Measurement of the top quark-pair production cross section with ATLAS in pp collisions at Root (s) = 7 TeV.

Aad, G., Abbott, B., Abdallah, J., Abdelalim, A. A., Abdesselam, A., Abi, B., ... & Galtieri, A. B. (2011). Measurement of the top quark-pair production cross section with ATLAS in pp collisions at√ s= 7 TeV. The European Physical Journal C, 71(3), 1-36. <10.1140/epjc/s10052-011-1577-6> Accessed 11 Aug 2021.

Abstract

A measurement of the production cross-section for top quark pairs (t¯t) in pp collisions at √s = 7 TeV is presented using data recorded with the ATLAS detector at the Large Hadron Collider. Events are selected in two different topologies: single lepton (electron e or muon μ) with large missing transverse energy and at least four jets, and dilepton (ee, μμ or eμ) with large missing transverse energy and at least two jets. In a data sample of 2.9pb−1, 37 candidate events are observed in the single-lepton topology and 9 events in the dilepton topology. The corresponding expected backgrounds from non-t¯tStandard Model processes are estimated using data-driven methods and determined to be 12.2±3.9 events and 2.5±0.6 events, respectively. The kinematic properties of the selected events are consistent with SM t¯t production. The inclusive top quark pair production cross-section is measured to be σt¯t = 145 ± 31 +42 −27 pb where the first uncertainty is statistical and the second systematic. The measurement agrees with perturbative QCD calculations..