Three Methods for Calculating Dark Energy and Dark Matter

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Abstract In this study, the ratio of dark energy to dark matter was calculated from the following three methods: 1) Cosmological constant and Hubble constant, 2) Integration of four forces, and 3) Z boson and H boson. In all three, the ratio of dark energy was equally calculated as 72.92%. The amount of ordinary matter does not affect this calculation. This means that the universe is a 4D sphere.

1. Introduction

In this study, three methods for calculating the ratio of dark energy and dark matter are introduced.

2. Cosmological constant and Hubble constant

2.1 Hubble constant

The age of the universe is calculated from Hubble constant and is given as 13.787 billion years from 2018 Planck data.

2.2 Cosmological constant

The cosmological constant Λ is currently presented as 1.1056E-52/m2. The value of 1 / c$\sqrt{\Lambda}$ is 1 / 2.9979E8 / 60 / 60 / 24 / 365.24 / $\sqrt{}$1.1056E-52 = 10.053 billion years.

2.3 Ratio of dark energy 72.92%

10.053 billion years over 13.787 billion years is 72.92%. This value is the ratio of not energy but time.

3. Integration of four forces

3.1 Proton radius

In physics, the proton radius from hydrogen was measured as 0.8751 $\pm$ 0.0061 fm, and the proton radius from muonic hydrogen was measured as 0.8414 $\pm$ 0.0019 fm. Since the force is in its natural state, the proton radius in its natural state is 0.8751 fm. The 0.8414 fm is the radius of the artificial state with the force removed.

3.2 Weak force coupling constant

Assume the following formula: Weak force coupling constant f_w $\times$ Hydrogen radius 52.92 pm = 8π $\times$ Electromagnetic force coupling constant 1 / 137.036 $\times$ Proton radius 0.8751 fm. Therefore, the weak force coupling constant f_w is calculated as 1.0109E-6.

3.3 Integration of four forces

As shown in Fig. 1(a), weak force w is placed in 4D, electromagnetic force e is placed in 5D, and strong force s is placed in 6D. Plotting the parabolic equation on them, 2.2645E-39 is calculated in 0D. Since gravitational force is 5.9061E-39, the ratio is calculated as 2.6081. The value of 2.6081 / (2.6081 + 1) is calculated as 72.28%.

In previous study [Table 1 of pp. 28 in Ref. 1], From electron 510.999 keV, muon 105.658 MeV, tau 1.77686 GeV, the dimension of space was calculated as 6.00108. Therefore, applying this value, it is calculated as 72.92% in Fig. 1(b).

3.4 Ratio of dark energy 72.92%

In Fig. 1(b), 2.6922 means dark energy, and 1 means dark matter. That is, the time from 10.053 billion years to 13.787 billion years is 1, and the time from 0 years to 10.053 billion years is 2.6922. Here, the amount of ordinary matter is not taken in above calculation.

4. Z boson and H boson

4.1 W boson and Z boson

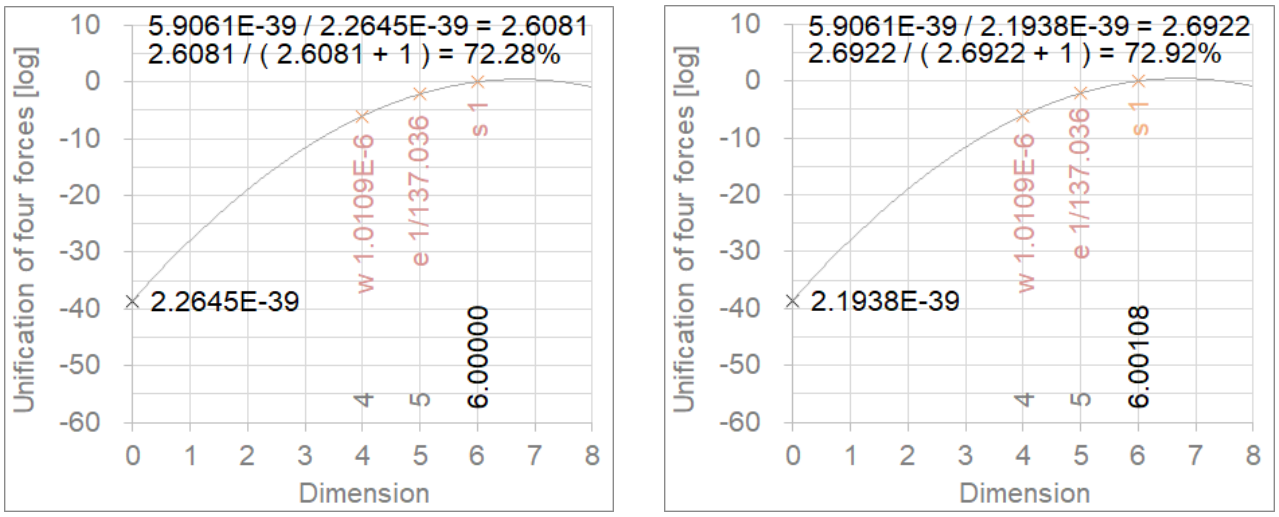
In physics, each average masses of W boson and Z boson were measured as 80.379 GeV and 91.1876 GeV.

4.2 H boson

In Fig. 2(a), when the log W boson is located on 4D, and the log Z boson is located on 5D, its parabola is shown, and from the inverse parabola on the 6.00000D value, its vertex is calculated as 125.00 GeV. In Fig. 2(b) of 6.00108D, the value is calculated as 125.05 GeV.

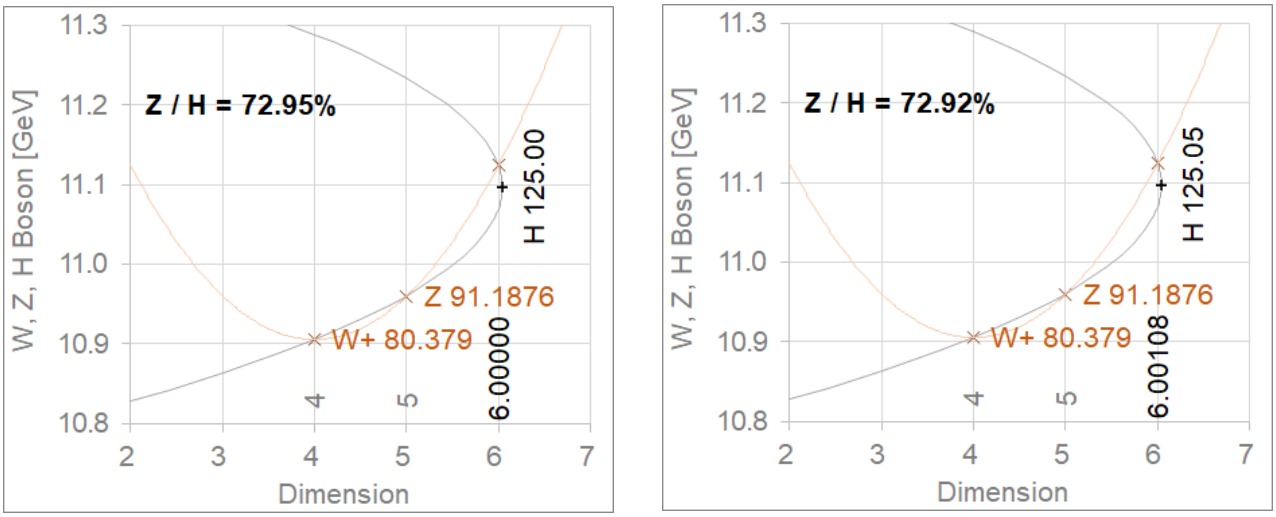
4.3 Ratio of dark energy 72.92%

In Fig. 2(b), the ratio of Z boson to H boson is calculated as 72.92%. Z boson is connected to cosmological constant



(a) at 6.00000D (b) at 6.00108D

Fig. 1 Integration of four forces



(a) at 6.00000D (b) at 6.00108D

Fig. 2 Relation of Z boson and H boson

time and H boson is connected to Hubble constant time.

5. Change of universe

5.1 Shape of universe

The amount of ordinary matter has no effect on the shape of overall universe. For this to happen, the shape of the universe must be a 4D sphere.

5.2 Universal fine-tuning

Cosmological constant time is an exact constant, and Hubble time continues to increase. Therefore, as time passes, dark energy ratio decreases, and dark matter ratio increases. That is, everything changes with the passage of time. Here, since the absolute speed of expansion toward the 4D direction of XYZ space is the absolute speed of light, the speed of light does not change. This is the universal fine-tuning. What is it which fine-tunes the universe such as above?

6. Conclusions

In three calculations, the ratio of dark energy and dark matter was calculated as 72.28% : 27.72%. These values represent the ratio of cosmological constant time and Hubble constant time. There is something in 4D direction of our universe.

References

[1] D. Kim, 2021, Theory of Everything and Logarithmic Elliptic Equation, https://vixra.org/abs/2110.0023