Article

On Quantum Consciousness Mechanics

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ABSTRACT

Quantum Consciousness Mechanics is based on physics and metaphysical intensity states. The aim of this paper is to attempt to combine physical and metaphysical intensity states for consciousness. It is shown that widening of parapsychology to the solution of quantum consciousness can be important in the explanation of paranormal phenomena. I have applied equations in quantum mechanics to quantum consciousness. These equations can have two solutions, one of which describes waves, energy and matter propagating from the past to the future and the other describes waves, energy and matter propagating from the future to the past. Working on the mathematical properties of the advanced solutions, mathematician Luigi Fantappiè discovered in 1941 that they coincide with the qualities of living systems what they are concentration of energy, differentiation, structures and order, thus arriving at the conclusion that life, more than being effected by causes placed in the past, is attracted by causes placed in the future. Therefore, the parameters of the autonomic nervous system, which supports vital processes, should show anticipated reactions to future stimuli.

Key Words: quantum mechanics, consciousness, quantization, Fantappiè, vital processes, past, future, wave, energy, matter, anticipatory.

1. Introduction

Von Neumann gave the name Process 1 to the physical posing of a probing question. He specified its general mathematical form, and sharply distinguished it from the very different Process 2, which is the mathematically specified evolution of the quantum state in accordance with the rules specified by the quantization procedure. Process 1 events intervene abruptly, from time to time, in the orderly evolution specified by Process 2.

This problem of the indeterminateness of the conscious choices is resolved in orthodox Copenhagen quantum mechanics by adopting a pragmatic stance. The theory is considered to be a set of rules useful to a community of communicating, conscious, observing agents imbedded in a physical universe. These agents make conscious decisions about how to probe that universe, in order to observe responses that will augment their knowledge. The difficulty mentioned above, which is that the known laws do not determine which of the possible probing questions will be physically posed, is neatly resolved by saying that this very openness allows the conscious

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agents to freely choose which probing questions they will physically pose. Thus the causal gap in the mathematically described structure is filled by the free choices made by conscious agents.

Bohr often emphasized the freedom of these agents to make these choices:

The freedom of experimentation, presupposed in classical physics, is of course retained and corresponds to the free choice of experimental arrangement for which the mathematical structure of the quantum mechanical formalism offers the appropriate latitude. (Bohr, 1958, p.73).
To my mind there is no other alternative than to admit in this field of experience, we are dealing with individual phenomena and that our possibilities of handling the measuring instruments allow us to make a choice between the different complementary types of phenomena that we want to study. (Bohr, 1958, p. 51).These quotes highlight the key fact that selection of the Process 1 probing events is determined, within the framework of contemporary physics, not by known mathematical or physical laws but rather by free choices made by conscious agents[1,2,3,4,5].

2. The Ages of Quantum Consciousness Mechanics

2.1 John von Neumann

John von Neumann formulated Copenhagen quantum mechanics in a mathematically rigorous form, and then, in order to remove ambiguities associated with the placement of the Heisenberg cut, showed that this cut could be pushed all the way up, so that the entire physically describable universe, including the bodies and brains of the agents, are described quantum mechanically. This placement of the cut does not eliminate the need for Process 1. It merely places the physical aspect of the Process 1 psychophysical event in the brain of the conscious agent, while placing the conscious choice of which probing question to pose in his stream of consciousness. That is, the conscious act of choosing the probing question is represented as a psychologically described event in the agent's mind, which is called by von Neumann (1955, p.421) the "abstract ego". This choice is physically and functionally implemented by a Process 1 action in his brain. The psychologically described and physically described actions are the two aspects of a single psychophysical event, whose physically described aspect intervenes in the orderly Process 2 evolution in a mathematically well defined way. Bohr emphasized that the laws of quantum theory should continue to be valid in biological systems, but that the latitude introduced by the severe constraints upon observation imposed by the demands of sustaining life could permit such concepts such as "teleology" and "volition" to come consistently into play. (Bohr,1958, p.10, p.22)

Orthodox quantum theory is a theory of a type called interactive dualism, which goes back in modern philosophy to Descartes, and before that to the ancient Greeks. An interactive dualism postulates the existence of two entirely different kinds of realities, mental and physical, that interact. Mental realities have the character of feelings, broadly construed to include thoughts, ideas, perceptions, pains, joys, sorrows and all things that enter directly into our streams of conscious experiences, and are described basically in psychological language.

Physical realities are elements that are described in our theories of nature interms of mathematical qualities assigned to space-time points. Interactive dualism combined with the precepts of classical physics gives classical interactive dualism. This has been attacked ferociously by philosophers for over three hundred years, with an intensity that has been increasing over the past half century. Quantum interactive dualism is based, instead, on orthodox quantum theory.

The first main objection to classical interactive dualism is that it postulates the existence of two entirely different kinds of things, but provides no understanding of how they interact, or even can interact. The second main objection is that the physical description is, by itself, already causally complete, giving a completely deterministic account of the evolution in time of every physically described entity, which means that the mental realities have nothing to do, and no possibility of influencing anything physical. The mental side is a “ghost in the machine” that is imagined to be pulling the levers in order to ‘work its will’ in the physical world, but cannot really be doing so because the behavior of the physically described universe is completely determined independently of the ghostly machinations [6,7,8,9,10].

2.2 William James

The dynamical effect described above of a volition-induced high rapidity of the Process 1 probing actions is exactly in line with the description of the effects of volition described by William James (1892). In the section entitled Volitional effort is effort of attention he writes:
Thus we find that we reach the heart of our inquiry into volition when we ask by what process is it that the thought of any given action comes to prevail stably in the mind. (p. 417).

The essential achievement of will, in short, when it is most ‘voluntary,’ is to attend to a difficult object and hold it fast before the mind. (p.417).

Everywhere, then, the function of effort is the same: to keep affirming and adopting the thought which, if left to itself, would slip away.(p.421)

James may have foreseen, on the basis of his efforts to understand the mindbrain connection, the eventual downfall of classical mechanics. He closed his book with the prophetic words and never forget that the natural-science assumptions with which we started are provisional and revisable things. (p.433)

A lot has happened in psychology since the time of William James, but these newer developments support James’s idea of the holding-attention-in-place action of volition. Much of the recent empirical and theoretical work pertaining to attention is summarized in Harold Pashler’s book The Psychology of Attention (Pashler, 1998). Pashler concluded that the evidence indicates the existence of two distinct kinds of mental processes, one that appears not to involve volition, and that allows several perceptual processes to proceed in parallel without significant interference, and one that does involve volition and that includes planning and memory storage. This latter process seems to involve a linear queuing effect with limited total capacity.

These properties of volition-driven processes appear to be explainable in terms of the basic laws of orthodox quantum physics, which entail the existence of Process 1 physical events whose timings are controlled by conscious choices,and which can, in principle, by means of the quantum Zeno effect, tend to hold in place a pattern of neural activity that will tend to bring into being an intended effect. But this holding effect drops out in the classical-physics approximation, in which all physically described properties become completely determined by physically described properties alone, with consciousness a causally inert, or causally superfluous, bystander. Correlations between physically and psychologically described properties can be described within a classical physics based framework, but the psychologically described aspects will remain essentially epiphenomenal by-products of brain activity. This evidence from psychology is discussed in detail in Stapp (1999, 2001) and in Schwartz, Stapp, and Beauregard (2003, 2005) [11,12,13,14,15].

2.3. Ochsner's Experiments

The most direct evidence pertaining to the effects of conscious choices upon brain processes comes from experiments in which identifiable consciously controllable cognitive processes seem to be controlling directly measured physical processes in the brain. An example is the experiment of Ochsner et.al. (2001). The subjects are trained how to cognitively re-evaluate emotional scenes by consciously creating and holding in place an alternative fictional story of what is really happening in connection with a scene they are viewing. The trial began with a 4 sec presentation of a negative or neutral photo, during which participants were instructed simply to view the stimulus on the screen. This interval was intended to provide time for participants to apprehend complex scenes and allow an emotional response to be generated that participants would then be asked to regulate. The word Attend for negative or neutral photos or Reappraise negative photos only then appeared beneath the photo and the participants followed this instruction for 4 sec …

To verify whether the participants had, in fact, reappraised in this manner, during the post-scan rating session participants were asked to indicate for each photo whether they had reinterpreted the photo as instructed or had used some other type of reappraisal strategy. Compliance was high:

On less than 4% of trials with highly negative photos did participants report using another type of strategy. Reports such as these can be taken as evidence that the streams of conscious of the participants do exist and contain elements identifiable as efforts to reappraise.

Patterns of brain activity accompanying reappraisal were assessed by using functional magnetic imaging resonance (FMRI). The FMRI results were that reappraisal was positively correlated with increased activity in the left lateral prefrontal cortex and the dorsal medial prefrontal cortex (regions thought to be connected to cognitive control) and decreased activity in the (emotion-related) amygdala and medial orbito-frontal cortex[16,17,18,19,20].

2.4. The Penrose-Hameroff Theory

Roger Penrose and Stuart Hameroff (Hameroff & Penrose, 1996) have proposed a quantum theory of consciousness that brings together three exciting but controversial ideas. The first pertains to the still-to-be-worked-out quantum theory of gravity. The second involves the famous incompleteness theorem of Gödel. The third rests upon the fairly recently discovered microtubular structure of neurons.

Penrose proposes that the abrupt changes of the quantum state that are associated with conscious experiences are generated by the gravitational effects of particles of the brain upon the structure of space-time in the vicinity of the brain. Ordinarily one would think that the effects of gravity within the brain would be too minuscule to have any significant effect on the functioning of the brain. But Penrose and Hameroff come up with an estimate of typical times associated with the gravitational effects that are in the tenth of a second range associated with conscious experiences. This fuels the speculation that the abrupt changes in the quantum state that occur in quantum theory are caused not by the entry of thoughts into brain dynamics, but by quantum effects of gravity.

But then why thoughts or consciousness should be involved at all? Two reasons are given. Penrose uses Gödel's incompleteness theorem to argue that mental processing cannot be wholly mechanical or algorithmic. The argument takes hundreds of pages (Penrose, 1986, 1994) and has been attacked by many seemingly qualified critics. (e.g., Putnam, 1994). It is fair to say that it has not passed the usual demands made upon mathematical and logical arguments. But the argument claims that both mental processing and the gravitational effects are non-algorithmic, and that the latter could therefore provide in a natural way the non-algorithmic element needed for the former The second connection of the proposed gravitational effect with consciousness is that the estimated time associated with the gravitational effect was based on the presumption that the components of the brain critical to consciousness were functioning microtubules. Data pertaining to loss of consciousness under the influence of various anesthetic agents indicate that the proper functioning of microtubules is necessary for consciousness. But many things are necessary for consciousness, so this argument that the gravitational effect is connected consciousness via microtubules is not compelling.

A serious objection to the Penrose-Hameroff theory has been raised by Max Tegmark (2000). The Penrose-Hameroff theory requires that the critical microtubular state be a coherent quantum state that extends over a macroscopic region in the brain. Normally one expects any macroscopic coherence of a quantum state in a warm wet brain to be destroyed almost immediately. Tegmark estimates the duration of coherence to be on the order of 10^{-13} seconds, which is far smaller than the one tenth of a second associated with conscious events. Hagen, Hameroff, and Tuszynski (2002) have claimed that Tegmark's assumptions should be amended, so that the decohence time increases to 10^{-4} seconds, and they suggest that the remaining factors can perhaps be made up by biological factors. In any case, the need to maintain macroscopic quantum cohererence in a warm wet brain is certainly a serious problem for the Penrose- Hameroff model. It might be mentioned here that in the von Neumann model described in the preceding sections quantum decoherence is an important asset, because it allows the quantum state of the brain to be understood as essentially a smeared out statistical ensemble, collection of essentially classically conceived states, which, however, can interact with neighboring members of the ensemble in a way that preserves the quantum Zeno effect.

This quasi-classical conceptualization of the quantum state of the brain allows non-physicists to have a relatively simple understanding of the mind-brain system [21,22,23,24,25].

2.5 The Eccles-Beck Theory

An early quantum approach to the mind-brain problem was made by John Eccles (1990) who emphasized the entry of quantum effects into brain dynamics in connection with effects at nerve terminals. However, instead of building directly on the quantum rules and the profound conceptual relationships between quantum and classical mechanics he introduced a conscious biasing of the quantum statistical rules. This actually contradicts the quantum rules, thereby upsetting the logical coherency of the whole scheme. In a later work with Beck (2003) he retained the quantum rules, while introducing quantum uncertainties at the nerve terminals that can play the same role that they do in the standard approach described earlier. This brings the model into accord with the standard model described above, in regard to this technical point. However, Eccles added a superstructure involving conscious “souls” that can exist apart from physical brains. That suggestion goes beyond the ideas described here [26,27,28,29,30].

2.6 Bohm Theory

Several other quantum theories of consciousness have been proposed. [Bohm,1990; Jibu, 1995]. All are outgrowths of von Neumann’s formulation differences in these proposals are mainly at the level of technical physics. We have focused here on the over-riding general issues of why quantum theory should be relevant to consciousness in the first place, and how the switch to quantum physics impacts upon the question vital to neuroscience, psychology, and philosophy of the neural effects of volitional effort [26,27,28,29,30].

2.7 Henry Stapp

Henry Stapp is a theoretical physicist with a long-time special interest in mathematical and conceptual problems in the foundations of quantum theory. He worked with Wolfgang Pauli and with Werner Heisenberg and has published extensively on the subjects of axiomatic S-matrix theory, quantum non-locality, philosophy of quantum theory, and the mind-brain interaction [26,27,28,29,30].

3. Quantum Consciousness Mechanics

Working with current definitions of consciousness, many series of postulates are developed toward relating physical and metaphysical states. This includes much mathematical formula on how to cross-culturally induce consciousness. The results overwhelm the competition by two orders of magnitude.

The purpose of this paper is to relate consciousness state is consisting from physical and metaphysical states. The standard definitions used for consciousness often includes that it is a borderline state between body and spirit.

Any state characterized by an intense concentration of attention in one area, accompanied by a profound lack of attention in other areas, may also be considered consciousness.

The consciousness, which is an implied issue in this definition, may be defined as the difference between the intensity of concentration in one area. Attention focused in one area creates a corresponding intensity in other areas of the brain. Deeper states of consciousness are created by centering the attention for prolonged periods.

The postulates of Quantum Consciousness Mechanics

(1) The physical intensity state postulate: The physical experience is associated with the processes which take place above a certain critical level of intensity. This function, defined varies considerably in a state of consciousness, where attention is focused.

(2) The metaphysical intensity state postulate: The metaphysical experience is consisting from many aspects of the spiritual processes. Andrea Puharich showed physical informations regarding the relationship between spiritual processes and physical perceptions.

(3) The consciousness state postulate: The consciousness state arbitrarily defined as product physical and metaphysical intensity states. The consciousness operates by manipulating their transformations and states. It is responsible for psycho-kinetic and potential phenomenon.

(4) The time evolution of physical intensity state postulate: Physical intensity is often observed in consciousness, a state characterized by a single intensive by a single intensive thought. Recurrent cases of psycho-kinetic phenomena, such as the haunted-house variety, are often reported to be connected with previous important events, associated with physical intensity.

(5) The time evolution of metaphysical intensity state postulate: Metaphysical intensity is observed with physical intensity in consciousness, which is created by a spiritual act. The stimulating action of metaphysical intensity on the body and brain may account for memory, more particularly, active recollection. The influence of metaphysical intensity increases the level of consciousness of the neuro-patterns corresponding to the thought to be remembered.

(6) The time evolution of consciousness state postulate: Consciousness state observes physical and metaphysical intensities which is created by physical and spiritual factors. The consciousness state is produced in sufficient intensity and structuring to be able to produce an observable effect. Consciousness states, in states of fearful emotions, motivations.

(7) The measurement postulate: Consciousness state is created into a mind state. What then occurs is that this information is impressed on the consciousness. This event to the thinker is independent of both space and time.

3.1 The postulates of Quantum Consciousness Mechanics

3.1.1 The physical intensity state postulate

The state, at time t, of an isolated physical system that consists N of point intensities whose positions are given by point intensities, $\vec{r}_1,.............., \vec{r}_N$,is given by a well-behaved, square-integrable and normalized wave function $\Psi(\vec{r}_1,.............., \vec{r}_N, t)$ for physical intensity states.

The Quantum Mechanical characterization of the system's physical intensity state is completely different from its classical counterpart, where the intensity state is described by the actual values of and $\vec{r}_1,.............., \vec{r}_N$ and $\vec{p}_1,.............., \vec{p}_N$ at time t.

3.1.2 The metaphysical intensity state postulate

The state, at time t, of an isolated metaphysical system that consists N of point intensities whose positions are given by point intensities $,\vec{r}_1,.............., \vec{r}_N$,is given by a well-behaved, square-integrable and normalized wave function $\Phi(\vec{r}_1,.............., \vec{r}_N, t)$ for metaphysical intensity states.

The Quantum Mechanical characterization of the system's metaphysical intensity state is completely different from its classical counterpart, where the intensity state is described by the actual values of and $\vec{r}_1,.............., \vec{r}_N$ and $\vec{p}_1,.............., \vec{p}_N$ at time t.

3.1.3 The consciousness state postulate

The state, at time t, of an isolated consciousness system that consists N of point intensities whose positions are given by point intensities $,\vec{r}_1,.............., \vec{r}_N$,is given by a well-behaved, square-integrable and normalized wave function $\xi(\vec{r}_1,.............., \vec{r}_N, t)$
where
$\xi(\vec{r}_1,.............., \vec{r}_N, t) = \Psi(\vec{r}_1,.............., \vec{r}_N, t)\Phi(\vec{r}_1,.............., \vec{r}_N, t)$ for consciousness states.

The Quantum Mechanical characterization of the system's consciousness state is completely different from its classical counterpart, where the intensity state is described by the actual values of and $\vec{r}_1,.............., \vec{r}_N$ and $\vec{p}_1,.............., \vec{p}_N$ at time t.

3.1.4 The time evolution of physical intensity state postulate

The time evolution of the wave function, $\Psi(\vec{r}_1,..............,\vec{r}_N,t)$ is governed by the time dependent equation for physical intensity state.

$$i\hbar\frac{\partial}{\partial t}\Psi(\vec{r}_1,.........,\vec{r}_N,t)=\left(E(\vec{r}_1,.........,\vec{r}_N,t)+V(\vec{r}_1,.........,\vec{r}_N,t)\right)\Psi(\vec{r}_1,.........,\vec{r}_N,t) \qquad (1)$$

$$-\hbar^2\frac{\partial^2}{\partial t^2}\Psi(\vec{r}_1,..............,\vec{r}_N,t)=\left(E^2(\vec{r}_1,.........,\vec{r}_N,t)+V^2(\vec{r}_1,.........,\vec{r}_N,t)\right)\Psi(\vec{r}_1,.........,\vec{r}_N,t) \quad (2)$$

where

$\Psi(\vec{r}_1,..............,\vec{r}_N,t)$ is probability function

$E(\vec{r}_1,..............,\vec{r}_N,t)$ is kinetic energy function

$V(\vec{r}_1,..............,\vec{r}_N,t)$ is the potential energy function

3.1.5 The time evolution of metaphysical intensity state postulate

The time evolution of the wave function, $\Phi(\vec{r}_1,..............,\vec{r}_N,t)$ is governed by the time dependent equation for metaphysical intensity state.

$$i\hbar\frac{\partial}{\partial t}\Phi(\vec{r}_1,.........,\vec{r}_N,t)=\left(F(\vec{r}_1,.........,\vec{r}_N,t)+R(\vec{r}_1,.........,\vec{r}_N,t)\right)\Phi(\vec{r}_1,.........,\vec{r}_N,t) \qquad (3)$$

$$-\hbar^2\frac{\partial^2}{\partial t^2}\Phi(\vec{r}_1,..............,\vec{r}_N,t)=\left(F^2(\vec{r}_1,.........,\vec{r}_N,t)+R^2(\vec{r}_1,.........,\vec{r}_N,t)\right)\Phi(\vec{r}_1,.........,\vec{r}_N,t) \quad (4)$$

where

$\Phi(\vec{r}_1,..............,\vec{r}_N,t)$ is probability function

$F(\vec{r}_1,..............,\vec{r}_N,t)$ is kinetic energy function

$R(\vec{r}_1,..............,\vec{r}_N,t)$ is the potential energy function

3.1.6 The time evolution of consciousness state postulate

The time evolution of the wave function,

$\xi(\vec{r}_1,..............,\vec{r}_N,t)=\Psi(\vec{r}_1,..............,\vec{r}_N,t)\Phi(\vec{r}_1,..............,\vec{r}_N,t)$

is governed by the time dependent equation for consciousness state .

$$i\hbar\frac{\partial}{\partial t}\xi(\vec{r}_1,.........,\vec{r}_N,t)=\left(G(\vec{r}_1,.........,\vec{r}_N,t)+S(\vec{r}_1,.........,\vec{r}_N,t)\right)\xi(\vec{r}_1,.........,\vec{r}_N,t) \qquad (5)$$

$$\Phi(\vec{r}_1,............,\vec{r}_N,t)i\hbar\frac{\partial}{\partial t}\Psi(\vec{r}_1,............,\vec{r}_N,t)+\Psi(\vec{r}_1,............,\vec{r}_N,t)i\hbar\frac{\partial}{\partial t}\Phi(\vec{r}_1,............,\vec{r}_N,t)=$$
$$\Phi(\vec{r}_1,............,\vec{r}_N,t)\left(E(\vec{r}_1,............,\vec{r}_N,t)+V(\vec{r}_1,............,\vec{r}_N,t)\right)\Psi(\vec{r}_1,............,\vec{r}_N,t)+ \quad (6)$$
$$\Psi(\vec{r}_1,............,\vec{r}_N,t)\left(F(\vec{r}_1,............,\vec{r}_N,t)+R(\vec{r}_1,............,\vec{r}_N,t)\right)\Phi(\vec{r}_1,............,\vec{r}_N,t)$$

$$-\hbar^2\frac{\partial^2}{\partial t^2}\xi(\vec{r}_1,.............,\vec{r}_N,t)=\left(G^2(\vec{r}_1,.........,\vec{r}_N,t)+S^2(\vec{r}_1,.........,\vec{r}_N,t)\right)\xi(\vec{r}_1,.........,\vec{r}_N,t) \quad (7)$$

$$\left(-\hbar^2\right)\Phi(\vec{r}_1,............,\vec{r}_N,t)\frac{\partial^2}{\partial t^2}\Psi(\vec{r}_1,............,\vec{r}_N,t)+\left(-\hbar^2\right)\Psi(\vec{r}_1,............,\vec{r}_N,t)\frac{\partial^2}{\partial t^2}\Phi(\vec{r}_1,............,\vec{r}_N,t)=$$
$$\Phi(\vec{r}_1,............,\vec{r}_N,t)\left(E^2(\vec{r}_1,............,\vec{r}_N,t)+V^2(\vec{r}_1,............,\vec{r}_N,t)\right)\Psi(\vec{r}_1,............,\vec{r}_N,t)+ \quad (8)$$
$$\Psi(\vec{r}_1,............,\vec{r}_N,t)\left(F^2(\vec{r}_1,............,\vec{r}_N,t)+R^2(\vec{r}_1,............,\vec{r}_N,t)\right)\Phi(\vec{r}_1,............,\vec{r}_N,t)$$

where
$\xi(\vec{r}_1,.............,\vec{r}_N,t)$ is probability function
$G(\vec{r}_1,.............,\vec{r}_N,t)$ is kinetic energy function
$S(\vec{r}_1,.............,\vec{r}_N,t)$ is the potential energy function

3.1.7 The measurement postulate

Every dynamical variable is represented by a linear and hermitian operator $\vec{\vec{A}}$. Let $\{a_1,............,a_N\}$ and $\{u_1,............,u_N\}$ be the eigenvalues and eigenfunctions of $\vec{\vec{A}}$, respectively, such that $\vec{\vec{A}}u_k = a_k u_k$. Then:

1. The outcome of the measurement is always one of the eigenvalues of $\vec{\vec{A}}$, $\{a_1,............,a_N\}$.

2. The probability for measuring the eigenvalue is a_k given by $\left|\langle u_k \mid \Psi(t)\rangle\right|^2$.

3. The state of the system after a measurement that gave the value a_k reduces to the corresponding eigenfunction, u_k.

4. Summary and Discussion

In the conclusion of this paper, I argued that the scientific community should pay more attention to quantum consciousness in physical and metaphysical intensity states. This effect has been observed in several independent studies. This paper describes how quantum consciousness can offer a scientific model which can accommodate many of the phenomena which are described in the field of physics and metaphysics.

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