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Search for a resonance in the di-Higgs channel decaying into $\gamma\gamma b\bar{b}$ with the ATLAS detector

In 2012, the ATLAS and CMS experiments jointly discovered the Higgs boson, a key particle of the Standard Model of particle physics. This discovery raised new questions, in particular about the mass hierarchy. The existence of new particles could help answering this problem, a Higgs-like resonance being one of them. Various theories beyond the Standard Model predict the existence of such new scalar particles that can decay in two Higgs bosons. Among the different decay channels, the decay of the first Higgs boson into a pair of photons and the second Higgs boson into a pair of b-quarks is one of the most promising since it benefits from the good diphoton resolution for the first one and the high branching ratio of the second one. This poster presents this search with 139/fb of data collected by the ATLAS detector in 2015-2018. Limits on the production cross-section for a new particle over the mass range 251-1000 GeV are set, improving by up to a factor five the expected limit of the 36/fb result.

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Collaboration / Activity

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