

Summary of the oriented time theory (TTO).

According to A.P. Levich, head of the laboratory-chair of modeling of natural time referents at the Lomonosov Research Institute of the nature of time in Moscow (Russian Federation), the concept of "time" used in the modern knowledge as original and undefined, in the practical application relies on the intuition of the researcher, his unreflected professional experience in the non-scientific elements, often unconscious conceptions of the world.

Also, was not justified the hope for the opportunity of instrumental introduction of common notions of time: the clocks to measure it can be quite different by nature and by properties of time they generate.

Therefore, continues Levich so that time becomes the subject of meaningful learning, it is necessary to take it out of undefinable representations of the logical basis of science. For this purpose, in the conceptual foundation of knowledge the image of time should be replaced by some other base representations. Only then the time properties of the "axioms" will turn into "theorems". In other words - scientific discussion of the concept of time will become possible.

The scientific work "Physics of time" of a mechanical engineer M. Zinaliev is dedicated to solve this issue. The full text of the book with the fundamentals of the oriented time theory (TTO), for wide audience in Russian language is available on the pages of the Web-institute of the research of the nature of time in the library of electronic publications through the following link: http://www.chronos.msu.ru/RREPORTS/zinaliev_fizika_vremeni.pdf.

The new concept reconciles modern physical theories that use time as a physical parameter, which doesn't change the natures of laws when the sign is replaced by an opposite one, with the property of unidirectionality in all real-time processes observed in the universe. Moreover, in the TTO, the cause of the emergence of properties of time orientation is the existence of another fundamental property of nature, *the violation of CP-invariance*, that is, the non-invariance of physical laws regarding the operation of mirror reflection with simultaneous replacement of all the particles with antiparticles.

OTT rests on two grounds, that bind space and matter:

- 1) the time is one of the dimensions of space-time continuum and has the properties of a vector: *direction and dimension*;
- 2) for a solid body in the inertial state in a homogeneous isotropic space, an objective indicator of the direction change of the vector of time is *the emergence of inertial force*.

The approach allows to use the methods of formal logic for the description and valuation of **the unit vector of time** $\vec{\mathcal{I}}$ (Zinal).

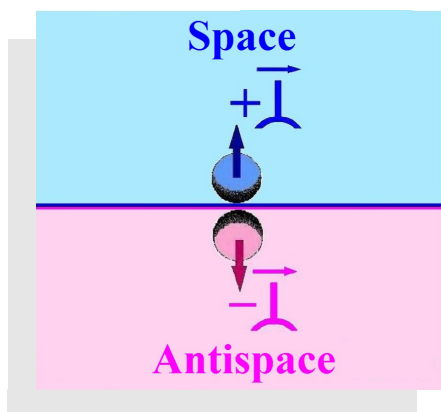
The idea of conceiving the relative properties of time as a change of orientation of the unit vector seems too simple to be new. In addition, at first glance, there is no significant difference between the relativistic time interval, which is known in science for nearly a century, and the time vector.

Nevertheless, this little noticeable difference, combined with the postulate of that the force of inertia is a mechanical indicator of the orientation change of time vector turns out to be fundamental.

The introduced approach is the basis of a new theory destined to change the current world view, to have an impact on the direction of future research on structure of space-time and matter and to become the theoretical basis for development in the foreseeable future of technologies and techniques that will make accessible new kinds of energy and the screening of gravity force.

The oriented time theory makes it possible to transfer the concept of "Time" from the category of a physical parameter which allows to evaluate the rate of dynamic processes and record the occurrence of certain events into one of the physical properties of the universe.

In its new quality **time** is a phenomenon, one of the fundamental phenomena of nature, the result of interaction between space-time continuum and substance is a way of existence of matter in the universe, and such, that each moment of existence of a matter particle situated in a defined point of space can be referred with its antipode in the antispace.



From the new world view positions the oriented time theory introduces a system of concepts: *time-oriented space*, *the principle of time division of space*, *the own vector of time of a body*, *body weight*, *the force of inertia*, and others. A natural consequence of OTT is *the sameness of gravitational and inertial properties of the body*.

In addition, the oriented time theory (OTT) defines the limits of applicability of the concept of time relatively the observer in two areas: at macroscopic distances – by *the event horizon*, in a microcosm - by *the criterion of localization of elementary particles in space*.

In this sense, *the event horizon* can be detected by the observer either in the surroundings of the object, creating a critical deformation of space-time geometry (black hole), or when the body reaches the light velocity relatively the observer.

The numerical expression of *the limits of applicability of the concept of time*

for microparticles is introduced by *the Heisenberg uncertainty principle*: as it is not possible without violating the natures of motion of elementary particles to determine with greater accuracy its coordinates and impulse, it is also not possible without disturbing the nature of the motion of a free elementary particle to give it a unit vector of time.

The following *criterion of localization* is used: during the interaction with other particles, or substance, the elementary particle is defined in space with an accuracy lesser or equal to the value of two of its radii (*wave function collapse*).

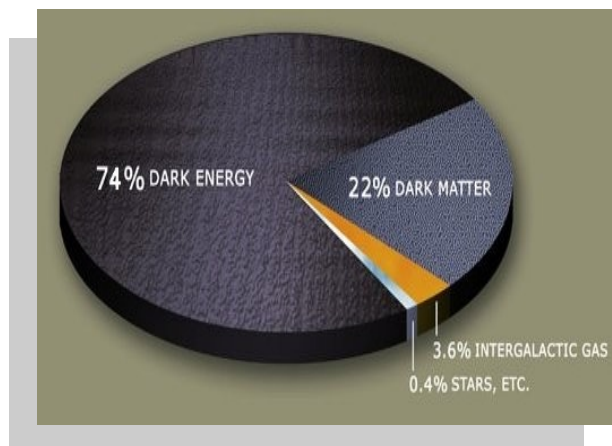
From the point of view of the oriented time theory, **the passing of time** (noumenon) is *a subjective perception of two factors*:

- 1) the properties of three-dimensional space of *not storing information about the matter located in it*;
- 2) *the presence of "arrows of processes"* ("arrows of time") that are various manifestations of the universal process of evolution of matter in the universe.

Therefore, information about the matter, which vanishes for an observer is subjectively perceived as **the past**. The current state of the object is perceived as **a moment of present**. **The future** is defined as transition to the next of its possible states.

Fitting into *the Big Bang theory*, OTT offers a range of interesting hypotheses that:

- connect *the beginning of formation of the Universe* with the emergence of a new degree of freedom of space - the time coordinates;
- offer a new approach to resolving *the problem of the annihilation of antimatter* in the early stage of the Universe and the absolute predominance of matter over antimatter in the present;
- suggest that *the nature and source of relic radiation is the quantum emission of energy from the vacuum surface in the modern era*.



In the context of the orientated time theory *the void of vacuum* is a property of Universe space not interacting with the energy filling the vacuum. In this case, the vacuum energy density is a relative value, and this, in its turn, eliminates *the problem of "dark energy"*.

A new representation of the structure of the universe in a natural way leads to a hypothesis about *the composition of its dynamic balance*. In accordance with the OTT concept there are two main components of the global law of energy conservation in the modern era:

- 1) a continuous *process of energy supplying from the active galactic nuclei*, which is reserved in form of substance in the space of the universe,
- 2) the process of *accelerated expansion of space*, a local manifestation of which in form of the second law of thermodynamics transfers matter into energy, and then disperses it on the surface of the vacuum.



In the spirit of today's standard models, OTT introduces two constants:

- *the first gravitational quantum number* is a universal constant equal to the absolute value of positive tension of the ideal gravitational field, and dividing the universe in space and antispaces: $\mathbf{m} |\vec{\nu}|^2 = + \Delta E = \mathbf{const}$;
- *the second gravitational quantum number* (a unit and own vector of the body time $\vec{\tau}$) - characterizes the orientation of the space relatively the matter, in a limited condition determining two antipodes, separated by the first gravitational quantum number in the space of the Universe.

Out of OTT phenomenologically follow the hypothesis of *the sameness of electric and gravitational forces*, as well as *the universality of electrical forces*.

In this work, thanks to a new conceptual apparatus, a definition of *time travel* and the classification of such movements, as well as the definition and classification of *time machines* are given.

As we can see, possessing heuristic properties, the oriented time theory answers to *the correspondence principle*, *falsifiable in Popper's sense*, but also opens up new areas of research in various fields of modern knowledge.

Reviews about OTT and the book will be read with great interest by the author through the following e-mail address: physics-of-time@yandex.com . The author is looking for possible printing edition as well as the translation into other languages.