Standard Model and Six-Dimensional Space

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November 26, 2021

Keywords: Elementary particle, Particle physics, Standard model

Abstract The standard model of particle physics is divided into three generation particles. Applying the parabolic equation to the logarithmic values of particles, a special rule is found. From the three generation of neutrinos, it is calculated that space is six-dimensions.

1. Introduction

The purpose of this paper is to identify the logarithmic characteristics of three generation particles.

2. Particles in physics

2.1 The biggest problem

There are many problems that the standard model of particle physics has not yet solved. The biggest problem among them is that there are too many particles that cannot be understood.

2.2 Proton mass calculation problem

Proton is a combination particle composed of two up quarks, one down quark, a strong force, and an electromagnetic force. We learned this in high school. However, even if supercomputer calculates one year, proton mass is not accurately calculated. Most of particles in physics are in this situation.

2.3 What is the problem?

The total number of particles in physics is about 100. It is necessary to find the fundamental particles from the 100 numbers. However, the problem has not been solved. If the problem is solved, why hasn't the proton mass been calculated yet?

2.4 Logarithmic trend of three generation particles

From Fig. 1 to 10, the trends of three generation particles are shown. The most important is the three generation of neutrinos in Fig. 1. Why does the logarithmic trend peak at about 5.98? Would there be a fourth-generation particle in that trend? It is very easily understood from Fig. 1 that the answer is because our space is six dimensional. As such, all particles in physics will have three generation trends. The core is to calculate the mass of particle logarithmically.

3. Three Generation Particles

3.1 Logarithmic parabolic equation

In Fig. 1, the logarithmic values of three generation neutrinos are shown, and the vertex of parabolic equation is 5.98. Here, the electron neutrino 0.15 eV is a predicted value. It is determined that fourth-generation neutrino does not exist.

3.2 Logarithmic elliptic equation

In Fig. 2, applying the elliptic equation to the logarithmic values of neutrino, the space is calculated as 6 dimensions. The exact value is 6.00108 in Table 3.1 of Ref. [1].

3.3 Cosmological constant problem

The ratio of 2.613E-12 eV on 3D to 1.163E-133 eV on 0D is calculated as 10^-121.4, which is almost similar to the value of cosmological constant problem 10^-121.5. That is, Planck constant is the value on 0D, and cosmological constant is the value on 3D. The difference between 0D and 3D is 10^-121.5.

3.4 Three generation forces

In Fig. 3, the coupling constant of three generation forces are shown. The vertex is also calculated as 6.74, which is a little larger than 6. This means that they are combination particles. The exact value of weak force is 1.0109E-6 in Fig. 5.1 of Ref. [1].

3.5 Gravity

In Fig. 3, the value on 0D is calculated as 1.9E-39. Applying the weak force of 1.0109E-6, the value is calculated as 2.194E-39 in Fig. 5.1 of Ref. [1].

3.6 Dark energy and Dark matter

In Fig. 3, multiplying the dark energy and dark matter ratio

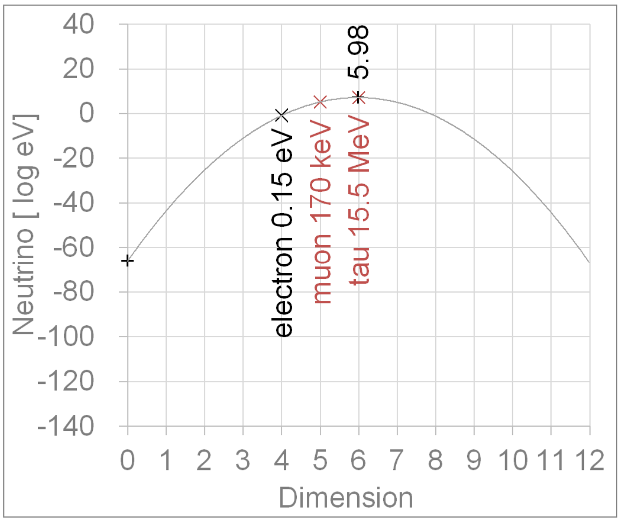

Fig. 1 Neutrinos

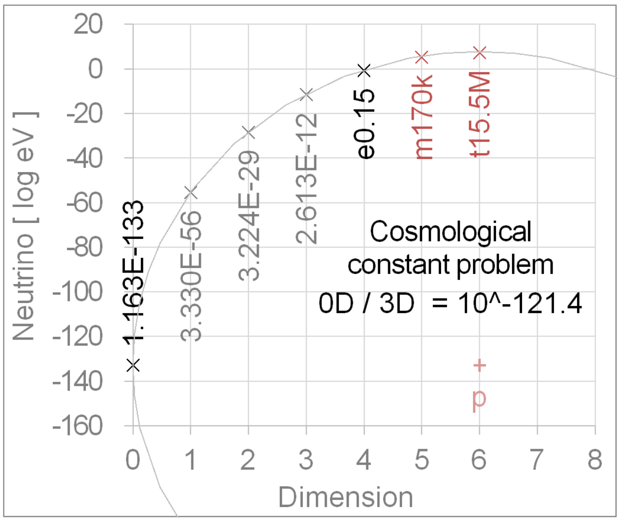

Fig. 2 Logarithmic elliptic equation

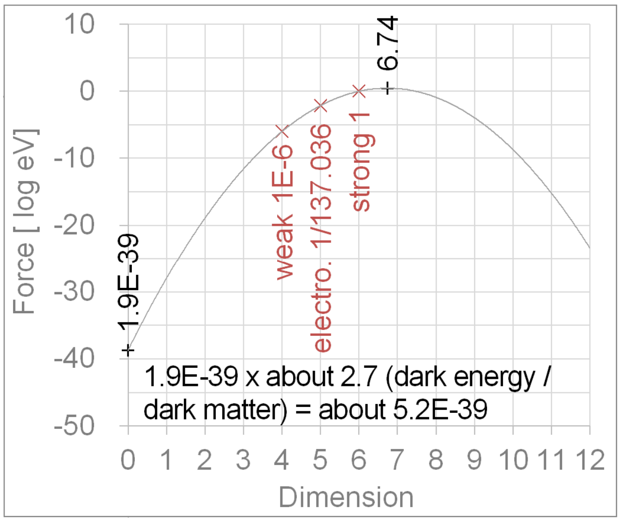

Fig. 3 Forces

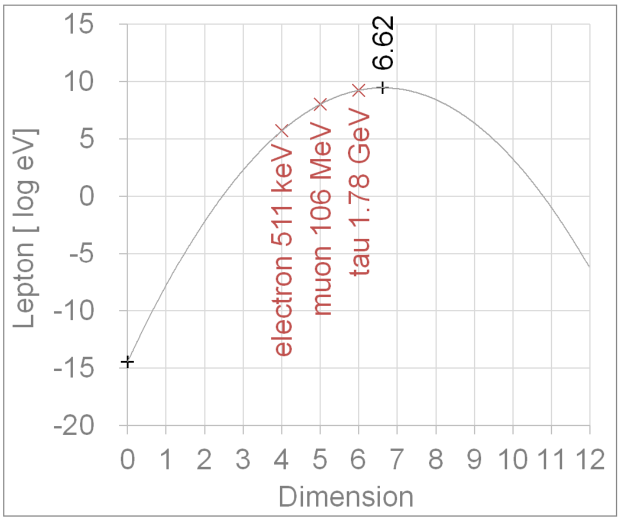

Fig. 4 Electron, Muon, Tau

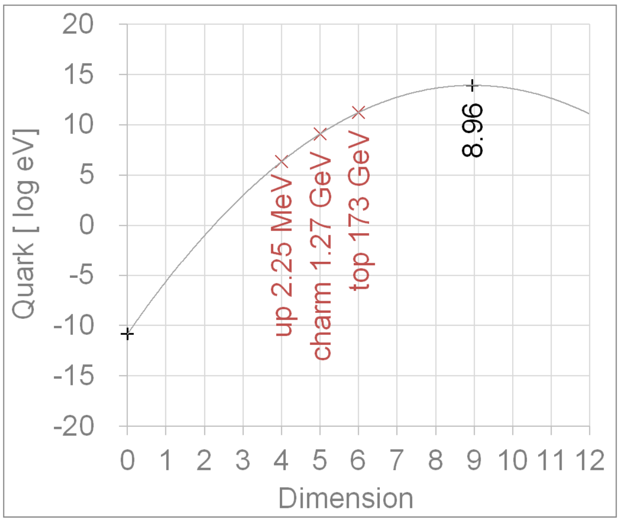

Fig. 5 Up, Charm, Top

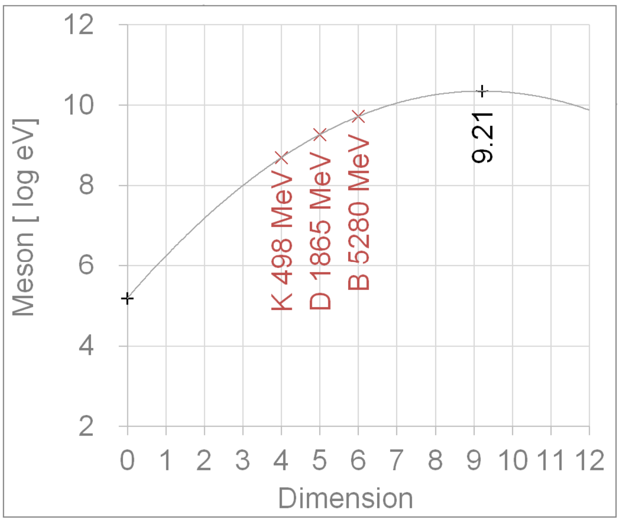

Fig. 6 K, D, B

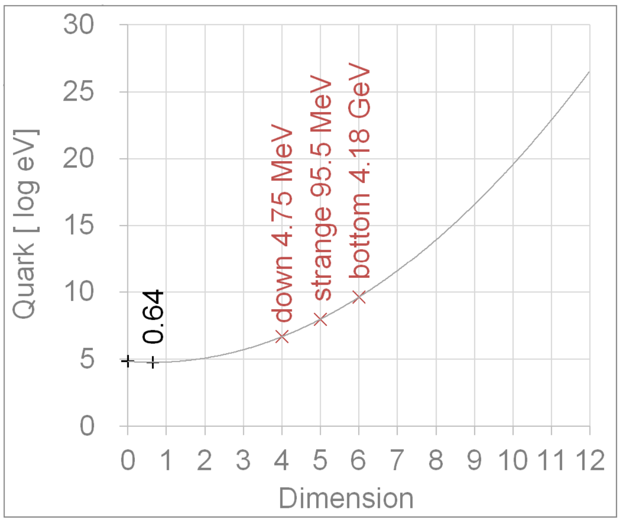

Fig. 7 Down, Strange, Bottom

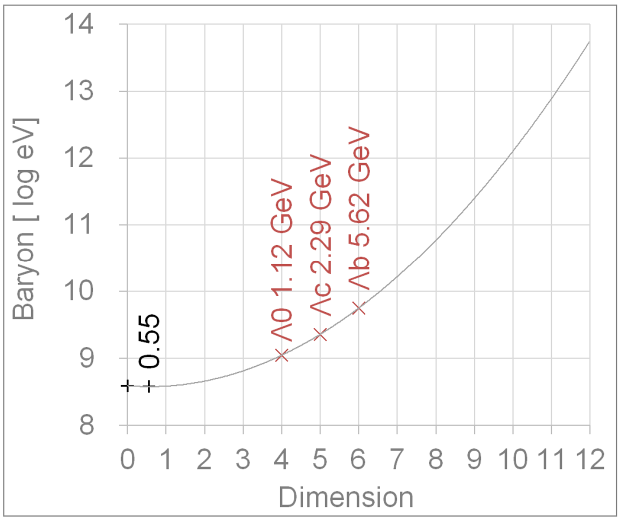

Fig. 8 Λ0, Λc, Λb

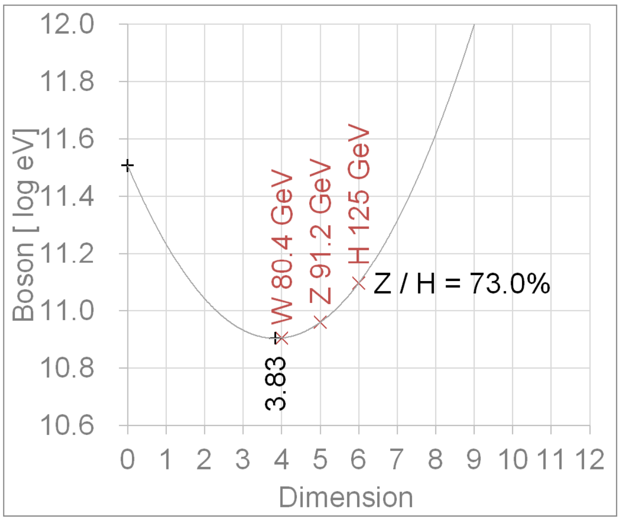

Fig. 9 W, Z, H

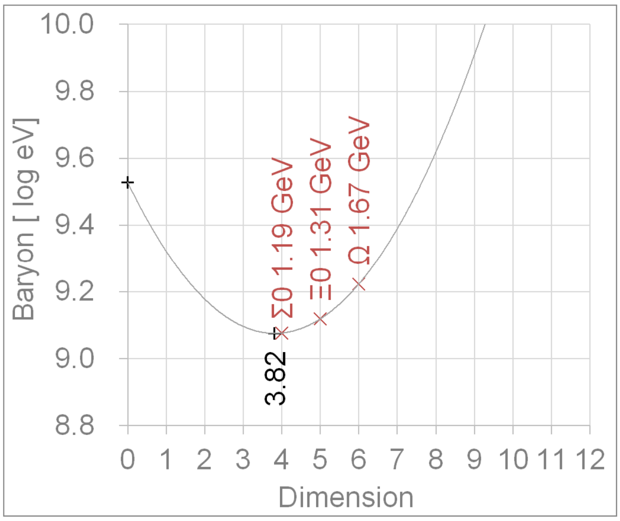

Fig. 10 Σ0, Ξ0, Ω

of about 2.7 by 1.9E-39, the value is calculated as about 5.2E-39. The value of 2.194E-39 multiplied by 2.7 is 5.9E-39. This is equal to the exact value 5.906E-39 of gravitational coupling constant.

3.7 Electron, Muon, Tau

In Fig. 4, the vertex is calculated as 6.62, which is a little larger than 6. This means that they are combination particles.

3.8 Up, Charm, Top

In Fig. 5, the vertex is calculated as about 8.96, which is much larger than the vertex of Figs. 1 ~ 4. This means that the combination has been done twice.

3.9 K, D, B

In Fig. 6, the vertex is calculated as 9.21, which is similar to Fig. 5. This may be a coincidence, but there may be some characteristics.

3.10 Down, Strange, Bottom

In Fig. 7, the vertex is calculated as about 0.64. The trend is completely different from Fig. 5. Down, strange, and bottom are particle, and up, charm, and top are antiparticle.

3.11 Λ0, Λc, Λb

In Fig. 8, the vertex is similar to Fig. 7. This may be a coincidence, but there may be some characteristics.

3.12 W, Z, H

In Fig. 9, the W, Z, and H bosons are of the same series in Fig. 1.2 of Ref. [1]. The vertex is calculated as 3.83. The ratio of Z 91.1876 GeV to H 125 GeV is 0.7295. The ratios of dark energy, dark matter, and ordinary matter are 69.36%, 25.80%, and 4.84% (Planck 2015 Results). Here, the value of 69.36% / (69.36% + 25.80%) is 0.7289. If the above two values are equal with each other, the mass of H boson is calculated as 125.11 GeV. Currently, the global average of H boson is 125.10 GeV.

ΛCDM model suggests the Hubble constant of about 67.7 km/s/Mpc. Multiplying that value by 72.89% and dividing by 69.36%, the Hubble constant is calculated as 71.1 km/s/Mpc, and the age of the universe is calculated as 13.7 billion years.

It is understood that the amount of ordinary matter has no effect on the universe.

3.13 Σ0, Ξ0, Ω

In Fig. 10, the vertex is calculated as 3.82, which is almost the same as Fig. 9.

4. Conclusions

The trends presented in this study may be coincidental. However, they explain why particles have three generations. All particles of standard model will be divided into three generations such as in this study.

The combination of quantum masses is logarithmic addition, not arithmetic addition. There is no quantum mechanics theory that can calculate this.

References

[1] D. Kim, 2021, Theory of Everything and Logarithmic Elliptic Equation, https://vixra.org/pdf/2110.0023v1.pdf