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.

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, $\alpha^f_n$, $\beta^f_n$, and $\gamma^f_n$ are the standard fermion anti-neutrinos for electron on 4D, muon on 5D, and tau on 6D. $\alpha^b_n$, $\beta^b_n$, and $\gamma^b_n$ are a pair of standard boson anti-neutrino on 10D, 11D, and 12D.

When up quark $\alpha\beta\gamma^f_n\alpha^b_n$ collides violently, the $\alpha^f_n$ is peeled off and it is turned into charm quark $\beta\gamma^f_n\beta^b_n$. When the charm quark collides violently, the $\beta^f_n$ is peeled off and it is turned into top quark $\gamma^f_n\gamma^b_n$. When the top quark collides violently, the $\gamma^f_n$ is peeled off, and a pair of anti-neutrino boson $\gamma^b_n$ pops out. Here, $\alpha^b_n$ located on 10D, $\beta^b_n$ located on 11D, and $\gamma^b_n$ 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.

The $\gamma^b_n$ 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-neutrinos. 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...
3.2 Masses of anti-neutrinos

The mass of anti-neutrino is $2\pi$ 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(2), 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 2.254 MeV, respectively.

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.
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 $\Lambda$ can judge this. Applying 6.000D, the $\Lambda$ is calculated as 80.3% ~ 82.7% based on the measurement. Applying 172.76 GeV, the $\Lambda$ is calculated as 98.4%. Applying 172.38 GeV, the $\Lambda$ 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.

References