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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

(Article) [\(Open Access\)](#)Khachatryan, V.^{a,a}, Sirunyan, A.M.^a, Tumasyan, A.^a, Adam, W.^b, Asilar, E.^b, Bergauer, T.^b, Brandstetter, J.^b, Brondolin, E.^b, Dragicevic, M.^b, Erö, J.^b, Flechl, M.^b, Friedl, M.^b, Frühwirth, R.^b, Ghete, V.M.^b, Hartl, C.^b, Hörmann, N.^b, Hrubec, J.^b, Jeitler, M.^b, König, A.^b, Krätschmer, I.^b, Liko, D.^b, Matsushita, T.^b, Mikulec, I.^b,[View additional authors](#) [v](#)^aYerevan Physics Institute, Yerevan, Armenia^bInstitut für Hochenergiephysik, Wien, Austria^cInstitute for Nuclear Problems, Minsk, Belarus[View additional affiliations](#) [v](#)

Abstract

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A search for single production of vector-like top quark partners (T) decaying into a Higgs boson and a top quark is performed using data from pp collisions at a centre-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. © 2017 The Author(s)

Author keywords

B2G CMS Higgs tagging Physics Tprime VLQ

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	General Secretariat for Research and Technology	GSRT	See opportunities by GSRT↗
	European Research Council	ERC	See opportunities by ERC↗

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