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Searching for soft leptons in compressed supersymmetric spectra at the LHC

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Searches for supersymmetry at the Large Hadron Collider in electroweak final states are kinematically limited by softness of the leptonic scattering products in the regime of narrow mass splitting between the slepton and neutralino. After requiring a hard initial-state jet in order to provide the visible system a large transverse boost, we cut on the reconstructed OSSF dilepton mass, as well as the ditau-mass variable and the missing transverse energy. We find that the most difficult residual background is the topologically identical WW +jets final state. We leverage two subtle differences in these processes, namely the mass of the invisible species (zero for background, or around 100 GeV for our signal hypothesis) and the spin of the parent species (vector for background, or scalar for signal) in order to improve discrimination.

Summary

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