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Search for Supersymmetry with a compressed mass spectrum in vector boson fusion topology with 1-lepton and 0-lepton final states in pp collisions at $\sqrt{s}$ = 13 TeV with CMS

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Summary

Supersymmetry (SUSY) is one of the major physics goals of the Large Hadron Collider. A large number of physics analyses are being performed in CMS (and ATLAS) experiments to detect signatures of Susy particles. The search presented here aims for observing Susy particles produced in the Vector Boson Fusion (VBF) topology, leading to the final state having zero or one lepton, large missing ET, and two jets with high p^T with large rapidity separation. The analysis is performed using 35.9 fb $^{-1}$ of proton-proton collision data collected with CMS detector during the year 2016 at a center-of-mass energy of 13 TeV. The background estimation is performed using data-driven/semi data-driven techniques and the observed dijet invariant mass, as well as lepton transverse mass spectra, are found to be consistent with the standard model predictions, but no signal observed. Hence, the upper limits are set on the cross sections for chargino $\tilde{\chi}_1^{\pm}$ and neutralino $\tilde{\chi}_2^0$ production along with two associated jets, assuming the lightest scalar leptons to be lighter than the $\tilde{\chi}_1^{\pm}$. For a compressed mass spectra in which mass difference between Lightest Supersymmetric Particle (LSP) $\tilde{\chi}_1^0$ and the mass-degenerate particles $\tilde{\chi}_1^{\pm}$ and $\tilde{\chi}_2^0$ is 30 (1) GeV, the most stringent mass upper limit to date is set for the latter two particles.

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