

Generating fermion masses and mixing angles in extra Higgs doublet models

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We present a framework to generate the mass hierarchies and mixing angles of the fermionic sector of the Standard Model with two extra Higgs doublets and one right-handed neutrino. The masses of the first and second generation are generated by small quantum effects, explaining the hierarchy with the third generation. The model also generates a natural hierarchy between the first and second generation after the assumption that the Yukawa couplings are of rank 1. All the quark and lepton mixing matrices can also be generated by quantum effects, reproducing the hierarchies of the experimental values. The parameters generated radiatively depend logarithmically on the heavy Higgs masses, therefore this framework can be reconciled with the stringent limits on flavor violation by postulating a sufficiently large new physics scale.

Primary authors: Prof. IBARRA, Alejandro (Technische Universität München); Ms SOLAGUREN-BEASCOA, Ana (Technische Universität München - Max Planck für Physik)

Presenter: Ms SOLAGUREN-BEASCOA, Ana (Technische Universität München - Max Planck für Physik)

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