Calculation of Neutrino and Gravino Masses by Q-theory

Deokjin Kim

EnTEs Institute, Korea. E-mail: entes@outlook.kr *April 29, 2021*

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Abstract Gravino is a word coined by author and means graviton, photon, and gluon. The fundamental particles of everything are three generations of neutrinos and gravinos, and logarithmic elliptic equation is established at them. Everything is divided into kinetic state and steady state. In kinetic state, the mass of electron neutrino was calculated as 0.1531 eV, and that of graviton, photon, and gluon were calculated as 2.495E-10 eV, 0.1600 eV, and 114.6 eV. In steady state, the masses of electron, muon, and tau neutrinos were calculated as 0.1384 eV, 166.0 keV, and 15.52 MeV, and that of graviton, photon, and gluon were calculated as 2.760E-10 eV, 0.1638 eV, and 114.5 eV.

1. Introduction

In previous studies, the mass of H boson was calculated easily from logarithmic parabolic equation relationship of W boson and Z boson[1], the characteristics of logarithmic elliptic equation and the principle of cosmological change were described[2], and from the masses of electron, muon, and tau, the dimension of our space was calculated as 6.00108.

The analysis of our universe is divided into kinetic state and steady state. The kinetic state is applied to four major forces, the steady state is applied to particles, and the combined state is applied to the change of our universe.

The purpose of this study is to calculate the masses of three generation neutrinos (electron, muon, and tau) and three generation gravinos (graviton, photon, and gluon) by applying logarithmic elliptic equation.

2. Analysis of kinetic state

2.1 Measured mass of muon and tau neutrinos

The minimum values of muon and tau neutrinos were measured as 170 keV and 15.5 MeV. The measured values are the neutrino masses for kinetic state. As the results of author's overall calculation, the minimum value is the exact mass of neutrino, and the mass not 18.2 MeV but 15.5 MeV of tau neutrino is right. The measured values are given with 3 significant digits. If given with 4 digits, more accurate calculation results can be obtained.

2.2 Standard masses of neutrinos

In previous study[2], the characteristics of logarithmic elliptic equation were described in detail. Given four constants, elliptic equation is calculated. In Fig. 1(a), the muon neutrino mass is 170 keV on 5D, the tau neutrino mass is 15.5 MeV on 6.00108D, the left vertex is 0D, and the top vertex is 6.00108D. From these four constants, the neutrino masses are calculated as shown in Fig. 1(a).

As the result of calculation, the mass of electron neutrino is 0.1531 eV on 4D. Here, the meanings of numbers and letters shown in Fig. 1(a) were described in previous study[2].

2.3 Oscillating masses of neutrinos

From the above calculation, Fig. 1(b) is also correct answer. That is, there are two answers, and this is the neutrino oscillation phenomenon[3]. This is a characteristics of quantum space, and neutrino jumps between the dimensions of quantum space. The standard masses of neutrinos are electron α_n^4 0.1531 eV, muon β_n^5 170 keV, and tau γ_n^6 15.5 MeV, and the others are oscillating masses.

In (a), selecting the 0.1531 eV on 4D and 15.50 MeV on 6.00108D, (c) also is correct answer. In (a), selecting the 0.1531 eV on 4D and 170 keV on 5D, (d) also is correct answer. That is, all values in Fig. 1 are correct answers.

In previous study[3], the dimension of our space was calculated as 6.00108. However, our space can be exactly 6D. In this case, the mass of electron neutrino is calculated as 0.1501 eV. As described in previous study[3], the correct answer of above two will be judged from the measurements of the H boson mass and the cosmological constant.

2.4 Standard masses of gravinos

In previous study[3], the logarithmic sum mass of neutrino and gravino was calculated as follows:

$$\alpha_{ng}^4 = \alpha_n^4 + \alpha_g^4 = -10.418 \quad (1)$$

$$\beta_{ng}^5 = \beta_n^5 + \beta_g^5 = 4.435 \quad (2)$$

$$\gamma_{ng}^6 = \gamma_n^6 + \gamma_g^6 = 9.250 \quad (3)$$

From above equations, the standard masses of gravinos are calculated as graviton α_g^4 2.495E-10 eV, photon β_g^5 0.1600 eV, and gluon γ_g^6 114.6 eV. The results are shown in Fig. 2(a).

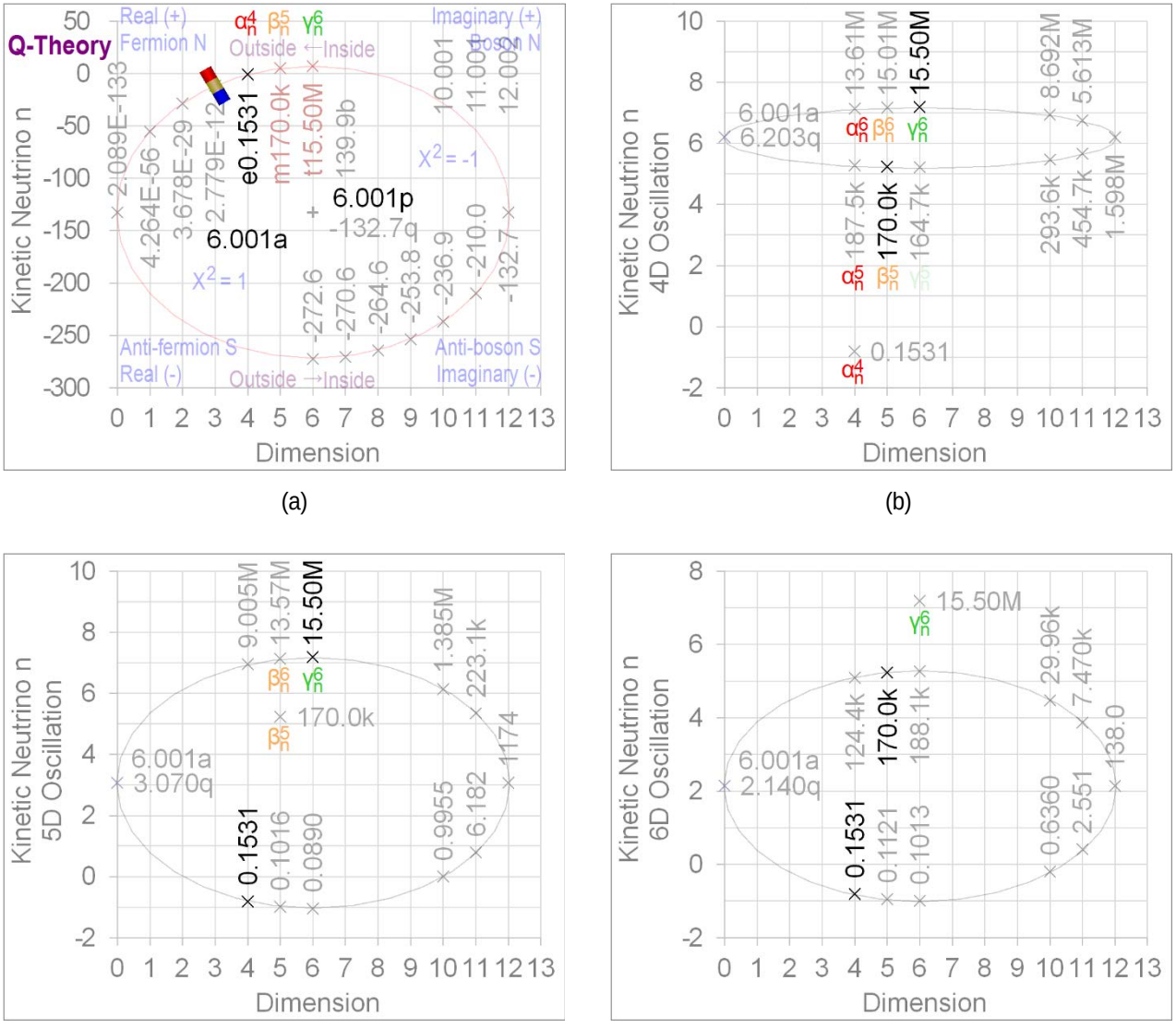


Fig. 1 The masses of neutrinos in kinetic state

2.5 Oscillating masses of gravinos

By the same logic such as Fig. 1(b-d), the gravino oscillation phenomena in Fig. 2(b-d) are calculated.

3. Analysis of steady state

3.1 Priority mass of muon and tau neutrinos

The measured neutrinos are in kinetic state going straight at almost the speed of light. However, the neutrinos that make up particles such as quarks are in steady state. The masses of the two types are different. The steady state neutrino mass is calculated from top and bottom quarks. The calculation process will be described in detail in future study. As the result of the calculation, the muon and tau neutrino masses were calculated as 166.0 keV and 15.52 MeV.

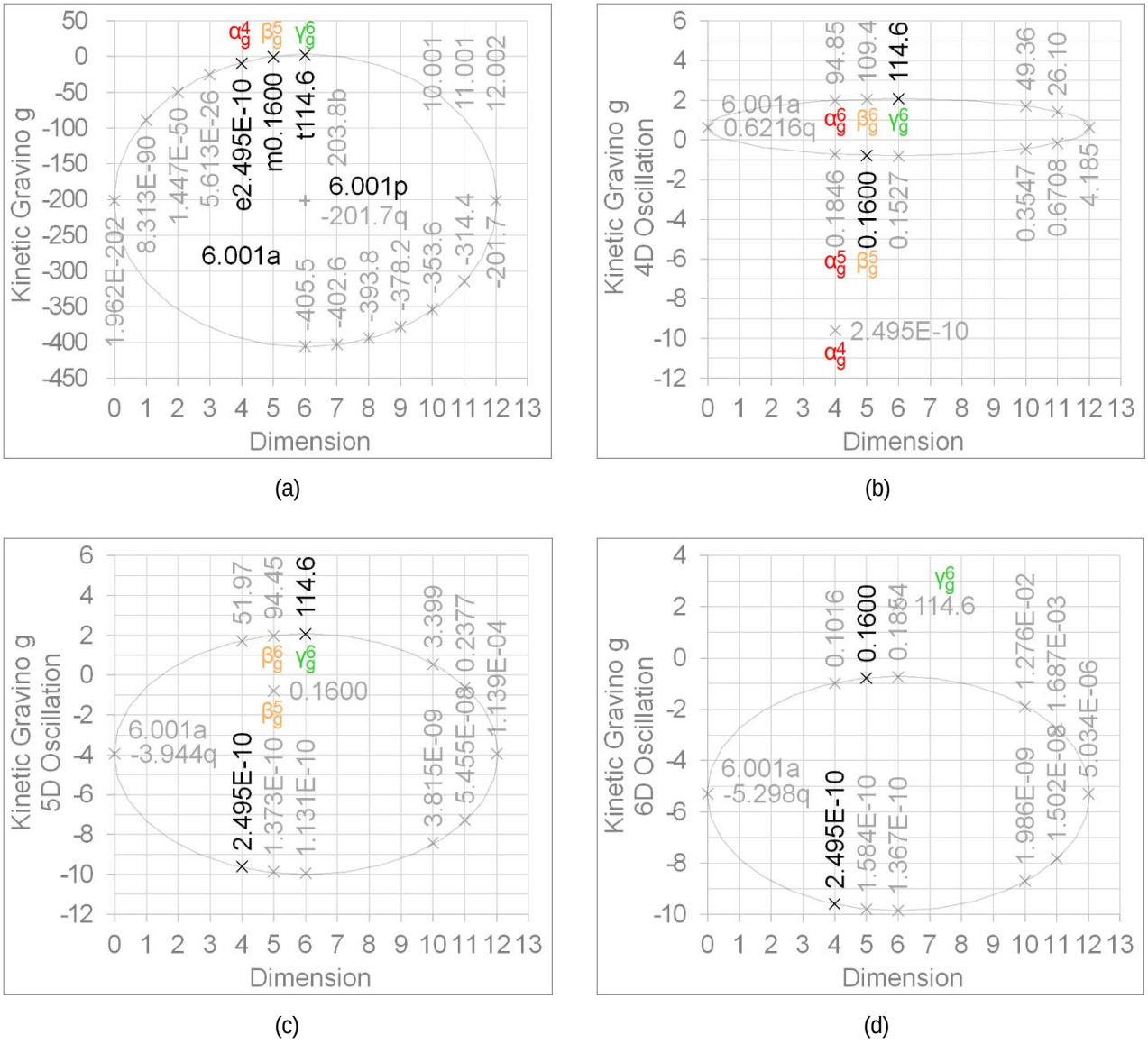
3.2 Standard masses of neutrinos

Given four constants, elliptic equation is calculated. In Fig. 3(a), the muon neutrino mass is 166.0 keV on 5D, the tau neutrino mass is 15.52 MeV on 6.00108D, the left vertex is 0D, and the top vertex is 6.00108D. From these four constants, the neutrino masses are calculated as shown in Fig. 3(a). As the result of calculation, the mass of electron neutrino is 0.1384 eV on 4D.

3.3 Oscillating masses of neutrinos

The calculation and analysis are the same as in Fig. 1. From Fig. 3(a), the neutrino oscillation masses in (b-d) are calculated.

3.4 Standard masses of gravinos



(a) (b)

(c) (d)

Fig. 2 The masses of gravinos in kinetic state

If the masses in Fig. 3(a) are applied to Eq. (1-3), the standard gravino masses in Fig. 4(a) are calculated.

3.5 Oscillating masses of gravinos

By the same logic such as Fig. 3, the gravino oscillation phenomena in Fig. 4(b-d) are calculated.

4. Combination of kinetic and steady states

4.1 Electron, muon, and tau

Electron, muon, and tau are particles[3] in steady state. Therefore, The Eq. (1-3) is the equation for calculating the steady state mass. The Fig. (4) in steady state is correct. The Fig. (2) in kinetic state was also calculated from Eq. (1-3), and it is strange. However, as the result of author's overall calculation, this is also correct.

4.2 Combination of kinetic and steady

The sum of kinetic state and steady state may be determined to be a constant such as following equation:

$$\text{Kinetic} \cdot 1/\xi + \text{Steady} \cdot (\xi - 1)/\xi = \text{Constant} \qquad (4)$$

Where, ξ is dark energy calculated by kinetic state, and the value is $10^{0.4301}$ (=2.692) by author's calculation. Since the quantum space is compressed logarithmically, the exponent of 0.4301 is important.

Therefore, at electron, muon, and tau[3], when the perfect kinetic neutrino values in Fig. 1(a) are substituted to Eq. (1-3), the perfect kinetic gravino values in Fig. 2(a) are calculated, and when the perfect steady neutrino values in Fig. 3(a)

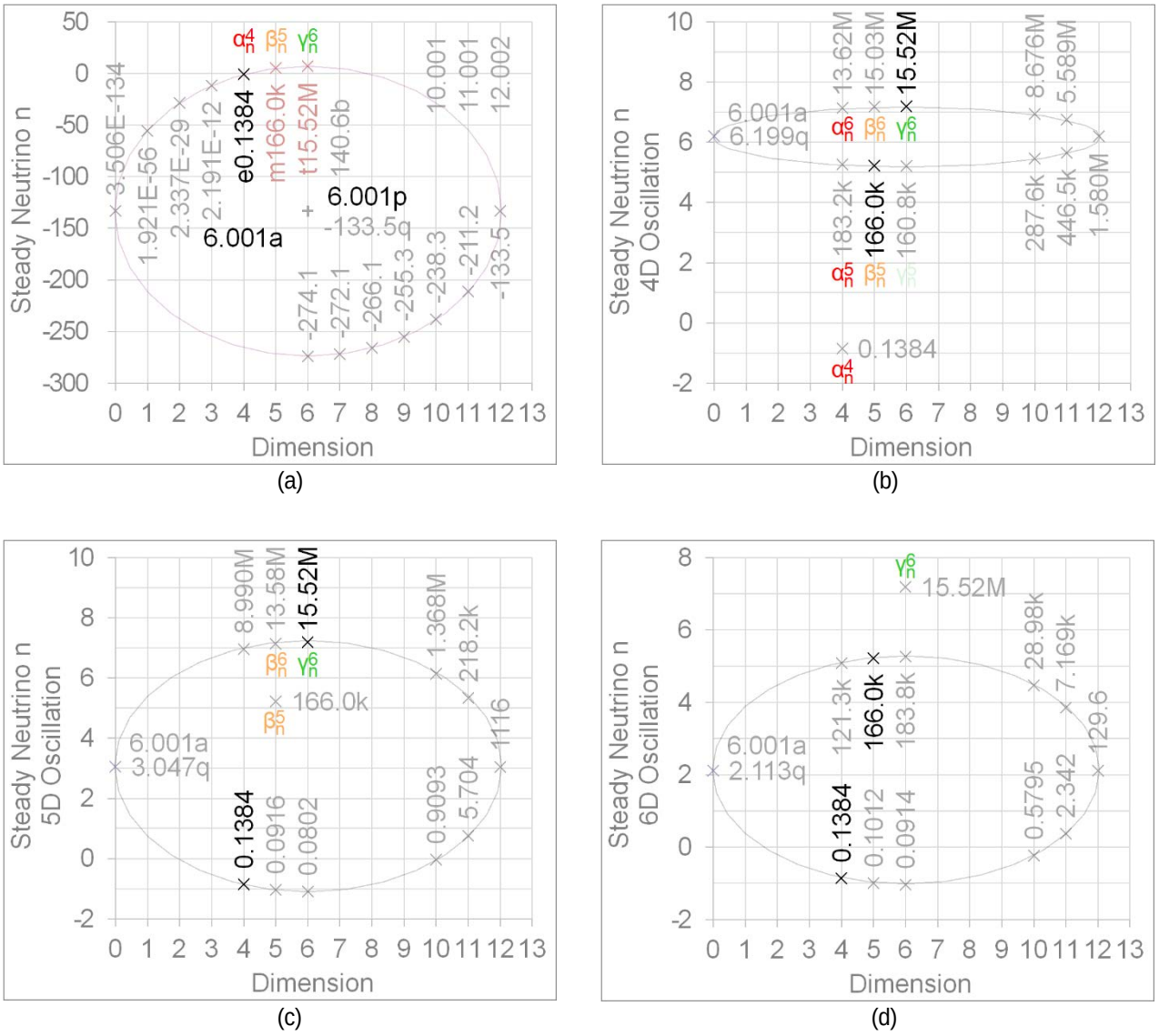


Fig. 3 The masses of neutrinos in steady state

are substituted to Eq. (1-3), the perfect steady gravino values in Fig. 4(a) are calculated.

4.3 Four major forces for kinetic state

The exponent 0 means that there is no quantization. Since the value of ξ is 1, the analysis target becomes the kinetic state moving as the speed of light by Eq. (4).

When four major forces are analyzed as kinetic state, author's overall calculation fits very well.

4.4 Force speed = Light speed

Four major forces are in the kinetic state, and the speed of forces is equal with the light speed. Also, the force is caused by gravino. Electron, muon, and tau have gravino. Therefore, when they react with four major forces, their gravino has the speed of light.

4.5 Particles for steady state

The exponent ∞ means that there is a perfect quantization. Since the value of ξ is ∞, the analysis target becomes the steady state in the fixed quantum space by Eq. (4).

When there is no reaction with force, all particles are in steady state.

4.6 Universe change for the combined state

Our universe expands at a very fast speed, so it has kinetic state. In addition, in previous study[3], our universe was calculated as a quantum particle like hydrogen in steady state. That is, the state of our universe is the combination of kinetic state and steady state. When analyzing universal change,

Fig. 4 The masses of gravinos in steady state

the combined state of Eq. (4) must be applied. And the value of ξ calculated by author is 2.692. This value is similar to the ratio of dark energy about 70% and dark matter about 26%.

4.7 Expansion speed of universe

Author judges that universe expands at a constant velocity. When ξ is 1, the speed is 2.998E8 m/s, and when ξ is ∞, the speed is 0 m/s. Since the ξ by author's calculation is 2.692, the expansion speed of universe may be 2.998E8 / 2.692 = 1.114E8 m/s. Here, it is not the speed at the end of universe but the speed in a 4D direction that we cannot understand.

5. Conclusions

The measured values for muon and tau neutrinos are 170 keV and 15.5 MeV. Applying logarithmic elliptic equation to that values, the mass of electron neutrino is calculated as 0.1531 eV. The accuracy of this value will be proven by experiment in the distant future.

The standard masses and oscillating masses of three generation neutrinos and three generation gravinos were calculated. The masses of all particles were calculated as the logarithmic combination of the neutrinos and gravinos.

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