

Charged-lepton decays from soft flavour violation in a two-Higgs doublet seesaw model

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Extensions of the Standard Model with right-handed neutrinos ν_R in the framework of the seesaw mechanism are popular to explain the smallness of the neutrino masses. In our model, we add a second Higgs doublet and in order to avoid lepton flavour-changing neutral-scalar interactions at tree level, we allow lepton flavour violation solely in the non-flavour-diagonal Majorana mass matrix of the right-handed neutrinos whereas all Yukawa-coupling matrices are lepton flavour-diagonal.

We show explicitly in that framework that the branching ratios of the charged-lepton decays

$$\ell_1^- \rightarrow \ell_2^- \ell_3^+ \ell_3^-$$

can be close to their experimental upper bounds,

while the branching ratios of other lepton flavour-changing decays, like $\ell_1 \rightarrow \ell_2 \gamma$,

are invisible because they are suppressed by m_R^{-4} ,

where m_R is the seesaw scale.

Furthermore, considering the anomalous magnetic moment of the muon, in our model the contributions from the extra scalars

can remove the discrepancy between its experimental and theoretical values.

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