Quantum Space and Origin of Mass

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Abstract 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. In previous study, dark energy ratio was calculated to be 72.916% (or 1/2/72.916% = 68.572%). When the value of Z 91.1880 GeV (PDG 2024) divided by H is 72.916%, the H boson mass is calculated to be 125.06 GeV. Also, from the log-parabolic equation, the mass of W boson is calculated to be 80.365 GeV. From the Higgs masses of Run 1 and 2016 measured at CMS, a very special value of 63.1% was found. Applying 63.1% to Run 1 and Run 2 of ATLAS, 125.07 GeV and 125.06 GeV are calculated. Also, when applying 63.1% to Run 1 and 2016 of CMS, 47 identity values are found. From 63.1%, the Hubble constant of 70.93 km/s/Mpc, the age of the universe of 13.785 BY, the dark energy ratio of 68.45%, and the cosmological constant of 1.1020E-52 /m2 are simply calculated. From the above calculations, it is concluded that our universe is 63.1% inside a 4D super black hole.

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1. Introduction

The mass of Higgs boson presented by PDG 2024 is 125.20±0.11 GeV [1]. At ATLAS, the Higgs mass of Run 1 is 125.38±0.41 GeV, that of Run 2 is 125.10±0.11 GeV, and the combined mass is 125.11±0.11 GeV [2]. At CMS, the Higgs mass of Run 1 is 125.07±0.28 GeV, that of 2016 is 125.46±0.16 GeV, and the combined mass is 125.38±0 GeV [3]. The purpose of this study is (1) to suggest the quantum space and origin of mass, (2) to calculate the mass of H boson, (3) to reinterpret the Higgs mass measured by ATLAS and CMS and find a special value of 63.1%, and (4) to concisely calculate the origin of the universe from 63.1%.

2. Quantum Space and Origin of Mass

2.1 Space = Empty + Brane + Gap

Space is called 'Gong-Gan' in Korean. Gong means empty, and Gan means gap. The author judges that our space consists of 'Heo-Gong' and 'Mak-Gan' in Korean. Heo means empty, Gong means empty also, Mak means that there are branes that we cannot understand, and Gan means that there are gaps between them. As shown in Fig. 1, based on the XYZ linear space, the quantum space is composed of Gan(gap) closed by two Mak(brane), Heo is left space(up, -) and Gong is right space(down, +).

2.2 Shape of quantum space

In Fig. 1, (a) There was 4-dimensional space of straight lines. (b) Unknown something quantized the 4D with extreme force in Big Bang. (c) This created quantum spaces to the left L and right R of the straight XYZ space. (d) Various quantum phenomena occur in the quantum space. In (e), the XYZ extends in a straight line, and the red spring abc space of vertical dimension is less than atomic thickness. Therefore, the mass of quantum particles must be calculated as logarithmic value.

2.3 Open particle = Particle & Wave

Particles collide outside the brane. Because of this, a line

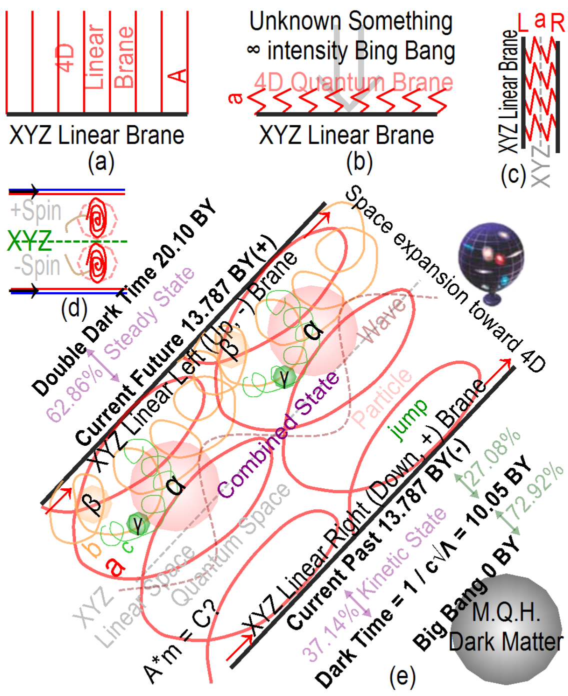


Fig. 1 Shape of quantum space

falls off from the brane. When the line curls inside of the red spring of (e), it turns into an open particle. When the particle pops out of the red spring (e), it turns into a wave.

2.4 Strict integer multiples

In Fig. 1, 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.

2.5 Observer effect

When a line is located inside of 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.

2.6 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 are divided into normal particle and oscillating particle.

2.7 Spin

XYZ space in Fig. 1 is divided into XYZup and XYZdown. A universal magnetic force flows from left to right along the

Table 1 W, Z, and H masses [GeV] presented by PDG

Year	W	Z	H
2024	80.3692	91.1880	125.20
2022	80.377	91.1876	125.25
2020	80.379	91.1876	125.10
2018	80.379	91.1876	125.18
2016	80.385	91.1876	125.09
2014	80.385	91.1876	

surface of branes. As the result, the particle located on XYZup has clockwise spin, and the particle located on XYZdown has counterclockwise spin.

2.8 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.

2.9 Origin of mass

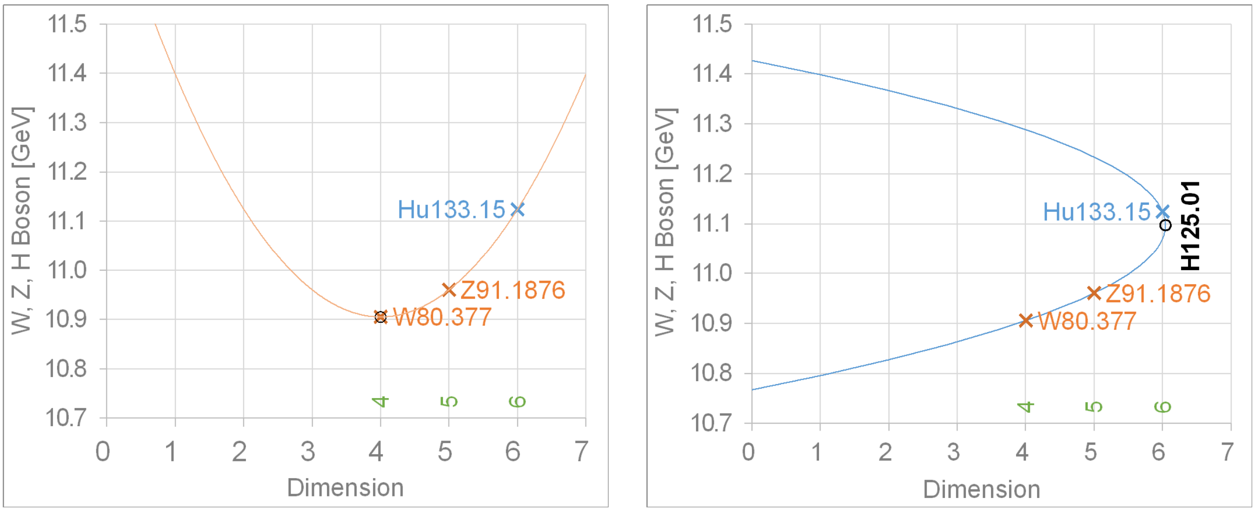
Particles do not have proper mass. The intensity of quantum space gives mass to particles.

2.10 Three generations of standard model

The three generation quantum spaces give properties to particles. Therefore, particles have three generations, and the fourth generation does not exist in our universe.

2.11 Elementary particle and Mixed particle

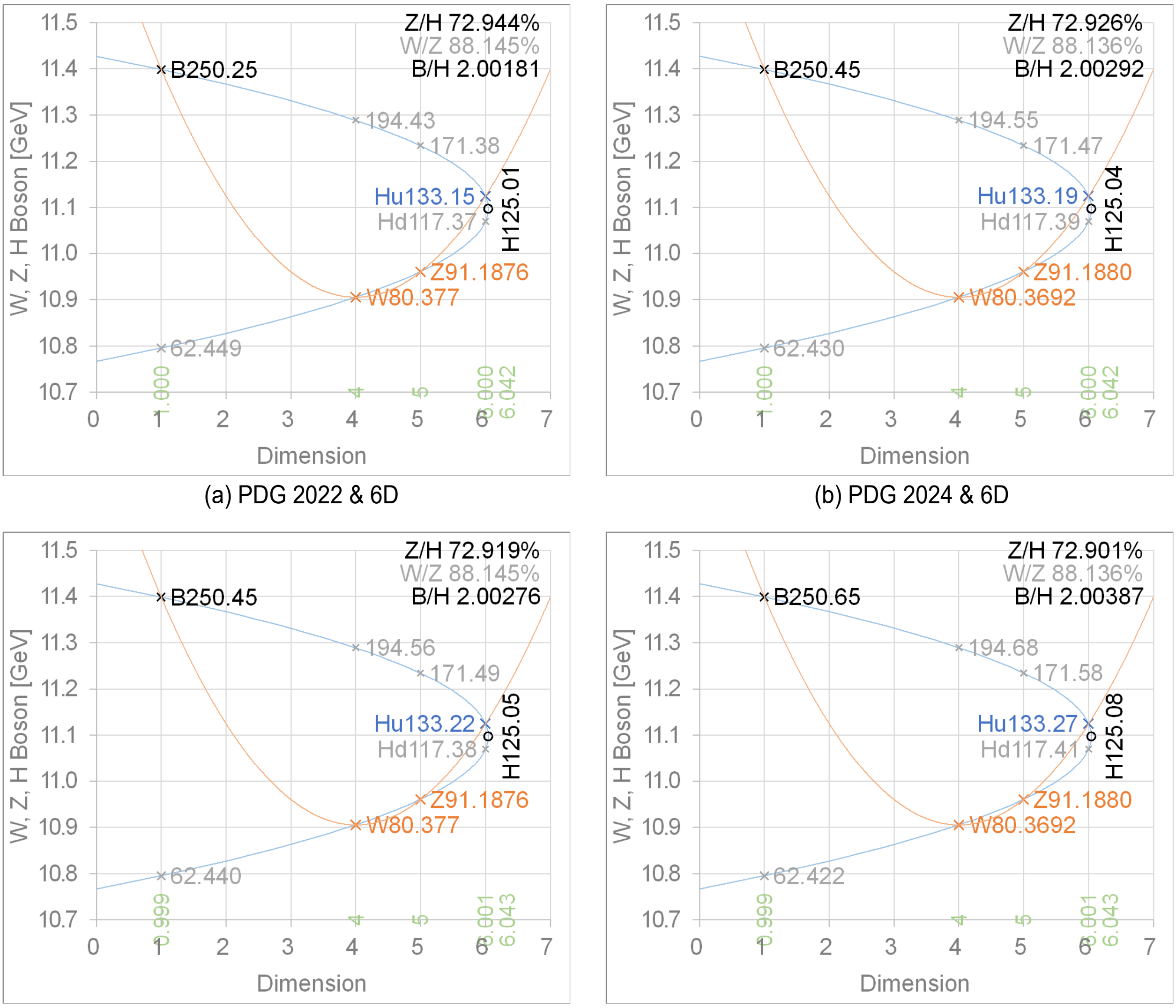
Three generations of neutrinos (electron, muon, tau) that make the shape of particle and three generation of gravinos (graviton, photon, gluon) that occur the force of particle are



(a) Log-parabola equation

(b) Log-inverse parabola equation

Fig. 2 Mass of H boson calculated from log and log inverse parabolic equations



(a) PDG 2022 & 6D

(b) PDG 2024 & 6D

(c) PDG 2022 & 6.001D

(d) PDG 2024 & 6.001D

Fig. 3 Mass of H boson calculated from W boson and Z boson

the elementary particles of all things. All other particles are mixed particles composed of above six particles. Here, gravino is the word suggested by the author.

2.12 Gravity

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

2.13 Absolute Something

The final question is what made our universe so perfectly beautiful. Absolute something created our strict universal space as shown in Fig. 1. The author calls it Mommy Quantum Hole (MQH). All multi-universes are very beautiful such as our universe.

3. Mass of H Boson: 125.06 GeV

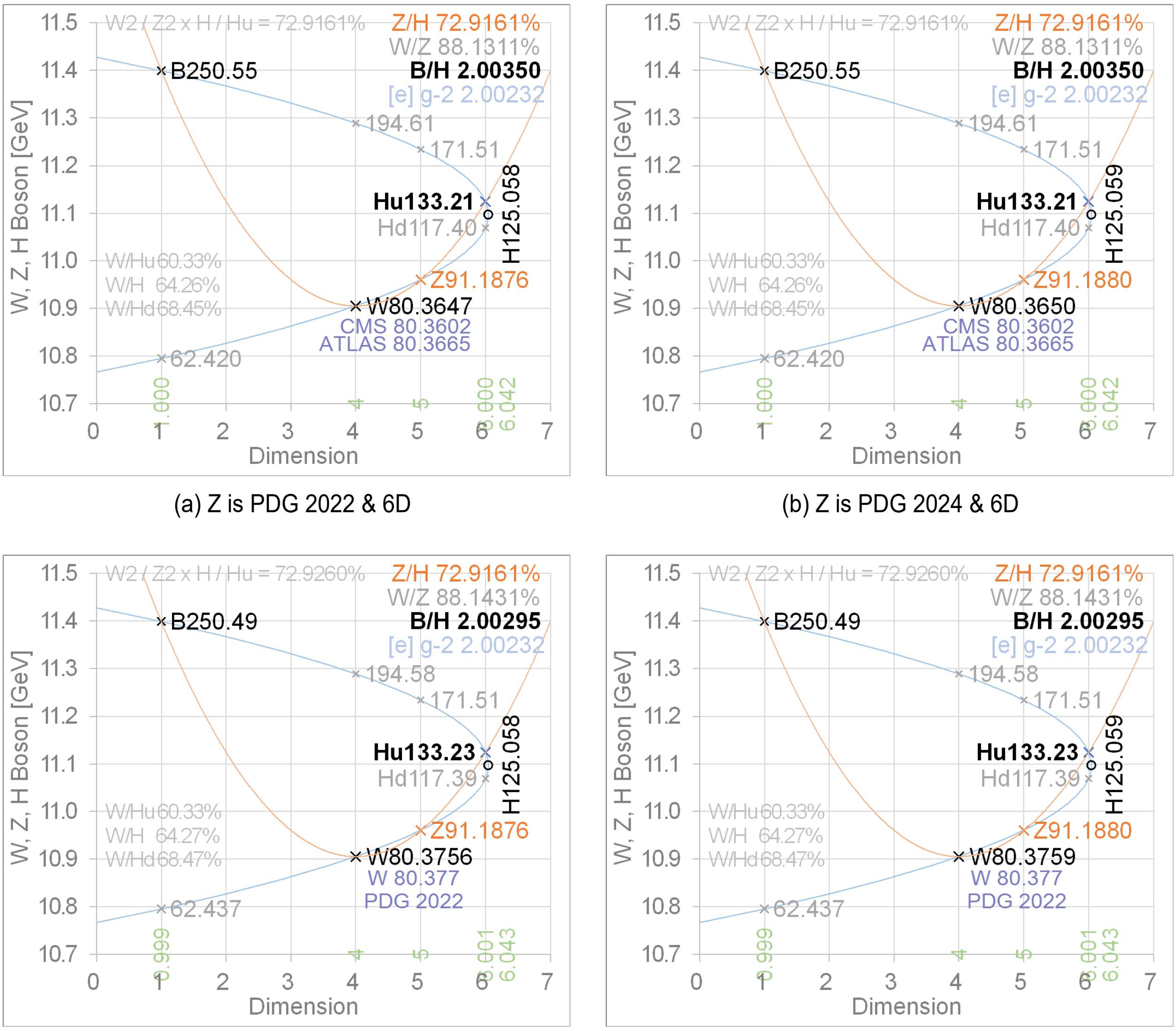
3.1 Masses of W, Z, H

In Table 2, the masses of W, Z, and H presented by Particle Data Group are presented.

3.2 Log-parabola equation

In the chart of Fig. 2, the horizontal axis is the dimension of space, and the vertical axis is the logarithm of particle mass. The core of this interpretation is that quantum mass should be calculated as logarithmic values. The values of W and Z masses in Fig. 2 is PDG 2022 data. In (a), drawing the log-parabola with (4D, 80.377W), (5D, 91.1876Z) and the vertex 4D, the value of Hu 133.15 GeV is calculated at 6D.

3.3 Log-inverse parabola equation



(a) Z is PDG 2022 & 6D

(b) Z is PDG 2024 & 6D

(c) Z is PDG 2022 & 6.001D

(d) Z is PDG 2024 & 6.001D

Fig. 4 Mass of H boson and W boson calculated from dark energy 72.9161% and Z boson

In Fig. 2(b), when the log inverse parabola is plotted for the three points (80.377W, 4D), (91.1876Z, 5D), and (133.15Hu, 6D), the value of 125.01 GeV is calculated at its vertex, which is almost the same as the mass 125 GeV of H boson.

3.4 H boson calculated from W and Z

Fig. 3(a) is the result of Fig. 2 applied with PDG 2022, and (b) is the result of applied with PDG 2024. From electron 510.999 keV, muon 105.658 MeV, and tau 1776.86 MeV, 6.00108D [4] is calculated. The results of applying this value are (c) and (d). It is not clear which value is correct in Fig. 3. However, it is very peculiar that the Z/H value is about 72.92% and the B/H value is about 2.002.

3.5 H boson mass 125.06 GeV

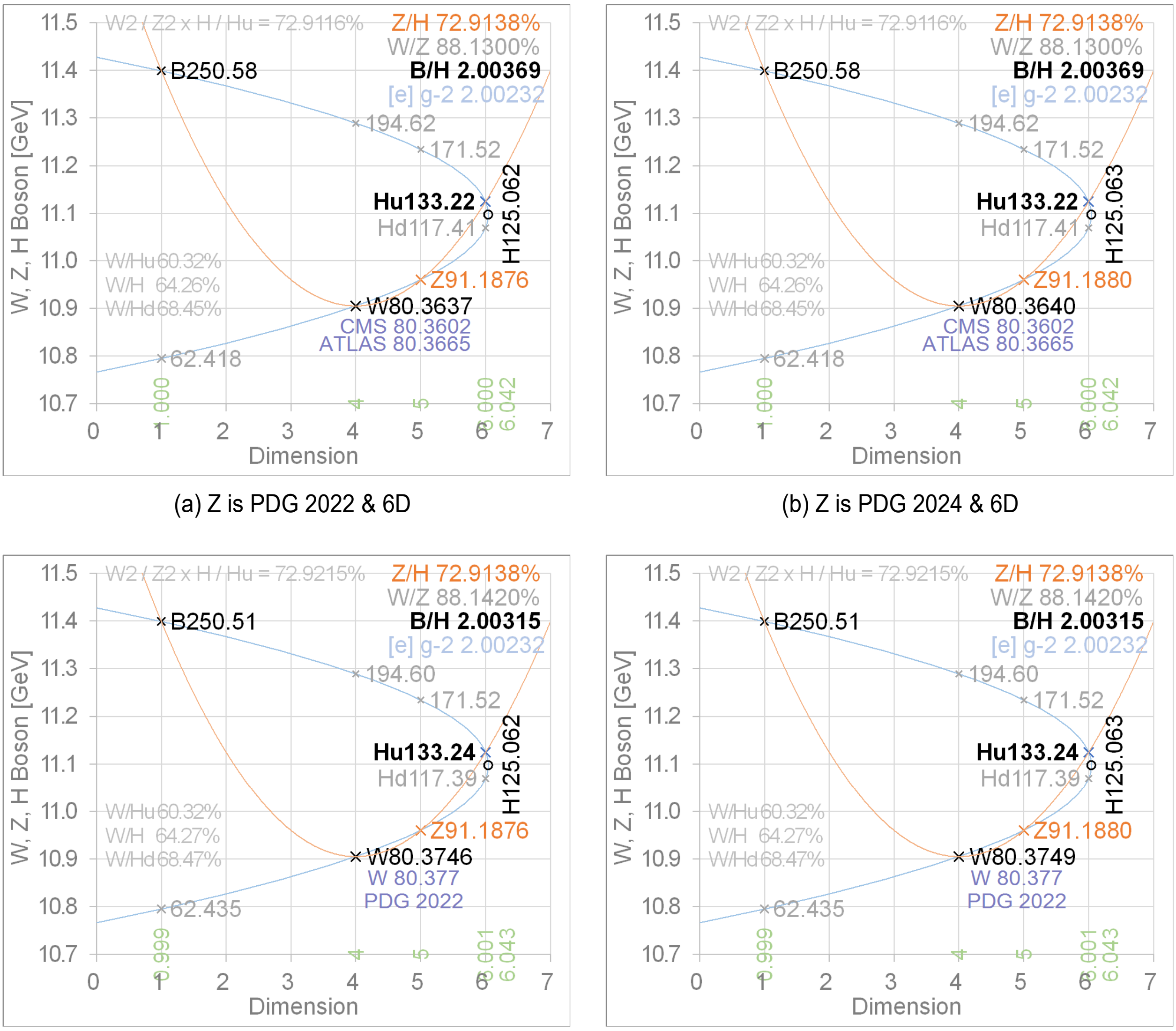
In previous study [5], the dark energy ratio was calculated to be 72.9138% or 72.9161%, which is similar to 72.8% of Before Planck. The value of 1/2/72.91_% is 68.57%, which is similar to about 68.4% of Planck 2018. If the value of Z / H is the dark energy ratio, the value of H is calculated to be 125.06 GeV, as shown in Fig. 4 and Fig. 5.

3.6 Down & Up H boson

There are down and up the vertex 125 GeV of the inverse parabola. The down is the region of 4ℓ, and the above is the region of γγ.

3.7 W boson mass 80.3650 GeV

In Fig. 4 and Fig. 5, the masses of W boson are calculated, and there are some differences. The author has so far judged the interpretation of 6.001D to be correct. However, the calculated value of W^2 / Z^2 x H / Hu is presented at the top of



(a) Z is PDG 2022 & 6D

(b) Z is PDG 2024 & 6D

(c) Z is PDG 2022 & 6.001D

(d) Z is PDG 2024 & 6.001D

Fig. 5 Mass of H boson and W boson calculated from dark energy 72.9138% and Z boson

each chart, and in Fig. 4(a, b), this value exactly matches the value of Z / H 72.9161%. The probability that this value coincides by chance is considered to be zero. From this, the mass of the W boson would be 80.3650 GeV. The value presented by CMS 2024 is 80.3602 GeV [6], the value presented by ATLAS 2024 is 80.3665 GeV [7], and the value of 80.3650 GeV in Fig. 4(b) is located between the two.

Here, Fig. 4(b) of 6D is too perfectly calculated. If it is too perfect, there will be no change in the universe. Something must be slightly off for the universe to change. If the above interpretation is correct, the value of 6.001D in Fig. 4(d) may be correct.

3.8 W- & W+ boson

W boson is located at the vertex of 4D. Therefore, W- and W+ exist based on the vertex. From the left-right and top-bottom symmetry of charts, new values will be discovered.

3.9 Dark energy : 72.9161% vs 72.9138%

So far, all the author's calculations have applied 72.9161% as the dark energy ratio. However, 72.9138% may be correct for the neutrino series, and 72.9161% may be correct for the force series. Since W, Z, and H bosons are in the force series, it would be correct to apply 72.9161%.

3.10 Various numerical values

Besides the H and W boson masses, various other numerical values are calculated in Fig. 4 and Fig. 5. All numbers probably have a physical meaning that we have not yet discovered. As an example, the value of B/H is calculated to be about 2.003. The value of electron g-2 factor is 2.00232. The two values are shown to be very similar.

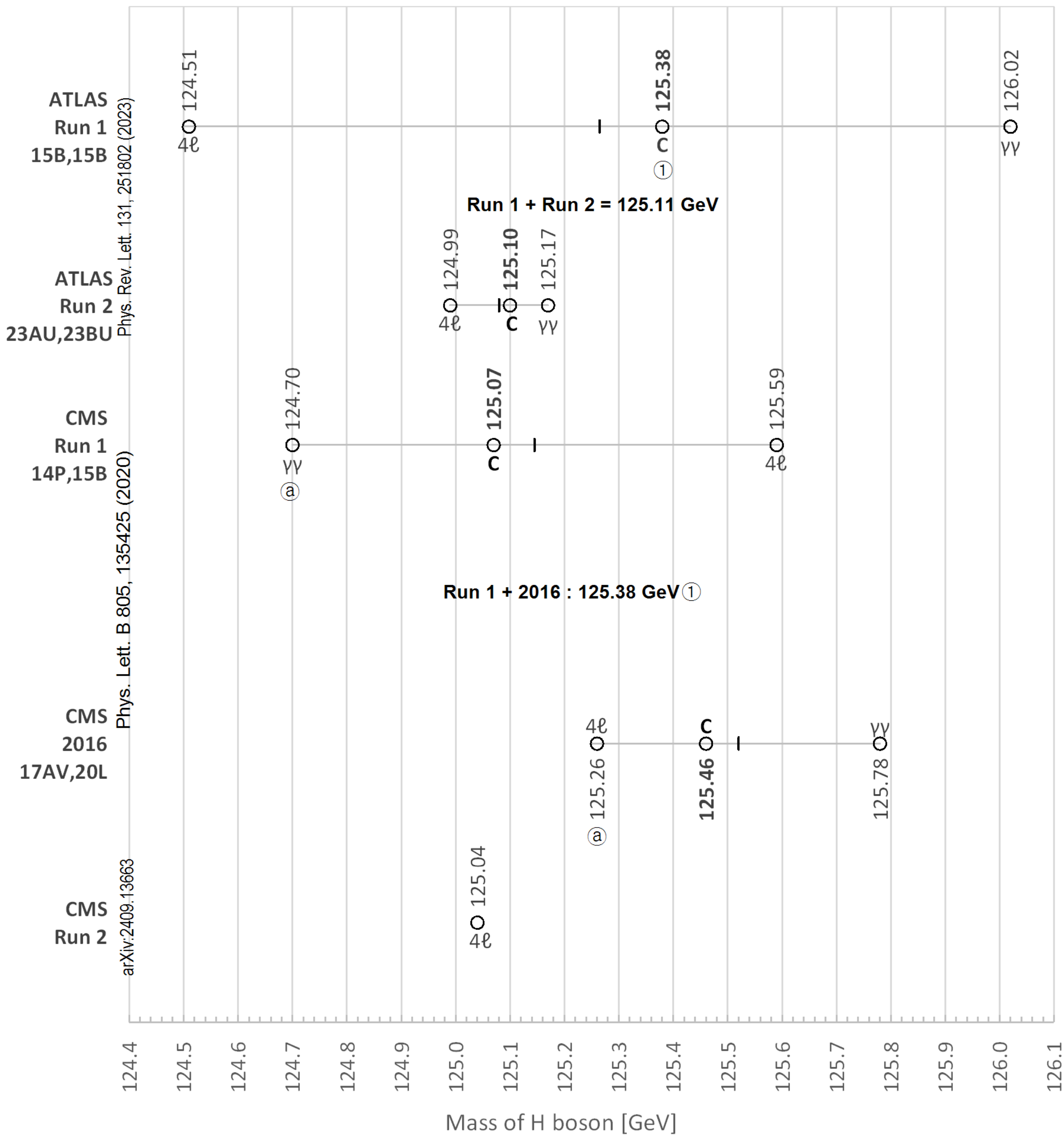


Fig. 6 The measured H boson masses [GeV]

4. Discovery of Dark Ratio 63.1% from CMS

4.1 ATLAS and CMS

The masses of Higgs boson measured by ATLAS and CMS are shown in Fig. 6. The 4ℓ mass of ATLAS Run 1 is 124.51±0.52 GeV, the γγ mass is 126.02±0.51, and the combined mass of above two is 125.38±0.41 GeV. The 4ℓ mass of ATLAS Run 2 is 124.99±0.19 GeV, the γγ mass is 125.17±0.14, and the combined mass of above two is 125.10±0.11 GeV. The combined mass of Run 1 and Run 2 was presented as 125.11±0.11 GeV [2]. The γγ mass of CMS Run 1 is 124.70±0.34 GeV, the 4ℓ mass is 125.59±0.46, and the combined mass of above two is 125.07±0.28 GeV. The 4ℓ mass of CMS 2016 is 125.26±0.21 GeV, the γγ mass is 125.78±0.26, and the combined mass of above two is 125.46±0.16 GeV. The combined mass of Run 1 and 2016 was presented as 125.38±0 GeV [3]. Recently, CMS measured 125.04±0.12 GeV at 4ℓ [8].

Two peculiar things are visible in Fig. 6. In ⓐ of CMS, the

Table 2 Recalculation applying a dark ratio of 63.1% to Run 1 and 2016 of CMS

State	Ratio	CMS	γγ	SK	KS	4ℓ	Deviation
[S]	62.4%	Run 1	124.70	125.03	125.26	125.59	68.80%
[K]	37.6%	2016	125.26	125.46	125.58	125.78	72.67%
			125.37	125.38	125.38	125.38	0.0037
[S]	63.1%	Run 1	(1) 124.70	(2) 125.03	(3) 125.26	(4) 125.59	1 - 63.1% / 2 Ω 68.45%
[K]	36.9%	2016	(5) 125.26	(6) 125.45	(7) 125.59	(8) 125.78	1 / (1+36.9%) Ω 73.05%
			(1↔8) 125.38	(2↔7) 125.38	(3↔6) 125.38	(4↔5) 125.38	σ 0.0001
[S]	63.5%	Run 1	124.70	125.02	125.27	125.59	68.25%
[K]	36.5%	2016	125.26	125.45	125.59	125.78	73.26%
			125.39	125.38	125.38	125.38	0.0020

Run 1 : (1) γγ 124.70 * [S] 63.1% + (4) 4ℓ 125.59 * [K] 36.9% = (2) SK 125.03
(1) γγ 124.70 * [K] 36.9% + (4) 4ℓ 125.59 * [S] 63.1% = (3) KS 125.26
2016 : (5) γγ 125.26 * [S] 63.1% + (8) 4ℓ 125.78 * [K] 36.9% = (6) SK 125.45
(5) γγ 125.26 * [K] 36.9% + (8) 4ℓ 125.78 * [S] 63.1% = (7) KS 125.59
New : (1) γγ 124.70 * [K] 36.9% + (8) 4ℓ 125.78 * [K] 63.1% = 125.38
(2) SK 125.03 * [K] 36.9% + (7) KS 125.59 * [K] 63.1% = 125.38
(3) KS 125.26 * [K] 36.9% + (6) SK 125.46 * [K] 63.1% = 125.38
(4) 4ℓ 125.59 * [K] 36.9% + (5) γγ 125.26 * [K] 63.1% = 125.38

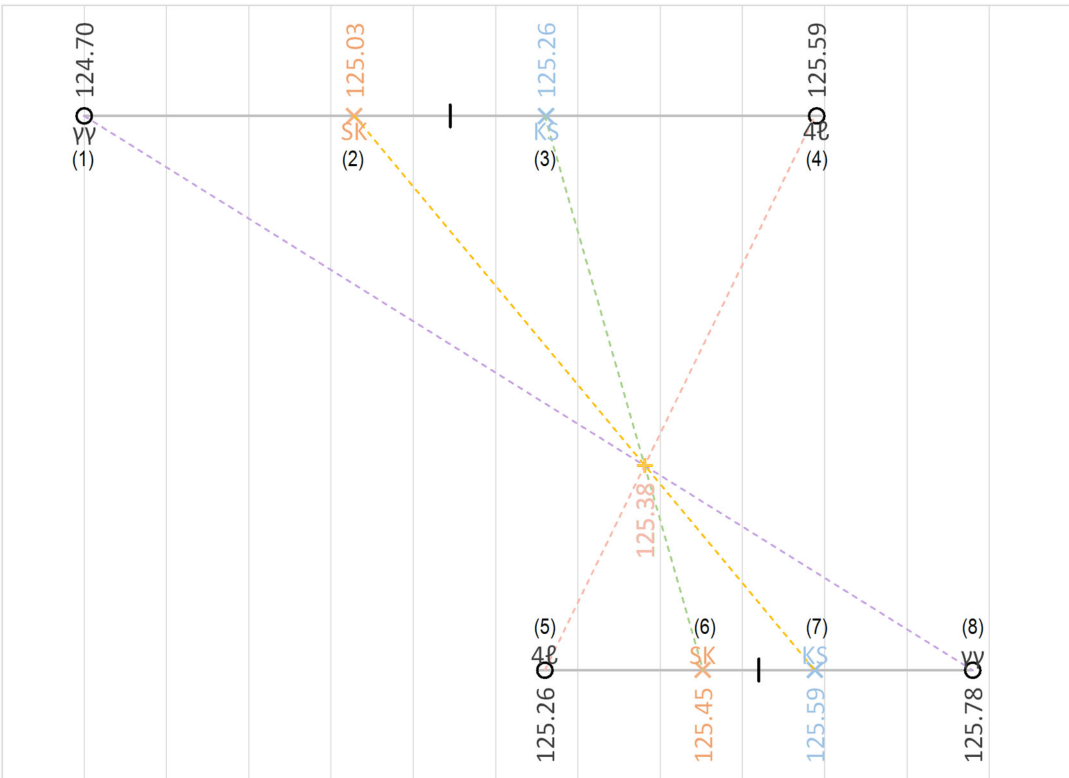
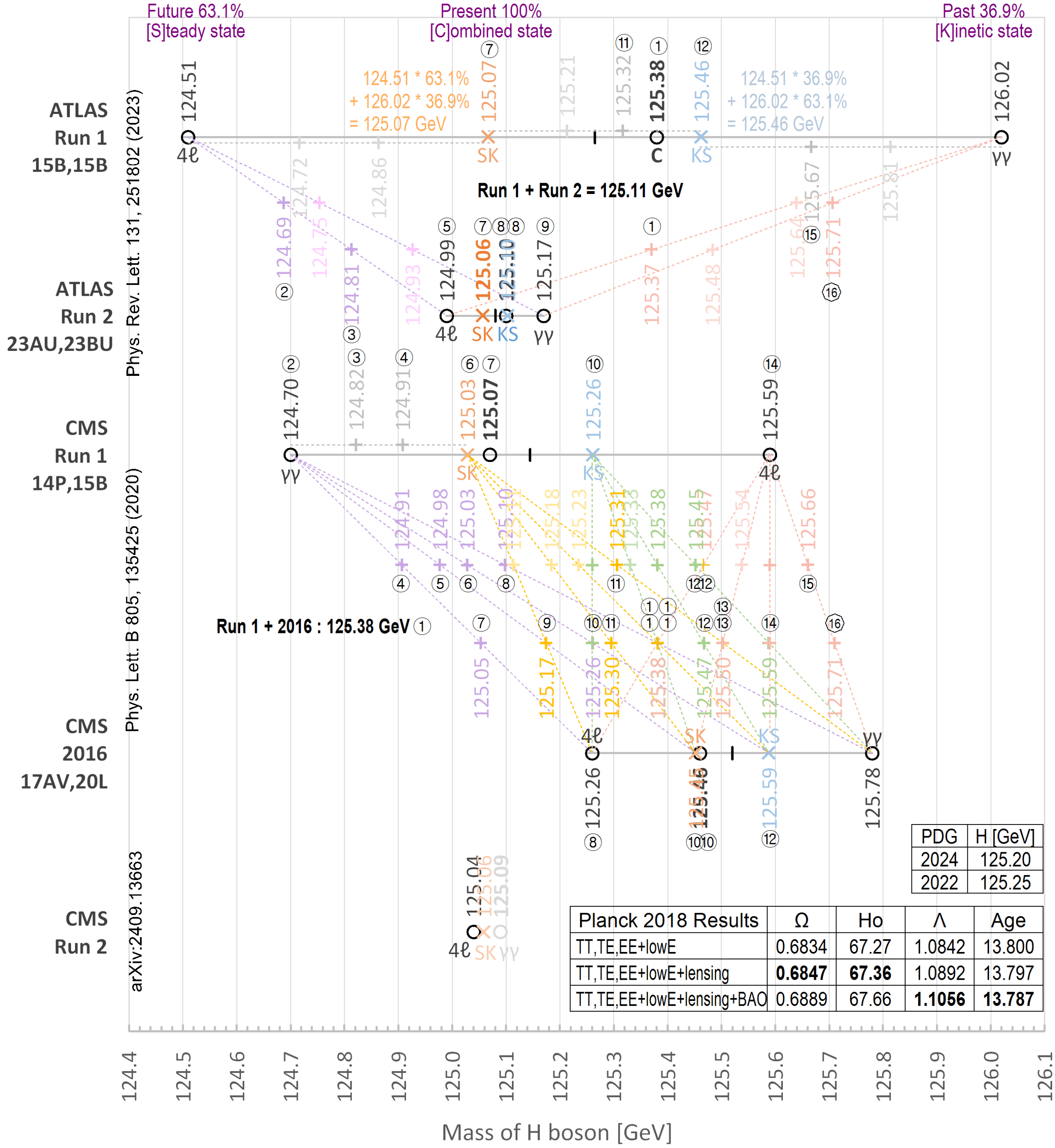


Fig. 7 Recalculation applying a dark ratio of 63.1% to Run 1 (above) and 2016 (below) of CMS



PDG	H [GeV]
2024	125.20
2022	125.25

Planck 2018 Results	Ω	Ho	Λ	Age
TT,TE,EE+lowE	0.6834	67.27	1.0842	13.800
TT,TE,EE+lowE+lensing	**0.6847**	**67.36**	1.0892	13.797
TT,TE,EE+lowE+lensing+BAO	0.6889	67.66	**1.1056**	**13.787**

ATLAS Run 1 4ℓ 124.51 * 63.1% + Run 1 γγ 126.02 * 36.9% = 125.07 GeV ⑦

Run 2 4ℓ 124.99 * 63.1% + Run 2 γγ 125.17 * 36.9% = 125.06 GeV ⑦

CMS Run 1 γγ 124.70 * 63.1% + Run 1 4ℓ 125.59 * 36.9% = 125.03 GeV ⑥

Run 1 γγ 124.70 * 36.9% + 2016 4ℓ 125.26 * 63.1% = 125.05 GeV ⑦

CMS Run 2 4ℓ 125.04 * 63.1% + Run 2 γγ _____ * 36.9% = 125.06 ☞ γγ = 125.09 GeV

Run 2 4ℓ 125.04 * 36.9% + Run 2 γγ _____ * 63.1% = 125.06 ☞ γγ = 125.07 GeV

Fig. 8 Reinterpretation of the measured H boson masses [GeV]

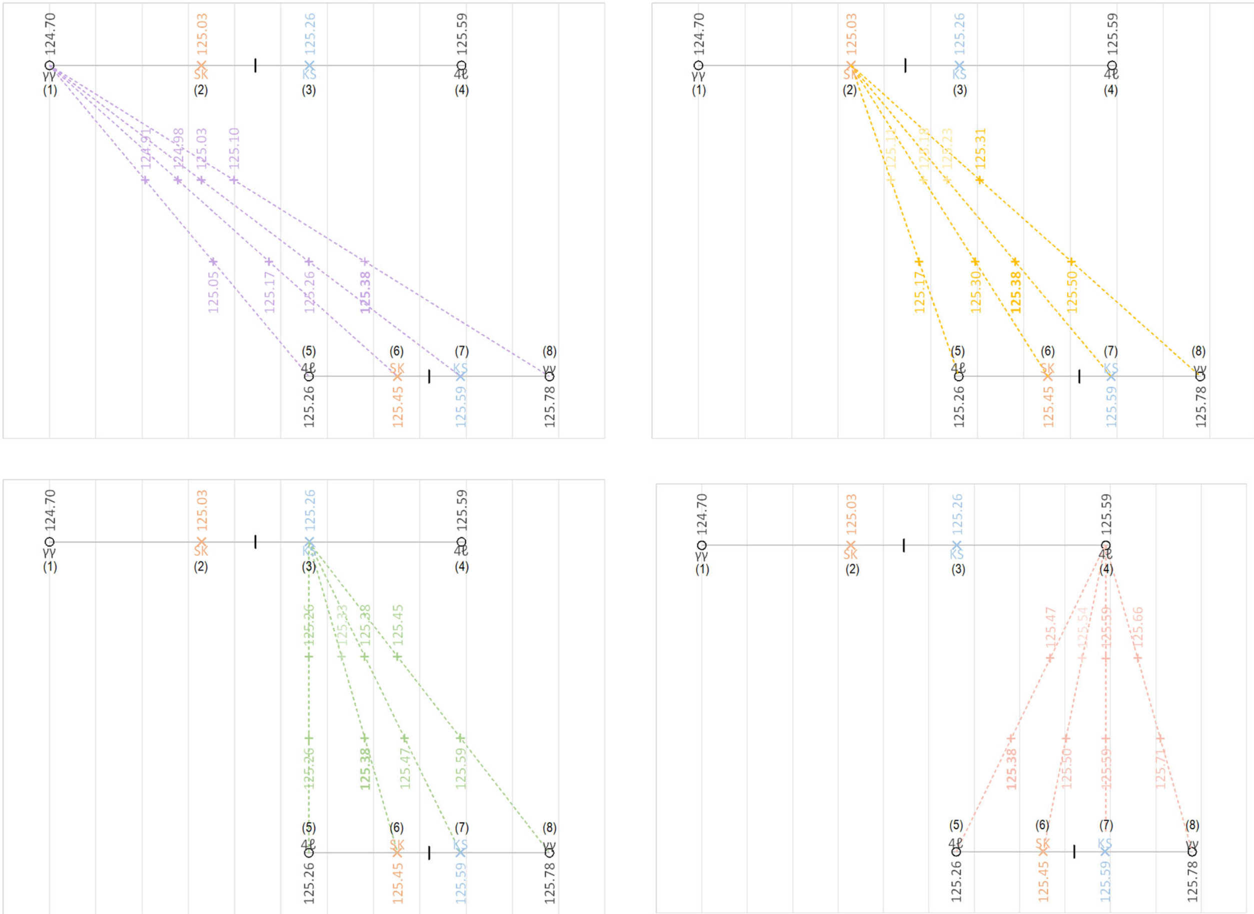


Fig. 9 Consistency between Run 1 (above) and 2016 (below)

left side of Run 1 is γγ, but the left side of 2016 is 4ℓ. In ①, CMS presented the value of Run 1 + 2016 as 125.38 GeV, and the combined mass of ATLAS Run 1 is also 125.38 GeV.

4.2 Six numbers of 125.38 GeV

Table 2 and Fig. 7 present calculations for four cases where 125.38 GeV is calculated. In Table 2, γγ of Run 1 is (1) 124.70 and 4ℓ is (4) 125.59. By multiplying these values by the ratio of 63.1% as Eqs. (2) and (3), the values of SK 125.03 and KS 125.26 are calculated. In Table 2, γγ of 2016 is (5) 125.26 and 4ℓ is (8) 125.78. By multiplying these values by the ratio of 63.1% as Eqs. (6) and (7), the values of SK 125.45 and KS 125.59 are calculated. If the above values are recalculated at the ratio of 63.1%, as shown in Fig. 7, 125.38 GeV is calculated for all four cases with a standard deviation of 0.0001. In Fig. 6, Run 1 of ATLAS was also 125.38 GeV, and Run 1 + 2016 of CMS was also 125.38 GeV. As calculated in Table 2, when 62.4% is applied, the standard deviation is calculated as 0.0037, and when 63.5% is applied, it is calculated as 0.0020.

4.3 Dark ratio 63.1%

A very peculiar ratio of 63.1% was found from CMS Run 1 and 2016. Since its physical meaning is unknown, it can be called the dark ratio.

4.4 Mass of H boson: 125.06 GeV

In Fig. 6, the combined value of ATLAS Run 1 is 125.38 GeV, and the combined value of Run 2 is 125.10 GeV. Fig. 8 shows the recalculated results by applying 63.1% and 36.9% to all values of ATLAS and CMS.

Applying 63.1% to 4ℓ 124.51 and 36.9% to γγ 126.02 of ATLAS Run 1, 125.07 GeV is calculated. Applying 63.1% to 4ℓ 124.99 and 36.9% to γγ 125.17 of ATLAS Run 2, 125.06 GeV is calculated. The above two results are the same as 125.06 GeV calculated in Fig. 4 and Fig. 5.

In Fig.6, the combined value of CMS Run 1 is 125.07 GeV, and that of 2016 is 125.46 GeV. Applying 63.1% to γγ 124.70 and 36.9% to 4ℓ 125.59 of CMS Run 1, 125.03 GeV is calculated. Applying 36.9% to Run 1 γγ 124.70 and 63.1% to 2016 4ℓ 125.26, 125.05 GeV is calculated.

4.5 State of 4ℓ, γγ, and H boson

Applying 63.1%, the mass of the H boson is calculated to

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             100%                                [K] 36.9%              [S] 63.1%
|-----------------------------------------|-----------------X---------------------------------|
0                                        0.5            Ω 0.6845                              1

             100%                                [K] 36.9%              [S] 63.1%
|-----------------------------------------|-----------------X---------------------------------|
0                                    Ω 0.7305               1                            1.4609

             100%                                [K] 36.9%              [S] 63.1%
|----------------------------------------- Λ ---------------⇛X⇚-------------------------------|
0                                        0.5            Ω 0.6845                              1
0Y           Dark Time                 10.069BY         13.785BY                      20.139BY
0m           Dark Length               9.526E25m        13.041E25m                   19.052E25m
∞/m2         Cosmological Constant     1.1020E-52/m2    CMB→|→Redshift           4D Super Black Hole
Big Bang     Dark Matter               3D Planck star   3D Universe              4D Event Horizon
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Fig. 10 Dark energy ratio and Cosmological constant

be 125.06 GeV. This result is unlikely to be a coincidence. This means that 4ℓ, γγ, and H are all real answers, and 4ℓ exists in a certain [S] state, γγ exists in a certain [K] state, and H exists in our [C] state.

4.6 Consistency of 47 values

All the values calculated in Fig. 8 are simply recalculated by applying the dark ratio of 63.1% to Fig. 6. In Fig. 8, 47 values from ① to ⑯ match within ±0.01 GeV.

Fig. 9 shows the detailed relationship between Run 1 and 2016 in the CMS of Fig. 8. The bold numbers indicate consistency, while the light numbers indicate inconsistency. It can be seen that the relationship between Run 1 and 2016 is almost perfectly established.

4.7 CMS Run 2 γγ: 125.07, 125.09 GeV

In Fig. 6, the 4ℓ of CMS Run 2 was measured at 125.04 GeV. The mass of H boson is estimated to be 125.06 GeV. Therefore, the γγ of CMS Run 2 is predicted to be measured as 125.07 or 125.09 GeV.

5. Physical Meaning of Dark ratio 63.1%

5.1 Hubble tension: 70.93 km/s/Mpc

In Planck 2018 results, Hubble constant from CMB is given as about 67.4 km/s/Mpc, and the global average value measured from redshift is given as about 73.0 km/s/Mpc. From the same calculation, the value of CMB 67.4 * [K] 36.9% + Redshift 73.0 * [S] 63.1% is calculated to be [C] 70.93 km/s/Mpc. From this, it can be determined that CMB is [K] state, Redshift is [S] state, and the mixture of the above two is the [C] state.

5.2 Age of universe: 13.785 BY

If the universe is expanding at a constant velocity, the Hubble constant of 70.93 km/s/Mpc is calculated to be 13.785 BY from 3.08568E19 / 70.93 / 60 / 60 / 24 / 365.24 / 1E8. In Planck 2018 results, the age of the universe is presented as 13.800, 13.797, or 13.787 BY.

5.3 Dark energy ratio: 68.45%

0.5 is plotted on the coordinate axes of 0 and 1 in Fig. 10. Let the interval between 0 and 0.5 be 100%, the interval between 0.5 and the unknown X be [K] 36.9%, and the interval between the unknown X and 1 be [S] 63.1%. From this, the value of Ω where the unknown X is located is calculated to be 0.6845 (= 1 - [S] 63.1% / 2). In the Planck 2018 results, the dark energy ratio by TT,TE,EE+lowE+lensing is presented as 0.6847.

5.4 Dark energy ratio: 73.05%

In Fig.10, let the unknown X be 1. Then, Ω is calculated as 0.7305 (= 100% / (100% + [K] 36.9%)). Until Planck 2012, the dark energy ratio was suggested as about 73%. Therefore, it can be understood that 68.45% and 73.05% are simply the differences in the reference positions, and the product of the two is 1/2 (0.5 : 0.6845 = 0.7305 : 1).

The dark energy ratio applied in Fig. 4 is 72.916%, which is 62.9% (= 2 – 1 / 72.916%) when converted. If 62.4% < [S] < 63.5% in Table 2, there is no change at all values of Fig. 8. That is, 63.1% in Table 2 and 62.9% in Fig. 4 are values within the margin of error.

5.5 Dark matter: Λ

From Fig. 8 and Fig. 10, we can understand that 63.1% is a value that can reveal the secrets of the universe. That is, it is clear that Fig. 10 has a very important physical meaning. The unknown X would be our universe, and 0 to 0.5 would be dark matter Λ.

5.6 Dark time: 10.069 BY

In Fig.10, the 0 is Big Bang. Since the time from 0 to X is 13.785 BY, the time from 0 to Λ is calculated from the proportional equation to be 10.069 BY, and since it is an unknown value, it becomes dark time.

5.7 Dark length: 9.525E25m

The dark time multiplied by the speed of light is the dark length, which is calculated to be 9.526E25m (= 10.069 BY * 1E8 * 2.99792E8 * 60 * 60 * 24 * 365.2422)

5.8 Cosmological constant: 1.1020E-52 /m2

1/m2 of the dark length is calculated as 1.1020E-52 /m2. In Planck 2018 results, the cosmological constant Λ was given as 1.1056E-52 /m2 (TT,TE,EE+lowE+lensing+BAO).

5.9 3D Planck star & 4D super black hole

Our universe X is located in the void between 0.5 and 1. In order for that X to remain stable, a certain extreme force must push from the left of X, and a certain extreme force must pull from the right of X. The Λ of size 0 to 0.5 could generate the extreme forces. The Λ is a 3D Planck star, the 1 is the event horizon of 4D super black hole, and we in 3D can never observe them.

5.10 Cosmological constant problem

The length of 3D Planck star l_{P3} is 9.525E25 m, and the cosmological constant Λ_3 is 1.1020E-52, so the cosmological constant problem $l_{P3}^2 \cdot \Lambda_3$ becomes 1/1, not 1/10^120.

5.11 Expansion of the universe

In Fig. 10, our universe is located at X, and as our universe expands, X moves to the right. Here, it is not reasonable to assume that only X moves to the right and the rest are fixed. It would be reasonable to assume that, like a 4D rubber band, 0 is fixed and 1 expands to the right. Therefore, 100%, [K] 36.9%, and [S] 63.1% are absolute constants, and the rest are time-dependent parameters. That is, dark energy ratio is the absolute constant, and cosmological constant is the cosmological parameter.

5.12 Theory of absoluteness

The entirety of Fig. 10 is the absolute theory of 4D space and 1T time, and our universe X is the relativity theory of 3d space and 1t time. When infinitely small dark particles exist infinitely in an infinitely large space, it would be difficult for them to cause beautiful changes. A single infinitely large dark particle could absolutely bring about beautiful changes. The one infinitely large dark particle could cause the absolute beautiful changes.

5.13 Absolute gravity

In Fig. 10, the space between Λ and X is a four-dimensional void, and dark matter Λ causes absolute gravity in universe X.

5.14 Kinetic, Steady, and Combined state

The left side of X is the past space that expanded at the speed of light, and is in [K]inetic state dominated by the pushing force. The right side of X is the future space that is stationary, and is in [S]teady state dominated by the pulling force. X itself is present space where the past and future coexist, and is in [C]ombined state.

5.15 [K] 36.9% + [S] 63.1% = [C] 100%

Hubble constant from CMB is about 67.4 km/s/Mpc, and that from redshift is about 73.0 km/s/Mpc. This problem is called 'Hubble Tension'. The radius of proton in ordinary hydrogen is 0.8751fm, and that in muonic hydrogen is 0.8409fm. This problem is called 'Proton Radius Puzzle'. The lifetime of neutron in beam is 887.7s, and that in bottle is 877.75s. This problem is called 'Neutron Lifetime Puzzle'. The above reason is the difference between kinetic measurement method and steady measurement method. That is, [K], [S], and [C] are all correct answers.

5.16 [K] CMB vs. [S] Redshift

As shown in Fig. 10, [K] CMB is the kinetic light that is moving due to the push of Λ, and [S] redshift is the steady light that is approaching due to the expansion of X. The core of the above explanation is that the characteristics of CMB and Redshift are different from each other.

5.17 Quantum mechanics

In Fig. 10, The X is our 3D universe. On the left, ⭆ is pushing with extreme force, and on the right, ⭅ is pushing with extreme force. This gives birth to quantum mechanics in which [K], [S], and [C] coexist in the extremely small 4D thickness of our 3D 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. 11. Where, α is electron neutrino, β is muon neutrino, γ is tau neutrino, f is fermion in 4D 5D 6D, b is boson in 10D 11D 12D, n is neutrino, s is anti-neutrino, g is gravino, t is anti-gravino, and N is the oscillating particle.

6.2 Particle and anti-particle

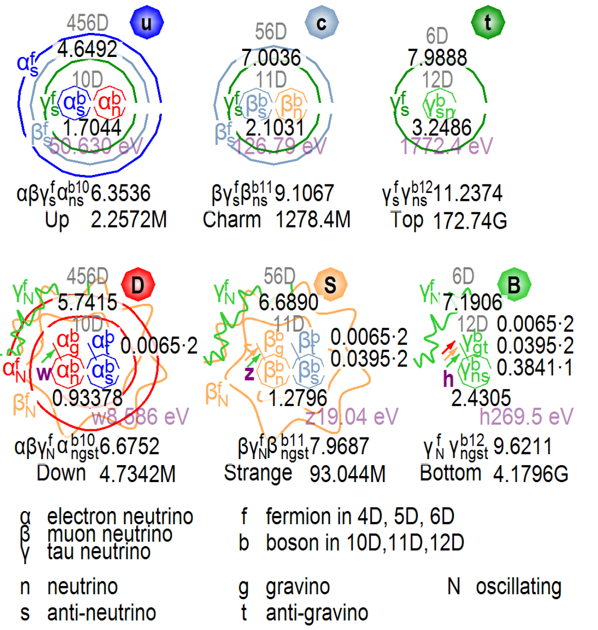


Fig. 11 Shape of quarks

As can be seen in Fig. 11, down, strange, bottom are particles, and up, charm, top are anti-particles. The difference is standard and oscillation.

6.3 w z h bosons inside of down, strange, bottom

Quark is a combined particle which is composed of shell fermion and inside boson in Fig. 11. There is a w boson of 10D in down quark. When down quark is collided, αN 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, βN 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

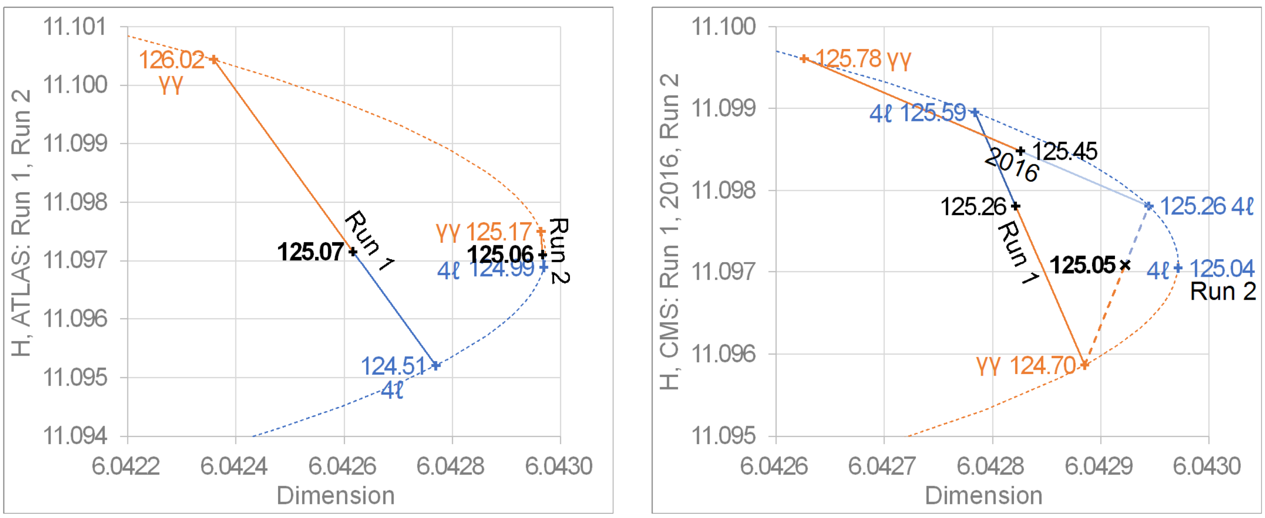
When the bottom quark is broken by very large energy, it is divided into 6D tau neutrino γN and 12D boson h. The boson h immediately moves into the quantum space of 6D, and its mass changes to H boson. The mass change also follows the logarithmic parabolic equation. The H boson located on 6D space of Fig. 4 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 4ℓ.

6.5 Collapse of H boson

If the collision energy is stronger, the h boson inside of bottom quark of Fig. 11 is broken. This phenomenon is the above area of the vertex on the inverse parabola of Fig. 4, and it is the γγ. The h Boson is composed of tau neutrino γn, gluon γg, tau anti-neutrino γs, and anti-gluon γt. 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.

6.6 Log-inverse parabola of ATLAS and CMS

Fig. 12 is a chart showing the values of ATLAS (a) and CMS (b) in Fig. 3 of log-inverse parabola. As explained in Fig. 11, when it is less than 125.06 GeV, w, z particle-antiparticle pairs (blue line) are generated, and when it is greater than



(a) ATLAS: Run 1, Run 2

(b) CMS: Run 1, 2016, Run 2

Fig. 12 Plot of the log-inverse parabola for the H masses of ATLAS and CMS

125.06 GeV, photon-antiphoton (orange line) pairs are generated. ATLAS Run 1 and Run 2 of Fig. 12(a) is consistent with the above explanation. However, CMS Run 1 in Fig. 12(b) is the opposite and Run 2 exceeded 125.06 GeV. If the measurement characteristics of ATLAS and CMS are assumed to be completely opposite, Fig. 12(b) may be correct. In this case, the combined value of 4ℓ 125.26 of 2016 and γγ 124.70 of Run 1 is calculated to be 125.05 GeV. 4ℓ of CMS Run 2 was measured at 125.04 GeV. It is necessary to confirm what the γγ value is measured to be.

6.7 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.

6.8 Neutrino inside of up, charm, top

There are boson neutrino pairs in up, charm, and top quarks. These do not respond to force, so they would be difficult to observe.

7. Conclusions

The intensity of the compressed quantum space gives the particle mass. In reverse, when a particle receives or loses quantum energy, the particle is moved to one of the three generations of quantum space that matches the energy. The core is that their relationship is established by log mass.

From the Z boson mass of 91.1880 GeV and the dark energy ratio of 72.916%, the mass of H boson was calculated to be 125.06 GeV, and from the log-parabolic equation, the mass of W boson was calculated to be 80.365 GeV.

A very special ratio of 63.1% was calculated from the Run 1 and 2016 of CMS. Applying 63.1% to Run 1 and Run 2 of ATLAS, the Higgs mass is calculated to be 125.07 GeV and 125.06 GeV. Applying 63.1% to Run 1 and 2016 of CMS, 47 identity values are found.

From 63.1%, the Hubble constant of 70.93 km/s/Mpc, the universe age of 13.785 BY, the dark energy fraction of 68.45%, and the cosmological constant of 1.1020E-52 /m2 are calculated, which are almost identical to the values in physics. There is no doubt that the secrets of the universe exist in 62.4% < [S] < 63.5%.

Proton is simply composed of two up quarks and one down quark. When the outer shell of down quark is stripped, it becomes a strange quark. When the outer shell of the strange quark is stripped, it becomes a bottom quark. When the outer shell of the bottom quark is stripped, H boson pops out.

In our 3D universe, there exists an extremely small 4D thickness where [K], [S], and [C] states coexist. We cannot easily understand this, and this is quantum mechanics.

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