The trouble with physics. How physics missed main part of the observer, and what comes next

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Abstract

In his excellent book (Smolin, 2006) Lee Smolin speaks about crisis in physics, blaming mainly string theory. We argue that modern physics should change its attitude towards what is called observer, but should be called cognitive machine or rather two distinctively different, inner and outer, cognitive machines.

Introduction

We argue that conception of observer in theoretical physics and its place in the well known concept, that physics should be independent from observer, is lived out in the sense that physics had reached some end point where we are obliged to take some steps back. The idea of this article is that concept of observer should be replaced with the concept of cognitive machine (CM) that consists from two parts, local cognitive machine or special CM (SCM), and general cognitive machine (GCM). SCM is that part of cognitive machine that we perceive as our (local) cognitive ability that we would locate within our body, bet GCM should stand for cognitive functionality that is outside us and is common for all human beings and whatever other beings if any with cognitive ability, say, animals, humanoids, angels, gods, the Lord himself. Two machines, SCM and GCM, say, inner and outer, interact between them and due to this interaction we acquire possibility to think, not due any mystical ability built in ourselves, in our brain. Thus, we demystify our brain as the unique, almost magical tool that provides us with the thinking ability in the extent we invent it through our cognitive experience.

General cognitive machine

The concepts in this article might not be so hard to be reached and were already long ago part of ordinary science, not had been negative attitude towards what is called religious experience. All religious experiences stand on some feeling of something being outside us, humans, but what we can't grasp directly and what we attribute to some numinal existence, and whatever we define adequately, as we use to think, in our religious teachings. Most of ideas of religious teachings were reached both due to global religious teachings such as Christianity, Islam, Buddhism, Confucianism, Daoism and others, and due to distinct

teachers of past such as Emanuel Swedenborg, Rudolf Steiner, Karl Jung, Peter Ouspensky, and many others.

One great exception was Karl Jung who's discovered collective unconscious is accepted more or less by general science. What stands behind this collective unconscious? We would like to differentiate in it something, that we would call general cognitive machine (GCM). More or less seriously science speaks about notion of noosphere introduced by Vernadsky. Religious version was developed by Teihard de Chardin. Science can't go around the psi, discovered by scientists such as Robert Jahn (Jahn & Dunne, 1989) and Dean Radin (Radin, 2006). What is common for all this, and represent this cognitive power, we call general cognitive machine.

Where GCM is located, if we are to accept its existence? Yes, of course. The reason that we can't name the place of its location is just the reason why it does not have main position in whatever sciences that deals with reasoning and cognition, thus, in all sciences. One place we may name, and it is our brain. Only, how our brains are connected in one common brain or common brain activity, that should be called general or common or collective brain, we do not know exactly. Or do we know, actually? Quantum entanglement, quantum vacuum theories, do they forbid collective environment for common brain functionality? In 19th century we had aether theories that where disproved by Michelson and Morley experiments. These experiments excluded aether from physical picture, but something similar, that may be candidate for carrier of GCM, comes back as vacuum fields or zero point energy or whatever physical environment near or behind Plank limits.

Well, let us accept possibility of existence of GCM. In what relation should it be with our SCM that is in everyone of us locally? There are two possibilities. First, cognitive power is due to local machines that are interconnected between them, and GCM is only some attachment, collective function with some useful functionality and only. And second, cognitive power is due to GCM and our local machines are more of status of interface than independent thinking machines. Just this second model we are going to use and defend and forward, saying that real cognitive ability is outside ourselves in GCM and we thing due to our collective existence via GCM.

Universality of GCM

Now comes some statements of declarative mood. This mood is more because we can't them prove than of our conviction that things run just this way and not other. We simply draw some comprehensive general picture.

Principle of universality GCM says that we see universe in the same way that we are built up from side of GCM. What does it mean? First, we think using the same functionality of GCM that builds us up. More distinctly, how we think and how we are built up is the same: we are built similarly on all levels, chemically,

physiologically, on our brain level, on our genes level. And now we may turn this principle round itself and say, how we are built up and how we see universe, is the same, of the same functionality.

To the same may be attributed principle that GCM is primary with respect to SCM. This means that GCM builds SCM, not that GCM is some simple common functionality where SCM were some independent block. We say that SCM block can't work without GCM on the most general level, GCM is primary block, and SCM's are only multiplications of GCM that are made operating in convenient conditions, that in religious teachings are called 'grace of God'. Who or what gave us this functionality or multiplicity? God, or nature? The place for religious, theistic or, contrary, to atheistic thinking remains.

These concepts we started to consider in the article (Zeps 2005).

Why we should take into consideration GCM in physical theories?

In physical theories, we are used to accept general principle that physics should be independent from observer. This principle was very useful for a long time, but now it has reached its endpoint in sense it could remain useful. If we are ignoring GCM in describing physical universe, our general picture of universe turns out more and more distorted. We explain it further in terms of frames of reference. In simplest graspable way we see it when we try to comprehend, what we have with quantum mechanics which interpretations start to be more and more complex in our attempt to understand nature around us. We come to the border when we think that we develop physical theory but it looks more like that we are describing our cognitive machine than the lows of nature. This is just in case of quantum mechanics. What we explore? Nature or our cognitive machine? The model of two cognitive machines gives us way to understand the situation about our epistemology what concerns quantum mechanics more clearly.

The model of GCM as toolkit of instruments

To understand, why we come to feeling that we search universe when actually we invent new and new functions of our cognitive machine (GCM), we may compare GCM with toolkit of instruments. When we find out some law of nature, actually we find out, how this law expresses in terms of GCM, we find new functionality of GCM, we find some new instrument in GCM as toolkit of cognitive instruments. This statement may seem trivial. But it were trivial if we were arguing in terms of SCM, but now we were speaking in terms of GCM, and the consequence is crucial for us. The generality of the low is not due to some functionality of our local cognitive machine, but it is of the nature itself, where under nature we should see GCM itself in its functionality. What we have? We can't go around GCM. Laws of nature are actually laws of GCM too, simply we do not have other way to acquire them. This point works in our reference system. Of course, we could try to get outside this reference system and ask: what is the law of nature itself, in general. But we can't. Alas, we are included in our human being essence. What we can judge

about things in nature and epistemology, what concerns nature, is that in long turn of time that, what we perceive as laws of nature via laws of GCM, should be accepted by ourselves as laws of nature in a way physics is doing now. The only difference is that we are to understand that on the most general level we can't see anything in nature directly, we see only gradually improving functionality of our GCM, where GCM discloses before us as more and more improved toolkit of instruments.

Mathematics or physics?

General assumption in modern physics is that physics is the science that describes laws of nature, and mathematics supports physics in this with useful tools. The introduction of GCM as main instrument of our cognitive ability changes this our deep-seated and old fashioned opinion. Truly, mathematics itself is that thing that describes laws of nature. Mathematics discovers functionality of GCM. String theory, mathematical theory, is example of functionality of GCM that has good projections in the nature out there in the sense that experiments support our physical theories.

But mathematics as functionality of GCM has another considerable feature. Mathematics is built up from cognitive functions, and mathematics may be discovered in this way more productively, if we accept this state of conditions. What this means? We are used to assume, similarly, as in case of physics as description of nature, that we are building mathematics arbitrary. Another way of thinking was that introduced by Plato, Platonic view. Assuming GCM, we know that reality is something different from both of them. Mathematics we may build arbitrary only in the sense that we may choose different ways of investigation, we have, of course, great freedom, what concerns, how to build, but end products that we discover are good functionality of GCM. That what does not work as good functionality in GCM, we are forced after shorter or longer time to throw out as useless. Mathematical theories unite themselves in general theories according functionality of GCM, not under rules that we could invent arbitrarily, that didn't exist in functionality of GCM.

Pythagorian numbers

The more radical consequence of influence of GCM on mathematics is that we are to accept that there exists some convenient functionality on cognitive level what is implied on our thinking ability due to GCM. In (D'Aquili & Newberg, 1999) two authors entered notion of seven cognitive operators. This way of thinking is only starting point to fruitful future discoveries. We suggest here a new one. Namely, in (Zeps 2008) we entered notion of Pythagorian numbers.

Pythagorian numbers are not the numbers what we naturally understand under numbers in mathematics, but Pythagorian numbers rather are cognitive functions of most general nature. Pythagorian numbers come

in pairs and there is some general law, routine that connects them or turns one into another, see (Zeps 2008).

Simplest pairs of Pythagorian numbers are closed line and unclosed line, translation and rotation, numbers one and two, and so on. Many things in mathematics may be explained better using Pythagorian numbers than in usual way. We can't argue that Pythagorian numbers may give us something more than interpretative functions in mathematics, but this, of course, is question of the future.

One idea we may express quite clearly. Pythagoras, when speaking about numbers as general appearance in nature, as building blocks of nature, was having in mind not usual numbers, but these Pythagorian numbers. The secret of Pythagoras was only one thing that these numbers are of cognitive, general nature, not simply countable units. This can explain, why Pythagoras had two types of numbers, prolonged and round, simply, he had pairs of Pythagorian numbers of mind. Of course, we could ask, where from Pythagoras had such mighty idea, that it had remained closed for more than two thousand years and even for contemporary scientists.

One explanation is that neither Pythagoras himself, nor his disciples discovered this rule. This was the remnant of the famous 'knowledge of past'. Epistemology knows many facts from the history of science, which could serve as maybe mystically sounding 'knowledge of past'. But some facts about such knowledge of past could be quite real, and the Pythagorian numbers could be just the case. Probably, Pythagoras could be not quite distinctive in differing ordinary numbers from cognitive pairs of Pythagorian numbers, he could have been acquired this knowledge already in some distorted appearance, where the proper understanding of thing were already partly lost.

Cognitive picture of universe

The present attitude to physics is of cognitive character, because all what we can expect as information both about our universe and microworld is via two cognitive machines SCM and GCM, or rather as interaction of the two machines. Thus, the picture that we could expect from outer world should be called cognitive picture of physical world. Simply we do not have other ways out there in whatever what we could call outer world than that via GCM and SCM and functionality of their interaction.

If previously we were used to world model, where human beings via sensual organs as tentacles acquired information from outer world, then now this model, according cognitive model, stops to work appropriately, because that what we called outer world, stop to exist in previous outlook, but should be replaced with something that could be called 'outer world via general cognitive machine'. This new situation arises because other access to outer world than via GCM we do not have principally.

Have we arrived where idealistic philosophies of the past have been aiming?

Maybe, we deceive ourselves and wont to accept some old fashioned idealistic philosophy approach according which universe does not exist except in our senses. No, we have the same positivistic approach that represents mainstream scientific worldview, but the difference is that we assume the ruling position of GCM in the interrelation of both cognitive machines, special and general. General cognitive machine comprise functionality that both codes universe and codes special cognitive machine. If we live, as local cognitive machines, within the global cognitive machine, we must turn the code, that codes special machine in general machine, inside out in order to get look to what outer universe looks in terms of our local machines. Or, maybe last sentence does not have much sense; simply, whenever we put some question about physical world, we try to look from SCM via GCM in outer world. What is outer world in such epistemological approach? It may be question of philosophers, but from point of physicists and positivistic scientists we need only to know how to use this model to go forward in our attempt to describe our universe more and more precise. Universe according this cognitive model remains the same, only we acknowledge limited ways in acquiring information about this universe.

What is time and space?

The question about time and space has been main controversy between materialistic and idealistic worldview for centuries. The question ultimately should be decided by theoretical physicists, but we would like to correct this statement, and add, the question should decided by mathematics that build up physical theoretical picture of matter and universe. The last addition is crucial because physics is tended to leave time and space where they were, maybe, with little corrections as in relativity of Einstein. What we use as time and space, i.e., coordinates of space and time in mathematical description of physical world, are only parameters, that describe some more general essence behind them. Physicists do not know what should be expected behind time and space, but mathematics builds correct functionality via its new models and theories of what should replace space and time in the theories of future.

Cognitive model should change situation in direction of exclusion time and space from epistemology of nature as something sacrosanct and untouchable, and say: maybe space and time are something of independent importance and sacrality and as if universal ‘stage’ of all what is going on in universe, in what we do not believe, but we must judge about the things on another ‘stage’ which is interconnectively functionality between SCM and GCM. Further we try to say something of cognitive approach of space and time.

Cognitive approach of space and time.

We must admit that today we do not have some completed cognitive theory of space and time. Nevertheless, we try to give some indications how we expect the question could be developed.

Mathematics give us cue that time is not only connected with space as in SR and GR, but with mass too or rather 'it connects all' . See (Zeps D. , On to what effect LHC experiments should arrive, 2007). Thus, time can't be anything put in ground of physical picture at all. We try to solve things another way. We name whole aggregate of aspects which all should be attributed to what should be expected from notion of time in physics.

First, traditional time should be regarded as only projection in what should be called multitime, with arrow of time not pointing in future or past, but somewhere in the orthogonal direction (Zeps D. , On to what effect LHC experiments should arrive, 2007). Second, human brain works with two different constituents, that may be what we perceive as time, and these are the temporalities or causalities behind distinctions and holograms, where the first more regularly is perceived via left cerebral hemisphere and second via right cerebral hemisphere (Zeps D. , Hologram and distinction, 2008). Third, one hemisphere projects three valued cognitive quantity into another hemisphere's three valued cognitive quantity, and we get sense of three dimensional space equipped with movement, where we tent to categorize this movement as one dimensional time notion (Zeps D. , Rudolf Steiner on mathematics and reality. In Latvian, 2008).

All this should be much complicated when we take into consideration, that there are two, not only one, machines are to be considered, general and special, or local. This shows that the modeling creation of time and space notions in our cognition is very complicate question, and gives some clue why these questions have not been solved or at least adequately treated before. Similarly, we acknowledge that higher considerations are of little value, because they try to work in only on one cognitive machine, but the notions of time and space should depend just on functionality of interactions of general and special cognitive machines.

The problem of references

Today's physics exclude this type of problem, because space-time is considered as being homogeneous both in directions and scales. Just the scale should be that could arouse reference problem in case space-time is not something that could be treated independently from things it is filled with, i.e. matter. Space-time is where matter is present too. But this doesn't arise because space would be created by matter, but rather because space-time is not this sacrosanct basis of the universe. Neither matter is.

More fundamental than space and time are rotation and translation. We are tended to consider rotation and translation features of space or space-time, but we should learn to think conversely: rotation and translation are more fundamental. Either problem, how they are connected, rotation and translation, is crucial for us. Rotation and translation is Pythagorian pair of numbers, they are on level of cognitive operators, they have something fundamental in correspondence in GCM too, but we can't they what rotation and translation are in nature out there, because for us these are functionalities of cognitive

machines. We would be forced to philosophize; or rather we might accept them as necessary things to describe reality without trying to define their ultimate role.

Just acceptation of translation and rotation as more fundamental than space-time should give rise to reference problem in space-time. But that with regard to what should be argued are scales of space-time. But one more scale non-relativity may arise, and that is global reversibility of space-time. Modern physics doesn't tend to accept global reversibility of space-time, but it does it against what regards reference systems. It is, we do not think that physics in direction of smaller sizes is different from physics in directions of larger sizes. It is quite sensible, but the thing maybe can't be declared as general principle, because reference in both directions maybe should be treated differently. Why? We are between two cognitive machines. One way of referencing we calculate with regard to our positioning in space-time, but in case they are not absolute, we perceive reference as we do because of functionality between both cognitive machines, local and global. But, changing direction of reference does not correspondence the positioning principle in space time, and we could gain situation where referencing in small-size direction we use one principle of inclusion, but in referencing in large-size direction we use another inclusion principle. Does it have some reality behind this?

Can we imagine that stars should be positioned as something that could be included in things of our sizes? Physics does not accept such reversibility, neither mathematics does, theoretical physicist would say. But in what concerns referencing in different directions with respect to our sizes, inward or outward, this could arise and maybe arises actually. This is the problem of physics of future, is it possible at all, and in what aspects it is reality. If physics does not know well such possibility, some philosophers, Richard Steiner, for example, knew very well; he accepted it as reality. Where from he got it? From theosophy, from the knowledge of the past.

References

D'Aquili, E., & Newberg, A. B. (1999). *The Mystical Mind: Probing the Biology of Religious Experience.* Augsburg Fortress Publishers.

Jahn, R., & Dunne, B. J. (1989). *Margins Of Reality: The Role of Consciousness in the Physical World.* Harvest Books.

Lakoff, G., & Nunez, R. E. (2000). *Where mathematics comes from. How the embodied mind brings mathematics into being.* Basic Books.

Ouspensky, P. (1911). *Tertium Organum. Key to Solving Mysteries of the World. In Russian.*

Ouspensky, P. *The Model of New Psychology. The Model of New Cosmology.*

Radin, D. (2006). *Entangled Minds. Extrasensory Experiences in a Qauntum Reality.* Paraview Pocket Books.

Smolin, L. (2006). *The Trouble with Physics. The Rise of String Theory, the Fall of a Science and What Comes Next.* A Mariner Book.

Steiner, R. (1995). *Die vierte Dimension. Mathematik und Wirklichkeit. R. Steiner Verl., 1995, 310 pp. .* Dornach: R. Steiner Verlag.

Zeps, D. (2007). *Classical and Quantum Self-reference Systems in Physics and Mathematics .*

Zeps, D. (2005). *Cognitum hypothesis and cognitum consciousness. How time and space concetion of idealistic philosophy is supported by contemporary physics.*

Zeps, D. (2008). *Hologram and distinction.*

Zeps, D. (2007). *On to what effect LHC experiments should arrive.*

Zeps, D. (2008). Pithagorian Numbers.

Zeps, D. (2008). Rudolf Steiner on mathematics and reality. *Latvian University, 66th conference, section: dialogue of science and religion*, (lpp. 7 pp).