

A search for triple Higgs boson production in the 6b final state using pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector

Friday, 31 October 2025 14:40 (20 minutes)

Ref. Phys. Rev. D 111 (2025) 032006, arXiv:2411.02040

A search for the production of three Higgs bosons (HHH) in the $b\bar{b}b\bar{b}b\bar{b}$ final state is presented. The search uses 126 fb^{-1} of proton-proton collision data at $\sqrt{s} = 13$ TeV collected with the ATLAS detector at the Large Hadron Collider. The analysis targets both non-resonant and resonant production of HHH . The resonant interpretations primarily consider a cascade decay topology of $X \rightarrow SH \rightarrow HHH$ with masses of the new scalars X and S up to 1.5 TeV and 1 TeV, respectively. In addition to scenarios where S is off-shell, the non-resonant interpretation includes a search for standard model (SM) HHH production, with limits on the tri-linear and quartic Higgs self-coupling set. No evidence for HHH production is observed. An upper limit of 59 fb is set, at 95% confidence level, on the cross-section for Standard-Model HHH production.

Primary authors: ZHOU, Baihong (Tsung-Dao Lee Institute, Shanghai Jiao Tong Univ. (CN)); YANG, Haijun (Shanghai Jiao Tong University); LI, Shu (TDLI, SJTU); CHEN, Jing (Shanghai Jiao Tong University); WANG, Xinzhu (Shanghai Jiao Tong University); ZHU, Xuliang (Shanghai Jiao Tong University)

Presenter: WANG, Xinzhu (Shanghai Jiao Tong University)

Session Classification: Parallel 2

Track Classification: ATLAS