Why the spin of the particles is equal to $s = \pm 1/2$?

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Abstract. According to the unified theory of dynamic space, the first (Universal) and the second (local) deformation of space is described, which change the geometric structure of the isotropic space. These geometric deformations created the dynamic space, the Universe, and the space holes (bubbles of empty space), the early form of matter. The neutron cortex is structured around these space holes with the electrically opposite elementary units (in short: units) at the light speed, as the third deformation of space (electrical and geometric deformation), resulting in the creation of surface electric charges (quarks), to which the particles spin is due. The constant kinetic energy of the particle spin is calculated at 100 million Joule. Thus, a single electron is enough to become the heart of a future energy machine.

Keywords: Space deformation; neutron cortex; quarks; spin.

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1. The spin of the particles and its dynamics

According to the unified theory[1,2] of dynamic space, the structure of the neutron cortex[3] interconnects the particle spherical structure with the cubic one of ambient space,[4] resulting in condensation of the electric units[5] in the inner cortex region.

The elision of the negative units and their motion towards the cortex periphery repulsed them as homonymous to the centers of two opposite seats of the initial cube.[4] The result is the appearance of two negative poles on opposite spherical regions of the cortex (Fig. 1), in the place of two opposite seats of the initial cube, while the surplus of positive units is condensed on its remaining four seats constituting the positive zone of the cortex. These electrically charged regions of the cortex are the particle quarks.

The excess of positive units ($+2/3e$) on the spherical zone of neutron repels the positive units and attracts the negative ones on proximal space (Fig. 2), reducing the pairs of oppositely charged units, resulting the reduction of cohesive pressure[4] at $P_0 - 2\Delta P$. For the same reason the cohesive pressure is reduced at $P_0 - \Delta P$, due to the charge $-1/3e$, on both sides of the negative poles, since now the reduction of the pairs of oppositely charged units is smaller. It is noted that the in double reduction of cohesive pressure ($2\Delta P$), is due to the fact that u charge is always double the d charge.

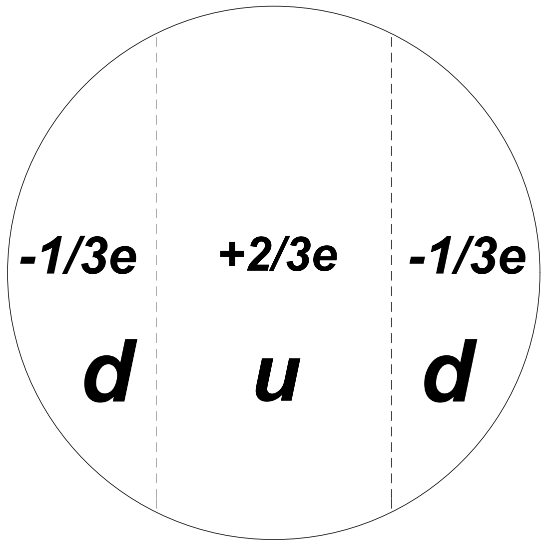

Figure 1. The surface electrical charges of the neutron cortex are its quarks

Therefore, the pressure difference ΔP as motion arrow,[6] will be then

$$\Delta P = (P_0 - \Delta P) - (P_0 - 2\Delta P). \tag{1}$$

Respectively, the positive charge $+2/3e$ of proton poles (Fig. 2) creates a reduction of pressure at $P_0 - 2\Delta P$ and the negative $-1/3e$ of zone at $P_0 - \Delta P$. Thus, the pressure difference is $\Delta P = (P_0 - \Delta P) - (P_0 - 2\Delta P)$, namely the same with the neutron (Eq. 1).

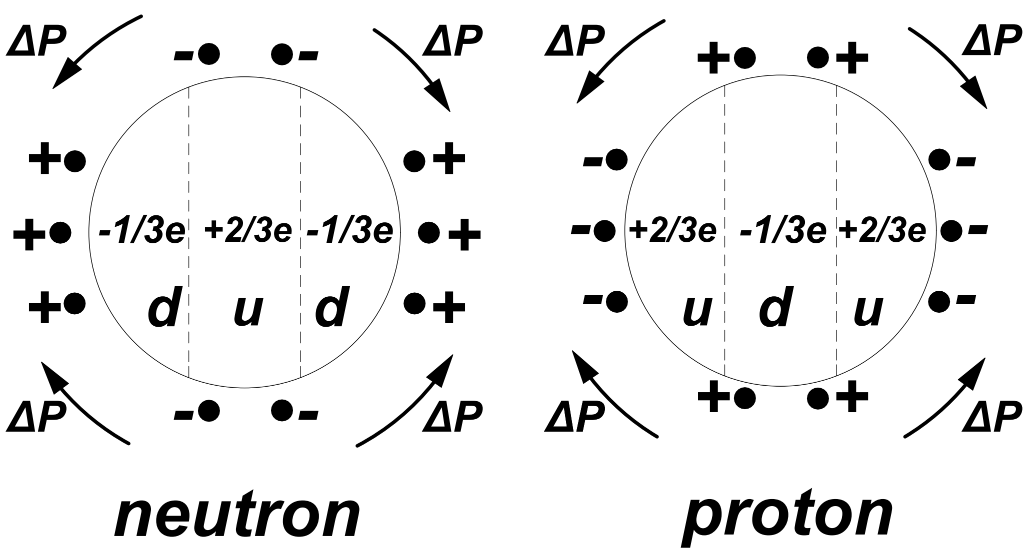

Figure 2. The same pressure difference $\Delta P = (P_0 - \Delta P) - (P_0 - 2\Delta P)$ is created by the surface electrical charges (quarks) of neutron and proton and installs a stable accumulated force $F_s = F_s/2 + F_s/2$ in an only antidiametrical pair of quadrants irrespective of the spin

The spin of the particle has two opposite motion arrows ΔP, which appear that they balance each other. However, the pressure difference ΔP of the particle spin is due to the cortex structure and not to an external force. It always installs a stable accumulated force[7]

$$F_s = \frac{F_s}{2} + \frac{F_s}{2} \tag{2}$$

in an only antidiametrical pair of quadrants that is vertical to spin axis and one of the two pressures difference ΔP is enforced (the way of enforcement is due to an external cause[8]), with a uniform rotational motion.[6]

This accumulated force $F_s = F_s/2 + F_s/2$ (Eq. 2) of the particle spin is considered as pairs of opposite forces ($F_s/2$) without a component and, therefore, has no direction but tends to rotate the dynamic space corresponding to mass‡ of the particle

$$m = \frac{E}{C_0^2} = \frac{F_s L_0}{C_0^2} \Rightarrow m = \frac{F_s L_0}{C_0^2}, \tag{3}$$

which causes the so called rotation gravity.

2. The spin of the particles is equal to $s = \pm 1/2$

The experimentally rotational momentum S_z of a particle is found as the quantum multiples of[9]

$$S_z = m_s \hbar \Rightarrow S_z = \pm \frac{1}{2} \cdot \frac{h}{2\pi}, \tag{4}$$

where h is the Planck constant, namely their spin values are defined as

$$s = \pm \frac{1}{2}. \tag{5}$$

Modern Physics has not given an interpretation for the spin $s = \pm 1/2$. The unified theory[1,2] of dynamic space proposes the following:

The rotational momentum S of a body is

$$S = I\omega = \frac{2}{\omega} \cdot \frac{I\omega^2}{2} \Rightarrow S = \frac{2}{\omega} \cdot \frac{I\omega^2}{2}, \tag{6}$$

where I is the moment of inertia and

$$\omega = \frac{2\pi}{T} \tag{7}$$

the angular speed by a rotation period T. Moreover, the kinetic energy of rotation is

$$E_k = \frac{I\omega^2}{2}. \tag{8}$$

‡ $F_f^2 = F_0^2 + F_s^2$ (Eq. 31), where for the E/M wave[17,18] applies $F_0 = 0$, therefore $F_f = F_s$, namely the final force F_f of the formation is equal to the accumulated force F_s, where $F_f = E/L_0$ represents the energy of the E/M wave and $F_s = pC_0/L_0$ (Eq. 24) represents its momentum. Substituting in the above $F_f = F_s$ we have $E/L_0 = pC_0/L_0$, where $p = mC_0$ is the momentum of the formation, so $m = E/C_0^2$ (Eq. 3).

So, Eq. 6, due to Eqs 7 and 8, becomes

$$S = \frac{2}{\omega} \cdot \frac{I\omega^2}{2} = \frac{2}{2\pi/T} E_k \Rightarrow S = 2E_k \frac{T}{2\pi}. \tag{9}$$

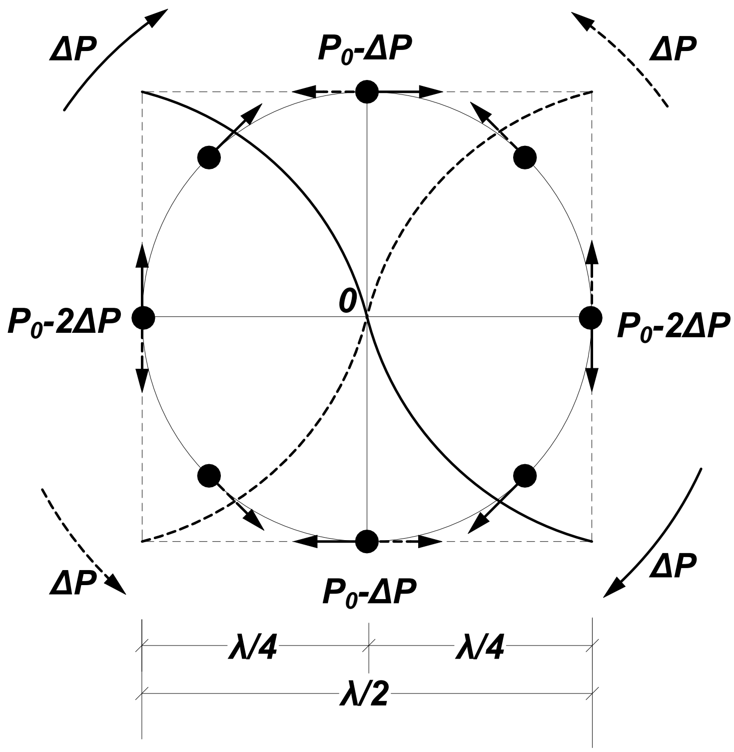

Figure 3. Schematically is designed the harmonic fluctuation of motion arrow $\Delta P = (P_0 - \Delta P) - (P_0 - 2\Delta P)$ of the particle spin

In the case of the particle spin, it is

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

as the quantum time[11] τ in the region of the formations, that is the accumulation time of a force talantonion[10] f_τ. So, due to Eq. 10, Eq. 9 becomes

$$S = 2E_k \frac{T}{2\pi} = 2E_k \frac{\tau}{2\pi} \Rightarrow S = E_0 \frac{\tau}{2\pi}, \tag{11}$$

where $E_0 = 2E_k$ is the total energy of the particle. However, a half force talantonion $f_\tau/2$

$$\varepsilon_\tau = f_\tau L_0 \Rightarrow \frac{f_\tau}{2} = \frac{\varepsilon_\tau}{2} \cdot \frac{1}{L_0} \tag{12}$$

corresponds to an accumulated force[7] F_s (Eq. 2) for an only antidiametrical pair of quadrants irrespective of the spin, where ε_τ the energy talantonion[10] and L_0 the quantum dipole length.[5] The accumulated force F_s as $f_\tau/2$ results from the harmonic oscillation of motion arrow ΔP (Figs 2 and 3) at $\lambda/4 + \lambda/4 = \lambda/2$. The natural interpretation of the phenomenon of the harmonic oscillation of motion arrow ΔP is given in the paper:[6]

What is de Broglie's wave-particle? (section 2). Therefore, the above total energy $E_0 = 2E_k$ (Eq. 11) of the particle corresponds to half the energy talantonion (Eq. 12), due to $\lambda/4 + \lambda/4 = \lambda/2$, that is

$$E_0 = 2E_k = \frac{\varepsilon_\tau}{2} \Rightarrow E_0 = \frac{\varepsilon_\tau}{2}, \tag{13}$$

since the whole force talantonion $f_\tau = \varepsilon_\tau / L_0$ (Eq. 12) corresponds to the entire wavelength λ. So, due to Eq. 13, Eq. 11 can be written as follow

$$S = E_0 \frac{\tau}{2\pi} = \frac{\varepsilon_\tau}{2} \cdot \frac{\tau}{2\pi} \Rightarrow S = \frac{1}{2} \cdot \frac{\varepsilon_\tau \tau}{2\pi}. \tag{14}$$

However, according to the unified theory,[1,2] of dynamic space the Planck's constant[10] is defined as

$$\varepsilon_\tau \tau = h. \tag{15}$$

Therefore, due to Eq. 15, Eq. 14 will be written

$$S = \frac{1}{2} \cdot \frac{\varepsilon_\tau \tau}{2\pi} = \frac{1}{2} \cdot \frac{h}{2\pi} \Rightarrow S = \frac{1}{2} \cdot \frac{h}{2\pi}, \tag{16}$$

which gives the values $s = \pm 1/2$ (Eq. 5) of the particle spin. It is noted that signs $(+)$ and $(-)$ are due to the two opposite motion arrows ΔP (see section 1).

3. Kinetic force and energy of the particle spin

The rotational momentum of the particle spin is

$$S = p r_c, \tag{17}$$

where

$$r_c = 10^{-34} m \tag{18}$$

is the radius[3] of its cortex. The momentum of motion is

$$p = Ft, \tag{19}$$

where the time t is equal to

$$t = \frac{S_p}{C_0} \tag{20}$$

and F is the corresponding motion force,[7] S_p is the interval[7] traveled by this force F at the light speed with κ click-shifts per L_0[5] and C_0 is the light speed.[12,13] So, the accumulated force[7] F_s will be then

$$F_s = \kappa F, \tag{21}$$

where

$$\kappa = \frac{S_p}{L_0} \tag{22}$$

and due to Eq. 22, Eq. 21 becomes

$$F_s = \kappa F \Rightarrow F_s = \frac{S_p F}{L_0} \Rightarrow F = \frac{F_s L_0}{S_p} \tag{23}$$

as the corresponding motion force F. Therefore, the momentum of motion (Eq. 19), due to Eqs 20 and 23, becomes

$$p = Ft = \frac{F_s L_0}{S_p} \cdot \frac{S_p}{C_0} \Rightarrow p = \frac{F_s L_0}{C_0}. \tag{24}$$

Hence, the rotational momentum S (Eq. 17), due to Eq. 24, can be written

$$S = pr_c = \frac{F_s L_0 r_c}{C_0} \Rightarrow S = \frac{F_s L_0 r_c}{C_0}. \tag{25}$$

From this Eq. 25 it is concluded that the rotational momentum S for all the particles is constant, since the accumulated force F_s, imposed by the same ΔP, is constant (depends on $\Delta Q = 1/3e$, Fig. 2) and also L_0,[14] r_c, C_0 are constant in our region. However, the constant value of the rotational momentum is[9]

$$|S| = \frac{\sqrt{3}}{2} \cdot \frac{h}{2\pi} = 0,913 \cdot 10^{-34} \Rightarrow |S| = 0,913 \cdot 10^{-34} Joule \cdot sec. \tag{26}$$

Also, from Eq. 25 we find the constant accumulated force

$$S = \frac{F_s L_0 r_c}{C_0} \Rightarrow F_s = \frac{S C_0}{L_0 r_c} \tag{27}$$

and by substituting $|S| = 0,913 \cdot 10^{-34} Joule \cdot sec$ (Eq. 26), $C_0 = 3 \cdot 10^8 \mathrm{m/sec}$, $L_0 = 0,558 \cdot 10^{-54} \mathrm{m}$[14] and $r_c = 10^{-34}\mathrm{m}$ (Eq. 18), we have

$$F_s = \frac{0,913 \cdot 10^{-34} \cdot 3 \cdot 10^8}{0,558 \cdot 10^{-54} \cdot 10^{-34}} = 4,9 \cdot 10^{62} N \Rightarrow F_s = 4,9 \cdot 10^{62} N. \tag{28}$$

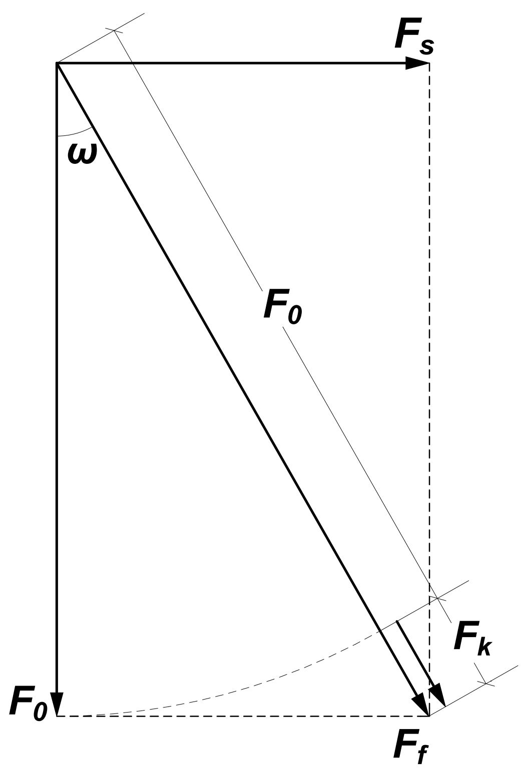

Figure 4. $F_k = F_f - F_0$ is the kinetic force of a particle, F_f its final force, F_0 its gravity force, $u_a = F_s/F_f = sin\omega$ its timeless speed[15] and $F_f^2 = F_0^2 + F_s^2$ is the Pythagorean[16] relationship

The kinetic energy E_k of the particle spin will be

$$E_k = F_k L_0, \tag{29}$$

where (Fig. 4)

$$F_k = F_f - F_0 \tag{30}$$

is the kinetic force of the particle spin, F_0 its total gravity force[16] and F_f its final force. However, by the Pythagorean[16] relationship, it is

$$F_f = \sqrt{F_0^2 + F_s^2}, \tag{31}$$

where F_s is the constant accumulated force of the particle spin. Therefore, due to Eqs 30 and 31, Eq. 29 can be written

$$E_k = F_k L_0 = (\sqrt{F_0^2 + F_s^2} - F_0)L_0 \Rightarrow E_k = (\sqrt{F_0^2 + F_s^2} - F_0)L_0 \tag{32}$$

as the constant kinetic energy of the particle spin.

We calculate the size class of the constant kinetic energy of neutron spin by substituting the values $F_0 \approx 10^{43}$N,[14] $F_s \approx 10^{62}$N (Eq. 28) and $L_0 \approx 10^{-54}$m[14] in Eq. 32. So, we have

$$E_k \approx (\sqrt{(10^{43})^2 + (10^{62})^2} - 10^{43})10^{-54} \approx 10^8 \Rightarrow E_k \approx 10^8 Joule. \tag{33}$$

It is noted that this very grand kinetic energy for every particle could be the future solution to our energy problem. For example, if we could acquire the proper technology to have the spin of an electron stopped, then the above energy could be released and whenever the electron is set free again, it would still rotate (spin) anew! Thus, a single electron is enough to become the heart of a future energy machine.

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