Cause of Muon g-2 Experiment Results

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Abstract In previous study, it was proved that the muon of 105.658 MeV is composed of the oscillating muon and tau neutrino masses of 4.912 MeV and the oscillating photon and gluon masses of 21.51 eV. The mass of quantum particle must be calculated logarithmically. The ratio of two masses is 0.000004378. The muon g-factor of standard model is 2.0023318 3620. The g-factor of experiment is 2.0023318 4122, and the g-factor calculated in this paper is 2.0023318 4130. Above two values are almost same. The muon g-2 experiment results prove that muon is not an elementary particle but a combination particle.

1. Introduction

The purpose of this paper is to prove the cause of muon g-2 experiment results.

2. Muon g-2 Experiment Results

2.1 Shape of muon

In Fig. 1, the normal shapes of electron neutrino, muon neutrino, tau neutrino, graviton, photon, and gluon are suggested such as (a), the oscillating shapes of them are suggested such as (b), and the combined shapes of electron, muon, and tau are suggested such as (c).

2.2 Mass of muon

In (a), the mass of muon neutrino is given as 170 keV. The mass of tau neutrino is calculated as 15.49 MeV from gravitational coupling constant of 5.906E-39. Applying 170 keV and 15.49 MeV to normal logarithmic elliptic equation, the mass of electron neutrino is calculated as 0.153 eV.

In (b), applying 0.153 eV, 170 keV, and 15.49 MeV to the oscillating logarithmic elliptic equation of Fig. 4.1 and 4.2 in Ref. [1], the values are calculated.

In (c), the mass of muon is calculated from follows:

$$(1.557\ MeV \cdot 15.49\ MeV)^{1/2} = 4.912\ MeV \quad (1)$$

$$(4.034\ eV \cdot 114.7\ eV)^{1/2} = 21.51\ eV \quad (2)$$

$$4.912\ MeV \cdot 21.51\ eV = 105.7\ MeV \quad (3)$$

The calculating method of electron and tau is the same. There is no quantum formula that produces above values.

2.3 g-factor of muon

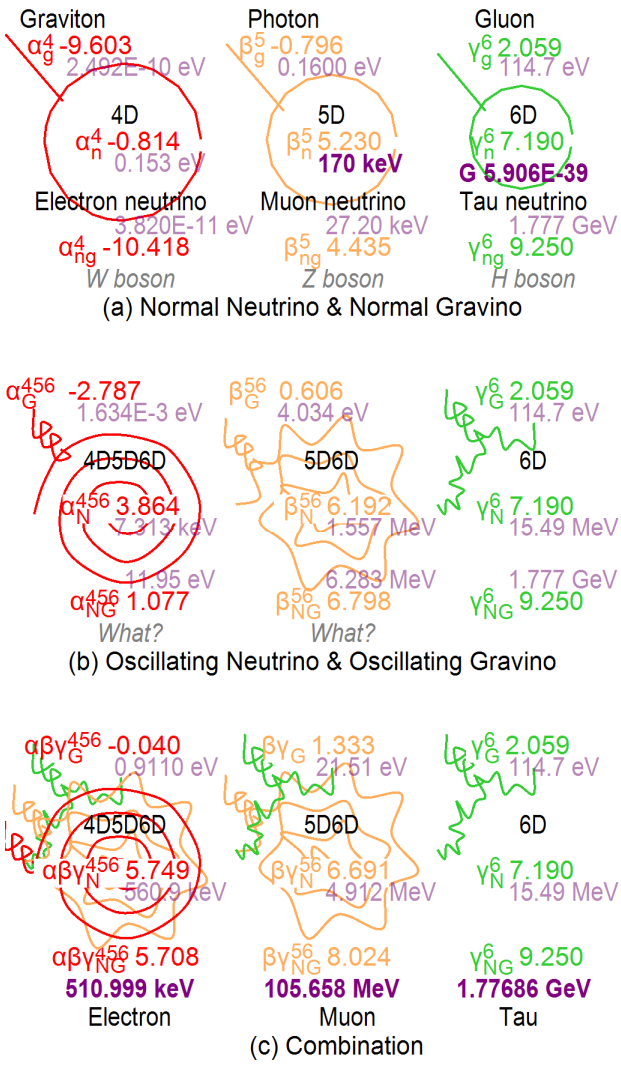

Fig. 1 Shapes of electron, muon, and tau

Table 1 Muon g-2 experiment results

Term	Case	Electron	Muon	Tau	Equation
Standard Model	g-factor	2.0023193 0436	2.0023318 3620		g_S
	a-value	0.0011596 5218	0.0011659 1810		$a_S = (g_S - 2)/2$
Experiment	g-factor	2.0023193 0436	2.0023318 4122		g_E
	a-value	0.0011596 5218	0.0011659 2061		$a_E = (g_E - 2)/2$
Δ anomalous magnetic moment		0.00000 0000	0.00000 4306		$r = (a_E/a_S - 1) \cdot 2$
Our Calculation	Log Mass	5.708420	8.023904	9.249653	$l_\mu = l_N + l_G$
	Neutrino	5.748900	6.691290	7.190163	l_N *in Fig. 1*
	Gravino	-0.040480	1.332614	2.059490	l_G *in Fig. 1*
	Mass	510998.95	105658374.50	1776860000.00	$m_\mu = given$ *eV*
	Neutrino	560918.65	4912353.23	15493982.54	$m_N = 10\hat{}l_N$ *eV*
	Gravino	0.91	21.51	114.68	$m_G = 10\hat{}l_G$ *eV*
Δ anomalous magnetic moment		0.000001624	0.00000 4378	0.000007402	$r = m_G \,/\, m_N$
Standard Model	a-value	0.0011596 5124	0.0011659 1806		$a_S = a_E \cdot 2/(2 + r)$
	g-factor	2.0023193 0248	2.0023318 3612		$g_S = 2 + 2 \cdot a_S$
Experiment	a-value		0.0011659 2065		$a_E = a_S \cdot (2 + r)/2$
	g-factor		2.0023318 4130		$g_E = 2 + 2 \cdot a_E$

The calculation results for muon g-2 are shown in Table 1. The Δ ratio r between experiment and standard model is 0.00000 4306.

In muon mass m_μ of 105.658 MeV, the neutrino mass m_N is 4.912 MeV and the gravino mass m_G is 21.51 eV. Therefore, the Δ ratio r is 0.00000 4378. From this value, the g-factor is calculated as 2.0023318 4130.

2.4 Meaning of muon g-2 results

The g-factor of experiment is 4122, and our calculation is 4130. Above two values are almost same. This means that muon is an oscillating combination particle composed of muon neutrino, tau neutrino, photon, and gluon as shown in Fig. 1(c). The very small mass 21.51 eV of photon and gluon in muon causes very small fluctuation in magnetic field. This is the reason for the very small difference between standard model and experiment.

2.5 Precision

The mass of particle must be calculated logarithmically such as Eq. (1-3). Therefore, both of very large mass and very small mass are equally important. The very small mass of 21.51 eV is the cause of g-2 problem. The precision of calculation is the effective 3 digits of electron neutrino 170 keV. Therefore, the accuracy of our calculation is not 4130 but 413X. 170.OO keV, not 170 keV is needed.

2.6 g-factor of electron

The electron g-factor of both of standard model and experiment is 2.0023193 0436. However, from the same calculation, the g-factor of standard model would be calculated as 2.0023193 0248 due to 0.91 eV.

2.7 g-factor of tau

The g-factor of tau is not being searched on Internet. This may be because there is no photon in tau of Fig. 1(c). From the same calculation, the difference of g-factor would be 0.00000 7402 due to 114.68 eV.

3. Conclusions

The g-factor of experiment is 2.0023318 4122, and the g-factor calculated from this study is 2.0023318 4130. Above two values are almost same. This means that muon is not an elementary particle, but a combination particle. The reason that the prediction of standard model and the value of experiment is different is that the very small value of 21.51 eV in muon was ignored. The 21.51 eV of photon and gluon in muon causes very small fluctuation in magnetic field.

The combination of quantum masses should be calculated by multiplication, not addition. There is no quantum mechanics theory that can calculate the elementary school arithmetic.

References

[1] D. Kim, 2021, Theory of Everything and Logarithmic Elliptic Equation, https://vixra.org/pdf/2110.0023v1.pdf