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P3.083 Soft lepton number violation in multi-Higgs doublet models

E Aeikens and W Grimus

University of Vienna, Austria

Extensions of the Standard Model with right-handed neutrinos ν_R in the framework of a seesaw mechanism are popular to explain the smallness of the neutrino masses. In our model, we additionally allow an arbitrary number of Higgs doublets. Since such models have flavourchanging neutral-scalar interactions (FCNIs) at tree level, we impose conservation of the family lepton numbers L_α ($\alpha = e, \mu, \tau$) in the Yukawa interactions whereas the Majorana terms violate the L_α . An interesting feature of this model is that FCNI processes are finite at one-loop level and amplitudes like $\mu \rightarrow e^- e^+ e^-$ containing Higgs-scalar exchanging subprocess, in contrast e.g. to $\mu \rightarrow e \gamma$, do not vanish when the ν_R -mass scale m_R becomes infinitely large. Therefore, they could be testable in future experiments. Furthermore, processes provide bounds on Yukawa couplings and the seesaw scale m_R .