

# DIS2023: XXX International Workshop on Deep-Inelastic Scattering and Related Subjects



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Type: **Parallel talk**

## Associated top-quark production and measurement of production asymmetries with the ATLAS experiment

*Tuesday, 28 March 2023 11:10 (20 minutes)*

The production of single top quarks as well as top-quark pairs in association with electroweak gauge bosons is presented together with the measurement of production asymmetries in  $t\bar{t}$  and associated  $t\bar{t}$  production. Using the data set collected during run 2 of the LHC (2015-2018, 139/fb of pp collisions at 13 TeV), the ATLAS experiment has observed  $t\bar{t}X$  production, with  $X=\gamma,Z$  and single top quark production with  $X=\gamma,Z,W$ . In this contribution, inclusive as well as differential cross-section measurements are presented in a multitude of production processes. This includes the observation of the rare production of a single top quark together with a photon. The charge asymmetry in top-quark pair production is a subtle NLO effect in QCD that was experimentally confirmed at the Tevatron, in the form of a forward-backward asymmetry. ATLAS has observed significant evidence for this SM effect in the challenging LHC environment, combining the  $l$ +jets and di-lepton channels, and has measured the complementary energy asymmetry. The results are interpreted in terms of bounds on the Wilson coefficients of the SMEFT. Two additional measurements in rare associated production processes are presented for the rapidity charge asymmetry in  $t\bar{t}\gamma$  production and the lepton asymmetry in  $t\bar{t}W$  production. Both measurements are statistically limited and have excellent prospects in future high-luminosity runs of the LHC.

### Submitted on behalf of a Collaboration?

Yes

### Participate in poster competition?

No

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