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Search for a vector-like quark T′ → tH in the diphoton decay mode of the Higgs boson in proton-proton collisions at √s = 13 TeV

Tuesday 13 December 2022 14:00 (1 hour)

A search for the production of a vector-like quark, T′ will be presented based on proton-proton collision events at √s = 13 TeV. The data sample corresponds to an integrated luminosity of 138 fb^{-1}, collected by the CMS during 2016-18 operations of the LHC. This search targets the electroweak production mechanism of T′ in the mass range 600 – 1200 GeV, in a narrow width approximation. The T′ quark decays to a top quark and a Higgs boson (T′ → tH); with the Higgs boson subsequently decaying into a pair of photons (H → γγ). This search is the first T′ search to exploit the decay of the Higgs boson in the diphoton channel. The excellent diphoton invariant mass resolution of 1 – 2% results in an increased sensitivity compared to previous searches up to 1 TeV. No significant excess over the standard model background is observed, accordingly an upper limit on the T′ production cross section is set and the T′ masses up to 730 GeV are excluded at 95% confidence level.

Session

Beyond the Standard Model

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