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Observation of associated production of top quarks with the ATLAS experiment

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The large integrated luminosity accumulated by the ATLAS detector at the highest proton-proton collision energy provided by LHC allows the study of rare SM top quark production processes. The observation of associated production of top quarks has provided the first direct measurement of the top quark EW couplings with neutral gauge bosons and the first access to the four-top-quark interaction vertex. Using the data set collected during run 2 of the LHC (2015-2018, 140/fb of pp collisions at 13 TeV), the ATLAS experiment has observed ttX production, with X=gamma,Z,H and single top quark production with X=gamma,Z,W. In this contribution, the first differential measurements of the ttZ and ttgamma cross section are presented, as well as inclusive cross section measurement for tZq and tgammaq production. The latter is a brand new result, which corresponds to the first observation of this process. Results are also presented from the search for four-top-quark production, where ATLAS has combined searches in several channels to find strong (4.7 sigma) evidence for the existence of this elusive process.

In-person participation

Yes

Primary author: ATLAS COLLABORATION

Presenter: KORN, Steffen (Georg August Universitaet Goettingen (DE))

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