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Combination of ATLAS and CMS searches for Higgs boson pair production at 13 TeV

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This note presents a combination of searches for Higgs boson pair (HH) production performed by the ATLAS and CMS Collaborations using proton-proton collision data sets recorded at $\sqrt{s}$ = 13 TeV at the LHC Run 2, corresponding to integrated luminosities ranging between 126 and 140 fb^{-1}. The upper limit at the 95% confidence level on the total HH production cross section corresponds to 2.5 times the standard model (SM) prediction with an expected value of 1.7 (2.8) assuming the absence (presence) of the SM HH signal. The strength of the HH signal is measured to be $0.8^{+0.9}_{-0.7}$ relative to the SM prediction. The observed significance is found to be 1.1 standard deviations when 1.3 are expected for the SM HH signal. Constraints are set on the Higgs boson trilinear self-coupling and on the couplings of two Higgs bosons to two vector bosons, both normalized to the SM predictions and denoted as κ_λ and κ_{2V}, respectively. The observed individual constraints at the 95% confidence level are $-0.71 < \kappa_\lambda < 6.1$ and $0.73 < \kappa_{2V} < 1.3$, while the expected constraints assuming the presence of the SM HH signal are $-1.3 < \kappa_\lambda < 6.7$ and $0.66 < \kappa_{2V} < 1.4$.

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