

IR fixed point predictions for third generation masses in the MSSM with a vectorlike family

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In the MSSM extended by a complete vectorlike family, precise top, bottom and tau Yukawa coupling unification can be achieved assuming SUSY threshold corrections which are typical for comparable superpartner masses. Furthermore, the unification is possible with a large unified coupling, implying that all three fermion masses can be simultaneously close to their IR fixed points. Assuming unified Yukawa couplings of order one or larger, the preferred common scale of new physics (superpartners and vectorlike matter) is in the 3 TeV to 30 TeV range, with larger couplings favoring smaller scales. Splitting superpartner masses from masses of vectorlike fields, the preferred scales extend in both directions. The multi-TeV scale for superpartners is compatible with and independently suggested by the Higgs boson mass.

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