measurements is the measurement of acceleration at the horizon of a Planck black hole. Because even here the preciseness of measurement of G is limited, this means a theoretical limit of accuracy of measurement of G. This is a way to a gravitationally generalized Heisenberg's uncertainty principle.

The second thought experiment is acceleration of a rocket on photonic propulsion. Because of a quantum nature of propulsion, completely uniform acceleration cannot be achieved, but it has some statistical dispersion. This also means that G has some statistical dispersion.

The third reflection is that space-time without matter does not exist and that matter is the essence of space-time. This is one type of Mach's principle. Even, the existence of dimensionless gravitational coupling constants of elementary particles confirms this [5]. The Heisenberg principle of uncertainty is linked to the existence of space-time, because momentum and location are properties of space-time. But the elementary particles are more fundamental than space-time. Thus, uncertainty principle of elementary particles or black holes is distinct according to the Heisenberg principle of uncertainty; it is linked only to G.

Those thought experiments can be used for improvements toward better QG.

Oops, a credible model for QG is not yet presented, and measurements of QG are not yet possible. New measurements are planned, but they cannot be done in the next 100 years, because a lot of big physical projects are expensive and last a long time. It is even possible that they last 100 years and more. Examples are LIGO, monocrystalline silicon sphere, measurement of G, etc. 100 years are not a big time period to complete physical measurements.

At the same time, a formula for the fine structure constant is still ever unknown.

However, the explanation of QG also means fundamental explanation what space-time and matter are [5], and what the most profound interpretation of quantum mechanics is. Besides, according to some theories, consciousness also belongs to those fundamental quantities. Two models for consciousness exist, emergentism and panpsychism. According to the second one, consciousness is more fundamental than matter.

Therefore, a possible solution for impasse of QG appears – if we can explain what consciousness is, it can be easier to find what space-time and matter are, thus what QG is [6]. This will be much easier than the planned measurements of QG. It will also help that the brains have been mapped already.

If QG is not connected to consciousness, we should wait a long time for QG measurements. Anyway, consciousness should be explained, because it is a physical phenomenon.

If we want to explain the problem of consciousness, their aspects as "free will" and qualia should be explained. The next related problem is a philosophical explanation of imagination of location [7, Sec. 6].

Therefore, because all processes in brain are located to the cell level, it should be found what causes "free will". An alternative question is: "What is a difference between a philosophical zombie (p-zombie) and a human?" On the other side, it is also possible to suppose that "free will" does not exist. However, "free will" is not the same as the "free won't" from the Libet experiment, therefore such claims do not yet have experimental confirmation. Even, they do also not have intuitive support.

There is also a question about quantum consciousness. If it is assumed, that consciousness is a physical phenomenon then there is a distinction between a p-zombie and a human [7, Sec. 4]. If consciousness is not a quantum phenomenon, then this distinction does not exist. Nevertheless, if it is a quantum phenomenon there is always a distinction between both of them because of the uncertainty principle. This is one of the reasons why quantum consciousness is not yet disproved.

According to all knowledge until now, we hope that important advance in QG and in explanation of consciousness will be achieved. We hope that in our lifetime there would be the end of new fundamental physics. There are some claims that fundamental physics has no end, but also dimensionless nature of gravitational coupling constants and of the fine structure constant suggests that this is possible [5].

Physics today in 2016 has given a prize for physical futurism, [8, 9][1]. In the year 2026, it gave also prizes for good physical predictions 10 years ago. This paper was unnoticed the first time, but it won the second time.

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[1] This paper was sent to the Physics Today contest: *Physics in 2116*. It was not rewarded or published.

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