Calculation of Up Charm Top Quark Masses by Q-theory

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Abstract Up, charm, and top quarks are the combination particles composed of the shell fermion of three generation anti-neutrinos and the inside boson of a pair of anti-neutrinos. When up quark collides violently, the most external electron anti-neutrino is peeled off and it is turned into charm quark. When the charm quark collides violently, the most external muon anti-neutrino is peeled off and it is turned into top quark. When the top quark collides violently, the most external tau anti-neutrino is peeled off, and a pair of anti-neutrino boson pops out. As the result of applying logarithmic elliptic equation to them, the mass of up quark was calculated as 2.254 MeV.

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1. Introduction

In previous studies, the mass of H boson was calculated easily from logarithmic parabolic equation relationship of W boson and Z boson[1], the characteristics of logarithmic elliptic equation and the principle of universal change were described[2], the dimension of our space was calculated as 6.00108 from the masses of electron, muon, and tau[3], and the standard masses and oscillating masses of three generation neutrinos and gravinos are calculated[4].

The purpose of this study is to calculate the mass of up quark by applying logarithmic elliptic equation.

2. Shape of up, charm, and top quarks

2.1 Shape of anti-quarks

The shapes of up, charm, and top quarks are drawn in Fig. 1. Where, α, β, and γ mean each 1st, 2nd, and 3rd generation fundamental particles, subscript n and s mean neutrino and anti-neutrino, and superscript f and b mean fermion and boson. Therefore, α_s^f, β_s^f, and γ_s^f are the standard fermion anti-neutrinos for electron on 4D, muon on 5D, and tau on 6D. α_{sn}^b, β_{sn}^b, and γ_{sn}^b are a pair of standard boson anti-neutrino on 10D, on 11D, and on 12D.

When up quark $\alpha\beta\gamma_s^f\alpha_{sn}^b$ collides violently, the α_s^f is peeled off and it is turned into charm quark $\beta\gamma_s^f\beta_{sn}^b$. When the charm quark collides violently, the β_s^f is peeled off and it is turned into top quark $\gamma_s^f\gamma_{sn}^b$. When the top quark collides violently, the γ_s^f is peeled off, and a pair of anti-neutrino boson γ_{sn}^b pops out. Here, α_{sn}^b located on 10D, β_{sn}^b located on 11D, and γ_{sn}^b located on 12D are all exactly same particle. Quantum space imparts the mass to particle[1], and because the quantum dimension of the most external shell is changed to 4D, 5D, and 6D, that of the boson anti-neutrinos also is naturally changed to 10D, 11D, and 12D.

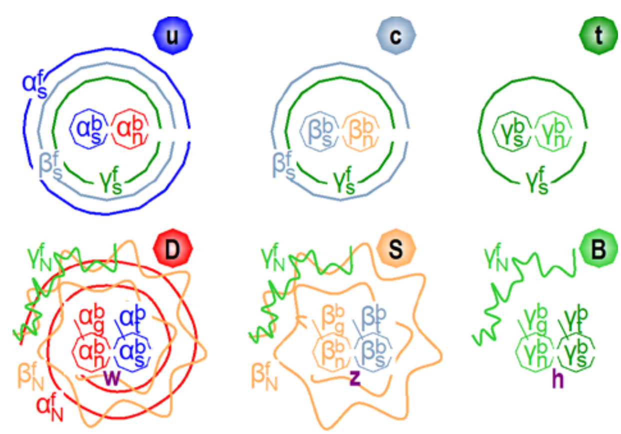

Fig. 1 Shape of quarks.

The γ_{sn}^b located on 12D jumps into our quantum space 6D, and it changes a very strange fermion anti-neutrino pair. And then it jumps to 5D and 4D by oscillation phenomenon[3,4]. And then it disappears in our empty XYZ space.

2.2 Shape of quarks

Up, charm, and top quarks are composed with anti-neutrons. Therefore, they are anti-quarks. Down, strange, and bottom quarks are composed with neutrons. Therefore, they are normal quarks. The masses calculation for down, strange, and bottom quarks will be performed in future study.

3. Calculation for up quark mass

3.1 Masses of neutrinos

In previous study[4], from the measured muon mass of 170 keV and tau mass of 15.5 MeV, the electron neutrino mass was calculated as 0.1531 eV. These values are presented in

Table 1 Calculation of up, charm, and top quark masses

Term	Reference	Kinetic State			Steady State			Unit	Symbol		
Dimension		4D	5D	6.001D	4D	5D	6.001D	-			
n Neutrino	Fig. 1, 2[4]	0.1531	170.0k	15.50M	0.1384	166.0k	15.52M	eV	α_n^f	β_n^f	γ_n^f
s Neutrino		0.9621	1068.1k	97.39M	0.8698	1043.1k	97.51M	eV	$s = n \cdot 2\pi$		
		-0.017	6.029	7.989	-0.061	6.018	7.989	log	α_s^f	β_s^f	γ_s^f
Shell Fermion		4.667	7.009	7.989	4.649	7.004	7.989	log	$\alpha\beta\gamma_s^f$	$\beta\gamma_s^f$	γ_s^f
		46.43k	10.20M	97.39M	44.56k	10.09M	97.51M	eV			
Dimension		10.001D	11.001D	12.002D	10.001D	11.001D	12.002D	-			
n Neutrino	Fig. 3, 4[4]	0.9955	6.182	1174	0.9093	5.704	1116	eV	m_{n5}^{10}	m_{n5}^{11}	m_{n5}^{12}
ns Neutrino		52.93	131.9	1818	50.58	126.7	1772	eV	m_{ns5}^{10}	m_{ns5}^{11}	m_{ns5}^{12}
Inside Boson		1.724	2.120	3.260	1.704	2.103	3.248	log	α_{ns5}^{10}	β_{ns5}^{11}	γ_{ns5}^{12}
Quarks		Up	Charm	Top	Up	Charm	Top				
Shell + Inside		6.390	9.129	11.248	6.353	9.106	11.237	log	q_u	q_c	q_t
		2.457M	1345M	177.03G	2.254M	1278M	172.76G	eV	m_u	m_c	m_t

1) $\alpha\beta\gamma_s^f = (\alpha_s^f + \beta_s^f + \gamma_s^f)/3$ $\quad \beta\gamma_s^f = (\beta_s^f + \gamma_s^f)/2$ $\quad \gamma_s^f = \gamma_s^f/1$

2) $m_{ns5}^{10} = (1+2\pi)^2 \cdot (m_{n5}^{10})^{1/2}$ $\quad m_{ns5}^{11} = (1+2\pi)^2 \cdot (m_{n5}^{11})^{1/2}$ $\quad m_{ns5}^{12} = (1+2\pi)^2 \cdot (m_{n5}^{12})^{1/2}$

the kinetic state of Table 1 and Fig. 1.

The masses of three generation neutrinos for steady state are calculated inversely from the masses of quarks. Frist, the masses of muon and tau neutrinos are assumed as 166.0 keV and 15.52 MeV. In previous study[4], the mass of electron neutrino for the values was calculated as 0.1384 eV from logarithmic elliptic equation. These values are presented in the steady state of Table 1 and Fig. 2.

3.2 Masses of anti-neutrinos

The mass of anti-neutrino is 2π times heavier than the mass of neutrino. This is the same with the relationship between Planck's constant and Dirac's constant. The calculated logarithmic values are presented in the table 1.

3.3 Masses of shell fermion

The logarithmic mass of shell fermion is calculated by equation 1) in Table 1. From this, the mass is calculated.

3.4 Masses of inside boson

In previous study, the oscillating masses of neutrinos were calculated. The fermion and boson are super-gauge symmetry[2]. Therefore, the values of 10.001D, 11.001D, and 12.002D at the below right of the logarithmic elliptic equation in Fig. 3 and 4[4] are adopted as the value of the inside boson.

Here, it is not yet clear why the "5D Oscillation" values should be adopted. When analyzing down, strange, and bottom quarks, the 5D characteristic also occur.

The internal boson is composed of s·n, and its mass is calculated as shown in equation 2) in Table 1. In previous study[2], Boson was described as a world of imaginary numbers. Such as this, equation 2) is also difficult to understand. The calculation results are presented in Table 1.

3.5 Masses of quarks for Kinetic state

Physics estimates that the mass of up quark is 2.2 ~ 2.3 MeV, the mass of charm quark is 1270 ~ 1280 MeV, and the mass of top quark is 172.38 GeV or 172.76 GeV.

The mass of quark is the logarithmic sum of the shell fermion and the inside boson. From this, the masses of quarks are calculated. In the kinetic state, the masses of up, charm, and top quark were calculated as 2.457 MeV, 1.345 GeV, and 177.03 GeV. These values differ slightly with the values of physics.

3.6 Masses of quarks for steady state

The start of the calculation is muon neutrino mass of 166.0 keV and tau neutrino mass of 15.52 MeV. The charm quark mass and the top quark mass calculated from them should be the same with the predicted values of physics. If the calculated value and the physical value are different each other, the calculation must be re-run with trial & error method.

The physical value of top quark 172.76 GeV was applied to this calculation. The mass of charm quark is calculated from the correlation of Z boson and down, strange, and bottom quarks. Here, they are connected to each other with 5D characteristics, and the calculated value was 1278 MeV. The calculation process will be described in a future study. Therefore, the mass of up quark is calculated as 2.254 MeV, and this sufficiently satisfies the predicted value of physics.

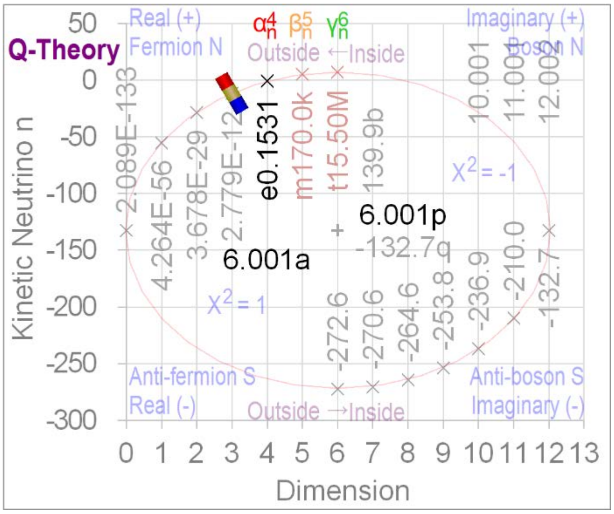

Fig. 1 Standard neutrino masses for Kinetic State(4)

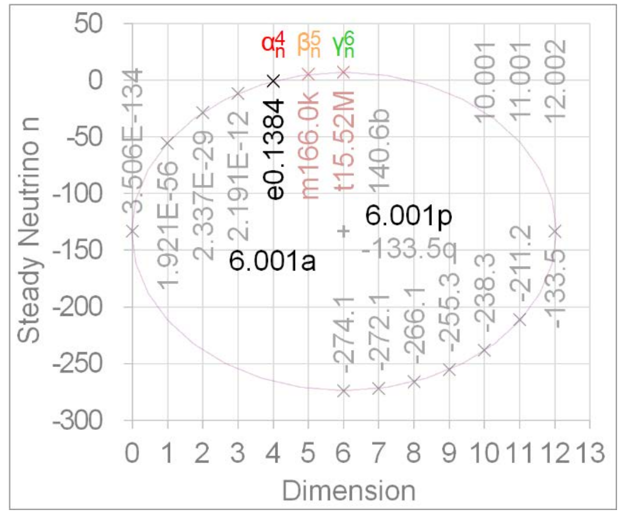

Fig. 2 Standard neutrino masses for Steady State(4)

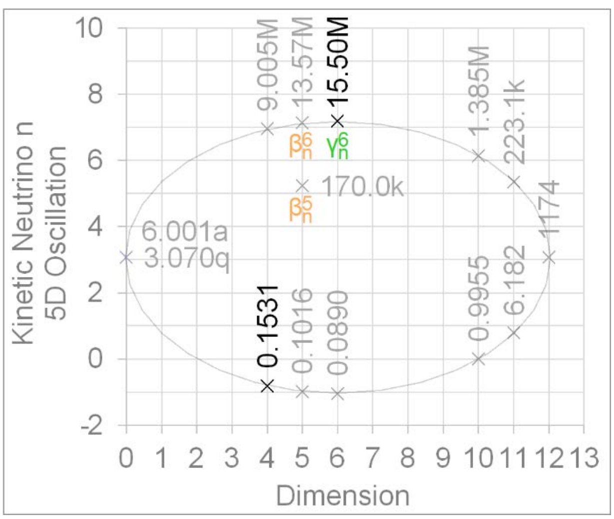

Fig. 3 5D oscillating neutrino masses for Kinetic State(4)

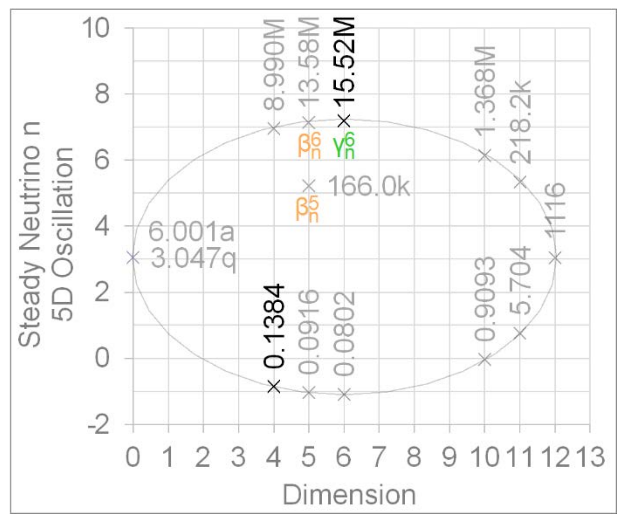

Fig. 4 5D oscillating neutrino masses for Steady State(4)

3.7 Sensitivity analysis

Substituting 172.38 GeV as the mass of top quark in Table 1, the masses of the up quark and charm quark are calculated as 2.253 MeV and 1276 MeV. Substituting 6.000D and 12.000D in Table 1, they are calculated as 2.250 MeV and 1280 MeV. Therefore, Table 1 cannot determine which of above values is more accurate.

The cosmological constant Λ can judge this. Applying 6.000D, the Λ is calculated as 80.3% ~ 82.7% based on the measurement. Applying 172.76 GeV, the Λ is calculated as 98.4%. Applying 172.38 GeV, the Λ is calculated as 101.3%. Measurement that is perfectly correct should be given.

4. Conclusions

The masses of up, charm, and top quarks applying kinetic state are calculated as 2.457 MeV, 1,345 MeV, and 177.03 GeV. These values have a bit error from the measured quark masses. Therefore, it can be understood that quarks should be analyzed as steady state.

When charm and top quark masses are given with 1278 MeV and 172.76 GeV, the mass of up quark by Q-theory was calculated as 2.254 MeV. The mass of up quark is estimated between 2.2 and 2.3 MeV in physics. The calculated mass 2.254 MeV satisfies this sufficiently.

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