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Search for di-Higgs boson production in multi-lepton final states at CMS

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The results of a search for Higgs boson pair (HH) production in the 4W, 2W2tau, and 4tau decay modes are presented. The search uses 138 /fb of proton-proton collision data recorded by the CMS experiment at the LHC at a center-of-mass energy of 13 TeV from 2016 to 2018. Analyzed events contain two, three, or four reconstructed leptons, including electrons, muons, and hadronically decaying tau leptons. No evidence for a signal is found in the data. Upper limits are set on the cross section for non-resonant HH production, as well as resonant production in which a new heavy particle decays to a pair of Higgs bosons. For non-resonant production, the observed (expected) upper limit on the cross section at 95% confidence level (CL) is 21.3 (19.4) times the standard model (SM) prediction. The observed (expected) ratio of the trilinear Higgs boson self-coupling to its value in the SM is constrained to be within the interval -6.9 to 11.1 (-6.9 to 11.7) at 95% CL, and limits are set on a variety of new-physics models using an effective field theory approach. The observed (expected) limits on the cross section for resonant HH production amount to 0.18-0.90 (0.08-1.06) pb at 95% CL for new heavy-particle masses in the range 250-1000 GeV.

Session

Higgs Physics

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