

Observation of top-quark pair production in heavy-ion collisions in the ATLAS experiment

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Top quarks, the heaviest elementary particles carrying colour charges, are considered to be attractive candidates for probing the quark-gluon plasma produced in relativistic lead-lead collisions. In proton-lead collisions, top-quark production is expected to be sensitive to nuclear modifications of parton distribution functions at high Bjorken- x values. In Run 2, the ATLAS experiment recorded 165 nb^{-1} of proton-lead data and 1.9 nb^{-1} of lead-lead data at centre-of-mass energy of 8.16 TeV and 5.02 TeV per nucleon pair, respectively. In this poster, we present the final measurement of the top-quark pair production in dilepton and lepton+jet decay modes in the proton-lead system with the ATLAS detector. The precision of the analysis requires detailed performance studies involving electrons, muons, jets and b-quark jets. A profile-likelihood approach is used to extract signal significance. The nuclear modification factor is also measured. The results are compared to theory predictions involving state-of-the-art nuclear parton distribution functions. Prospects for the top-quark pair measurement in lead-lead collisions are also presented.

Category

Experiment

Collaboration

ATLAS

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