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Search for Higgs boson pair production with one associated vector boson in proton-proton collisions with CMS

A search is presented for Higgs boson pair production (HH) associated with a vector boson V (W or Z boson) with 138 fb^−1 of proton-proton (pp) collisions at a center-of- mass energy of 13 TeV with the CMS detector at the LHC at CERN. The processes in this search include ZHH and WHH production. All hadronic decays and leptonic decays of W and Z bosons involving electrons, muons, and neutrinos are utilized. The decay channel of the Higgs bosons is restricted to bbbb. An observed (expected) upper limit at 95% confidence level (CL) is set at 294 (124) times the cross section from the standard model prediction of the VHH process. Constraints are also set on the modifier of the Higgs boson trilinear self-coupling k_lambda, and on the coupling of two Higgs bosons with two vector bosons k_VV. The observed (expected) allowed intervals of these coupling modifiers from this search at 95% CL are −37.7 < k_lambda < 37.2 (−30.1 < k_lambda < 28.9) and −12.2 < k_VV < 13.5 (−7.64 < k_VV < 8.90). In addition, a 95% CL upper limit is set at 43 (22) times the cross section of the VHH process when k_lambda = 5.5 and other couplings are set to standard model predictions.

Collaboration / Activity

CMS Collaboration

Primary author: Dr ASAWATANGTRAKULDEE, Chayanit (Chulalongkorn University)

Presenter: Dr ASAWATANGTRAKULDEE, Chayanit (Chulalongkorn University)

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