

Search for pair production of boosted Higgs bosons via vector-boson fusion in the $b\bar{b}b\bar{b}$ final state using pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector

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A search for Higgs boson pair production via vector-boson fusion is performed in the Lorentz-boosted regime, where a Higgs boson candidate is reconstructed as a single large-radius jet, using 140 fb^{-1} of proton-proton collision data at $\sqrt{s} = 13$ TeV recorded by the ATLAS detector at the Large Hadron Collider. Only Higgs boson decays into bottom-quark pairs are considered. The search is particularly sensitive to the quartic coupling between two vector bosons and two Higgs bosons relative to its Standard-Model prediction, κ_{2V} . This study constrains κ_{2V} to $0.55 < \kappa_{2V} < 1.49$ at the 95% confidence level. The value $\kappa_{2V} = 0$ is excluded with a significance of 3.8 standard deviations with other Higgs-boson couplings fixed to their Standard-Model values. A search for new heavy spin-0 resonances that would mediate Higgs-boson pair production via vector-boson fusion is carried out in the mass range of 1-5 TeV for the first time under several model and decay-width assumptions. No significant deviation from the Standard-Model hypothesis is observed and exclusion limits at the 95% confidence level are derived.

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