# Measurements of the Higgs boson width and anomalous HVV couplings from on-shell and off-shell production in the four-lepton final state

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## Abstract

Studies of on-shell and off-shell Higgs boson production in the four-lepton final state are presented, using data from the CMS experiment at the LHC that correspond to an integrated luminosity of 80.2 fb(-1) at a center-of-mass energy of 13 TeV. Joint constraints are set on the Higgs boson total width and parameters that express its anomalous couplings to two electroweak vector bosons. These results are combined with those obtained from the data collected at center-of-mass energies of 7 and 8 TeV, corresponding to integrated luminosities of 5.1 and 19.7 fb(-1), respectively. Kinematic information from the decay particles and the associated jets are combined using matrix element techniques to identify the production mechanism and to increase sensitivity to the Higgs boson couplings in both production and decay. The constraints on anomalous HVV couplings are found to be consistent with the standard model expectation in both the on-shell and off-shell regions. Under the assumption of a coupling structure similar to that in the standard model, the Higgs boson width is constrained to be 3.2(-2.2)(+2.8)MeV while the expected constraint based on simulation is 4.1(-4.0)(+5.0) MeV. The constraints on the width remain similar with the inclusion of the tested anomalous HVV interactions.

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