

## Search for four top quark production in the single-lepton final state with the CMS data

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We present a search for the standard model four top quark (tttt) production in the single-lepton final state. We analyze the proton-proton collision data collected by the CMS experiment at center-of-mass energy of 13 TeV, corresponding to an integrated luminosity of  $35.8 \text{ fb}^{-1}$  in 2016,  $41.5 \text{ fb}^{-1}$  in 2017 and  $59.97 \text{ fb}^{-1}$  in 2018. The single lepton final state features a high jet multiplicity, with at least four jets coming from the hadronization of a bottom quark, an electron or a muon, and missing transverse momentum from neutrino. We consider the distribution of HT and BDT to discriminate the signal from background, where HT is the scalar sum of transverse momentum of all the jets and BDT is the discriminator from a multivariate analysis based on Boosted Decision Tree approach. We set limits on the four tops production cross section in the absence of signal. The expected limits and significances on tttt production cross section for data-taking period 2016 to 2018, and their combination are presented.

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