Search for single production of a heavy vector-like T quark decaying to a Higgs boson and a top quark with a lepton and jets in the final state

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Abstract

A search for single production of vector-like top quark partners (T) decaying into a Higgs boson and atop quark is performed using data from pp collisions at acentre-of-mass energy of 13 TeV collected by the CMS experiment at the CERN LHC, corresponding to an integrated luminosity of 2.3 fb(-1). The top quark decay includes an electron or a muon while the Higgs boson decays into a pair of b quarks. No significant excess over standard model backgrounds is observed. Exclusion limits on the product of the production cross section and the branching fraction are derived in the T quark mass range 700 to 1800 GeV. For a mass of 1000 GeV, values of the product of the production cross section and the branching fraction greater than 0.8 and 0.7 pb are excluded at 95% confidence level, assuming left-and right-handed coupling of the T quark to standard model particles, respectively. This is the first analysis setting exclusion limits on the cross section of singly produced vector-like T quarks at a centre-of-mass energy of 13 TeV. (C) 2017 The Author(s). Published by Elsevier B.V.

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