



Canadian Association
of Physicists

Association canadienne
des physiciens et physiciennes

Contribution ID: 3192 Type: **Oral Competition (Graduate Student) / Compétition orale (Étudiant(e) du 2e ou 3e cycle)**

(G*) Most precise measurement of the top-quark pair production cross-section in the single-lepton channel

Monday 6 June 2022 14:00 (15 minutes)

The inclusive top-quark pair ($t\bar{t}$) production cross-section was measured in proton-proton collisions at a center of mass energy of 5 TeV with 257 pb^{-1} of data collected by the ATLAS detector. The $t\bar{t}$ cross-section measurement at a lower center of mass helps to further constrain the gluon Parton Distribution Function (PDF) at high Bjorken x . The cross-section is first measured individually in both the dilepton and single-lepton channels of the $t\bar{t}$ decay before being combined. The measurement in the dilepton channel is measured using a “cut-and-count” approach whereas the single-lepton measurement utilizes a Boosted Decision Tree (BDT) trained on Monte Carlo to separate signal from background. The output distribution of the BDT is the fit to data in a profile-likelihood fit leading to the single-lepton measurement being the most precise single measurement of the $t\bar{t}$ cross-section. The combined cross-section improves this measurement by an additional 10%. The results are used to further constrain PDFs at 5 TeV center-of-mass energy.

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Session Classification: M2-1 Exploring the Energy and Precision Frontier II (PPD) | Exploration de la frontière d'énergie et de précision II (PPD)

Track Classification: Technical Sessions / Sessions techniques: Particle Physics / Physique des particules (PPD)