Cosmic Journey of Galaxies
Pythagorean Harmony of Universe Expansion

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Abstract. The unified theory of dynamic space[1] describes the first force of Nature as the Universal antigravity one, because of which the galaxies follow an accelerated centrifugal motion.[2] Therefore, what the great astronomer Edwin Hubble observed is not due to the Universe expansion[3] as a result of the Big Bang, but to the relative motion of galaxies and their centrifugal antigravity motion. The Cosmic journey of the matter (the galaxies) takes place at the constant timeless speed[4] towards the Universe periphery,[5] while the smallest Pythagorean Triple (3, 4, 5) reveals the harmony of Universal antigravity motion.

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1. The smallest Pythagorean Triple reveals the harmony of Universal antigravity motion

The unified theory of dynamic space,[1] also, describes the Genesis of matter[6] at the Universe center,[5] where the primordial neutron is created, namely the first particle that typically participates to the creation of our galaxy. Cosmic journey is considered as the interval (the distance x), typically traveled by this neutron from the Universe center to our region. The time t of this Cosmic journey is also calculated.

The Cosmic journey is based on the Pythagorean relationship[7] (Fig. 1)

$$F_f^2 = F_0^2 + F_s^2 \tag{1}$$

and on the timeless speed[4]

$$u_a = \frac{u}{C_0} = sin\omega = \frac{F_s}{F_f}. \tag{2}$$

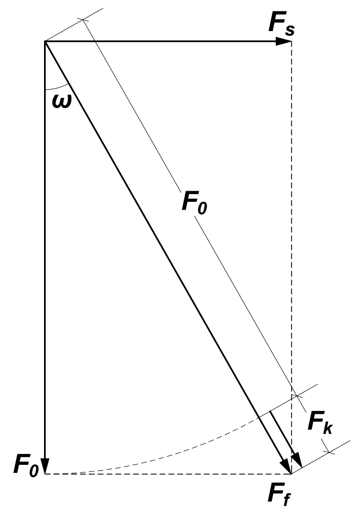

Figure 1. Kinetic force $F_k = F_f - F_0$, Pythagorean relationship $F_f^2 = F_0^2 + F_s^2$ and timeless speed $u_a = u/C_0 = sin\omega = F_s/F_f$.

The Work executed by a particle, which traveled a distance x from the Universe center to our region, is[8]

$$W = \frac{\pi a^3 P_{0p} x^8}{3R_0^2}. \tag{3}$$

This Work is converted into kinetic energy[9]

$$E_k = \frac{2\pi a^3 d_m u^2 x^6}{3}, \tag{4}$$

where $d_m = m/V$ the constant mass density of space,[10] u the centrifugal speed of the particle, m its mass and V its volume. So, due to $W = E_k$ (Eqs 3 and 4), $d_m = m/V$ and $E_k = mu^2/2$, it is

$$d_m u^2 = \frac{P_{0p}x^2}{2R_0^2} \Rightarrow \frac{2mu^2}{2V} = \frac{P_{0p}x^2}{2R_0^2} \Rightarrow \frac{2E_k}{V} = \frac{P_{0p}x^2}{2R_0^2} \Rightarrow E_k = \frac{P_{0p}Vx^2}{4R_0^2} \tag{5}$$

and by putting[11] $P_{0p}/R_0^2 = P_{0x}/x^2$, the Eq. (5) becomes

$$E_k = \frac{P_{0x}V}{4}. \tag{6}$$

The dynamic energy of the particle[12] is

$$E = P_{0x}V \Rightarrow E = \frac{4P_{0x}V}{4} \tag{7}$$

and the final energy E_f, due to Eqs (6) and (7), will then be

$$E_f = E + E_k \Rightarrow E_f = \frac{5P_{0x}V}{4}. \tag{8}$$

However, energy is the possibility of the force shift, so, due to Eq.(8), we have

$$E_f = F_f x = \frac{5P_{0x}V}{4} \Rightarrow F_f = \frac{5P_{0x}V}{4x}, \tag{9}$$

resulting from the shift of final force F_f. Also, dynamic energy is the possibility of the shift of gravity force F_0,[13] so, due to Eq.(7), it is

$$E = F_0 x = \frac{4P_{0x}V}{4} \Rightarrow F_0 = \frac{4P_{0x}V}{4x} \tag{10}$$

and the Pythagorean relationship (Fig. 1) of the forces F_f and F_0 (Eq. 1), due to Eqs (9) and (10), becomes

$$F_s^2 = F_f^2 - F_0^2 = (\frac{5P_{0x}V}{4x})^2 - (\frac{4P_{0x}V}{4x})^2 \Rightarrow F_s^2 = (\frac{3P_{0x}V}{4x})^2 \tag{11}$$

and

$$F_s = \frac{3P_{0x}V}{4x}. \tag{12}$$

Therefore, by replacing forces F_f (Eq. 9) and F_s (Eq. 12) in Eq. (2), we find

$$u_a = \frac{F_s}{F_f} = \frac{3P_{0x}V/4x}{5P_{0x}V/4x} = \frac{3}{5} \Rightarrow u_a = 0,6. \tag{13}$$

From Eq. (11), we have

$$(\frac{5P_{0x}V}{4x})^2 - (\frac{4P_{0x}V}{4x})^2 = (\frac{3P_{0x}V}{4x})^2 \tag{14}$$

and by simplifying, it is

$$5^2 - 4^2 = 3^2, \tag{15}$$

where 3, 4, 5 is the smallest Pythagorean Triple. So, at the Universal antigravity motion the harmony of the Pythagorean numbers is revealed, whom with the unique phenomena of Nature, namely matter and motion, are expressed.

We, therefore, conclude that all galaxies have the same constant timeless speed $u_a = 0,6$ (Eq. 13) in their Universal centrifugal motion. The time speed (Eq. 2) is then

$$u = u_a C_0 \Rightarrow u = 0,6C_0 \tag{16}$$

and thus the speeds u and C_0 are uniformly increased at the accelerated centrifugal motion of the galaxy towards the Universe periphery.

The Universal antigravity force is very weak,[2] as it is exerted on the small volume of the particle core vacuum[6] (vacuum bubble) by a very small difference ΔP[2] of cohesive pressure. However, the results of the antigravity force, although they evolve at a slow pace, are grand in the Universe. Indeed, our galaxy is moving towards the Universe periphery at the inconceivable speed (Eq. 16)

$$u = u_a C_0 = 0,6 \cdot 3 \cdot 10^8 m/sec \Rightarrow u = 180.000 km/sec, \tag{17}$$

resulting from the constant timeless speed $u_a = 0,6$ (Eq. 13), with which the Cosmic journey of galaxies takes place, at the centrifugal motion of antigravity. It is noted that the light speed shall be considered as constant ($C_0 = 3 \cdot 10^8$m/sec) in region of our galaxy.

2. Distance x and time t of the Cosmic journey of our galaxy

The distance x of our region from the Universe center is calculated according to Hubble's Law[3]

$$u = Hx \Rightarrow x = \frac{u}{H} \tag{18}$$

and by substituting $u = 0,6 \cdot 3 \cdot 10^8$m/sec (Eq. 17) and[14] $H = 1,6 \cdot 10^{-18}$sec^{-1} in Eq. 18, we find

$$x = \frac{u}{H} = \frac{0,6 \cdot 3 \cdot 10^8}{1,6 \cdot 10^{-18}} m \Rightarrow x = 1,125 \cdot 10^{26} m, \tag{19}$$

namely it is $x \approx 11,25$ billion light years.

Also, according to Hubble's Law $u = Hx$ (Eq. 18) and for $u = dx/dt$, we have

$$\frac{dx}{dt} = Hx \Rightarrow \int_0^x \frac{dx}{x} = \int_0^t Hdt \Rightarrow lnx = Ht \Rightarrow t = \frac{lnx}{H} \tag{20}$$

and by substituting $x = 1,125 \cdot 10^{26}$m (Eq. 19) and $H = 1,6 \cdot 10^{-18}$sec^{-1} in Eq. 20, we find

$$t = \frac{lnx}{H} = \frac{ln1,125 \cdot 10^{26}}{1,6 \cdot 10^{-18}} sec \Rightarrow t = 37,4893 \cdot 10^{18} sec, \tag{21}$$

namely the time of the Cosmic journey of our galaxy is $t \approx 1.190$ billion years.

3. References.

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