

SUMMARY OF DOCTORAL THESIS

The author's name: *Nguyen Thi Tham*

Thesis title: *Some lepton flavor violating decays in the 3-3-1 model with inverse seesaw mechanism*

Major: Physics

Specialization: Theoretical Physics and Mathematical Physics

Code: 9 44 01 03

Training institution: Hanoi Pedagogical University 2

1. Thesis purposes and objects

✓ *Thesis purposes*

- Study the process of lepton flavor violating in the 3-3-1 model with inverse seesaw.
- Construct the formula for calculating branching ratio of decays of $l_a \rightarrow l_b \gamma$ and $h \rightarrow l_a l_b$, investigate for cLFV, LFVHD and discuss.
- Construct the formula for contributions of particles in anomalous dipole moment of muon, find numerical results for the regions creates large Δa_μ in the experimental limit of cLFV.

✓ *Objects*

- LFV processes, contributions of new Higgs boson and gauge boson in the 331ISS model into new physics processes, contributions to anomalous magnetic moment of muon in the 331ISS model.

2. Research methods

- Use the quantum field theory to construct analytical formulas
- Use mathematica for numerical investigation.

3. Major results and conclusions

3.1. *The main results*

- Establish analytic formulas of one-loop contributions to decay amplitudes of cLFV and LFVHD, analytic formulas of the branching ratio of two processes $l_a \rightarrow l_b \gamma$ and $h \rightarrow l_a l_b$ in the 331ISS model. Find

out the allowed regions that satisfy experimental limits of cLFV, and predict large signals of $Br(h \rightarrow l_a l_b)$, in particular, $Br(\tau \rightarrow e\gamma)$ can reach about 10^{-9} and $Br(\tau \rightarrow \mu\gamma)$ may achieve 10^{-10} , these results are very close to the upper bound of the experimental limits.

- Evaluate the contributions of heavy neutrinos through Δ_i ($i=1,2,3$) leading to the change of $Br(h_1^0 \rightarrow \mu\gamma)$. This is presented through the hierarchy of the mixing matrix of heavy neutrinos M_R . In case $M_R \sim \text{diag}(1, 1, 1)$, $Br(h_1^0 \rightarrow \mu\gamma)$ has a greater value than that of $M_R \sim \text{diag}(3, 2, 1)$ and $M_R \sim \text{diag}(1, 2, 3)$. The largest value that $Br(h_1^0 \rightarrow \mu\gamma)$ can reach is about $O(10^{-3})$ in the context of this model.
- Establish analytic formulas of muon anomalous magnetic dipole moment in the 331ISS model, numerical survey the deviation Δa_μ under the recent constraint of cLFV decays.
- By adding new singly charged Higgs boson h_3 all experimental data of Δa_μ and cLFV decays can be explained simultaneously. As a consequence, all of the cLFV decays $l_a \rightarrow l_b \gamma$ are predicted that their branching ratios can be large closely to the recent experimental bounds. The value of large Δa_μ can reach $\Delta a_\mu^{331ISS} \geq 192 \times 10^{-11}$ in the context of this model.

3.2. Conclusions

The 3-3-1 model with the ISS neutrinos gives a good explanation of the cLFV decay signal, giving large LFVHD signals enough to be able to observed in the near future. By adding singly charged Higgs boson to the 331ISS model, the large value of the $(g-2)_\mu$ can be reach in the context of the model.

On behalf of academic supervisors

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