Everything About Dark Energy and Dark Matter and Their Equations in the Universe

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In conventional cosmological models, dark matter and dark energy are introduced as unknown components of the universe, which are the reasons for the stability of galactic structures and the accelerated expansion of the cosmos, respectively.

Dark Matter from the point of view of Saleh Theory

The Big Bang is a natural phenomenon in which, due to the collision of masses and particles and their subsequent explosion, an extremely large cloud comes into existence far from the central point. This immense cloud forms nebulae, which serve as the birthplace for future stars.

However, it is important to note that when cosmic inflation ends, particles begin to cluster together under the influence of magnetic forces and other gravitational forces. These clusters eventually form larger objects, such as moons, planets, stars, and so on.

It is notable that during the early inflationary period, when everything existed as gas and tiny particles, each particle in the universe's space was suspended, as gravitational effects from any specific point did not act upon it. In other words, inflation involved both linear and rotational movement, but no central force acted on these particles. Each particle remained suspended in infinite space, gradually combining with other suspended particles to form larger celestial objects.

In systems like galaxies that possess a central black hole, the black hole exerts a gravitational effect on the particles suspended in infinite space, which are not influenced by any external forces. In such systems, the central black hole can, with minimal force, hold the suspended particles-such as stars, planets, moons, and others-in orbit around itself.

If we consider the particles existing in the universe during the inflationary period, these are the same objects that later form stars or moons. In fact, it can be stated that dark matter is the result of particles being suspended in the infinite space during the inflationary period.

Dark Energy from the point of view of Saleh Theory

Within the framework of Saleh Theory, two fundamental types of motion have existed in the universe from the earliest moment of the Big Bang:

1- Linear motion – resulting from the initial explosion, which caused the universe's radius to increase.

2- Rotational motion – the rotation of the entire universe around a cosmic axis at a constant angular velocity.

Over time, as the universe's radius expanded the linear motion, which depended on the force from the Big Bang explosion, gradually decreased because, after the explosion, there was no longer a force to maintain or increase the linear velocity. In contrast, the rotational motion was not affected by any force, and its angular velocity remained constant. This stability in angular velocity caused the tangential velocity of objects to increase as the radius grew. In other words, a portion of the linear energy has been converted into rotational energy over time:

$$E_{linear} \downarrow \quad \& \quad E_{rotational} \uparrow$$

Since we measure the total velocity of galaxies minus our total velocity in cosmological observations, the linear components (which are approximately similar) cancel out, and only the difference in tangential velocities becomes apparent. This difference leads to the incorrect conclusion that the universe is undergoing an externally accelerated expansion and requires a mysterious energy called 'dark energy'. However, in reality, dark energy is nothing but the rotational energy that has existed since the beginning of the Big Bang and has not been accounted for in conventional calculations.

Now, we shall proceed to compute the dark energy of a galaxy with mass (m_1):

$$E_{D_1} = \frac{1}{2} m_1 {v_{r_G}}^2 = \frac{1}{2} m_1 (\omega r_1)^2$$

$$E_{D_1} = \frac{1}{2} m_1 \omega^2 {r_1}^2 = \frac{1}{2} m_1 \omega^2 (r_e + D)^2$$

Where (v_{r_G}) is the same tangential velocity of the galaxy, (D) is the distance of galaxy from Earth, and (r_e) is the distance of the Earth from the centre of the universe. Also, as we have proven before, the angular speed of our universe is constant and is equal to the Hubble constant ($\omega = H$), so the following equations can be written:

$$E_{D_1} = \frac{1}{2} m_1 H^2 {r_1}^2 = \frac{1}{2} m_1 H^2 (r_e + D)^2$$

to compute the total dark energy of all galaxies, we have:

$$E_{D_T} = \sum_{i=1}^{n} \frac{1}{2} m_i H^2 {r_i}^2(t)$$

$$\boxed{E_{D_T} = \sum_{i=1}^{n} \frac{1}{2} m_i H^2 (r_e + D_i)^2}$$

Although the distance of galaxies from the observer (D_i) can be ascertained for a number of galaxies, given that the precise distance of Earth (the Milky Way galaxy) from the universe's centre (r_e) remains unknown, we shall instead adopt a method for computing the magnitude of dark energy within the universe at any given instant. Assume the entirety of the universe comprises n galaxies of equal mass m, and for computational convenience, we consider all galaxies to be situated at half the distance from the universe's centre. Consequently, we have:

$$r_i = \frac{r}{2}$$

$$E_{D_T} = n\,E_{D_i} = n(\frac{1}{2}m_i H^2 {r_i}^2) = \frac{H^2 n m_i}{2}(\frac{r}{2})^2$$

$$n m_i = M_u$$

$$E_{D_T} = \frac{H^2 M_u}{8} r^2$$

$$K = \frac{H^2 M_u}{8} = 6.8 \times 10^{16}\, {}^{kg}/_{s^2}$$

$$\boldsymbol{E_{D_T} = K\, r^2}$$

This equation facilitates the calculation of the total dark energy of the universe at any given time, wherein (K) represents the “Saleh Dark Energy Constant” and (r) denotes the radius of the universe at any given time.

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