What is de Broglie's Wave-Particle?

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Abstract. According to the theory[1,2] of dynamic space the inductive-inertial phenomenon G and its forces F_G will be developed, which act on the electric units of the dynamic space, forming the grouping units (namely electric charges or forms of the electric field). So, the nature of the magnetic forces is explained, that are Coulomb's electric forces between these grouping units, created by the accelerated electron. Additionally, it is proved the so called de Broglie's wave-particle is a motion wave (wave-like form) as a result the dynamics of the extremely fine texture of the particle motion.

Keywords: Inductive-inertial phenomenon, grouping units, photon length.

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1. Inductive-inertial phenomenon G and its forces F_G - Pressure difference ΔP as motion arrow - Magnetic forces

In a changing motion of an electron a shift of electric units[3] of the proximal space is caused and a difference ΔP of space cohesive pressure[4] is created. This shift of units at a proximal area of an electron is the inductive-inertial phenomenon G and the forces F_G are the cause that moves these units. The inductive force F_{G+}, when is applied on the positive units, has the same direction with the acceleration γ of the electron, while if the F_{G-} applied on the negative units, it has the opposite direction to γ (Fig. 1). The inductive-inertial phenomenon takes place, when an external force is applied on an electron, due to which it reacts, hindering the change of its kinetics by sending positive units in front and negative units behind.

The phenomenon G is another expression of the antithesis (opposition) principle[3] and the cause is the acceleration of the electron. Therefore, due to the principle of antithesis, the electron reacts to the change of its kinetics and tries to hinder the approach of the positive charge by which it is attracted, by placing positive units in front and removing negative ones behind (Fig. 2). Like in uncharged particles, inertia

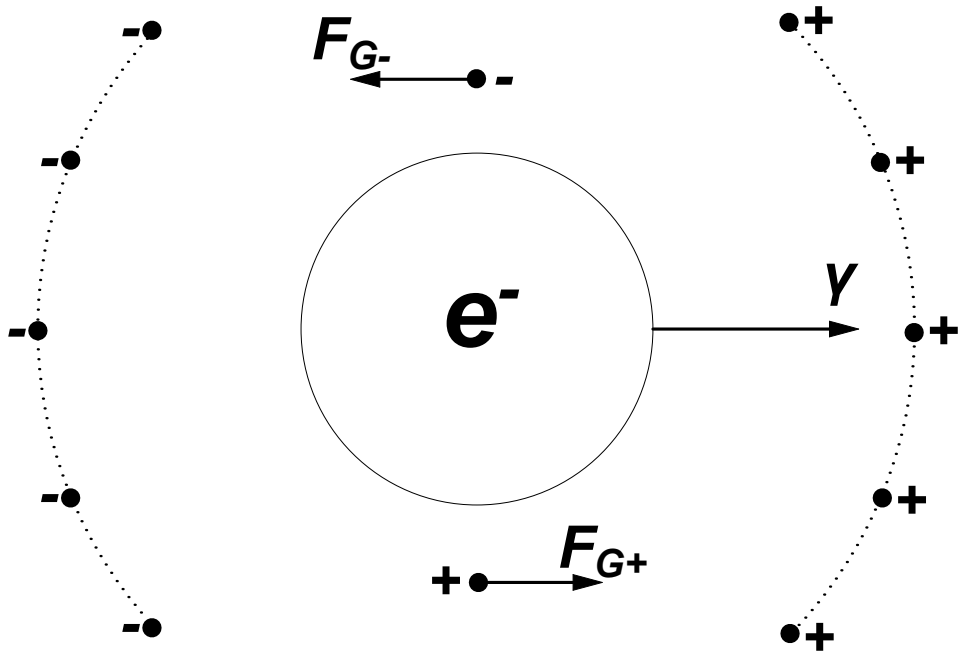

Figure 1. Phenomenon G and its inductive-inertial forces F_{G+} and F_{G-}

is the reaction mechanism to the change of its kinetics, the same occurs in charged particles that the corresponding reaction mechanism to this change is the phenomenon G.

In front of the uniformly moving ($\gamma = 0$) electron (right in Fig. 2), a positive unit of its electric field is balanced. However, the accelerated electron leaves (due to acceleration γ) a part of the electric attraction that acts on the positive unit, proportionally to force F_{G+}, by which the unit is moving to the right at the same direction with acceleration γ.

A similar dynamic analysis of the phenomenon G can be done for a negative unit in front of the electron (right in Fig. 2), since the accelerated electron leaves a part of the electric repulsion that acts on the negative unit, proportionally to force F_{G-}, by which the unit is moving to the left at the opposite direction to acceleration γ.

Also, the same dynamic analysis can be done behind the electron (left in Fig. 2), but here the electric attraction and repulsion on the positive and negative units are strengthened, due to the electron acceleration , resulting the positive units to move to the right and the negative ones to the left in Fig. 2.

This loosening of the electric attraction and repulsion of the units in front is created, due to the thickening of them (inertial phenomenon G-geometric deformation), imposed by the electron acceleration γ, resulting in the reduction of dipole forces[3]

$$F = kL_0. \tag{1}$$

The opposite happens behind the electron, where the strengthening of the electric

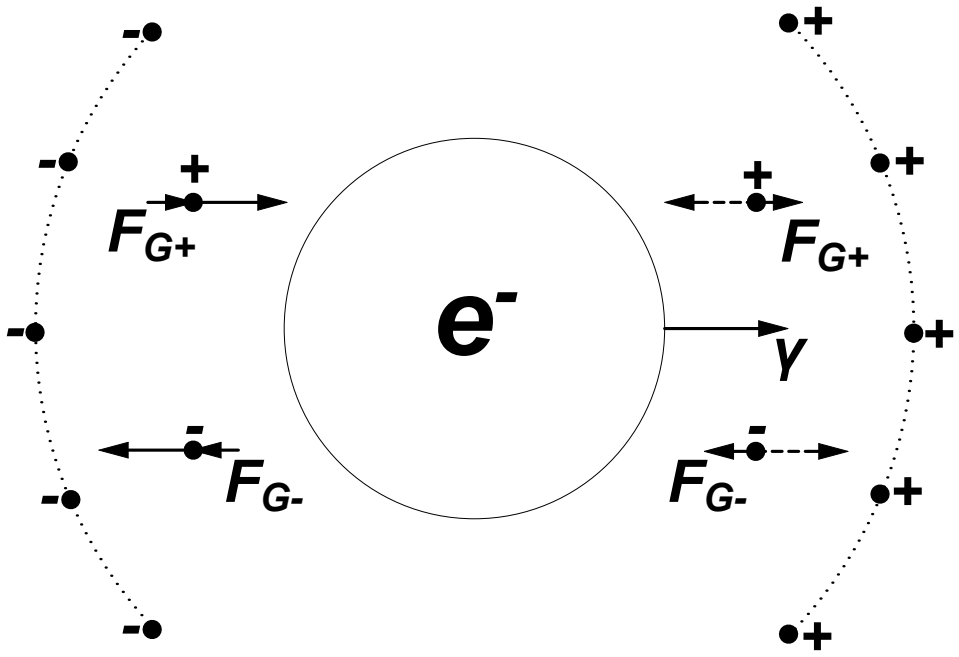

Figure 2. Dynamics of phenomenon G (the electron acceleration imposes a loosening of electric attraction and repulsion in front and a strengthening of them behind)

attraction and repulsion is created due to the dilution of units, imposed by the electron acceleration γ, thus increasing the dipole forces $F = kL_0$ (Eq. 1).

This tends to increase the cohesive pressure of space behind the electron and reduce it in front of it (inertial phenomenon G). However, the dynamic space[4] reacts to this change with the inductive phenomenon G, reversing the phenomenon (principle[3] of antithesis). This is achieved by placing positive units in front and negative ones behind (electric or quantitative deformation-inductive phenomenon G), forming the grouping units, thus increasing the cohesive pressure in front of and reducing it behind the electron, since the positive units in front are added to the negative ones of the electron field, increasing the pairs of oppositely charged units and, consequently, the cohesive pressure of space. The opposite happens behind the electron, wherein the negative units of electron field are increasing, due to the negative grouping units of the inductive phenomenon G, decreasing the pairs of oppositely charged units, resulting in reducing of the space cohesive pressure.

Therefore, in this geometric deformation (inertial phenomenon G) the dynamic space reacts with the inductive phenomenon G and imposes an electric or quantitative deformation of the space in front of and behind the electron, installing a pressure difference ΔP as a motion arrow of the electron. This is the extremely fine texture of motion.[5]

The achieved pressure difference ΔP, in front of and behind the electron, is the

cause of the accumulated forces on the electron spherical zone. Of course, during the electron deceleration, a discharge of grouping units happens and therefore a reduction of pressure difference ΔP, by a discharge of forces at the spherical zone of electron.

Therefore, acceleration creates the grouping units (the phenomenon G) and uniform motion maintains them. To confirm the conservation of grouping units with uniform motion, we suppose that, as oppositely charged units, they are attracted and tend to coincide, causing the electron to receive a force F_{G-} backwards (Fig. 3), due to the acceleration γ_1 of the negative units and a force F_{G+} also backwards, due to the acceleration γ_2 of the positive ones. These two forces would have neutralized the kinetic force of the electron as opposite of motion, but that is contrary to the principle of conservation of kinetic force or energy. Hence, acceleration γ of the electron creates the grouping units and its constant speed u maintains them.

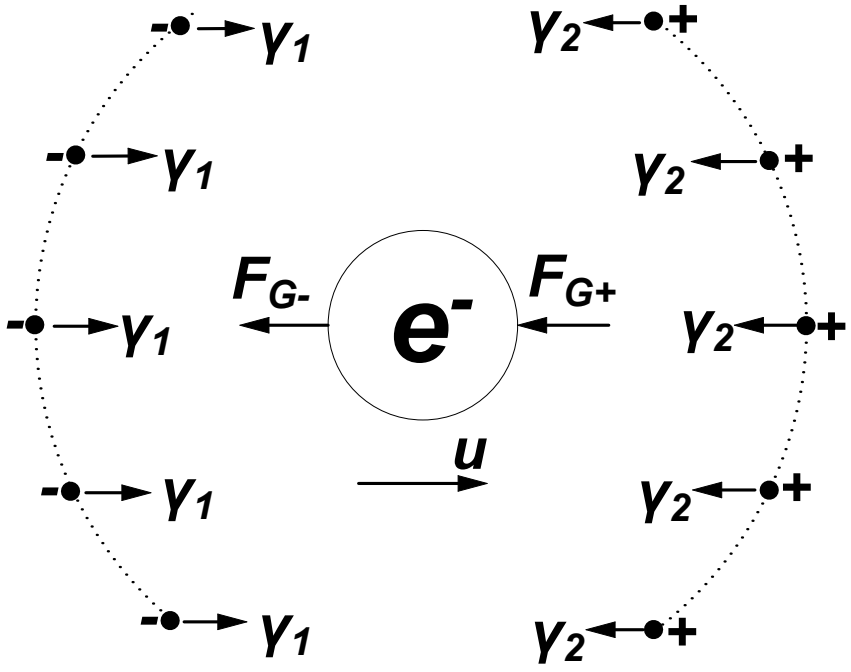

Figure 3. The constant speed u maintains the grouping units

This phenomenon G occurs also at the acceleration of the grouping units, resulting in the reproduction of new grouping units, called extra grouping units (Fig. 4).

Thus, as the positive grouping units of electron are accelerated, they send in front negative extra grouping units of the same form, while no positive units are placed of them behind. Respectively, behind the electron the negative grouping units form positive extra grouping units, without negative ones in front of them. Additionally, other extra grouping units are created with a charge decreasing, resulting the harmonic fluctuation of pressure difference ΔP by descending geometric sequence (Fig. 8).

The magnetic force between two parallel electric conductors is interpreted (Fig. 5),

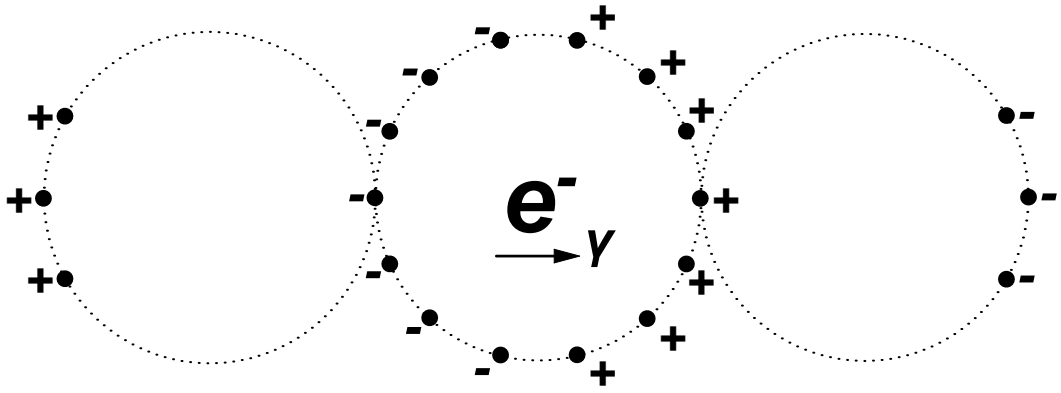

Figure 4. The first pair of extra grouping units

by the fact that their electrons create grouping units during their motion as by the phenomenon G has been described.

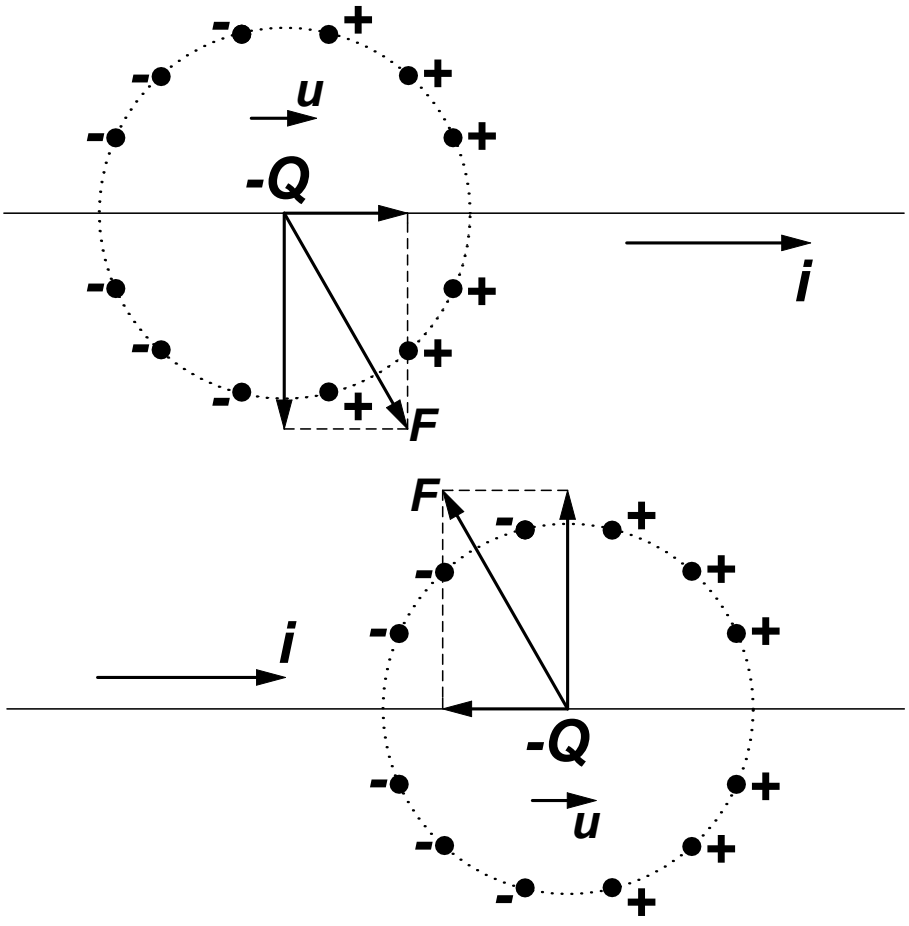

Figure 5. Interpretation of the magnetic force F between two parallel electric conductors

For electrons moving at the same direction, the oppositely charged grouping units (at speeds u_1 and u_2 of the moving electrons) are always as in Fig. 6 and are attracted.

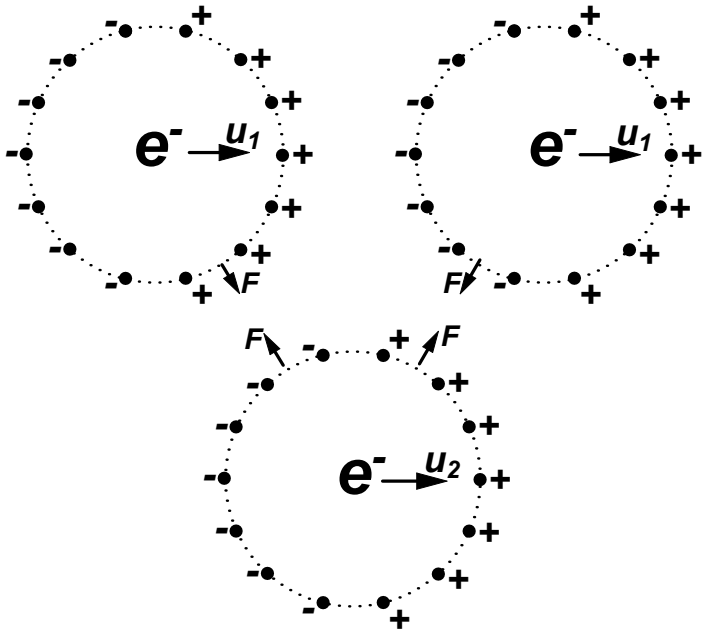

Figure 6. Attraction between electrons moving at the same direction

For electrons moving at the opposite direction, the homonymous grouping units (at speeds u_1 and u_2 of the moving electrons) are always as in Fig. 7 and are repelled.

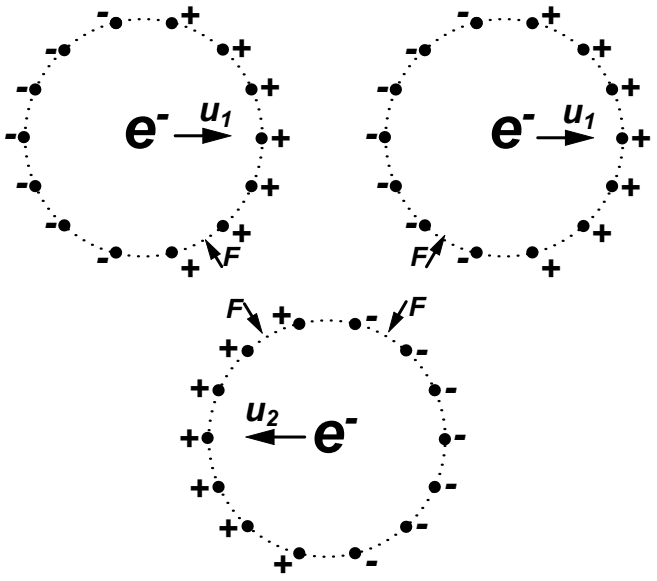

Figure 7. Repulsion between electrons moving at the opposite direction

Thus, the phenomenon G is the cause for the creation of magnetic forces that occur as a result of attractive or repulsive Coulomb's electric forces between the grouping units of the moving electrons.

2. The length of motion wave is identical to de Broglie's wave length

The creation of the grouping units (phenomenon G) causes a change of the electric field in front of and behind the electron, resulting in the change of space cohesive pressure.[4]

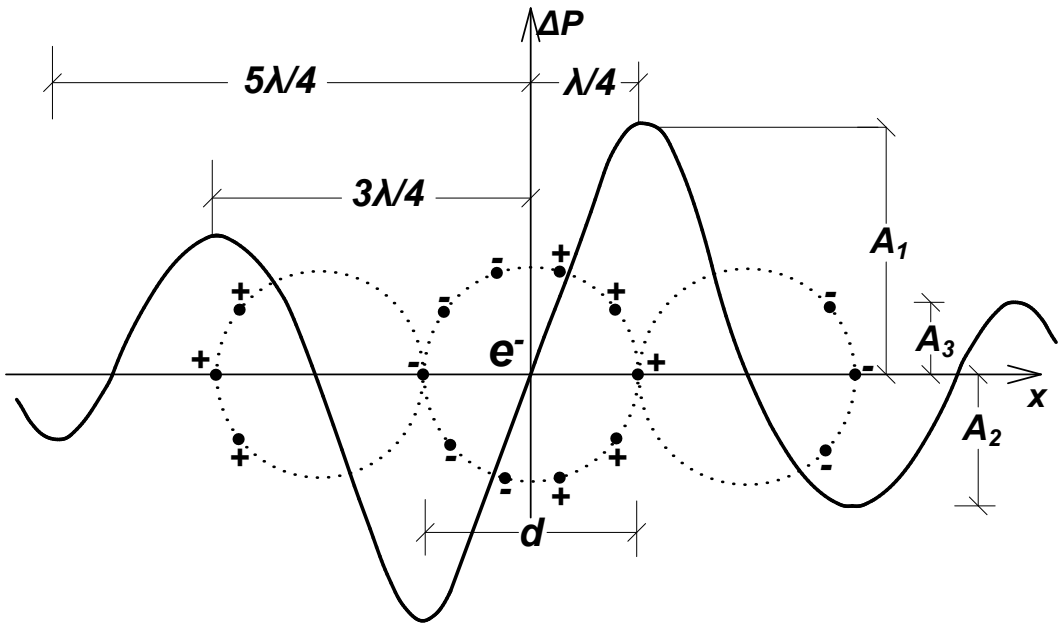

Figure 8. Descending change of pressure difference ΔP as motion arrow of the electron with a motion formation diameter $d = \lambda/2$, where λ the wavelength of the harmonic fluctuation amplitude A ($A_1 = P_0 u_a^2/2$, $A_2 = P_0 u_a^4/2$, $A_1 = P_0 u_a^6/2$, where $u_a < 1$ the timeless speed[6] of the electron)

Thus, a pressure difference ΔP as motion arrow (Fig. 8) at the proximal field in front of and behind the electron is created, resulting in the accumulation of forces on a sphere meridians with axis to the direction of motion and having as center the particle.[5] The displacement of this forces spherical formation at the space takes place, of course, by time and spatial fluctuation. The above forces are accumulated by force talantonia[7] (oscillators) on vertical meridian pairs of particle spherical zone as a quantum phenomenon.

This idea is derived from the conclusion, that motion is the only and unique natural phenomenon of Universe. Actually, in the dynamic space[4] motion is made by two kinds of moving formations: by the accompaniment formations of particles and by the formations of autonomous motion of the E/M waves.[8] Moreover, the E/M wave

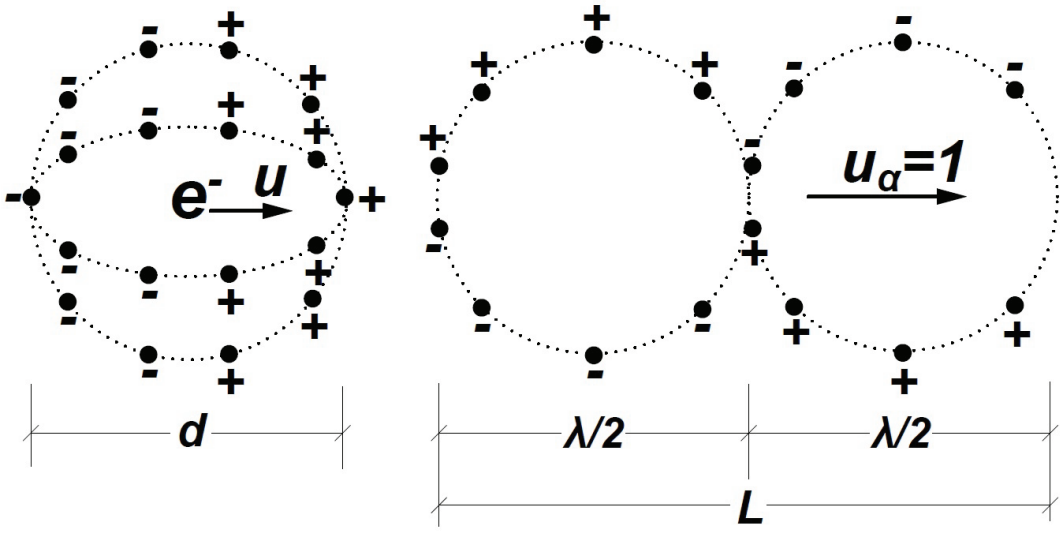

Figure 9. Correlation of a meridians pair (talantonion) with a fundamental E/M wave ($d = \lambda/2$, $\lambda = L$ the photon length and $u_a = 1$ the constant timeless speed[6] of light)

derived from the change of kinetics of a charged particle and, therefore, it is reasonable that dynamics of E/M wave is created from the dynamics, which is accumulated in the particle.[5] Hence, by studying the dynamic elements of E/M wave, we probe the way by which they accumulate in the particle (Fig. 9). It is also understood that there is no difference between charged and uncharged particles in the allocation form of these dynamic elements. Their difference is limited only in the property of the charged particles to release part of their dynamic elements,[8] whenever there is change of their kinetics. Therefore, the E/M wave is concentrated as an accompaniment formation in the charged particle.

The accumulation of grouping units (and forces) continues for as long as the acceleration of electron lasts, up to the emission limit of the E/M wave with the less energy. This weakest E/M wave[8] in Nature has a frequency[9]

$$\nu_\tau = \frac{1}{\tau} = 10^5 Hz \Rightarrow \nu_\tau = 10^5 Hz, \tag{2}$$

corresponding to period $\tau = 10^{-5}$sec[9] of the rotary oscillations of an electron.[8] It is the quantum time in formations region and corresponds to the time of accumulation of force talantonia f_τ[7] on vertical meridian pairs of spherical zone of the particle.

Therefore, up to the so-called strength frequency[9] $\nu_\tau = 10^5$Hz of the dynamic space[4] there is no radiation of E/M wave, but phenomena of electric induction due only to the phenomenon G.

For a higher acceleration of the electron, a talantonion f_τ is accumulated on a pair of vertical meridians of the spherical zone and another talantonion is emitted as a E/M wave, according to the mechanism of its emission.[8] Hence, the E/M wave consists of force talantonia f_τ, that are released from the motion formation of the electron, after violent

change of its kinetics. Therefore the talantonion, that gives the weakest-fundamental E/M wave, is necessary to be accumulated on a pair of meridians (Fig. 9), the diameter d of which is equal to

$$d = \frac{\lambda}{2}, \tag{3}$$

so that when released to become equal to two spindles of diameter $\lambda/2$.

The weakest-fundamental E/M wave with a period $\tau = 10^{-5}$sec and a frequency $\nu_\tau = 10^5$Hz has a wavelength

$$L = \frac{C_0}{\nu_\tau} = \frac{3 \cdot 10^8}{10^5} = 3 \cdot 10^3 m \Rightarrow L = 3 \cdot 10^3 m. \tag{4}$$

This wavelength is called photon length L and at $L_0 \approx 10^{-54}$,[10] it is

$$\frac{L}{L_0} = \frac{3 \cdot 10^3}{10^{-54}} \approx 10^{58} \Rightarrow \frac{L}{L_0} \approx 10^{58}. \tag{5}$$

This admirable number $L/L_0 \approx 10^{58}$ is the same, that is described as the number of units,[11] by which the neutron is structured and is here identical with the units number of the E/M wave. Of course, in different regions of the Universe, the dipole length L_0 depends on the local cohesive pressure P_{0x} and is denoted L_{0x}, as a function of the distance x from the Universe center. Accordingly, the photon length L is denoted L_x and $L_x/L_{0x} \approx 10^{58}$ (Eq. 5).

In Fig. 9 it appears the correlation of a meridians pair and a fundamental E/M wave, wherein a force talantonion f_τ is accumulated to a length $2\pi d$, where d is the spindle's diameter of wavelength

$$L = 2d. \tag{6}$$

Therefore, due to Eqs 4 and 5, the length of the helix is

$$2\pi d = \pi L \Rightarrow 2\pi d = \pi 3000m \Rightarrow 2\pi d = \pi L_0 10^{58}, \tag{7}$$

into which there can be accumulated one or more force talantonia f_τ. For example, two talantonia $(2f_\tau)$ need two pairs of vertical meridians, corresponding to photon length

$$L = 4d, \tag{8}$$

given that four spindles form the E/M wave, while the length of the helix remains constant, i.e. πL. Thus, photon length $L = 3000$m or $L = L_0 10^{58}$ and helix length $\pi L = \pi 3000$m or $\pi L = \pi L_0 10^{58}$ remain constants.

Wavelength λ_1 of the fundamental E/M wave coincides with the photon length L, namely $\lambda_1 = L$ and the next will be $\lambda_2 = 2d$, where $2 \cdot 2d = L$ (four spindles of the photon) and $\lambda_2 = L/2$, therefore

$$\lambda_1 = \frac{L}{1}, \lambda_2 = \frac{L}{2}, \lambda_3 = \frac{L}{3}, ..., \lambda_n = \frac{L}{n}. \tag{9}$$

Then, the total force that is accumulated on the entire length of the helix (πL), is

$$F_s = n f_\tau \Rightarrow n = \frac{F_s}{f_\tau} \tag{10}$$

and so the Eq. 9 becomes

$$\lambda_n = \frac{Lf_\tau}{F_s}. \tag{11}$$

It is noted that, in the units region, the motion force F is accumulated as[12]

$$F_s = \frac{FS_p}{L_0}, \tag{12}$$

where S_p is the interval traveled by force F at light speed per[9]

$$\tau_0 = 0,186 \cdot 10^{-62} sec \tag{13}$$

with click-shifts at each $L_0 = 0,558 \cdot 10^{-54}$m[10] on pairs of vertical meridians of the particle's spherical zone (in the formations region) as quanta of force talantonia $f_\tau = 11,87 \cdot 10^{25}$N[7] per $\tau = 10^{-5}$sec.[9]

If the numerator and the denominator of formula $\lambda = Lf_\tau/F_s$ (Eq. 11) is multiplied by L_0/C_0, then

$$\lambda = \frac{f_\tau L L_0/C_0}{F_s L_0/C_0}, \tag{14}$$

where[12]

$$\frac{F_s L_0}{C_0} = p, \tag{15}$$

the impulse-momentum,

$$f_\tau L_0 = \epsilon_\tau \tag{16}$$

the energy talantonion[7] and due to Eqs 2 and 4

$$\frac{L}{C_0} = \tau. \tag{17}$$

Then Eq. 14, due to Eqs 15, 16 and 17, becomes

$$\lambda = \frac{\epsilon_\tau \tau}{p}. \tag{18}$$

However,[7] it is

$$\epsilon_\tau \tau = h \tag{19}$$

and by the classical Physics it is

$$p = mu. \tag{20}$$

So, Eq. 18, due to Eqs 19 and 20, becomes

$$\lambda = \frac{h}{mu} \tag{21}$$

as the so-called de Broglie's wave length, which coincides with the length of motion wave (wave-like form), as a result of the dynamics of the particle motion (Fig. 8). Specifically, in charged particles the motion formation is a concentrated E/M wave, which is released from the particles as a part of their dynamic elements, during a violent change of their kinetics.[8]

3. References

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