

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

Wednesday, 1 June 2016 14:20 (20 minutes)

Summary

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 a center of mass energy of 8 TeV and 13 TeV. The inclusive measurements reach high precision and are compared to the best available theoretical calculations. Differential measurements of the kinematic properties of top quark pair production are also discussed. These measurements, including results using boosted tops, probe our understanding of top pair production in the TeV regime. The results, unfolded to particle and parton level, 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. The production cross-section of top-quark pairs in association with additional light or heavy jets is presented. These processes are important backgrounds to searches for new physics and are all compared to the best available theoretical calculations.

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Session Classification: EW + Top + Higgs