

An MCMC analysis to probe trilinear RPV SUSY scenarios and possible LHC signatures

We probe the trilinear R-parity violating (RPV) supersymmetric (SUSY) scenarios with specific non-zero interactions in the light of neutrino oscillation, Higgs, and flavor observables. We attempt to fit the set of observables using a state-of-the-art Markov Chain Monte Carlo (MCMC) set-up and study its impact on the model parameter space. Our main objective is to constrain the trilinear couplings individually, along with some other SUSY parameters relevant to the observables. We present the constrained parameter regions in the form of marginalized posterior distributions on different two-dimensional parameter planes. We perform our analyses with two different scenarios characterized by our choices for the lightest SUSY particle (LSP), bino, and stop. Our results indicate that the lepton number violating trilinear couplings λ_{i33} ($i=1,2$) and λ'_{j33} ($j=1,2,3$) can be at most of the order of 10^{-4} or even smaller while $\tan \beta$ is restricted to below 15 even when 3σ allowed regions are considered. We further comment on the possible LHC signatures of these LSPs focusing on and around the best-fit regions.

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