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Combination of searches for resonant Higgs boson pair production in the ATLAS experiment

Combination of searches for the resonant production of Higgs boson pairs is performed in the bbbb, bbtautau, and bbyy decay channels using up to 139 fbˆ-1 of proton-proton collision data at a center-of-mass energy of 13 TeV recorded by the ATLAS detector at the LHC. No significant excess over the expected background was observed, and upper limits were set at the 95% confidence level on the production cross section of Higgs boson pairs from the decay of a narrow scalar resonance with masses ranging from 251 GeV to 5 TeV. The observed (expected) upper limits range from 0.96 to 600 fb (1.2 to 390 fb). These results are interpreted in the context of the Type-I Two-Higgs-Doublet Model and the Minimal Supersymmetric Standard Model, tightening constraints on parameter spaces not previously excluded by other searches.

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