

# Origin of the Speed of Light 2.99792E8 m/s

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**Abstract** In previous study, the masses of six dimensional neutrinos were calculated and the ratio of the 0D mass to the 3D mass was shown to be cosmological constant problem  $1E-121.54$ . In this study, three values were additionally found. (1) The root ratio of the 3D mass to the 2D mass is  $2.99789E8$ , and the error is 0.001% of light speed  $2.99792E8$  m/s. (2) The root ratio of the 5D mass to the 6D mass is 88.163%, and the error is 0.02% of the ratio 88.145% of  $W$  80.377 GeV and  $Z$  91.1876 GeV. (3) The root ratio of the 0D mass to the 1D mass is  $5.9065E-39$ , and the error is 0.01% of gravitational coupling constant  $5.90595E-39$ . It was once again confirmed that the origin of all things is neutrinos.

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## 1. Introduction

In this paper, the speed of light  $c$ , the mass ratio of  $W / Z$ , and gravitational coupling constant  $\alpha_G$  are calculated based on the results of previous study [1].

## 2. Previous Results

### 2.1 Six-dimensional neutrino masses

Fig. 1(a, c, e) are the masses of six-dimensional neutrinos, which were calculated in Fig. 4a, Fig. 6a, Fig. 8a in Ref. [1]. There is a slight difference in values, but it is very small and can be ignored.

### 2.2 Six-dimensional Planck lengths

The six-dimensional Planck length for the combined state was calculated in Fig. 25(b) of Ref. [1], and it is Fig. 1(f). It is the combined values of kinetic state (b) and steady state (d), and they were not presented in Ref. [1].

### 2.3 Kinetic state, Steady state, Combined state

The author continued to insist that quantum particles are divided into kinetic state and steady state, and the universe changes into the combined state. In physics, Planck length is given as  $1.61626E-35$  m. The author judges that it is the value of steady state. In Fig. 22 of Ref. [1], the kinetic state radius of proton was calculated to be 0.87506 fm, and the steady state radius of proton was calculated to be 0.84101 fm. As shown in the top equation of Fig. 1(b), the Planck length in kinetic state will be  $1.64865E-35$  m. Fig. 2 is the Fig. 18 of Ref. [1]. The kinetic state was calculated to be 37.144%, and the steady state was calculated to be 62.856%. Therefore, the Planck length in combined state is calculated as  $1.62821E-35$  from the bottom of Fig. 1(f).

### 2.4 Cosmological constant problem

The cosmological constant problem  $l_p^2 \cdot \Lambda$  is the value  $1E-121.5394$  ( $= 1.61626E-35 \text{ m}^2 \times 1.1056E-52 / \text{m}^2$ ). The combined state (e) is kinetic state (a) x 37.144% + steady state (c) x 62.856%. In (e),  $v_0$   $7.0356E-134 / v_3$   $2.3990E-12$  is  $1E-121.5327$ .

### 2.5 Constant in all dimensions

$v_0/l_{p0}^2$  is calculated as a constant in all dimensions. Let's call this value  $\Phi$ . This value is calculated in (a) (c) (e). Therefore, the dimensional Planck length  $l_{pN}$  is equal to  $\sqrt{v_N/\Phi}$ , and these values are calculated as kinetic state (b) and steady state (d). The combined state (f) is kinetic state (b) x 37.144% + steady state (d) x 62.856%.

### 2.6 Origin of all things = Neutrinos

The Planck length  $l_p$  was calculated from the mass of neutrino  $\nu$ . In Chapter 3, combinations of Planck lengths were calculated. Here, it must be remembered that the origin of Planck length is the mass of neutrino.

## 3. Origin of Light Speed 2.99792E8 m/s

### 3.1 Six-dimensional Planck lengths

In Table 1, six-dimensional Planck lengths are presented. The kinetic state is the values in Fig. 1(b), and the steady state is the values in Fig. 1(d). The combined state is the values in Fig. 1(f), Eq. (1) is logarithmic calculation, and Eq. (2) is simple calculation.

### 3.2 Speed of light

From Eq. (3),  $2.98013E8$  is calculated, which is an error of

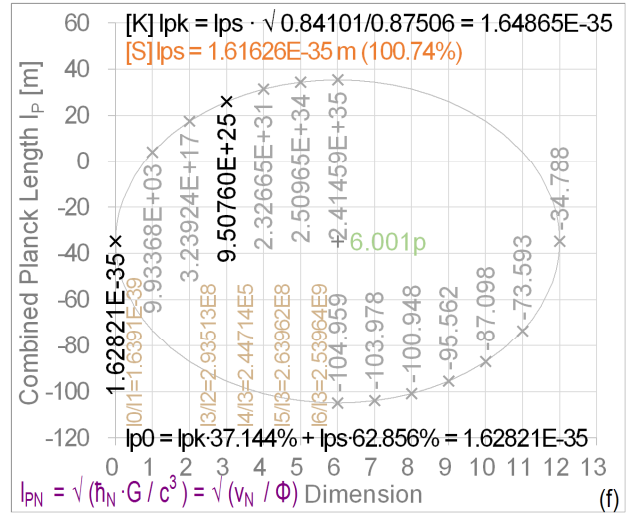
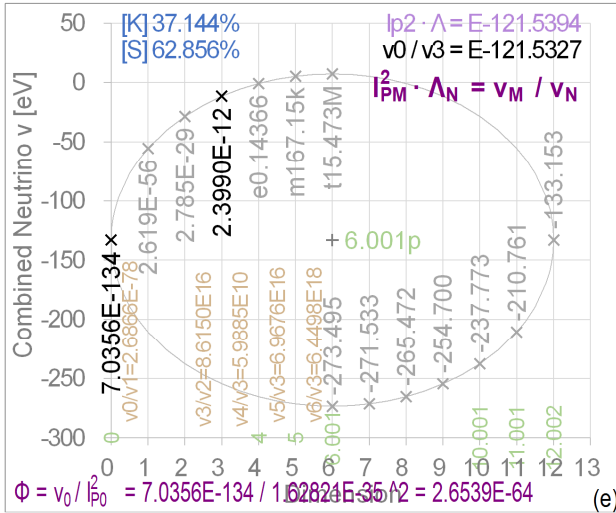
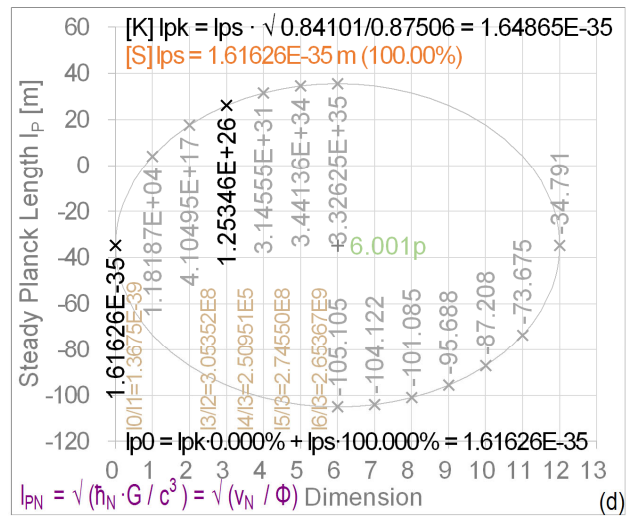
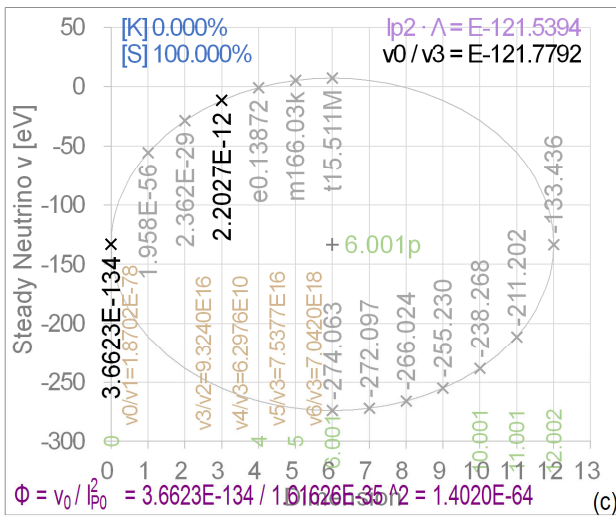
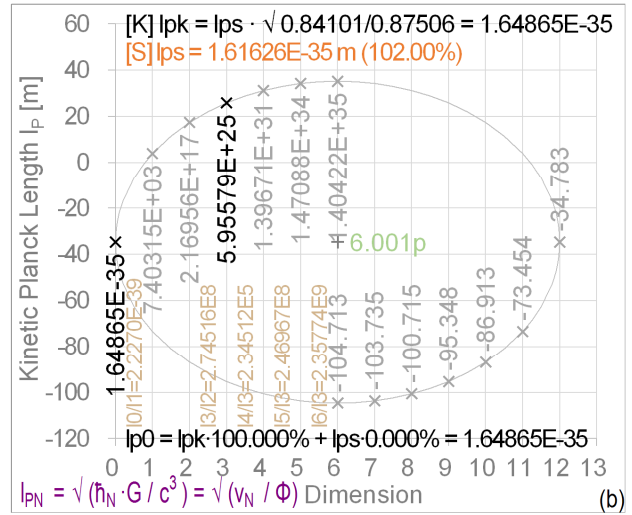
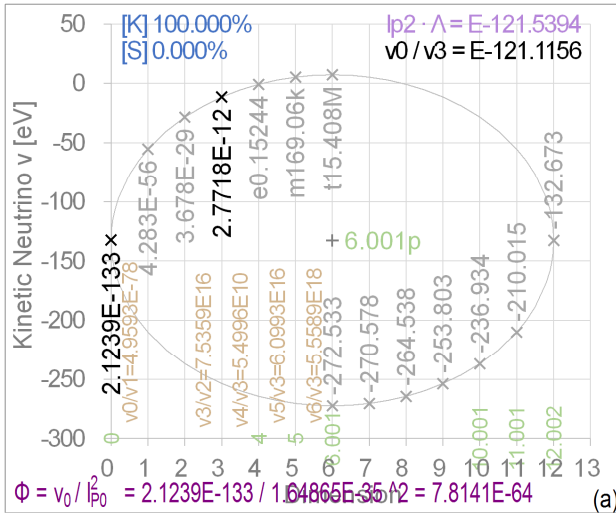
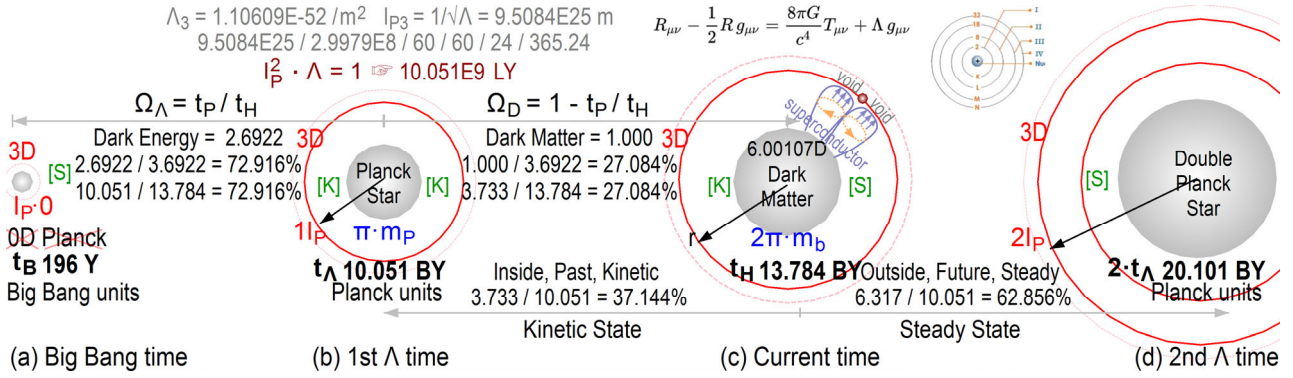


Fig. 1 Six-dimensional neutrino masses and Six-dimensional Planck's constants



**Fig. 2** Dark energy 72.916%, Dark matter 27.084%, Kinetic state 37.144%, Steady state 62.856%

0.593% of the speed of light. From Eq. (4), 2.99789E8 is calculated, which is an error of 0.001% of the speed of light. From Eq. (5), 2.99887E8 is calculated, which is an error of 0.032% of the speed of light. Is this result coincidental or inevitable?

### 3.3 Unitless constant

Since the calculated value is unitless constant, it can be seen that the speed of light must also be unitless. To easily express the above equation,  $l_{P3} : l_{P2} = 2.99792E8m$  at 3D : 1s at 2D.

### 3.4 Absolute time 1s & Absolute length 1m

In above, the absolute constant  $\Phi$ , which does not change in all dimensions, was calculated. Let's apply absolute time 1s, which does not change in any circumstances. And let's define 1s = 1m at 2D. Therefore,  $l_{P3} : l_{P2} = 2.99792E8m$  at 3D : 1m at 2D is established, and this is unitless. That is, 1 second in the 2D universe is 1 meter, and 1 second in the 3D universe is 2.99792E8 m.

### 3.5 Light speed = 3D quantization / 2D quantization

$l_{P3}$  is the quantization unit length (time, mass) of 3D universe, and  $l_{P2}$  is the quantization unit length (time, mass) of 2D universe. To explain it simply, 3D universe is our universe, and 2D universe is inside supermassive black hole. Here, the meaning of the quantization unit can be understood from Fig. 2. It is very shocking that our universe is quantized. The quantization unit is the cosmological constant  $\Lambda$ , and the ratio of time is the ratio of dark energy. In previous study [2], it has been computationally proven that the expansion rate of the universe is constant. Therefore, the speed of light is the expansion velocity ratio of 3D universe and 2D universe.

### 3.6 Spaceship at the speed of light

If 3D spaceship flies at the speed of light, it will be quantized into 2D spaceship. The process of the change will follow the logarithmic ellipse from 3D to 2D in Fig. 1. If this were true, Lorentz transformation formula would have to be derived from the logarithmic elliptic equation.

**Table 1** Six-dimensional Planck lengths and their combinations

Dim.	[K]inetic State	[S]teady State	[C]ombined State	
	37.144%	62.856%	Log	Value
	Fig. 1(b)	Fig. 1(d)	Fig. 1(f), (1)	(2)
$l_{P0}$	1.64865E-35	1.61626E-35	1.62821E-35	1.62829E-35
$l_{P1}$	7.40315E3	1.18187E4	9.93368E3	1.01786E4
$l_{P2}$	2.16956E17	4.10495E17	3.23924E17	3.38607E17
$l_{P3}$	5.95579E25	1.25346E26	9.50760E25	1.00909E26
$l_{P4}$	1.39671E31	3.14555E31	2.32665E31	2.49596E31
$l_{P5}$	1.47088E34	3.44136E34	2.50965E34	2.70945E34
$l_{P6}$	1.40422E35	3.32625E35	2.41459E35	2.61234E35

- $10^\wedge (\log [K] \times 37.144\% + \log [S] \times 62.856\%)$
- $[K] \times 37.144\% + [S] \times 62.856\%$
- $l_{P3/P2}^C = 1.00909E26 / 3.38607E17 = 2.98013E8$  (0.593% of c2.99792E8)
- $l_{P3/P2}^C = l_{P3/P2}^K \times 37.144\% + l_{P3/P2}^S \times 62.856\% = 2.93898E8$   
 $l_{P3/P2}^C \times l_{P0}^{K/S} = 2.99789E8$  (0.001% of c2.99792E8)  $l_{P3}/l_{P2}$
- $l_{P6/P3}^C = l_{P6/P3}^K \times 37.144\% + l_{P6/P3}^S \times 62.856\% = 2.54375E9$   
 $3/8\pi \times l_{P6/P3}^C \times l_{P0}^{C/K} = 2.99887E8$  (0.032% of c2.99792E8)
- CMB  $\times$  K(t) + RedShift(t)  $\times$  S(t) = C 70.93 km/s/Mpc
- $8\pi/3 \times l_{P5/P6}^C = 2.50965E34 / 2.41459E35 \times l_{P0}^{K/C} = 88.163\%$  (0.020%)
- $l_{P5/P3}^C = l_{P5/P3}^K \times 37.144\% + l_{P5/P3}^S \times 62.856\% = 2.64304E8$   
 $l_{P5/P3}^C / c = 88.162\%$  (0.020% of W80.377/Z91.1876 = 88.145%)
- $(2.6922+1) \times l_{P0/P1}^C = 5.9065E-39$  (0.010% of  $\alpha_G$  5.90595E-39)
- $1 - l_{P3/P2}^K / l_{P5/P3}^S = 2.74516E8 / 2.74550E8 = 0.01\%$   $l_{P0}/l_{P1}$

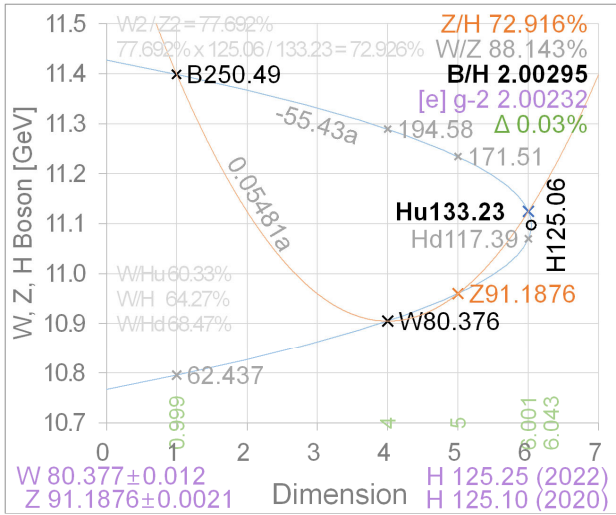


Fig. 3 Integration of W Z H

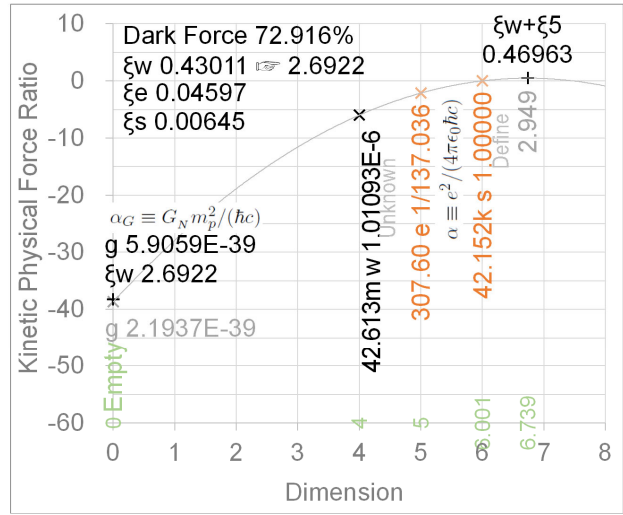


Fig. 4 Unification of four fundamental forces

### 3.7 Does the speed of light change?

The concept of speed of light described above is a constant that does not change. Here, it is known that the universe is expanding with an accelerated velocity. In Fig. 2 of previous study [3], Eq. (6) was presented. The speed of light also has kinetic speed, steady speed, and combined speed. Since the above formula is the interpretation of the combined state, the speed of light  $2.99792E8$  m/s is the combined state and is constant that does not change. In Eq. (6), the ratio  $K(t)$  and the ratio  $S(t)$  change over time. Here, the author believes that CMB speed will not change. From this, Red Shift (t) is calculated to accelerate expansion.

### 3.8 Change of the universe

In Fig. 29 of Ref. [1], the author attempted to calculate the changes of particles and forces over time, but it did not work well. From the above logic, in Fig. 1, it is judged that over time, the kinetic state and the combined state are constants, and the steady state is variable.

## 4. Origin of the mass ratio of W / Z 88.145%

### 4.1 Dark energy & Dark matter $\rightarrow$ Dark time

In Fig. 2, the dark time from (b) to (a) is dark energy 72.916% or 2.6922, and the dark time from (b) to (c) is dark matter 27.084% or 1. Therefore, the time from (a) to (c) is 3.6922.

### 4.2 The mass ratio of Z / H 72.916%

The mass of Z boson is 91.1876 GeV, the mass of H boson is about 125.1 GeV, and the ratio of Z / H is about 72.89%. This value is very similar to 72.916%. From this, the

mass of H boson would be 125.06 GeV.

### 4.3 Logarithmic parabolic equation

Fig. 3 is the Fig. 10 of Ref. [1]. From this chart, the mass of W boson is calculated to be 80.376 GeV, and the average of the current measurements is 80.377 GeV.

### 4.4 The mass ratio of W / Z 88.145%

This means that the assumption above of  $Z / H = 72.916\%$  is correct. From this, it can be seen that the value 88.145% of  $W 80.377$  GeV /  $Z 91.1876$  GeV must also have a certain meaning. However, previous study did not find the value.

### 4.5 Logarithmic elliptic equation

The errors of all values calculated in Ref. [1] are within 0.03% at the smallest and 0.1% at the largest. In Eq. (7), 88.163% is calculated, and the error is 0.020%. In Eq. (8), 88.162% is calculated, and the error is 0.020%. Why are the above two results exactly the same? This is the value of elliptic equation, and Fig. 3 is the value of parabolic equation. The parabola and the ellipse are connected to each other.

## 5. Origin of Gravitational Force 5.90595E-39

### 5.1 Particle force

The shapes of strong, electromagnetic, and weak forces are shown in Fig. 3(b) of Ref. [1]. That is, force is particle.

### 5.2 Origin of all things

As described in Ref. [4], the origin of all things is the nature of quantum space. Quantum particles do not have unique characteristics, but quantum space gives quantum particles

their unique characteristics. That is, Fig. 1 is the characteristics of quantum space.

### 5.3 Logarithmic parabolic equation

Fig. 4 is the Fig. 16(b) of Ref. [1]. From the logarithmic parabolic equation, the 0D value is calculated as  $2.1937E-39$ , and multiplying by 2.6922 in Fig. 2, the gravitational coupling constant is calculated as  $5.9059E-39$ . Why is the logarithmic parabola established in the relationship of forces?

### 5.4 Logarithmic elliptic equation

The calculated value  $5.9065E-39$  of Eq. (9) is an error of 0.010% of gravitational coupling constant of  $5.90595E-39$ . What is unique is that the 0D value was multiplied by 2.6922 in the parabola of Fig. 4, and the  $l_{p0}^c / l_{p1}^c$  value was multiplied by 3.6922 in the ellipse of Table 1. From this, the parabolic equation and the elliptic equation were connected to each other.

### 5.5 What is gravitational coupling constant?

In Fig. 3, the strong force of 6D, the electromagnetic force of 5D, and the weak force of 4D are particles, but the gravity of 0D is something unusual, not a particle. The speed of light in our 3D universe was  $l_{p3} / l_{p2}$  from Eq. (4). The gravitational coupling constant  $\alpha_G$  was  $l_{p0} / l_{p1}$  from Eq. (9). From this,  $1 / \alpha_G$  is  $l_{p1} / l_{p0}$ , and this value is assumed to be the speed of light in 1D universe. Here, 1D means a specific direction. Gravity has a velocity of 1D acting toward the center of object. Since formulas and calculation could not proceed any further, I would like to stop further explanation.

## 6. Miscellaneous

### 6.1 Equal value

In Eq. (10), why is the difference between  $l_{p3/p2}^K$  and  $l_{p5/p3}^S$  is 0.01%?

### 6.2 Etc.

From the values in Fig. 1, more new things will be discovered. Three generations of neutrinos in Fig. 1 make the shapes of universes and particles. Graviton, photon, and gluon give force to universes and particles, and their masses are shown in Fig. 9(a) of Ref. [1]. Various new phenomena can be discovered from the chart.

## 7. Conclusions

In previous study, the origin of cosmological constant problem was solved from the masses of six-dimensional neutrinos, and in this study, the speed of light, W / Z mass ratio, and gravitational coupling constant were additionally discovered. From this, it is once again confirmed that the origin of all things is the six-dimensional neutrinos. Their parabolic and elliptic equations were linked together. The task for the future is to find out what this means.

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