

Inconsistency of time-symmetry model

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Abstract: Can physical objects be in time-symmetry? Physical objects can only exist in a medium that has physical attributes, which means this medium is a type of energy. Is time energy? This article will show that time is not energy, and there is no possibility that physical objects could be in time-symmetry. Physical objects can only be in symmetry in the time-invariant space, in which they exist. In this perspective, time measured with clocks is the result of the observer's measurement in the time-invariant space. The time-symmetry model is flawed. © 2021 *Physics Essays Publication*. [<http://dx.doi.org/10.4006/0836-1398-34.4.470>]

Résumé: Les objets physiques peuvent-ils être en symétrie temporelle? Les objets physiques ne peuvent exister que dans un support qui a des attributs physiques, ce qui signifie que ce support est un type d'énergie. Le temps est-il de l'énergie? Cet article montrera que le temps n'est pas de l'énergie et qu'il n'y a aucune possibilité que les objets physiques soient en symétrie temporelle. Les objets physiques ne peuvent être en symétrie que dans l'espace invariant dans le temps dans lequel ils existent. Dans cette perspective, le temps mesuré avec des horloges est le résultat de la mesure de l'observateur dans l'espace invariant dans le temps. Le modèle de symétrie temporelle est défectueux.

Key words: Time; Space; Symmetry.

I. INTRODUCTION

The idea of 20th-century physics was that elementary particles can move forward and backward in space-time, which was considered the fundamental arena of the universe. Feynman has hypothesized that an electron, when moving backward in time, is becoming positron. His idea of the symmetry between electron and positron in space-time was an example of the so-called "time-symmetry." Feynman published his article on the theory of the positrons back in 1949.¹ From 1949 until now, we do not have in physics any experimental confirmation that time is the fourth dimension of space. The idea of time-symmetry needs rigorous re-examination that we will carry out in this article.

II. UNIVERSAL SPACE IS TIME-INVARIANT

Experimental physics is confirming that with clocks we measure the duration of material changes, i.e., motion in space. Based on experimental physics facts, we have to admit that universal space is time-invariant in the sense that the duration of material change that in experimental physics is time, does not have any impact on space. We measure duration of material change or not, the physical properties of space will not be changed, which means that universal space is time-invariant.² Time invariant universal space has a so-called "timeless configuration."^{3,4} In this space with timeless configuration, gravity is immediate and is the result of the quantum structure of time-invariant universal space.²

III. THE MODEL OF TIME REVERSAL SYMMETRY IS FLAWED

The model of time reversal symmetry (T-symmetry) has no physical correspondence in the physical world. The equation of time symmetry has no physical meaning

$$T: t \rightarrow -t. \quad (1)$$

Experimental research is confirming that time reversal symmetry is a model that has no bijective correspondence with the physical world.⁵ The discovery of the positron particle does not prove that time-reversal symmetry exists. The scientific fact is that the electron and positron are both discovered and they both move and exist in the same universal space.

The model of space-time, where past is represented as the negative time $-t$ and future is represented as the positive time $+t$, needs to be aligned with human observation and experimental results. In physics, we do not have a single proof that negative time exists and it is time we abandon this idea. The same applies for the symmetry in time. There is no symmetry in time, because there is no negative time $-t$. Elapsed time t is not positive and is not negative, it has an absolute value

$$t = |t|. \quad (2)$$

IV. THE MODEL OF TIME-INVARIANT SPACE-SYMMETRY HAS PHYSICAL EXISTENCE

The only symmetry that exists between physical objects is the symmetry in time-invariant space. For example, in an Einstein-Podolsky-Rosen experiment (EPR-type experiment), the electrons will have always the opposite spin. This is the measurable effect of the "space symmetry." Also, the

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energy of space, we call it today “superfluid quantum space,” is in perfect symmetry with the mass of a given physical object accordingly to the equation

$$E = mc^2 = (\rho_{EP} - \rho_{Emin})V, \quad (3)$$

where E is the energy of the object, m is the mass of the object, ρ_{EP} is the Planck energy density of the space in the intergalactic space, ρ_{Emin} is the energy density of the space in the center of the object, and V is the volume of the object.⁶ This formula is valid from the proton scale to the black hole scale. It describes the mass-energy equivalence principle extension on the universal space.

V. MODEL OF TIME-INVARIANT SPACE SOLVES THE “FOUR-VECTOR” PUZZLE

In special relativity, the four-vector is introduced in order to unify space-time coordinates x , y , z , and t into a single entity. The length of this four-vector, called the space-time interval, is shown to be invariant, which means that it is the same for all observers: $A = (A^0, A^1, A^2, A^3)$, where A^0 as a temporal coordinate is $A^0 = ct$. The so-called “temporal coordinate” is a product of time t as the duration of motion and light speed c . The four-vector can be positive or negative and depends on the direction of motion in the future or in the past

$$d\tau = \pm \sqrt{dx^\mu dx_\mu}, \quad (4)$$

where τ is the proper time.⁷

The idea of motion into the past or into the future is questionable, because it leads to the logical inconsistency where the sum of positive four-vector and negative four-vector is zero⁷

$$\sqrt{dx^\mu dx_\mu} + (-\sqrt{dx^\mu dx_\mu}) = 0. \quad (5)$$

This means that the value of the space-time interval in the Minkowski manifold from A to B and back from B to A is zero, which seems wrong. In our model of time-invariant space, a given physical object can move only in a \mathbb{C}^4 space and not in time that is the duration of motion.² The value of the four-vector $A = (A^1, A^2, A^3, A^4)$ in a \mathbb{C}^4 space is always absolute; one cannot move into the past or into the future. One can only move in time-invariant space. There is no negative time $-t$, and there is no negative four-vector. The puzzle is solved.

Rovelli has proposed that the existence of physical time is an illusion.⁸ Our research has confirmed his idea and added an important fact: Time is an illusion as long as it is not measured. When measured by the observer, time enters the existence as the duration. In the physical universe, time has only a mathematical existence and is the numerical order of changes, i.e., motion in space. Once this “fundamental time” is measured by the observer, the “emergent time” enters existence. This emergent time is the duration we measure with clocks.⁹

VI. DISCUSSION

Feynman and Wheeler have suggested in their “Wheeler–Feynman absorber theory” that the electromag-

netic field equations must be time-invariant under time-reversal transformation.¹⁰ Their model implies that, for electromagnetism, there is no time-symmetry. We have shown in this article that also on the macro level there is no time-symmetry.

20th-century physics has set its own boundaries with the belief that the space-time model has physical existence and that physical phenomena occur in some physical time. This belief has created unsolvable problems in the understanding of EPR-type of entanglement and in the understanding of quantum nonlocality that does not allow faster than light communication.^{11,17} With the understanding that universal space is time-invariant, the puzzle of EPR-type of entanglement and quantum nonlocality is solved. Universal space itself is the medium of immediate information transfer. When the photon is the carrier of the information, the information is transferred with light speed.

The model of the time-invariant space is opening new perspectives also in current cosmology, where the development of the universe is seen in some physical time and the beginning seems necessary: “When has the universe started?” is an open question. The cosmological arrow of time is an open question. The quantum origin of time is an open question.^{18,19} We have shown in our article that time, as duration, has the origin in the measurement done by the observer. We observe, in the universe, material changes running in space. Thinking that these changes have a duration on their own seems not right. Duration enters existence when measured by the observer.

VII. CONCLUSIONS

Experimental physics is confirming that time is the duration of a material change, i.e., motion in space. The duration that we measure with clocks cannot be positive or negative, and elapsed time is always an absolute value $|t|$. The time-symmetry model has no single experimental support and should be abandoned in the name of physics progress.

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