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Searches for Electroweak Production of Compressed Supersymmetry with Soft Leptons and Missing Transverse Momentum in pp Collisions at $\sqrt{s} = 13$ TeV with the ATLAS Detector SHEENA SCHIER, Univ of California-Santa Cruz, US ATLAS COLLABORATION — Supersymmetry (SUSY) is an extension of the Standard Model that predicts a boson (fermion) partner for each fermion (boson) in the Standard Model. Weak scale SUSY is attractive for reasons like improving gauge coupling unification, reducing fine-tuning in the Higgs sector and providing a dark matter candidate. In this talk, I present a dedicated search for direct production of new colorless weak scale states in a compressed mass spectra with final states characterized by soft visible decay products. This analysis uses pp collisions at $\sqrt{s} = 13$ TeV at the Large Hadron Collider and collected by the ATLAS experiment during 2015 and 2016 corresponding to 36.1 fb^{-1} of integrated luminosity. This analysis selects events with two soft electrons or muons and missing transverse momentum (E_T^{miss}) recoiling against hadronic initial state radiation. Backgrounds from $t\bar{t}$, diboson, and other production mechanisms with prompt leptons are estimated with Monte Carlo simulation while reducible backgrounds with instrumental E_T^{miss} and fake/non-prompt leptons is estimated with a mix of Monte Carlo and data-driven methods. Results are consistent with Standard Model expectation and limits on compressed supersymmetric states are extended for the first time since LEP.

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