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Search for supersymmetry in events with a photon, a lepton, and missing transverse momentum in proton-proton collisions at √s=13 TeV (Article) (Open Access)

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Abstract

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Results of a search for supersymmetry are presented using events with a photon, an electron or muon, and large missing transverse momentum. The analysis is based on a data sample corresponding to an integrated luminosity of 35.9 fb $^{-1}$ of proton-proton collisions at s=13 TeV, produced by the LHC and collected with the CMS detector in 2016. Theoretical models with gauge-mediated supersymmetry breaking predict events with photons in the final state, as well as electroweak gauge bosons decaying to leptons. Searches for events with a photon, a lepton, and missing transverse momentum are sensitive probes of these models. No excess of events is observed beyond expectations from standard model processes. The results of the search are interpreted in the context of simplified models inspired by gauge-mediated supersymmetry breaking. These models are used to derive upper limits on the production cross sections and set lower bounds on masses of supersymmetric particles. Gaugino masses below 930 GeV are excluded at the 95% confidence level in a simplified model with electroweak production of a neutralino and chargino. For simplified models of gluino and squark pair production, gluino masses up to 1.75 TeV and squark masses up to 1.43 TeV are excluded at the 95% confidence level.[Figure not available: see fulltext.] © 2019, The Author(s).

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