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Extending RPV stops coverage via resonant production

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We discuss resonant squark production at the LHC via baryonic R-parity violating interactions. The cross section easily exceeds pair-production and a new set of signatures can be used to probe squarks, particularly stops. These include dijet resonances, same-sign top quarks and four-jet resonances with large b-jet multiplicities, as well as the possibility of displaced neutralino decays. We use publicly available searches at $\sqrt{s} = 8$ TeV and first results from collisions at $\sqrt{s} = 13$ TeV to set upper limits on R-parity violating couplings, with particular focus on simplified models with light stops and neutralinos. The exclusion reach of these signatures is comparable to R-parity-conserving searches, $m_{\tilde{t}} \simeq 500\text{--}700$ GeV. In addition, we find that $O(1)$ couplings involving the stop can be excluded well into the multi-TeV range, and stress that searches for single- and pair-produced four-jet resonances will be necessary to exclude sub-TeV stops for a natural SUSY spectrum with light higgsinos.

Summary

Author: MONTEUX, Angelo (Rutgers University)

Presenter: MONTEUX, Angelo (Rutgers University)

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