What is the dark matter?

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Abstract. The structure of the particles of the galactic systems, as well as by their gravity tails, has created new dynamics of them, resulting in their chaotic motion. So, the search for an unknown form of dark matter is no longer necessary. This gravity deviation concerning the moving bodies is a criterion to define the absolute motion. Hence, the inability of detection of a uniform motion in inertial systems has been lifted.

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1. The gravity pressure of the empty space hole

The vacuum bubble (empty space hole) is the second deformation of space (local), the sophisticated form of which is perceived by our senses as matter.[1,2] The grid structure of the cell, that surrounds the vacuum of the bubble, has the properties of an elastic membrane.[3] This membrane stretches the surrounding space with force F_0 of its formation and balances the opposite attractive force of the space cohesive pressure[4] P_0. This force F_0 is due to the elementary resultants (Fig. 1) that are formed by the component forces[5]

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

of the electric dipoles of the bubble spherical surface, where L_0 the dipole length. Therefore, force

$$F_0 = 4\pi r^2 P_0 \Rightarrow r = \sqrt{\frac{F_0}{4\pi P_0}} \tag{2}$$

balances the attractive forces, caused by the cohesive pressure P_0 on the spherical surface of bubble and so the dynamic energy of the core vacuum, due to Eq. 2, is

$$E = P_0 V = \frac{P_0 4\pi r^3}{3} = \frac{(P_0 4\pi r^2)r}{3} = \frac{F_0 r}{3} = F_0 L_0 \Rightarrow r = 3L_0, \tag{3}$$

where $r = r_x = 3L_{0x}$ (Eq. 3) is the radius of the particle core vacuum at a distance x from the Universe center. The forces developed in the surrounding space create the dynamic field of gravity. This total force F_0 (Eq. 2) is the gravity force of the vacuum bubble.

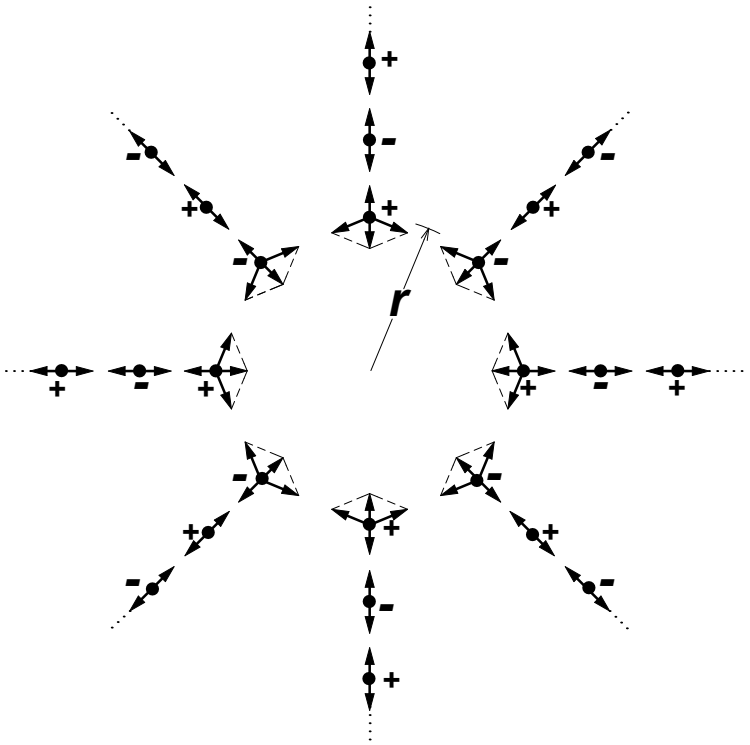

Figure 1. Indicative presentation of the bubble spherical formation ($F_0 = 4\pi r^2 P_0$, where F_0 the gravity force of bubble, P_0 the cohesive pressure of space, $4\pi r^2$ the surface area of bubble and r its radius)

The gravity force $F_0 = 4\pi r_x^2 P_{0x}$ (Eq. 2) of the vacuum bubble (core of particle) is transmitted unaltered, as a stretching of the elastic-dynamic space on a spherical surface of a radius R. That is

$$F_0 = 4\pi R^2 P_g, \tag{4}$$

where P_g the gravity pressure of the empty space hole (vacuum bubble) of a radius r_x at a distance R from the particle. From Eqs 2 and 4 the gravity pressure of the particle at a distance x from the Universe center is calculated as

$$P_g = P_{0x}\frac{r_x^2}{R^2}. \tag{5}$$

The gravity pressure P_g is the new form of pressure within the gravitational field of the particle. It causes thickening of the space units[5] and reduction of the space cohesive pressure, due to $F = kL_0$ (Eq. 1). Therefore, the gravity pressure P_g replaces part of the cohesive pressure P_{0x}. It converts the cohesive forces of space into gravity forces,

due to the presence of the space hole (local deformation). The fact that the gravity pressure P_g (Eq. 5) of a particle is proportional to the cohesive pressure[6]

$$P_{0x} = P_{0p}\frac{x^2}{R_0^2} \tag{6}$$

of the Universe regions is the cause that affects the dynamics of motion (see sections 3 and 4) of the distant galaxies, where P_{0p} the constant cohesive pressure at the Universe periphery of a constant radius[7] $R_0 \approx 10^{26}$m. The result of this effect is the chaotic and "unexplained"motion of galactic systems.

In $P_g = P_{0x}r_x^2/R^2$ (Eq. 5) for $R = r_x$, namely on the surface of the vacuum bubble (neutron core), it is $P_g = P_{0x}$ and because $r_x = \sqrt{F_0/4\pi P_{0x}}$ (Eq. 2), the radius r_x of the neutron core depends on the cohesive pressure P_{0x} of the region. Therefore, close to the Universe center, where a very stable and consistently low cohesive pressure exists, one single kind of particle is born (the neutron).

It is also noted, that the two deformations of space are, respectively, proportional (x^2) and inversely proportional ($1/R^2$) to their distances:

(i) Universal deformation (cohesive pressure) $P_{0x} = P_{0p}x^2/R_0^2$ (Eq. 6).

(ii) Local deformation (gravity pressure) $P_g = P_{0x}r_x^2/R^2$ (Eq. 5).

Therefore, it is concluded that the cohesive pressure P_{0x} is proportional to the square of the distance x from the center of the Universal deformation (Universe center), while the gravity pressure P_g is inversely proportional to the square of the distance R from the center of the local deformation (empty space hole of radius r_x).

Hence, the Universal deformation creates the opposite local deformation, according to the fundamental principle of antithesis.

2. Gravitational attraction force between two particles

On the spherical surface of the vacuum bubble (core of particle), the cohesive pressure P_{0x} has been completely substituted by the gravity pressure P_g, namely it is $P_{0x} = P_g$. However, at a distance R from the particle the cohesive pressure of space is

$$P = P_{0x} - P_g, \tag{7}$$

namely it decreases by the measure of the corresponding gravity pressure P_g, which prevails at the above position.

At a distance R from particle A with core vacuum of radius r_1, let a second particle B with a radius r_2 be found (Fig. 2). The gravity pressure $P_g = P_{0x}r_1^2/R^2$ (Eq. 5) of particle A is not transmitted through the core vacuum of particle B, since there are not electric charges and dipoles[5] into that.

Thus, the whole gravity pressure P_g appears as an attraction pressure on the surface of the largest circle of the particle core vacuum B (of approximate area $\sim \pi r_2^2$).

Hence, the mutual gravitational attraction force F_g between the particles A and B is equal to the product of surface $\sim \pi r_2^2$ times the gravity pressure P_g (Eq. 5), so

$$F_g = \pi r_2^2 P_g \Rightarrow F_g = \pi P_{0x} \frac{r_1^2 r_2^2}{R^2}. \tag{8}$$

This Eq. 8 expresses the Law of gravitation.

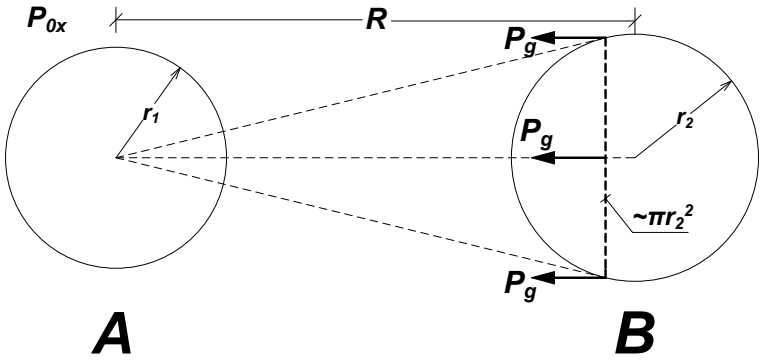

Figure 2. The gravitational attraction force of the particle A on the particle B is due to the gravity pressure $P_g = P_{0x} r_1^2/R^2$ (Eq. 5) where P_{0x} is the cohesive pressure of space

Substituting the $r_1^2 = F_{01}/4\pi P_{0x}$ and $r_2^2 = F_{02}/4\pi P_{0x}$ (Eq. 2) in Eq. 8, we have

$$F_g = \frac{1}{16\pi P_{0x}} \cdot \frac{F_{01} F_{02}}{R^2}. \tag{9}$$

This is the Law of gravitation as a function of the gravity forces F_{01} and F_{02} of the particles A and B.

Comparing the Law of gravitation (Eq. 9) with Newton's Law

$$F_g = G\frac{m_1 m_2}{R^2} \tag{10}$$

the following reciprocal concepts

$$G \sim \frac{1}{16\pi P_{0x}}, \tag{11}$$

$$m_1 \sim F_{01} \tag{12}$$

and

$$m_2 \sim F_{02} \tag{13}$$

are resulting. So, the masses of particles correspond to the gravity forces of particles. They are the gravity forces of particles, with which the space is stretched.

Consequently, the gravitational mass is the expression of the particle gravity force, which stretches the space, while the inertial mass is its property of reacting to any change of its movement.

The dynamic energy of the particle is $E = P_0 V = F_0 L_0$ (Eq. 3) and for $E = mC_0^2$ the gravitational mass is

$$m = \frac{F_0 L_0}{C_0^2}, \tag{14}$$

that it coincides with the inertial mass.

It is noted, that the mass-energy equivalence ($E = mC_0^2$) is calculated from the accumulated force (see section 3) at the dynamic autonomous motion formation[8] of the E/M wave.‡

3. Accumulation of motion force

Physics considers the motion of a body as a simple change of its distances from other objects, namely considers it as a relative displacement in time. By the special relativity has been done a mathematical expression (Lorentz transformations) of the problem that had arisen from the Michelson-Morley experiment,[9] ignoring, though, the real cause of the slowing of the moving clock, i.e. the phenomenon of motion. This experiment is interpreted by the unified theory of dynamic space[1,2] with the Galilean transformations, by calculating the actual reduction of the light speed on moving material systems, not based on the second postulate of relativity.

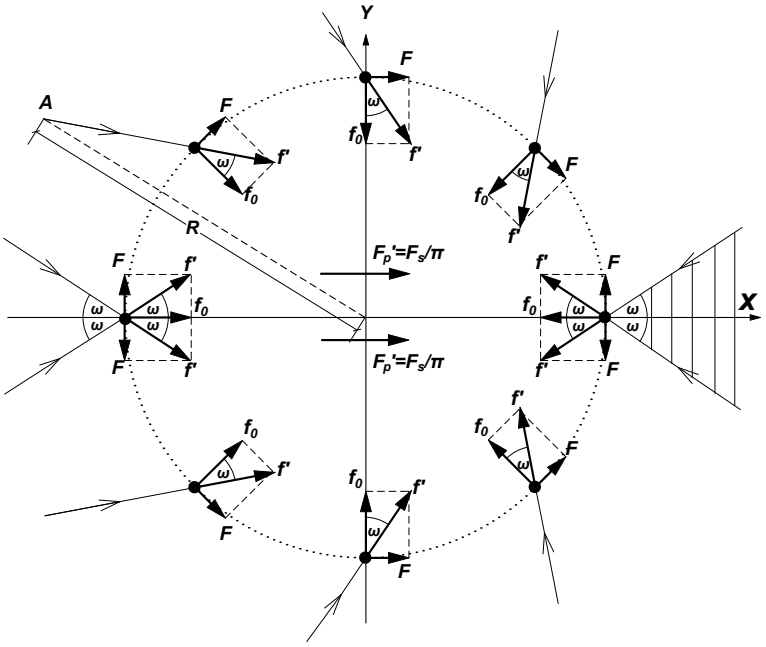

Figure 3. Gravitational field of moving particle ($sin\omega = F/f' = F_s/F_f$, Eq. 23)

The accumulation of motion force F on the dipole bonds of the particle spherical zone[10] happens per $\tau_0 = L_0/C_0 \approx 10^{-62}$sec.[11] This way of accumulation of motion force F gives a real interpretation of the impulse-momentum $p = Ft$ of classical Physics, which is the time addition of the exerted force F per second, that is replaced by the Natural unit of time, i.e. the quantum time $\tau_0 \approx 10^{-62}$sec (in the units region), as

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

click-shifts of force F from unit to unit[5] at light speed.[12] If S_p is the interval traveled by force F at light speed with κ click-shifts per L_0,[5] then

$$S_p = \kappa L_0 \Rightarrow \kappa = \frac{S_p}{L_0} \tag{15}$$

and, respectively, the accumulated force upon the particle, due to Eq. 15, is

$$F_s = \kappa F \Rightarrow F_s = \frac{F S_p}{L_0} \Rightarrow F_s L_0 = F S_p. \tag{16}$$

Also, if we consider that the gravity force F_0 (Eq. 2) is concentrated on one meridian of the particle (Fig. 3), then

$$F_0 = \kappa f_0, \tag{17}$$

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

$$f' = \sqrt{F^2 + f_0^2} \tag{18}$$

and a final force

$$F_f = \kappa f'. \tag{19}$$

Hence, due to Eqs 16, 17 and 18, the Eq. 19 becomes

$$F_f = \kappa\sqrt{F^2 + f_0^2} = \sqrt{\kappa^2 F^2 + \kappa^2 f_0^2} = \sqrt{F_s^2 + F_0^2}. \tag{20}$$

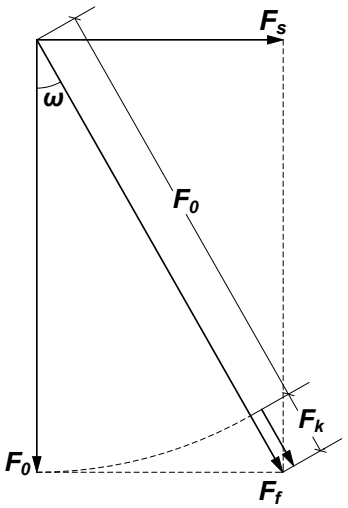

Figure 4. Kinetic force $F_k = F_f - F_0$, Pythagorean relationship $F_f^2 = F_0^2 + F_s^2$ (Eq. 21) and timeless speed[12] $u_a = u/C_0 = F_s/F_f = sin\omega$ (Eq. 23)

Namely the

$$F_f = \sqrt{F_s^2 + F_0^2} \Rightarrow F_f^2 = F_s^2 + F_0^2 \tag{21}$$

is the final force of gravity and motion of the particle, which creates a new structure of the proximal area (new dynamics). So, Pythagorean relationship $F_f^2 = F_s^2 + F_0^2$ expresses the Nature's Mathematics (Fig. 4).

4. Dynamics of gravitational field of moving particle

The gravitational field of the moving particle is exercised in the directions of the elementary resultants f' (Fig. 3), forming an angle ω with gravitational elementary forces f_0.

The sine of that angle is

$$sin\omega = \frac{F}{f'} \tag{22}$$

and by putting $F = F_s/\kappa$ (Eq. 16) and $f' = F_f/\kappa$ (Eq. 19), it is

$$sin\omega = \frac{F_s}{F_f}. \tag{23}$$

However, angle ω is as well as between the final force F_f and the gravity force F_0 of the particle (Fig. 4). This sine is a very important element for the dynamics of the moving particle, since it gives the timeless speed[13] $u_a = sin\omega = F_s/F_f$.

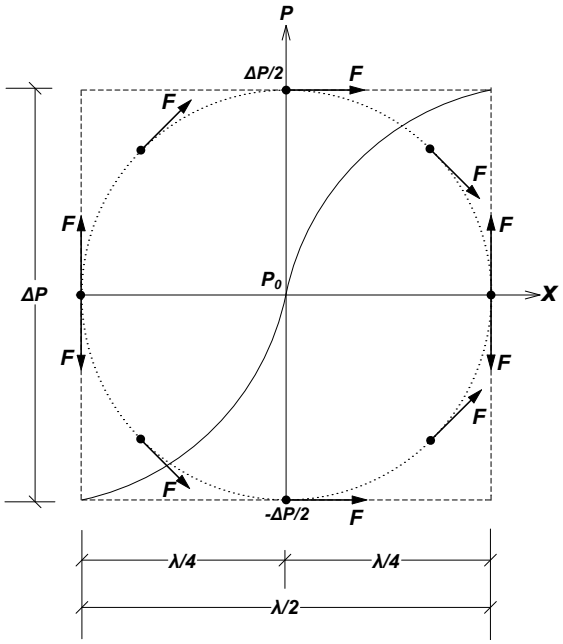

Figure 5. Harmonic fluctuation of motion arrow $\Delta P = (P_0 + \Delta P/2) - (P_0 - \Delta P/2)$

The fluctuation of the pressure difference as a motion arrow ΔP begins by the dilution of gravitational tensions in front of the particle (namely decreases the gravity pressure P_g (Eq. 5) and increases of cohesive pressure P_0), given that gravity is created by forces of the dynamic space. The opposite happens behind the particle, where the thickening of gravitational tensions increases the gravity pressure P_g and decreases the cohesive pressure P_0. In Fig. 3, we can observe the dilution of gravitational tensions in front of and the thickening of them behind the particle, with a corresponding reduction and an increase of gravity pressure P_g. The extensions of elementary resultants f' create an increased gravity cone behind (left in Fig. 3), while in the shaded cone in front of

the particle there is no gravity pressure (right in Fig. 3). The cone behind the particle, where there is gravity from both hemispheres, is called tail of gravity, whose width is the cone angle 2ω, where $sin\omega = u_a$ is the timeless speed of the particle.

The pressure difference as a motion arrow

$$\Delta P = (P_0 + \frac{\Delta P}{2}) - (P_0 - \frac{\Delta P}{2}), \tag{24}$$

which fluctuates from $+\Delta P/2$ in front of to $-\Delta P/2$ behind the particle, causes the geometric deformation of the particle spherical zone at a pear form, resulting a change of the dipoles length L_0[5] (expansion in front of and shrinking behind the particle) and, hence, a respective change of the force $F = kL_0$ (Eq. 1), which accumulate and flow endlessly at light speed.[12] The above spherical shape of the zone changes harmonically in the form of pear-shaped, as a harmonic oscillation of the elastic-dynamic space, by a half wavelength (Fig. 5)

$$\frac{\lambda}{2} = d, \tag{25}$$

as a meridian diameter of spherical zone and, hence, the motion of the particle is achieved.

Therefore, the pressure difference ΔP fluctuates from $+\Delta P/2$ in front of and at $-\Delta P/2$ behind the particle, that causes a change of volume V in proximal area and produces the dynamic energy $V\Delta P/2$, which is converted into kinetic energy $mu^2/2$ of the particle. So, it is

$$\frac{V\Delta P}{2} = \frac{mu^2}{2} \tag{26}$$

and for

$$d_m = \frac{m}{V} \tag{27}$$

the constant mass density[14] of space, then the particle speed u, due to Eqs 26 and 27, becomes

$$u = \sqrt{\frac{\Delta P}{d_m}}. \tag{28}$$

5. Tail of gravity

The gravity pressure P_g at the point A (Fig. 3), in a maximum approach, is

$$P_g = \frac{F_f}{4\pi R^2}, \tag{29}$$

wherein $F_f = \kappa f'$ (Eq. 19) and R the distance from the particle. If this point is within the gravity cone (tail of gravity), then it is attracted by both hemispheres at a double final force F_f and, therefore, the gravity pressure P'_g (within the cone behind) is

$$P'_g = 2P_g = \frac{2F_f}{4\pi R^2} \Rightarrow P'_g = \frac{F_f}{2\pi R^2}, \tag{30}$$

namely double than the outside space.

It is noted that, the so-called gravity tail behind the particles of galactic systems, as well as the effect of the new dynamics the structure of the above particles, are the causes for their chaotic and "unexplained" motion.

Moreover, this gravity deviation to behind of the moving bodies (with the formation of gravity tail) is a criterion to define the absolute motion. Therefore, the inability of detection of the uniform motion in inertial systems has been lifted.

However, the result of the first deformation of the Universal space is the development of the local cohesive pressure[15]

$$P_0 = 0,7777 \cdot 10^{151} N/m^2 \tag{31}$$

in our region.

Thus, the dynamic space is a vast storehouse of energy, in which the fundamental cause of the force is the electric one between positive and negative units. This vast energy comes from the dynamic energy E_0 of the spherical deformation of Universal space of a constant radius[7] $R_0 \approx 10^{26}$m, that is

$$E_0 = P_0 V = \frac{P_0 4\pi R_0^3}{3} \Rightarrow E_0 = \frac{P_0 4\pi R_0^3}{3}. \tag{32}$$

Substituting, into Eq. 32 the $R_0 \approx 10^{26}$m and $P_0 \approx 10^{151}$N$/m^2$ (Eq. 31), we found

$$E_0 \approx \frac{4\pi \cdot 10^{151} \cdot (10^{26})^3}{3} \approx 10^{230} Joule \Rightarrow E_0 \approx 10^{230} Joule. \tag{33}$$

This huge Cosmic energy adequately covers the energy and material needs of the Universe and so, the search for so-called dark matter is no longer required.

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