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THE ACCELERATED EXPANSION OF THE UNIVERSE MAY BE AN ILLUSION OF THE OBSERVER: THE HUBBLE CONSTANT IS CALCULATED FROM THE DENSITY OF SPACE IN THE UNIVERSE

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ABSTRACT: *Based on the principle of symmetry, this paper extends the general relativity's description of space's curvature and expansion to the conclusion that space has density. On this basis, the relation between the increment of spatial density and the spectral redshift of light propagating in space is deduced according to the conservation relation of space-time in special relativity. In addition, according to the description of the space structure of gravitational mass and charge in the material space theory. The increased space due to the existence of charge is calculated, and the relationship between the linear density of protons and the spectral redshift on the observation path is deduced. Finally, the relationship between the spectral redshift due to spatial density and the regression velocity of the galaxy is obtained：* $z = 5.8571144 * 10^{-12} NDP$. *Through calculation, the Hubble constant generated by the space density is (114.02793Km/s) /Mpc, which is basically consistent with the observed results. The results show that the observed acceleration expansion of the universe is an illusion caused by the spectral redshift due to the space density of the universe. The universe is not accelerating expansion.*

KEY WORDS: universe, Hubble constant, space density, accelerated expansion, spectral redshift

PREFACE

Hubble's law, a statement of physical cosmology, was first formulated in 1929 by Hubble and Milton after nearly a decade of observations, and is often cited as an important piece of evidence in favor of the big bang.[1] In 1929, Hubble published his classic paper on the expansion of the universe in PNAS (Proc. Natl. acad. Sci. USA 15168-173.).[2] The main result: "the distance of a galactic cloud is proportional to its redshift," a concept that has stuck in astronomers' minds ever since. When Hubble measured the Hubble constant H, it used Cepheid variables and the brightest stars in the galaxy to calibrate distances [3]. In 1952, Bard pointed out that the magnitude of the Cepheid variable star in Andromeda should change by 1.5, so the Hubble constant should be revised to H=260. In 1958 Sande pointed out that Hubble's brightest star was actually in the region of ionized hydrogen, so a magnitude correction of 1.8 was added to reduce the Hubble constant to H=75. In 1974-76, Sande and Taman revised the

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Hubble constant by using seven distance measures, resulting in H=55, which was only 1/10 of Hubble's current value.

Since 2018, scientists have published eight observations of the Hubble constant [4-11] based on observations from various telescopes, with an average value of (70.6±3.0) (km/s) /Mpc.

Hubble's law gives a model for the accelerating expansion of the universe, and for decades there has been a consensus that the universe is accelerating. However, the problem caused by the accelerated expansion of the universe is difficult to solve. The hypotheses of dark matter, dark energy and cosmic inflation have not been proved.

Can we doubt the observations about the expansion of the universe? Although our observations irrefutably confirm the accelerating expansion of the universe, have we ever wondered whether there is a problem with the spectral redshift on which we depend to determine the accelerating expansion of the universe? Spectral redshift is caused by the motion of the galaxy, is it possible that there are other causes of spectral redshift as well?

The material space theory [12] is the basic theory of the origin of matter put forward by the author. According to the cosmological model of the material space theory, our universe has already formed the existing scale at the starting time of about 10^{-8} seconds, and the current expansion is very small, so there is no accelerated expansion.According to general relativity, space can be curved and expanded. According to the principle of symmetry, since space can be expanded and curved, space has elasticity and compressibility. Therefore, space has density.The authors suggest that it is the density of space that creates the redshift in the spectra of distant galaxies, creating the illusion that the universe is expanding at an accelerating rate.

Relationship between galactic regression velocity and spatial density

The material space theory adheres to the principle of "local existence" and agrees that the universe satisfies the conservation of space and time at any time. Therefore, in the relation of space and time, the material space theory is consistent with the theory of special relativity.

Special relativity satisfies the invariance of space-time interval, therefore, the following formula is valid:

$$\triangle x_1^2 + \triangle x_2^2 + \triangle x_3^2 - c^2 \triangle t^2 = \triangle x'^2_1 + \triangle x'^2_2 + \triangle x'^2_3 - c^2 \triangle t'^2 \cdots\cdots\cdots\cdots\cdots 1$$

For any dimension, it can be simplified as:

$$\triangle x^2 - c^2 \triangle t^2 = \triangle x'^2 - c^2 \triangle t'^2 \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots 2$$

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When x and x' adopt the same geometric metric, and the spatial density of x is b, and the spatial density of x' is b', the above equation can be rewritten as:

$$b^2 \triangle x^2 - c^2 \triangle t^2 = b'^2 \triangle x'^2 - c^2 \triangle t'^2 \cdots\cdots 3$$

When the space interval is the same, the following can be obtained:

$$\triangle t^2 - \triangle t'^2 = (\mathrm{b}^2 - b'^2)\frac{\Delta x^2}{c^2} \cdots\cdots 4$$

The density of vacuum is 1, finishing available:

$$\triangle t^2 - \triangle t'^2 = (\mathrm{b}^2 - 1)\frac{\Delta x^2}{c^2} \cdots\cdots 5$$

For light waves, the time interval is the reciprocal of frequency ν, and the space interval is the wavelength λ:

$$\frac{1}{\nu^2} - \frac{1}{\nu'^2} = (\mathrm{b}^2 - 1)\frac{\lambda^2}{c^2} = (\mathrm{b}^2 - 1)\frac{1}{\nu'^2}$$

$$\frac{\nu'}{\nu} = \mathrm{b} \cdots\cdots 6$$

Let: b_0 be the increment of spatial density:

$$\frac{\nu'}{\nu} = b_0 + 1$$

$$\frac{\nu' - \nu}{\nu} = b_0 = z \cdots\cdots 7$$

z is the spectral redshift.

Relationship between spectral redshift and velocity:

$$1 + z = (1 + \frac{v}{C})\gamma \cdots\cdots 8$$

Where: $\gamma = 1/\sqrt{1 - \frac{v^2}{c^2}}$ at low speed, $\gamma = 1/\sqrt{1 - \frac{v^2}{c^2}} \approx 1$

$$v \approx \mathrm{z}C = b_0 C \cdots\cdots 9$$

v is the rate at which the galaxy regresses.

The calculation of the density of space

According to the description of the material space theory, the gravitational mass is a four-dimensional space volume projected as a sphere in three-dimensional space. The gravitational mass is defined as a four-dimensional mass. The calculation formula of the gravitational mass is as follows:

$${}_0^4M = \frac{4}{3} \cdot \pi \cdot \mathrm{C} \cdot b_0^3 {\mathrm{a}_0}^3 \cdots\cdots 10$$

$$b_0 = \sqrt[3]{\frac{3\,{}_0^4M}{4\pi C {\mathrm{a}_0}^3}}$$

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Where: b_0 is the density of the three-dimensional space of the proton, and a_0 is the radius of the three-dimensional sphere of the proton. It is known that the radius of the proton is $8.4087*10^{-16}$m, and its mass is $1.6726216378*10^{-27}$kg. Substituting the radius and mass of the proton, the space density of the proton can be calculated as: b_0=1308.48. The proton contains a charge, and the density of the charge of the proton is b_0=1308.48.

According to the description of the material space theory, charge is a cylindrical volume surrounded by a three-dimensional spiral curve, and charge is defined as a three-dimensional mass. The calculation formula of charge is as follows:

$$_0^3M = 2\pi^2 F b_0^2 a_0^3 = \frac{1}{2.48140196} 2\pi^2 C b_0^2 a_0^2 \cdots\cdots 11$$

Where, b_0 is the density of the space in two dimensions of the proton charge helix plane, and a_0 is the radius of the proton charge helix. The radius of the cylindrical spiral with calculable charge is: $a_0=8.4087*10^{-16}$m.

Therefore, the volume of cylindrical helix is:

$$\mathrm{V} = 2\pi^2 a_0^3 = 1.17359146 * 10^{-44} m^3$$

Since the space of charge has density, the space volume of charge increase is:

$$b_0^2 \mathrm{V} = b_0^2 1.173591463 * 10^{-44} m^3 = 2.0093293 * 10^{-38} m^3$$

The length of each dimension of the three-dimensional space of the increased charge is:

$$\sqrt[3]{2.0093293 * 10^{-38}} = 5.8571144 * 10^{-12} m$$

The average mass density of the known universe is 65.7658 protons /m3. Assuming that the universe is a standard sphere, the linear density of the universe in any direction is 2.504016 protons /m.

According to formula 7, the redshift of galaxies in the universe can be expressed in the following formula:

$$z = 5.8571144 * 10^{-12} NDP \cdots\cdots 12$$

N ～ the number of protons per unit length in the observation path, in units: 1 /m.

D ～ the spatial distance between the observed object and the observer, unit: m.

P ～ the probability that light meets a proton per unit length.

The rate at which galaxies recede

According to equation 7, it can be calculated as follows:

Due to the change of space density caused by the charge of protons in the universe, the resulting spectral redshift is:

$$z = 2.504016 * 5.8571144 * 10^{-12} m = 1.4666308 * 10^{-11}/m$$

In three-dimensional space, at the length of 1m, the probability of an electromagnetic wave meeting a proton is a geometric probability, which can be calculated as follows:

$$P = \frac{8.4087 * 10^{-16}}{1} = 8.4087 * 10^{-16}$$

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Therefore, the redshift generated by the spectrum of 1Mpc distance in the universe can be calculated as:

$$z = 8.4087 * 10^{-16} * 1.4666308 * 10^{-11} * 3.0841882 * 10^{22}$$
$$= 3.80356227 * 10^{-4}$$

According to equation 9, the expansion velocity of the universe generated by redshift can be calculated as:

$$v \approx \mathrm{zC} = （114.02793Km/s）/\mathrm{Mpc}$$

CONCLUSION

Hubble's law describes the phenomenon of the accelerated expansion of the universe, causing great confusion for people, scientists have to find a variety of reasons to explain the phenomenon of the accelerated expansion of the universe, Whether it is dark matter, dark energy, or cosmic inflation theory, there is no causal support.

After nearly a hundred years of research, we have not found dark matter and dark energy, we have to doubt the possibility of the existence of dark matter and dark energy. The concept of space density in the universe proposed by t the material space theory conforms to the symmetry principle of space properties. Based on this concept and the principle of space-time conservation, we calculate the value of spectral redshift caused by space density, and thus calculate the observed regression velocity of nebulae in the universe.

The calculated results are in good agreement with the observed values, which indicates that the observed results of the accelerated expansion of the universe are an illusion caused by the spectral redshift caused by the density of the universe space, and the universe is not accelerating expansion.

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