



Contribution ID: 321

Type: parallel talk

Top quark pair production cross-section measurements and measurements of $t\bar{t}+X$ with the ATLAS detector

Monday 8 May 2017 14:00 (15 minutes)

Measurements of the inclusive and differential top-quark pair production cross sections in proton-proton collisions with the ATLAS detector at the Large Hadron Collider are presented at center-of-mass energies of 8 TeV and 13 TeV. The inclusive measurements reach high precision and are compared to the best available theoretical calculations. These measurements, including results using boosted tops, probe our understanding of top-pair production in the TeV regime. The results are compared to Monte Carlo generators implementing LO and NLO matrix

elements matched with parton showers and NLO QCD calculations. The production of top-quark pairs in association with W and Z bosons is also presented. The measurement uses events with multiple leptons and in particular probes the coupling between the top quark and the Z boson.

The cross-section measurement of photons produced in association with top-quark pairs is also discussed. These process are all compared to the best available theoretical calculations.

Summary

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Session Classification: Top