

Search for supersymmetry in pp collisions at $\sqrt{s} = 13$ TeV in the single-lepton final state using the sum of masses of large-radius jets



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ABSTRACT: Results are reported from a search for supersymmetric particles in proton-proton collisions in the final state with a single, high transverse momentum lepton; multiple jets, including at least one b-tagged jet; and large missing transverse momentum. The data sample corresponds to an integrated luminosity of 2.3 fb^{-1} at $\sqrt{s} = 13 \text{ TeV}$, recorded by the CMS experiment at the LHC. The search focuses on processes leading to high jet multiplicities, such as gluino pair production with $\tilde{g} \rightarrow t\bar{t}\tilde{\chi}_1^0$. The quantity M_J , defined as the sum of the masses of the large-radius jets in the event, is used in conjunction with other kinematic variables to provide discrimination between signal and background and as a key part of the background estimation method. The observed event yields in the signal regions in data are consistent with those expected for standard model backgrounds, estimated from control regions in data. Exclusion limits are obtained for a simplified model corresponding to gluino pair production with three-body decays into top quarks and neutralinos. Gluinos with a mass below 1600 GeV are excluded at a 95% confidence level for scenarios with low $\tilde{\chi}_1^0$ mass, and neutralinos with a mass below 800 GeV are excluded for a gluino mass of about 1300 GeV. For models with two-body gluino decays producing on-shell top squarks, the excluded region is only weakly sensitive to the top squark mass.

KEYWORDS: Hadron-Hadron scattering (experiments), Supersymmetry

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