

## Search for new physics via compressed mass spectra SUSY in VBF topology with one-lepton final states using LHC Run II data

A search for supersymmetric particles produced in the Vector Boson Fusion (VBF) topology using LHC Run II data at  $\sqrt{s} = 13$  TeV collected with the CMS detector is performed. The search focuses on the final states involving a single low- $p_T$  lepton, large missing transverse momentum, and two widely separated jets having large invariant mass. Such a dijet system is the peculiar signature of VBF topology and plays a crucial role in background reduction. The event selection criteria are designed to maximize the SUSY signal acceptance under a compressed mass scenario where the wino-like electroweakino masses are nearly degenerate to the bino-like lightest SUSY particle ( $\tilde{\chi}_1^0$ ). The benchmark model for this search is the R-parity conserving Minimal Supersymmetric Standard Model (MSSM), where the lightest neutralino is the canonical dark matter candidate. The dominant standard model background processes are estimated using data-driven techniques. This talk will focus on the overall search strategy, methodology, and background estimation using various data-driven control regions along with their validation.

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