Contribution ID: **174** Type: **Talk**

Using associated production of top quarks to neutral bosons to probe standard model couplings and search for new physics

Thursday, July 30, 2020 9:15 AM (25 minutes)

The unprecedentedly large integrated luminosity accumulated by the ATLAS detector at the highest proton-proton collision energy provided by LHC allows the study of rare SM processes. The associated production of top quarks with neutral bosons is such an example: it directly probes top-quark couplings to photons and Z bosons and tests for deviations from the standard model.

Three measurements are presented.

The cross sections for the production of top quark pairs in association to a photon (ttgamma) or to a Z boson (ttZ) are measured both inclusively and differentially as a function of kinematic variables characterizing the tt+boson system. Both sets of measurements use the full Run2 data set consisting of 139/fb of integrated luminosity. Final states with three and four leptons and b-jets are used to extract ttZ rates, while tt+gamma cross sections are derived from final states with one photon, one electron and one muon of opposite sign and at least two jets. The measurements are compared to predictions obtained by NLO+PS Monte Carlo and fixed order NLO calculations.

The single top-quark production in association with a Z boson (tZq) probes two SM couplings in the same process (WWZ and tZ coupling) and it is a background to the rare associated production of a single top quark and a Higgs Boson. Using a total integrated luminosity of 139/fb collected in the LHC Run-2 from 2015 to 2018, events containing three isolated charged leptons (electrons or muons) and two or three jets, one of which is identified as containing a b-hadron are selected. A neural network is used to improve the background rejection and extract the signal. The measured cross section for tl+l-q production, including non-resonant dilepton pairs with dilepton mass larger than 30 GeV is presented and compared with the SM prediction.

I read the instructions

Secondary track (number)

Primary author: ZOCH, Knut (Georg August Universitaet Goettingen (DE))

Presenter: ZOCH, Knut (Georg August Universitaet Goettingen (DE))

Session Classification: Top Quark and Electroweak Physics

Track Classification: 04. Top Quark and Electroweak Physics