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Inclusive search for vector-like T quark pairs in leptonic final states in proton-proton collisions at $\sqrt{s} = 13$ TeV

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A search is presented for pair production of heavy vector-like T quarks using proton-proton collisions were collected by the CMS experiment at the CERN LHC in 2016 with an integrated luminosity of 35.9 fb⁻¹. A vector-like T quark of charge 2e/3 is predicted to decay to bW, tZ, and tH, so pair production of T quarks yields a wide array of final states. This inclusive search is performed in three channels: a single lepton channel that identifies boosted hadronic W and Higgs boson decays, same-sign dilepton channel and a trilepton channel that is enriched in Z boson decays. Production of vector-like B quarks that decay to tW, bZ, and bH are also considered. Results remain blinded at this time, but if no excess of data is observed this search will exclude T quark masses in the range of 1090 – 1210 GeV for many branching ratio combinations.

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