Theoretical proof of Hubble’s Law

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Abstract

On a previous paper (see http://viXra.org/abs/1410.0040) it is described the first Nature force (the Universal antigravity), because of which the galaxies follow an accelerated centrifugal motion. Therefore, what the great astronomer Edwin Hubble observed is not due to the Universe «expansion» as a result of the «Big Bang», but it is the relative motion of galaxies.

The Cosmic journey of the matter (the galaxies) takes place at the constant timeless speed (see http://viXra.org/abs/1507.0079) towards the Universe periphery, while the numbers 3, 4 and 5 express the Pythagorean harmony of matter and centrifugal antigravity motion.
1. Hubble’s Law

On a previous paper (see http://viXra.org/abs/1410.0040) it is described the structure of the isotropic space of infinite dimensions by the electrically opposite elementary units (in short: units) and, also, it is described the spherical deformation of this isotropic space as a dynamic space of finite dimensions, the Universe. The cubic cell is the elementary volume or the space quantum, structured by the electric dipoles (figure 1). It is obvious that this spherical deformity of space has distorted the cell-cubes. So, the electric dipoles lengthen more, away from the Universe center to its periphery, with result the development of stronger cohesive forces. This is because the force of the electric dipole \( F=kL_0 \) is proportional to the dipole length \( L_0 \) between the units. Therefore, the cohesive pressure \( P_0 \), developed by forces of the electric dipoles, is altered and increasing from the center to the Universe periphery, the same way that the distance \( L_0 \) of the units is increasing. In our region the force \( F \) of the electric dipole is measured at the amazing value (see previous link) \( F=F_0=0.242\cdot10^{43} N \) and is, of course, the cause of the space cohesiveness.

![Figure 1: The cubic cell as an elementary volume-quantum of isotropic space, which has the form of infinite-dimensional cubic grid](image)

Using the mechanical analog of a maximum circle of Universe section and by studying the dynamics of the elastic stretched circular membrane, the cohesive pressure \( P_0 \), of a place at a distance \( x \) from the Universe center with a constant radius \( R_0 \) is calculated, as a
function of the constant cohesive pressure $P_0 p$ at the Universe periphery, that is $P_{0x}=P_0 x^2/R_0^2$ (see http://viXra.org/abs/1602.0220).

The previous formula $P_{0x}=P_0 x^2/R_0^2$ originates from $f_{0x}=F_0 x^2/R_0^2$, where $f_{0x}=kL_{0x}$ is the electric dipole force at a distance $x$ from the Universe center of constant radius $R_0$ and $F_{0p}$ the constant force of the electric dipole on the Universe periphery, so $kL_{0x}=F_0 x^2/R_0^2$ that is $L_{0x}=F_0 x^2/kR_0^2$.

The gravity force $F_0$ of the particle-neutron (figure 2) balances the attractive forces of the space cohesive pressure $P_0$. Therefore it is $F_0=4\pi r^2 P_0$, so the dynamic energy of the particle-neutron is $E=F_0 L_0=P_0 V=P_0 4\pi r^3/3=(4\pi r^2 P_0) r/3=F_0 r/3 \Rightarrow L_0=r/3$, where $r=3L_0$ is the radius of the neutron core vacuum.

\[ \text{Figure 2: Indicative presentation of the vacuum spherical formation} \quad (F_0=4\pi r^2 P_0, \text{ where } F_0 \text{ the bubble force, } P_0 \text{ the space cohesive pressure, } 4\pi r^2 \text{ the bubble surface area and } r \text{ is its radius}) \]

Consequently, the quantum dipole length $L_0$ ($L_{0x}=F_0 x^2/kR_0^2$) of the cell edge is proportional to the square of distance $x$ from the Universe center, and hence radius $r$ ($r=3L_0$) of the particle core vacuum (figure 3) is also proportional to $x^2 \Rightarrow r=r_x=\alpha x^2$, wherein $\alpha$ is a constant ratio. If $V=4\pi r^3/3$ is the spherical volume of the bubble, then
\[ V=4\pi\alpha^2 x^6/3 \quad (1) \]
Figure 3: The buoyancy in the dynamic space creates the antigravity force $F_a = 2xVP_0p/R_0^2$, which causes the accelerated Universe expansion and has a direction towards the greater cohesive pressure $P_5$ and towards the Universe periphery ($P_1 < P_2 < P_3 < P_4 < P_5$, $F_a = V\Delta P/\Delta x$, $\Delta P = P_5 - P_1$, $V$ is the bubble vacuum volume and $\Delta x$ is the bubble vacuum diameter).

Substituting $V$ from (1) at the Universal antigravity force $F = F_a = 2xVP_0p/R_0^2$ (see previous link) we have $F = F_a = 8\pi\alpha^3x^3P_0p/3R_0^2$, so Work accomplished until position $x$ is $W = \int_0^x Fdx = \int_0^x f(8\pi\alpha^3P_0p/3R_0^2)x^7 dx = (8\pi\alpha^3P_0p/3R_0^2)x^8/8 \Rightarrow W = \pi\alpha^3P_0p/3R_0^2$ (2), which is converted into kinetic energy $E_k = mu^2/2$, where $m = Vd_m$, $d_m$ the constant mass density of space and $u$ the centrifugal speed of a galaxy (figure 4), i.e. $E_k = Vd_mu^2/2$ and substituting $V$ from (1), it is $E_k = 2\pi\alpha^3x^6d_mu^2/3$ (3) and equating (3) and (2), it is $u = \beta x$.

In figure 4, $A$ is our galaxy, while $B$ is a galaxy moving away (observed by Edwin Hubble). The centrifugal speed $u_1$ of galaxy $A$ is $u_1 = \beta x_1$ and of galaxy $B$ is $u_2 = \beta x_2$. Hubble observed galaxy $B$ moving away with relative speed $u_r = u_2 - u_1 \Rightarrow u_r = u_2 \cos\theta_2 - u_1 \cos\theta_1 \Rightarrow u_r = \beta x_2 \cos\theta_2 - \beta x_1 \cos\theta_1 \Rightarrow u_r = \beta (O'B) - \beta (O'A) \Rightarrow u_r = \beta (AB) \Rightarrow u = \beta (AB) = \frac{P_0p}{2R_0^2d_m} (AB)$, which is identical with the empirical Hubble’s formula, that he concluded by observing the shift of the spectral lines towards the red in the galaxies spectrum and so $H = \frac{P_0p}{2R_0^2d_m}$ is the Universal Hubble’s constant. Using the approximate values $P_0p \approx 10^{151} N/m^2$, $R_0 \approx 10^{26} m$ and $d_m \approx 10^{134} Kg/m^3$ (see previous link), we verify the size class of the Hubble’s constant $H \approx 10^{-18} sec^{-1}$. 

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Figure 4: In the relative motion of galaxies A and B as Universe «expansion» (A is our own galaxy, B is the galaxy observed by Hubble, $P_1$ is the cohesive pressure in our region, $P_2$ is the cohesive pressure in B galaxy region and $x_1$ and $x_2$ are the galaxy distances from the Universe center $O$).
2. Cosmic journey of matter – Numbers 3, 4 and 5 expressing the Pythagorean harmony of matter and centrifugal antigravity motion

On link of paragraph 1 it is described the Genesis of matter in the Universe center, where the primordial neutron is created, i.e. the first particle that typically participates at the creation of our galaxy. Cosmic journey shall be considered the interval (the distance \( x \)), typically traveled by this neutron from the Universe center until our region. The time \( t \) of this Cosmic journey is also calculated.

Calculation of distance \( x \) of a region from the Universe center and of time \( t \) of the Cosmic journey is based on the Pythagorean relationship \( F^2 = F_0^2 + F_s^2 \) (figure 5) and on the timeless speed \( u = u/C_0 = \sin \omega = F/F_\tau \) (see http://viXra.org/abs/1507.0079). The Work executed by a particle, which traveled a distance \( x \) from the Universe center (see link in paragraph 1) until our region is \( W = \pi \alpha^3 P_0 x^5/3 R_0^2 \) (see formula 2 in paragraph 1). This Work is converted into kinetic energy \( E_k = 2\pi \alpha^3 x^6 d_m u^2/3 \) (see formula 3, paragraph 1), where \( d_m = m/V \) the constant mass density of space, \( u \) the centrifugal speed of the particle, \( m \) its mass and \( V \) its volume. So, it is \( 2\pi \alpha^3 x^6 d_m u^2/3 = \pi \alpha^3 P_0 x^5/3 R_0^2 \Rightarrow d_m u^2 = P_0 x^5/2 R_0^2 \Rightarrow 2\mu^2/2V = P_0 x^5/2 R_0^2 \) and putting \( E_k = \mu^2/2 \) it is \( E_k = P_0 Vx^2/4 R_0^2 \) and, also, putting \( P_0 / R_0^2 = P_0 / x^2 \) (see paragraph 1), it is \( E_k = P_0 V/4 \). The potential energy of the particle is \( E = P_0 V \Rightarrow E = 4P_0 V/4 \) and the final energy will be then \( E_f = E + E_k \Rightarrow E_f = 5P_0 V/4 \).

\[
\text{Figure 5: Kinetic force } F_x = F_\tau F_0 \text{ Pythagorean relationship } F^2 = F_0^2 + F_s^2 \text{ and timeless speed } u = u/C_0 = \sin \omega = F/F_\tau
\]

However, energy is the possibility of the force shift, so the \( E_f = F_x x = 5P_0 V/4 \Rightarrow F_x = 5P_0 V/4x \) resulting from the shift of final force \( F_\tau \) and the \( E = F_0 x = 4P_0 V/4 \Rightarrow F_0 = 4P_0 V/4x \) from the gravity force \( F_0 \), so the Pythagorean relationship of the forces \( F_\tau \) and \( F_0 \) becomes \( F_\tau^2 = F^2 - F_0^2 \Rightarrow F_\tau^2 = (5P_0 V/4x)^2 - (4P_0 V/4x)^2 = (3P_0 V/4x)^2 \). Therefore, the accumulated force \( F_\tau \) (corresponding to accumulated energy \( E_\tau = 3P_0 V/4 \)) is \( F_\tau = 3P_0 V/4x \), as follows from the Pythagorean relationship. Hence, replacing the forces \( F_\tau = 3P_0 V/4x \) and \( F_0 = 5P_0 V/4x \) in the formula \( u = \sin \omega = F/F_\tau \) we find \( u = (3P_0 V/4x)/(5P_0 V/4x) = 3/5 \Rightarrow u = 0.6 \).
We, therefore, conclude that all galaxies have the same constant timeless speed }u_\alpha=0.6\text{ in their Universal centrifugal motion. The time speed is then }u=u_\alpha C_0, \text{ i.e. } u=0.6C_0 \text{ and thus the speeds } u \text{ and } C_0 \text{ are uniformly increased at the accelerated centrifugal motion of a galaxy towards the Universe periphery.}

The Universal antigravity force is very weak, as it is exerted upon the small volume of the particle core vacuum (vacuum bubble) and also as the cohesive pressure difference } \Delta P \text{ (see link in paragraph 1) is very small. The results of the antigravity force, however, 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 } u=u_\alpha C_0=0.6\cdot3\cdot10^8=180,000\text{ km/sec, resulting from the constant timeless speed } u_\alpha=u/C_0=0.6, \text{ with which the Cosmic journey of all galaxies takes place at their centrifugal antigravity motion.}

Therefore, according to Hubble’s Law }u=Hx \Rightarrow x=u/H \text{ (see paragraph 1) and for } u=0.6C_0, \ C_0=3\cdot10^8\text{ m/sec and } H=1.6\cdot10^{-18}\text{ sec}^{-1}, \text{ distance } x \text{ of our region from the Universe center is } x=\frac{u}{H}=0.6C_0/1.125\cdot10^{26}\text{ m, i.e. } x=11.25\text{ billion light years.}

According to Hubble’s Law } u=Hx \text{ and for } u=dx/dt \Rightarrow dx/dt=Hx \Rightarrow \int dx/x=\int Hdt \Rightarrow \ln x=Ht \Rightarrow t=(\ln x)/H \text{ is the time of the Cosmic journey and } t=(\ln 1.125\cdot10^{26})/1.6\cdot10^{-18}=37,4893\cdot10^{18}\text{ sec, i.e. it is } t=1190\text{ billion years.}

Finally, simplifying the above formula } (5P_0\cdot V/4x)^2-(4P_0\cdot V/4x)^2=(3P_0\cdot V/4x)^2 \text{, it is } 5^2-4^2=3^2 \text{ where 3, 4 and 5 are the minimum side lengths of the right triangle. So, at the Universal antigravity motion it is revealed the harmony of the Pythagorean numbers, with whom the unique phenomena of Nature, namely matter and motion, are expressed.
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