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New Discoveries in the Digital Physics of the Subatomic Universe

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Motto: *The main engine of any development is the stimulation of pluralistic research***.**

1. Purpose of the Report.

The original purpose of the research, which began more than 45 years ago, was to gain a deeper understanding, *'beyond Planck's constant'*, of photonic radiation and the electrons of the silicon atom, which scatter them in the reflection points inside the optical fiber. to determine both the signal frequency and the fiber diameter required to achieve the 'photo*nic superconductivity'* effect, i.e. reducing the signal attenuation from 99% per km (20 dB), as it was for the fibers patented in 1970, to less than 1% (0.2 dB), per km, as obtained as a result of that research.

In the first phase of the research, based on the observation that *'speed* **c** *of quantum radiation'* in the **Abraham-Einstein** equations for electron energy, can not be associated with the masses of elementary particles in the structure of silicon atoms, but an '*universal quantum radiation'* outside the elementary particles, spatially equidistributed, which elementary particles intercept / scatter in the form of quantum waves, (*observed by Compton in 1922*), we discovered that '*the entire Subatomic Universe is composed only of two fundamental digital particle types'*, individually being indiscernible because '*dimensional incompatibility'*.

The '*base particle'* named '*Bason*', the single non-complex particle (the '*brick of the Universe'*), which in the free state compose *'the Universal Basic Radiation'* at '*the radiation speed',* and in the bound state, at '*the cluster kinetic velocity',* they compose the '*Fundamental Digital Quantum Particle'* named '*Quanton*'.

The free Quntons compose *'the Universal Quantum Radiation'* at '*the radiation speed',* and in '*the bound state'*, at the '*globular cluster velocity'*, they compose all *'the Quantum Globular Clusters',* known under the name *'elementary particlers',* including the Photonic radiations.

The first application of this knowledge obtained from research was the determination, in 1975, of the signal frequency and diameter of photonic superconducting optical fibers, used since 1992, for the realization of terrestrial and suboceanic telecommunications of high capacity and long distance, which have made possible the global development of the internet and 'online' communications used today around the world.

Other applications of the basic knowledge obtained consisted of:

- the discovery of the natural essence of the phenomena behind the Planck constant, such as: *'electricity, gravity, inertia, light, heat, nuclear forces and natural relativity'*, which are the foundation of the entire Universe of which Man is part;
- the discovery of the universal digital resonance between the generated gravitational waves of the Quantons that make up all observable matter in Universe, and quantum-electrostatic waves (*first measured by* **Compton**), generated by Electron and Positron, having the same frequency, respectively the same *'digital speed'* of 124 billion Gbps (*billions of Gigabits per second*) ;
- the discovery of the digital quantum gravity that manifests itself between the '*elementary*

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particles' in which they are including '*photons adsorbed by bodies'*, located at mutual distances less than the length of quantum-electrostatic waves generated by electron and positron, where proton-proton and electron-electron electrostatic repulsion interactions are missing;

- the discovery of the binary digital structure of the Proton composed of a '*digital protonic electron'* (positron) in which penetrated a '*digital protonic neutron'*, under the effect of '*quantum digital gravity'*, reversing the polarization of quantum-electrostatic waves;
- the discovery of the effect of conserving the energy of photons from the adsorbed radiation by the intercepted bodies, by spinoid motion around their own axes, at the angular velocity '**αc**' (where '**α**' is the **Sommerfeld** constant for *'fine structures'*), which in the *'quantum-gravitational bound state'* become *'digital thermo-photons'*, accompanying electrons in their motion.
- the discovery of '*natural digital relativity'*, after which an electric particle can be accelerated, using the electrostatic force field, until the limit speed equal to the speed of the accelerating waves is reached, and the inertial mass of the particle, in the direction of motion, doubles when the motion of the particle theoretically reaches the speed limit, without becoming '*infinite*', as proved in proton flux accelerators, where the *'infinity mass hypothesis'*, which seems to result from *'conventional relativity'*, has been experimentally invalidated.
- the discovery of '*natural relativity'*, after which an electric particle can be accelerated, using the electrostatic force field, until the limit speed equal to the speed of the accelerating waves is reached, and the inertial mass of the particle, in the direction of motion, doubles when the motion of the particle theoretically reaches the speed limit, without becoming '*infinite*', as proved in proton flux accelerators, where the *'infinity mass hypothesis'*, which seems to result from *'conventional relativity'*, has been experimentally invalidated.

The research method for obtaining these results consisted in using the knowledge obtained about the two fundamental digital particles and the two subatomic universal radiations, to identify the physical entities involved in the analyzed phenomena, by '*qualitative reanalysis of quantitative physical constants'*, previously obtained by other brilliant researchers.

This Report is to inform ESOF-2020 participants, through an example, that effective cross-border international cooperation in innovative research based on knowledge of fundamental phenomena, less known to the scientific community, is a real chance to meet the huge challenges of the third millennium in the climate and human security, under the main aspects involved.

Keywords: *digital electron, digital proton, digital* ***quanton****, digital* ***bason****, digital* ***thermo-photon,*** *digital sub-quantum gravity, digital quantum gravity, digital inertia, universal digital resonance*, *globular velocity, spinoid force, digital strong nuclear forces, natural relativity factor*, *photonic superconductivity.*

2. Discovery the Fundamental Digital Particle

Planck's constant, **h**, resulted from the division of energies $\mathbf{E_i}$ by the frequencies $\mathbf{f_i}$, which have been be rigorously measured on the radiation of the *black body*, by 5 other brilliant

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researchers [1], between 1898-1900 years, using spectrometers based on Newton's prism and calorimeters whose results in calories were converted by **Planck** to **Joule**s, over the same second, resulting in the equations:

$$\mathbf{h} = E_i / f_i = 6.6260693 \times 10^{-34} \quad [J/Hz \equiv \mathbf{kg.m^2s^{-1}}] \qquad (2.1)$$

$$E_i = \mathbf{h}f_i \qquad (2.2)$$

Observation 1: The presence of the frequency $\mathbf{f_i}$ in the two equations proves that the radiation of the black body belongs to a cyclic phenomenon, uninterrupted, and the constant **h** being expressed în **Joule**s / **Hertz** (J/Hz), proves that it is *'spectral energy density* ', not '*elementary quantum of energy* ', as **Planck** called it [2].

Since the product ($\mathbf{hf_i}$) of equation (2.2) is '*the energy of quantum waves generated by photon radiation during a second'*, we wrote the new equations resulting from the same rigorous measurements performed by the 5 researchers:

$$\mathbf{n_i h_q = hf_i = E_i} \qquad (2.3)$$

$$\mathbf{n_i = f_i\ (1s)} \qquad (2.4)$$

$$\mathbf{h_q = h/(1s) = 6.6260693 \times 10^{-34}} \quad [J \equiv \mathbf{kg.m^2s^{-2}}] \qquad (2.5)$$

where the new universal constant $\mathbf{h_q}$ is exactly the *'unitary energy quantum'*, respectively the *'energy of quantum waves generated by photons in the prpagation medium, during a single cycle'* of the cyclic process, and $\mathbf{n_i}$ is the '*digital number of cycles during each second'*.

In 1903, Max **Abraham**, inspired by **Lorentz**'s formula:

$$\mathbf{(\mu_o/4\pi)e^2 = m_e r_e} \qquad (2.6)$$

which proved the mass essence of electricity, wrote the following equation for Electron [3]:

$$\mathbf{e^2 / 4\pi\varepsilon_o = m_e c^2 r_e} = 2.3070772558 \times 10^{-28}\ \mathbf{kg.m^3s^{-2}} \qquad (2.7)$$

where: $1/\mathbf{\mu_o}$=7.957747154×10^5 F.m.s^{-2}; $\mathbf{e}$ =1.6021766208×10^{-19} C; $\mathbf{\varepsilon_o}$= 8.854187817 x 10^{-12} F/m**;**

$\mathbf{r_e}$=2.81794x10^{-15} m; $\mathbf{m_e}$=0.910938291×10^{-30} kg; *the radiation speed*, $\mathbf{c}$ = 2.99792458 x 10^8 [m/s].

In 1905, **Einstein**, inspired by **Abraham**'s equation, wrote the following equation for both incident photons and all elementary particles, during each second:

$$\mathbf{E = m_i c^2} \qquad (2.8)$$

Observation 2: The expression of energy in the **Abraham-Einstein** equations by the product ($\mathbf{m_i c^2}$) does not allow the knowledge of the real physical entities participating in the analyzed phenomenon, because the mass of elementary particles, respectively of the Electron '*in the quasi-stationary state'* cannot be associated with the velocity **c** '*relative to the same frame of reference to which the quasi-stationary state of elementary particles refers'*.

In the logic of research engineering, the very presence of velocity **c** in the product ($\mathbf{m_i c^2}$) of all quasi-stationary elementary particles proves without error that velocity **c** belongs to a '*radiated*

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[1] **Beckmann** H.. Inaug-Dissert. Tűbingen, 1898; **Rubens** H., Wied. Ann., 1899, 69, 582; **Lummer** O., **Pringsheim** E., Verhandl. Deutsch. Phys. Ges., 1900, 2, 163; **Rubens** H., **Kurlbaum** F.. Sitzungsber. Akad. Wiss. Berlin, 1900, 929.

[2] **Planck**, M., *On the Theory of the Energy Distribution Law of the Normal Spectrum,* Verhandl. Dtsch. phys. Ges., 1900; **Planck**, M., 1901, *Ueber das gesetz der energieverteilung im normalspectrum (On the law of distribution of energy in the normal spectrum)*: Annalen der Physik, v. 309, no. 3, p. 553-560.

[3] Abraham M., Prinzipien der Dynamic des electrons (1903).

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particles', which we called ***Quantons***, from a *'universal quantum radiation'* (UQ Rradiation), having the mass given by the equation:

$$\mathbf{m_q = h_q/c^2 = 7.372497201 \times 10^{-51}\ kg} \qquad (2.9)$$

which are intercepted and scattered by the elementary particles in the cyclical collisions [4].

Equation (2.7) proves that in the *'free state'* at speed **c**, Quantons form '*Universal Quantum Radiation'*, a number $\mathbf{n_i}$ of them being intercepted and scattered by each elementary particle, during each second, in the form of *'quantum waves'* at the frequency $\mathbf{f_i}$ and the wavelength $\boldsymbol{\lambda_i}$**.**

In order for the **Abraham-Einstein** equations, although *'quantitatively correct'*, applied to the quasi-stationary elementary particles to become *'qualitatively error-free'*, I replaced the *'body masses*, m_i ' with the *'quantum digital masses,* $n_i m_q$ ', according to the '*digital equation of quantum equivalence of body masses'* [5]: $m_i = n_i m_q$ (2.10)

for Electron and Photon respectively the following nine new digital quantum equations resulted:

$$m_e = n_e m_q \qquad (2.11)$$

$$n_e = m_e/m_q = 1.23558909024 \times 10^{20} \qquad (2.12)$$

$$f_e = n_e/(1s) = 1.23558909024 \times 10^{20}\ \mathbf{s^{-1} \equiv bps}\ \text{(bits per second)} \qquad (2.13)$$

$$\lambda_e = c\ (\mathbf{2\pi r_e/v_o}) = 2.4263102367 \times 10^{-12}\ [\mathbf{m}] \qquad (2.14)$$

$$\mathbf{v_o = 2\pi f_e r_e = 2\pi f_n r_n} = 2.1876912633 \times 10^{6}\ \mathbf{m.rad.s^{-1}} \qquad (2.15)$$

$$m_\gamma = n_\gamma m_q \qquad (2.16)$$

$$n_\gamma = m_\gamma/m_q \qquad (2.17)$$

$$f_\gamma = n_\gamma/(1s) \qquad (2.18)$$

$$\lambda_\gamma = c\ (\mathbf{2\pi r_\gamma/v_o}) \qquad (2.19)$$

The equation (2.19) contains the product of the *'wave velocity'* of the scattered Quantons and the duration of single cycle of the wave generating process, equation (2.15) expresses the '*angular globular-cluster velocity'* of the bound Quantons in the structures of elementary particles, which is a universal constant. resulting from the generalized quantum equation: $\mathbf{v_o = \alpha c}$ (2.20)

where: $\boldsymbol{\alpha} = \mathbf{2\pi r_i/\lambda_i = v_o/c} = 1/137.036$ (2.21)

is the **Sommerfeld** constant for all quantum clusters also called *'fine structures'*.

Observation 3: The mass value of Quantons according to equation (2.9), being over 10^{20} times smaller than the masses of the elementary particles, which compose the sensors of measuring instruments, their individual discernment is impossible due to dimensional incompatibility, but their existence and physical characteristics are free errors as they result exclusively from data and physical characteristics rigorously measured by other brilliant researchers.

The '*principle of the dimensional incompatibility'* has been demonstrated în the particles accelerators, where only many combinations of fragments of protons or electrons/positrons, which resulted from collisions, have individually detected, but no '*fundamental particle'* having the mass about 10^{20} times smaller than Electron mass.

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[4] Şomacescu I., Şomăcescu A., *The fundamental quantum particle generates gravitation,* Paper-Report to the **GE-2 Sympos.** (Proc.Interdicip.Res. on the Phys.Phenomena), ICPE, Bucharest, Mai-1982, Section 3, poz.3.15 (*updated*); Şomacescu I., *The fundamental quantum particle*, Proc. Of 10th Int. Conf. on Gravity, Padova, Italy (1983) 1019.

[5] Şomacescu I., *From Analogical to Digital Physics*, Bucharest (2018), ISBN 978-973-0-28204-7.

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3. Discovery the natural essence of digital electric charge

To continue the fundamental research by analysing the electric charge, I wrote **Abraham**'s equation (2.7) in the extended analogical/digital form:

$$E_e = \mathbf{e^2/4\pi\varepsilon_o r_e = hf_e = n_e m_q c^2 = n_e h_q = 8.18710506546 \times 10^{-14}\ kg.m^2 s^{-2}} \quad (3.1)$$

and the equation (2.9) in the form [6]:

$$\mathbf{h_q = m_q c^2} = 6.6260693 \times 10^{-34}\ \ [\mathbf{kg.m^2 s^{-2}}] \quad (3.2)$$

Observation 4: The fact that the ratio between the electric charge **e** and the product of the physical entities participating in the electrical phenomenon, ($\mathbf{n_e m_q c}$), resulting from equation (3.1), is a constant without dimensions: $e/n_e m_q c = 4\pi/3\alpha k_e$ (3.3) proves without error, that the electric charge is expressed '*qualitatively*' in ($\mathbf{kg.m.s^{-1}}$), according to the following quantum equation determined from the digital equation (3.3) [7]:

$$\mathbf{e = (4\pi/3)\ (n_e m_q c)/\alpha k_e = (4\pi/3)\ (n_e m_q c^2)/v_o k_e} = 1.6021765314 \times 10^{-19}\ \mathbf{kg\ m\ s^{-1}} \quad (3.4)$$

which sources from the dynamic equilibrium of the both inner and outer/wave Electron energies, given by:

$$\mathbf{(ev_o)}\ k_e = \mathbf{(}4\pi/3)\ n_e m_q c^2 \quad (3.5)$$

$$\mathbf{k_e} = (4\pi/3)\ (n_e m_q c^2/v_o e) = 0.978413757228 \quad (3.6)$$

where $\mathbf{k_e}$ is the recoil effect of the Electron, in the process of collisions with the freee Quantons intercepted in the UQR at speed **c**, in number of $\mathbf{n_e}$ during each second (the **Compton** effect).

Geometric factor (4π/3) and equation (2.15), prove that all untied Quantons $\mathbf{n_e}$ in the Electron, which move both spinoidly about their own axes to conserve energy as they move from the *'free state to the bound state'*, and at the '*angular globular-velocity'* $\mathbf{v_o}$ around the axis of motion of the Electron, forms '*a dynamic globular layer'* with an average radius $\mathbf{r_e}$.

The digital equations for the two electrical constants are given by:

- *the globular mass density*, $\boldsymbol{\varepsilon_o} = (4\pi/3\alpha k_e)^2\ n_e m_q/4\pi r_e = 8.854187817 \times 10^{-12}$ **kg / (m.rad)** (3.7)
- the *spinoid force transmited to waves*, $\mathbf{1/\mu_o} = [(4\pi/3\alpha k_e)^2\ n_e m_q/4\pi r_e]c^2$, **(kg.m.s^{-2}) / rad,** (3.8)

From equations (3.4) it results that the elementary electric charge is in reality *'the mass momentum transmitted by Electron to the electrostatic waves'* generated every second, in the process of isochronous collisions with the $\mathbf{n_e}$ free Quantons intercepted / scattered in the Universal Quantum Radiation.

4. Discovery the natural essence of digital gravity

Observation 5: The fact that gravity, between the Quantons. that make up quantum particles, is permanently attractive, proves: a) - that the gravitational interaction is transmitted by kinetic waves generated by the pressure deficit caused by the reciprocal shielding of Quantons, compared to the pressure of the Universal Basic Radiation (UBR) populated by the Base Subquantum Particles (BSP) named 'Basons', at the radiation speed **c**, which push the Quantons

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[6] Idem above footnote 4, and: Şomăcescu I., *Lélectromagnetisme et la gravitoinertie en une theorie unitaire*, International Conf. of Gravitation, G.R.11, Abstract Book, Stockholm, 27 feb. (1986) (*updated*); Somacescu I., *Model of Gravity and Electricity*, 1988, Communication Report to The Gravity Research Foundation, Massachusetts – USA: poz.76/List [www.gravityresearchfoundation.org/pdf/awarded/1988/1988author_title.pdf].

[7] Şomăcescu I., *A new available energy source,* Bucharest (2007), ISBN 978-973-0-05413-2, p.50 (*updated*).

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towards each other; b) - that Basons are indivisible subquantic particles which, in the bound state, compose the constituent Quantons of all '*quantum particles'* also called '*elementary particles'*.

The stability of the Electron in interaction with UQ Radiation when collided by a free Quanton is given by the balance of gravitational energy between the $\mathbf{n_e}$ Quantons bound in the Electron, on the one hand, and the energy of the intercepted free Quanton, according to '*the quantum digital stability equation'*:

$$\mathbf{G(n_e m_q)^2/r_q = m_q c^2 = h_q} \quad (4.1)$$

from which results the radius of Quanton given by the digital equation:

$$\mathbf{r_q} = G(n_e m_q)^2/h_q = 0.83582113772 \times 10^{-37} \ \mathbf{m} \quad (4.2)$$

The stability of the Electron in interaction with UBR when any of the bound Quanton is collided with a free Bason is given by the balance between the gravitational energy that binds the collided Quanton with the other bound Quantons, on the one hand and the $\mathbf{h_b}$ energy of the intercepted free Bason, according to '*the basic digital stability equation* ':

$$Gm_q(n_e m_q)/r_q = \mathbf{h_b} = 5.36268032175 \times 10^{-54} \ \mathbf{kg.m^2 s^{-2}} \quad (4.3)$$

'*The subquantising factor of gravity'* in relation to the electrical interaction is given by the equation:

$$\mathbf{n_q} = h_q/h_b = 1.23558909024 \times 10^{20} \quad (4.4)$$

which results in the following characteristics at the subatomic level of the Universe:

$$\mathbf{f_q} = n_q/(1s) = 1.23558909024 \times 10^{20} \ \mathbf{s^{-1} \equiv bps} \quad (4.5)$$

$$\boldsymbol{\lambda_q} = c/f_q = 2.4263102367 \times 10^{-12} \ [\mathbf{m}] \quad (4.6)$$

$$\mathbf{m_b} = m_q/n_b = 5.966787226624 \times 10^{-71} \ \mathbf{kg} \quad (4.7)$$

$$\mathbf{G} = h_q r_q/(n_q m_q)^2 = 6.67408 \times 10^{-11} \ kg^{-1}.m^3 s^{-2} \quad (4.8)$$

Equations (4.4), (4.5) and (4.6) prove that there is a digital resonance between UQR, respectively the Quantons that compose all the elementary particles, on the one hand and the electrical particles (Electron and Positron), on the other hand: the same frequencies, $\mathbf{f_e = f_q}$, , the same quantum-subquantum numbers, $\mathbf{n_e = n_b}$, and the same wavelengths, $\boldsymbol{\lambda_e = \lambda_q}$ **.**

This *'universal digital resonance'* explains both the existence of the two electric polarizations caused by the direction of angular motion at velocity $\mathbf{v_o}$ of the *'bound Quantons'* on the globular layer of the electric cluster, which generates attraction or repulsion between the electric particles, and the *'electric neutrality'* of the particles. quantum that does not possess this isochronism.

The angular motion at velocity $\mathbf{v_o}$ of the Quantons bound in electrically neutral quantum particles, causes the precession effect which causes the direction of angular rotation to be reversed at each rotation cycle, so that the electric effect transmitted remotely by quantum waves becomes zero during of two successive cycles of angular rotation.

The existence of this effect is proved by the magnetic moments '*of proximity of the electric dipole'*, found experimentally in '*electrically neutral particles'* when they are placed in strong electromagnetic fields.

5. Relativity in the Subatomic Universe. The natural essence of digital Inertia.

A quasi-stationary quantum particle intercepts / scatters cyclic $\mathbf{n_o}$ free Quantons in UQR at speed c. When the particle moves at the translation velocity **v**, in the direction $\boldsymbol{\theta} = \mathbf{0}$, in relation to

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the UQ Radiation considered stationary, behind it appears a pressure deficit which is compensated by the effect of kinetic equalization, at velocity **c**, of the volume density of energy in UQ Radiation, by attaching / capturing an additional number of Quantons.

The initial $\mathbf{n_o}$ number of Quantons becomes $\mathbf{n_v}$, and the internal and external energies of the particle change as a function of velocity, according to equation [8]:

$$n_v m_q (v_o/\alpha)^2 = n_o m_q c^2 + n_v m_q v^2/2 \qquad (5.1)$$

where the variation of the moving mass of the particle as a function of velocity results, according to the equation:

$$n_v m_q = n_o m_q / (1- v^2/2\, c^2) = n_o m_q k_r \qquad (5.2)$$

where *'natural relativity factor'*, $\mathbf{k_r}$, for the variation of the mass with the speed of movement in relation to the UQRadiation considered stationary, is given by the equation:

$$\mathbf{k_r = 1/(1- v^2/2\, c^2)} \qquad (5.3)$$

Relativistic equation (5.2) shows that the '*gravitational mass'* transmitted at a distance by the quantum waves generated by PQ, increases with the speed of motion as the '*inertial mass'*, with the difference that "*inertial mass*" exists only in the sense of the quantum particle's displacement, only during its displacement.

Observation 6: Doubling the inertial mass of photons at velocity **c**, as shown in equation (5.3) of natural relativity, has been demonstrated experimentally by using the photoelectric effect as a renewable source of electricity.

6. Discovery the binary digital structure of the Proton [9]

The experiments made during 1967-1973 years, by ***Taylor (SLAC)*** and ***Friedman-Kendall (MIT),*** where accelerated electron fascicles collided with target Protons, have demonstrated, based on the distribution of energies and spreading angles, that some electrons collided with a 'protonic - neutron' (name after wards given by us), with a radius $\mathbf{r_{np}}$ of approximately 10-18 m, situated inside the Proton, and with a *'protonic - Electron'*, ie '*Positron'*, with a globular shape around to the protonic-Neutron having the radius $\mathbf{r_{e+}}$ equal to the Electron radius $\mathbf{r_e}$:

$$\mathbf{r_{e+}} = r_e = 2.81794 \times 10^{-15}\ [m] \qquad (6.1)$$

Based on those measurements, I wrote the following equations for the protonic-Neutron and the protonic-Electron (Positron) [10]:

$$m_{np} = m_p - m_{e+} = 1.6717107746 \times 10^{-27}\ \mathbf{kg} \qquad (6.2)$$

$$n_{np} = m_{np}/m_q = 2.2674962268 \times 10^{23} \qquad (6.3)$$

$$f_{np} = n_{np}/(1s) = 2.2674962268 \times 10^{23}\ \ \mathbf{s^{-1} \equiv bps} \qquad (6.4)$$

$$\lambda_{np} = c/ f_{np} = 1.322129909 \times 10^{-15}\ \ \mathbf{m} \qquad (6.5)$$

The equivalent radius of the kinetic cluster '$\mathbf{n_p}$' considered to be in the stationary situation, is given by:

$$\mathbf{r_{np}} = \alpha\lambda_{np}/2\pi = 1.5355345442 \times 10^{-18}\ \mathbf{m} \qquad (6.6)$$

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[8] Şomăcescu I., *Folosirea luminii în experimente inovative din fizică* , Poştă şi Telecomunicaţii, nr.12, 1985, p.139.
[9] Şomăcescu I., *Subatomic Universe*, Bucharest (2004), ISBN 973-0-03716-7, p.39-43 (*updated*).
[10] Şomăcescu I., *A new available energy source,* Bucharest (2007), ISBN 978-973-0-05413-2, p.42 (*updated*).

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resulted from the inner dynamic stability in relation to the partner Positron, where the globular momentum of the $\mathbf{n_{np}}$ bound Quantons at the globular cluster speed, $\mathbf{v_o}$, is equal to the positron wave momentum (*the charge* +**e**), given by the digital stability of electrical neutrality equation:

$$\mathbf{n_{np}m_qv_o/(\pm\pi)\alpha k_{np}= n_{np}m_qc/(\pm\pi)k_{np}= \pm e} \qquad (6.7)$$

where: $k_{np}= n_{np}m_qc/\pi e = 0.995684$ (6.8)

is the constant caused by the recoil effect caused by the scattering of the free Quantons intercepted by the protonic-Neutron (the **Compton** effect).

The '*phase switch factor'* , ($\pm\pi$), in the equation (6.7) proves that during one half orbital cycle, the electrostatic waves generated by '*protonic neutron'* have a positive polarization, corresponding to the ($+\pi$) radians, followed by a negative polarization during the other half digital cycle, thereby rezulting the electric neutrality per entire orbital cycle.

The electrical neutrality equation for Neutron ($m_n= 1.67492747 \times 10^{-27}$ **kg**) is given by:

$$n_n= m_n / m_q = 2.271859078865 \times 10^{23} \qquad (6.9)$$

$$\mathbf{n_nm_qv_o/(\pm\pi)\alpha k_n= n_nm_qc/(\pm\pi)k_n= \pm e} \qquad (6.10)$$

where: n_nm_q is the Neutron digital mass of both Quantons: the globular bound and the free waves;

$$k_n= n_nm_qc/\pi e = \mathbf{0.9976} \qquad (6.11)$$

7. Discovery the natural essence of strong digital nuclear forces and heat

Observation 7: Electric repulsion between Protons inside atomic nuclei are missing, because on the distances smaller than the length of electric waves, $\boldsymbol{\lambda_e}$, the electric waves which transmit the repulsion force are missing too.

There continues instead the '*quantum gravity'* given by the reciprocal shielding of the nucleons in interaction with the free Quantons of the UQ Radiation , whose constant $\mathbf{G_q}$ results from the equation of equivalence of quantum gravity:

$$\mathbf{G_q\,(n_em_q)^2 = (e^2/4\pi\varepsilon_o) = 2.3070772558 \times 10^{-28}\ kg.m^3s^{-2}} \qquad (7.1)$$

$$\mathbf{G_q= (e^2/4\pi\varepsilon_o)/(n_em_q)^2 = 2.78025217887 \times 10^{32}\ kg^{-1}.m^3s^{-2}} \qquad (7.2)$$

The equation of Q-gravity equivalence for 2 '*Protons*' ($\mathbf{n_{e+np}m_q}= 1.672621713 \times 10^{-27}$ **kg**), is given by: $\mathbf{G_q}\,(n_{e+np}m_q)^2 = 7.778209749 \times 10^{-22}$ **kg.m^{3}s^{-2}** (7.3)

The equation of Q-gravity equivalence for one '*protonic-Electron*'/Positron ($\mathbf{n_{e+}m_q}=$ $0.910938291\times10^{-30}$ kg) and '*protonic - Neutron'* ($\mathbf{n_{np}m_q}= 1.6717107746 \times 10^{-27}$ **kg**), is given by:

$$\mathbf{G_q}\,(n_{e+}m_q)\,(n_{np}m_q)= 4.2338385142 \times 10^{-25}\ \mathbf{kg.m^3s^{-2}} \qquad (7.4)$$

A similar equation can be written for attractive interaction between electrons and the captured radiative photons, which become 'thermo-photons' at distances $R< \lambda_e$:

$$\mathbf{G_q}\,(n_em_q)\,\mathbf{(n_im_q)/R^2} = (2.532638175354 \times 10^2)\,\mathbf{(n_im_q)/R^2}\ \ \mathbf{kg.m.s^{-2}} \qquad (7.5)$$

These results prove that '*strong nuclear forces'* are in essence '*Quantum Gravity'* from interaction between hard nucleons and UQ Radiation, which is about 10^6 times stronger than the equivalent electrical interactions given by equation (7.1).

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8. The first application of the research: the photonic superconductivity of optical fibers

In 1970, engineers R. Maurer, D. Keck, and P.Schultz of Corning Glass company (USA), invented round optical fiber (FO), with a diameter of 62.5 microns, equal to the natural silk fiber, having an optical signal attenuation of about 99% per km (20 dB/km), and a transmission of the *'multi-mode'* signal in the visible spectrum (633 nanometers), patented under the name "*optical waveguide fibers*" (patent no. 3,711,262).

Limiting communications without intermediate amplifications on FO, to a maximum of 4 km, due to the attenuation of light signals by over 99% per km, was a major problem of optical fibers, which could be solved only by both innovative and fundamental research.

I have begun the research, following two technical ideas: a) determination of the central frequency of the digital optical signal, $\mathbf{f_\gamma}$, which ensures the '*energetic resonance of the photons with the peripheral electrons of the Silicon atom in the optical fiber'*; b) - determination of the diameter of the optical fiber, (D_{FO}), which ensures the '*synphasing of photons in the reflective points'* inside the FO, regardless of its length.

In order to obtain the photons *synphasing* in the reflexive points we put two known conditions in optical engineering: i) - the angle of incidence, **φ,** to be equal to the reflex angle in the reflexive points, and ii) - the distance traveled by the photon between two successive refleive points, $(\mathbf{D_{FO}/\cos\varphi})$, divided at the wave path over that distance, $(\mathbf{\lambda_\gamma/\cos\varphi})$, must be $\mathbf{2\pi}$ radians, writing the following equation:

$$(\mathbf{D_{FO}/\cos\varphi}) / (\mathbf{\lambda_\gamma / \cos\varphi}) = \mathbf{2\pi} \quad (8.1)$$

which resulted in:

$$\mathbf{D_{FO}} = \mathbf{2\pi\,\lambda_\gamma} \quad (8.2)$$

To obtain the energy resonance of photons with the peripheral electrons of the silicon atom. according to the existing logic in research engineering, it was necessary a preliminary qualitative verification of the constants resulting from rigorous quantitative measurements previously perfomed by other researchers, which refer to both photonic radiation and the electrons of the Silicon atom.

In 1975 we obtained both aimed results [11] sought through mixed research: fundamental and applied. on both the frequency of optical signals and the diameter of optical fibers suitable for photonic superconductivity.

The fact that the two peripheral electrons in the (**3p**) orbital layer of the Silicon atom move at the speed resulting from the calculation of the interactions with the 14 protons of the nucleus, given by:

$$\mathbf{v_{e(3p)}} = v_o/(4\pi/3)k_{Si} = 0.53037888 \times 10^6 \ \mathbf{m.rad.s^{-1}} \quad (8.3)$$

when interacting with the incident photon at velocity **c**, prove that the energy resonance occurs in accordance with the following quantum equation:

$$n_\gamma m_q c^2 = \mathbf{E_{e(3p)}} = n_e m_q (\mathbf{v_{e(3p)}})^2/2 = 1.2812427 \times 10^{-19} \ \mathbf{kg.m^2s^{-2}} \quad (8.4)$$

where:

$$k_{Si} = 1-(2\pi/3)\alpha = 0.98471646 \quad (8.5)$$

is a constant caused by the recoil effect of the Electron in the collision-scattering process of free Quantons into UQ Radiation.

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[11] Şomacescu I., *The elementary quantum particle allows to know the effect of photonic superconductivity at the optical fibers*, Scientific Communications Session , ICPTTc, Bucureşti, 1975, Secț. 2 – Sect. Proiectări, poz. 2.3 (*updated*);

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From equation (8.4) corroborated with equations (2.18) and (2.19) results the quantum number, $\mathbf{n_\gamma}$, the quantum frequency, $\mathbf{f_\gamma}$, and the length of the quantum waves, $\boldsymbol{\lambda_\gamma}$, of the photons in the digital flux passing through the superconducting optical fibers:

$$\mathbf{n_\gamma} = n_e(\mathbf{v_{e(3p)}/c})^2/2 = 1.9336391916 \times 10^{14} \quad (8.6)$$

$$\mathbf{m_\gamma} = n_\gamma m_q = 1.42557495278 \times 10^{-36}\ \mathbf{kg} \quad (8.7)$$

$$\mathbf{f_\gamma} = n_\gamma/(1s) = 1.9336391916 \times 10^{14}\ \mathbf{bps} \quad (8.8)$$

$$\boldsymbol{\lambda_\gamma} = \mathbf{c/f_\gamma} = 1.55\ \mathbf{x\ 10^{-6}\ m;}\ \textit{(≡1550 nanometri)} \quad (8.9)$$

From equation (8.2) the diametre of the optical supetrconductive fiber results:

[*digital transmission window,* μm: 8 – 11] **,** $\mathbf{D_{FO} = 2\pi\lambda_\gamma = 9.74}$ μm (8.10)

In December 1978, NTT engineers Ibaraki Lab. stated that they obtained in the laboratory the effect of superconductivity (reduction of optical signal attenuation to 0.2 db / km), using signals with wavelengths of 1550 nm, resulting from the research presented here, experimentally confirming the validity of knowledge from fundamental research on the Subatomic Universe, expressed by the above equations.

Following the 1992 **TAT-10** system, in 1996, MCI engineers commissioned the **TAT-12/13 Transatlantic Transmission System** at a capacity of 5 Gbps, which allowed the explosive development of the Internet worldwide, using superconductivity FO - SM/1550 nm/0,2 dB/ km, based on the symphasing of the reflections and on the diameter $\mathbf{D_{FO} = 2\pi\lambda_\gamma}$.

In 1998, the superconductivity of optical fibers based on '*the symphasing of reflections'* allowed telecommunications engineers to raise global transmission capabilities to 10 Gbps.

8. Instead of conclusions

The new model of the '*two Subatomic Universal Radiations and two Fundamental Digital Subatomic Particles*' is an '*unitary digital theory'* which explain the natural essence of the electricity, gravity, inertia, nuclear forces, heat, and natural relativity, based exclusively on the quantitative physical constants resulted from the previously measurements effectuated by other brilliant researchers who had access to the resources needed for the research.

Natural climatic and health phenomena, which increasingly threaten people's lives, can be controlled at a reasonably acceptable level, only if we endeavor together to know their natural essence in depth.

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