

TIME IS A STREAM OF NUMERICAL ORDER OF MATERIAL CHANGE

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Abstract

Einstein and Gödel speculated that time does not run into the universe as humans experience it. Elementary perception is confirming their preposition. One can observe in the universe only stream of material change. Time as a physical entity into which material change runs can not be observed. Time is what one measures with a clock. With a clock one measures a stream of numerical order of material change that runs into universe. One can observe time only as a stream of numerical order of material change. Space-time does not exist as a physical reality, it exists only as a mathematical model, into which one describes stream of material change that runs into universe.

Introduction

Different authors recently suggested that time has not an objective existence. For example, Woodward argued that Mach's principle leads to the conclusion that time, as we normally treat it in our common experience and physical theory, is not a part of fundamental reality (1). Rovelli proposed the idea that time is not defined at the fundamental level (at the Planck scale), namely that, in the quantum gravity regime, time should be simply forgotten, that the concept of absolute time t , as used in Hamiltonian mechanics as well as in Schrödinger quantum mechanics, is not relevant in a fundamental description of quantum gravity (2, 3, 4). On the ground of the results obtained by these authors, it appears legitimate to find a new consistent interpretation of time. In this regard we go back to some considerations made by Einstein and Gödel during the fifties of the last century. These considerations can be considered the starting-point for a new interesting interpretation of time.

Gödel and Einstein opened new perspectives regarding definition and experience of time. They have been discussing the possibility that there is no time in the universe as science experiences it (5). Their scientific vision of a "World without time" is not examined yet fully. In this article will be shown that Gödel and Einstein idea is right.

Let's start with a question: "What is measured with a clock?" On the basis of elementary perception (eyes) one can answer: "With a clock is measured duration and speed of a stream of material change and a stream of numerical order of material change: material change X_1 transforms into X_2 , X_2 transforms into X_3 and so on. X_3 exists "after" X_2 , X_1 exists "before" X_2 as numerical order only. Smallest material change that can be observed in the universe is a motion of a photon through Planck distance. The unit of numerical order (of time) that indicates this material

change (motion) is called “Planck time”. A photon moves into space only, not in time. Time is a stream of numerical order of motion of a photon into a-temporal space.

For linear time as one experiences it into universe (past, present, future), there is no material evidence. Linear time exists only as a mathematical concept through which we experience a stream of material change into a-temporal space. Let’s see the process of experiencing a stream of material change: stream of material change is first perceived by senses (eyes) then elaborated into time as a mathematical concept and finally experienced. Linear time is a “mathematical time” through which we experience a stream of material change that runs into a-temporal space. Past, present and future are elements of mathematical time. Into the a-temporal space there is no past, present and future (6, 7).

Methods and Results

One takes a pendulum and swings it. On the base of elementary perception (eyes) one concludes that pendulum moves into space only and not into time. With clock one measures duration, speed and numerical order of pendulum swinging. This stream of numerical order of pendulum swinging is time.

Discussion

One should distinguish between physical time (numerical order of material change) and mathematical time (time as a mind concept). One should be aware that material change has no duration on its own; we give it a sense of duration by measuring it. This view is compatible with the fact that in quantum gravity evolution may only be defined with respect to physical clock variables, that at the most fundamental level time plays no crucial role.

The motion of a clock has no duration on its own. We have been defined duration of motion of clocks regarding to the movements of stellar objects, we are not aware that stellar objects move into universe only and not into time. We “measure” with clocks duration of all other motions that run into universe. Universe does not run into time, time runs into universe as numerical order of events.

Length is a physical quantity to measure lengths of the objects and distances between them. Man has invented “units” of lengths: Planck distance, meter, kilometer, light year. In the same way time is a physical quantity that measures numerical order of material change. To measure numerical order of material change man has invented “units” of time: Planck time, second, day, year.

For example, let’s consider a photon is moving from the point A to the point B. Distance between point A and B is 100 Planck distances. A movement of a photon from A to B is described by a numerical order given by 100 units of Planck time. Photon does not move into time, it moves into a-temporal space only. Time is numerical order of this movement.

As photon moves space only and not in time in Special Theory of Relativity forth coordinate of space-time X_4 is imaginary: $X_4 = c \times i \times t$. Here c is light speed, i is imaginary number (i on square is minus 1) and t is a number that indicates the numerical order of photon motion.

Fourth imaginary coordinate describes numerical order of photon motion into a-temporal space that itself has a granular structure (8).

In “Einstein-Podolski-Rosen” experiment a-temporal space is a “direct information medium” between elementary particles. Space keeps two elementary

particles in an immediate contact. The instantaneous connection between two quantum particles also when they are at big distance can be seen as an effect of a-temporal physical space. That is to say: information does not travel from between particle A and B, space itself is informing particle A about behaving of particle B and opposite (9).

One can say that it is a-temporal physical space to transmit the information between two quantum particles, before joined and then departed and carried at big distance one from the other, to make them communicate instantaneously. Since in bohmian quantum mechanics nonlocal correlations concerning microscopic phenomena (and which constitute a fundamental feature of many-particle systems) are connected to quantum potential, it derives immediately the possibility that there is a sort of correspondence between quantum potential and a-temporal physical space, in particular that quantum potential can be interpreted as the special "state" of a-temporal physical space in presence of microscopic processes, and thus of quantum particles. When one takes in consideration an atomic or subatomic process (such as for example the case of an EPR-type experiment, of two subatomic particles, before joined and then separated and carried away at big distances one from the other), a-temporal physical space assumes the special "state" represented by quantum potential, and this allows an instantaneous communication between the two particles under study (10).

According to Special Theory of Relativity clock speed is slower in a faster inertial system with respect to a slower inertial system. According to the understanding here this means that the speed of material change and the speed of stream of numerical order are slower in a faster inertial system. Speed of time as a numerical order of material change follows speed of material change. Similar is in the General Theory of Relativity where clock speed diminishes into stronger gravitational field. Speed of material change and speed of stream of numerical order of material change are slower into stronger gravity. Basic unit of time that is "Planck time" does not become shorter with increase of speed of inertial system and increase of strength of gravitational field, what changes is speed of stream of material change and speed of stream of numerical order.

Idea of space-time as a physical reality allows hypothetical travel into time. Speculation of time travel into past leads into contradictions: one could travel into past and kill his grandmother. Here this contradiction is resolved. One can travel only into a-temporal space and not in time as time is a stream of numerical order of material change that runs into a-temporal space.

Numerical order of change is arrow of time

Material change in the universe does not run into linear way in this sense: second material change is after first material change and before third material change and so on. What happens is that first material change transformations into second material change, second into third into a-temporal space where "before" and "after" exist only in a sense of numerical order. In this sense "arrow of time" is numerical order of material change itself.

Experiencing numerical order of material change as a "linear stream" is result of experiencing them inside linear mathematical concept of time. In the universe material change runs into a-temporal space that Einstein called NOW; instead, past, present and future belongs to the mathematical time.

Mother is born “before” son and “after” grandmother in a sense of numerical order only: grandma has number 1, mother number 2 and grandson number 3. All three are born into a-temporal space.

Temporal and A-temporal Experience into Physics

Current experience into physics is temporal. Physicists experience universe on the basis of the linear concept of mathematical time. One first perceives information of a given experiment into senses, then mind elaborates this information into mathematical time and finally experience occurs.

perception – elaboration into mathematical time – experience

With awareness that mathematical time has a “prism” between perception and experience, future physics will develop also a-temporal experience. Into a-temporal experience there will be no mind elaboration, no gap between perception and experience. A-temporal experience requires activation of consciousness. Mind creates mathematical models (linear time included), consciousness watches them (witnesses them). By watching them one becomes aware of temporal experience of an experiment and one can step into a-temporal experience of an experiment. One becomes aware and understands that experiment runs into a-temporal space. Consciousness as research tool has an important role into physics: it gives awareness of the difference between linear mathematical time and physical time as a numerical order of material change (11).

Conclusions

Concept of space-time is here developed into the concept of a-temporal space where physical time is numerical order of material change that runs into a-temporal space. In General Theory of Relativity gravitational force is result of curvature of space-time. Here idea arises that the gravity force is a result of curvature of a-temporal space.

Space-time exists as a mathematical model into which one experiences irreversible stream of material change. With clocks we measure numerical order of irreversible stream of material change. Time does not run into universe as a fourth dimension of space-time, it runs only as numerical order of material change that runs into a-temporal space.

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