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Highlights of top-quark production cross-section measurements with ATLAS at LHC: from precision to rarity

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Top-quark production in proton-proton collisions at a center-of-mass energy of 13 TeV is measured with the data collected by the ATLAS detector over five orders of magnitude.

The relatively large inclusive cross-section for the production of top-quark pair production is determined using events in the lepton+jets channel and it reaches a relative uncertainty of 4.6% allowing for experimental scrutiny to theoretical calculations at next-to-next-to-leading order.

Measurements of differential cross-sections of top-quark-antiquark pair-production performed in the all-hadronic channel allow studies of the correlation between the top-quark pair system and additional jet radiation by exploiting fully-reconstructed final states. Such measurements are compared quantitatively with predictions from several setups of next-to-leading order matrix-element generators combined with parton-shower generators.

Finally, the ATLAS collaboration recently established first evidence for the hard scattering process in which two top-quark-antiquark pairs are produced. This process is also called four-top-quarks production and is predicted to have a small cross-section of 12 fb in the standard model. Candidate events are selected if a lepton pair with the same electric charge is present or if there are at least three leptons in the event. The background is mainly given by top-quark-antiquark production in association with a W boson and heavy-flavour jets. A multivariate discriminant is used to optimize the separation between signal and background events and enhance the sensitivity.

Is this abstract from experiment?

Yes

Is the speaker for that presentation defined?

Yes

Name of experiment and experimental site

ATLAS, http://atlas.cern/

Internet talk

Details

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