

# Eleven Solutions to the Unsolved Problems in Physics

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March 8, 2023

**Keywords:** Cosmological constant problem, Quantum gravity, Theory of Everything, Unsolved problems in physics

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**Abstract** There is a list of unsolved problems in physics on Internet Wikipedia. In this paper, eleven unsolved problems were calculated or explained through simple mathematics. The results are as follows. 1) Generations of matter: Fourth generation particle does not exist. 2) Extra dimensions: The space of the universe has six dimensions. 3) Arrow of time: The quantization of our universe proceeds from 4D to 3D direction. 4) Neutrino mass: The mass of electron neutrino is calculated to be 0.15 eV. 5) Cosmological constant problem: The  $10^{120}$  is the ratio of 0D and 3D neutrino masses. 6) Hierarchy problem: Elliptic equation must have a largest value and a smallest value. 7) Origin of mass of most elementary particles: The compressive strength of quantum space gives mass to the particle. 8) Quantum gravity: Four fundamental forces are integrated into the logarithmic parabolic equation. 9) Dark energy: There is a dark force greater than strong force. 10) Dimensionless physical constants: Force is particle, and the mass of strong force is 42.152 keV, which is the root of tau mass 1776.82 MeV. 11) Theory of everything: Since quantum space has a logarithmic property, mass of quantum particle must be calculated as a logarithmic value.

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## 1. Introduction

In previous studies [1, 2], the author has precisely calculated various unsolved problems in Standard Model of particle physics and Standard Model of cosmology. However, since the scope of previous studies is very wide, the core of the study is not clear. In this study, the core of the author's argument is clearly described, focusing on eleven of the unsolved problems in physics introduced in Wikipedia. For convenience of understanding, since the calculation was performed macroscopically, there is a slight error between the calculation result and the correct answer.

## 2. Eleven Solutions to the Unsolved Problems

### 2.1 Generations of matter

The masses of electron, muon, and tau neutrino are each  $<0.12$  eV (normal),  $<170$  keV, and  $<15.5$  MeV. Fig. 1 is a chart drawing the parabolic equation after plotting above logarithmic mass values on 4D, 5D, and 6D. There is an insistence that the mass of fourth generation neutrino would be  $<45$  GeV. When the logarithmic value is plotted on 7D and the cubic equation is drawn, it is judged that the trend is not natural. Since symmetry is very important in physics, the parabolic equation drawn is considered reasonable. Therefore, it can be determined that 4th generation particle does not exist.

### 2.2 Extra dimensions

In Fig. 1, the vertex of parabola is 5.97D. The author ar-

gues that three generation neutrinos make the shape of particle, and graviton, photon, and gluon impart force to particle. Therefore, since three generation neutrinos of Fig. 1 are the origin of everything, spaces can be determined as six dimensions.

### 2.3 Neutrino mass

Fig. 2 is a logarithmic elliptic equation with muon neutrino mass 170 keV on 5D, tau neutrino mass 15.5 MeV on 6D, center 6D, and vertex 0D. From the elliptic equation, the value on 4D is calculated to be 0.15 eV.

### 2.4 Cosmological constant problem

The square of Planck length  $1.6162E-35$  m multiplied by cosmological constant  $1.1056E-52$  /m<sup>2</sup> is calculated to be  $1E-121.5$ . The value of  $1.16E-133$  on 0D divided by the value of  $2.61E-12$  on 3D is calculated to be  $1E-121.4$ . The probability that the above two values are almost the same will be close to zero. The cosmological constant problem is a fundamental challenge in physics. Therefore, it can be judged that neutrinos are the origin of everything.

### 2.5 Hierarchy problem

At 0D in Fig. 2, a characteristic value of  $1.16E-133$  is calculated. This value is almost close to zero, but not zero. Also,  $+\infty$  and  $-\infty$  do not exist in Fig. 2. The value of  $1.16E-133$  eV is the Planck mass of neutrino. Here, since our universe exists on 3D, the neutrino on 0D becomes a wave.

### 2.6 Origin of mass of most elementary particles

In Fig. 2, the mass of each neutrino is determined by the

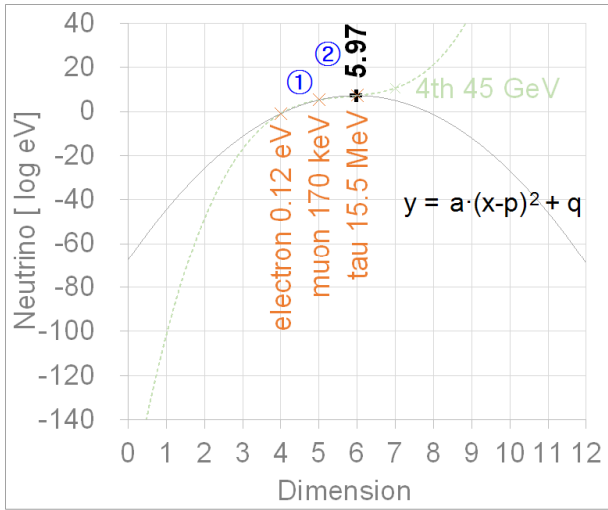


Fig. 1 Three generation neutrinos

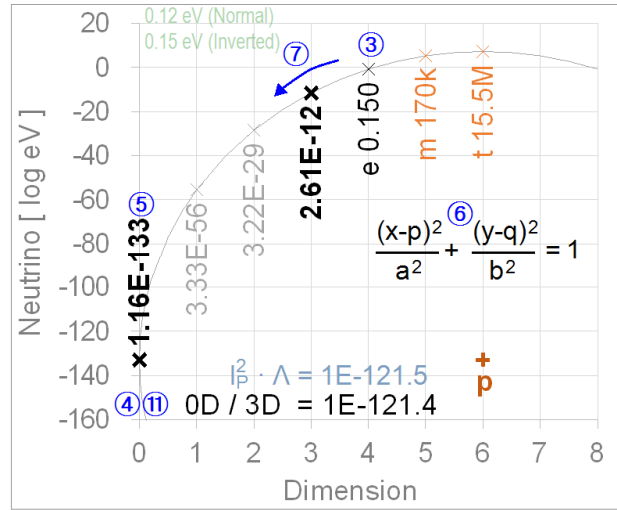


Fig. 2 Logarithmic elliptic equation

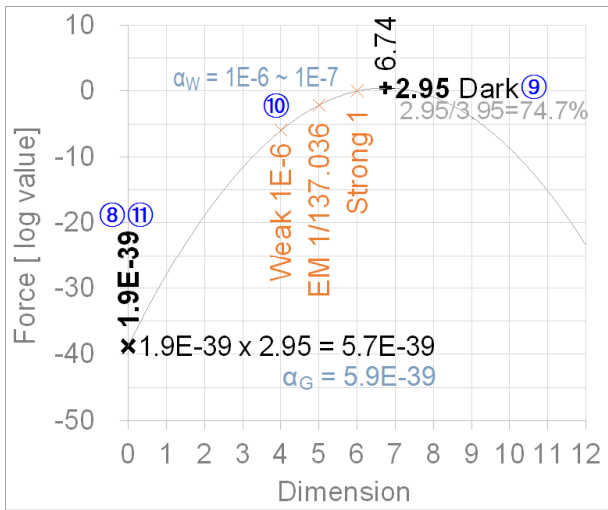


Fig. 3 Integration of four fundamental forces

< Wikipedia: List of Unsolved Problems in Physics >

- ① Generations of matter: Why are there three generations of quarks ...
  - ② Extra dimensions: Does nature have more than four spacetime ...
  - ③ Neutrino mass: What is the mass of neutrinos, whether they ...
  - ④ Cosmological constant problem: Why does the zero-point energy ...
  - ⑤ Hierarchy problem: Why is gravity such a weak force? It becomes ...
  - ⑥ Origin of mass of most elementary particles: Solved with the ...
  - ⑦ Arrow of time: Why does time have a direction? Why did the ...
  - ⑧ Quantum gravity: Can quantum mechanics and general relativity ...
  - ⑨ Dark energy: What is the cause of the observed accelerating ...
  - ⑩ Dimensionless physical constants: The values of various ...
  - ⑪ Theory of everything: Is there a singular, all-encompassing, ...
  - ⑫ Etc.
- ※ Quantum spaces have logarithmic characteristics.

Fig. 4 Eleven unsolved problems in Physics

elliptic equation. This means that the mass of neutrino is given by quantum space. Since neutrinos are the origin of all things, it can be judged that the properties of quantum space determine everything.

**2.7 Arrow of time**

The elliptic equation in Fig. 2 should be drawn from 6D to 0D direction. This is the flow direction of change. Our universe exists on 3D and is changing from 4D to 2D.

**2.8 Quantum gravity**

Weak coupling constant is about 1E-6 to 1E-7. In previous study [2], the value was calculated to be 1.0109E-6. Therefore, Weak coupling constant can be determined as about

1E-6. Fig. 3 is a chart drawing the logarithmic parabolic equation at strong force 1 on 6D, electromagnetic force 1/137.036 on 5D, and weak force 1E-6 on 4D. The value on 0D is calculated to be 1.9E-39. The exact value of gravitational coupling constant is 5.9E-39. It can be judged that four fundamental forces will be connected by the logarithmic parabolic equation. Since our universe exists on 3D, the gravity located at 0D in Fig.3 exists as a wave. Therefore, graviton that cause gravity cannot be observed.

**2.9 Dark energy**

In Fig. 3, the vertex is 2.95. This means that there exists a certain force greater than strong force 1. Multiplying this value by 1.9E-39 yields 5.7E-39. Dark force, not dark energy,

exist in the universe. Therefore, dark energy cannot be discovered in the universe.

### **2.10 Dimensionless physical constants**

Force is particle, and the mass of strong force particle is 42.152 keV, which is the root of tau mass 1776.82 MeV. From this, electromagnetic force, weak force, and gravitational force have unit of mass. Dimensionless physical constants are not universal values. It should be applied where dimensionless term exists in physically derived formula. Otherwise, it will cause an error. The proton-electron mass ratio of 1,836 is just a dimensionless constant for calculation convenience. It has a physical meaning that the proton mass is accurately calculated, and the electron mass is accurately calculated. When everything is calculated as terms of dimensional values, the meaning of dimensionless constants will become clear.

### **2.11 Theory of everything**

The cosmological constant problem in Fig. 2 and the quantum gravity in Fig. 3 are the most important items that integrate general relativity and quantum mechanics. If the above

two things were proven, it can be said that the theory of everything almost was revealed.

## **3. Conclusions**

In this paper, the eleven unsolved problems in physics were macroscopically calculated or explained from three generation neutrino masses and three generation force coupling constants. The core of this calculation is logarithm. Quantum spaces have logarithmic characters. In quantum space, the fusion mass of a particle of mass 3 eV and a particle of mass 4 eV is not the addition of 7 eV, but the multiplication of 12 eV. Multiplication can be calculated as log addition. There is no mathematical formula that can turn addition into multiplication. This is why physics theories and formulas become more and more complex as time goes on.

## **References**

- [1] D. Kim, 2021, Theory of Everything and Logarithmic Elliptic Equation, <https://vixra.org/abs/2110.0023>
- [2] D. Kim, 2022, New Standard Model, <https://vixra.org/abs/2207.0003>