Quantum Space and Origin of Mass

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Keywords: H boson, Higgs particle, Quantum space, W boson, Z boson

Abstract Applying logarithmic parabolic equation to the mass of W boson and Z boson, Higgs mass is very simply calculated as 124.98 GeV or 125.02 GeV. This means that Higgs particle has no relation with the origin of mass. Elementary particles have oscillating mass, and combined particles have static mass. The compressive strength of three generation quantum spaces makes the three generation particles and gives it a quantum mass. Since quantum space has a logarithmic property, the total mass of particles must be calculated as the logarithmic value.

1. Introduction

W boson and Z boson are the elementary particles that mediate weak interaction, and Higgs boson is the elementary particle that explains the origin of mass. The aim of this study is to prove that Higgs Boson has no relation with the origin of mass, and to newly suggest an origin of mass.

2. Measurement of Higgs mass

2.1 ATLAS 2012

The Higgs mass measured in 2012 at CERN's ATLAS is shown in Fig. 1. The Higgs mass in left area is about 123.5 GeV, the Higgs mass in right area is about 126.5 GeV, and the average value is about 125 GeV. In the figure, the Higgs boson in the left area collapsed into two W bosons and two Z bosons, and the Higgs boson in the right area collapsed into a pair of photons.

Table 1 Higgs mass measured at CERN.

[GeV]	ATLAS	CMS	Combine
Run 1	125.38	125.07	125.09
Run 2	124.86	125.46	-
Combine	124.97	125.38	-

(A1C1 125.09 + A2 124.86) / 2 = 124.98
(A1A2 124.97 + C1 125.07) / 2 = 125.02
(C1 125.07 + C2 125.46) / 2 = 125.27

2.2 CMS 2014

The Higgs mass measured in 2014 at CERN's CMS is shown in Fig. 2. The mass is 125.02 GeV. In Fig. 2, unlike Fig. 1, the left side collapsed into a pair of photons, and the right side collapsed into two W and two Z boson. According to the interpretation of this study, it is judged that the left side and right side of Fig. 2 are reversed.

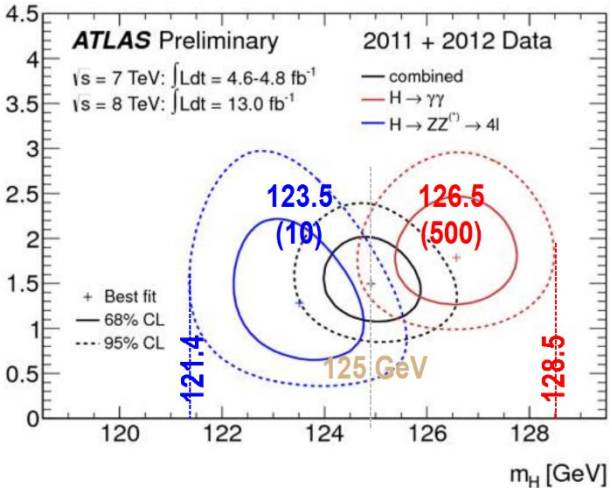

Fig. 1 Higgs mass of ATLAS 2012 at CERN.

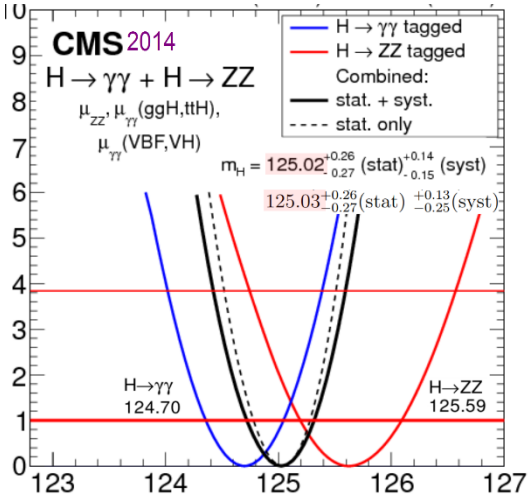

Fig. 2 Higgs mass of CMS 2014 at CERN.

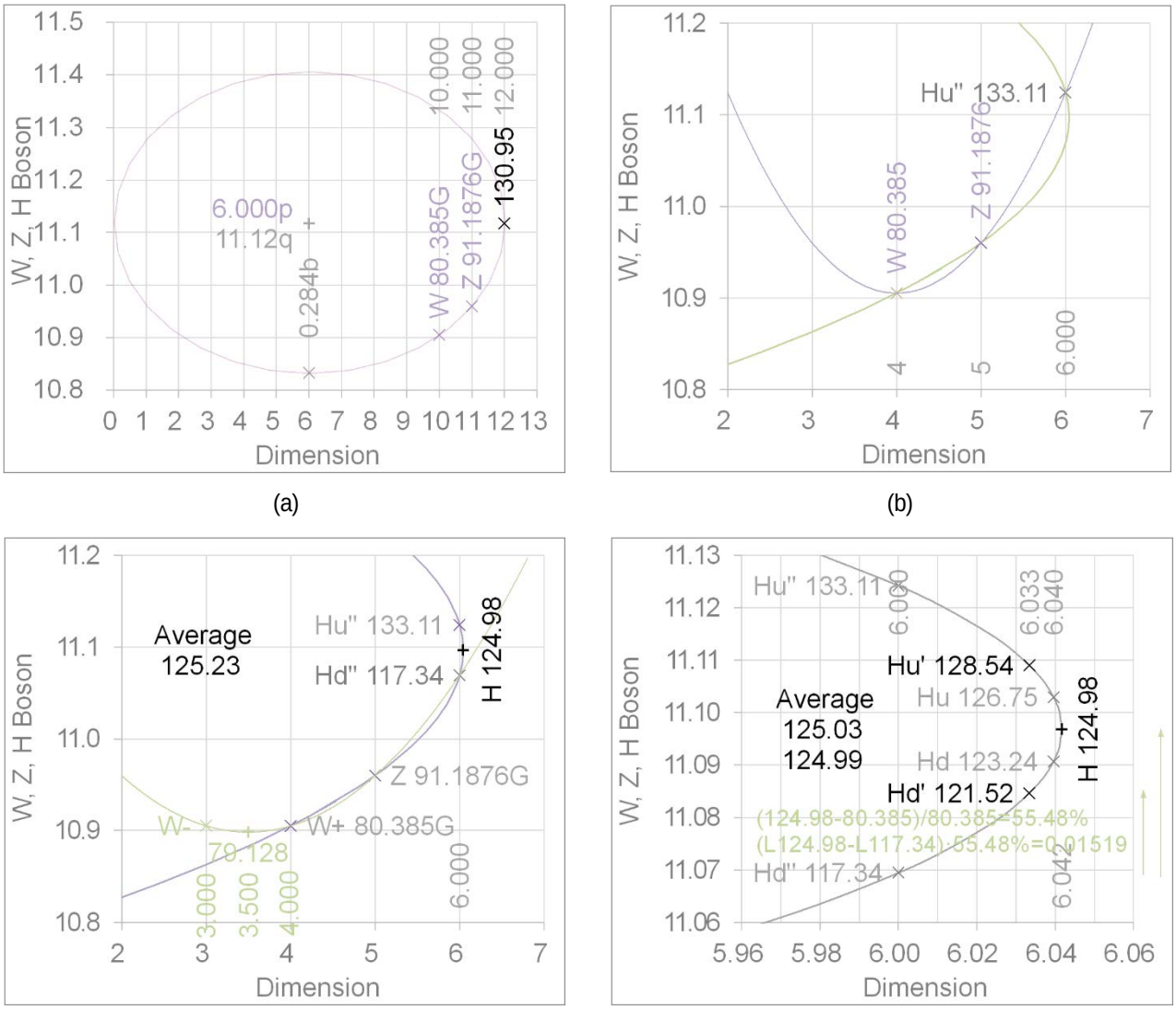

Fig. 3 Calculation of H boson mass at 6D.

2.3 Run 1 & Run 2

The H boson masses of Run 1 and Run 2 measured in ATLAS and CMS are presented in Table 1. The combined value of ATLAS Run 1 and ATLAS Run 2 is 124.97 GeV, and the combined value of ATLAS Run 1 and CMS Run 1 is 125.09 GeV. These two masses are the current standard mass value for H boson.

3. Calculation of H boson at 6D

3.1 Log-elliptic equation

The masses of W boson and Z boson were precisely measured as 80.385 GeV and 91.1876 GeV. Assuming that the mass of W boson is 10D, the mass of Z boson is 11D, the center of ellipse is 6D, and the vertex of ellipse is 0D, the log-ellipse is drawn as Fig. 3(a). From this, the mass of vertex 12D is calculated as 130.96 GeV. Since Higgs mass is about 125 GeV, the log-elliptic equation in (a) does not fit the calculation of Higgs mass.

3.2 Log-parabolic equation

When W boson is 4D vertex and Z boson is 5D, log-parabola is drawn as (b), and the value of 6D is calculated as 133.11 GeV. Applying the inverse parabola of (c) to the values, the vertex is calculated as 124.98 GeV. This value can be said to be the same as 124.97 GeV of 'ATLAS Combine' in Table 1, and the average of 'Combine Run 1' and 'ATLAS Run 2' is 124.98 GeV. In the diagram of standard model, W boson is 80.39 GeV and Z boson is 91.19 GeV. Applying these values, H boson is calculated as 124.97 GeV.

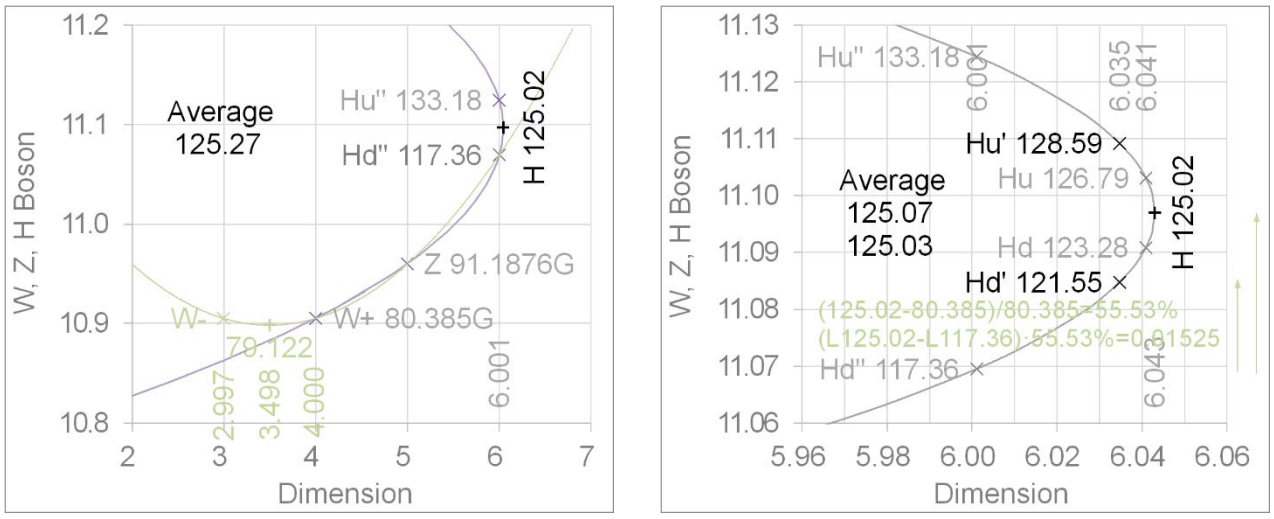

Fig. 4 Calculation of H boson mass at 6.00108D.

3.3 Down & Up H boson

The enlarged figure of the 124.98 GeV area in (c) is (d). If the logarithmic value 0.01519 that is calculated at the bottom of (d) is added to Hd'' and subtracted from Hu'', Hd' 121.52 GeV and Hu' 128.54 GeV are calculated. Here, the meanings of the formula and the dimension exceeding 6D cannot be explained yet. Hd' 121.52 GeV is similar to the left end value in Fig. 1, and Hu' 128.54 GeV is almost equal to the right end value in Fig. 1. The logarithmic averages from Hd', Hu' and H are Hd 123.24 GeV and Hu 126.75 GeV.

4. Calculation of H boson at 6.00108D

4.1 Dimension of our space

Author asserts that our space consists of three linear dimensions: horizontal, vertical, and height, and three quantum dimensions: 4D, 5D, and 6D. Here, the correct answer is 6.00108D, not 6D. The value is determined from the mass calculations of electron, muon and tau, and the calculation process will be described in detail in the following paper.

4.2 Log-parabolic equation

The values applying 6.00108D are shown in Fig. 4(a), and the H boson mass is calculated as 125.02 GeV. It is exactly equal with the value of CMS 2014 in Fig. 2 and the average of 'ATLAS Combine' and 'CMS Run 1' in Table 1.

4.3 Down & Up H boson

The enlarged figure of the 125.02 GeV area in (a) is (b). The calculation process is equal with Fig. 3(d). The average of 123.28 and 126.79 coincides with 125.03 GeV in Fig. 2. The average of 121.55 and 128.59 coincides with CMS Run 1 125.07 GeV in Table 1. The average of 117.36 and 133.18 coincides with the average 125.27 GeV of CMS Run 1 and CMS Run 2 in Table 1.

4.4 W+ & W- boson

The W boson in (a) is located on left 3D and right 4D of the vertex. It is similar to W+ boson and W- boson. With the same logic, the Z boson in (a) must also be located on left 2D and right 5D of the vertex, but there is no 2D in our universe. The H boson is also the same.

4.5 Gauge theory

The correlation between W boson, Z boson and H boson in (a) is similar to the gauge theory.

5. Quantum space

5.1 Space = Empty + Brane + Gap

Space is GongGan in Korean. Gong means empty, and Gan means gap. Author judges that our space consists of HeoGong and MakGan in Korean. Heo means empty, Gong means empty again, Mak means that there are branes that we cannot understand, and Gan means that there are gaps between them. As shown in Fig. 5, the XYZ direction is empty and empty again, and the vertical direction consists of up down branes and the gap.

5.2 Shape of quantum space

The simple shape of the predicted quantum space is shown in Fig. 5. However, the actual shape will be more complex than Fig. 5. Something has quantized the linear space into the logarithmic space like spring of Fig. 5. For this reason, the mass of particle must be calculated as logarithmic value.

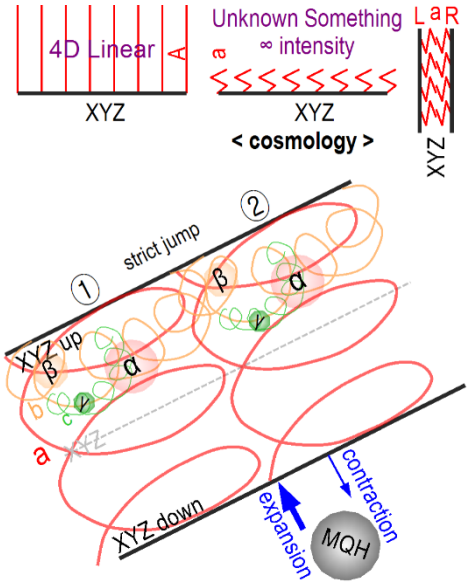

Fig. 5 Shape of quantum space.

The something will be revealed in cosmology. In the figure, XYZ extends in a straight line, and abc space of vertical dimension is less than atomic thickness.

5.3 Open particle

Particles collide outside the brane. Because of this, a line falls off from the brane. When the line curls, it turns into an open particle. All particles are open particles such as Fig. 6.

5.4 Strict integer multiples

In Fig. 5, a means 4D, b means 5D, c means 6D quantum space, and α means 4D, β means 5D, γ means 6D particle. Space a has weak intensity, space b has medium intensity, and space c has strong intensity. Because of this, α has weak mass, β has medium mass, and γ has strong mass. As can be seen from the figure, the quantum space abc has the characteristic of strict integer multiple. This causes that particle moves as jump.

5.5 Observer effect

When a line is located on abc quantum space, it turns into an open particle, and when the open particle is located on XYZ space, it turns into a wave line. When an external influence exerts on the wave line, it hides into quantum space and turns into a particle.

5.6 Oscillation

When α particle is located on space a, it has weak standard mass, when it is located on space b, it has intermediate oscillation mass similar to β particle, and when it is located on space c, it has strong oscillation mass similar to γ particle. β particle and γ particle are also the same situation. This is the cause of neutrino oscillation phenomenon. All particles in the standard model of particle physics are divided into standard particle and oscillating particles.

5.7 Spin

XYZ space in Fig. 5 is divided into XYZup and XYZdown. A universal magnetic force flows from left to right along the surface of branes. As the result, the particle located on XYZup has clockwise spin, and the particle located on XYZdown has counterclockwise spin.

5.8 Superposition

In the same XYZ space, only two α particles can be located on space a, many β particles can be located on space b, and innumerable γ particles can be located on space c.

5.9 Origin of mass

Particles do not have proper mass. The strength of quantum space where the particle is located determines its mass. Elementary particles have oscillating mass, and combined particles have static mass.

5.10 Three generation of standard model

The reason that particles exist as three generation is that quantum space is three generation. The three generation quantum spaces give properties to particle.

5.11 Basic particle and Combination particle

Three generation of neutrinos (electron, muon, tau) that make the shape of particle and three generation of gravinos (graviton, photon, gluon) that occur the force of particle are the elementary particles of all things. All other particles are combined particles composed of above six particles.

The masses of three generation elementary particles are determined by logarithmic elliptic equation, and the masses of three generation force particles are determined by logarithmic parabolic equation. Therefore, the three generation of boson are similar to force particles.

5.12 Gravity

Weak, electromagnetic, and strong force act at the inside of quantum space in Fig. 5. Gravity is the force that acts toward 4D empty space which is outside of quantum space.

5.13 Absolute Something

Final question is what made our universe so perfectly beautiful. Absolute something, not absolute someone, created our strict universal space as shown in Fig. 5. Author calls it Mommy Quantum Hole (MQH). Universe can be made only by MQH. Therefore, all multi-universes are very beautiful like our universe.

6. Composition of quarks

6.1 Shape of quarks

The shapes of up, charm, top, down, strange, and bottom Quarks are shown in Fig. 6. Where, α, β, γ are 4D, 5D, 6D particles, n is standard neutrino, N is oscillating neutrino, s is standard anti-neutrino, g is standard gravino, t is standard anti-gravino, f is fermion located on 4D5D6D, and b is boson located on 10D11D12D. Three generation neutrinos are electron, muon, tau, and three generation gravinos are graviton, photon, gluon. Therefore, α_n, β_n, γ_n are standard neutrinos, α_N, β_N, γ_N are oscillating neutrinos, α_s, β_s, γ_s are standard anti-neutrinos, α_g, β_g, γ_g are standard gravinos, and α_t, β_t, γ_t are standard anti-gravinos.

6.2 Particle and anti-particle

As can be seen in Fig. 6, down, strange, bottom are particles, and up, charm, top are anti-particles. The difference is standard and oscillation. The shape of electron is similar to down quark. Therefore, if one electron is added to one proton which is composed of two up quarks and one down quark, the number of particles and anti-particles becomes the same. This means that the number of particles and anti-particles is the same in whole universe. Author judges that there is a simulation universe which is the exact opposite of the character of our universe. The whole universe means including the simulation universe.

6.3 w z h bosons

Quark is a combined particle which is composed of shell fermion and inside boson. There is a w boson of 10D in down quark. When down quark is collided, α_N shell is peeled off and it turns into strange quark. At that time, the w boson in it changes to z boson of 11D. When the strange quark is collided, β_N is peeled off and it turned into bottom quark. At that time, the z boson in it changes to h boson of 12D.

6.4 Oscillation of H Z W bosons

When the bottom quark is broken, it is divided into 6D tau neutrino γ_N and 12D boson h. The boson h immediately moves into the quantum space of 6D, and its mass changes to H boson. The mass change also follows the logarithmic parabolic equation. This is Higgs particle. The H boson located on 6D space of Fig. 5 moves into 5D space due to the oscillation phenomenon. This is Z boson. It also moves into 4D space. This is W boson. That is, W Z H are all the same particles. The mass of three generation boson is determined by the quantum space where the particle is located. This phenomenon is the below area of the vertex on the inverse parabola of Fig. 4, and it is the left area of Fig. 1.

6.5 Collapse of H boson

If the collision energy is stronger, the h boson in Fig. 6 is broken. This phenomenon is the above area of the vertex on the inverse parabola of Fig. 4, and it is the right area of Fig. 1. The h Boson is composed of tau neutrino γ_n, gluon γ_g, tau anti-neutrino γ_s, and anti-gluon γ_t. The boson gluon and boson anti-gluon on 6D space move into 5D space. It is boson photon and boson anti-photon. They move into 4D space. It is boson graviton and boson anti-graviton. Here, the measurement of photon is easy, and the others are difficult to measure. The same phenomenon occurs at up, charm, and top quarks with boson neutrinos of the inside.

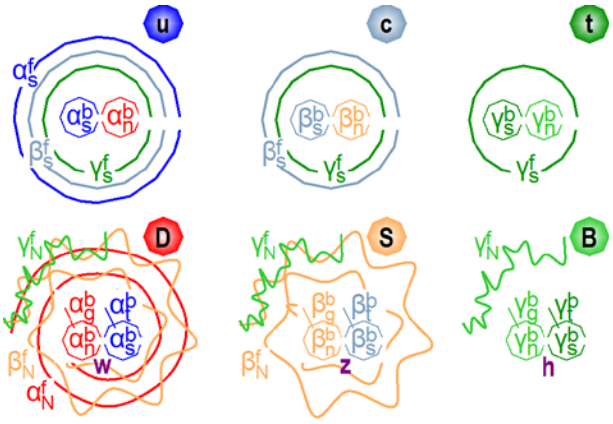

Fig. 6 Shape of quarks.

6.6 Dark energy

From the outside of our universe, three generation dark forces are affecting our universe. Dark energy is judged to be the sum of three generation dark forces. They affect graviton, photon, and gluon. Therefore, it is assumed that W, Z, and H bosons are affected by the dark forces. Also, gravity force, weak force, electromagnetic force, and strong force are all affected by the three generation dark forces.

7. Conclusions

The mass of H boson is simply calculated by applying the logarithmic parabolic equation to W and Z boson masses. This means that Higgs boson has nothing to do with the origin of mass. The compressive strength of three generation quantum space gives the mass of three generation particles. W boson, Z boson, and H boson are the same particles, and the masses of three generation bosons are determined by the quantum space where the particle is located.

Quantum space is compressed logarithmically. Therefore, the mass of combined particle must be calculated as logarithmic value. Here, in case of bonded particle such as hydrogen, the mass is the simple sum of the composed masses.

It is suggested that the mass values measured in ATLAS and CMS should be reinterpreted as logarithmic values. The correct mass of H boson is 125.02 GeV. Reinterpreting the observational data after knowing the correct answer will reveal many new facts.