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Search for new physics in final states with a single photon and missing transverse momentum in proton-proton collisions at $\sqrt{s} \geq 13$ TeV

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Abstract

A search is conducted for new physics in final states containing a photon and missing transverse momentum in proton-proton collisions at $\sqrt{s} \geq 13$ TeV, using the data collected in 2016 by the CMS experiment at the LHC, corresponding to an integrated luminosity of 35.9 fb⁻¹. No deviations from the predictions of the standard model are observed. The results are interpreted in the context of dark matter production and models containing extra spatial dimensions, and limits on new physics parameters are calculated at 95% confidence level. For the two simplified dark matter production models considered, the observed (expected) lower limits on the mediator masses are both 950 (1150) GeV for 1 GeV dark matter mass. For an effective electroweak-dark matter contact interaction, the observed (expected) lower limit on the suppression parameter is 850 (950) GeV. Values of the effective Planck scale up to 2.85-2.90 TeV are excluded for between 3 and 6 extra spatial dimensions.

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