

# XXVIII International Workshop on Deep Inelastic Scattering and Related Subjects



Contribution ID: 72

Type: **Contributed Talk**

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

*Wednesday, 25 March 2020 12:20 (20 minutes)*

The associated production of top quarks with neutral bosons is measurable in 13 TeV pp LHC collisions thanks to the unprecedented accumulated luminosity. 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 ( $t\bar{t}\gamma$ ) or to a Z boson ( $t\bar{t}Z$ ) are measured both inclusively and differentially as a function of kinematic variables characterizing the  $t\bar{t}$ +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  $t\bar{t}Z$  rates, while  $t\bar{t}\gamma$  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. Finally, 81/fb of integrated luminosity are used to search for flavour-changing neutral currents via the coupling of a top quark, a photon and an up or charm quark in events with one photon, one lepton (electron or muon), one b-tagged jet and missing transverse momentum.

**Primary authors:** JUSTE ROZAS, Aurelio (ICREA and IFAE (ES)); ZOCH, Knut

**Presenter:** ZOCH, Knut

**Session Classification:** Electroweak Physics and Beyond the Standard Model

**Track Classification:** Electroweak Physics and Beyond the Standard Model