

Abstract Submitted
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Improving the Slepton Reach through Cascade Decay at the LHC

JONATHAN ECKEL, SHUFANG SU, University of Arizona, WILLIAM SHEPHERD, University of California, Irvine — LHC studies on the slepton sector have mostly been focused on direct slepton Drell-Yan pair production. We analyzed the case when the left-handed sleptons are lighter than winos and can appear in the on-shell decay of those particles. The invariant mass of the lepton pairs, $M_{\ell\ell}$, from the neutralino decay has a distinctive triangle shape with a sharp cutoff. We discuss the utilization of the triangle shape in the $M_{\ell\ell}$ distribution to identify the slepton signal. We studied the trilepton signal and obtained the $\sigma \times \text{BR} \times \text{acceptance}$ that is needed for a 5σ discovery as a function of the cutoff mass for the LHC with center of mass energy 14 TeV and 100 fb^{-1} integrated luminosity. Our results are model independent such that they could be applied to other models with similar decay topology. When applied to the MSSM case, it is found that with 30 (100) fb^{-1} , the left-handed slepton mass of about 500 (600) GeV could be reached, which extends far beyond the slepton mass reach in the usual Drell-Yan study.

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