A COLD GENESIS THEORY OF FIELDS AND PARTICLES

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Abstract

The book argues the possibility of cold genesis of particles and of fundamental fields through a phenomenological approach using the concept of sub-quantum fluid, the theory explaining the elementary particle and the fundamental fields cold genesis with ideal unitary pre-quantum particle' models of simple or composite chiral soliton type, formed at $T \rightarrow 0K$ from confined "dark energy" in a cascade vortex process, according to the ideal fluids mechanics applied to the particle soliton vortex, in the Protouniverse' period, by primordial gravstars.

The exponential form of the nuclear potential is theoretically found through a nucleon model of degenerate electrons and an Eulerian expression, as being generated by the vortexial dynamic pressure inside the nucleonic quantum volume. The weak force is explained by a dynamid model of neutron with intrinsic vibration and the particle disintegration are explained as a result of intrinsic vibration of quarks formed as cluster of quasi-electrons.

For a phenomenologic model of cosmic expansion, by the dependency of the G-gravitation constant of the etheronic local density, the physical cause of the cosmic expansion results as a force of pressure difference of etheronic winds coming from the ultrahot stellary structures having an antigravitic charge given by destroyed particles, the speed of expansion resulting with a semi-sinusoidal variation.

1. Introduction

The abandonment of the concept of ether in the explanation of the microphysics phenomena, through the postulate of the constant light speed in Einstein's special relativity, led to major paradoxes in the physical interpretation of the relativist relations, such as the so called "the twins paradox". Moreover, a series of experiments states the possibility of exceeding the light speed, [1]. These theoretical consequences are determined the recurrence to the classic concept of quanta having a non-null repose mass, (L. de Broglie, [2]). In 1974, J.P. Vigier argued the existence of experimental proofs in favor of this hypothesis, [3] .

The hypothesis of a quantum medium existence also in the intergalactic space was reconsidered in the case of some "etheronic" theories explaining the fundamental fields and interactions and the Universe expansion, [4],[5],[6] which are compatible with a matter cold genesis mechanism.

Also, the astrophysical researches regarding the graviton mass asserts the hypothesis of the etheronic nature of the gravitic fields, [7].

Thus, these theoretical drifts reconsidered also the need for some ideal pre-quantum models, based on the classical law of mechanics and the Galileian relativity, for explain the genesis, the fields and the evolution of elementary particles. The link of these models with the quantum mechanics is made by the theoretical results of the researches of Böhm and Vigier [8] showing that- in adequate general conditions, the density of the presence probability of a particle, $p(|\psi|^2)$ given by the quantum mechanics, associated to de Broglie wave, approximates the physical density $\rho(r)$ of a non-viscous, uniform quantum fluid for which the equations of the ideal fluid can be applied. At the same time, these models can explain, through the "hidden thermodynamics" of the particles, [9], the constancy of charge and of magnetic moment and the spin characteristics of the particles, considering a negentropy of the sub-quantum medium transmitted to the particle by "quantum winds", [10]. These quantum winds generates a magnetic field around the electric charge by quantum vortices that are proper to a chiral quantum soliton structure of the electromagnetic field quanta [11] and of the elementary particles [12], particularly considered in a quantised soliton model [13].

The particle chiral quantum soliton model used by some etheronic theories for explain the wave-corpuscle dualism of the photons and fermions complies with both the nonlinear causal interpretation in quantum mechanics (de Broglie, D.Bőhm, J.P.Vigier) and Einstein's idea of unifying the fundamental fields by considering the particles as formed by field matter structures which comply with nonlinear field equations [14].

H. A. Mùnera considers the particles repose mass as being generated by the etherial fluid with a flow moment (vortex) along a perpendicular direction to the impulse [15].

The photon is considered as a semi-classic doublet: particle-antiparticle, which explains the frequency and the repose mass of a photon, the model deducing two spin values (±1) for the photon and the validity of the de Broglie's energy equation, [9].

Geoffrey Hunter and L.P. Wadlinger [16] proposed a solitonic model of photon corresponding to the Einstein's concept of photon considered as a localized and confined electromagnetic wave in a circular volume of an ellipsoid with the length along the propagation axe- equal to the associated wave- length, λ, and the photon diameter: $d_f = \lambda/\pi$. This model has been recently confirmed by experiments regarding photoelectric effect and the diffraction.

The wave constituting the chiral soliton vortex might be considered as being composed by two parts: a linear part – the evanescent component, and a non-linear part that might be identified with the ψ(r,t) -wave function from the double solution theory of de Broglie-Bohm-Vigier, [17].

Donev Stoil has deduced by the photon energy Planck expression: $E = h\nu$, written in the form $E\cdot\tau = h$, $(\tau = 1/\nu)$, that the size $h = E_\tau$ represents the photon' kinetic moment of spin (the polarization) and represents a real physical size associated to the solitonic photon [18].

It is important to observe that if the Múnera's model of photons is dimensioned like in the Hunter-Wadlinger model, considering the simple photon as a doublet of two vectorial photons with mutually anti-parallel spins $S=\hbar/2$ and a diameter: $d_w = d_f = \lambda/\pi$ and considering the hard-gamma quanta as a doublet: negatron-positron, $\gamma_c = (e^+ - e^-)$, with opposed spins and the energy: $\varepsilon_\gamma = h\nu = 2m_e c^2$, results that the electron of γ_c-doublet may be assimilated with a vectorial (semi)photon, m^e_w, with a r_λ-radius which results equal to the Compton radius of a free electron:

$$r_\lambda = r_e = \frac{\lambda}{2\pi} = \frac{c}{2\pi\nu} = \frac{ch}{2\pi\cdot m_e c^2} = \frac{h}{2\pi\cdot m_e c} = 3{,}86x10^{-13}m \qquad (1)$$

This value of a electron Compton radius is found in the solitonic models of electron as representing the electron' soliton radius [12].

By this result it is suggested the possibility of finding a pre-quantum model (conform to the classical mechanics applied to the quantum and sub-quantum fluid) of chiral soliton type, for the fermionic particles, by considering a prequantum substructure of photonic bosons vortexially confined „at cold", in a volume of a Compton radius: $r_\mu = \hbar/(m_\rho c)$ – according to the eq. (1) extended for the case of a simple or compound soliton-like particle.

This pre-quantum model of elementary particle corresponds to the Sidhart model of particle [19], which considers the elementary particles as being relativistic vortexes of a Compton radius from which the mass and the spin of the particles is obtained, with the circulation speed of the quantum fluid in the solitonic vortex space- equal to the light speed, c, being admitted also the hypothesis of the existence of a super-light speed in the vortex, without contradiction to the conventional theories.

In accordance with this chiral pre-quantum model of particle, we may consider that the repose inertial mass of a fermion, m_p, is confined by a solitonic vortex with a stabilizing super-dense centroid and with: $\omega \cdot r = c$ for $r \le r_\lambda$, (i.e.-generated by quantum and subquantum winds), in a volume of a r_p -radius representing the particle' quantum volume radius.

2. Considerations concerning the quantum and subquantum medium

Relative recent researches [7] based on astrophysical determinations relating to the graviton mass, denote a probable mass of the gravitons in a very large range: 10^{-67}kg, according to S. Choundhury -resulted from a "gravitational lens" effect and 10^{-55}kg, according to L.S.Finn -resulted from studies of the binary pulsars .

This seeming contradiction can be solved-in a classical theory of fields, by the hypothesis that the mentioned values correspond to the mass of at least two categories of etheronic particles which can constitute a sub-quantum (etheronic) medium and which generates gravitic field.

Regarding to the quantum medium, accepting the Munera's vortexial model of photon and a chiral soliton model of electron, for explaining the fields and the difference between a positive and a negative electric charge by a vectorial type of electric field quanta, it is important to know which vectorial photons, of un-bounded chiral soliton type, (semiphoton), are the most stable vectorial leptons. Because that these vectorial photons are parts of the most widespread radiation quanta, as a Floreanini-Jackiw chiral antiparallel component particle of a scalar field quanta which can be splitted into its components, [20], considering also the electron chiral soliton as a semiphoton of a hard-gamma quantum and excepting the neutrino, (which is very penetrant and have probably a very dense mass), we deduces three vectorial leptons which are the most stables fermionic leptons in the Universe, in un-bonded state: the electron: $m_e = 9.1 \times 10^{-31}$ kg; the semiphoton of the 3K -cosmic background radiation: $m_v = k_B T/2c^2 = 2.3 \times 10^{-40}$kg, (named "vecton" in our model) and the h-quanta, named "quanton" in some theories [6], with the mass: $m_h = h \cdot 1/c^2 = 7.37 \times 10^{-51}$ Kg.

Considering these leptons as being quasistable vectorial leptons and the electron as being the 1-rank quasistable vectorial lepton, m_s^1 , we observe that the masses of the considered quasistable leptons are in the relation:

$$m_s^1 \approx K^v \cdot m_s^2 \text{ ; } m_s^2 \approx K^v \cdot m_s^3 \text{ ; with: } K^v \in (10^9 \div 10^{11}); \qquad (m_s^1 = m_e \text{ ; } m_s^2 = m_v \text{ ; } m_s^3 = m_h).$$

-In accordance with that, it results as plausible the hypothesis that the elementary particles genesis can occurs „at cold", in a Euclidean Protouniverse, ones from another, from the „dark energy" containing primordial un-structured subquantum particles, by confination of quasistable leptons of inferior mass, realised by a solitonic vortex with a stabilizing super-dense centroid. We deduce the possibility to characterise the process of soliton-particles genesis by a „vortices cascade" model, with the next specific *axioms*:

a1–the natural cold genesis of particles is a fractalic „vortices cascade" process;

a2-all fermions are simple or composite chiral solitons, formed by a particle-like central inertial mass giving its corpuscular properties and a spinorial mass which do not contribute to the inertial mass, the pairs of fermions with antiparallel chirality being bosons;

a3-the particles of composite chiral soliton type having the mass of k–stability rank, with k=1 for $m^k=m_e$ and k=0 for $m^k > m_e$, are formed by the confination of quasistable leptons with (k+1) rank mass: m_s^{k+1}, by chiral solitons of quasistable photons or/and etherons with the mass: $m_s^l \le m_s^{k+1}$, ($l \ge k+1$) formed around a centroid with chirality $\zeta=\pm 1$;

a4-the masses of stable/quasistable free photons or etherons are in the relation:

$$m_s^k \approx (K^v)^{-1} \cdot m_s^{k+1}\ ; \qquad \text{with: } K^v \in (10^{-9} \div 10^{-11}); \quad k \ge 1 \tag{2}$$

and this (quasi)stable free photons or etherons can be field quanta or pseudoquanta or/and constituent quanta of elementary particle with bigger mass, as "frozen photons".

It deduces logically that the etherons, having the most little mass, are quanta of gravitational type field , in accordance also with the results of the generalized relativity.

According to a4-axiom we will consider that the sub-quantum medium, (A_c), containing etherons, b_s, having the mass $m_s << m_h = h/c^2$, (h-Plank constant), is compound of two categories of field quanta, named as follow:

-s-etherons or "sinergons"-with the mass: $m_s = K^v \cdot m_h \in (10^{-9} \div 10^{-11}) \cdot m_h \in (10^{-59} \div 10^{-61})$kg;

-g-etherons or "gravitons"- $m_G = K^v \cdot m_s \in (10^{-9} \div 10^{-11}) \cdot m_s \in (10^{-68} \div 10^{-72}) \cdot$kg ;

This last result of a4 -axiom is in accordance with the upper limit of the graviton mass: $m_g \le 1.6\text{x}10^{-69}$ kg, found by the relativistic theory of gravitation and experimental data concerning the "dark energy" density, [5], so the generalisation of rel. (2) also for the (A_c) - subquantum medium is justified.

To this sub-quantum medium, (A_c), regarded as an ideal fluid, as for the quantum medium, (B_c), the Bernoulli's law for ideal fluids can be applied, in the reduced form: $P_s+P_d=P_s^M$,

(P_s; P_d; P_s^M - the static, the dynamic and the maximum quantum pressure).

-The mass: $m_h = h/c^2$ which corresponds to the chiral soliton named "quanton" in our theory, delimits the (A_c)- sub-quantum medium particles from (B_c) quantum medium particles.

-Also, we shall consider a density: $\rho^M \ge 2 \cdot 10^{19}$ Kg/m^3 (bigger than the density of black holes) for all unstructured particles of the (A_c)- sub-quantum medium and for the centroids of (B_c)- quantum medium leptons, (centroids named "centrols" in our theory).

-For the fundamental particles, we shall consider a solitonic, pre-quantum spin, **S***, depending on the existence of an $\boldsymbol{\Gamma}_p$ -intrinsic vortex of quanta, distinct from the quantum spin, **S,** but wich shall be identified with this for the leptonic fermions. This $\boldsymbol{\Gamma}_p$-vortex must be in causal link with a $\boldsymbol{\mu}_p$ -magnetic or pseudomagnetic moment of particle, according to eq.:

$$\mathbf{S}_p^{*} = K_S\cdot\boldsymbol{\Gamma}_p = \tfrac{1}{2}\hbar\cdot\zeta_p.; \quad \mu_p = (q^*/m_p)\cdot\mathbf{S}^*_p = \tfrac{1}{2}\,(q^*\cdot c\cdot r_\mu)\,, \quad \text{with: } \zeta_p = \pm 1;\ \Gamma_p = \oint dl\cdot v = 2\pi r_p c\,; \qquad (3)$$

where: r_p ; r_μ –the fermion' mean radius and the Compton radius- defined as the superior limit of the vortex: $\Gamma_s(\omega_s\cdot r = c)$; q*-the particle charge or pseudocharge, and: $\zeta_p = \pm 1$- the "intrinsic chirality", considered as an absolute value.

-The considered pre-quantum dimension: "intrinsic chirality": $\zeta = (\pm 1;\ 0)$, differs from the quantum helicity representing the spin projection on the impulse direction and characterise the sense of the formed vortex around the centroid (the centrol) of the fermion in a homogenous quantum or subquantum wind. In consequence, in our model the "intrinsic chirality" is a dimension which characterizes the particle' core, the particle spin depending on the hypothetical spiral shape of its centroid, i.e.: on the intrinsic chirality: $\zeta = \pm 1$ for levogyrous or dextrogyrous spiral core and $\zeta = 0$ for non-spiral core, (without vortex). The image in mirror of $+\zeta$, is: $P(\zeta) = -\zeta$, so the spatial parity P operator change the solitonic spin.

-Because that the chiral soliton model of electron is of spatial-extended (lorentzian) type, the electromagnetic nature of the inertial m_e-mass is done-according to the a3- and a4-axioms, by n_v -component vectorial photons with bigger mass than the vecton mass, wich will be named "vexons" in our theory, corresponding to the 'zero point energy' photon: $E_w^0 = \tfrac{1}{2}h\nu$ and which may explains the photonic emission of the accelerated electron or proton .

In this case, the vecton ,m_v, may be identified with the quantum of electrostatic field, **E**, and the next quantum of inferior order: the quanton, m_h, may be identified with the quantum of **H**-magnetic field, in the sense that the Γ_c -quantonic vortex generates the μ_e -magnetic moment of electron, in accordance also with the eq. (3).

-The vectorial quantum of stability rank k=1 resulted in accordance with the a4 -axiom: the hard-gamma semiphoton, which will be named: "semigammon" in our theory, having the electron mass, m_e, may be identified in this case with the pseudoquanta of the strong nuclear field in the sense that the proton results as being a compound chiral soliton formed by the confination of gammonic pairs of degenerate electrons resulted as bounded "semigammons", wich attracts an another nucleons by its own degenerate quantum vortex.

-Resuming, results-according to the a1-a4 axioms, that the sub-quantum and the quantum medium have the following composition of field quanta and pseudoquanta:

(A_c) – sub-quantum medium; ($m_s << m_h = h/c^2$; $S_s^* \cong 0$):

- gravitons; (g-etherons): $m_g = (10^{-68} \div 10^{-72})$ kg, acting as gravitic field quanta and having contribution as etheronic wind to the genesis of gravitomagnetic quantum-vortices;
- sinergons; (s-etherons): $m_s = (10^{-59} \div 10^{-61})$ kg, acting as sinergonic quanta of vortices of gravitomagnetic chiral solitons ;

(B_c) – quantum medium, $m_b \geq m_h = h/c^2$:

-quantons: $m_h = h/c^2 = 7.37 x 10^{-51}$ Kg; $S_h^* << ½\hbar$, acting as quanta of the **B**- magnetic field and forming the μ_p -magnetic moment of fermion; similarily, the pseudomagnetic moment of quanton: μ_h , results by eq. (3) as a sinergonic vortex formed around a quantonic superdense centrol having the mass: $m_h^c = m_h$, the quanton being-in our theory, the smallest hard-core fermion.

- vectons (vectorial photons): $m_v = 3x10^{10} m_h = 2.2x10^{-40}$ kg; $S_v = S_v^* = ½\hbar$; acting as electrostatic field quanta, resulted as hard-core semiphotons of the cosmic 3K-background radiation;

-vexons; $m_w \geq 10 m_v$; $S_w = S_w^* = ½\hbar$; structured as CF-chiral soliton of vectons, acting as constituents of elementary particles quantum volume (as "frozen photons") and of luxons;

- pseudoscalar photons, (particularly-luxons): $m_f = n \cdot \nu \cdot m_h = 2n \cdot m_w$, $S_l = 1\hbar$; acting as electromagnetic radiation pseudoscalar quanta, formed by 'n' pairs of vectorial photons: $m_f = n \cdot (m_w - \bar{m}_w)$ which changes sign at a parity inversion: $P(+\zeta-\zeta)=(-\zeta+\zeta)$, i.e.:

$$P(\zeta m_w - \zeta \bar{m}_w) = (\zeta \bar{m}_w - \zeta m_w) = -(\zeta m_w - \zeta \bar{m}_w).$$

In accordance with the Munera's model of photon, the multiphoton with energy: $\in_f = n \cdot h\nu$, represents a row of 'n' pairs of coupled vexons having antiparallel spins, the vexon being considered in our theory with the diameter dimensioned conform with the Hunter-Wadlinger's model of photon, ($d_w = \lambda/\pi$), and being identifiable as "photino" in the supersymmetric theories.

The possibility of representing quantum particles as composed of chiral soliton fronts of planar vortices having reciprocally opposed orientations, formed in a Madelung-type fluid as solutions of a nonlinear equation, is theoretically confirmed [21].

In the soliton theory, these photon pairs corresponds to Falaco-type pairs of planar vortices, [22], that could be long-life states and arise usually in areas having minimal surface defects when the energy density $\in_r = \rho_r c^2$ of the generating vortex soliton field is double, at least, comparing to the mass/energy density $\in_w = \rho_w c^2$ of the generated sub-solitons: $\in_r = 2\in_w$.

As chiral constituent of the electron mass- given by paired component vexons (frozen photons) according to a4- axiom, the m_v-vecton has as correspondent in supersymmetric theories, a particularly fermionic superpartner of the axion-particle, called „axino" and having the rest-mass: $10^{-6} \div 10^{-2}$ eV/c^2, predicted to change into and resulting from a microwave photon in the presence of strong magnetic fields, explaining in this way the non-baryonic dark matter.

The existence of vectorial photons as electromagnetic field quanta is considered also by L. S. Mayants, [23], which argued the possibility to explain the electromagnetic field by a gas of particles, called “emons”, having a tiny but non-zero rest mass ($m < 10^{-50}$ kg).

According to the model, the structure of particles contained by the quantum medium, (B_c) , is consistent with the quantum soliton theory which shows that the quantified soliton-particles are solutions of the Schrodinger nonlinear equation – solutions that are similar to those which describes wave bundles whose centers moves as particles that can interact elastically, [13].

We will argue in the theory that all elementary particles can be described by a „cascade vortices” cold formation process. The basic particle model of cold genesis used for explain the particles basic properties represents an ideal, un-disturbed and non-relativist model of chiral pre-quantum soliton, generated at cold, ($T \to 0K$), as a quantized vortex in a sub-quantum or/and quantum medium, with a Madelung type representation of the sub-quantum fluid [24], according also to the Bohm-Vigier interpretation of Ψ-wave function.

3. The photon

Considering that the simple photon with energy $\in_f = h\nu$ represents a pair of coupled vectons or vexons -in accordance also with Munera model of photon, [15], the known wave-corpuscle dualism of photon is explained in the theory considering that the wave properties of photon is given by a vortexial evanescent part of its vectons/vexons formed around theirs inertial mass $m_{v(w)}$ which gives the corpuscular character of the photon.

The fact that for a photon of an electromagnetic wave the value of electric **E**-field energy is equal to the value of the magnetic **B**-field energy by the relation: $E = c \cdot B$, results -according to the theory, from the equality between the value of the electric field energy: $w_E^f = ½ \cdot \varepsilon_0 E^2 \sim ½ m_S c^2$, given by the translation energy of a spinorial Γ_S vortex of quantons, which do not contribute to the vecton'/vexon' inertial mass, $m_{v(w)}$ - given by a vectonic/vexonic core, and the value of the magnetic moment vortexial energy: $w_\mu^f = ½ \mu_0 H^2 \sim ½ m_S (\omega_h c)^2$ of the photonic vecton/vexon, given by the vortexial energy of the Γ_S -vortex containing a m_S-mass of quantons in the volume of Compton radius, i.e.:

$$w_E^f = w_\mu^f \;; \quad \frac{\sum m_h \cdot c^2}{2} = \frac{\sum m_h (\omega_h \cdot r)^2}{2} = \frac{h \cdot \nu}{4}; \quad w_f = 2(w_E^f + w_\mu^f) = 2 m_{v(w)} c^2 = h\nu \tag{4a}$$

because that inside the vexonic chiral soliton with $r_\mu = r_\lambda$, is satisfied the condition: $(\omega_c \cdot r) = c$.

From (4a) results also that: $m_S = \sum m_h = m_{v(w)}$, so the spinorial mass of the vecton'/vexon' spinorial vortex is equal with the inertial mass of the photonic vecton/vexon.

In accordance with the general character of a1-a4 axioms of the theory, this result may be generalised for all chiral soliton particles in the sense that the intrinsic chirality: $\zeta = \pm 1$ of the particle superdense centroid, induces a (sub)quantum Γ_υ-vortex formation to a particle having the v_p -speed in the presence of a (sub)quantum medium as in the case of the action of a (sub)quantum wind having the same velocity, according to the relation:

$$w_\mu = \in_k; \quad \Rightarrow \quad \tfrac{1}{2}\sum m_h(\omega_h \cdot r)^2 = \tfrac{1}{2} m_p v^2 \qquad (4b)$$

which suggests a phenomenological reason for the relativist hypothesis of the particle speed-depending mass variation, by the vortex pair forming condition [22], (i.e.: $m = m_0 + \Delta m(v) \sim \Gamma_\upsilon$).

4. The fermionic spin

The semi-whole spin: $S_v = \tfrac{1}{2}\hbar$, ($\hbar = h/2\pi$) of the vectorial photon considered as spatially extended chiral soliton with a spinorial Γ_S -vortex of radius equal to the Compton radius: $r_\lambda = d_\lambda/2 = \lambda/2\pi$, [16], results in theory as a real size representing the rotation kinetic moment in classical sense, i.e.–"pre-quantum spin", S_v^*, by approximating the vectorial photon with a vortex–tube in a barrel form (pseudo-cylindrical), in prequantum model, which becomes pseudo-spherical by spin precession, in quantum model, with a (3D) radial-symmetric distribution of the component quantons, with the quantonic density, $\rho_c(r)$, varying according to the relation: $4\pi r^2 \rho(r) = 4\pi r_a^2 \rho(r_a) = \text{constant}$,

characteristic to the evanescent part of the photon wave ($\rho(r) \sim |\psi|^2 \sim r^{-2}$; $r > r_a$) which contains the m_S spinorial mass of its vectons or vexons, i.e.- excepting the quantum volume mass of a r_a –radius, containing the $m_{v(w)}$ inertial mass, which is characterized by an exponential wave function of Schrödinger-Bohm-Vigier type, ($\rho'(r) \sim |\psi'|^2 \sim e^{-\gamma \cdot r}$; $r \le r_a$).

Considering a spin precession movement of vecton or vexon, we can approximate that the kinetic moment of a vortexed quanton of its spinorial vortex, Γ_S, has the value: $i_h = m_h c.r$, (r- the distance from the soliton centre) in all solitonic volume, thus having for any pair of vortexed quantons equally placed at a δ distance from a surface of radius $r^*_\lambda = r_\lambda/2$, the relation: $m_h c\cdot(r^*_\lambda + \delta) + m_h c\cdot(r^*_\lambda - \delta) = 2 m_h c.r^*_\lambda$. Therefore, integrating for all photonic volume of r_λ -radius and with the mass: $m_S = \nu_v \cdot m_h$, ($\nu_v = m_s c^2/h$- the equivalent frequency of the vectorial photon), the vectorial photon spin results of value: $S_v^* = m_v \cdot c \cdot r_\lambda/2 = \tfrac{1}{2}\hbar$,

if the spinorial mass of fermionic soliton' evanescent part is equal with the particle-like part mass: $m_S = m_{v(w)}$ - condition fulfilled also in the case of the vexon, according to the relation (4b) of the theory , so- in concordance with the quantum mechanics.

The same result is obtained, for a vectorial photon with spin precession, also by the integral:

$$S_v^* = \int_{r_a}^{r_v} r \cdot c \cdot dm \cong 4\pi r_a^2 \rho(r_a) \cdot c \cdot \frac{r_v^2}{2} \cong m_s \cdot c \cdot \frac{r_v}{2} = \mathrm{m_s c} \cdot \frac{\lambda}{4\pi} = m_s \cdot c \cdot \frac{h}{4\pi \cdot m_v c} = \frac{1}{2}\hbar \qquad (5)$$

with : $\rho(r)/\rho(r_a) = r_a^2/r^2 = |\psi|^2$, neglecting the spin: $I_s(r_a) \approx \frac{1}{2} m_v c \cdot r_a^2$ of the inertial $m_{v(w)}$-mass . An identical result is obtained similarily also for a vectorial photon without spin precession, approximated as being pseudo-cylindrical, with the lenght: $l_a = 2r_a$ and with a density: $\rho(r) \sim |\psi|^2 \sim r^{-1}$, i.e.: $\rho(r)/\rho(r_a) = r_a/r$. It is explained by this also the equality between the prequantum and the quantum spin of the leptonic fermions. The equation (5) by which the S_v*-spin' value of vectorial photon is equal to the value of quantum spin, S_l, by the equality: $m_s = m_{v(w)}$, may be generalised also in the case of another leptonic fermion: the electron.
Results also that the S_p^*-prequantum spin is null for the pseudoscalar photon of vectons ($m_f = 2n \cdot m_v$, $T \to 3K$), being given by the $\Gamma_s = \Gamma_\mu$ quantonic vortex of vecton' magnetic moment and $S_p^* = S_l = 1$ for photons with mass $m_f = (m_w + \bar{m}_w)$ if Γ_s is given by a vortex of vectons, $\Gamma_s = \Gamma_v = \pm\Gamma_\mu$.

5. The charge model

In accordance also with the charge model of quantum mechanics, the q_e charge of a particle, results as being given by a spheric-symmetric distribution of charge' quanta around the particle having the radius $r_a = a$, i.e.: $\rho_a \cdot r^2 = \rho_a^0 \cdot a^2$, with a variation of the quanta impulse density having the form:

$$p_c = \rho_c(r) \cdot \mathrm{v_c} = \rho_a^0 \frac{a^2}{r^2} \cdot \mathrm{v_c}; \qquad \rho_a^0 = \rho_c(a);\ \mathrm{v_c} = c; \qquad (6)$$

We shall consider as real charge: $Q(p_c)$, the charge for which the quanta impulse density, p_c , is parallel to the radius direction: ($p_c \uparrow\uparrow r$) and as virtual charge: $q_i(i.p_c)$, ($i = \sqrt{-1}$), the charge for which the impulse density p_c is anti-parallel to the radius direction , ($p_c \downarrow\uparrow r$).
A charge for which the intrinsic chirality and the field quanta chirality is: $\zeta_c = 0$, is exclusively a repulsive of "static" type charge if it is real charge and exclusively attractive of "static" type charge if it is virtual charge, according to the model.
-For the elementary electric charge 'e' , the charge sign depends on its intrinsic chirality ζ_e correlated with the electric field quanta chirality: ζ_v, in accordance also with the combined CP parity , the fact that: $P(\zeta_v) = -\zeta_v$ being the cause of the charge sign inversion: C(e) = -e.
The vectons chirality $\zeta_v = \pm 1$ express also the fact that for ultrarelativistic particles, the spin lies in the direction of the motion, parallel or antiparalle with the particle' impulse.
This charge model is complying partially with Whittaker principle (1903) according to which any scalar potential is a result of the energy of an "electromagnetic wind", [25].

5.1 The electrostatic type interaction between charges

In a classical way, the interaction force F_e of an electrostatic type field, generated by a charge Q(M) on a pseudocharge $q(m_0)$, is given by the impulse density variation:

$\Delta p_c = p_c(r) - p_c(-r) = 2n.m_c v_c$, ($n = n_0 \Delta r$) of the Q(M)-charge quanta which interacts elastically on the x direction at the semi-surface level: $S^x = S^0/2 = 2\pi r_0^2$ of the m_0 interaction particle, for which its "pseudo-charge" is proportional with its surface: $q_s(m_0) = S^0/k_1$.

The electric type field of the Q -charge has the intensity $E_s(r)$ depending on the interaction force $F_e(r)$, which classically has-in consequence, the expression:

$$F(r) = S^x \cdot \frac{\Delta(p_c)_r}{\Delta t} = S^x \cdot \frac{\Delta(n.m_c \cdot \mathrm{v}_c)_r}{\Delta t} = S^0 \cdot \rho_\mathrm{v}(r) \cdot \mathrm{v}_c^2 = q_s \cdot E(r); \quad n.m_c = n_0 \Delta r.m_c = \rho_\mathrm{v} \Delta \mathrm{r} \qquad (7)$$

where : $\Delta p_c/\Delta t = 2(n_0 m_c v_c^2)_r = 2\rho_v(r) v_c^2$; (elastic interaction).

By the constant k_1 and the expression: $q_s(m_0) = S^0/k_1$ of the pseudo-charge, the expression of the intensity $E_s(r)$ of the pseudo-electric field results from the eq. (7), in the form [26]:

$$E_s(M_r) = k_1 \cdot \rho(r) \cdot \mathrm{v}_c^2 = \frac{1}{2} k_1 \cdot \frac{\Delta p_c}{\Delta t}; \quad (\mathrm{v}_c \approx c); \qquad k_1 = \frac{4\pi \cdot r_0^2}{q_s(m_0)} \qquad (8)$$

For extending the equations (6) ÷ (8) to the electron having: $q_s = e$; $r_0 = a$, replacing these values in the expression of the pseudocharge: q_s, results the expression of the proportionality constant: $k_1 = S_e^0/e = 4\pi a^2/e$, gauged by the electron.

Considering the electron e-charge as being of space-extended (Lorenzian) type and the electron a-radius as given by the equality between the intrinsic energy of the electron and the electrostatic field energy, used by some electron models [32] of the classic electrodynamics:

$$\in_E^o = \int_a^\infty 4\pi \cdot r^2 \Phi(r) dr = \frac{e^2}{8\pi\varepsilon_0 a} = m_e c^2; \qquad \Phi(\mathrm{r}) = \varepsilon_0 \frac{E^2(r)}{2} = \frac{\varepsilon_0}{2}\left(\frac{e}{4\pi\varepsilon_0 r^2}\right)^2 \qquad (9)$$

results that: $a = 1.41\mathrm{x}10^{-15}$m = 1.41 fm, (with e-charge in surface); $k_1 = 1.56\mathrm{x}10^{-10}$ $[\mathrm{m}^2/\mathrm{C}]_{si}$.

For the general expression of the Q charge generating a E(r)-field, we shall also consider the electric charge gaussian expression, given by the electric flux:

$$Q = \varepsilon_0 \int E \cdot dS = 4\pi\, \varepsilon_o.r_0^2 \cdot E(r_0) = 4\pi\, k_1 \cdot \varepsilon_o.r_0^2 \cdot \rho(r_0).\mathrm{v}_c^2; \qquad Q = e; \ \mathrm{v}_c = c; \ r_0 = a, \qquad (10)$$

where, if Q = e and $r_0 = a$, it results that: $\rho(a) = \rho^0_a = 1/(k_1^2 \varepsilon_0 c^2) = \mu_0/k_1^2 = 5.17\mathrm{x}10^{13}$ kg/m^3 .

The density of the electrostatic energy at the e-charge surface, (r = a), is equal with the kinetic energy of the field quanta in the volume unity, according to the equation:

$$\Phi^o(r) = \frac{\varepsilon_o}{2}\cdot\left(\frac{e}{4\pi\cdot\varepsilon_o\cdot a^2}\right)^2\cdot\frac{a^4}{r^4} = \frac{1}{2}\cdot\frac{\mu_o\cdot c^2}{k_1^2}\frac{a^4}{r^4} = \frac{1}{2}\cdot\rho_a^o\cdot c^2\cdot\frac{a^4}{r^4} = \frac{1}{2}\cdot\rho(r)\cdot c^2\cdot\frac{a^2}{r^2};\quad \rho_a^o = \rho(a) \tag{11}$$

From (11) and (9) results also the dependence: $2\pi a^3\cdot\rho^0_a = m_e$.

5.2. The interaction between charges through magnetic type field

In the case of a m_p-particle, having a q_s-pseudo-charge and a r_0-radius which crosses a quantum fluid (quantum wind) with the speed $v_0=v_p\cos\alpha$ perpendicular on the quantum wind considered as an ideal fluid having the v_c speed, ($v_0\perp v_c$), according to the impulse theorem for ideal fluids derived from a Gauss-Ostrogranski relation, on the m_p-particle surface, S, acts a pressure force given by the impulse density: $p_i = \rho_c v_c$, that is:

$$F_i = m_p\cdot a_i = -\frac{d}{dt}\int_s \rho_c\cdot v_c\cdot d\tau = \int \Pi_{ik}\cdot dS_k \quad . \tag{12}$$

where Π_{ik} represents the impulse flow density tensor:

$$\begin{gathered}\Pi_{ik} = P_c\cdot\delta_{ik} + \rho_c(v_i\cdot v_k)\ ;\quad \text{with: } \delta_{ik} = (n_i n_k) = n_j;\quad |n_i| = |n_k| = 1;\quad dS_k = n_k dS \\ (n_i; n_k \text{ - unit vectors})\ ;\quad P_c = \rho_c\cdot v_c^2\ ;\ v_i = v_c\cdot n_i;\ v_k = v_0\cdot n_k\ ;\end{gathered} \tag{13}$$

For Π_{ik} =constant and $\int dS_k = S^0\cdot n_k$, considering the interaction of quanta with the particle surface as being quasi-elastic, according to eq. (7) and (8), to the quantum pressure static force: $P_c = \rho_c\cdot v_c^2$, correspond: $S^0 = 4\pi r_0^2$, therefore the equation (12) becomes [26]:

$$F_i = m_p a_i = \frac{S^0}{k_1}(k_1\rho_c v_c^2 + k_1\rho_c v_c v_0)n_i = q_s(E_i^0 + E_i^l) = F_i^0 + F_i^l\ ;\qquad v_c \approx c \tag{14}$$

According to the eq. (7) and (14), the force F_i^0 is obtained as an electric type force.
In this case, the dynamogenic force, F_i^l , may be considered as of magnetic type, as follows:

$$F_i^l = q_s\cdot k_1\rho_c(v_i\cdot v_k)n_k = q_s(B_j\cdot v_k) \Rightarrow \vec{F}^l = q\cdot\vec{B}\,x\,\vec{v}_o;\qquad q_s = S^0/k_1 \tag{15}$$

where B represents the magnetic induction, having the expression:

$$B_j(r) = k_1\rho_c(\mathrm{r})\cdot \mathrm{v_i}\cdot n_k = k_1 p_i(r)\cdot n_k \ ; \quad \mathrm{v_i} = \mathrm{v_c}\cdot n_i\ ; \ \ \mathrm{v_c} \cong c \quad \cdot \tag{16}$$

where $p_i(r)$ represents the impulse density of field quanta which pass through the surface unit in the point P(r). According to eq. (7) we also may consider the force F_i^l as being a pseudo-Lorentzian force, generated by an electric type field, E^l, induced at the m_p-particle level by a magnetic type B -field displaced with the speed $v_B = -v_0$:

$$\vec{E^l} = \vec{B}\, x\, \vec{\mathrm{v}}_0 = -\vec{B}\, x\, \vec{\mathrm{v}}_{\mathrm{B}} \tag{17}$$

The eq. (17) expresses- in a vectorial form, one of the electromagnetism fundamental laws (referring to the generation of an electric E- field through a magnetic B- field) but generally deduced, i.e.-which may be extended also for the dynamogenic gravitational field, (the gravito-magnetic field).

If an electric type field has the intensity vector E displaced with the speed $v_E = -v_k$ in a x_0 -point, the displacement of the impulse density: $p_i = p_s\cdot v_i$ generating an E_i –field, generates in the x_0-point an induction, B, of a magnetic type field, as follows:

$$B_j = k_1\cdot \rho_c\cdot \langle \mathrm{v}_E\cdot n_i\rangle = \frac{1}{c^2} < \mathrm{v}_E\cdot (k_1\cdot \rho_c c^2) n_i > = \mu_0\varepsilon_0 < \mathrm{v}_E\, xE_i >, \qquad \vec{B} = \frac{1}{c^2}\vec{\mathrm{v}}_{\mathrm{E}}\, x\, \vec{E} \tag{18}$$

The eq. (18) expresses in a vectorial form the fundamental law of electromagnetism referring to the generation of a B- magnetic field through an E-electric field, but generally deduced.

If the $\rho_c(r)$ -density of field quanta in the x_0 -point is varying in time, the continuity equation for ideal fluids may be applied to the vectonic fluid, in the form:

$$\frac{\partial \rho_c}{\partial t} = -\nabla(\rho_c\cdot \mathrm{v_E});\qquad \frac{1}{c^2}\cdot\frac{\partial(k_1\cdot\rho_c\cdot c^2)}{\partial t} = -\nabla(k_1\cdot\rho_c\cdot \mathrm{v_E}) \quad \cdot \tag{19}$$

and by eq. (7) and (16), results another equation of electromagnetism, generally deduced:

$$\frac{1}{c^2}\frac{\partial E}{\partial t} = -\nabla\cdot B = -\,div B \quad . \tag{20}$$

Considering that the density of quanta of **E**- and **B**- field is given by a quanta concentration: $n_0 = n_s\cdot n_i$,where n_i –the linear concentration; n_s- the concentration of quanta in a plane perpendicular on the **E** –field direction, according to eq.(16) results that the **H**-intensity of the (pseudo)magnetic field can be considered proportional with the surface density of quanta: $\sigma_c = m_c.n_s$, and the magnetic permeability –as a measure proportional with n_i:

$$H_j = K_1\cdot\sigma_c.v_k = B_j/\mu_j\ ; \quad (v_k = v_E)\ ; \quad \sigma_c = m_c.n_s;\ \ \mu_j = B_j/H_j = n_i \tag{21}$$

The possibility to deduce the electromagnetic fundamental laws through hydrodynamic equations applied to the quantum and sub-quantum fluid is in accordance also with the Maxwell theory regarding the electromagnetic interactions.

6. The gravitic interaction

To the attracted m_p-mass and to the gravitic field of an attractive M- mass of a particle or of a body, can be assigned a conventional size: the "electrogravitic" pseudo-charge, q_G , respectivelly-the "electrogravitic field, $E_G(r,Q_G)$, whose expressions results by the general eq. (14) writted in the form:

(22a) $$q_G = \frac{S_g^0}{k_1}; \qquad \mathrm{E}_G(r,Q_G) = \pm k_1 \rho_g c^2; \qquad \mathrm{p_g}(r) = \rho_g(r)\cdot c = \rho_g^0 \cdot \frac{r_0^2}{r^2}\cdot c \quad .$$ (22b)

In the expression (22b) of the electrogravitic field intensity, the meaning of the sign: ± is that the electrogravitic Q_G -charge generating the E_G-field is given by an uniform spheric distribution of an etheronic flux with a non-compensated component, i.e. –by the difference between the received etheronic flux and the etheronic flux reflected by the super-dense centrols of the inertial M-mass structure, in the case of an attractive, gravitic M-charge. Therefore, considering this non-compensated etheronic component as a gravitonic field' flux having the impulse density $\mathbf{p}_g(r)\uparrow\downarrow\mathbf{r}$, the generation of the gravitation force, F_N , complies with the Lesage's hypothesis [27] which presumes the screening of the m_p-mass by the M-mass in report with the cosmic etheronic winds that comes radial-symmetrically towards the M-mass. The etheronic flux formed by a M-mass with disturbed sinergonic vortex which emits s-etherons gives an antigravitic pseudocharge, generating a positive, repulsive E_G-field.

We shall reconsider the eq. (14) in the case of an interaction force acting on a m_p-particle having a q_G-electrogravitic pseudo-charge which crosses an etheronic wind of a gravitic field generated by an $Q_G(M)$-electrogravitic charge, with the speed $v_0 = v_p \cdot \cos\theta$- perpendicularly on the v_s-speed of the etheronic wind, ($v_0 \perp v_s$). Considering the m_p-particle formed by n_p quantons having the m_h-mass and the surface: $S_h = 4\pi r_h^2$, (where r_h is the quanton centrol radius), because the particle' penetrability to etheronic winds, the interacting surface of the m_p-particle with the etheronic wind is a sum of S_h-surfaces interacting with the elementary quantonic centrols, thus, in eq. (14) we shall consider that:
$S^0_g = n_p.S_h$ and the equation (14) becomes:

$$F_i^g = m_p a_{Gi} = -k_h \cdot m_p(\rho_g \mathrm{v_g^2} + \rho_g \langle \mathrm{v_g} \cdot \mathrm{v_o} \rangle)\cdot n_i\,; \qquad \mathrm{k_h} = S_h / m_h \ [\mathrm{m}^2/kg] \qquad (23)$$

For the variation of $\rho_g(r)$-density of gravitonic wind, in compliance with eq. (23) of the electrogravitic $q_G(M)$-charge of the M-mass having the radius r_0 and for $v_g = c$, the gravitic force results from eq. (23) as having the form:

$$F_i^g = -k_h m_p \cdot \rho_g c^2 \left(1 + \frac{v_0}{c}\right) n_i = -G \frac{m_p M}{r^2} \left(1 + \frac{v_0}{c}\right) n_i ; \qquad \rho_g(r) = \rho_g^0 \frac{r_0^2}{r^2} \approx \frac{M}{m_h} \rho_g^h \frac{r_h^2}{r^2} \qquad (24)$$

where: ρ_g^0 and ρ_g^h are the density of the gravitonic flux (i.e.-of the uncompensed etheronic wind) at the $M(r_0)$-mass surface and- respectively- at the $m_h(r_h)$-quanton surface.

If the m_p-mass represent a photon having the speed $v_0 = c$, the value of the F_i^g -force, acting as a gravitic type force, results from the equation (24) as: $F^g(r,c) = 2\,F^g(r,0)$-of a double value comparing to Newtonian static gravitational force, in accordance with the Einstein's theory of relativity and the astrophysical observations. This correspondence is explained by the fact that the form with lorentzian type term of the total gravitational force F_i^g , may be obtained also in the tensorial theory of gravitation for a weak gravitational field or reasonably flat spacetime, giving as solutions the gravitational analogs to Maxwell's equations for electromagnetism, (Lano, Fedosin, Agop, N.I.Pallas et al. [28]), the increasing of F_i^g with the v-speed, being equivalent with an transversal relativistic effect of the gravitational mass growth: $F_v = g_g \cdot m_p(1+\beta) = g_g \cdot m_p^v$, ($\beta = v_0/c$).

The eq. (24) gives for the G-gravitation constant, the expression :

$$G = \frac{k_h \rho_g^0 r_0^2 c^2}{M} = \frac{k_h \rho_g^h r_h^2 c^2}{m_h} = \frac{4\pi \rho_g^h r_h^4 c^2}{m_h^2} = 6{,}67x10^{-11} \frac{N \cdot m^2}{kg^2} \;; \qquad (25)$$

The value of the density ρ_g^o of the uncompensed etheronic wind on the surface of a black-hole type star-for example, characterizes only the local (not also the intergalactic) etheronic density: ρ_e^o , because that it results by the speed's statistic distribution of the etherons emitted by the solitonic quantum-vortices of the elementary particles proportional with the mass density.

We observe also that –according to eq. (22) and (23), the value of S^0_g being given by a very great number of quantons, for an electron, for example, the value of q_G may be of size order of the electron charge, i.e.: $S^0_g \approx S^0_e \Rightarrow q_{Ge} \approx e$, resulting that the entire weakness of the gravitation force comparative to the electrostatic force may be considered as given by the value of ρ_g^0, by the approximation:

$k_\rho = F_N/F_e \approx \rho_g^0/\rho_a^0$. In this case, for an unitary form of the electric and of the electrogravitic fields, we may obtain a plausible gauge value of k_h and of ρ_g^h, considering that for the electron case we have the gauge condition: $q_{Ge} \approx e$, which complies whith the expression of the electrogravitic field obtained by M. Agop [28], starting from the acceleration obtained by an electron in the field of another, i.e.:

$$a_i^e = \frac{F_N^e}{m_e} + \frac{F_e^e}{m_e} = a_{Gi}^e + \left(\frac{e}{m_e}\right) \cdot \frac{e}{4\pi\varepsilon \cdot r^2} = \left(\frac{e}{m_e}\right) \cdot (E_G^e(r) + E_e^e(r)); \quad \mathrm{E}_{\mathrm{G}}^{\mathrm{e}} = \left(\frac{m_e}{e}\right) \cdot a_{Gi}^e \qquad (26a)$$

resulting-by the generalisation: $E_G = (m_e/e) \cdot a_{Gi}$ and by eq. (22b), in accordance with (25), the equation:

$$F_i^g = \mathrm{q}_{\mathrm{G}} \cdot E_G(r, Q_G) = -\frac{m_p}{m_e} e \cdot k_1 \rho_g c^2 = -k_h m_p \rho_g c^2 \Leftrightarrow \rho_g^0 \approx k_\rho \rho_a^0; \quad \mathrm{q}_{\mathrm{G}} = \frac{m_p}{m_e} e; \Rightarrow k_h = \frac{4\pi a^2}{m_e} \qquad (26b)$$

which gives the gauge constants: $k_h = 27.4$ [m^2/kg], $r_h = 1.26 \times 10^{-25}$ m and: $\rho_h = \rho_c^M = 8.8 \times 10^{23}$ kg/m^3 and respectively, by eq.(25): $\rho_g^0 = 1.23 \times 10^{-29}$ kg/m^3 . Also, by (26a), results that: $Q_G = 4\pi\varepsilon_0 GM \cdot (m_e/e)$.

If the g- and s-etheron have the same ρ_c^M density as the quanton, results also the size order of the graviton' and the sinergon' radius: $r_g \approx 10^{-31}$m; $r_s \approx 10^{-28}$m –bigger than the Planck lenght (1.6×10^{-35} m) and the ratio: $r_s/r_g \approx r_h/r_s \approx 10^3$.

7. A galileian relativist expression of the particles acceleration

The abandonment of the concept of ether through the postulate of the light speed constancy in Einstein's special relativity, led to major paradoxes in the physical interpretation of relativistic equations, such as the so-called "the twins paradox" from which derives a version that may be denamed: "the three twins paradox". This version leads to the relativistic conclusion that, if two of three twin brothers flew in space with relativistic speeds on perfectly symmetrical trajectories in comparison with the third brother remained on Earth, but having a 45° …180° angle between these trajectories, then the first twin should meet the second one younger than himself (according to the relativistic equation of time dilatation), but this comes in contradiction with the fact that the twin remained on Earth should observe that both of them returned younger than himself by an identical difference of age.

Also, the Einsteinian equation of speed-dependent mass increasing, leads to the phylosophic paradox of infinitely mass growth by its movement with relativist speed.

By the concept of cosmic ether, it is possible to avoids such paradoxes by a physical reinterpretation of the Einstein's relativistic equations.

In the case of an accelerated m_0-particle under a field action in a quasi-homogenous sub-quantum medium, (A_c) , considering this medium as an ideal fluid with a ρ_s mean density, according to a specific equation for ideal fluids, the acceleration a_p of the m_0 -particle "falling" into the sub-quantum medium is dependent on the "falling" v_p-speed because the resistance force of the subquantum fluid: $F(r,v) = S^0\rho_s v^2$, in the form:

$$a_{ps} = a_0(1 - \frac{v_p^2}{w^2}); \qquad a_p = \frac{\bar{F}_{(r,v_p)}}{m_p}\ ;\ a_0 = \frac{\bar{F}_{(r,0)}}{m_p};\quad \bar{F}_{(r,0)} = S^0\rho_s w^2 \tag{27a}$$

This equation, for a value of the limit-speed of "falling" into this medium equal to: $w = \sqrt{2}c$ (c = the light speed) and for non-relativistic v_p-speed, approximates the Einstein's equation for the variation of mass acceleration given by a field, considered in the Einstein's theory of relativity as a result of the speed-dependent mass variation (and not of the F(r)- force variation), having the known form:

$$m = m_0/[1-(v/c)^2]^{1/2} = m_0/\beta,$$

Mathematically, the eq. (27a) is equivalent to a longitudinal relativist effect, of the particle inertial m_0-mass variation with the speed:

$$m_p^*(v_p) = m_p^0/[1-v_p^2/w^2] = m_0/\beta'; \qquad \text{with: } w = \sqrt{2}.c \tag{27b}$$

considering-formally, an invariance of F(r)- force with the mass speed.

This theoretical result shows also a theoretical limit of the particles speed in Universe: $w = \sqrt{2}c$, which suggests also that the etherons may be tachyons, with $v_g > c$.

The apparent quasiconstant c- speed of photons is possible to result as an effect of the local quasihomogeneity of the cosmic etheronic winds pressure with the c- mean speed **.**

By (27b) , the eq. (24) results in a form similar to those of Şomacescu's classic theory of fields [6], the gravitation force being:

$$F_i^g(v) = F_i^g(o)\cdot(1+ v_0/c)/(1-v_p^2/2c^2); \qquad F_i^g(o) = -G\cdot M\cdot m^0/r^2\ ;\ v_0 = v_p\cos\alpha \perp v_s \tag{27c}$$

It results also -according to eq.(8), that the F(r,v)-resistance force of the (sub)quantum fluid is equivalent with a relativistic force of (pseudo)electric type: $F_q(r,v) = S^0\rho_s v^2 = q_r\cdot E_r$; ($q_r = S^0/k_1$).

The galileian relativist expression of the electric field results- according to eq. (8), in the form:

$E(q,r,v) = k_1\rho_r(c\pm v)^2 = E_0\cdot(1\pm v/c)^2$, by a relative speed: $v_r = (c \pm v) /\!/ r$ of the q-charge.

8. The soliton electron model

8.1.The electron model

-Along the time, were proposed some classical electron models: Abraham's rigid electron model; Lorentz's space-extended model [29]; Parson's annular model; Page model [30], which presumes the existence of a magnetic field inside the electron; the Poincare's model, which presumes the existence of a quantum pressure on the electron surface that gives its stability; the Born-Infeld model [31], which considers, as the Mie model, that the electric field does not differ essentially from the electron; the Yadava model [32] and other models.

-In accordance with the a3-a4 axioms of the theory, considering the proton as a composite fermion formed by gammonic pairs of degenerate electron cluster type, similar to A.O. Barut's particle model [33], from the deduced equality between the electron radius and the proton radius: r_p= a =1.41 fm, results a similarity between the electron structure and the proton quantum' structure, which is penetrable by electrons until to the core level, having the radius of approx. 0.2 fm and by protons until to an "impenetrable" quantum volume, having the radius of approx. 0.45÷0.6 fm, [34].

-The experiments of scattering electrons on protons revealed also some scattering centers ("partons"- Taylor, Friedman, Kendall, [35]) with the radius of approx. 10^{-18} m and an exponential distribution of the proton charge and of the nucleon' magnetic moment, having the (η_{rms}) root-mean-square radius between 0.86fm and 0.89 fm (G.Simon; I. Sick et al, [36]) . Similar scattering centers, having the radius under 1% from the classic radius of electron, was evidenced by experiments of X-rays exploration of the electron structure, [37].

Some theories [38] based on this experimental result, considers that the electron has the inertial m_e- mass compressed into a volume with the radius r^0 = 10^{-18}m, but other electron models consider that the electron has a core surrounded by a penetrable cloud of virtual leptons conjugated in pairs having opposite charges, [39] .

-In the Composite fermions (CF) theory, the electron is a composite fermion carrying an even number of vortices of the many-particle wave function, [40], as a composite chiral soliton.

-According to the known electron soliton model, the electron soliton characteristics results from a solution of a nonlinear Schrödinger type equation, the ψ-wave function of electron having a linear part which characterizes the de Broglie's wave and a nonlinear part which characterizes the distribution of the charge' spatial density: $\rho_q(r) = e\cdot|\psi|^2$, and of the electron vortex field' density, [41].

According to these researches and to the a1 - a4 axioms of the theory, for a classic non-relativistic CF chiral soliton model of electron, we consider a substructure of electron quantum volume formed by vexons stabilized by vexonic centrols, resulted by the confination of cosmic 3K photons formed by paired vectons, around an electronic centroid (centrol), by the electron soliton vortex, Γ_e , which generates also the μ_e -magnetic moment of electron. The considered electron cold genesis by confination of vectons, is in accordance also with Einstein's perception of elementary particles as "condensation" of electromagnetic field.

Because that the formed vexons forms also bosonic (m_w- $\overline{m}_w$) pairs of vexons blended with polarized vectons inside the quantum impenetrable volume, they are distributed in electron according to a Boltzmann type statistic distribution: $\rho_e(r) = \rho_e^0 \cdot |\psi(r)|^2 \sim e^{-r/\eta}$ that also characterizes the mixtures of bosons and fermions, the electron surface containing lighter m_w^*-polarized vexons, (polarised "frozen" vectorial photons).

These vexons gives the inertial mass of electron by theirs inertial mass as "frozen photons" and forms the electron quantum volume with the density $\rho_w(r)$ having-in accordance with the a1-a4 axioms and by similitude with the structure of proton, the following substructure [26]:

-an "impenetrable" supersaturated quantum volume having the radius a_i = 0.5÷0.6fm, composed of vexonic layers-in even number for positrons and odd number for negatrons, with paired and magnetically coupled vexons to the radial and the meridian direction;

Considering a pseudo-charge: $q_w^* = q_w \cdot \zeta_w$ of vexons, results that the vexons of the last layer of "impenetrable" quantum volume, attracts light vexons with oppsed q_w* pseudo-charge.

-a charge's and strong interaction' quantum volume, having the thickness $\Delta a = a - a_i$, formed by un-paired light vexons: m_w*, attracted by the last layer of the "impenetrable" quantum volume and polarized with the μ_w-pseudo-magnetic moments on the meridian direction, by the μ_e-magnetic moment of electron having vortexial nature.

The q_w^*-pseudo-charge of the polarised vexons from the strong interaction quantum volume of electron, gives the electron' charge: $e = \Sigma(q_w^*)$.

-The attractive or repulsive interaction is carried through the vectorial quanta of the **E**-electric field, named "vectons" in theory, generated by the electron e–charge.

These m_v-quanta may comes from the bosonic pairs of the 3K-background radiation, attracted by the Γ_e-vortex and divided by the m_w^*-vexons of the charge' quantum volume, the m_v-vectons having the same q^*-pseudo-charge as the m_w^*-vexons of the electron charge being rejected with an oriented spin, forming the E-field, and the remained antivectons being absorbed and destroyed by the m_w^*-vexons having bigger mass-according to the theory.

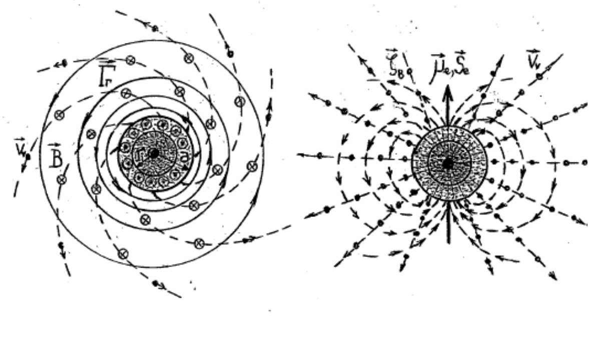

Fig. 1-Model of chiral soliton electron

-According to the model, the parallel polarization rate of m_w*-vexons of the electron charge and implicitly- the value of the vectonic flux: $\Phi_v(E)$, are proportional to the impulse density of Γ_e-electron vortex in the strong interaction quantum volume, by the dependence relation:

(d) $e \sim \mu_e(\Gamma_e) \sim \rho_\mu(a) \cdot c^2$; $(\rho_e(r) \sim \rho_\mu(r);\ a_i \le r \le a)$,

given by the dependence: $\mu_e(e;\Gamma_e) \sim B(e,a) \sim \rho_\mu(r) \cdot c$ –resulted by eq. (16) in accordance with the known proportionality between the electric charge and the magnetic moment .

In accordance with the experiments of electrons scattering concerning the value of the η_e mean radius of the e-charge' and the μ_e-magnetic moment density distribution inside the proton, according to an electron cluster type model of proton, by similitude results by the model that the electron density $\rho_e(r)$ is proportional with the electron charge density, $\rho_q(r)$, given by the vexons pseudocharge:

$$\rho_e(r) \approx \rho_q(r) = e \cdot |\Psi_e|^2 ; \Rightarrow \rho_e(r) = \rho_e^o \cdot e^{-\frac{r}{\eta_e}}; \ |\Psi_e|^2 = e^{-\frac{r}{\eta_e}} \ ; \quad \rho_e^o = \rho_e(0);\ a_i \le r \le a \qquad (28)$$

The classic probabilistic interpretation of the ψ-wave-function associated to the stationary electron results by the conclusion that at a distance x=r from the electron centre, the electron is found in the proportion: $[\rho_e(r)/\rho_e^0] = \psi_e \cdot \psi_e^* = |\Psi_e|^2 = R^2$, by the probability to found intrinsic quantons.

In accordance with the experiments [37] shoulding that the electron is a hard-core fermion we consider also the existence of a super-dense electronic centroid (centrol) having the density: $\rho^m \ge 10^{19}$ kg/m^3 and the radius: $r_0 = 10^{-18}$ m, so being a very penetrant particle, which may explain-in consequence, the electronic neutrino as being a half of them (according to a resulted neutrino model –chpt. 12).

In this case, with the experimental result [34] that indicates as plausible the approximative value: $m_\nu = 4 \times 10^{-4}\ m_e$ for the superior limit of neutrino rest mass, results a value:

$m_0 = ½ m_\nu = 2 \times 10^{-4}\ m_e = 1.82 \times 10^{-34}$ kg, and $\rho_e^0 = 4.3 \times 10^{19}$kg/m^3, ($m_e$ - the electron mass), for the electron centrol, formed as a pseudo-compact assembly of quanton centrols-according to a3-a4 axioms of the theory. The super-dense electron' centrol is characterized in our model by an intrinsic chirality: $\zeta_e = \pm 1$ ($\zeta_{e-} = -1$; $\zeta_{e+} = +1$) corresponding to a hypothetical helix form which determines the sense of the induced Γ_e -soliton vortex relative to the $\mathbf{S}_e^*$-spin sense .

In this case, the electron' mass, $m_e = 9.1095 \times 10^{-31}$ kg, is a sum between the electron centrol mass, m_0 and the mass: $m_e^v = (m_e - m_0)$ of the quantum volume, having the radius: a = 1.41×10^{-15}m, that is:

$$m_e^v = \int_0^a 4\pi r^2 \rho_e(r).dr = 9{,}109x10^{-31} kg; \quad \rho_e(r) = \rho_e^o \cdot \mathrm{e}^{-\frac{r}{\eta_e}} = \rho_e^o \cdot |\Psi_e|^2 \tag{29a}$$

According to the model, the a-electron radius is equal to the limit-radius of the e-charge scalar cloud, defined as a separation limit between the vexonic quantum volume of electron and the volume of the e-charge' electrostatic field, whose ε_v(r)-energy is given by a spheric-symmetrical distribution of vectons which do not take part to the electron inertial mass and have the same q_v*-pseudo-charge sign like the m_w*-vexons of the electron vexonic layer.

The calculation of the mean radius η_e of the electron charge cloud results considering that all m_w*-vexons of the electron layer are polarised by the μ_e-magnetic moment, giving the e-charge and by considering the continuity condition of the polarised vectorial photons density variation at the limit:

r = a, i.e.-considering that- at the electron surface, the vexonic density of electron is equal to the vectonic density of the E-field and have the value:

$$\rho_e(a) = \rho_E(a) = \mu_0/k_1^2 = 5.17 \text{ x } 10^{13} \text{ kg/m}^3. \tag{29b}$$

From this condition and by the eq. (29a), solving the integral of m_e-mass, results a value:

$\eta_e \cong 0.965x10^{-15}$ m, for the e-charge mean radius, that is relatively close to the value of η^p_{rms} = 0.895fm of the root-mean-square radius of the proton charge distribution, experimentally deduced by Ingo Sick [36] and to the isoscalar magnetic mean radius: r_m=0.92fm, given with the Skyrmion soliton model of proton, [42]. From (28) results also: $\rho_e^0 = 22{,}24x10^{13}$ kg/m^3.

-We must also consider that the density of vexon-antivexon pairs confined inside the electron vortexial energy, complies with the chiral sub-solitons forming condition [22] which specifies that the energy density $\in_r = \rho_r c^2$ of the mass-generating vortex soliton field should be double, at least, comparing to the mass energy density: $\in_w = \rho_w c^2$ of the generated sub-solitons, i.e.: $\in_r = 2\in_w$, leading to the condition: $\rho_r \geq 2\rho_{w.}$.

- Based on a theoretical result [9] which show that at quantum equilibrium, on the vortex lines the field quanta have the light speed: v_t = c, and in concordance with the chiral sub-solitons forming condition [22], we may consider that the energy density, $\in_r$, of the generated Γ_r^e vortex field is given by a soliton vortex of quantons, of the electron μ_e -magnetic moment: $\Gamma_\mu = 2\pi r v_{ct}$, with: v_{ct} = c for $r \leq r_\mu$, ($r_\mu \cong r_\lambda$), and by a sinergonic vortex: $\Gamma_A = 2\pi r \cdot w_t$, ($w_t$ = c) having the same density: $\rho_s(r)=\rho_\mu(r)$, which generates the magnetic **A**-potential of electron and induces the Γ_μ -vortex, ensuring the negentropy and the stability of electron and explaining the constant values for both the e-charge and the μ_e-magnetic moment.

The hypothesis of the Γ_A-vortex existence is also in accordance with the Aharonov-Bohm effect which reveals the influence of a magnetic **A**-potential over the phase of de Broglie wave of a moving electron also in the case of a null magnetic induction **B** = rot.**A**, [43].

According to eq. (8) and (18), it results that- for $r \leq r_\mu$, the magnetic induction of the electron field has the value: $B_j = k_1\rho_\mu c = (1/c)\cdot E_i = k_1\rho_v c$, because that the radial repulsive interaction of these vectons with the vexons of electron' e-charge determines a speed of quantons of the Γ_μ -vortex relative to the vectons of the **E**-field- quasi-equal to the light speed, c, (figure1).

So, for: $r \leq r_\mu$, $\rho_\mu = \rho_v$ and it produces a kinetic energy density of electron' magnetic field: $\in_{kB}(r) = ½\cdot\rho_\mu.c^2$ -equal to the kinetic energy density of the **E**-electric field quanta in the volume unit: $\in_{kE}(r) = ½\cdot\rho_v.c^2$ -given by theirs m_v-vectons having the spinorial mass: $m_S = m_v$ given by an induced quantonic vortex, according to eq. (4a).

Therefore, considering the electron m_e-mass as cluster of confined vexons: $\rho_e(r)=\rho_w(r)$, it results that the chiral sub-solitons forming condition [22] applied in the case of vexon-antivexon pairs generation inside the electron volume, is respected for an identical variation of the quanta density: $\rho_s(\Gamma_A)$, $\rho_\mu(\Gamma_\mu)$ and $\rho_{w(v)}(e;E)$:

$$\rho_s(r) = \rho_\mu(r) = \rho_{w(v)}(r) = \rho_r(r)/2, \quad (\rho_r(r) = \rho(\Gamma_r^e) = \rho_s(r) + \rho_\mu(r)) \qquad (30)$$

with $\rho(r)$ having the form (28) for $r \leq a$, ($\rho_w(r)= \rho_e(r)$) and the form (6) for $r > a$, ($\rho(r) = \rho_v(r)$).

By the (d)-dependence relation: $e\sim\rho_\mu(a)$, the eq. (30) explaining also the oppinion [44] that the proton charge and the mass density have almost the same variation.

8.2-The electron entropy and stability

Considering the $\Psi(r)$- wave function associated to the electron structure, corresponding to a Schrodinger equation characterizing an electron soliton model [45], by a Bohm-Vigier hydrodynamic interpretation [8] of the square amplitude $R^2 = |\Psi|^2$, that is: $\Psi(r) = R\cdot e^{iS/\hbar}$, ($S = p_h\cdot\delta l_r$; $\delta l_r \perp r$), with: $R^2 = e^{-\varepsilon/k}$ associated to the internal entropy : $\varepsilon = -k_B\cdot\ln R^2$, the equality (30) suggests a linear proportionality between the position entropy inside the electron and the total quanton action on the electron vortex line: $S_h(r)=\oint m_h c\cdot dl_r = 2\pi r\cdot m_h c$, in accordance also with the de Broglie's "hidden" thermodynamics of particle [9]. Considering the de Broglie's relation for the quantum temperature associated to the stationary particle: $T_c=m_0c^2/k_B$, results a mean internal electron entropy:

$$\bar{\varepsilon}_e=k_B= \varepsilon_e(r =\eta_e)=m_ec^2/T_c= n_h\cdot \bar{\varepsilon}_h(r=\eta_e) \; ; \qquad n_h= m_e/m_h$$

$\bar{\varepsilon}_h$ representing the mean entropy per quanton inside the electron mass, m_e .

Considering also-for the solitonic part of electron, a stationary S_e-action and ε_e-entropy on the vortex line, $l_r = 2\pi r$, by the de Broglie's equation of particle "hidden" thermodynamics at quantum equilibrium [9]: $\varepsilon/k_B \approx S/\hbar$, results the proportionality between $\varepsilon_e(r)$ and $S_h(r)$:

$$\varepsilon_e(r)=k_B\cdot(r/\eta_e)=n_h\cdot\varepsilon_h(r) = \gamma\cdot(k_B/\hbar)\cdot n_h S_h(r)= \gamma\cdot(k_B/\hbar)\cdot S_e(r); \quad S_h(r)=\oint m_h c\cdot dl_r = 2\pi r\cdot m_h c \,;\; dl_r \perp r \quad (31)$$

by a γ - coefficient of correlation between (ε_h/k_B) and $(S_h/\hbar)$, theoretically permitted [46].

In consequence, the de Broglie relation of quantum equilibrium allows the conclusion that the amplitude, R, of the $\Psi(r)$- function associated to electron structure characterizes the variation of the quantum density: $\rho_e(r)$ of the m_e-particle mass by the intrinsic entropy, $\varepsilon_e(r)$ and the imaginary part: $I = e^{iS/\hbar}$ characterizes the impulse density variation of the magnetic moment quantum vortex, Γ_μ, for which $S_\mu \sim p_\mu = \rho_\mu(r)\cdot c$, with: $S_\mu = (\delta m_e)_r\cdot c\cdot\delta l_r$, $(\delta m_e)_r = (\delta\upsilon_e)\cdot\rho_\mu(r)$. By eq. (30), (31), we have:

$$\rho_{\mu(r)} = \rho_e(r) = \rho_e(0)\cdot R^2 = \rho_e^o\cdot e^{-\frac{\varepsilon_e}{k_b}} = \rho_c^o\cdot e^{-\frac{S_e}{\hbar}} = \rho_e^o\cdot e^{-\frac{r}{\eta_e}}; \qquad S_e(r) = \gamma\cdot n_h\cdot S_h(r)$$

$$\mathrm{R}^2 = |\Psi|^2;\; \Psi = R\cdot \mathrm{e}^{\mathrm{i}\frac{S_\mu}{\hbar}}; \quad \mathrm{S}_\mu = (\delta\mathrm{m_e})_\mathrm{r}\,\mathrm{c}\cdot\mathrm{l_r};\; \mathrm{S_h} = \oint m_h c\cdot dl_r = 2\pi\,\mathrm{r}\cdot\mathrm{m_h}c \qquad (32)$$

With η_e = 0.965fm, and: $n_h = (m_e/m_h) = 1.23\text{x}10^{20}$, results from (32) that: $\gamma = 64$.

-The stability of the electron quantum volume is explained by the attraction force generated by the Γ_e -soliton vortex which generates the electron' magnetic moment, μ_e.
In accordance also with other soliton models of electron [45], the stability equation of the Γ_e soliton vortex may be expressed by the Schrödinger nonlinear equation (NLS) with soliton-like solutions, identifying in this equation the term: $k_n\cdot|\Psi|^2$, (k_n-the nonlinearity constant), with the strong self-potential, $V_p(r)$, of the particle, generated by its Γ_μ-vortex of quantum volume :

$$\text{(33a)}\quad i\hbar\frac{\partial\Psi}{\partial t} + \frac{\hbar^2}{2m}\frac{\partial^2\Psi}{\partial x^2} - k_n\cdot|\Psi|^2\Psi = 0; \quad \Psi = \mathrm{R}\cdot e^{\mathrm{i}\frac{S_\mu}{\hbar}}; \quad k_n\cdot|\Psi|^2 = k_n\cdot[\rho_\mu(r)/\rho_e^0] = -V_p(r) \quad . \quad \text{(33b)}$$

writted for an infinitesimal vortex volume $\delta\upsilon_e = (\delta m_e/\rho_\mu)_r$ in conditions of quantum equilibrium to the vortex line $l_r \parallel x \perp r$, i.e.–with $\delta l_r/\delta t = c$ and without vortex expansion or contraction :

$$-i\hbar\frac{\partial\Psi}{\partial t} = \hat{H}\Psi = (\hat{E}_{cf} + V_p)\cdot\Psi = -\frac{\hbar^2}{2\delta m_e}\frac{\partial^2\Psi}{\partial x^2} + k_n\cdot|\Psi|^2\Psi = 0; \quad \Psi = R\cdot \mathrm{e}^{\mathrm{i}\frac{S_\mu}{\hbar}}; \;\Rightarrow V_P(r) = -\frac{1}{2}\delta\upsilon_e\cdot\rho_\mu(r)\cdot c^2 \qquad (34)$$

with $S_\mu = (\delta m_e)_r\cdot c\cdot\delta l_r$, which gives: $k_n = V_P^0(o)$ and express the equality between the values of the centrifugal potential $E_{cf}(r)$ and the self-potential $V_p(r) = V_p^0\cdot|\psi|^2$.

The form (34) of the fermion' strong self-potential corresponds to an Eulerian attractive force of quantum dynamic pressure gradient: $f_p = \nabla_r V_p = -\delta\upsilon_e \cdot \nabla_r P_d$, generated by a pseudostationary quantonic medium accumulated by the Γ_A-sinergonic vortex, having the same (32) density variation and a relativistic c-speed in report with $(\delta m_e)_r$.

The same (34) expression has also the self-potential generated by the Γ_μ-vortex having the same relative impulse density, acting upon a (pseudo)stationary mass having the impenetrable quantum volume, $\delta\upsilon_e = \upsilon_i$: $V_P(r) = -\frac{1}{2}\upsilon_i \cdot \rho_\mu(r) c^2$.

Because the solitonic nature of vexons, by eq. (32) results that the quantum intrinsic energy of electron, which is liberated at electron-positron annihilation, is given as in the case of photon, (eq. (4)), by the intrinsic vortexial energy of vexons induced by Γ_e-vortex, and by the kinetic energy of the electron' magnetic moment:

$$E_w = \frac{1}{2}\sum_e m_w c^2 + \frac{1}{2}\sum_\mu m_c(\omega \cdot r)^2 = m_e c^2 \qquad (35)$$

in accordance with the quantum mechanics conclusions.

- For the electron' external part , (r >a), according to the conclusions which shows that the field quanta moves with the light speed, c, on the Γ_μ -soliton vortex lines, it results that the electron' magnetic field is generated by a soliton vortex: $\Gamma_e^e = \Gamma_A + \Gamma_B$, which continue the interior electron vortex: $\Gamma_e^i = \Gamma_A + \Gamma_\mu$. By the effect of Γ_e^e-vortex and the e-charge action, the electric E-field is generated by a vectonic helicoidal pseudo-vortex: Γ_E , given by the vectons movement on an helical trajectory, (figure 1), with the total speed: $v_v = v_{vt} + v_{vr} = c$, and with $v_{vr} \to c$ along the radial direction, with a spheric-symmetric distribution given by the quanta total flux conservation, as in eq. (6):

$$\phi_m = 4\pi r^2.\rho_v(r) = 4\pi a^2.\rho_v(a) = \text{constant} \ .$$

For the case of electron, the stability is ensured by the Γ_e -soliton also by the condition of quasiequality between the magnetic energy of the soliton vortex and the electrostatic field energy: $W^s_B = W^s_E \cong W_E = e^2/8\pi\varepsilon_0 a = m_e c^2$, given by the relation: E = c.B specific to the soliton electron' vortex, W_E resulting equal with the intrinsic energy contained by the m_e-electron mass, like in the Yadava's electron model, [32], which deduces that: a =1.41fm, value which is characteristic to a (quasi)superficial contained e-charge, with the non-contribution of field quanta to the electron inertial m_e-mass. This stability condition is necessary be fulfilled for compensate- by the W^s_B-field energy, the W_E-electrostatic energy of electron surface which tends to disintegrate the electron surface by repulsion between the q_w^* vexonic pseudocharges which gives the e-charge, according to the model.

8.3 The interaction between vectorial photons and the elementary charges

According to the theory, having their own μ_v-magnetic moment, the vectorial photons interacts magnetically. According to eq. (3) it results that the vectons or the vexons having the same sign for the ζ_v-chirality, the S_v-spin and the $q_v^* = q_v \cdot \zeta_v$ pseudo-charge, shall interact repulsivelly by magnetic elastical interaction. Thus, they will increase the vectonic pressure on the reciprocally interacting surfaces of e-charges with the same sign. These charges interacts repulsivelly, in this case.

The vectons and the vexons having opposite signs for the intrinsic chirality, spin and q_v^*-pseudo-charge, shall interact attractivelly by magnetic interaction. They will form, by nondestructive pseudo-plastic interaction, (vecton-antivecton)- bosonic pairs, thus reducing the vectonic pressure on the reciprocally interacting surfaces: $S' = 2\pi a^2$ of the e-charges having opposite signs. These charges shall also attracts each other.

8.4.- The magnetic field and the magnetic interaction

According to the model, the Γ_A vortex of a magnetic **A**-potential **,** generates a magnetic induction: **B** = rot.**A ,** by the gradient of the impulse density : $\nabla_r p_A = dp_A/dr$, which induces ξ_B-vortex-tubes of the **B** -induction around the vectons of the **E** -electric field.

This theoretical conclusion explains the fact that the direction of the vortex-tubes ξ_B, which can be expressed by their helicity: ζ_B , depends on the sense of charge' $\mathbf{v}_v$-speed and on the charge' sign, as a result of the "intrinsic chirality", $\zeta_v = \pm 1$ of the **E**(**r**)-field vectons- giving the e-charge sign by theirs pseudocharge: $\mathrm{sign}(q_v^*) = \zeta_v$ and which generates the **B**-field according to eq. (18) by theirs movement with the $\mathbf{v}_v$-speed relative to the quantonic medium. For the same concentration: n^0_v, of vectons and of vortex-tubes: ξ_B, we have:

$$\mathbf{B} = n^0_v \cdot \xi_B = \varepsilon_0 \mu_0 (n^0_v \cdot q_v^*/\varepsilon_0) \langle \mathbf{u_r} \bullet \mathbf{v_v} \rangle; \qquad (\mathbf{u_r} = \mathbf{r}/r;\ \mathbf{u_v} = \mathbf{v_v}/v_v;\ \mathbf{E} = \mathbf{u_r} \cdot n^0_v \cdot q_v^*/\varepsilon_0); \tag{36}$$

$$\Rightarrow \xi_B = \mu_0 . q_v^* \langle \mathbf{u_r} \bullet \mathbf{v_v} \rangle$$

which gives by eq. (8) in which: $\rho(r) = n^0_v m_v$, the values: $q_v^* = 2.73\times10^{-44}$C; $\xi_B = 1.03\times10^{-41}$T. According to eq. (3), the value: $r_\mu = r_\mu^e = r_\lambda^e$ represents the virtual radius of the electron magnetic moment, which is equal to the electron Compton radius resulting by the known quantum expression of the magnetic moment, from the equation:

$$\mu_e = k_\mu \Gamma_\mu = \frac{e\, r_\mu^e\, c}{2} = \frac{e\, h}{4\pi\, m_e} = \frac{e}{m_e} S_e^* \ ; \quad k_\mu = \frac{e}{4\pi} ;\ \Gamma_\mu = 2\pi r_\mu^e c ;\ r_\mu^e = \frac{h}{2\pi m_e c} \tag{37}$$

This value: $r_\mu^e = 3.86\times10^{-13}$ m, representing the classical magnetic radius of electron, is found by the electron soliton models as representing the electron soliton radius [12] and because that: $E = c \cdot B$ for $r \le r_\mu^e$, it gives a magnetic energy of the solitonic vortex:

$$W^s_\mu = W^s_E = (e^2/8\pi\varepsilon_0 a - e^2/8\pi\varepsilon_0 r_\mu^e) \approx e^2/8\pi\varepsilon_0 a = m_e c^2$$

i.e.-approx. equal with the intrinsic energy of electron. By this theoretical interpretation of the eq. (37), is avoided the paradoxical explanation given by the classic electromagnetism which explains the value of the electron magnetic moment by a electron surface revolving speed exceeding of 274 times the light speed, c .

The solitonic signifiance of eq. (37) is that : $v_{ct} = c$ inside the soliton and that at a distance: $r > r_\mu$, the spinning of quantons in the Γ_B-vortex around the e-charge, is realized in conditions of quantum non-equilibrium, according to the vortexial kinetic moment conservation law:

$$\Gamma_B = 2\pi r\cdot v_{ct} = 2\pi r_\mu c = ct, \quad \text{for} : r > r_\mu \,, \tag{38}$$

with a relative velocity : $v^r_{ct} \approx v_{ct}$ in report with the vectons of **E**-field considered with a radial speed: $v_{cr} \to c$ at distances $r > r_\mu$, (pseudoradially emitted, like in fig.1).

The magnetic interaction between electrons is explained- according to the CF-soliton electron model, through the interaction between the quantonic ξ_B vortex-tubes of the **B**(r)-magnetic induction, aligned antiparallel with the electron' μ_e -magnetic moment.

The **B**-magnetic induction around the e -charge has, by eq. (16), the expression:

$$B_j(r) = k_1[\rho_v v^r_v](r) = k_1\rho_B(r)\cdot c; \qquad \rho_v(r) = \rho^0_a \frac{a^2}{r^2}; \;\; v^r_v = -v^r_{ct} = -v_{ct}\,; \; \rho^0_a = \rho_v(a) \tag{39}$$

in which $\rho_B(r)$ represents the mean density of ξ_B-vortex tubes and of the **B**-field, implicitly.

According to eq. (39), (16) and (38), for $r >> r_\mu$ the magnetic induction B(r) has the form which was found also by the classic magnetism:

$$B(r) = k_1\rho_v v^r_{ct} \cong k_1\rho^0_a \frac{a^2}{r^2}\cdot\frac{r_\mu c}{r} = k_1\rho_B c = \frac{\mu_0}{2\pi}\cdot\frac{\mu_e}{r^3} \;\; ; \quad \rho^0_a = \frac{\mu_0}{k_1^2};\; \rho_B = \frac{v^r_v}{c}\rho_v;\;\; r > r_\mu; \tag{40}$$

Also, through the known relation: **B** = rot.**A**, it can be deduced by eq. (39), the solitonic expression of the magnetic **A-** potential of the electron' magnetic field :

$$A(r) = \frac{B(r)\cdot r}{2} = \frac{k_1 r_\mu c}{2}\rho^0_a \frac{a^2}{r^2} = \frac{k_1 r_\mu}{2} p_A(r) = \frac{k_1\cdot\Gamma_A(r_\mu)}{4\pi}\rho_s(r) \;\; ; \quad r \geq r_\mu \;. \tag{41}$$

$$\rho_s(r) = \rho^0_a \frac{a^2}{r^2}; \quad \Gamma_A(r_\mu) = 2\pi . r_\mu c; \quad p_A(r) = \rho_s(r)\cdot c$$

in which $\rho_s(r)$ represents the density of Γ_A -synergon vortex, resulted as having the identical variation with the density of Γ_B - quanton vortex, according also to the eq. (30).

-The gradient: $\nabla_r A \sim \nabla_r p_A(r)$, generates magnetogravitic force and field, according to eq. (23).

-The μ_e magnetic moment is generated like in the figure 2, by the Γ_μ -vortex, ($\mu_e \uparrow\uparrow \Gamma_\mu$), which induces secondary Γ_w-vortexes of light m_w^*-vexons of e-charge with the sense depending on theirs ζ_w -intrinsic chirality: $\Gamma_w \sim \zeta_w$ and continuing the exponential part of Γ_e by $|\Psi|^2 \sim r^{-2}$, explaining the dependences: (d) and (37) between μ_e and e.

-The prequantum electron' spin: $S_e^* \cong S_e = ½ m_e c \cdot r_\mu = ½\hbar$ is generated according to eq. (3), (5) generalised for the electron case by similitude with the vectorial photon, by a proportion:

$k_{\rho s} = (\rho_{ws}/\rho_v)_r = (\rho_{ws}/\rho_v)_a = a/2r_\mu = 1.8 \times 10^{-3}$, $(r_\mu \geq r > a)$

$(\rho_{ws}(a) = m_s/4\pi a^2 r_\mu$; $m_s = m_e$; m_s-the spinorial mass),

of vectorial photons representing- in our model, paired vexons vortexed around the e-charge with $v_{wt}(r) \approx c$, by the Γ_w-vortexes, inside the volume of Compton radius, r_μ .

The case: $\Gamma_w \downarrow\uparrow \Gamma_\mu$ corresponds logically to the negatron, ($\psi^- = R \cdot e^{-iS/\hbar}$) explaining its stability and the case: $\Gamma_w \uparrow\uparrow \Gamma_\mu$ corresponds to the positron, ($\psi^+ = R \cdot e^{iS/\hbar}$).

The fact that the positron is vortexially less stable than the negatron in a very strong magnetic field may explain also the magnetic moment anomaly of the electron:

$(g_{e+} - g_{e-})/\ \bar{g}_e = (-0.5 \pm 2.1) \times 10^{-12}$

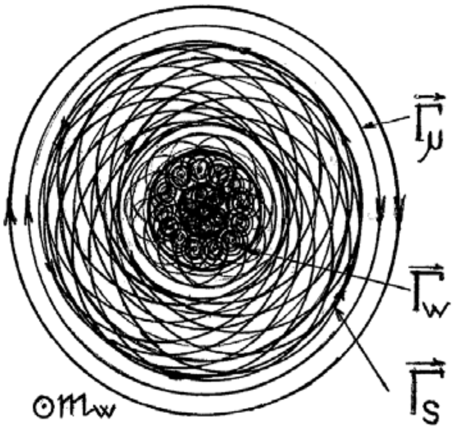

Fig.2-The generation of μ_e and S_e

8.5. The magneto-electric interaction (the Lorentz force)

According to the CF-electron model of the theory, the vexons of electron superficial layer, by theirs μ_w-magnetic moment having-conventionally, the same sign of ζ_w-intrinsic chirality as the electron centrol ζ_e-intrinsic chirality, gives the e-charge: $e^\pm = e \cdot \zeta_e$, ($\zeta_e = \pm 1$).

In this case, the resultant of vexonic quantons rotation at the electron surface, considered in the form of an electron' surface circulation: $\Gamma_a^* = \Gamma_s(a) = 2\pi a \cdot c$, depends of the charge sign:

$$\Gamma_a^* = \Gamma_s(a) = 2\pi ac \cdot \zeta_e \ ; \quad \zeta_e = \pm 1 \qquad (42)$$

For an electron that passes with the $\mathbf{v}_e$- speed through a **B**-magnetic field having the $\rho_B(r)$-mean density of quantonic ξ_B vortex-tubes, the electron surface circulation, Γ_a^*, generates a quantonic Magnus type $\mathbf{F}_L$-force on the moving electron. The $\mathbf{F}_L$-force sense depends also on the sense of the **B**-induction field lines, through the electron' μ_e-magnetic moment, oriented parallel with the ξ_B vortex-tubes of the external **B**-field which may be generate by a q-charge. This force represents the Lorentz force which is of Magnus type-according also to other theories [6] and depends on the dimension: $l_e = 2a$ of the electron- considered as pseudo-cylinder (barrel like) and on the B-magnetic induction, proportional with the relative impulse density of the E-field vectons: $p_v = \rho_e v_v^r$, generating the B-field in accordance with eq. (39):

$$F_L = 2a\cdot\Gamma_a^* \cdot \rho_B \cdot \mathrm{v_e} = q\cdot B\cdot \mathrm{v_e} = e\zeta_e \cdot k_1(\rho_e \vec{\mathrm{v}}_{\mathrm{v}})_r \cdot \mathrm{v_e}; \quad \Gamma_{\mathrm{a}}^* = 2\pi\cdot a\cdot c\cdot \zeta_e; \quad \rho_{\mathrm{B}} = \rho_e(r)\cdot[\vec{\mathrm{v}}_{\mathrm{v}}/c] \tag{43}$$

in which the expression (10) of e-charge depends, in the electron soliton model, on the electron Γ_a^*-surface circulation and has the solitonic form:

$$q = e\cdot\zeta_e = 4\pi k_1 \varepsilon_0 a^2 \rho_a^0 c^2 \cdot \zeta_e = 2a\cdot\Gamma_a^* \sqrt{\varepsilon_0 \rho_a^0}; \qquad \rho_a^0 = \rho_e(a) = 5{,}17x10^{13}\left[\frac{\mathrm{kg}}{\mathrm{m}^3}\right]; \ \zeta_e = \pm 1 \tag{44}$$

8.6. The emission of electromagnetic and of scalar radiation

According to the chiral soliton model described in the theory, for an electromagnetic vibrating charge, the pulsatile loosing and absorbtion of vexons/vectons from/in the strong interaction quantum volume explains the electromagnetic waves emission, in particular-by a Munera's type model of photon [15], composed by pairs of vexons-according to our model. This pulsating losing and absorption of paired vexons, having the resonance frequency $\nu=\omega/2\pi$ of the electromagnetic radiation, is a consequence of the relative moderate perturbation of the particle' quantum volume, caused by the vibration of particle' kernel with the increasing of intrinsic entropy, which produces a pulsating inflation of particle' quantum volume by partial destruction and alternative regeneration of vexons by etherono-quantonic winds. This process is equivalent to the generation of electromagnetic wave fronts with the same frequency of charge' vibration and with the energy: $\in_f = h\nu_f = m_f c^2$, which, for another el- charge, determines its vibration with the same frequency, by an effect which is equivalent to a pulsating electrostatic interaction, caused by the interaction of the quantonic wave fronts of the photonic vexons with the charge surface and may be expressed by SNL eq. (34) written for an vexonic pair of energy $\varepsilon = \hbar\omega$ initially contained by the charge' surface of a-radius and emitted under the quantonic pressure effect of the Γ_μ-vortex when:

$$-\mathrm{ih}\cdot(\partial/\partial t)\Psi_a = \hbar\omega\cdot\Psi_a = [E_{c\nu}^i + V_\nu^{'}(a)]\cdot\Psi_a; \qquad \Psi(\mathrm{r,t}) = \mathrm{R}\cdot\mathrm{e}^{\mathrm{i(kx}-\omega\mathrm{t})}; \ \mathrm{V}_\nu^{'}(a) = (\mathrm{V_i^0} - \Delta\mathrm{V}_\nu)_{\mathrm{a}}; \ \mathrm{k} = 2\pi/\lambda = \omega/\mathrm{c} \tag{45}$$

where $\Delta V_\nu'(a) = h/\Delta\tau = \hbar\omega$ represent the periodic decreasing of the initial potential $V_i^0(a)$, the loosed mass being periodically completed by the mass of n vectons, $h\nu_v$, absorbed by the charge when the initial value $V_i^0(a)$ of the potential is restored, i.e.: $V_i^0(a) = (E_{cv}'+n\cdot h\nu_v) = E_{cv}^i$.

At the fermion vibration or deceleration under energetic shocks, $\Delta\varepsilon_s$, the intrinsic vexons of particle are easier destroyed by the kernel and the vortexial structure is strogly disturbed, decreasing also the elastic character of photons interaction with vexons of the e-charge' surface. In this case, n photons of energy $h\nu_i$ which in the unperturbed state are reflected, can penetrate quasi-simultaneously the charge' quantum volume and they are periodically converted inside the particle' volume, by the Γ_μ-vortex, into vexons having bigger mass, afterwards emitted through the particle Γ_μ-vortex, i.e.:

1) $E_c^i - V_v'(a) = \Delta\varepsilon_s = (V_v^0 - V_v')_a$; $\Rightarrow$ 2) $E_c^f = E_c^i + n\cdot h\nu_i$; $\Rightarrow$ 3) $E_c^f - V_v^0 = \varepsilon_w = h\nu_w = n\cdot \varepsilon_i$. This conclusion is sustained also by the experiment of photons-electron interaction experiment made in 1997 with the Stanford particle accelerator using interaction of green laser pulse with 10^{22}W/m^2 peak power density with 46.6 GeV electron beam, in which the resulted photons was gamma rays producing e^--e^+ pairs [47] and by the observations of γ-rays emission generated by thunderstorm, (italian group, 2000, [48]).

Results also that the exceeding mass of particle may be emitted-at least partially, as a stable-bounded vexon-antivexon bosonic double pairs: $\varepsilon_w = 2(m_w - \overline{m}_w)\cdot c^2$, having a null prequantum spin, under the action of the magnetic moment quantum vortex Γ_μ.

This possibility corresponds to a scalar radiation quanta emission, realised according to the energy conservation law applied to the conversion of quasi-simultaneously captured photons into a scalar quanta of double vexonic pair with bigger mass, having the form:

$$n.\varepsilon_i + m_p c^2 \rightarrow(\text{by } \Delta\varepsilon_s)\rightarrow m_p^* c^2 + \varepsilon_w \text{ ; } \quad n.\varepsilon_v \cong \varepsilon_w \quad ;E_v \geq E_v^0 = \varepsilon_w / K_v \text{ ;} \qquad (46)$$

where: ε_i ; ε_w -are the energy of the captured photons and, respectively, of the emitted scalar quanta and K_v is a constant which can be of over-unity value-according to some experiments [49], without contradiction with the energy conservation law, the eq. (45) explaining in this case phenomenons such as the kinetobaric effect [49] consisting in the possibility to obtain a dynamic response of a balance with a water glass containing also a microwaves antenna, bigger than the absorbed microwave energy- transmitted in poulses of high frequency, as consequence of the ionizing effect of the ε_w-scalar quanta- according to eq. (46).

The emitted bosonic double pairs with a null spin: $\varepsilon_w = 2(m_w - \overline{m}_w)c^2$, corresponds to the characteristics of the scalar radiation photons which-as in the theory of Gupta and Bleuler [50], not contribute to the electromagnetic radiation energy- phenomenon explained with the soliton model of photon by the fact that these bosons represents a pair of two $h\nu$- photons of electromagnetic radiation coupled in antiphase, as in the Tesla's theory of scalar waves, with inertial mass but with null magnetic moment along $x||m_w c$. These scalar radiation quanta corresponds also with the experimental results of T. G. Hieronymus [51] concerning the emission of scalar radiation obtained by electromagnetic vibration of atomic nuclei, with the energy of scalar quanta in the violet and ultraviolet spectra: $\varepsilon_w \cong 2\cdot h\nu_w$ - proportional with the mass of the vibrated nucleus, according to the equation of harmonic oscillator frequency: $\nu \sim\sqrt{(k/M)}$; ($M = m_n.A$; k-the quasielastic constant). According to the theory and by eq. (46), the nuclei which presents nuclear self-resonance and giant-resonance, are natural emitters also of scalar radiation quanta.

8.7. The electron' cold genesis

Considering the formation of the quantonic Γ_{μ} -vortex as the main condition for the fermion genesis in a very strong magnetic field which generates a genesical quantum potential: Q_G , for the movement of a single quanton to the Γ_{μ}-vortex line: $l_r = 2\pi r$ ($r \le a$), results that-in the fermion genesis process, at quantum equilibrium, when: $\Gamma_c = 2\pi m_c c$, the genesic Q_G- quantum potential compensates the quanton centrifugal potential, so:

$$Q_G = - E_{cf} = -p_c^2/2m_c$$

For the fermion genesis, the nature of this genesic Q_G-quantum potential results- according to the prequantum model of fermion, as being a magnetic genesic field, given by the Γ_A - sinergonic vortex of an external superstrong magnetic field as those of a magnetar type star or equivalent, acting by a pseudomagnetic (sinergonic) B_S -induction in report with μ_c- pseudomagnetic moment of quanton and having the vortex centre in coincidence with the formed fermion centrol.

It results, in consequence, according also to the eq. (16) of the magnetic induction, that the Q_G -quantum genesic potential is given by the equation:

$$Q_G = -\mu_c \cdot B_S(r) = -\mu_c \cdot k_1 \cdot \rho_s^* c = -p_c^2/2m_c = -h/2 = - E_{cf} , \qquad (47)$$

acting as a pseudomagnetic interaction of quanton with the genesic magnetic field.

For the electron' cold genesis, the eq. (30) resulted from the chiral sub-solitons forming condition [22], impose that:

$$\rho_s^* \rightarrow \rho_e^0 = 22{,}24 \times 10^{13}\ kg/m^3, \text{ resulting that: } \mu_c \rightarrow 3 \times 10^{-47}\ A \cdot m^2\ ;\ B_S \rightarrow 10^{13}\ T.$$

The obtained critical value of B_S represents –in the theory, the minimal value of a genesic magnetic field which determines the confination of vectons and of quantons in particles, and is characteristic to a magnetar-star which can generates electrons by a genesic Q_G-potential- similar to but different from the de Broglie quantum potential.

The previous mechanism of CF-particle cold genesis is different from those resulted from the quantum mechanics as a process of virtual particles transformation in real particles in the gravitational field of rotating black-holes, from the polarised quantum vacuum, (Zeldovich, Hawking, [52]).

9. The cold genesis of particles in the Protouniverse' period

The possibility to explain the basic properties of the elementary particles by a fractalic cold genesis structure, argued by the theory, sustains also the conclusion that before the actual material Universe, existed a Protouniverse formed initially by leptons of the proto„dark energy", i.e.-etherons and quantons which was vortexially confined, forming „dark" photons, „dark" particles with bigger mass and Majorana neutrins which -by theirs vortexial confination, are generated massive neutrins (postulated as components of Protouniverse also by the Dark matter Universe model) and micro- and mini-black-holes with growing mass and magnetic field.

The possibility of "dark particles" formation by the confination of "dark energy", as "dark solitons", is argued also in other theories [53]. Also, the forming of vortexial balls of dark energy which may forms mini-black holes corresponds to the case of a "gravstar" forming and evolution, i.e.-a dark energy ball with hard-core, similar to the hypothetical "gravastar", proposed by E. Mottola and P.O. Mazur [54], [55].

-By the considered proto-dark energy structure, resulted from the theory : g-etherons, ($m_g = (10^{-68} \div 10^{-72})$kg), s-etherons ($m_s = (10^{-59} \div 10^{-61})$kg) and quantons, ($m_h = h/c^2 = 7.37 \times 10^{-51}$ kg), and by the considered inertial mass quantum volume radius of CF-particles: $r_{CF} = 1.41$fm, results that-according to the considered chiral sub-solitons forming condition [22], the mean dark energy density necessary for cold genesis of a CF-particle having a m_{CF} mass, is:

$$\overline{\rho}_\Lambda^* = 2m_{CF}/\upsilon_{CF} = 2m_{CF}/11.7\ \text{fm}^3 \qquad (48)$$

-value which can be obtained locally by vortexial confination from a low density .

The local temperature and pressure of the proto-dark energy is given by the quantons of quantonic winds, according to the classical equations:

$$(49a)\quad {}^3/_2 \cdot m_h c^2 = {}^1/_2 \cdot k_B T_\Lambda\ ; \quad P_\Lambda = (\overline{\rho}_\Lambda/m_h) \cdot k_B T_\Lambda = 6m_{CF}c^2/\upsilon_{CF} = 7.7 \times 10^{60} m_{CF}\ [\text{N/m}^2] \quad (49b)$$

resulting that: $T_\Lambda = 1.44 \times 10^{-10}$ K , $\rho_\Lambda^* \cong 3.7 \times 10^4$Kg/m^3 and: $P_\Lambda^r = 1.7 \times 10^{21}$ [N/m^2] for the cold genesis of the 3K -background radiation semiphotons and photons, ($m_{CF} = m_v = 3 \times 10^{10} m_h$).

So, the theory permits the hypothesis of a cold genesis of the 3K-background radiation .

The eq. (49b) should also that the proto- „dark energy" quantonic pressure locally necessary for the dark particles genesis was the quantonic pressure necessary for the electron cold genesis, i.e.: $P_\Lambda^e = 7 \times 10^{30}$[N/m^2], value which permitted the formation of Big Balls of protomatter in the dark energy vortexes of the Protouniverse.

The great "dark energy" density in the Protouniverse centre not permitted the formation of stable atoms, according to the theory, but could be formed metastable states of "atonium", i.e.-pseudo-atoms having a nucleus and non-quantified electronic orbitals, formed in conditions of metastable dynamic equilibrium:

$$F_S(r) = F_R(r) \quad \Leftrightarrow \quad \rho_s(r)\cdot(c-v_e)^2 = \rho_R(r)\cdot v_e^2(r); \qquad \rho_R(r) \leq \rho_s(r),\ v_e \leq c/2, \tag{50}$$

realised between the $F_S(r)$-force of sinergonic Γ_S-vortex and the advancing resistance force, $F_R(r)$, given by the brownian non-vortexed component $\rho_R(r)$, of the „dark energy".

10. The nucleons and the nuclear forces

The well-known theory of Yukawa for the nuclear forces exercised between nucleons, presuming an exchange of magnetically interacting vectorial and pseudo-scalar mesons between nucleons, presents some deficiencies that has determined the proposal of a version with repulsive term of the nuclear potential, (Friedman, Kendall [35]). Also, it is necessary to explain in the theory which force impede the meson to leave the nucleon.

In NLS equation, particularly, the non-linear term (33b) may be taken in the form of a non-local interaction of Yukawa type [56] , possibility that suggest a CF type of nucleon, with internal vortexial structure. .

-The electron soliton model of the theory allows an cvasi-unitary explanation also for the nuclear forces, through a degenerate electron cluster model of nucleon, presumed also by A. Osim Barut, [33] and resulted also by the axioms: a1-a4 of the theory, supposing a model of "cold" formed proton as chiral soliton cluster, compound of (N^p+1) degenerate electrons (semigammons) vortexially confined, (N^p-even number), which gives the proton mass by a cluster of N^p bounded degenerate electrons and an attached positron with e^+ integer charge.

-For the proposed CF model of nucleon, in accordance also with the quarks theory, we may consider for the bounded degenerate electron, a charge degeneration to the value: $^2/_3e$, complying also with the hypothesis of „quasi-electrons" with fractional charge: $^2/_3e$, used by Haldane and Halperin for explain the fractional quantum Hall effect, [57], and we will consider these bounded degenerate electrons of the N^p cluster, as being quasielectrons, $(e^*={}^2/_3e)$.

10.1. The proton model

It is known that- in comparison with the interaction at high energy, when the negatron is annihilated by the positron, resulting two gamma quanta, at low energy interaction the negatron and the positron can forms a hard-gamma quanta, without annihilation of magnetically coupled electrons and that this quanta can brake into the two component electrons in an electric field of a nucleus or in an intense magnetic field, [58].

The possibility to form quasistable $(e^+\text{-}e^-)$-oscillons at low energy of $(e^+\text{-}e^-)$-interaction, resulted from the theory, brings arguments for a proton cluster model of (N^p+1)-degenerate electrons, [26], having an attached positron with degenerate spin and magnetic moment, axially positioned, entrapped by an inert cluster: N^p, as in the proton model of G.C.Wick model, [59], which-according to some theoretical opinions (A. Pais, 1986), explains also the "abnormal" value of the proton magnetic moment, (the proton gyro-magnetic ratio).

In our CF model, the N^P-inert cluster is composed by bounded quasielectrons, having $e^*=\pm{}^2/_3e$ charge, i.e.- electrons with degenerate charge, mass and magnetic moment, magnetically coupled by the Γ_e–quantum vortices in negatron-positron pairs, with the inertial mass in the same quantum volume having the radius: r_n=a=1.41fm and with theirs centrols forming the m_0 -mass of the nucleon core having the radius: r_m = 0.2fm- according to the experimental data [34], seeming as a Bose-Einstein condensate of gammonic $(e^+\text{-}e^-)$-pairs.

The degeneration of electrons coupled in $(e^{*+} - e^{*-})$-pairs, supposing a decrease of its mass, of r_μ-radius and of Γ_μ-vortex density in the strong interaction quantum volume, results by the quantons mutual interaction in these partially superposed vortices, interactions that diminish the quantonic $\rho_\mu(r)$ -density of the Γ_μ -vortex on the electron surface, to a value corresponding-by rel. (d), to the charge: $e^* = {}^2/_3e$ of a quasielectron:

$$\rho_\mu^x(a) = \rho_e^o \cdot e^{-\frac{a}{\eta^x}} = \rho_e'(a) = \frac{2}{3}\rho_e(a) = 3{,}44x10^{13}kg/m^3 \,; \qquad a = 1.41\text{fm} \qquad (51)$$

where $\rho_e'(a)/\rho_e(a)$ =(2/3), represents the proportion of m_w*-vexons parallel polarised by the Γ_μ^* -vortex in the e*-quasielectron surface, reported to the normal electron, according to the (d)-dependence rel. of the theory: $e \sim \mu_e(\Gamma_e) \sim \rho_\mu(a)\cdot c^2$; $(\rho_e(r)\sim\rho_\mu(r);\ a_i\leq r \leq a)$.

The value: $\rho_\mu^*(a) = ({}^2/_3)\rho_e(a)$ corresponds-by eq. (51), to a degenerate mean radius of the magnetic moment distribution, of value: η_e^* = 0.755fm , resulted by the increasing of internal entropy of electron- which explain- by rel. (d), the quasielectron charge in a CF-model different from the „dressed electron" model of quasielectron, (A. Goldhaber, J.K.Jain, [60]), supposing CF-medium screening, which explain relative artificially the proton' charge.

The sinergonic Γ_A -vortices of the N^p-cluster may be considered as un-degenerate, because that we may neglect the weak mutual interactions between sinergons having cvasinull vortex.

-Presuming-according to the model, an un-degenerate Γ_A -sinergonic vortex of quasielectron in the N^p-cluster, in accordance with eq. (30) derived from the chiral sub-solitons forming condition [22], we may approximate the m_e*-mass of quasielectron in the N^p cluster, considering a degeneration of the strong interaction quantum volume mass, at the value: $\Delta m_e^* \cong ½\cdot(1+ ⅔)\cdot\Delta m_e$, obtaining for the bounded quasielectron mass, the value:

$$m_e^* \cong ½\cdot(1+ ⅔)\cdot(m_e - \rho_e^0\cdot\upsilon_i) + \rho_e^0\cdot\upsilon_i \cong 7.925x10^{-31}\ \text{kg} \cong 0.8722\cdot m_e = f_d\cdot m_e \ , \qquad (52)$$

which corresponds-by (29a), to a mean radius of the $\rho_e(r)$-density variation: η_d=0.93fm- close to the value: η^p_{rms} = 0.895fm found by I. Sick [36] for the proton' charge distribution.

For the mass of a degenerate gammon: $\gamma^*=(m_e^*- \overline{m}_e^*)$, results-also by eq. (29a), the value: $m_\gamma^*=2m_e^*=1.742m_e$. In this case, the neutral proton cluster is formed by : $N^p=1835.1/f_d \cong 2104$ paired quasielectrons, according to the model. The loosed part of electron energy:

$\Delta\varepsilon_e(\gamma^*) \cong (1-f_d)\cdot m_ec^2 = 65.3keV$, in the degenerate gammon formation process, have the signifiance of a binding energy per quasielectron-similar to the case of deuteron.

-The virtual radius r_μ^n of the proton' μ_p-magnetic moment, compared to the electron, decreases when the protonic positron is included in the N^p -cluster volume, from the value: $r_\mu^e = 3.86x10^{-13}m$, to the value: $r_\mu = r_\mu^p= 0,59fm$, as a consequence of the increasing of impenetrable quantum volume' mean density in which is included the protonic positron centrol, m_0, from the value: $\overline{\rho}_e$ to the value: $\overline{\rho}_n \cong f_d \cdot N^p\cdot \overline{\rho}_e$, conformed with the equation:

$$\text{(53a)}\quad \mu_p=k_p\frac{m_e}{m_p}\mu_e=k_p\frac{\overline{\rho}_e}{\overline{\rho}_n}\mu_e\cong k_p\frac{1}{f_d\cdot N^P}\mu_{Bp}=\frac{e.c\cdot r_\mu^p}{2};\quad k_p=\frac{g_p}{g_e}=2.79=\frac{\rho_n(r^+)}{\rho_n^0}=e^{\frac{r^+}{\eta_d}}\quad\text{. (53b)}$$

in which: k_P-the gyromagnetic ratio; $\overline{\rho}_e$; $\overline{\rho}_n$ –the mean density of electron and of nucleon;

r^+ -the position of the protonic positron centrol in report with the proton centre.

f_d -the degeneration coefficient of the quasielectron m_e^*-mass.

-The interpretation given by eq. (53) of the particle' mass-depending magnetic moment variation, explains also the fact that- when the proton is transformed in neutron, the emitted positron regains the μ_e-magnetic moment value of free state, by the negentropy of quantum and subquantum medium, given by quantonic and etheronic winds- according to the theory.

-The virtual radius of the proton magnetic moment: $r_\mu^p = 0.59fm$- resulting from eq. (53a), may be considered approximately equal to the radius of the impenetrable nucleon volume, of value: $r_\mu^p \cong r_i \cong 0.6fm$- used in the Jastrow expression for the nuclear potential, [61], by the conclusion that the impenetrable nucleon volume being supersaturated with quantons, it limitates the decreasing of $\Gamma_\mu^p=2\pi r_\mu c$ -quantonic vortex radius, at the value: $r_\mu^p = r_i$.

-The value $\mu_N = \mu_c/1836$ of the nuclear magneton, gives-by eq. (53), a magnetic moment radius: $r_i^o = 0.21x10^{-15}m$, that represents the Compton radius of the proton, given by a presumed central position of the proton charge- value close to the experimentally deduced proton core radius, (0.3fm-[62]) and to the experimentally deduced proton quark radius, [62] . The eq. (53b) also gives: $r_e^+ = 0.96$ fm for the axial position of protonic positron centrol.

10.2. The forming of electronic orbitals in atoms

Considering-in particular, the case of the hydrogen atom, according to the considered CF-cluster model of proton with incorporated positron, the sinergonic Γ_A-vortex of the protonic positron explains the $v_e(r)$-speed variation of the atomic electrons by the conclusion that these electrons are revolved around the nucleus by the action of a tangent force: $F_A(r)$, given by the impulse density: $p_s(r) = \rho_s(r)\cdot c$ of the Γ_A vortex, in a dynamic equilibrium with the advancing resistance force: $F_R(r)$ given by a spatial density, ρ_R of a equivalent pseudo-stationary sinergonic medium:

$$\rho_s(r)\cdot(c-v_e)^2 \cong \rho_s(r)\cdot c^2 = \rho_R(r)\cdot v_e^2(r); \qquad (\rho_s(r)= \rho_s^a\cdot(a/r)^2). \tag{54a}$$

The electron' $v_e(r)$-speed variation in the hydrogen atom results from the quantification law of the orbital kinetic moment of electron: $L_e = m_e v_e r_e = n.h/2\pi$, ($v=v_0/n$; $r=n^2 r_0$), in the form:

$$v_e(r) = c\cdot\sqrt{\frac{2a}{r}}; \qquad \frac{v_0}{c} = \sqrt{\frac{2a}{r_0}} = \frac{1}{137} = \alpha; \qquad r^0 = 0{,}53\overset{0}{A} \tag{54b}$$

resulting that: $\rho_R(r)=\rho_s^a\cdot(a/2r)$. The eq. (54b) shows also that at the distance $r_\mu^a \cong 2a$ from the proton, the electron would be revolved by the Γ_p–proton vortex with the speed: $v_e^M \cong c$, which may be explained-in our model, if the proton' Γ_μ^p-quantonic vortex satisfy the condition:

$$r_\mu^a \to 2a \quad \Rightarrow \quad \Gamma_\mu^p \to 2\pi r_\mu^a c\ , \tag{55}$$

An argument for rel. (55) is the fact that- at β disintegration of the neutron, the released electron has an energy corresponding to a speed close to the light speed, ($v_\beta \cong 0.92c$) explained by rel. (55) of the model by the conclusion that this speed is given to the electron of β^- -radiation by the Γ_μ^p - vortex of the remained proton.

The apparent contradiction between the value $r_\mu^a \to 2a$ and the radius: $r_\mu^p = 0{,}59$fm of the proton' μ_p-magnetic moment, may be explained in the model by the fact that the protonic Γ_μ^p-vortex, given by its positron, generates also the Γ_w-vortex of parallel polarized m_w^*-vexons of proton surface, giving the e^+-charge and having the confined vortexial energy: $w_w = w_\mu = \frac{1}{2}\Sigma m_h(\omega_h r)^2 = \frac{1}{2} m_w^* c^2$ contained by a chiral soliton with radius: $r_w^n \to 1.4$fm, this $\Sigma(w_w)$-vortexial energy decreasing exponentially-in the proton case and giving the value r_μ^a of $\Gamma(\mu_P)$-proton soliton radius like in figure 2, the virtual radius, r_i^o, of the proton' magnetic moment being explained by the fact that the linear part of proton' chiral Γ_μ^p-soliton is induced around the proton' kernel and around the m_0-centrol of protonic positron according to eq. (53).

Because that- for the electron CF-model case, the vexons of electron' surface has a degenerate Compton radius approximative equal with the electron Compton radius: $r_w^e \cong r_\mu^e$, explaining the electron prequantum spin: $S_e = ½\hbar$, (fig.2), results by eq. (53), that for a vexon of the proton surface ($r \cong 1.4$fm), we have : $r_w^n \cong (r_\mu^e/1836)\cdot e^{1.4/0.93} = 0.946$fm, so we may consider in eq. (55), the value: $r_\mu^a \approx a + r_w^n \cong 2.35$ fm, for which: $\Gamma_\mu^p \cong 2\pi r_\mu^a c$.

Results in this case, a semiempiric relation for the variation of quantons tangent v_{ct}-speed in the Γ_μ^p-proton vortex, which corresponds to the eq. (38), (53) and (55), in the form:

$$v_{ct}(r) = \begin{cases} c, & for: r < r_\mu^a = a + r_w^n \cong 2.35 fm; \qquad (a = 1.41\text{fm}) \\ c\left(\dfrac{r_\mu^p}{r}\right)^{\left(1-\frac{r_\mu^p}{r}\right)}, & for: r \geq r_\mu^a \cong 2.35 fm \quad ; \qquad r_\mu^p = r_i = 0{,}59 fm \end{cases} \qquad (56)$$

The resulted pre-quantum soliton model of atom, of T→0K, which degenerates in the Bohr-Sommerfeld's model at T>0K, is also consistent with some other soliton models of atom, [63] and allows the explaining of the electron transition on under-fundamental level (n = 1/2) in the hydrogen atom, observed in some experiments of cold nuclear fusion [64], by the conclusion that the quantification of the electron number of an atomic energy level: N(n), corresponds to a superficial charge density: σ_e of constant value for an energetic layer-considered as having a quasi-cylinder (barrel-like) form, having the same height: l_σ and quantified radius, $r_e = n^2 \cdot r_o$:

$$N(n) = Q(n)/e = (\sigma_e . 2\pi r_e\, l_\sigma)/e = 2n^2\ ; \quad Q(1) = 2e, \quad r_o = e/(\sigma_e . \pi .\ l_\sigma)\ ; \quad r_e = n^2 . r_o \qquad (57)$$

According to the model, the transition on under-fundamental level (n = 1/2) is particular to the hydrogen atom, by the condition Q(1/2) = e, (H-atom having a single electron), condition which gives a radius for the under-fundamental level orbital: $r_o^* = e/(\sigma_e . 2\pi . l_\sigma) = r_o/2$.

For other atoms, with bigger mass, the transition on under-fundamental level: (n=1)→(n'=½) results as possible by stimulated electronic transition, according to the model.

10.3. The nuclear force

In the case of protonic cluster formed by N^p-quasielectrons, the quantonic Γ_μ^*-vortices of paired quasielectrons, induced by the sinergonic Γ_A^* -vortices around each electronic centrol with reciprocally opposed senses, have logically an quasi-identical variation of the v_c-tangential speed of quantons as in case of the Γ_μ^p-soliton vortex, given by eq. (56).

It results that the superposition of the (N^p+1) proton quantonic vortices: Γ_μ^* , generates-inside the volume with the radius: r_μ^a = 2.35fm, a total dynamic pressure: $P_n = (1/2)\rho_n(r)\cdot c^2$ having a variation according to eq. (32) and (51), with η^*=0.755fm :

$$P_n(r)=\frac{1}{2}\rho_n(r).c^2=\frac{1}{2}\rho_n^o.c^2.e^{-\frac{r}{\eta^*}}=P_n^0\cdot e^{-\frac{r}{\eta^*}}, \qquad \eta^*=0{,}755\,fm;\ \mathrm{r}\le \mathrm{r}_\mu^\mathrm{a}=2.35\,fm \tag{58}$$

in which the proton density in its centre has the value: $\rho_n^o=(N^p+1)\cdot\rho_e^o=2105\cdot\rho_e^o=4.68\mathrm{x}10^{17}\mathrm{kg/m^3}$, (with: ρ_e^0 = 22.24 x10^{13} kg/m^3), and gives an approximate mass of the impenetrable quantum volume, $\upsilon_i(a_i)$ = 0.9 fm^3, of value: $m_i(a_i)\cong\rho_n^0\cdot\upsilon_i=4.21\mathrm{x}10^{-28}$ kg .
According to the law of ideal fluids extended for quantum fluids in a form that neglects the exterior forces, i.e.: $P_d(r)+P_s(r)=P_s^M(r)$, (P_s^M corresponding to the totally destroyed vortex), in the proton nuclear field volume having the radius: $r_\mu^a\cong 2.35$ fm, the gradient of quantonic dynamic pressure: $P_d(r)=P_n(r)$ acting upon the impenetrable nucleonic volume $\upsilon_i(a_i)$ of an another nucleon, generates a scalar nuclear force: $F_n(r)=\mathrm{grad}\ V_s^n(r)$, conforming to the Euler's equation [26]:

$$F_s(r)=\nabla V_s^n(r)=\rho_n^0\upsilon_i.\frac{d\mathrm{v}}{\mathrm{dt}}=-\upsilon_i.\nabla P_d(r)+\rho_n(r)\cdot f_{ext}\ , \text{with}:\ \rho_n^0\upsilon_i=\mathrm{m_i};\quad f_{ext}\cong 0 \tag{59}$$

through the static quantonic pressure gradient having the same value but an opposed sign.
The scalar nuclear force between two nucleons is produced, conformed with eq. (58) and (59), by a scalar nucleonic potential: $V_s^n(r)$, having-by eq. (32) and (51), the form:

$$V_s^n(r)=-\upsilon_i\cdot P_n(r)=-\frac{\upsilon_i}{2}\rho_n(r)\cdot \mathrm{v_c^2}=V_s^0\cdot e^{-\frac{r}{\eta^*}};\ (\mathrm{v_c}=\mathrm{c});\ V_s^0=-\frac{\upsilon_i}{2}\rho_n^0\cdot c^2;\ \mathrm{r}\le\mathrm{r}_\mu^\mathrm{a}=2.35\mathrm{fm} \tag{60}$$

The $F_s(r)$-force acts only upon the υ_i –impentrable quantum volume because that the rest of nucleon is penetrable to the field quanta action, (to quantons action), according to the model.
Thus, by eq.(60) is theoretically refound the expression of the exponential nuclear potential, with a specific deepness of the potential well: V_s^o = -118.4 MeV and with: η^* = 0.755 fm.

At the distance d ≅2fm between deuteronic nucleons (generally considered as the dimension of the nuclear potential well), it results from eq. (60) that the scalar nucleonic potential $V_s^n(r)$ has the value: $V_s^n(d)$ = -8.37 MeV- value which corresponds to the known mean binding energy inside the stable nuclei: -7.5….-8.5 MeV. By the given interpretation of the eq. (53), the meson theory of nuclear force results as formal, in our cold genesis theory.

We observe also that the form (60) of the nuclear potential comply with the form (34) of the strong potential of the electron, anteriorly deduced by the SNL equation (33a) with soliton-like solution, by a particular value: $k_n=-V_s^o$ and with $\delta\upsilon=\upsilon_i$, $V_s^n(r)$ resulting from eq. (34), in accordance with the superposition principle specific also to the quantum mechanics.

The sinergonic dynamic pressure: $P_d^s(r)$ of the Γ_A^n vortices of (N^p+1)-protonic cluster, generates a scalar gravito-magnetic potential, similar to the nuclear potential $V_s^n(r)$ but acting upon a volume: $\upsilon_c^n \cong m_i/\rho^m = 4.21\times10^{-28}/4.3\times10^{19} \cong 10^{-47}$ m^3, given by the sum of the electronic and quantonic super-dense centrols of the m_i-inertial mass of impenetrable nucleonic volume, υ_i. Because that the value υ_c^n results as being of ~100 times smaller than the value υ_i= 0.9fm^3 , by eq. (30) it results that the scalar potential generated by the sum of synergonic Γ_A -vortices is of a relative negligible value related to the nuclear potential.

However, related to the nucleon' gravitic potential, this magneto-gravitic potential: $V_{Mg}(r)$ results of signifiant value, having- for $r \le r_\mu^a$, a variation according to eq. (60), of short range and explaining –at the macro-scale, also the "black hole" effect, especially in the case of a "magnetar" type super-dense stars, according to the theory.

At the micro-scale, this gravito-magnetic potential explains the maintaining of vexons and of quasielectrons centrols inside the nucleonic quantum volume- explanation complying also with the chiral soliton model with quantum potential, suggested also by other theories, [8].

For $r > r_\mu^a$, by eq. (59) results that the magneto-gravitic potential generated by an elementary particle over another particle having the mass m_p, has the expression:

$$V_{Mg}(r) = -\frac{\upsilon_c}{2}\rho_s(r)\cdot \mathrm{w}_t^2 = -\frac{m_p}{2\rho^M}\rho_a^0\frac{a^2}{r^2}\cdot c^2 = V_{Mg}^0\left(\frac{a}{r}\right)^2; \quad V_{Mg}^0 = -\frac{m_p}{\rho^M}\rho_a^0 c^2 \tag{61}$$

10.4. The neutron model

Complying with the CF proton soliton model, the neutron results in the theory conforming to a Lenard-Radulescu dynamid model, (Dan Radulescu, 1922, [65]) according to which the neutron is composed by a proton centre and a negatron revolving around it with the speed $v_e^* < c$ at a distance $r_e^* \le a$, at which- according to eq. (53), it has a degenerate μ_e^S-magnetic moment and a S_e^n-spin.

The revolving of the neutronic negatron, generates a negative orbital magnetic moment, μ_e^L, the neutron magnetic moment resulting according to equation:

$$\mu_n - \mu_p = (\mu_e^L + \mu_e^s) = (-1{,}91 - 2{,}79)\mu_N = -4{,}7\mu_N; \quad with: \mu_e^L = \frac{e\cdot v_e^*\cdot r_e^*}{2} \quad . \tag{62}$$

Because that the neutronic negatron orbital rotation takes place under the action of the dynamic pressure: $\frac{1}{2}\cdot\rho_\mu(r_e^*)c^2$ of the Γ_μ^n-quantonic vortex, forming the μ_p -proton magnetic moment and having the $\rho_n(r)$- density inside the quantum volume, we can consider also the equilibrium relation of the dynamic pressures given by these densities acting over the revolved degenerate negatron area: $S' \cong 2\pi a_i^2$, by the approximation: $\rho_n(r_e^*) \cong N^p\cdot f_d\cdot\rho_\mu(r_e^*)$ conformed to eq. (53a) and (30), in the form:

$$\rho_\mu(r_e^*)\cdot c^2 \cong \rho_n(r_e^*)\cdot v_e^2; \quad \Rightarrow \quad \rho_\mu^0 c^2 \cong f_d\cdot\rho_n^0 v_e^2, \quad (f_d = 0.8722); \quad v_e \cong c/\sqrt{f_d}\cdot(N^p+1) \qquad (63)$$

with: $\rho_\mu^0 = \rho_e^0 = 22.24\text{x}10^{13}$ kg/m^3; $\rho_n^0 = 4.68\text{x}10^{17}$ kg/m^3, resulting that: $v_e = 0.0233\cdot c \cong 7\text{x}10^6$m/s.

Also, by eq. (53) regarding the magnetic moment' degeneration considered also for the incorporated neutronic negatron, results that:

$$\mu_e^S = \mu_N \cdot \frac{\rho_n^0}{\rho_n(r_e^*)}; \qquad \rho_n(r_e^*) = \rho_n^o \cdot e^{-\frac{r_e}{\eta_d}} \quad ; \quad \eta_d = 0{,}93\, fm; \qquad (64)$$

By (62), (63) and (64), results: $r_e^* = 1.41$ fm; $\mu_e^L \cong -0.1563\mu_N$; $\mu_e^S \cong -4.554\mu_N$, so-the μ_n value results by the conclusion that the neutronic negatron has the m_0-centrol of the quantum volume positioned in the surface of protonic quantum volume, (figure 3), comparative with the positronic proton, axially positioned, for which the eq. (53) gives: $r_e^+ = 0.96$ fm. The spin and the revolving frequency of the neutronic negatron around the proton centre results by the relations:

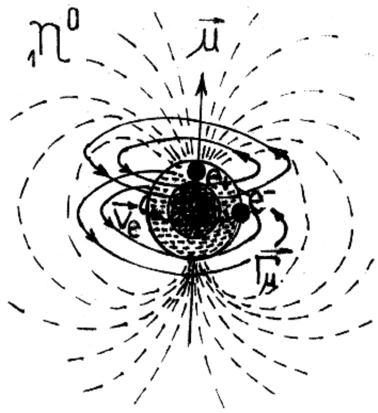

Fig.3-The neutron model;

$\nu_e = v_e/2\pi r_e = 0.79\text{x}10^{21}$ Hz

$\mu = (e/m_e)\cdot S; \quad \Rightarrow \quad S_e^n = \mu_e^S\cdot(m_e/e) = 0.0025\,\hbar, \ (\hbar = h/2\pi)$,

-in concordance with the (quasi)equality between the spin of proton and of neutron, ($S_n \approx S_p = \frac{1}{2}\hbar$), resulted in the quantum mechanics.
So, by eq. (53) in which $r_n = a$ for all CF-particles, our model solve the classical problem of the nucleon' spin and magnetic moment value, problem which determined the abandonment of the classical nucleon models presuming incorporated nucleonic electron(s).

The continuous energy spectrum of β-radiation observed at neutron' transformation, corresponding to a v_e-speed of β-electron, of value: 0.7÷0.92c, is explained-in accordance with eq. (55), (56), through the acceleration given to β-electron by the Γ_μ^p-vortex of remained proton after β-disintegration, whics is function also of the β-electron emission angle, θ_β .

10.5. The deuteron model and the deuteron' self-resonance

In the case of deuteron, the experiments [66] evidenced a binding energy: $\Delta E(d) = -2.226$ MeV, for the real deuteron having parallel nucleonic spins and of about –0.07MeV for the virtual deuteron having anti-parallel nucleonic spins. Comparatively to the binding energy value: $V_n(d) = -8.4$ MeV, (d=2fm), of the undisturbed deuteronic state from stable multi-nucleonic nuclei, the value $\Delta E(d) = -2.226$ MeV indicates, by eq. (56) and (60) of the model, a decrease of the quantonic dynamic pressure: $P_d(r) = 1/2\rho_c(r).v_{ct}^2$ in the composite chiral soliton of the (N^p+1)-protonic cluster.

This decrease is generated by the decrease of r_μ^a-radius of the exponential part of quasielectron' chiral soliton, Γ_μ^*, at a value: $r_\mu^c < r_\mu^a$ =2.35fm, as consequence of the perturbations caused by the protonic kernel' intrinsic vibration inside the deuteronic nucleons with an E_v-energy which decrease also the value of the nuclear potential well: V_s^0, in accordance with eq. (60), to a value: $V_s^{0*} < V_s^0$.

This conclusion is in concordance with the Onsager's observations regarding the decrease of the circulation value for a super-fluid perturbed over a critical value, [67].

Conformed to eq. (56) and (60), the expression of the deuteron' binding energy results, in consequence, according to:

$$V_s^*(r) = -\frac{\upsilon_i}{2}\rho_n(r)\cdot \mathrm{v}_c^2(r) = V_s^{0*}\cdot e^{-\frac{r}{\eta^*}}\cdot\left(\frac{r_\mu^c}{r}\right)^2 = V_d^{0*}\cdot e^{-\frac{r}{\eta^*}};\ r_\mu^c \le \mathrm{d};\ V_d^{0*} = k_v^*\cdot V_s^0\cdot\left(\frac{r_\mu^c}{r}\right)^2 \qquad (65)$$

in which: η^* = 0.755fm and $V_s^{0*} = k_v^*\cdot V_s^0$, ($k_v^*<1$; V_s^o = -118.4 MeV)- by the deuteronic self-resonance mechanism.

From energetic point of view, the effect of the E_v -vibration energy which decrease the deuteron' binding energy to the value ΔE(d) = -2.226 MeV, may be explained by the contribution of the nuclear potential, $V_s(d)$, to the deuteron self-resonance state through an alternatively „destruction-regeneration" mechanism of the unperturbed deuteron state.

Therefore, if the deuteronic nucleon vibration has the amplitude A_v around the position x=d, between two positions: x_1 and x_2, the kinetic energy: $E_c = V_s(x_1)-V_s(x_2)$ of the deuteronic proton is transformed at the impact of nucleons υ_i-quantum volumes, in an energy $\varepsilon_v = \Sigma m_w c^2$ of destroyed vexons in the surface $S_i = \pi a_i^2$ of υ_i-impenetrable volume. This destruction which transforms the intrinsic ε_v -energy of destroyed vexons into static quantonic pressure, partially transforms the attractive gradient of dynamic quantonic pressure into repulsive gradient of quantonic pressure, with degeneration of the potential well: $V_s^0 \rightarrow V_s^{0*}$, in accordance with eq. (65), by the increasing of nucleons internal entropy, which produces the nucleons' re-separation against a degenerate nucleonic potential: $V_s(d) = \Delta E_D \approx$ -2.22MeV.

The decreasing of the V_s^0 -nuclear potential well results in this case proportional with the mean vibration energy: $E_v(d,l_v)$ permitted by the nucleon vibration liberty: $l_v = A_v$, according to:

$$V_s^{0*} = V_s^0\cdot\left(1-\frac{\varepsilon_v(d,l_v)}{\varepsilon_v^0}\right) = V_s^0\cdot\left(1-\frac{E_v(d,l_v)}{E_v^0(d,l_v^0)}\right) = k_v^*\cdot V_s^0 \qquad (66)$$

in which ε_v^0 ; $E_v^0(d,l_v^0)$ represents the critical values of ε_v and of $E_v(d,l_v)$ which cancel the attractive potential, $V_s^*(d)$. Because that the mass defect: $\Delta m_D = (m_p+m_n-m_D) \cong 2.23 MeV/c^2$, resulting at deuteron formation as destroyed vexons mass/energy, ε_v^0 , corresponds to the ΔE_D -binding energy, results that: $E_v^0(d,l_v^0) = ½\, m_p v_p^2(d) = \varepsilon_v^0 = -\Delta E_D = 2.226$ MeV.

According to the model, simplifying, we may approximate also that the initial value: $V(r_\mu^a)$ of the potential well is recovered by the negentropy of the etheronic winds at the distance-limit between proton and neutron: $r_d=d+A_v^*$ for which the nuclear potential given by eq. (60) formally extended and for $r>r_\mu^a$, has the approximative value: $V_s(r_d) = \Delta E_D = -2.23$MeV.

In this case, by eq.(65) results that:

$$V_s^*(d,E_v)=V_s(d+l_v^*)=V_s(d)\cdot e^{-\frac{l_v^*}{\eta^*}}=V_s(d)\cdot k_v^*\left(\frac{r_\mu^{c*}}{d}\right)^2\cong V_s(d)\cdot\left(\frac{r_\mu^{c*}}{r_\mu^a}\right)^2=\Delta E_D\ ;\ \eta^*=0{,}755fm; \quad (67a)$$

resulting that: $r_d \cong 3$fm and $A_v^* = l_v^* = 1$ fm. With: $r_\mu^a = 2.35$fm, results also from eq. (67) that: $k_v^* = 0.72$, $r_\mu^{c*}\cdot\sqrt{k_v^*} \cong 1$fm; $r_\mu^{c*} \cong 1.2$fm . By eq. (66) results that: $E_v^*(d,l_v^*) = 0.66$MeV and that:

$$r_\mu^c = r_\mu^a \cdot e^{-\frac{l_v}{2\eta^*}} \quad (67b)$$

This theoretical result complies with the conclusion of quantum mechanic' deuteron model, that-on average, the deuteron nucleons are found outside the limits of the potential well having the length: $d_d = 2$fm, the probabilistic deuteron radius being, in QM: $R_D = 4.32$fm, [34]. The value: $E_v^*(l_v^*=1\text{fm}) = 0.66$MeV, corresponds-by a classic expression of vibration energy:

$$E_v^D = 2\pi^2 \nu_\gamma^2 m_p \cdot A_v^2 \quad (68)$$

to a vibration frequency of nucleons in the real deuteron, of value: $\nu_v = \nu_v^D = 1.8\text{x}10^{21}$ Hz, which corresponds in the quantum mechanics to a phonon with the energy: $h\nu_v = 7.4$MeV. So, it is explained by the model the fact that was observed emissions of γ-quanta with energies until to 17MeV-exceeding the nucleon binding energy, without the nucleon separation, like in the case of reaction:

$${}^7_3Li + p^+ \rightarrow {}^8_4Be + \gamma,$$

According to the model, the γ-quanta is emitted by the vibrated nucleon at the impact of nucleons impenetrable quantum volume, when: $V_s(r) \geq h\nu_\gamma$.

Comparative with the plastic interaction of deuteronic nucleons with $A_v \rightarrow 0$, when the vexon' energy: $\Delta\varepsilon_v(\Delta\rho_n^0)$ of the nucleon' superficial destruction is emitted as a binding energy, ($\Delta\varepsilon_v = \Delta m_n c^2$), in the vibrated proton case this energy is used for nucleon' re-separation followed by emission of γ-photons by the vibrated proton, with the regeneration of the nucleon' mass and vorticity, by the Γ_A^* -vortices and by quantum and subquantum winds.

It is thus explained also - by the nucleon prequantum model of the theory, the mechanism of the nondestructive interaction between nucleons at relative high energies.

Another kinetic cause which induces the protonic kernel vibration inside the deuteron, determining the decreasing of r_μ^a -radius of the Γ_μ^*-soliton, is-according to the model, the revolving movement of the deuteronic proton centres around the neutronic negatron under the action of the $\Gamma_\mu(e^-)$-vortex quantonic pressure, which determines also magnetic attraction. Thus, considering the protonic centres revolving with the v_p-speed around the neutronic negatron at an average distance: $r_d/2 \cong 1.5$fm from it, the difference between the sum of the magnetic momenta of the deuteronic nucleons in free state and the deuteron' magnetic moment experimentally found: $\mu_d = 0.857\ \mu_N$, results from the equation:

$$\Delta\mu_d = (\mu_n + \mu_p) - \mu_d \cong \mu_e^L - \mu_D^L = 0{,}0226\ \mu_N; \quad with: \mu_D^L = 2\mu_p^L = (e^+ \cdot \mathrm{v_p} \cdot r_d)/2 \qquad (69)$$

Therefore, with $\mu_e^L = -0.147\mu_N$ it results that: $\mu_D^L = -0.167\mu_N$; $v_p=3.5\times10^6$ m/s and a value: $V_{CF}(r)= \frac{1}{2} m_p v_p^2 = 64$keV of the nucleon centrifugal potential, which compensates the potential of electrostatic interaction. In consequence, the theory explains the normal deuteron as being a quasi-stable oscillonic couple: $({}_1p^1\text{-}{}_1n^0)$, i.e.-with self-resonance.

-In the virtual deuteron case, the nucleons having anti-parallel spins, the neutronic negatron revolves as in its free state around the proton center of the neutron, passing periodically with the frequency: $\nu_e = 0.8\times10^{21}$Hz between the two deuteron protonic centers, and because that the two deuteronic protons has antiparallel magnetic moments, the neutronic negatron intervenes with a repulsive magnetic potential: $V_\mu^n(d_d/2) \cong 0.3$MeV against the proton.

The deuteronic protons, as a consequence of the induced deuteron' self-resonance, are thus re-separated to a distance: $r_d' = d + A_v^{*'}$ with $A_v^{*'} > 2r_i$, which determines– in accordance with eq. (68), a maximum decrease of the degenerate value r_μ^c given by (67b) at the value: $r_\mu^p \cong 0{,}6$fm- corresponding at $l_v' = A_v' \cong 2$ fm, and a decrease of the scalar nuclear potential at a minimal value: $V_s^*(d;l_v') \cong -0.6$ MeV -which is canceled by the remained nucleon' vibration energy, so explaining the fact that the deuteron having anti-parallel nucleon spins is a virtual state .

In consequence, according to the model, the spin-dependence of nucleons strong interaction is given by different values of the vibration energy and of vibration amplitude.

In a conventional simplified form, de spin-dependent nuclear potential may be expressed-in accordance with the resulted phenomenological model and with eq. (67), in the form:

$$V_s^n(r) = V_s^0 \cdot e^{-\frac{r}{\eta^*}} \cdot e^{-\frac{l_v^*}{\eta^*}} \,[\mathrm{MeV}]; \qquad \mathrm{l}_v^* = l_v^0 \cdot (\frac{3}{2} - \frac{1}{2}\vec{\tau}_p \cdot \vec{\tau}_n); \quad \vec{\tau} = \frac{\vec{s}}{s}; \qquad (70)$$

with: V_s^0= -118.4 MeV; $l_v \cong A_v$; $l_v^0(E_v^*) \cong$ 1fm- for the deuteron and: $l_v(E_v=0) = 0$.

The deuteron model of quantum mechanics consider also a self-resonance vibration mechanism of the deuteron for explain the deuteron' E_D-binding energy but in a different way, considering a reciprocal vibration of these deuteronic nucleons with an energy: $E_v \cong$ 20MeV, [34]- value which is in a relative discrepancy with the value of the E_D -binding energy.

The correspondence with the quantum mechanics formalism for the nuclear interaction [34], of the theory, may be justified writing the eq. (34) for $\delta m_i = \upsilon_i \cdot \rho_p(r)$ in the particular form :

$$\frac{\partial^2\Phi}{\partial r^2} - k_\lambda^2 \cdot \Phi = 0; \; k_\lambda^2 = \left(-\frac{2\delta m_i \cdot V_p}{\hbar^2}\right)_{r\to 0}; \; \Phi(r) = \Phi_0 \cdot e^{-k_\lambda r}; \; V_p(r) = k_n \cdot |\Psi|^2 = -\frac{1}{2}\delta\upsilon_i \cdot \rho_p(r) \cdot c^2 = V_p^0 \cdot e^{-\frac{r}{\eta}} \qquad (71a)$$

i.e.-considering the $m_i(a_i)$-mass of the impenetrable quantum volume of the attracted nucleon in a quasi-rectangular potential well V_p^0 having the radius: $a_r = \pi/2k_\lambda$ of another.

For a pseudo-protonic cluster of N_c =1837 un-degenerate electrons, $(V_p)_{r\to 0} \approx V_p^0$ = $V_s^0 \cdot (N_c/N^p+1)$=-103.32 MeV, $(\rho_p)_{r\to 0} \to \rho_p^0 = N_c \cdot \rho_e^0$ and $k_\lambda \approx (-2V_p^0/\hbar c)$, so: $\eta \approx \lambda^* = 1/k_\lambda$ = 0.956 fm-very close to the value: η_e= 0.965 fm of the e-charge- and mass- mean radius of the electron, obtained in the theory. Also, for the protonic cluster of (N^p+1) degenerate electrons, to V_s^0=-118.4MeV corresponds a value: $\lambda' = 1/k_\lambda$= 0.8(3) fm, so the form (60), (70) of the nuclear potential classically obtained, with $\eta = \eta^*$ = 0.755 fm, may be re-obtained by a degeneration function: $f_D = e^{-0.1245 \cdot r - l_v}$, in the form:

$$V_s^n(r) = f_D \cdot \Phi(r) = f_D \cdot V_s^0(r) \cdot e^{-r/\lambda'} = V_s^0(r) \cdot e^{-r/\eta^* - l_v}; \qquad V_s^o = -118.4 MeV; \quad r > a_r = 1.3 fm \qquad (71b)$$

Also, considering that the nuclear vibration spectra is generated by excedentary nucleons as quantified deuteronic vibrations with phononic energy: $E_v(d) = n \cdot \hbar\omega + ½\,\hbar\omega$, ($\hbar\omega \approx$ 0.33MeV, [34]) the resulted deuteron model of the theory explains also phenomenologically and the zeroth vibration energy ½ $\hbar\omega$, of T≈0K, by the specific self-resonance mechanism.

11. The atomic nucleus; A quasicrystal nuclear model

Conforming to the solitonic "dynamide" neutron model, to the resulted deuteron model and to the observations regarding the nuclear stability that shows a maximum stability for the even-

even nuclei, the pre-quantum nuclear model of $T\rightarrow 0K$ results as a quasi-crystalline cluster having nucleons coupled in deuteronic pairs, and corresponding also to the α-particle cluster model, to the "nuclear molecule" model and to the extreme-uniparticle type model, [68].

-According to this quasi-crystal model, the nucleus consists of magnetically and symmetric coulped square root forms with an integer number of α-particles. According also to anoter quasicrystal nuclear model, (Lonnroth, [69]), the weakly bound excedentary nucleons or alpha-particles formed from the valence nucleons, are revolved around the quasicrystal nucleus, as in the extreme-uniparticle (Schmidt, [68]) model, by the action of quantonic Γ_{μ}^{N}-vortex of the nuclear magnetic moment which explains also the nuclear centrifugal potential-according to our theory and to the resulted quasi-crystall nuclear model.

The orbital revolving liberty of the unpaired nucleon around the quasi-crystal nucleus results, by eq. (65), (66) and (71), as a consequence of its low binding energy determined by a bigger l_v-vibrating liberty, which explain also the α-decay of nucleus by nuclear bareer decrease, without the hypothesis of nuclear bareer „tunneling", used by the quantum mechanics.

-The stable nuclei, with a "magic" number of protons or and of neutrons: 2;8;20;28;(40);50;126, may be found by the model as symmetrical quasi-crystal forms, resulted from the superposition of square root forms with an integer n^2-number of α -particles, having $2n^2$ protons [26]:

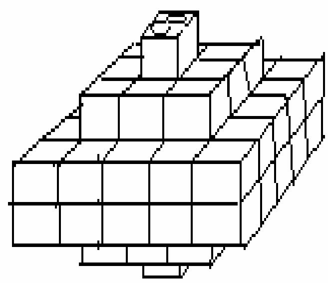

Fig. 4-Quasicrystal nucleus

$Z = \Sigma(2n^2)$, (n = 1.2….7-figure 4), and with tendency to a minimum deformability: 2; $2x2^2=8$; ($2x3^2=18$); 18+2=20; 20+8=28; ($2x4^2=32$); $2x5^2=2x3^2+2x4^2=50$; 50+32 = 82; 50+50+18+8=126, or of quasi-stable triangular forms (^{10}Ne) or hexagonal forms (^{19}K).

The model explains in a similar way the super-asymmetrical nuclear fission [70], through eq. (65), (71), by the conclusion that the incompleteness of the quasi-crystal network or an exceeding number of nucleons determines a bigger l_v-vibration liberty for these nucleons weakly bound, this vibration decreasing the scalar nucleonic potential value and generating either the nucleus fission in sub-nuclei with symmetrical quasi-crystal forms, (frequently- in "magic" stable or quasi-stable forms), either vibrational gamma -spectra, as a consequence of the self-resonance of weakly bound nucleons.

Through the same equations (65), (71), by the deuteron self-resonance mechanism and without the hypothesis of exciting energy concentration on a single nucleon or of nuclear bareer tunneling-used in the quantum mechanics, it is also possible to explain the following:

-the compound nucleus transformation mechanism by excitation with particles having low energy, up to 2MeV, as in the case of Be9 which can be transformed with a γ-quantum of only 1.78MeV even if the binding energy given by the sum of the nucleons is 58 MeV;

-some reactions with thermal neutrons (having some tens of eV), as in the reaction: Li7+H1 $\rightarrow$ Be8+2He4+γ, generated with only 125eV proton energy, or in typical reactions (n;α), such as the reaction: B10+n $\rightarrow$ Li7+α, generated by thermal neutrons even if normally there are necessary neutrons having an energy of 0.5…10MeV; [34].

-nucleon emission from a compound nucleus excited with particles having only 1÷2MeV, after approx. 10^{-15} seconds, as in the nuclear reactions of the type: Ca(p, n)Sc; Al(p, α)Mg.

By the property of rigid rotator, the quasi-crystal model of nucleus complies also with the vibrated rigid rotator model of nucleus, (Schmidt type-with the unpaired nucleon generating the nuclear spin and magnetic moment) and with the experiments of α-particles scattering on heavy nuclei, which have evidenced a behaviour of these nuclei in accordance with a quasi-crystalline nuclear structure (W.Bauer, K. Ershov, [71]) which can be formed when the distance between alpha-particles is comparable with the lenght of de Broglie wave of alpha-particle and which can captures alpha-particles, (K.A. Gridnev, K.V.Ershov et.al, [72]).

12. The beta disintegration

The fact that- according to the neutron "dynamide" model, the protonic positron coexists with the neutronic negatron inside its quantum volume until the neutron' transformation with emission of an electron and an antineutrino, $\bar{\nu}_e$, may be explained by our CF model of nucleon, through the hypothesis that the difference of approximate 2.53 m_e between the neutron mass and the proton mass is given by the sum of the neutronic m_e-negatron mass and a degenerate γ^*-binding gammon, considered as a (quasinegatron-quasipositron) pair having a common degenerate quantum volume and spaced centrols by an effect of "static" type charge (generated by reflection of sinergons).

This γ^*-binding gammon , called "σ-gluol" in our model, have thus the intrinsic energy:

$$\in_\sigma = 2m_e^*c^2 \cong 1.74m_ec^2 \cong 0.889 \text{ MeV}. \qquad (72)$$

For a bound neutron inside the nucleus, this σ-gluol has a quasi-stable position between the proton centre and the neutronic negatron. Through an intrinsic vibration of the neutron, i.e.-of the neutronic negatron in report wiht the protonic centre, induced in nucleus by neutron' vibration, the centrols of σ-gluol' comes into contact and its e*-quasielectrons reciprocally annihilates each other, loosing the quantum volume whose intrinsic energy, $\in_\sigma$, is

transformed by the resulted quantonic static pressure, in the β-disintegration energy of the neutron, acting upon the remained centrols of σ-gluol and upon the neutronic negatron.
At the same time, the centrol couple having the mass: $2m_0$, of the disintegrated σ-gluol, is being emitted under the form of a very penetrable particle by the action of the local quantonic pressure.
This penetrable particle has the speed $v \to c$ and is experimentally identified as electronic antineutrino, according to the theory, having the approximate superior limit of the repose mass:

$$m_v(\nu_e) = 2m_0 \cong 4x10^{-4}m_e = 3.6x10^{-34}kg, \ [34] .$$

This conclusion explains also the neutrino' property to penetrate atomic structures.

Considering the electronic pair: negatron-positron of the solitonic neutron as representing a gammonic metastable state: $\gamma^0 = e^- + e^+$, attached to the particle neutral M*-cluster formed by quasi-electrons, it results that the known reaction of beta disintegration [34]:

$$^0n_e \to {}^1p_r + {}^{-1}\beta + \bar{\nu}_e + Q_k(728keV) \qquad (73)$$

may be considered-according to the theory, as derived from a reaction having the form:

$$(M_n^* + \gamma^0 + \sigma \ ) \to (M_n^* + e^+) + e^- + \bar{\nu}_e + \in_\sigma(889keV); \qquad (M_n^* + e^+) = {}^1p_r \qquad (74)$$

given by the dissociation of the metastable γ^0-gammon with the transformation of the σ-gluol :

$$t^0 = \gamma^0 + \sigma \to e^+ + e^- + \bar{\nu}_e + \in_\sigma(889keV) \ ; \ \in_\sigma \to Q_k + \Delta\varepsilon \ ; \ (\Delta\varepsilon \text{ - loosed energy}) \qquad (75)$$

reaction in which the couple (γ^0 - σ) may be considered as a neutral particle: trion, t^0 .
The escape of β-electron from the nuclear field results-in the theory, in the condition of neutron self-resonance with an intrinsic E_v^e- vibration energy of the neutronic electron, induced by a $E_v^n(d)$ -vibration energy of a deuteronic neutron satisfying the condition:

$$E_v^n(d) \geq E_v^0(d,l_v^0) = \Delta E_D = 2.226MeV; \qquad E_v^e \to m_e c^2 = 0.511MeV \qquad (76)$$

value which cancel momentanly the $V_s(d)$-nuclear potential, according to the theory, the resulted $\in_\sigma$-quantonic energy, acting upon the resulted $\bar{\nu}_e$-neutrino and upon the β^--electron and determining the penetration of neutron field by these particles, by an energy of β^--electron impenetrable quantum volume: $\in_i \to m_i c^2 = 0.112MeV$-which explain the loosed

energy: $\Delta\varepsilon = \in_{\sigma} - Q_k \cong 160$keV-necessary for leave the neutron at a canceled value of the neutron' strong potential, obtained according to eq. (65), (66) and (76). An argument for this theoretical conclusion is the fact that the energy of γ-quanta emitted by a nucleus after β-transformation may be until to 2÷2.5MeV, [34], -explained in the model by the vibration energy of the resulted proton remained bounded in nucleus by the field of adiacent nucleons.
Because that the maximum energy of neutrino is: $\in_{\nu}=2m_0c^2 \cong 4x10^{-4}$ MeV-according to (27b), the neutrino emission not solve the problem of non-conservation energy in β-transformation.
The explanation of the observed continuous energy spectrum of β-electrons results-in theory, by the energy given to β-electron by the proton' Γ_{μ}^{p}-soliton vortex and which depends on the angle of electron initial impulse, given by the $\in_{\sigma}$-energy: θ ($\mathbf{p}_{\beta}$,$\mathbf{r}_{p}$).

In this case, the hypothesis concerning the existence of a $W^{\pm}$ -boson mediating the weak interaction of β-disintegration, used in the quantum mechanic' standard model, is not strictly necessary, in our model its natural equivalent being the couple: $w^{-} = (\sigma + e^{-})$, (a „weson") which generates the beta disintegration in the form: $w^{-} \rightarrow e^{-} + \overline{\nu}_e + \in_{\sigma}$ when: $\sigma \rightarrow \overline{\nu}_e + \in_{\sigma}$.
The reaction of proton transformation by electron capture:

$$^{1}p_r + e^{-} \rightarrow {}^{0}n_e + \nu_e \,, \tag{77}$$

may be explained similarly by the conclusion that the captured negatron and the protonic positron forms a metastable gammonic state: $\gamma^0 = (e^- + e^+)$ of degenerate electrons, which is transformed in an ν_e-electronic neutrino by reciprocally annihilation of the electronic quantum volumes and emission of the centrol couple having the mass: $m_{\nu}(\nu_e) = 2m_0$.
Because that the neutronic negatron- being open thermodynamic system, regains the free state values of spin and magnetic moment when it is emitted as β^--electron, according to eq. (53), the total spin S_n is not conserved in the beta disintegration-according to the model, the characteristic relation between particle spins being in consequence:

$$S_n + ½ = (S_p + S_e + S_{\nu}) \,, \tag{78}$$

resulting that: $S_{\nu}(\overline{\nu}) = S_{\nu}(\nu) = 0$, because that: $S_n = S_p = S_e = ½$, the neutronic degenerate electron having the spin almost null, as a „selectron" in the Supersymmetry.
The eq. (78) explain also the fact that at the proton transformation by K-electron capture, the electron spin is not transmitted with the μ_B-value to the formed neutron. From eq. (78) results also that the electronic antineutrino is identical to the electronic neutrino- this theoretical result being in accordance with the conclusion that the electronic neutrino is formed as

doublet of electronic centrols having opposed ζ_e-intrinsic chiralities, which determines a null chirality of the neutrino that explain the lack of vortexial structure and magnetic interactions of the electronic neutrino and implicitly-its property to penetrate the matter.

This theoretical result is complying with the Majorana model, which considers the neutrino as a superposing of two Majorana fields having equal masses and opposed CP parities, [73].

The reciprocally opposed quantum helicities of the negatron and positron, remarked in the β^- and β^+ disintegration (Wolfenstein [74]), are explained in the theory by the S_e^*-soliton spin dependence of the ζ_e-intrinsic chirality of m_0-electronic centrol which- by its supposed helix form, determines the electron spin orientation, parallel or antiparallel with the impulse direction, when is passing through a quantum and sub-quantum medium.

In accordance with the theory, at high temperatures as those of supernovae, because the perturbation of the nucleonic vortexial structure by particle vibration, the e^+-gammonic positron of neutron may be not retained by the neutronic M_n^*-cluster and the neutron is transformed, with a temperature-dependent probability, by gamma- emission, in the form:

$$(M_n^* + \gamma^0 + \sigma\ ) \rightarrow M_n^* + \gamma^0 + \bar{\nu}_e + \in_\sigma(889\ \mathrm{keV}) \qquad (79)$$

This theoretical conclusion can explain the cosmic poulses of gamma radiation detected as coming from the direction of Oort cosmic cloud [75] and resulting by collision of nuclear components- phenomenon not enough understood by other theories. According to the eq. (79), this poulses may be explained as being produced by pulsatile contraction of the volume of a supernovae or a neutronic star, with pulsatile increasing of the nuclear temperature, T_n , or by integrally gammonic transformation of the nucleonic M_n^*-cluster at $T_N \cong 10^{13}$ K .

In accordance with the theory, because that at high energy, in the interior of stars, it is produced- with a probability depending on the nuclear temperature, also the reaction (79), results the possibility to explain the discrepancy between the actual model of solar neutrins emission and the observed solar neutrinic flux (r_ν = 9/1) by the hypothesis of nucleons mutual transformation: $p_r \leftrightarrow n_e$ with neutrino absorbtion, according to the reactions:

$$p_r + \bar{\nu}_e + \gamma^0 \rightarrow (p_r + \sigma + e^-) + e^+ \rightarrow n_e + e^+ ; \quad n_e + \bar{\nu}_e \rightarrow p_r + e^- , \qquad (80a,b)$$

by the transformation of $\bar{\nu}_e$ -antineutrino in a σ-gluol inside the proton: $\bar{\nu}_e \rightarrow \sigma$ and the disintegration of the formed n_e -neutron, induced by a neutrino absorbtion, characterising especially the reactions:

$$\mathrm{Ar} + \bar{\nu}_e + \gamma^0 \rightarrow {}^{37}\mathrm{Cl} + e^+ ;\ {}^{37}\mathrm{Cl} + \bar{\nu}_e \rightarrow {}^{37}\mathrm{Ar} + e^-,$$

13. The elementary particles; The mesons and the baryons

The previous conclusions concerning the β disintegration weak force, may be generalized for other particles formed at cold, by a Q_G -genesic potential-according to the theory, as a neutral M*-cluster having an even number of quasielectrons and which has attached:

-a positron, in the positive charged particle case (or a negatron- for theirs antiparticle);

-a trion, (t^0), for the null electric charge particle case, or:

-a trion (t^0) and a negatron (e^-), forming a „tetron": $T^- = t^0 + e^- + \sigma = t^0 + w^-$,

for non-nucleonic baryons, that is, a positron attached to the neutral cluster M* core and two diametrically opposed negatrons revolved around the core, at the particle quantum volume surface, bound each of them to the core of M*-cluster by a σ-gluol.

The particle soliton model of degenerate electron cluster type is also in concordance with the theory of Olavi Hellman [76] which consider the particle intrinsic energy (mc^2)-equal to the total energy of a spin field expressed by the Ψ-wave function and interacting with the electro-magnetic field, according to the Schmidt model (1959) of the binary interaction between spin fields. This theory deduces the value of elementary particles mass, by a simplified relation:

$$M_p = \frac{K_m}{2\alpha} m_e; \qquad \alpha = \frac{e^2}{hc} = \frac{1}{137}; \qquad \mathrm{m_e} = 9.1x10^{-31} kg \quad . \tag{81}$$

with a tolerance under 1%, neglecting the electromagnetic field contribution, by integer values of K_m, as a multiple of the mass : $M_0=68.5m_e$; (K_m = 3; 4; 14 for the mesons μ, π, K).

The concordance of Olavi Hellman theory with the composite chiral soliton model of particle results- in our theory by the conclusion that the spinorial solitonic mass of the electron is equal with its inertial mass , by the non-participation of the electromagnetic field mass.

By the value $m_e^* \cong 0.872\ m_e$ of the quasielectron mass, obtained in our theory, the basic neutral costituent with with null spin and the mass closest to the value: $M_0 = 68.5m_e$ obtained by O.Hellman, is the neutral „zeron": $z^* = 78 \cdot m_e^* \cong 68m_e$, which may be considered a quasistable fundamental constituent of the elementary particles by a model of „cold genesis" of it, by very strong magnetic field vortex of a magnetar type star or equivalent.

By the basic z* -zeron it is possible also to deduct a quark model of cold formed particles with current mass of quarks, which gives the particle mass by the sum rule, considering as fundamental stable solitonic constituent of mesons and baryons, the „quarcin": $c_0^{\pm} = z^*/2 = 39 \cdot m_e^* \cong 34m_e$, with $q^* = \pm{}^2/_3e$ and $S^*_c = ½\hbar$-in free state, which can forms derived quarcins- with odd number of $c_0^{\pm}$-quarkons and "zerons": z, with even number of paired c-quarcins.

-The resulted structure of the fundamental elementary particles, considered as formed „at cold" by quarks with current mass and fractional electric charge $q^*=(+^2/_3e;\ -^1/_3e)$, formed as prionic clusters, is given by the following sub-structures:

quarcins ($S^* = ½$; $q^* = \pm^2/_3e$) : $c_0^{\pm} = 34m_e = (c_0^0 + e^*)$; $c_1^{\pm} = 3c_0^{\pm} = 102m_e$; (pseudo-preons)

basic zerons ($S^* = 0$): $z^* = (c_0 + \overline{c}_0) = 68\ m_e$; $z_1 = 2z^* = 136\ m_e$; $z_\mu = (c_1^- + c_1^+) = 3z^* = 204m_e$

basic quarks ($S^* = ½$): $m_1^+ = (z_1 - e^{*-}) = (136-0.87)m_e = 135.13m_e$, (mark$_1$ -$q^* = +^2/_3e$);

$m_2^- = m_1 + e^- + \sigma \cong 137.87m_e$; (mark$_2$ - $q^* = -^1/_3e$); $m_2^- \rightarrow m_1^+ + e^- + \overline{\nu}_e$;

Derived zerons ($S^*=0$): $z_2 = (c_1^- + m_1^+) = 237.13\ m_e$; $z_3 = 2(c_1^{\pm} + z_1) = 476\ m_e$; $z_4 = z_2 + z_3 = 713.13\ m_e$

Derived quarks ($S^* = ½$) :

$p^+ = m_1 + z_3 = 611.13\ m_e$, (park- $q^* = +^2/_3e$); $n^- = m_2 + z_3 = 613,87m_e$, (nark- $q^* = -^1/_3e$);

$\lambda^- = n^- + z_2 = 851\ m_e$, (lark- $q^* = -^1/_3e$); $s^- = \lambda + z_1 = 987\ m_e$, (sark- $q^* = -^1/_3e$);

$v^- = s^- + z_1 = 1123\ m_e$, (vark- $q^* = -^1/_3e$); $n \rightarrow p^+ + e^- + \overline{\nu}_e$

Elementary particles:

Mesons ($S^*=0$) : (theoretical masses) (known masses); ($\overline{s}$ = s-antiquark)

$\mu^- = z_\mu + e^- = 205\ m_e$	$\mu^+ = 206.7\ m_e$
$\pi^o = m_1 + \overline{m}_1 = 270.26\ m_e$	$\pi^0 = 264.2\ m_e$
$\pi^+ = m_1 + \overline{m}_2 = 273\ m_e$	$\pi^+ = 273.2\ m_e$
$K^+ = m_1 + \overline{\lambda} = 986.13\ m_e$	$K^+ = 966.3\ m_e$
$K^o = m_2 + \overline{\lambda} = 988.87\ m_e$	$K^o = 974.5\ m_e$
$\eta^o = m_2 + \overline{s} = 1124.87\ m_e$;	$\eta^0 = 1073\ m_e$;

Baryons ($S^*=½$) :

$p_r^+ = 2p+n = 1836.13\ m_e$; $n_e = 2n+p = 1838.87\ m_e$;	$p_r^+ = 1836.1\ m_e$; $n_e = 1838.6\ m_e$
$\Lambda^o = s+n+p = 2212\ m_e$	$\Lambda^0 = 2182,7\ m_e$
$\Sigma^+ = v+2p = 2345.6m_e$; $\Sigma^- = v+2n = 2350,74m_e$;	$\Sigma^+ = 2327\ m_e$; $\Sigma^- = 2342,6\ m_e$;
$\Sigma^o = v+n+p = 2348m_e$	$\Sigma^0 = 2333\ m_e$;
$\Xi^o = 2s+p = 2585.13\ m_e$; $\Xi^- = 2s+n = 2587,87m_e$;	$\Xi^0 = 2572\ m_e$; $\Xi^- = 2587,7\ m_e$
$\Omega^- = 3v = 3369\ m_e$; $\Omega^{-*} = 2v+s = 3233\ m_e$	$\Omega^- = 3278\ m_e$.

The difference between the obtained theoretical masses and the known experimental masses may be explained by the conclusion that the impact energy of particle formation from other particles, determines the transformation of some constituent γ^*-degenerate gammons in ν_e -neutrins by the loss of the quantum volume energy; (part 12 of the theory).

According to the theory, results also the existence of the next baryon resonances:

$\Delta^o = 2v + p = 2857.13\ m_e$; $\Delta^- = 2v+n = 2859,87\ m_e$; (known mass: $2850\ m_e$), and:

$\Xi^{-*} = 3s^- = 2961m_e$; (known mass: $3004\ m_e$), as particles which could be formed also at cold.

The way in which the real charge of the transformed particle is redistributed on the resulted particles was considered according to the quark theory, considering a fractional electric charge: $q^* = +(^2/_3)e$, given to quark by a quasielectron and corresponding to a degenerate magnetic moment. The sum of the current quark charges and correspondent magnetic moments results as equal to the real charge: 0, e, 2e, and to the real magnetic moment of the initial particle, because that the impulse density of $\Gamma_\mu(e)$ -soliton vortex of the real elementary unpaired e-charge of the elementary particle is given as a sum of component vortexes corresponding to the component quark charges, according to the (d)-dependence : $e \sim \mu_e(\Gamma_e) \sim \rho_\mu(a)\cdot c^2$; $(r_i < r \leq a)$, specific to the theory:

$$\rho_\mu \cdot c^2 (e) = \rho_\mu \cdot c^2 \cdot (^2/_3 n - m) ; \qquad \mu = (n\cdot\mu_p - 4.7\cdot m) \ [\mu_N] \tag{82}$$

where n; m, -the total number of quarks and respectively-the number of quarks with negative charge, $(-^1/_3 e = +^2/_3 e - e)$. From eq. (82) and the relation: $\mu_{ne}/\mu_{pr} \approx -2/3$ - resulted in the known theory of quarks, results that: $\mu_p = 8x4.7/15 \approx 2.5\ \mu_N$; $\mu_n = (\mu_p - 4.7) \approx -2.2\ \mu_N$.

By eq. (82), it can be explained also the fact that in the β^+ disintegration the whole proton charge is emitted by a single lepton– the emitted positron. It results also from eq. (82) that the cold genesis of baryons with more than three quarks is possible.

The previous prequantum CF model of particle, argues -also by eq. (82), the possibility of the cold genesis of particles, in very strong quantum vortices, the model not-being in disagreement with the chiral soliton quark models of the quantum mechanics, [77].

Results also-from the theory, that the charged $\mu^\pm$; $\pi^\pm$ mesons have a non-null prequantum spin: $S^*_\pi = (m_e/e)\cdot\mu_\pi = (\mu_\pi/\mu_e)\cdot S_e = 0.00185\ \hbar$, gived by the intrinsic degenerate electron.

It can be observed also that-excepting the particles Σ and Ξ, the masses of the principal elementary particles can be found as cluster of zerons: $z^* = 2c_0^\pm = \nu_\mu^* = 68m_e$, having the form:

$$\text{a): } 2^n z^* , (n = 1...5); \quad \text{b): } (3 \times 2^n + n)\cdot z^*, \quad (n=1...3), \quad \text{c): } 3 \times 2^n z^* , (n = 4) \tag{83}$$

which indicates the tendency of smaller particles to form clusters of doublets in a)-form:

a): n=1, $(m_{1,2})$; n=2, $(\pi^{0,\pm})$; n=4, (η^0); n=5, (Λ^0); or triplets in b)- or c)-form:

b): n=0, $(\mu^\pm)$; n=1, (z_2); n=2, $(K^{0,-})$; n=3, (p_r, n_e); c): n=4, (Ω^-); or: $(3x2)^n z^*$; n=2, $(\Sigma^{0,\pm}, \Xi^{0,-})$, tendency specific also to the quarks theory of the particle' standard model.

According to the model, in weak interactions are transformed the quarks: m_2 ; n^-; λ^- ; s^- or/and v^- in theirs components which forms new particles, like in the examples:

a1) (Exp.): $\Omega^-(3v) \rightarrow \Xi^o(2s+p) + \pi^-(\overline{m}_1 + m_2) + Q$; (Q-the reaction energy);

(theor.): $2v^- \rightarrow 2s^- + 2z_1$; $v^- \rightarrow \lambda^- + 2z_1 \rightarrow m_2 + z_4 + 2z_1$; $2z_1 \rightarrow m_1 + \overline{m}_1$;

$z_4 \to z_2 + z_3$; $\overline{m}_1 + m_2 \to \pi^-$; $m_1 + z_3 \to p^-$;

$p^- + 2s^- \to \Xi^o$; $\Omega^- \to \Xi^o + \pi^- + (2z_1 + z_2)$; $(2z_1 + z_2) \to Q$;

a2) $\pi^+ (m_1 + \overline{m}_2) \to \mu^+ (z_\mu + e^+) + \nu_\mu$; $m_1^+(z_1 - e^{*-}) + \overline{m}_2(\overline{m}_1 + e^+ + \sigma) \to 2z_1 + e^+ \to (3z^* + e^+) + z^*$;

$\pi^+ \to \mu^+ + z^*$; $z^* \to \nu_\mu + Q$;

a3) $\Omega^-(3v) \to \Lambda^o(s+n+p) + K^-(\overline{m}_1 + \lambda)$; (a controversed reaction)

(theor.): $v^- \to \lambda^- + 2z_1$; $2z_1 \to m_1 + \overline{m}_1$; $\lambda^- + \overline{m}_1 = K^-$

$v^- \to n^- + (z_2 + 2z_1)$; $v^- \to s^- + z_1$; so: $\Omega^- (3v) \to K^-(\overline{m}_1^- + \lambda) + (s+n+ m_1 + z_2 + 3z_1)$.

Because that: $p^+ = m_1 + z_3$, the reaction is possible if: $z_2 + 2z_1 \to z_3 + c_0^0$, by: $m_1 + z_3 \to p^+$,

in the form: $\Omega^- (3v^-) \to K^-(\overline{m}_1^- + \lambda) + \Lambda^o(s+n+p) + (z_1 + c_0^0)$; $(z_1 + c_0^0) \to Q$,

but because that the z*-zeron results as quasistable, the probability of reation is low.

In the strong interaction of particles, the conservation of the “strangeness” quantum number is equivalent to a law of quarks conservation which states that the quarks which enters in strong interactions are not transformed by weak interactions, but they can forms zerons with other quarks or combinations with quarks resulted- in form of quark-antiquark pairs, also from zerons of the polarised quantum vacuum, by the Q_i-interaction energy which transforms bosonic (zeronic) virtual q- $\overline{q}$ pairs of the polarised quantum vacuum in real q- $\overline{q}$ pairs by quarks separation, when $Q_i \geq E_q$-binding energy of q- $\overline{q}$ pairs, like in the examples:

b1) $\pi^-(\overline{m}_1 + m_2) + p_r(2p^+ + n^-) + Q_i \to \Lambda^o(s+n+p) + K^o(m_2 + \overline{\lambda})$; (Experimentally permitted)

(theor.): $\overline{m}_1 + p^+ + Q_i \to \overline{m}_1 + (m_1 + z_3) + Q_i' \cong \pi^0 + z_3 + Q_i' \to (s^- + \overline{s})$;

$s^- + n^- + p^+ \to \Lambda^o$; $\overline{s} + m_2 \to \eta^o$; - reaction theoretically permitted in the form:

$\pi^- + p_r + Q_i \to \Lambda^o + \eta^o$ with an ulterior transformation of η^o : $\eta^o(\overline{s} + m_2) \to K^o(m_2 + \overline{\lambda}) + Q_e(z_1)$

b2) $\pi^-(\overline{m}_1 + m_2) + p_r(2p^+ + n^-) + Q_i \to \Lambda^o(s+n+p) + \pi^o(m_1 + \overline{m}_1)$;

(Reaction forbidden by the law of strangeness conservation) ;

According to the theory, the reaction implies the transformations: $m_2 + p^+ + Q_i \to s^- + m_1$, which is in contradiction with the considered law of quark’ conservation and with the fact that the reaction energy: Q_i, can form only (q- $\overline{q}$) -pairs and all resulted quarks must be bouned in particles, so the reaction is not permitted by the proposed prequantum model of particles.

b3) $\nu_\mu + p_r \to \nu_\mu + p_r + \pi^+ + \pi^- + \pi^0$; (reaction considered as mediated by neutral Z-boson)

According to the theory, the interaction energy generates real (q- $\overline{q}$)-pairs from the polarised quantum vacuum zerons:

$$\nu_\mu + p_r + Q_i \to \nu_\mu + p_r + 2(m_1 + \overline{m}_1) + (m_2 + \overline{m}_2) \to \nu_\mu + p_r + \pi^+ + \pi^- + \pi^0.$$

So, the hypothesis of neutral Z^0 boson of Q.M. is not strictly necessary for explain the particles cold forming and theirs interactions, the generating of particles with bigger mass than those of particles entered in reaction being explained-in our theory, by the decomposing of quantum vacuum „zerons" of m_z–mass and x_r = a-radius in real (q- $\overline{q}$)-pairs, by the Q_i-interaction energy, considered in quantum mechanics, when $O_i \approx E_q = m_z c^2$.

These „zerons" of ‚quantum vacuum' are- in our theory, a classic equivalent of bosonic background of ‚dark matter' and may be considered as bosonic m_z -particles with self-resonance, (oscillons), with a phononic intrinsic vibration energy of paired quarks given by:

$$E_v \cong (\Delta p \cdot \Delta x_v / \Delta\tau) < E_q, \qquad (E_q = m_z c^2 ; \quad \Delta x_v \leq 2a),$$

($\Delta\tau$; Δx_v -the self-resonance period and amplitude), which explains the existence of pseudo-virtual paired quarks and fermions in the „quantum vacuum".

14. The strong interaction of quarks and the proton disintegration

The principal strong force necessary to keep quarks- formed as sub-clusters of quasielectrons, inside the "impenetrable" quantum volume of particle is given- according to our CF chiral soliton model, by the gradient of a quantum and sub-quantum potential having the form (54). This potential is produced by the sum of $\Gamma_q^* =(\Gamma_\mu^*+\Gamma_A^*)$-vortices which acts upon the υ_q-volume of quark sub-cluster and respectively –upon theirs centrols.

For example, in the case of proton- having n_q=3 quarks with a radius of approximate value: $r_q \cong$ 0.2fm, [62], the kernel of p^+-quark located at a radial distance: $r_b = 2 r_q$= 0.4fm from the other two quarks (n^- and p^+), is attracted in a strong interaction given by theirs Γ_q^*-quantonic vortices , by a potential having the form (54) and an approximate value:

$$V_s^q(r_q) = {}^2/_3(\upsilon_q/\upsilon_i)\cdot V_s(r_q) \cong -1.5\text{MeV} ; \ (V_s(r)= V_s^0 \cdot e^{-r/\eta'} ; V_s^0 = -118.4\text{MeV}) \qquad (84)$$

which permits the keeping of quark inside the "impenetrable" quantum volume of proton, if the proton were not vibrated with a vibration energy bigger than: $\in^0_p = ½m_pc^2$ = 0.47GeV, because that the energy of vexons destroyed by the vibrated particle kernel, actions against the kernel' tendency to penetrate the quantum volume . According to the CF particle model of the theory, this binding energy, V_s^q, of current mass quarks, is supplemented by the binding energy: $\in_q^\sigma = -n_\sigma \cdot \in_\sigma$ of :

$$n_\sigma \leq n_\sigma^0 = [(1/n_q)\cdot N^p]^{2/3} \cong 79 \text{ binding } \sigma\text{-gluols}$$

formed by the ($\overline{e}$*-e*)-quasielectron pairs of quark interface, having: $\in_\sigma = 2m_e^* c^2$=889 keV, these n_σ-gluols being -in our CF model, the pseudo-equivalent of „gluon" of the standard model, in accordance also with the observed correspondence between QCD and superconductivity which shows that the gluon-gluon attraction is similar to the electron–positron attraction.

In the case of an axial arrangement of quarks, results by the model that: $n_\sigma = n_\sigma^0$, and the deconfination temperature for the proton results of maximum value, according to the relation:

$$T_d = \in_q^\sigma / k_B = (79\text{x}0.889)\text{MeV}/ k_B = 0.72\text{x}10^{12}\ \text{K} \quad (85)$$

-in accordance with the result of some experiments of collision between ionic fascicles at relativistic speeds, which evidenced the possibility of nucleon disintegration into mesons and leptons at a collision temperature: $T_n \approx 10^{12}\ ^O\text{C}$, [78], so the proton' quarks are axially coupled. The short lifetime of other baryons (10^{-10}s.), indicates-according to the model, that: $n_\sigma << n_\sigma^0$, i.e.-a relative positioning specific to quarks vibration inside the baryion.

The fact that the proton disintegration with mass→energy transformation may occur usually at vibration energies exceeding the value: $m_pc^2 \cong 1\text{GeV}$ in an einsteinian relativist expression, may be explained also -by the CF nucleon model of the theory, by the conclusion that- at a critical value: $\in^0_p \cong m_pc^2$ of the proton intrinsic vibration energy, its super-dense kernel having the mass: N^pm_o, can penetrate the nucleon' quantum volume, causing its destruction.

The value of the energy necessary to nucleonic kernel for penetrate the proton' impenetrable quantum volume, is quasi-equal to the kinetic energy of the N^pm_0 -cluster at speed $v_0 \to c$, in a classic expression permitted by eq. (27a), which gives an approximate value: $E_0 = ½N^pm_oc^2 \cong 0.11\text{MeV}$ that is obtained by the proton' vibration with an energy: $\in^0_p = ½m_p.c^2 = 0.47\text{GeV}$ and a critical frequency of its destruction: $\nu_c^0 = 1/\tau_c = c/a = 2\text{x}10^{23}\text{Hz}$ -corresponding to the penetration of the proton quantum volume by its kernel.

The energy which must be given to the proton for its destruction is obtained by the relativist expression of mass: $m_p^r = m_p/\beta'$, given by (27b), with $v^0 \to c$, and corresponds to a proton energy value: $\in^R_p = ½m_p^r.c^2 = 2\in^0_p = m_p.c^2 = 0.94$ GeV-equal with the intrinsic energy, which explains the proton destruction mechanism in concordance with the inferior limit of the proton destruction energy obtained by the quantum mechanics. By that, is explained in a non-contradictory manner, also the quasar energy-generated by nucleon mass→energy transformation, by a nuclear quasar' temperature having the real value: $T_N = \in_p^R/k_B \approx 10^{13}$ K – value that is more plausible than those imposed by the Big-bang model of Universe, (10^{14}K).

According to the theory and complying with the astrophysical hypothesis concerning the quasar energy generation by proton mass destruction, results that the proton destruction presumes the existence of a high star' matter density which characterizes a high temperature, such as in case of supernovae, by a contained little star with a strong magnetic field by which can accumulate nuclear particles, i.e.: white dwarf, neutron star, black hole or magnetar star. This theoretical conclusion is in accordance with the fact that the ratio between the magnetic energy and the rotational energy is highest for quasars [79].

15. The particle disintegration

According to the CF-model of the theory, results also that the fermions entropisation at high temperatures with partial destruction, generates-by emission of quantons and sinergons of the perturbed quantum volume, a temperature-dependent mass decreasing and a pseudo-antigravitic field of a Q_a-pseudocharge having the expression (10) and a value proportional with the particle vibration energy: $\varepsilon_v = k_B T$. This theoretical conclusion may explains the observed temperature-dependent gravitational mass decreasing for which Shaw and Davy [80] obtained, with a relation of temperature-dependent gravitational force having the form:

$$F_G(T) = F_0(1 - \alpha T) \; ; \; F_0 = -G \cdot (M \cdot m)/r^2 \qquad (86)$$

a value of temperature coefficient : $\alpha = 1/T_G = 2.0 \times 10^{-6}$ [K^{-1}] , ($T_G = 5 \times 10^5$K).

For the inertial mass was used a similar relation for the temperature-dependent mass of u- and d- quarks in the QMDTD model (quark mass density- and temperature-dependent), [81]:

$$m_q = \frac{B}{3n_B}; \quad \mathrm{B} = \mathrm{B}_0\left(1 - \frac{T}{T_c}\right) \quad \text{or} \quad \mathrm{B} = \mathrm{B}_0\left(1 - \frac{T^2}{T_c^2}\right); \qquad \mathrm{q} = \mathrm{u, d}; \qquad (87)$$

where B is the vacuum energy density; B_0-parameter ; n_B –baryon density; T_c-the quark deconfination temperature deduced from the thermodynamic QMDTD model, of value: $170 MeV/k_B \cong 1.3 \times 10^{12}$K, [81].

According to the theory, in accordance also with eq. (86), the attractive gravitational mass: M(T) is totally compensated at $T = T_G$ by an antigravitational pseudocharge:

$q_a(T) = -M \cdot (T/T_G)$ given by partially destroyed sinergonic vortexes of destroyed vexons from the M-mass quantum substructure, as a result of a destructive intrinsic vibration of particle' superdense kernel, with the frequency:

$\nu_v = k_B T/h$. The observed relation: $T_G \ll T_c$ is done by the fact that -according to eq. (10), for a nucleon, for example, the value: $\phi_a(T_G) = 4\pi a^2 \cdot \delta\rho_s^a c^2$ representing the flux of loosed sinergons necessary for compensate the attractive gravitic field, is much smaller than the flux of loosed quantons necessary for quarks deconfination, $\phi_h(T_c)$, resulted from destroyed intrinsic vexons: $\phi_a(T_G) \ll \phi_h(T_c) = 4\pi a^2 \delta\rho_h^c \cdot c^2$.

Because that the quantity of destroyed intrinsic vexons is proportional with the vibration energy: $\Delta m_p c^2 \approx k_s \cdot \varepsilon_v = k_s \cdot k_B T$, by a $k_s<1$ constant of subquantum medium negentropy, it is logical to consider a temperature-dependent decreasing of the inertial mass for all particles, in the form:

$$m_P(T) = m_P^0 - \Delta m_P(T) = m_P \cdot \left(1 - \frac{T}{T_c}\right); \quad \Delta m_P(T) = m_P^0 \cdot \frac{T}{T_c} \quad . \tag{88}$$

the value: $T = T_c$ having the signification of total destroying temperature of the particle.

So, the quark deconfination of elementary particles by transformation of the neutral M*-cluster is achieved- according also to our CF model of particle having current mass quarks, by the vibration of the component quark cores, as in the case of a Skyrme chiral soliton model of baryons, constructed from a mesonic field and considered as a bound state of pentaquarks with individual and collective rotation and vibration, [82].

The eq. (88) should also that- for „hot" confination of 2-3 quarks with constituent mass, the quark mass cannot exceed the formed particle mass, because that the mass defect given as difference between the constituent and the current quark mass, is liberated in the form of static quantonic pressure which acts against the quarks kernel in the sense of deconfination. Complying with the a1-a4 axioms of the theory, the quark' vibration destroys partially also the Γ_μ-quantum vortices, diminishing the strong interaction between the component quarks.

Because that the total intrinsic vibration of the M*-cluster logically depends on the vibration frequency of the quark cores by an eq. specific to phonons: $\varepsilon_v = n.h\nu_i$, (n- the number of component quarks), in accordance also with eq. (88) we may consider also a temperature-dependent lifetime of the elementary particle: $\tau_k \sim 1/\Delta m_P(T) \sim (T_c / T)$.

Considering the $\mu^\pm$-lepton , having a lifetime: $\tau_\mu = 2.2\text{x}10^{-6}$ sec. [34], as single-particle cluster and taking into account that the majority of baryons-considered with n=3 quarks in the M*-cluster sub-structure, has a lifetime: $\tau_B \cong 10^{-10}$ sec. and the majority of mesons (n=2) has a lifetime $\tau_m \cong 10^{-8}$ sec. at the ordinary temperature: $T \cong 300$K of the particle medium, the lifetime of the elementary particles results-by the considered dependence: $\tau_k \sim 1/\Delta m_P(T)$, inversely proportional to the total intrinsic ε_V-vibration energy of the M*-cluster considered as oscillon, according to an empiric relation of approximation:

$$\tau_k = \frac{\tau^0}{k_v \cdot 10^{2n}} \approx \frac{1}{\Delta m_P(T)}; \quad \tau^0 \cong 10^{-14}\text{sec.}; \quad k_v = \frac{\varepsilon_v}{\varepsilon_v^o} = \frac{n \cdot \nu_i}{\nu_c^o} = \frac{n \cdot T}{T_N}; \quad T_N \cong 10^{13}\text{K} \tag{89}$$

in which: ν_c^0 and ε_c^0 represent the critical frequency and the critical phononic energy of particle vibration at which the proton total disintegration takes place: $\nu_c^0 = \nu_c(T_N \cong 10^{13}\text{K}) = 2\text{x}10^{23}$Hz, according to the theory; (the great stability of proton was explained in the theory by the homogeneity and the continuity of the M*-cluster of degenerate electrons, which determine a low value of the particle intrinsic vibration energy).

As a consequence of eq. (89), when a particle passes with the v-speed through a quantum medium of the space, the dynamic quantum pressure generated in a relativistic way by the quanta and subquanta of this medium, has a cooling effect for the M*-particle cluster, which explains also the existence of polarised quantum vacuum bosons as metastable particles.

This phenomenon can be mathematically expressed considering an ε_v -energy of phonons associated to the particle intrinsic vibration, proportional with the intrinsic quantum temperature, T_q, and with the $P_c(v)$ -static quantum pressure inside the elementary particle, depending on the quantons brownian energy, and taking into account a ρ_c^0-density of quantons in the deplacing space, according to equation:

$$\varepsilon_v(\mathrm{v}) = h \cdot \nu_i = k_p \cdot k_B T_q = k_p \frac{P_c(\mathrm{v}) \cdot m_h c^2}{P_c^0} \;;\quad \mathrm{P_c(v)} = P_c^0 - \frac{1}{2}\rho_c^0 \mathrm{v}^2 \;;\; \mathrm{P_c^0} = \rho_c^0 \mathrm{c}^2 \qquad (90a)$$

which is equivalent with a relation for the intrinsic quantum temperature variation of the form:

$$T_q(v) = T_q(0)\cdot(1-v^2/2c^2) = T_q(0)\cdot\beta' \;; \qquad k_B\cdot T_q(0) = m_h c^2 \qquad (90b)$$

-similar to the Einsteinian relativistic relation: $T=T_0\cdot\beta$, but with β' in the classic form (27b) .

For the eq. (90) it was considered the simplified form of the Bernoulli's equation between static and dynamic quantonic pressures. The k_p -constant depends on the "zeroth" intrinsic entropy of the particle. From the eq. (89) and (90) it results that:

$$(91a) \qquad \frac{\varepsilon_v(\mathrm{v})}{\varepsilon_v(0)} = \frac{P_c(\mathrm{v})}{P_c^0} = \left(1 - \frac{\mathrm{v}^2}{2c^2}\right) = \frac{\tau_k(0)}{\tau_k(\mathrm{v})} \;; \qquad \tau_k(\mathrm{v}) = \tau_k(0)\cdot\left[1 - \frac{\mathrm{v}^2}{2c^2}\right]^{-1} \quad . \qquad (91b)$$

The eq. (90), (91) explains in the theory, also the lifetime increasing for relativistic $\mu\pm$-mesons or other relativistic particles with $v \to c$, the eq. (92b) being mathematically quasi-equivalent to the einsteinian-relativistic relation used by Rossi and Hall, [83], but obtained without the einsteinian hypothesis of the speed-dependent lifetime dilatation.

-Another argument which sustains the considered dependence of the particles lifetime on the intrinsic quantum temperature is given by the fact that the lifetime of the neutral variant of a composed particle, (with quasinull magnetic moment), is sensible smaller than the lifetime of the charged variant:

$\tau(\pi^\pm) \cong 10^{-8}$s; $\tau(\pi^0) \cong 10^{-16}$s; $\tau(K^\pm) \cong 10^{-8}$s; $\tau(K^0) \cong 10^{-10}$s; $\tau(\Sigma^\pm) \cong 10^{-10}$s; $\tau(\Sigma^0) \cong 10^{-14}$s ,

phenomenon explained in the model by the considered cooling effect of quantum dynamic pressure of the Γ_μ- magnetic moment vortex of particle' chiral soliton.

16. Implications of the theory in cosmology

Logically, in the interstellary space, the uncompensed etheronic wind forming the gravitonic flux at the quanton surface and at the particle' surface-generally, is a constant fraction of the local etheronic mean density of space, ρ_e^0 . In this case, the value of G-gravitation constant results, according to eq. (26), proportional with the galactic matter mean density, matter which emits also etherons coming from the solitonic quantum-vortices of vibrated elementary particles-according to an etherono-solitonic theory of fields and particles. This dependence may explain also the gravitic force decreasing during the Universe expansion after the supposed "big bang", by the conclusion that simultaneously with the matter volume expansion was expanded also the quantum and subquantum medium volume.

In the standard Einstein-Friedmann cosmological model of the cosmic expansion, the etheronic density of space: ρ_e^0, may be identified with the "dark energy" of space: ρ_Λ^*, (the 'vacuum energy'), which is considered as the physical cause of the cosmic expansion explaining the correspondence between the Einstein-Friedmann equations and the Hubble law of the Universe expansion: $v_R = H \cdot R$, (where H is the rate of expansion) by the cosmological constant Λ depending on ρ_Λ^* [84]:

$$3\frac{\ddot{a}}{a} = \Lambda - 4\pi G\left(\rho_m + \frac{3p_m}{c^2}\right) = -4\pi G\left(\rho_m + \frac{3p_m}{c^2} - 2\rho_\Lambda\right); \qquad \rho_\Lambda = \frac{\Lambda}{8\pi G} \tag{92a}$$

$$H^2 = \left(\frac{\dot{a}}{a}\right)^2 = \frac{8\pi G\rho_m + \Lambda}{3} - k\frac{c^2}{a^2} = \frac{8\pi G(\rho_m + \rho_\Lambda)}{3} - k\frac{c^2}{a^2}; \qquad \rho_c = \frac{3H^2}{8\pi G} \tag{92b}$$

where ρ_m and p_m are the mean density and pressure of the ordinary matterr and radiation, Λ is the cosmological constant, possibly caused by the vacuum energy, *G* is the gravitation constant, *k* = 1, 0, −1 is the curvature, (according to whether the shape of the universe is hyperspherical, flat or hyperbolic respectively), *a* -is the scale factor and *c* is the light speed and ρ_c is the critical density for which the Universe is flat: $\rho_c = \rho_m + \rho_\Lambda \cong 1.6\times10^{-26}$ kg/m^3.

It results- in consequence, a proportionality of the local Λ-cosmological constant with the mean density of the matter, proportionality which can explain also the fact that the „vacuum energy" density and the cosmological constant results with different values calculated by the scalar field model of quantum mechanics for different scales of mass distribution.

16.1. A hypothesis concerning the cause of the cosmic expansion

The observations made by the BOOMERANG project (1999), regarding the cosmic background radiation anisotropy, are indicates that the „concordance model" of the Universe is a flat Universe (k=0), filled with „dark energy" and corresponding to an Euclidean geometry, [85]. In accordance with the observational result regarding the redshift-magnitude relation of some supernovae, it proves also that the geometric spacetime is flat and the measurements agrees with the relativistic cosmological model with Ω_Λ~0.75 and Ω_M ~0.25, [86], according to the characteristic Einstein-Friedmann condition for a flat Universe filled with matter (ρ_m) , with dark energy (ρ_Λ) and with 3K-radiation (ρ_R):

$$\Omega_m + \Omega_\Lambda + \Omega_R = \frac{\rho_m}{\rho_c} + \frac{\rho_\Lambda}{\rho_c} + \frac{\rho_R}{\rho_c} = 1\ ; \quad \rho_c = \frac{3H^2}{8\pi G}\ ;\ \Omega_\Lambda = \frac{\Lambda_0}{3H^2} \quad . \tag{93}$$

that gives a value of the mean „dark energy" density: $\rho_\Lambda^*(R_L) = \Lambda/8\pi c^2 G \cong 1.2\text{x}10^{-26}$ kg/m^3.

In accordance with the observations, $\Omega_m = (\Omega_M + \Omega_{DM}) \cong (0.2+0.05)$, in which Ω_M measures the mean density of the baryonic observed matter and Ω_{DM} measures the mean density of the hypothetical non-baryonic cold dark matter needed for satisfy the cosmological tests.

In 1985 there were significant arguments against the Cold Dark Matter model (CDM), refering mainly to the empty state of the voids- existent between the concentration of the large scale galaxies, (Peebles, 1986, [87]).

Some theoretical models try to explain in what kind of structural forms it is possible to exist the „dark matter" and the „dark energy", like in the case of the „quintessence" model (Caldwell, Dave' and Steinhardth, 1998, [88]), which suppose the existence of some bosonic concentrations of matter and energy- forms which was not discovered yet.

A etherono-solitonic theory of fieds and particles which supposes also the existence of an gravitomagnetic field given by an etheronic pseudovortex of a magnetic potential: A(μ), permits the acceptance of the hypothesis of "quintessence" bosonic structures, in the form of a photonic energy, accumulated by a little „black hole" type star by its own gravitomagnetic field, but this model suppose or a cold non-emitting structure, which cannot contribute to the cosmic expansion force, or a hot structure, with photonic emission, that is-observable.

This means that only a hot, visible cosmic structure, can emit „dark energy", and that the emission can be modeled as that of a scalar field Φ_a with the energy density: $\varepsilon_\Phi = ½\, |\nabla\Phi_a|^2$.

If we suppose that the „dark energy" emission forming the Φ_a -scalar field consist of an etheronic emission of entropised baryons vibrated at ultrahigh temperature inside ultrahot cosmic structures as the quasars and the galactic centers or the supernovae, according to an etherono-solitonic theory of fields and particles based on the Lesage's hypothesis concerning the cause of the gravitation, results by eq. (86) and (88) that this etheronic Φ_a-scalar field of the cosmic structures corresponds to a pseudo-antigravitic field: $V_g^a(q_a,r)$ given by a pseudo-antigravitic charge, q_a , which results in theory as proportional with the intrinsic vibration energy and with the mass value, M, also for a multifermionic structure: $q_a \cong -M\cdot(T/T_G)$;

It results in consequence-according to the theory, the conclusion that at ultrahigh temperature, inside an ultrahot cosmic structure, the antigravitic charge q_a can exceed the gravitic attractive charge: $q_G = M$, resulting a total gravitic charge:

$$q_{Gt} = (q_G + q_a) \cong M\cdot[1-(T/T_G)] < 0 \quad \text{for} \quad T>T_G \tag{94}$$

The total gravitic charge $q_{Gt}< 0$ generates an antigravitic force, F_{Gt} and an a_G - acceleration :

$$a_{Gt} = \ddot{r} = -G\frac{(q_G + q_a)}{r^2} = -G\frac{M}{r^2}\left[1-\left(\frac{T}{T_G}\right)\right]; \qquad T \rangle T_G \tag{95}$$

Apparently, a total antigravitic charge q_{Gt} of a star results in contradiction with its gravitational relative stability, but for a cosmic structure with a strong magnetic field, this contradiction is eliminated by the theoretically resulted gravitomagnetic field: $a_{GM} \sim r^{-3}$ –according to eq. (41), which can exceed the antigravitic field: $a_{Gt} \sim r^{-2}$, under a critical limit, r_l. In the same time, the variation with r^{-3} of the gravitomagnetic force comparative with the variation with r^{-2} of the antigravitic force explains the fact that the gravitomagnetic force results from a relative short range field, while the antigravitic force results from a long-range type field, explaining in this way also the expansion of the Universe by the considered hypothesis of an antigravitic repulsion between antigravitic charges of the ultrahot cosmic structures (quasars, galactic centers, supernovae). The hypothesis is in concordance with the high value for the quasar' redshift: $z = \Delta\lambda/\lambda=(2\div6)$, (Fan et al., 2001) and for giant elliptical galaxies redshift: $z \cong 2$ .Esthatiou and Rees (1988) showes that the value z =6 for quasars fits with the „dark energy" model (ΛCDM) if the quasar have a black hole mass $\sim10^9 M_S$ (M_S-solar mass) in dark halos with mass $\sim10^{12}$ M_S , [89]. The existence of a black hole mass for quasars is in accordance also with the hypothesis of a strong gravitomagnetic field existence for quasars and other ultrahot cosmic structures, used in this paper.

Considering the antigravitic repulsion between (pseudo)antigravitic charges of the ultrahot cosmic structures, resuls that to the mean matter density, ρ_M , corresponds conventionally a mean antigravitic charge density, ρ_a , and a total gravitic charge density: $\rho_{Gt} = (\rho_M + \rho_a)_R$.

The dynamics generated by the repulsive antigravitic charge density of an expanding ellipsoidic quasi-flat Universe with mass: $M_{fR} \sim 2R^0 \cdot \pi R^2 \cdot \rho_M$ for which the local mean matter density: $\rho_m(R) \sim R^{-1}$,
may be approximated by eq.(95) according to the Poisson's equation if it is equivalent with a deformed spherical Universe, with $\rho_m'(R) \sim R^{-2}$ having the same mass for each R-radius, i.e.:

$$M_{fR} \cong \int 2R^0 \cdot 2\pi R \cdot \rho_m(R) dR \cong \int 4\pi R^2 \cdot \rho_m'(R) dR = M_{sR} \Leftrightarrow \quad (96)$$
$$\rho_m(R) = \rho_m^0 \cdot (R^0/R); \quad \rho_m'(R) = \rho_m^0 \cdot (R^0/R)^2$$

$$a_u(R) = \ddot{R} = -G\frac{4\pi R^3(\rho_M + \rho_R + \rho_a)_R}{3R^2} = \mathrm{H}^2 \cdot \mathrm{R}; \quad \rho_\mathrm{R} = \frac{3p_R}{c^2} \quad (97)$$

where ρ_R ; p_R are the space radiation density and pressure (mainly-of 3K). The eq. (97) is classicaly equivalent to eq. (92a) for the flat Universe (k=0) with neglijible matter pressure, p_m, by : $\rho_a = -2\rho_\Lambda$, with the difference that ρ_a is dependent of the mean temperature of the Universe, T_u , according to the eq. (95) . Results from eq. (97) the condition of the cosmic expansion, in the form:

$$\left|\rho_C'\right| = \frac{3H^2}{4\pi G}; \qquad H^2 = \left(\frac{\dot{a}}{a}\right)^2 = \frac{4\pi G}{3}\left|\rho_C'\right|; \qquad \left|\rho_C'\right| = \left|(\rho_M^e + \rho_a^e + \rho_R^e)\right| \quad (98)$$

According to eq. (98), the Universe expansion is obtained by the antigravitic charge of the ordinary observed matter for which $\Omega_m \cong 0.25$, in accordance with eq. (92) and with
$\Omega_\Lambda \cong 0.75$, by $\rho_a = -2\rho_\Lambda$:

$$\Omega_a = \frac{\rho_a^e}{\rho_C'} = \frac{2\rho_\Lambda^*}{\left|\rho_C'\right|} = \frac{2\rho_\Lambda^*}{\rho_c + \rho_\Lambda^*} = \frac{2\Omega_\Lambda}{1+\Omega_\Lambda} \cong 0.857; \quad \rho_a^e = -2\rho_\Lambda^* \cong -\frac{\mathrm{T_u}}{\mathrm{T_G}} \cdot \rho_M^e \cong -6 \cdot \rho_M^e \quad (99)$$

In this case the „dark energy" pressure is explained by the baryonic antigravitic charge of ultrahot cosmic structures as those of quasars, whose energy is explained by the disintegration of constituent baryons (nucleons) which gives an intense photonic but also etheronic emission- corresponding to a very high antigravitic (pseudo)charge-according to the theory. For example, because that the relative intensity of the gravitational force is $\sim 10^{-42}$, writing the electric field energy of electron in the form: $\in_E = ½\, a \cdot F_e(a) = m_e c^2$,
results that the (electro)gravitic energy of the electron is:

$\in_G = ½\, a \cdot F^e_N(a) = m_e^2 G/2a$, and: $\in_E / \in_G = \rho_a^0/\rho_g^0 = 2ac^2/m_e G = 4 \times 10^{42}$, so the gravitic field energy of the m_e-gravitic charge is of $\sim 10^{42}$ times smaller than the etheronic energy contained by the sinergonic Γ_A-vortex of the particle' magnetic moment: $\in_s = m_s c^2/2$, which is emitted at the particle disintegration, giving at the disintegration moment an antigravitic charge of $\sim 10^{42}$ times bigger than the m_g -gravitic charge, according to the theory .

In the same time, the hypothesis of cosmic expansion by repulsion between antigravitic charges of the ultrahot cosmic structures, gives a physical justification for the supposed homogeneity of the hypothetical „dark energy" which generates cosmic expansion, by the natural tendency of a charge distribution to cancel the gradients of charge density.

16.2. A phenomenological model of the cosmic expansion

For a model of the Universe evolution, the Hubble's law of cosmic expansion: $v_R = H \cdot R$, even if it is confirmed for the case of our cosmic time: t_L and our location from the Universe centre : R_L , it may be a particulary case . A possibility to deduce this particulary cosmologic case from a more general case of the Universe' expansion-generated by repulsive antigravitic charges, according to the theory, is obtained considering a variation with the t_E - expansion time of the total mean gravitic charge density: $\rho_{Gt} = (\rho_M + \rho_a)_R$. This variation can be approximated by a phenomenological model of the cosmic expansion based on our etherono-solitonic theory of fields and particles, considering also a Macronucleus of Universe with a R^0 radius, having a macro-black-hole with a Macro-vortex around it and an Universe mass, M_{fR} , given by a local mean matter density: $\rho_m(R) \sim R^{-1}$, according to eq. (96) .

This hypothesis results by the generalisation of the a1-axiom for elementary particles, permitted as a consequence of ideal fluids classic mechanics, reconsidering also the hypothesis of a fractalic organization of the Universe by a "vortices cascade" process, (A.N.Kolmogorov [90] et al. [91]).

The conclusion of „black holes" forming in the early Universe is theoretically sustained [92] and the possible existence of a revolving axis of the Universe is suggested also by some observations concerning the rotation of the electromagnetic radiation polarization plane at cosmic distances, (John Ralston, Borge Nodland, [93]).

In the hypothesis of a variation of the etheronic pressure: $P_c(R) \sim [R^{-1} \div R^{-2}]$ with the R-distance from the supposed Macronucleus- specific to a magneto-gravitic pseudo-vortex, the gravity G-constant - depending on the quantum pressure: $P_c(R)$ by the etheronic density, ρ_G^0, according to eq. (26), decreases proportional with $P_c(R)$. Thus, close to the limit $R = R_u$ - considered as the structured Universe' radius, the gravity force and the quantum vortices intensity becomes too weak for forming or conserving vortexial structures. In this case, we may consider that the zone: $\Delta R_u = (3R_u/4 \div R_u)$ represents a zone of "stellar cemetery" (S.C)

in which the stellary structures disintegrates at the distance $R_u \cong 3R_u/4$ and that the protons and the neutrons disintegrates at the distance close to R = R_u as a consequence of the decreasing of the nucleonic strong interaction potential, according to a quantum chiral soliton model of particle conform to an etherono-solitonic theory of fields.
In the field of the Macronucleus, the disintegration of nucleons occurs also because the ultra-high nuclear temperature close to the critical value: $T_N \cong 10^{13}$ K-according to the theory .
The disintegration energy of these vortexial structures would be emitted in all directions as intense stellary bosonic winds. For the position $R>R_u/2$, these winds, in the radial direction, would exercise a pressure in the sense of slowing down the Universe expansion, i.e.-the advancing of the stellar structures towards the "stellar cemetery", S.C., case in which we may approximate the Universe expansion law by the equation:

$$v_e = \partial_t R = v_M \cdot \sin(\pi R/R_u)\ ; \qquad v_M \cong 0.5\ c \tag{100}$$

in which the maximum value, $v_M \cong 0.5c$, was considered as the maximum speed of the Universe expansion, deduced from the redshift of the quasar 3C295, (v_e = 0.46c).
According to the model, the Hubble law is valid in the zone of the local galaxy supercluster (Virgo) and its surroundings because that it may be regained from eq. (100) by the conditions:

$$R \le R_L = (1/6)R_u \;\Rightarrow\; \sin(\pi R/R_u) \cong (\pi R/R_u) \tag{101}$$

which gives:

$$\frac{\pi R}{R_u} = \frac{v_e}{v_M} = \frac{H \cdot R}{0.5 \cdot c}\ ; \quad \Rightarrow \quad H = \frac{\pi \cdot c}{2\,R_u}; \qquad R \le R_u/6 \tag{102}$$

With the mean value: H = 75Km/s·Mps, deduced by A. Sandage in 1958, [94], results from eq. (102), that: $R_u = 6.28 \times 10^3$ Mps, (27.3×10^9 l.y.) –of two times bigger than that deduced by the Big-Bang cosmological model of Universe, corresponding to an Universe filled with stars.
For a drifted body M_s, the expansion force, F_e, has, by the eq. (100), the form:

$$F_e = F_a - F_d = M_s^* \frac{dv_e}{dt} = \frac{\pi M_s^* \cdot c^2}{8 R_u} \sin\frac{2\pi R}{R_u}; \qquad R < \frac{3}{4} R_u; \qquad M_s^* = M_s^0 \Big/ \left(1 - \frac{v^2}{2c^2}\right) \tag{103}$$

in which F_a represents the accelerating force –given by the pressure of the stellary winds (mainly, sub-quantum winds) coming with the intensity I_a from the expansion centre and F_d

represents the decelerating force, given by the total pressure of the stellary winds coming with the intensity I_d from the zone C.S. and by the resistance force to advancing, given by the boson density of the cosmic "vacuum". The mass: M_s^* represents the virtual mass given by the relativistic relation (27b) of the speed-depending mass apparent variation.

We may consider that the intensities I_a and I_d of the stellary winds generating the expansion force are given mostly by the sub-quantum component (etheronic winds) that acts upon the quantons of the mass M_s^*, so the expansion force, F_e , results conformed with the eq. (24) of the gravitation' force , resulting that the maximum value of this force is given, for R = $R_u/4$, by the equation:

$$a_e^M = \frac{F_e^M}{M_S^*} = \frac{\pi c^2}{8R_u} = \frac{S_h}{m_h}(I_a - I_d)_{\frac{\pi}{4}} \cdot \cong \mathrm{k_h} \cdot \Delta \rho_g^M \cdot c^2; \quad \mathrm{k_h} = \frac{S_h}{m_h} \tag{104}$$

With the gauge value: $k_h \cong 27.4$ [m^2/kg] resulted from the theory, results from eq. (104) a value: $\Delta\rho_g^M \cong 5.47 \times 10^{-29}$kg/m^3 , and because that the mean etheronic density, ρ_s^M, which ensures the gravitational stability of the material structures without the contribution of a gravitomagnetic field, in the intergalactic space must be at least with two size order bigger, it results bigger than the observed matter mean density: $\rho_s^M > \rho_M \cong \Omega_M \cdot \rho_c \cong 3.2 \times 10^{-27}$kg/m^3, conclusion which corresponds to the „dark energy" density value deduced from cosmological observations [86], ($\rho_\Lambda^* \cong 1.2 \times 10^{-26}$ kg/m^3).

This estimated value for ρ_Λ^* gives a important effect of „radiation aging" which may explain the Olbers paradoxe and which contributes to the total redshift effect, according to eq.:

$$\Delta E_\nu = h\cdot\nu - h\cdot\nu' = F_f \cdot \Delta R = k_h \cdot m_f \cdot \rho_s \cdot c^2 \cdot \Delta R = k_h \cdot \rho_e \cdot h \cdot \nu \cdot \Delta R \tag{105a}$$

$$\nu_f = \nu_i \cdot (1 - k_h \cdot \rho_s \cdot \Delta R); \qquad z = \Delta\nu/\nu_i = k_h \cdot \rho_s \cdot \Delta R ; \tag{105b}$$

For example, considering a supposed position of the local supercluster of galaxies (Virgo) at $R_V = R_u/8$ results from eq. (105b), the condition to receive photonic radiation from the margin of the stellary Universe considered at $R_M = \frac{3}{4} R_u$, according to the model:

$$\Delta\nu/\nu_i < 1 \Rightarrow \rho_s^c < 1/k_h \cdot \Delta R = 2.2 \times 10^{-28}\ \mathrm{Kg/m^3}\ ; \ (\Delta R = R_M - R_V = {}^5/_8 R_u\ ; k_h = 27.4) \tag{106}$$

From eq. (106) results the conclusion that-because the resulted condition: $\rho_s^M > \rho_M \cong 3.2 \times 10^{-27}$ kg/m^3, we cannot receive photonic radiation from the margin of the stellary Universe.

Because that the density of the uncompensed etheronic winds, $\Delta\rho_g$, acts as a gravitic flux: $\Delta\varphi = ½\Delta\rho_g c^2$, generated by a total mean gravitic charge density: $\rho_{Gt} = (\rho_M + \rho_a)_R$ of the Universe mass, $M_u(R)$, by the eq. (97) and (103) results also the equation:

$$a_u(R) = \ddot{R} = \frac{c \cdot H}{4} \sin\frac{2\pi R}{R_u} = -\frac{4\pi G}{3}(\rho_M + \rho_a)_R \cdot R; \qquad \mathrm{R} < \frac{3\mathrm{R_u}}{4} \tag{107}$$

The variation of the mean total gravitic charge density of the Universe mass, $M_u(R)$, given by the Universe expansion, results from eq. (107), in the form:

$$\rho_{Gt}(R) = (\rho_M + \rho_a)_R = -\frac{3cH}{16\pi G} \cdot \frac{1}{R} \sin\frac{2\pi R}{R_u}; \qquad \rho_a = -\frac{\mathrm{T_u}}{\mathrm{T_G}} \cdot \rho_{\mathrm{M}}; \quad \mathrm{R} < \frac{3\mathrm{R_u}}{4}; \tag{108}$$

The condition: $\rho_M(R_u/2) = -\rho_a(R_u/2)$ resulted from (108) is explained conforming with eq. (86):

$$\rho_M(R) \le -\rho_a(\mathrm{R}) \quad \Leftrightarrow \quad T_u \ge T_G(\mathrm{R_u}/2) \;\; ; \;\; \mathrm{R} \le \mathrm{R_u}/2 \tag{109}$$

.

Eq. (108) shows also the variation of T_u with R. The value $\rho_a \equiv 0$ corresponds- in the model, to the cancellation of the thermal activity in the structured cosmic forms of the Universe.

Results also-from the model, that the existence of „dark matter" in the galactic space may be in the form of zeronic (q- $\bar{q}$) pairs which forms the bosonic field of quantum vacuum, explaining the process of bigger mass particle forming by the interaction energy of particles with smaller mass.

Because the proportionality between the matter density and the subquantum and quantum medium density inside a Metagalaxy, results also that the formation of individual CF-particles by the polarisation of quantum vacuum in the form of bosonic (q- $\bar{q}$) oscillonic pairs is possible only inside a galaxy and is not possible in the intergalactic zones, where the mean value of matter density is too low for that - according to the theory.

-Relative to the Universe structure, a consequence of a1-axiom generalisation is the fact that the vortices cascade fractalic organisation of the Universe is governed by the similitude' principle by which may be argued also the existence of a similitude between the Kant-Laplace genesis mechanism of a planetary system and a vortexial mechanism of the Universe genesis, presuming the formation in a similar way, at a critical vortexial speed of the transformed protomatter, of material rings forming further planets and respective-of meta-haloes („layers") formed from galaxies assemblies, discovered in the form of a quasi-regular three-dimensional network of superclusters of galaxies and voids [95], with regions of high density separated by a distance of 120Mpc. on a distance of $7 \cdot 10^9$ l.y. , ($\sim {}^1/_4 R_U$).

This similitude results from the generality of the vortexial movement also to the Universal scale and may be better understood by the fact that the relation Titius-Bode referring to the distance between Sun and a planet:

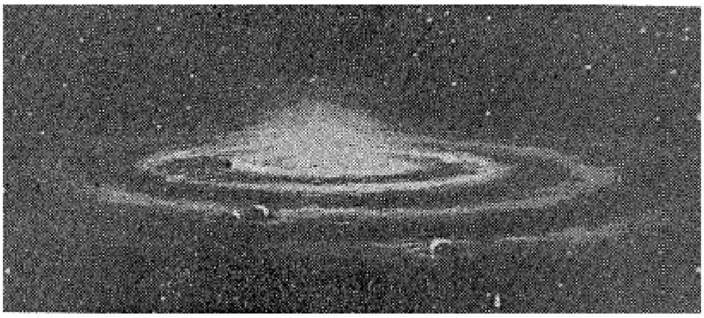

Fig.5

$$d = 0,4 + 0,3x2^M \quad (u.a); \quad (n = -\infty, 0,1,2,...7); \tag{110}$$

(u.a. – astronomical unit), can be explained using the Kant-Laplace theory (1755 and 1796) about the genesis of the Solar Sistem, theory wich assumes that the planets apeared in the vortex nucleuses of some material "rings" separated one by one from a rotative protoplanetary nebula, (fig.5).

The Kant-Laplace model of the Solar System formation seems to be confirmed by the discovery in 1992 of a proto-planetar system around the Beta Pictoris star (that apears surrounded by a disk of cosmic dust of 360 u.a. diameter).

The known explanation of the Titius-Bode relation assume a specific distribution of the vortex centers wich generated the planets. Is well known the theory of Karl Weizsacker (1944) who proposes the empiric relation:

$$r_n = r_0(1,894)^M, \quad \text{with: } r_0 = 0,3 \text{ u.a.} \tag{111}$$

which was amended by Chandrsekhar(1946), D. der Haar (1950) and by V. Vilcovici (1954) which used the Kant-Laplace hypothesis completed by V.G. Fesenkan.

Based on the mentioned similitude, we may consider that the proto-solar nebula had, excepting a little central part, a rotation speed $\omega r = v_\omega$ – constant, this speed being kept after its dividing into proto-planetar material rings, by the kynetic energy conservation belonging to the nebular particles onto the quasitangential direction of the rotation: $m_p v^2_\omega /2$ = constant. A constant rotation speed: $v_\omega = \omega \cdot r$ was observed-for example, also to some star swarms with expanding periphery and to the gas and stars M33 or NGC5055 galaxy.

Having: k- the proto-planet number in the sense of its distance to the Sun, the material ring of the rank k is stabilized, according to the hypothesis, at a distance R_K given by the balance between the gravitational attracting force exerted by the nebular rest M_{N-K} (remained after dettaching the material ring of rank k) and the centrifugal inertia force:

$$G\frac{m.M_{n-k}}{R_k^2} = \frac{m.v_\omega^2}{R_k}, \tag{112}$$

(M_n – the initial nebular mass). R_K results according the relation:

$$R_k = \frac{G}{v_\omega^2}M_{(N-k)} = \lambda \cdot M_{(N-k)}; \qquad \lambda = \frac{G}{v_\omega^2} \tag{113}$$

Having k=9, results $R_9 = \lambda \cdot M_{N-9}$, but: $M_{N-9} = M_0 + M_1 + M_2 + ... + M_8$, so generally:

$$R_K = \lambda M_{N-K} = \lambda.(M_o + M_1 + M_2 + ... + M_{K-1}) \text{ [a.u.]} \tag{114}$$

On the other side, according to the Titius-Bode relation, we may write:

$$R = 0,4 + 0,3 \times 2^{K-2} = 0,1 + 0,3 \times 2^{K-1} \text{ [a.u.]} \tag{115}$$

From the relations (114) and (115) results in consequence that:

$$\begin{aligned}
&R_1 = 0,4 = \lambda.M_0\\
&R_2 = 0,4 + 0,3 = \lambda.(M_0 + M_1)\\
&R_3 = 0,4 + 0,3 + 0,3 = \lambda.(M_0 + M_1 + M_2)\\
&R_4 = 0,4 + 0,3 + 0,3 + 0,6 = \lambda.(M_0 + M_1 + M_2 + M_3)\\
&\bullet\\
&R_K = 0,4 + 0,3\,(1 + 2^1 + 2^2 + ... + 2^{K+3}) = \lambda.\Sigma M_{K-1}\\
&\bullet\\
&R_9 = 0,4 + 0,3\,(1 + 2 + 2^2 + ... + 2^6) \text{ [a.u.]}
\end{aligned} \tag{116}$$

meaning: $M_o = \frac{0,4}{\lambda}; M_1 = \frac{0,3}{\lambda}; M_2 = \frac{0,3}{\lambda}; M_3 = \frac{0,6}{\lambda}; .... M_9 = \frac{0,3}{\lambda} x\, 2^7;$

or generally:

$$M_k = \frac{0,3}{\lambda} x\, 2^{k-2} \quad . \tag{117}$$

The interpretation of the relation (117) is that the protoplanetar material rings was formed by the halving of the nebular mass that initially rounds up the proto-solar mass M_0 (the nebular nucleus). It is presumed also that from the proto-planetary ring material have been formed more proto-planets or pseudoplanets but after the dissipation of the non-confined matter, remained to stable orbit only those with dynamic equilibrium to the radial direction. In this case, the planets natural satellites (Moon, Tytan etc.) might represent independently formed planets, which, meeting the bigger planet (found on an orbit of a stable dynamic equilibrium) have been attracted and kept around it on a stable orbit.

16.3. - Gravstars as primordial genesic structures of the Protouniverse

Relative to the Protouniverse structure, the generalisation of a1-axiom permits-by the similitude principle, an anisotropic model of „gravstar”- considered as a hard-core rotation ellipsoid of „dark energy” with vortexially generated „dark photons” and „dark particles” formed as Bose-Einstein condensates at distinct levels of density. This possibility is argued also by the model of „gravastar” with very cold core formed by a „dark energy” fluid, which may create Bose-Einstein condensate in the outer core, [55], but in the proposed model of hard-core gravstar not exists the "gravitational vacuum" region, specific to a “gravastar”, because that the quasi-stability of the hard-core deformed ball of “dark enery” forming a relativist vortex of quantons, $\Gamma_\mu = 2\pi r \cdot v_c$, ($v_c \to c$), is given-in the proposed model, similarly to the electron case, by a quantum potential, $V_\Gamma(r)$, which satisfy the stability condition in agreement with a NLS equation of (33a) form in which: $i\,\hbar\cdot(\partial\psi/\partial t) = 0$ (null variation with time of $\rho_c(r)$ by expansion or contraction), i.e.:

$$V_\Gamma(r) = V_\Gamma^0 |\Psi|^2 = -\frac{\delta\upsilon_c}{2}(\rho_c v_c^2)_r = -\frac{\delta m_p}{2} v_{pt}^2 ; \qquad \delta m_p = \delta\upsilon_c \cdot \rho_p ; \ |\Psi|^2 = \frac{(\rho_c)_r}{(\rho_0)_0} \tag{118}$$

in which: p_c (r) = $(\rho_c v_c)_r$ is the impulse density of the relativist quantonic component of the “dark energy” forming the gravstar’ vortex: $\Gamma_G = \Gamma_\mu + \Gamma_s$ of quantons and sinergons, in which a δm_p – mass of vortexially formed “dark” photons or of “dark” particles is attracted until a tangential v_{pt}-speed satisfying the eq. (118) for which the δm_p – mass remains at the same r-distance from the gravstar centre.

The force resulted from the V_Γ potential: $F_\Gamma(r) = \nabla V_\Gamma(r)$, is given by the dark energy pressure gradient, resulted in accordance with the Bernoulli’s law for ideal fluids, considered in the simplest form:

$$P_s(r) + \tfrac{1}{2}(\rho(r)\cdot v_c^2)_r = P_s^0(r) ; \tag{119}$$

with $P_s^0(r)$ –pseudo-constant to short δr distances.

The sinergonic component of dark energy, forming a pseudo-vortex: $\Gamma_s = 2\pi r\cdot c$ gives a gravito-magnetic force: $F_{gm} = \nabla V_{gm}(r)$ acting over quantons. Without other forces, for maintain the quanton with the speed $v_{ct} \approx c$ to a vortex-line $l_r = 2\pi r$, is necessary- according to eq. (118), a sinergonic density of the Γ_S -vortex: $\rho_s \approx \rho_h = \rho_c^M$, so the force which ensures the gravstar forming is given as in the electron genesis case, by a stronger force, those generated by the quantum pseudomagnetic potential: $Q_G = -\mu_c\cdot B_S(r) = -\mu_c\cdot k_1\cdot\rho_s^* c$ which maintains the quanton with $v_{ct} \approx c$ to the vortex-line at $\rho_s^* \to \rho_e^0 = 22{,}24\times10^{13}$ kg/m^3, according to the theory, (schp. 8.7). Also, the sinergonic Γ_S vortex is formed by the gravitic force $F_{gs} = \nabla V_{gs}$ of the gravstar' core M_0 of R_0-radius, acting over sinergons, which have-according to (14), the form: $F_{gs}=2\cdot(4\pi r_s^2 \rho_g c^2)$ with the sinergon radius: $r_s \sim 10^{-28}$m, in the theory, (chp. 6). The plausibility of the previous conclusion is given by the fact that-according to eq. (14), the gravitic intensity of the M_0 hard-core necessary for maintain sinergons to a given vortex-line, in particular-at the hard-core surface, for which $\rho_g(R_0) = \rho_g^0 \approx 4\cdot 10^{-6}/R_0$ according to eqn:

$$F_{gs} = 2\cdot(4\pi r_c^2 \rho_g c^2) = 2G^*(m_c M_0/R^2) = m_c c^2/R \qquad (120)$$

in which $r_c = r_s$ and $m_c = m_s$, is smaller than those necessary for maintain quantons to the same vortex-line, for which the eq. (120) with $r_c = r_h$ and $m_c = m_h$ gives:
$\rho_g^0 = 1/2k_h R_0 \approx 2\cdot 10^{-2}/R_0$, so-because that the M_0 hard-core is formed gradually, by quantons and "dark" photons confining, the vortex Γ_c of quantons is formed after the pseudovortex Γ_s of sinergons, with the contribution of the Q_G -potential.
Results also that the growing of the M_0 hard-core increase also the density of vortexed sinergons and quantons at its surface until values of "dark" photons and of electrons cold genesis: $\rho_{\Lambda v} \approx 3.7\text{x}10^4$Kg/m^3, respective: $\rho_{\Lambda e} \approx 1.5\text{x}10^{14}$Kg/m^3 which corresponds by eq. (25) to specific values of ratio: $(M_0/R_0^2) = \rho_g^0\cdot(k_h c^2/G^*)$ depending on the corresponding gravitation constant, $G^* \geq G$.

Considering a zone $\Delta R = R_0 \div R_G$ of quantum equilibrium characterised by an entropy per quanton: $\varepsilon_h(r) = \gamma\cdot(k_B/\hbar)\cdot S_h(r)$, the variation of the dark energy' impulse density results-in our model, as in the electron' case, (eq. (32)), i.e.-exponential variation of the quantons energy forming dark photons in the gravitic and pseudomagnetic field of the gravstar, with: $\rho_c \sim e^{-r/\eta}$ in the zone with formed "dark" photons of the formed gravstar having the effective R_G radius, and $\rho_c' \sim r^{-2}$ in the outer zone, $r > R_G$.
The "dark" photons are formed vortexially by the ξ_B vortex-tubes of the hard-core magnetic induction, $\mathbf{B}_\mu(r) \sim k_1 \nabla \rho_s c$, in form of vectorial photons, initially-in form of vectons–according to the theory, and these ξ_B vortex-tubes favorised the negatron' and the particles forming-vortexially more stable than theirs antiparticles, explaining the spontaneous symmetry breaking in the particles genesis process and theirs magnetic moment anomaly, $(\mu_m - \mu_{\bar{m}}) \sim$ m, [96]. The dynamic equilibrium between the pseudomagnetic and the centrifugal potential:

$$Q_G = Q_G^0\cdot e^{-r/\eta} = Q_{CF} \Leftrightarrow -\mu_c\cdot B_S(r) = -\mu_c\cdot k_1\cdot\rho_s^* c = ½\, m_v v_f^2 \,;\ \ \rho_s^* = \rho_s^0\cdot e^{-r/\eta} \,;\ Q_G^0 = ½\, m_v c^2 \qquad (121)$$

is realised for vortexially formed vectorial photons with $\mu_c \uparrow\uparrow \mathbf{B}_S$ and the square tangential

speed : $v_f^2 = c^2 \cdot e^{-r/\eta}$, so the vectons or vexons with higher $v_f(r)$ or with $\mu_c \uparrow\downarrow \mathbf{B}_S$ are removed from the gravstar' volume with the speed growed by the Γ_s pseudovortex, the parallely oriented vectons generating an E-field corresponding to a q-charge of M_0-hard core. In the sametime, the vectorial and pseudoscalar „dark" photons with lower speed and oriented μ_c will be attracted to the M_0- hard-core surface where-at specific ρ_Λ density, will generate-by the ξ_B vortex-tubes, electrons and thereafter-nucleons formed „at cold" as Bose-Einstein condensate of photons and respective-of electrons-according to the theory. In this way are generated nuclear quasi-cristalline networks which ensures the growing of the M_0- hard-core which becomes a rotational „black hole" of „magnetar" type which-finally, by the gravitostatic F_{gs} force, will generate nucleons destruction, at $\rho_c = \rho_s^* > \rho_n^0 = 4.68 \times 10^{17} kg/m^3$, transforming the gravstar into a supernovae or into a (micro)quasar by the antigravitic pseudocharge generated conform to eq. (22b)-according to the theory.
The evanescent part: $\rho_c' \sim r^{-2}$, of the gravstar field ensures the continuity of its $\mathbf{B}_\mu$-magnetic field by a quantonic vortex $\Gamma_\mu'(r) = 2\pi r v_c = \Gamma_\mu'(R_G)$ maintained by the (121) dynamic equilibrium.
So, according to the model, the M_0 hard-core of the gravstar have a magnetic moment with exponential density' variation, similar to a magnetar star , generating a strong magnetic field.
The gravstar' transformation into a „black hole" begin when the pseudo-lorentzian force F_l given by the Q_G-potential acting over quantons is replaced by the gravitostatic force F_{gs} according to (120), i.e-when the hard-core radius becomes equal to the Schwarzschild radius, for which:

$$\rho_g^0 = 1/2k_h R_0 \approx 2 \cdot 10^{-2}/R_0 \,, \quad \text{with: } R_0 = R_0^* = 2G^* M_0/c^2 \,; \; M_0 \approx (4\pi/3) R_0^3 \cdot \rho_n \qquad (122)$$

If $\rho_n \approx m_n/\upsilon_n \approx 1.5 \times 10^{17}$ kg/m^3 and $G^* \approx G$, results from eq. (122) that: $R_0 \approx 32$ km and for $\rho_n = \rho_h \approx 8.8 \times 10^{23}$ kg/m^3, results $R_0 \approx 1.3$ m . This result suggests that the pseudomagnetic Q_G potential was essential for the M_0 hard-core forming and the gravstar' genesis.
Results that the cold genesis of "dark" photons and elementary particles was possible in the Protouniverse' period by gravstar' forming which in this case may explain also the supposed "big-bang" scenario of the material Universe genesis by a fractalic process of multi-gravstars forming and by theirs transformation into supernovae and micro-quasars containing a rotational „black hole" of „magnetar" type, in the first stage, transformed into normal- and super-quasars in the second stage.
So, according to the theory, the Protouniverse period had some Eras specific to:
-the gravstars forming; -the dark photons confining and the formation of "dark particles";
-the "dark particles" confining; -the "atonium" states forming;
-the "black holes" and micro-quasars forming.

The forming of supermassive particles, ($m_P > 10^{10}$GeV/c^2), in the primordial Universe is deduces also by unified gauge theories of elementary particles [92], but as formed „at hot”.

The theory and the existence of magnetars -neutron stars converting rotational energy into magnetic energy to more than 10^{11} teslas [97] and of microquasars–sources of high energy with only 10^3km diameter [98], sustains indirectly the previous conclusions regarding the particles cold genesis in the Protouniverse period by gravstars forming.

The hypothesis of a Universe' Macronucleus forming, having a macro-vortex of "dark energy", may be also sustained by the conclusion that the biggest gravstar from a number of locally formed gravstars are determined the attraction of the others in its magnetic field and the "black holes" formed as magnetars after the gravstars transformation could form a super-black hole of a super-magnetar transformed into super-quasar by matter attracton and particles destruction.

16.4. The ‚dark matter' as bosons of the ‚polarised vacuum'

An important conclusion of the theory identifies the bosons named „zerons” as being ‚dark matter' bosons of ‚quantum vacuum' which may be considered as bosonic m_z-particles with self-resonance, (oscillons), with a phononic intrinsic vibration energy, E_v, of paired quarks :

$$E_v \cong (\Delta p \cdot \Delta x_v/\Delta\tau) < E_q, \qquad (E_q = m_z c^2 ; \quad \Delta x_v \le d_c = 2a), \qquad (123)$$

($\Delta\tau$; Δx_v -the self-resonance period and amplitude), which explains the existence of pseudo-virtual paired quarks and fermions in the „quantum vacuum”. This possibility results in classic sense by similitude with the deuteron' self-resonance given by the nucleonic potential, $V_s(r,l_v)$, generated by the superposition of the strong interaction potential of (N^p+1) quasielectrons of the nucleon, i.e.: $V_s(r,l_v) = (N^p+1)\cdot V_e(r,l_v)$.

Considering a bosonic particle-antiparticle pair: $M_b = (m_p - \bar{m}_p)$, the particles being formed by N_p quasielectrons of m_e^*-mass, results by eq. (60) a ratio:

$$K_a = V_s^p(r)/m_p \approx N_p \cdot V_e(r)/N_p \cdot m_e^* = V_e(r)/m_e^* \qquad (124)$$

which should that the acceleration: $a_p = \nabla V_s^p(r)/m_p = \nabla V_e(r)/m_e^*$ not depends on the m_p -value. Approximating the M_b-boson self-resonance as being given by a quasi-elastic maximal force: $F_k^* = k_v \cdot A_v \approx m_p \cdot a_p^*$, considering $A_v \approx d_c$ results also the same pulsation: $\omega_v \approx \sqrt{(k_v/m_p)} \approx \sqrt{(a_p^*/d_c)}$ for all oscillonic M_b-bosons at a given quantum temperature of the quantum vacuum, T_c. Considering for the mean relative speed of the particle relative to its antiparticle the conditions: $v_m < v_M \approx c/2$; with: $A_v \approx d_c$, results for the vibration period , the condition:

$$\tau_v = 2\pi/\omega_v \approx 2d_c/v_m > 2d_c/v_M = 8a/c = 3.76\text{x}10^{-23}\text{ s, so: } \omega_v < \omega_v^M = 1.67\text{x}10^{23}\text{ s}^{-1} \qquad (125)$$

If ω_v^M is associated by the quantum mechanics with a phonon having the energy:

$E_\omega = ½\, \hbar\cdot\omega_v^M = ½\, m_p^* \cdot c^2 = 107.5$ MeV, ($m_p^* \approx 210 m_e$), results for the phononic self-resonance of M_b-boson , the condition: $E_v < E_\omega \cdot (m_p/m_p^*)$ with $m_p^* \approx 210 m_e$ and $E_\omega = 107.5$ MeV.

17. Conclusions

The possibility to explain all fundamental fields and the elementary particles by equations of ideal fluids applied to the subquantum and the quantum medium, may be considered an strong argument for the CF-prequantum model of particles of the theory, describing the particle as chiral CF-soliton cluster in the ground state: T→0K, i.e.-formed „at cold", as a stable or metastable Bose-Einstein condensate of gammonic (e^+-e^-)-pairs confined by a very strong magnetic field corresponding to those of a magnetar type star or equivalent, with determined parameters in a Galileian relativity -like in the scale relativity theory of Nottale [99], which predicts-like in our theory, the natural apparition of some structures by self-organisation of a material system with dispersed matter.

At T>0K, in perturbative conditions, the prequantum particle becomes quantum, as in the case of chiral soliton electron which at T>0K becomes pseudosperical by spin precession, without changing of spin value, or as in the case of vortexial atom which only at T→0K forms a state of Bose-Einstein condensate, at T>0K becoming individual quantum systems.

The classic CF model of nucleon of the theory, with neutral cluster of quasielectrons and incorporate electron(s), explaining also the values of spin and of magnetic moment by the conclusion of a density-dependent electron' magnetic moment degeneration, is not contradictory because that the soliton-like particle is an open system in the quantum and subquantum vacuum and explains the fact that- at the proton transformation by K-electron capture, the electron spin is not transmitted with the μ_B-value to the formed neutron. In the same time, this conclusion permits to explain the nucleon and the nuclear field whithout the Yukawa's mesonic theory, which has no correspondence in a prequantum model of particle.

The possibility to explain the cold genesis of "dark" photons and of elementary particles considered in a CF -chiral soliton model by a coherent model of primordial gravstar is another argument which sustains the theory. Also, the possibility to obtain a coherent cold genesis prequantum model of particles and of fields, leads to the principle that the quantum models of particles must have a prequantum correspondent at the limit: T→0K that completes the image of the matter genesis, explaining also the physical cause of the cosmic expansion by an antigravitic charge which explains also the "dark energy" nature .

The use of a galileian relativity for explain the photons and the particles cold genesis is in concordance with the "stopped light" experiment, (L.V.Hau, 2001, [100], Savchenkov, A.A. et al., 2007, [101], [102]) which evidenced the possibility to reduce the speed of a light beam which is passed by a small cloud of ultracold atoms of sodium forming a B-E condensate, magnetically suspended inside a vacuum chamber, to 17÷0 m/s, by compressing a light pulse of more than 1 km long in vacuum, to a size of ~50 μm, completely contained within the B-E condensate-phenomenon which sustains the C.F. electron model of the theory. Also, this phenomenon may be used for verify partially the theory, which predict a deviations of the slowed light in a very strong magnetic field, with an angle depending on the B-field sense.

The possibility to retrieve classically by the theory the exponential form of nuclear potential in accordance also with the Schrödinger equation writted in the simplest form (71a), suggests that all basic classic forms of field' potential, $V_p(r)$: electric, magnetic, gravitic or nuclear, are compatible phenomenologically with equations derived from a Proca–type equation, (eq. Seelinger-in the static approximation): $\left(\nabla^2 - \frac{1}{c^2}\frac{\partial^2}{\partial t^2} - k_\lambda^2\right)\Phi = g \cdot \delta[\vec{r} - \vec{r}'(t)]$

by a degeneration function f_D, in the form: $V_p(r) = f_D \cdot \Phi(r)$,

and by particular values of k_λ, f_D and g, corresponding-for the nuclear potential, to eq. (71).

For the electro-magnetic and the electro-gravitic field, by the Lorentz gauge: $\vec{\nabla} \cdot \vec{A} = -\frac{1}{c^2} \cdot \frac{\partial \phi}{\partial t}$

the field equation may be written taking $k_\lambda \approx h/m_{v;(g)} \cdot c$; $g = -q/\varepsilon$, in the Maxwell-Proca form: $\left(\nabla^2 + \frac{\partial}{\partial t}(\vec{\nabla} \cdot \vec{A}) - k_\lambda^2\right)\Phi = g \cdot \delta[\vec{r} - \vec{r}'(t)]$ expressing the **E**-type field generating by a **B**=rot**A** type field.

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