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LHC Phenomenology of SO(10) Models with Yukawa Unification

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We study Yukawa-unified SO(10) SUSY GUTs with two types of SO(10) boundary conditions: (i) universal gaugino masses and (ii) non-universal gaugino masses with “effective mirage” mediation. With these boundary conditions, we perform a global χ^2 analysis to obtain the parameters consistent with 11 low energy observables, including the top, bottom, and tau masses. Both boundary conditions have universal scalar masses and “just so” splitting for the up- and down-type Higgs masses. In these models, the third family scalars are lighter than the first two families and the gauginos are lighter than all the scalars. We therefore focus on the gluino phenomenology in these models. In particular, we estimate the lowest allowed gluino mass in our models coming from the most recent LHC data and compare these to limits obtained using simplified models.

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