



ATLAS NOTE

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Combination of the searches for Higgs boson production in association with top quarks in the $\gamma\gamma$, multilepton, and $b\bar{b}$ final states at $\sqrt{s}=13$ TeV

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Abstract

This note summarises the combination of the searches for the Higgs boson production in association with top quarks, $t\bar{t}H$, in the $\gamma\gamma$, multilepton, and $b\bar{b}$ final states using the ATLAS detector at the CERN Large Hadron Collider. The results are obtained using the data from the proton-proton collisions at centre of mass energy of 13 TeV in 2015 and 2016 and corresponding to the total integrated luminosity of 36 fb⁻¹. The $t\bar{t}H$ signal strength, defined as a ratio of the observed cross-section for the signal to the cross section predicted for a Standard Model Higgs boson with a mass of 125.09 GeV, is measured to be $1.17^{+0.34}_{-0.32}$. This corresponds to the observed significance of 4.2 σ , while 3.7 σ was expected. The observed $t\bar{t}H$ production and decay rates are also interpreted in a leading order coupling framework.