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Measurement of ttH cross section times branching ratio in the gamma-gamma decay channel with the full Run-2 pp collision dataset collected by ATLAS experiment at $\sqrt{s}$ = 13 TeV

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The latest results on the $t\bar{t}H$ associated production from the diphoton decay channel performed by ATLAS experiment are presented. Measurements are based on 140 fb-1 of pp collision data at 13 TeV collected in 2015-2018. Events are preselected and classified in orthogonal categories targeting both hadronic and semi-leptonic top decays. The categories definition is performed using advanced ML algorithms, optimised to isolate $t\bar{t}H$ events from other production modes and to enhance the overall expected sensitivity. The $t\bar{t}H$ signal strength is obtained fitting the diphoton invariant mass distributions simultaneously over categories with a signal plus background analytical model. Relevant theoretical and experimental systematics are taken into account. Results are presented in terms of p-value, signal strength and cross section times branching ratio.

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