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Search for heavy Higgs bosons decaying to a top quark pair at $\sqrt{s}$ = 13 TeV with the CMS detector

The CMS Collaboration

Abstract

Multiple new physics models extending the standard model predict the existence of new heavy scalar (H) or pseudoscalar (A) Higgs bosons. In this paper, a search is presented for such new bosons decaying to a top quark pair in proton-proton collisions at 13 TeV, in a data sample corresponding to an integrated luminosity of 35.9 fb^{-1} collected by the CMS experiment in 2016. Final states with one or two leptons are considered, where the lepton may be a muon or an electron. The information from the invariant mass of reconstructed top quark pairs, as well as from variables that are sensitive to the spin of the particles decaying into the pair of top quarks, is used to search for signatures of the H or A bosons. The strength of the coupling of the hypothetical bosons with the top quark is probed as a function of the mass and width of the boson. The results are interpreted in a model-independent way as well as in an minimal supersymmetric standard model context.