

## Some words about fundamental problems of physics

### Part 10:

#### The fundamental period-quantum of the Decimal Code of the Universe

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Adhering to the dialectical philosophy and dialectical logic, we consider the Universe as the Material-Ideal System. Accordingly, in such a system must be not only material, physical laws, but also the laws of an ideal facet of the Universe, ideal laws [1-3]. We call them the Laws of the Second Kind, thereby distinguishing them from ordinary physical (material) laws, which we attribute to the Laws of the First Kind.

In this Part we discuss one of the fundamental phenomena existing in the Universe, unknown up till now to "modern" physics, related to the aforementioned Second Kind Laws, to which, as we assume, all physical phenomena are subject. This is the fundamental law of nature, that we discovered, related to one of the ideal fields (in opposite to physical) of the Universe, namely, to the dialectical numerical field [1]. Numerical fields, including a binary dialectical numerical field, are typical ideal fields of the Universe.

Physics uses the absolute, reference, time  $t$ , which represents an ideal mathematical time of an imaginary absolute uniform motion. It is defined by the formula

$$t = \frac{l}{v}. \quad (1)$$

The real (physical) time as a measure of pure rest-motion is determined by the similar way as it is done for the reference time (1) [4]. However, the displacement in the numerator of the formula of the physical time must be a complex wave function, which reflects the dual potential-kinetic nature of the movement. Take for example the wave function

$$\hat{\Psi} = \hat{R}(r)\Theta(\theta)\hat{\Phi}(\varphi)\hat{T}(t) = \hat{\varphi}(r, \theta, \varphi)\hat{T}(t). \quad (2)$$

It satisfies the universal wave equation

$$\Delta\hat{\Psi} - \frac{1}{c^2} \frac{\partial^2 \hat{\Psi}}{\partial t^2} = 0. \quad (3)$$

This equation contains a wealth of information about the structure and behaviour of physical objects that have a wave nature, and about physical processes occurring in them in space and time [3]. In form and content, Eq. (3) is the mathematical expression of the inseparable bond of the fields of material space with an ideal field of the physical time. The time function  $\hat{T}(t)$  (its simplest form is  $\hat{T}(t) = e^{\pm i\omega t}$ ) expresses, with use of the variable  $t$  of absolute mathematical time, the physical periodical time field.

Thus, the physical time of harmonic oscillations  $\hat{t}$  is defined as the ratio of the potential-kinetic displacement  $\hat{\Psi}$  to the modulus of the potential-kinetic speed  $v$ :

$$\hat{t}(t) = \frac{\hat{\Psi}}{v} = \frac{ae^{i\omega t}}{\omega a} = t_e e^{i\omega t} = t_e (\cos \omega t + i \sin \omega t), \quad (4)$$

where

$$t_e = \frac{1}{\omega} = \frac{T}{2\pi} \quad (5)$$

is the modulus of the potential-kinetic time. The time period is  $T = 2\pi t_e$ . The modulus of the potential-kinetic time  $t_e$  represents the radius of a time circumference  $T$ . All details about the binary numerical field of dialectical physics can be found, in particular, in [5-7] available online on the Internet.

When  $t_e = 1$ , we come to a unit (absolute) time radius. Hence, when the basis of numbers is the number  $e$ , i.e., the base of natural logarithms, the absolute time period  $T$ , corresponding to the unit time radius  $t_e$ , is  $T = 2\pi$ . In this case Eq. (4) takes the form,

$$\hat{t}(t) = \hat{1}_e(t) = e^{i\omega t} = \cos \omega t + i \sin \omega t. \quad (6)$$

The lower index indicates the unit base  $e$ , in which all parameters are presented (usually it is omitted). Thus, we have a time circle  $T_e = 2\pi$  with a time radius (vector) of the unit length,  $t_e = 1$ , uniformly rotating with the absolute time angular velocity  $\omega_e = 1$ .

The above presented absolute parameters of time ( $t_e$ ,  $T_e$ , and  $\omega_e$ ) are zero-dimensional measures, so they are universal, common to all minds on any planetary system in the Universe (regardless of the time measurement methods taken there).

An appearance of the concept of time is equally and inevitable everywhere in the Universe. It is connected with the circular motion of the planets in stellar systems and, consequently, due to cyclic processes in them resulting in the fully-formed proper biological rhythm of their reasonable creatures. Let us remember in this regard the first sundials of our distant ancestors.

In the transition from the base of natural logarithms  $e$  to an arbitrary basis  $B$  (e.g., octal or decimal, etc.), the absolute radius of the unit time is saved, that is,  $t_B = t_e = 1$  and (see (6))

$\hat{1}_B(t) = B^{i\omega_B t}$ , in the basis  $B$ , is equal to  $\hat{1}_e(t) = e^{i\omega t}$  in the basis  $e$ . Thus, at any basis  $B$ , we have

$$\hat{1}_B(t) = \hat{1}_e(t) \quad \text{and} \quad B^{i\omega_B t} = e^{i\omega t}, \quad (7)$$

where  $\omega_B$  is the absolute time angular velocity in an arbitrary basis  $B$ . The following elementary mathematical relations are valid for Eq. (7):

$$i\omega_B t \ln B = i\omega t, \quad \text{or} \quad \frac{i\omega_B t}{\log_B e} = i\omega t. \quad (8)$$



Considering (6) - (8), the rotation of the unit time vector (6) in an arbitrary basis  $B$  takes the following general form:

$$\hat{1}_B(t) = e^{\frac{i\omega_B t}{\log_B e}} = \cos\left(\frac{\omega_B t}{\log_B e}\right) + i \sin\left(\frac{\omega_B t}{\log_B e}\right). \quad (9)$$

For the decimal basis,  $B = 10$ , we arrive at the following expression:

$$\hat{1}_B(t) = 10^{i\omega_{10}t} = e^{\frac{i\omega_{10}t}{\lg e}} = \cos\left(\frac{\omega_{10}t}{\lg e}\right) + i \sin\left(\frac{\omega_{10}t}{\lg e}\right). \quad (10)$$

Here  $\omega_{10}$  is the absolute time angular velocity in the decimal basis.

The period  $T$  of the exponential function (6),  $e^{i\omega t} = \cos \omega t + i \sin \omega t$ , is equal to  $2\pi$ , i.e.,

$$T_e = \omega_e t = 2\pi.$$

The period of the exponential function  $e^{\frac{i\omega_{10}t}{\lg e}}$  (10) (as any exponential function) is equal to  $2\pi$  as well, i.e.,

$$T_e = \frac{\omega_{10}t}{\lg e} = \frac{T_{10}}{\lg e} = 2\pi.$$

Hence, the unit time circles in the two bases, 10 and  $e=2.71828\dots$ , are related by the following equalities,

$$T_{10} = \omega_{10}t = T_e \lg e \quad \text{or} \quad T_{10} = \omega_{10}t = 2\pi \lg e$$

Thus (denoting  $T_{10}$  by the symbol  $\Delta$ ), we obtain the following *absolute period of the absolute time at the decimal basis*

$$\Delta = 2\pi \lg e = 2.7287527\dots \quad (11)$$

This quantity represents the *fundamental period-quantum of an ideal field of the decimal numeric basis*.

The dominant number system on the Earth is the decimal numeration. The emergence of this system was not accidental. As it turned out, the decimal basis underlies the cosmic processes. In particular, it determines the stability of oscillatory (wave) motion of the Earth in the Solar System and the Earth-Moon system. Let us show this. If one takes as a unit of time one day, the period of a rotation of the Moon around the Earth of 27.3 days is tenfold of the absolute time period of the decimal base,  $10\Delta$ . And the time wave radius of Moon's orbit,

$$\tilde{\lambda}_{Moon} = \frac{\langle r_{Earth-Moon} \rangle}{v} \approx 4.34 \text{ days}, \quad (12)$$

is tenfold of the absolute time radius  $\lg e = 0.43429448\dots$ . Here  $\langle r_{Earth-Moon} \rangle = 384.467 \text{ kkm}$  is an average distance between the centers of the Earth and Moon,  $v = 1.023 \text{ km} \times \text{s}^{-1}$  is an average speed of the orbital motion of the Moon. If one takes 10 Earth days for a unit of time, then the period of revolution and the time radius of the Moon's orbit will be equal, respectively, to the numerical values of  $\Delta$  and  $\lg e$ . Thus, we can say that the Earth-Moon system is in resonance with the period-quantum  $\Delta$  of the Decimal Code of the Universe, and therefore such a system is stable.

The time angular speed of the proper time wave field of the Earth, corresponding to the sidereal day: 23 hours, 56 minutes, 4 seconds is equal to  $\omega_{Earth} = 7.2939 \times 10^{-5} \text{ s}^{-1}$ . From this it follows that the time radial wave of the Earth's rotation around its axis is multiple of half the fundamental period-quantum,  $\frac{1}{2}\Delta$ , of an ideal field of the decimal numerical basis:

$$\tilde{\lambda}_{Earth} = \frac{1}{\omega_{Earth}} \approx 1.37 \times 10^4 \text{ s}. \quad (13)$$

The frequency of rotation of the Earth around the Sun is also in harmony with the absolute period-quantum (11):

$$v = \frac{1}{T} = \frac{1}{365.26} \approx 2.74 \times 10^{-3} \text{ days}^{-1}. \quad (14)$$

Let's look at the Universal harmony from the other side. From the Dynamic Model (DM) [9, 10] it follows that the gravitational field is wave [11, 12], and its fundamental frequency (see Part 5) is equal to

$$\omega_g = 9.158082264 \times 10^{-4} \text{ s}^{-1}. \quad (15)$$

The gravitational frequency (15) defines the *radial* time wave-period,

$$T_g = \frac{2\pi}{\omega_g} = 0.686080898 \times 10^4 \text{ s}. \quad (16)$$

Only one half wave of the fundamental tone is placed on an orbit with a single node. Hence, the following, in value, *azimuthal* time wave of the fundamental tone corresponds to the radial wave period (16),

$$T_{azimuth} = 4\pi T_g = 8.621546841 \times 10^4 \text{ s} . \quad (17)$$

This value almost coincides with the sidereal day of

$$23 \text{ hours}, 56 \text{ min}, 4 \text{ s} = 8.6164 \times 10^4 \text{ s} . \quad (18)$$

The time wave,  $T_{azimuth} = 4\pi T_g$ , repeats the structure of the spatial wave of the fundamental tone on the Bohr orbit of the hydrogen atom,  $\lambda = 4\pi r_0$ .

The above relations show that the Earth is in harmonic resonance coupling with both the fundamental period-quantum  $\Delta$  of an ideal field of the decimal numerical basis and the fundamental frequency of the gravitational field  $\omega_g$ . Like the electron in the Bohr orbit in the hydrogen atom is in harmonic resonance coupling with the period-quantum  $\Delta$  and the fundamental frequency of the atomic and subatomic levels  $\omega_e$ .

Thus, the Earth is fundamentally different from other planets occupying a special place in the Solar System. Like the hydrogen atom is different from other elements in the periodic table.

Our analysis showed that at the heart of the ancient spectrum of measures of various nations at the dawn of our civilization lies the fundamental period-quantum  $\Delta$  of an ideal field of the decimal numerical basis (11). This subject was described in detail in [1-3, 6]. The decimal system penetrated into the life on the Earth independently and everywhere under the influence of cosmos. With the development of our civilization to the present day, a lot has changed; with this the new measures have emerged and old ones were changing. However, some of them related to the fundamental period-quantum have survived to this day almost unchanged. I cite here below only a few examples from the recent past and the present time, demonstrating the relationship of various measures with the fundamental period-quantum  $\Delta = 2.72875\dots$  of an ideal numerical field. Here they are.

Ancient Roman ounce = 27.2875 g

A measure of tea (UK), bag of tea (cybik, from Russian "цыбик") = 27.2 kg

Foot for tin (UK) = 27.216 cm

A measure of flax yarn (UK), lea = 274.31 m

A measure for wheat (U.S., UK), board pound = 27,216 kg

A measure for potatoes (U.S.), board pound = 27.216 kg

Barrel of rice (U.S.) = 272.2 kg

A measure in weighing silk in Russia (14-17 cc), ansyr = 545.28 g (272.64 × 2)

Thaler Milan coin (1556-1598), filippo = 27.5 g

Bale of paper (U.S.) = 136.0 kg (272.0 : 2)

Bale of cotton (U.S.) = 170.0 kg (the golden section of 272.875...)

Bulgarian sartorial arshin = 68 cm (272.0 : 4)

Net weight of 2.5 pounds explosive charges M5A1 (U.S.) in a box = 27,216 kg

Barrel of mineral oil (U.S.)  $\approx$  136.4 kg (272.8 : 2)

Barrel for the measurement of cranberries (U.S.) = 2.71 bushels

An interesting evidence, which has come down to us from prehistoric times, is contained in the document written in French of about hundred and fifty years ago, with which the members of Rushel Blavo's expedition in Burma [13, p. 105] were lucky to meet. Here is a fragment of the text (translated from Russian).

*«...An entrance to the cave represents a small cutout of an arcuate shape on the east side of the hill. Immediately after the entrance, literally at a depth of five meters, there is a very spacious hall with a relatively small lake located at its center, and on the opposite wall with respect to the entrance, on the other side of the lake, there is a heathen temple; along the entire wall lined up strictly in line 9 (nine) of mineral columns of equal height (54 cm) and the same diameter (27 cm at its base and 17 cm at the top). ...columns were not liable to exposure by mechanical tools, showing a pattern of durability... After that, the cave was blown up, so the hill where the cave was located was completely destroyed».... "In those few years of French occupation in the nineteenth century, this cave was blocked and completely destroyed. Why? The French wanted to nullify the native beliefs of the Burmese, and the cave just such fundamental beliefs has cultivated. Since ancient times, rites of worship of spirits, in the reality of which no one could doubt, were accomplished in it...».*

Ordained monks from nearby monasteries were told that in the cave, which was completely destroyed by the French about 150 years ago, "was an ancient temple, left over from atlanteans" [13, p. 175]. Please, pay attention to the numbers 9 , 54, 27, and 17, which are multiple to  $\Delta$  (11): the number 9, (27:3), is related to identical columns of a mineral in the form of a truncated cone of the height 54 cm, ( $27 \times 2$ ), and the diameter of 27 cm from the bottom and 17 cm on top. The number 17 is multiple to  $\sim \frac{5}{8} \Delta$ , that is, a golden section of the fundamental period-quantum.

## **Conclusion**

The Universe is a single *material-ideal wave system*, where the material and ideal components of the system are inseparable, interacting and influencing each other. Therefore, regardless of the will and consciousness of people, *ideal fields* (like an ideal field of the decimal numerical basis) naturally exert influence upon the physical fields and the wave structure of *material* objects. This is evident everywhere, and in particular, as we have found, in the spectrum of measures and the numerical values of fundamental physical constants (the latter will be shown in an Appendix).

Thus, everything in the Universe is in natural harmony and at all levels is strictly subordinated to a certain rhythm. Owing to this, the frequency spectrum of oscillatory (wave) processes in nature correlates with the fundamental period-quantum  $\Delta$  of an ideal field of the decimal numerical basis.

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