The Real Linear and Rotational Velocity of the Universe and Its Radius

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Abstract

Astronomers always study and calculate the velocities in the universe and they are looking for the values of these velocities in the universe, but they have never been able to get a real value for them. In this paper we are going to calculate the real linear and rotational velocity of the universe and its radius.
At the beginning of the Big Bang, the universe expanded more quickly and then reached a relative equilibrium and then the objects are moving at their specific velocity relative to their distance from the center of the universe. We are going to find real velocity of the universe by assuming the universe is spherical. We will write the equation for velocity of any celestial object in the universe, which consists of two parts: a rotational part and a linear part. The value of the linear part can be obtained by using the energy released in the Big Bang moment, and its rotating part can also be obtained from Hubble's law. We will also use the linear velocity to calculate the real radius of the universe.

1.Introduction

Telescopes are always showing the acceleration of celestial objects, which is cosmic acceleration. These observations prove Hubble's experimental law, which shows that the farther away a galaxy is from Earth, the faster it moves away. Edwin Hubble, in 1929 found that all galaxies are moving away from us. In fact, he demonstrated that the universe with all galaxies was expanding and moving away from each other [1-6]. In June 2016, NASA and ESA scientists reported that the universe was found to be expanding 5% to 9% faster than thought earlier, based on studies using the Hubble Space Telescope [7-12]. In this paper, we have focused on universal expansion from the Big Bang moment up to the present.
In this paper, we have mathematically derived Hubble's experimental law. By deriving this law, we proved that the universe has two motions: linear motion and rotational motion. The linear motion due to the expansion of the universe is due to the energy remaining from the Big Bang, and in rotational motion due to the absence of external force in the rotational motion, the angular velocity must also be constant. Since the angular velocity is constant, the only variable factor that affects the tangential velocity is the radius. This means that the linear motion increases the radius and in rotational motion at a constant angular velocity, the tangential velocity increases.

2.Methods

Considering that the universe was created from the Big Bang phenomenon and the Big Bang is an explosive process, it can be said that the universe continues to expand after the formation of stars, and the galaxies move away from each other. According to the motions of the universe which includes the rotational motion that is proved by Hubble's law and that of linear which is a motion with negative acceleration, the equations of motion can be written for the universe.
On the other hand, we have calculated the initial energy released from the Big Bang explosion by Monte Carlo technique in previous articles, and the amounts of 10^{110} joules was obtained. Some of this energy is used for creation of the galaxies and stars, which have a mass of about 10^{53} kg, and the amount of initial energy is reduced. So, it can be said that the linear velocity of the world decreases with the passage of time and reaches zero at the end, and when the amount of linear energy becomes zero, the rotational energy achieves its maximum.

a) Specifications and features of the forward path:

The rotational motion starts from the first moment of Big Bang and at the point where linear velocity "v" is equal to zero (return point), the rotational velocity reaches the maximum value (according to the law of conservation of energy that states the total energy of a system remains constant). Now the following relations can be written:

Linear Motion

$v_{L_{max}} = 0 \quad , \quad v_{L_0} = ?$

$E_{Tot} = 10^{110} j$

$y = \frac{1}{2}at^2 + v_0 t + y_0$

$v_L = at + v_{L_0}$

$E_{Tot} = \frac{1}{2} m_{Tot} {v_{L_0}}^2 \Rightarrow 10^{110} = \frac{1}{2} \times 10^{53} \times {v_{L_0}}^2$

$\Rightarrow v_{L_0} = 4.4 \times 10^{28}\ m/s$

Rotational Motion

$\left.\begin{matrix} v_r = \omega r \\ v_H = HD \end{matrix}\right\} \quad \omega = H = Const \quad \left\{\begin{matrix} v_r = \omega r \\ y = r \end{matrix}\right.$

$M_{Tot} = 10^{53}\ kg$

$\omega = H = 2.22 \times 10^{-18}\ 1/s$

$E_{Tot} = \frac{1}{2} m r^2 \omega^2 \Rightarrow 10^{110} = \frac{1}{2} \times 10^{53} \times r_{max}^2 \times (2.22 \times 10^{-18})^2$

$\Rightarrow r_{max} = 2 \times 10^{46}\ m$

$v_r = \omega r \Rightarrow v_{r_{max}} = 2.22 \times 10^{-18} \times 2 \times 10^{46}$

$\Rightarrow v_{r_{max}} = 4.4 \times 10^{28}\ m/s$

$$v_L = at + v_{L_0} \Rightarrow 0 = at + 4.4 \times 10^{28} \Rightarrow t = \frac{4.4 \times 10^{28}}{-a} \quad (1)$$

$$r = y = \frac{1}{2}at^2 + v_0 t + y_0 \xrightarrow{(1)\ ,\ y_0 = 0} 2 \times 10^{46} = \frac{1}{2} a \left(\frac{4.4 \times 10^{28}}{-a}\right)^2 + 4.4 \times 10^{28} \times \left(\frac{4.4 \times 10^{28}}{-a}\right) + 0 \Rightarrow a = -4.84 \times 10^{10}\ m/s^2 \quad (2)$$

$$\xrightarrow{(1),(2)} t = 9.09 \times 10^{17}\ s \approx 29 \times 10^9\ yr$$

Linear Motion	Rotational motion
$y_{max} \approx 2 \times 10^{46}\ m$	$r_{r_{max}} \approx 2 \times 10^{46}\ m$
$t \approx 9.09 \times 10^{17}\ s$	$t \approx 9.09 \times 10^{17}\ s$
$v_{L_0} \approx 4.4 \times 10^{28}\ m/s$	$v_{r_0} \approx 0\ m/s$
$v_{L_{max}} \approx 0$	$v_{r_{max}} \approx 4.4 \times 10^{28}\ m/s$
$a \approx 4.84 \times 10^{10}\ m/s^2$	

The above table is the result of all the rotational and linear motions of the universe, and it means that in the next fourteen billion years the universe will come to a standstill (in terms of linear velocity).
In fact, we can say that the amount of energy and velocity of the linear motion have tended to zero, and that those of rotational motion will reach the maximum value.
Let us now see what the image of the Milky Way will look like after 14 billion years:
Knowing the swallow rate of the Milky Way black hole (the number of stars that swallow per billion years) and taking into account that 6 billion years have passed since the age of our galaxy and the black hole in the center of the Milky Way has swallowed about a few percent of the stars, we can predict that after 14 billion years the Milky Way will be as it is today and that only a few of its stars will be swallowed. Thus, the central black hole will grow only a little more.
Therefore, at the end of the expansion of the universe, only about 10% of the stars in the galaxy will disappear or be swallowed by the black hole, and there will be no particular change in the shape of the galaxies. So it can be said that at the end of the expansion, in 28 billion years, the universe will neither heat nor cool, but will have a return point to the initial point of the Big Bang.

b) Specifications and features of the return path:

Considering that after 28 billion years from the beginning of the Big Bang, the universe reaches a point of stagnation or a point where its linear velocity becomes zero and the rotational motion reaches its maximum, the structure of the remaining 14 billion years of galaxies until the end of 28 billion years is that the structure of galaxies will not change much (the number of black holes will increase)
To calculate the return time, the following relations can be suggested:

$$a_T = \frac{-v^2}{r} \Rightarrow a' = \frac{-{v_{r_{max}}}^2}{r_{max}} \Rightarrow a' = \frac{-(4.4 \times 10^{28})^2}{2 \times 10^{46}} \Rightarrow a' = -9.68 \times 10^{10}\ m/s^2$$

$$x = \frac{1}{2}at^2 + v_0 t + x_0 \Rightarrow r = \frac{1}{2}a'(t')^2 + v_{L_{max}} \times t' + r_{max} \Rightarrow 0 = \frac{1}{2}(-9.68 \times 10^{10})(t')^2 + (0 \times t') + (2 \times 10^{46})$$

$$\Rightarrow t' = 6.42 \times 10^{17} s \Rightarrow t' \approx 20 \times 10^9\ yr$$

3.Result

According to the above calculations, it can be said that the universe returns to its initial point approximately every 50 billion years. Like an unstuck spring that compresses again, or like a planet that revolves around the Sun and returns to its point of origin. The universe therefore has a back and forth motion that repeats itself every 50 billion years (Cycle period).

4.References

[1]Battersby S 2016 Dark energy: Staring into darkness Nature 537 S201-S4
[2]Mannheim P D 2019 Is dark matter fact or fantasy?—Clues from the data International Journal of Modern Physics D 28 1944022
[3]Roberts M S and Whitehurst R N 1975 The rotation curve and geometry of M31 at large galactocentric distances The Astrophysical Journal 201 327-46
[4]Rubin V C, Ford Jr W K and Thonnard N 1980 Rotational properties of 21 SC galaxies with a large range of luminosities and radii, from NGC 4605/R= 4kpc/to UGC 2885/R= 122 kpc The Astrophysical Journal 238 471-87
[5]Schaf J 2015 The Nature of Dark Matter and of Dark Energy Journal of Modern Physics 6 224
[6]Team N W S Tests of Big Bang: Expansion. National Aeronautics and Space Administration)
[7]Vimal R L P 2019 Dark Energy for expanding universe and Dark Matter for large rotational velocities of stars: extended Dual-Aspect Monism framework
[8]Hartle J B, Hawking S and Hertog T 2008 No-boundary measure of the universe Physical review letters 100 201301
[9]Saleh Gh, Faraji M J, Alizadeh R and Dalili A 2018 A New Explanation for the Color Variety of Photons MATEC Web of Conferences 186 01003
[10]Saleh Gh, Faraji M J, Alizadeh R and Dalili A 2018 THE SUPERSTRING THEORY AND THE SHAPE OF PROTONS AND ELECTRONS MATTER: International Journal of Science and Technology 4
[11]Saleh Gh, Alizadeh R and Dalili A 2020 WHY THE ELECTRON IS NEGATIVELY CHARGED AND THE PROTON POSITIVELY? MATTER: International Journal of Science and Technology 6
[12]Saleh Gh, Alizadeh R and Dalili A 2020 Presenting a New Theory about the Feasibility of Existence of Speed Faster than Light in Several Ways Bulletin of the American Physical Society