

Measurements of the Higgs boson inclusive and differential fiducial cross-sections in the diphoton decay channel with $\sqrt{s} = 13$ TeV with the ATLAS detector

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A measurement of inclusive and differential fiducial cross-sections for the production of the Higgs boson decaying to two photons is performed using 139 fb⁻¹ of proton–proton collision data recorded at $\sqrt{s} = 13$ TeV by the ATLAS experiment at the Large Hadron Collider. The inclusive cross-section times branching ratio, in a fiducial region closely matching the experimental selection, is measured to be 67 ± 6 fb, which is in agreement with the state-of-the-art Standard Model prediction of 64 ± 4 fb. In addition, the cross-section in four fiducial regions sensitive to various Higgs boson production modes and differential cross-sections as function of several observables are measured. All the measurements are found to be in agreement with the Standard Model predictions. The measured transverse momentum distribution of the Higgs boson is used as an indirect probe of the Yukawa coupling of the Higgs boson to the bottom and charm quarks. In addition, five differential cross-section measurements are used to constrain anomalous Higgs boson couplings to vector bosons in the Standard Model effective field theory framework.

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