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Search for dark matter produced in association with a single top quark or a top quark pair in proton-proton collisions at s=13 TeV

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Abstract

A search for dark matter produced in association with top quarks in proton-proton collisions at a center-of-mass energy of 13 TeV is presented. The data set used corresponds to an integrated luminosity of 35.9 fb⁻¹ recorded with the CMS detector at the LHC. Whereas previous searches for neutral scalar or pseudoscalar mediators considered dark matter production in association with a top quark pair only, this analysis also includes production modes with a single top quark. The results are derived from the combination of multiple selection categories that are defined to target either the single top quark or the top quark pair signature. No significant deviations with respect to the standard model predictions are observed. The results are interpreted in the context of a simplified model in which a scalar or pseudoscalar mediator particle couples to a top quark and subsequently decays into dark matter particles. Scalar and pseudoscalar mediator particles with masses below 290 and 300 GeV, respectively, are excluded at 95% confidence level, assuming a dark matter particle mass of 1 GeV and mediator couplings to fermions and dark matter particles equal to unity.

Keywords

Author Keywords: [Dark matter](#); [Hadron-Hadron scattering \(experiments\)](#); [Top physics](#)

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