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Measurement of the single top quark and antiquark production cross sections in the t channel and their ratio in proton-proton collisions at s=13TeV (Article)

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Abstract

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Measurements of the cross sections for the production of single top quarks and antiquarks in the t channel, and their ratio, are presented for proton-proton collisions at a center-of-mass energy of 13 TeV. The data set used was recorded in 2016 by the CMS detector at the LHC and corresponds to an integrated luminosity of 35.9 fb^{-1}. Events with one muon or electron are selected, and different categories of jet and b jet multiplicity and multivariate discriminators are applied to separate the signal from the background. The cross sections for the t-channel production of single top quarks and antiquarks are measured to be 130±1(stat)±19(syst)pb and 77±1(stat)±12(syst)pb, respectively, and their ratio is 1.68±0.02(stat)±0.05(syst). The results are in agreement with the predictions from the standard model. © 2019 The Author(s)

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Funding text #1

We congratulate our colleagues in the CERN accelerator departments for the excellent performance of the LHC and thank the technical and administrative staffs at CERN and at other CMS institutes for their contributions to the success of the CMS effort. In addition, we gratefully acknowledge the computing centers and personnel of the Worldwide LHC Computing Grid for delivering so effectively the computing infrastructure essential to our analyses. Finally, we acknowledge the enduring support for the construction and operation of the LHC and the CMS detector provided by the following funding agencies: BMBWF and FWF (Austria); FNRS and FWO (Belgium); CNPq , CAPES , FAPERJ , FAPERGS , and FAPESP (Brazil); MES (Bulgaria); CERN ; CAS , MOST , and NSFC (China); COLCIENCIAS (Colombia); MSES and CSF (Croatia); RPF (Cyprus); SENESCYT (Ecuador); MoER , ERC IUT , and ERDF (Estonia); Academy of Finland , MEC , and HIP (Finland); CEA and CNRS/IN2P3 (France); BMBF , DFG , and HGF (Germany); GSRT (Greec... View all

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