Time as Motion Phenomenon
Physics Laws do not Apply to Inertial Systems

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Abstract. In the unified theory of dynamic space the quantum time is identical to the elementary motion, traveled by electrically opposite elementary units (in short units) in the interval (click-shift) of the quantum dipole length at the speed of light. The quantum time in the units region is the Natural time, that replaced the conventional time, i.e. the second. Nature understands time, as a crowd of moving units, as a length traveled with click-shifts and as a volume occupied by the units. Therefore, time is reflected in the structures of space by the number of their units. However, motion is a form of space deformation, created by force that is reduced from the dynamic space as motion force, which is accumulated on the spherical zone of the particle, due to the difference of cohesive pressure in front of and behind it. This accumulation is made by force talantonion (oscillator) per quantum time in the formations region as quantum force, causing harmonic change to the difference of cohesive pressure in proximal space of the particle as a motion wave (wave-like form), the so-called, de Broglie's wave-particle. The Physical meaning of Planck's constant is interpreted as the product of three Nature's entities, namely the force talantonion (which is the foundation of motion), the quantum dipole length and the quantum time in the formations region. The "relative" mass has now been proved and the proof is not based on the second postulate of relativity. So, the particle mass does not in fact increase, when it moves, but only the final force (of gravity and motion), which causes the new dynamics of particle motion, increases. This new dynamics appears as a tension of space, which is maintained in a different way for each uniform motion, resulting the change of the Physics Laws in different inertial systems.

Keywords: Quantum time, quantum length, quantum force, motion arrow.

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1. Quantum time τ_0 in units region - Quantum time τ in formations region

In the unified theory of dynamic space,[1,2] time is not a Physical entity, since it is identical to motion. Time is the motion phenomenon itself. In the dynamic space[3] it

takes place the minimal and fundamental motion of the electrically opposite elementary units (in short units),[4] which move at the distance L_0 (the quantum dipole length), that transports some variation-disturbance of the elastic (tense) dynamic space at the speed of light.[5]

The quantum time, that it takes the light to travel at a speed $C_0 = 3 \cdot 10^8$ m/sec in the interval $L_0 = 0,558 \cdot 10^{-54}$m,[6] is

$$\tau_0 = \frac{L_0}{C_0} \Rightarrow \tau_0 = 0,186 \cdot 10^{-62} sec. \tag{1}$$

This is identical to the elementary motion as quantum time in the units region. This is the click-shift of unit, the transmission time of the electric force[4]

$$F = kL_0 \tag{2}$$

from unit to unit at the light speed.

Nature understands time, as a crowd of moving units, as a length traveled with click-shifts and as a volume occupied by the units. Therefore, time is reflected in the structures of space by the number of its units.

However, there is also the quantum time

$$\tau = 10^{-5} sec, \tag{3}$$

which is the basic time in the formations region, namely the time required for the completion of an elementary phenomenon. We consider as elementary phenomena the structure of a neutron (see section 2), the creation of a photon,[7] the accumulation of force (see section 4) in the motion formation of the particle or the accumulation of force in the autonomous formation of motion as the E/M wave[7] etc.

The quantum time $\tau = 10^{-5}$sec (Eq. 3) is corresponding to the frequency

$$\nu_\tau = \frac{1}{\tau} = 10^5 Hz \Rightarrow \nu_\tau = 100 kHz \tag{4}$$

of the fundamental E/M wave.[7] It is the frequency threshold of the rotational oscillations of the electron spin, by which it is produced the weakest radiation that can be given by the dynamic space.[3] At less rotational oscillations frequency, no E/M wave is produced but the induction phenomenon only.

It is noted that the motion of light is not independent of the particles motion, since force is accumulated in the formation of motion at light speed. Therefore, the motion of light does not replace the concept of time, but it is the very essence of the phenomenon.

2. Structure of the neutron cortex - Planck's length

The creation of matter was initiated by the Genesis of the primary neutron[8] close to the Universe center in the form of a space hole (bubble of empty space), which resists to the weak attraction of space cohesive pressure[9] prevailing over there. Under the influence of the antigravity force[10] the bubble acquires centrifugal accelerated motion towards the Universe periphery. So, it gradually crosses areas of increasing cohesive

pressure, because of which the edge tensions of the cells and their distortions[8] on the elastic surface of the bubble (space hole) are increasing.

As the area around the bubble is distorted, a crush into its elastic surface and distension outwards is caused. This crush and distension on the area around the bubble changes locally the cohesive pressure of space, resulting in the outflow of negative units outwardly, mitigating the strong attractive forces of distension, after a decrease the pairs of negative and positive units.[4] The outflow of these negative units outwardly is caused by the dynamic space[3] due to the inertial phenomenon,[11] as a reaction to the geometric deformation of the neutron cortex, according to the fundamental principle of antithesis[4] (opposition). So, a balanced allocation of the tensions on the inner and outer surface of the neutron cortex follows, rendering it resistant to the attraction of the cohesive pressure. Outflow, however, can happen with the positive units too, by producing the antineutron, which has opposite magnetic dipole moment. This space deformation is done (as it has been described) by the alteration of equality of the positive and negative units and is called electric or quantitative deformation, while the geometric deformations, namely that of the first and second space deformation,[1,2] are created by the distortion of the cells only. Therefore, the third space deformation, which created the neutron cortex, is a mixed deformation, namely an electric and a geometric one.

Thus, during the structure completion of the neutron cortex, which is performed at time $\tau = 10^{-5}$sec (Eq. 3), each unit is moved to a neighboring position at a distance $L_0 = 0,558 \cdot 10^{-54}$m,[6] at every $\tau_0 = 0,186 \cdot 10^{-62}$sec (Eq. 1). Therefore, the ratio τ/τ_0 gives the number of the moving units that is structured the neutron, namely

$$\frac{\tau}{\tau_0} = \frac{10^{-5}}{0,186 \cdot 10^{-62}} \approx 10^{58} \Rightarrow \frac{\tau}{\tau_0} \approx 10^{58}. \tag{5}$$

The above is a famous number that gives the crowd of units of a neutron, which is equal to the number of the cells, since each cell contains eight units and each unit belongs to eight cells.[12]

Therefore, if r_c is the cortex radius of the neutron, then $4\pi r_c^3/3$ is the spherical volume of the neutron cortex and L_0^3 is the volume of the cell. So,

$$\frac{4\pi r_c^3}{3L_0^3} \approx 10^{58} \tag{6}$$

is the crowd of cells or units of the neutron and due to $L \approx 10^{-54}$m,[6] we have

$$r_c \approx L_0 \sqrt[3]{\frac{3 \cdot 10^{58}}{4\pi}} \approx 10^{-54} \cdot 10^{19} \approx 10^{-35}m \Rightarrow r_c \approx 10^{-35}m, \tag{7}$$

namely it is the size class of the cortex radius of neutron. We observe that radius $r_c \approx 10^{-35}$m (Eq. 7) is identical with the fundamental Planck's length

$$l_p = \sqrt{\frac{\hbar G}{C_0^3}} \approx 10^{-35}m \Rightarrow l_p \approx 10^{-35}m, \tag{8}$$

considering that radius r_c of the neutron cortex, is corresponding to its Natural size. It is noted that, due to Eq. 7, the scale

$$\frac{r_c}{L_0} \approx 10^{19}, \tag{9}$$

expressing the ratio of the third to the second deformation of space, is maintained constant for all the extent (dimension or length) ratios of all five space deformations.

It is also noted that the rest two space deformations, namely the fourth and the fifth ones, are the inverse (inner) and the outer electric field of the electrically charged particles.[13]

3. Talantonion of energy ε_τ and force f_τ - Planck's constant h

We define the quantum energy

$$\Delta E = h\nu \tag{10}$$

as talantonion (oscillator) of energy

$$\Delta E = \varepsilon_\tau, \tag{11}$$

which corresponds to the elementary energy of a fundamental E/M wave of frequency $\nu = \nu_\tau = 10^5$Hz, which is structured in time $\tau = 1/\nu_\tau = 1/10^5 = 10^{-5}$sec, wherein $\tau = 10^{-5}$sec (Eq. 3) is the quantum time for the formation of a photon[7] or any other elementary formation. Therefore, for

$$h = 6,626 \cdot 10^{-34} Joule{\cdot}sec \tag{12}$$

the Planck's constant and $\tau = 10^{-5}$sec (Eq. 3), due to Eqs 10 and 11, it is

$$\varepsilon_\tau = h\nu = h\nu_\tau = 6,626 \cdot 10^{-29} Joule \Rightarrow \varepsilon_\tau = 6,626 \cdot 10^{-29} Joule. \tag{13}$$

It is noted that energy talantonion $\varepsilon_\tau = 6,626 \cdot 10^{-29}$Joule (Eq. 13) is the result of the displacement at L_0 of force talantonion $f_\tau = \varepsilon_\tau/L_0$ from unit to unit at the light speed, wherein $L_0 = 0,558 \cdot 10^{-54}$m[6] the quantum dipole length and so

$$f_\tau = \frac{\varepsilon_\tau}{L_0} = 11,87 \cdot 10^{25} N \Rightarrow f_\tau = 11,87 \cdot 10^{25} N. \tag{14}$$

Consequently, the above energy talantonion (Eq. 13), due to Eqs 4 and 14, can be written as

$$\varepsilon_\tau = h\nu_\tau = \frac{h}{\tau} = f_\tau L_0 \Rightarrow h = f_\tau L_0 \tau, \tag{15}$$

which defines, clearly, the Planck's constant h, equal to the product of three Nature entities, i.e. the force talantonion (Eq. 14) $f_\tau = 11,87 \cdot 10^{25}$Joule (the foundation of motion), the quantum dipole length $L_0 = 0,558 \cdot 10^{-54}$m[6] and the quantum time $\tau = 10^{-5}$sec (Eq. 3) in the formations region.

4. Accumulation of motion force

Physics considers the motion of a body as a simple change of its distances from other objects, namely considers it as a relative displacement in time. By the special relativity has been done a mathematical expression (Lorentz transformations) of the problem that had arisen from the Michelson-Morley experiment,[14] ignoring, though, the real cause of the slowing of the moving clock, i.e. the phenomenon of motion. This experiment is interpreted by the unified theory of dynamic space,[1,2] but is not based on the second postulate of relativity.

The accumulation of motion force F on the dipole bonds of the particle spherical zone happens per $\tau_0 = L_0/C_0 \approx 10^{-62}$sec (Eq. 1). This way of accumulation of motion force F gives a real interpretation of the impulse-momentum

$$p = Ft \tag{16}$$

of classical Physics, which is the time addition of the exerted force F per second, that is replaced by the Natural unit of time, i.e. the quantum time $\tau_0 \approx 10^{-62}$sec (in the units region), as click-shifts of force F from unit to unit at light speed.[5]

Therefore, the accumulation of the talantonion (see section 3) upon the pairs of vertical meridians per $\tau = 10^{-5}$sec (Eq. 3) corresponds to $\tau/\tau_0 \approx 10^{58}$ (Eq. 5) click-shifts of force F. This famous number (10^{58}) coincides with the number of units structuring the neutron cortex (see section 2).

Consequently, the motion will be studied as an accumulation of force on the spherical zone of the particle. This mechanism (extremely fine texture of motion) happens by deformation of space, namely with deduction of forces from the dynamic space, whose the cohesive pressure[9] is reduced, at the same degree as the motion arrow ΔP[11] on the particle.

The antithesis[4] (opposition) is evident between matter and motion, since matter represents the balance of empty space hole[8] (immobility), while motion represents the flow (mobility). The spatial or right antithesis[4] (principle of antithesis) is a condition of motion, namely the motion force F is placed vertically to the elementary forces f_0, that constitute the total gravity force F_0[16] of the particle (Fig. 1).

The accelerating force F is accumulated on the bonds of the electric dipoles of units as tangent of the meridians of the particle spherical zone, having as axis the motion direction and as center the particle. This force (as tangent) ensures the verticality of spatial or right antithesis[4] resulting in motion, since there is no balance between motion force F and the elementary gravity force f_0 of the particle. Radial motion force cannot be installed, since a balance between forces F and f_0 is created.

The electrical-gravitational force is transmitted in the dynamic space from unit to unit at light speed and it is accumulated on the above meridians of the particle spherical zone. For example, due to the gravity pressure[15]

$$P_g = \frac{P_{0x} r_1^2}{R^2}, \tag{17}$$

a pressure difference ΔP (motion arrow)[11] is placed in front of and behind the particle, causing the geometric deformation of the spherical zone and the accumulation of force. In any case, by an external force upon a body, repulsing or attracting, the deformation of the elastic-dynamic space is transferred at disturbance speed, namely at light speed,[5] upon the body particles and is installed on the spherical zone of the particle as a pressure difference ΔP, namely as a motion arrow.[11]

Figure 1. Accumulation of motion force F on the particle spherical zone

The deformation that is installed as pressure difference ΔP in front of and behind the particle as a change of space cohesive pressure is maintained after the interruption of the accelerating force, ensuring the uniform motion[11] of the particle.

The pressure difference

$$\Delta P = (P_0 + \frac{\Delta P}{2}) - (P_0 - \frac{\Delta P}{2}),\tag{18}$$

which fluctuates from $+\Delta P/2$ in front of to $-\Delta P/2$ behind the particle, causes the geometric deformation of the particle spherical zone at a pear form, resulting a change of the dipoles length L_0[6] (expansion in front of and shrinking behind the particle) and, hence, a respective change of the force $F = kL_0$ (Eq. 2), which accumulate and flow endlessly at light speed.[5] The above spherical shape of the zone changes harmonically in the form of pear-shaped, as a harmonic oscillation of the elastic-dynamic space, by wavelength (Fig. 2)

$$\frac{\lambda}{2} = d,\tag{19}$$

as a meridian diameter of spherical zone[11] and, hence, the motion of the particle is achieved.
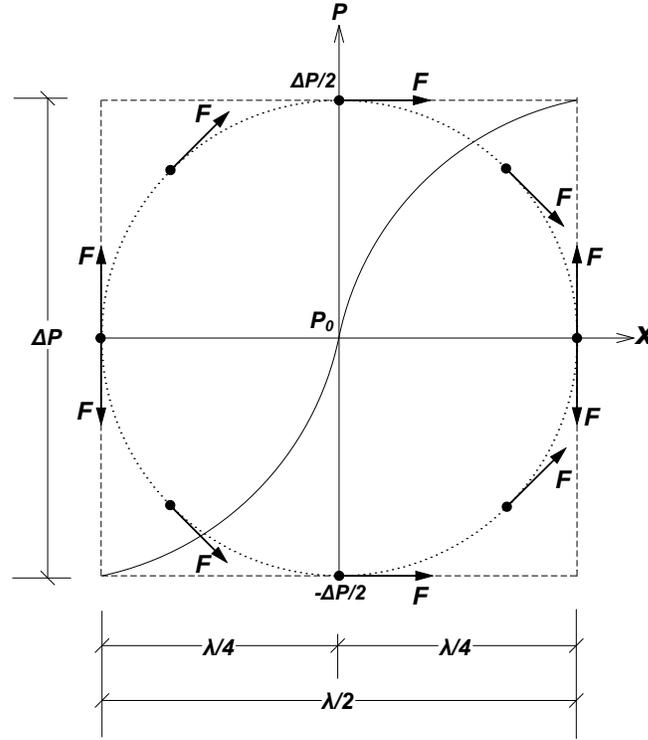
Figure 2. Harmonic fluctuation of motion arrow $\Delta P = (P_0 + \Delta P/2) - (P_0 - \Delta P/2)$

This ΔP fluctuation[11] creates the motion wave (wave-like form) in proximal area of the particle or, the so-called, de Broglie's wave-particle.[17]

5. Dynamics of particle motion - Final energy and mass of particle

This accumulation of motion force F takes place in the dipole bonds of the particle spherical zone[11] per $\tau_0 = L_0/C_0 \approx 10^{-62}$sec (Eq. 1) with κ click-shifts from unit to unit at light speed.[5] If S_p is the interval traveled by force F at light speed with κ click-shifts per L_0,[6] then

$$S_p = \kappa L_0 \Rightarrow \kappa = \frac{S_p}{L_0} \tag{20}$$

and, respectively, the accumulated force upon the particle, due to Eq. 20, is

$$F_s = \kappa F \Rightarrow F_s = \frac{F S_p}{L_0}. \tag{21}$$

Also, if we consider that the gravity force F_0[16] is concentrated on one meridian (Fig. 1), then

$$F_0 = \kappa f_0, \tag{22}$$

where f_0 the elementary gravity force, which corresponds to a click-shift of force F at light speed. Therefore, on each dipole bond of the particle spherical zone, the elementary force f_0 and the motion force F have an elementary resultant (Fig. 1)

$$f' = \sqrt{F^2 + f_0^2} \tag{23}$$

and a final force

$$F_f = \kappa f'. \tag{24}$$

Hence, due to Eqs 23, 22 and 21, the Eq. 24 becomes

$$F_f = \kappa\sqrt{F^2 + f_0^2} = \sqrt{\kappa^2 F^2 + \kappa^2 f_0^2} = \sqrt{F_s^2 + F_0^2}, \tag{25}$$

namely the

$$F_f = \sqrt{F_s^2 + F_0^2} \tag{26}$$

is the final force of gravity and motion of the particle, which creates a new structure of the proximal area (new dynamics). So, the above Pythagorean relationship (Eq. 26) expresses the Nature's Mathematics.

The interval traveled by the motion force F at light speed C_0[5] is (Eq. 20)

$$S_p = C_0 t. \tag{27}$$

So, the accumulated force $F_s = F S_p / L_0$ (Eq. 21) becomes

$$F_s = \frac{C_0 F t}{L_0}. \tag{28}$$

However, Eq. 28, due to the impulse-momentum $p = Ft$ (Eq. 16), becomes

$$F_s = \frac{C_0 F t}{L_0} = \frac{C_0 p}{L_0} \Rightarrow p = \frac{F_s L_0}{C_0}. \tag{29}$$

It is, also, the mass‡ of particle

$$m = \frac{E}{C_0^2} = \frac{F L_0}{C_0^2} \Rightarrow m = \frac{F L_0}{C_0^2}, \tag{30}$$

where $E = F L_0$ the Work of force F at a click-shift L_0.[6]

So, the Pythagorean relationship $F_f^2 = F_0^2 + F_s^2$ is transformed as follows

$$F_f^2 = F_0^2 + F_s^2 \Rightarrow (F_f L_0)^2 = (F_0 L_0)^2 + (F_s L_0)^2, \tag{31}$$

where $F_f L_0 = E_f$, $F_0 L_0 = E_0$ and $F_s L_0 = p C_0$ (Eq. 29), so substituting there in Eq. 31, the final energy E_f (as the "relative" energy) of the particle (where E_0 is the rest energy) becomes

$$E_f^2 = E_0^2 + p^2 C_0^2. \tag{32}$$

‡ $F_f^2 = F_0^2 + F_s^2$, where for the E/M wave applies $F_0 = 0$, therefore $F_f = F_s$, namely the final force F_f of the formation is equal to the accumulated force F_s, where $F_f = E/L_0$ represents the energy of the E/M wave and $F_s = pC_0/L_0$ represents its momentum. Substituting in the above $F_f = F_s$ we have $E/L_0 = pC_0/L_0$, where $p = mC_0$ is the momentum of the formation, so $m = E/C_0^2$.

Also, the Pythagorean relationship is transformed as follows

$$F_f^2 = F_0^2 + F_s^2 \Rightarrow (\frac{E_f L_0}{C_0^2})^2 = (\frac{F_0 L_0}{C_0^2})^2 + (\frac{F_s L_0/C_0}{C_0})^2. \tag{33}$$

Due to Eq. 30, the final mass m_f is

$$m_f = \frac{F_f L_0}{C_0^2} \tag{34}$$

and also the rest mass m_0 is

$$m_0 = \frac{F_0 L_0}{C_0^2}. \tag{35}$$

So, substituting Eqs 29, 34 and 35 in the above Eq. 33, we have

$$m_f^2 = m_0^2 + \frac{p^2}{C_0^2}, \tag{36}$$

where $p = m_f u$ the impulse-momentum of the particle, moving at a speed u. So, Eq. 36 becomes

$$m_f^2 = m_0^2 + \frac{p^2}{C_0^2} = m_0^2 + \frac{m_f^2 u^2}{C_0^2} \Rightarrow m_f = \frac{m_0}{\sqrt{1 - u^2/C_0^2}} \Rightarrow m_f = \gamma m_0, \tag{37}$$

where $\sqrt{1 - u^2/C_0^2}$ the so called Lorentz factor[14] and

$$\gamma = \frac{1}{\sqrt{1 - u^2/c_0^2}}, \tag{38}$$

as symbolized in special theory of relativity. Here, the "relative" mass (Eq. 37) as the final mass m_f has now been proved and the proof is not based on the second postulate of relativity.[14]

Therefore, by Pythagorean relationship $F_f^2 = F_0^2 + F_s^2$ (Eq. 26) it has been proved that in fact the particle mass does not increase, when it moves, but only the final force F_f (of gravity F_0[16] and motion F_s), which causes the new dynamics of particle motion, increases. This new dynamics appears as a tension of space, which is maintained in a different way for each uniform motion,[11] resulting the change of the Physics Laws in different inertial systems.

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