Search for new physics in final states with an energetic jet or a hadronically decaying $W$ or $Z$ boson and transverse momentum imbalance at $\sqrt{s} = 13$ TeV

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A search for new physics using events containing an imbalance in transverse momentum and one or more energetic jets arising from initial-state radiation or the hadronic decay of $W$ or $Z$ bosons is presented. A data sample of proton-proton collisions at $\sqrt{s} = 13$ TeV, collected with the CMS detector at the LHC and corresponding to an integrated luminosity of 35.9 fb$^{-1}$, is used. The observed data are found to be in agreement with the expectation from standard model processes. The results are interpreted as limits on the dark matter production cross section in simplified models with vector, axial-vector, scalar, and pseudoscalar mediators. Interpretations in the context of fermion portal and nonthermal dark matter models are also provided. In addition, the results are interpreted in terms of invisible decays of the Higgs boson and set stringent limits on the fundamental Planck scale in the Arkani-Hamed, Dimopoulos, and Dvali model with large extra spatial dimensions.

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Search for new physics in final states with an energetic jet or a hadronically decaying W or Z boson using 35.9 fb$^{-1}$ of data at $\sqrt{s} = 13$ TeV

Abstract

A search for dark matter and extra dimensions are presented using events containing an imbalance in transverse momentum and one or more energetic jets. The data of proton-proton collisions at the LHC were collected with the CMS detector, and correspond to an integrated luminosity of 35.9 fb$^{-1}$. Results are presented in terms of limits on the dark matter production in association with jets or vector bosons in a simplified models, nonthermal dark matter models, and fermion portal dark matter models. Results are also interpreted in terms of the decay of the standard model Higgs boson to invisible particles and as limits on the Planck scale in the ADD model with large extra spatial dimensions.
