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Constraints on Higgs boson production with large transverse momentum using $H \rightarrow b\bar{b}$ decays in the ATLAS detector.

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Constraints on Higgs boson inclusive production with transverse momentum above 1 TeV are reported for the first time by the ATLAS Collaboration. This kinematic region is not yet well constrained by Higgs boson measurements and is sensitive to new physics effects, as predicted in some Beyond Standard Model scenarios. The analysed data were recorded from proton-proton collisions at a centre-of-mass energy of 13 TeV with the ATLAS detector at the Large Hadron Collider from 2015 to 2018 and correspond to an integrated luminosity of 136 fb^{-1} . Higgs bosons decaying into $b\bar{b}$ are reconstructed as single large-radius jets recoiling against a hadronic system and identified by the experimental signature of two b-hadron decays. The experimental techniques are validated in the same kinematic regime using the $Z \rightarrow b\bar{b}$ process. The 95% confidence-level upper limit on the cross section for Higgs boson production with transverse momentum above 450 GeV is 115 fb, and above 1 TeV it is 9.6 fb. The Standard Model predictions in the same kinematic regions are 18.4 fb and 0.13 fb, respectively.

In-person participation

Yes

Primary author: JINNOUCHI, Osamu (Tokyo Institute of Technology)**Presenter:** CELLI, Federico**Session Classification:** Poster Session**Track Classification:** Higgs Physics