T 29: Other Exp., EW

Time: Tuesday 17:00–18:30   Location: HSZ/0103

T 29.1 Tue 17:00 HSZ/0103

Search for new physics in top quark production with an associated boson in the framework of the SMEFT — Arnulf Quadt, Baptiste Ravina, Elizaveta Shabalina, and •Sreelakshmi Sindhu for the ATLAS-Collaboration — II. Physikalisches Institut, Georg-August-Universität Göttingen, Germany

The Standard Model Effective Field Theory (SMEFT) provides a model independent approach to study beyond the Standard Model effects. A search for new physics using the framework of the SMEFT is performed using events with one or two top quarks in association with a boson ($t\bar{t}W$, $t\bar{t}Z$, tZ, $t\bar{t}H$, tH). The simultaneous analysis of these processes gives the opportunity to constrain a large number of dimension six SMEFT operators.

In this analysis, final states with two same sign or three isolated leptons are selected and classified into various regions based on the number of leptons, jets, b-jets and the total charge of the leptons. Using the event yields in these regions, limits are extracted on the SMEFT operators. This measurement is performed using the proton-proton collision data at $\sqrt{s} = 13$ TeV with an integrated luminosity of 139 fb^{-1}, recorded from 2015 to 2018 with the ATLAS experiment at the Large Hadron Collider at CERN.

T 29.2 Tue 17:15 HSZ/0103

A neural network for beam background decomposition in Belle II at SuperKEKB — •Yannik Buch, Ariane Frey, Lukas Herzberg, and Benjamin Schwenker — II. Physikalisches Institut, Georg-August-Universität Göttingen, Friedrich-Hund-Platz 1, 37077 Göttingen, Deutschland

The Belle II detector investigates the b-sector by measuring the decays of the $\Upsilon(4S)$ resonance. These $\Upsilon(4S)$ decays are produced by the SuperKEKB accelerator at KEK in Tsukuba, Japan. The goal of SuperKEKB is to achieve an instantaneous luminosity of 6.5×10^{35} cm^{-2}s^{-1}, of which 4.7×10^{34} cm^{-2}s^{-1} has recently been reached.

The beam backgrounds at Belle II are mostly composed of storage and luminosity-induced backgrounds. Due to short beam lifetimes continuous top-up injections into both rings are necessary, resulting in injection-induced background spikes. BGNet is a neural network based diagnostic tool for real-time background decomposition and analysis. The training data for BGNet are 1 Hz time series of diagnostic variables describing the state of the SuperKEKB collider subsystems. Using feature attribution to explain the predictions, provides clues to identify the most relevant causes of changes in background levels.

T 29.3 Tue 17:30 HSZ/0103

Studies of ATLAS Forward Proton (AFP) ToF performance with Run-3 data — •Viktoriia Lysenko and Andre Sopczak — CTU in Prague

Performance studies of ATLAS Forward Proton (AFP) ToF with Run-3 data are presented.

T 29.4 Tue 17:45 HSZ/0103

Search for $\gamma\gamma$jj final states from Vector Boson Scattering at the ATLAS experiment — •Orcun Kolay — Technische Universität Dresden, Germany

Vector boson scattering (VBS) is a suitable process to observe triple and quartic gauge couplings. This rare processes provide us an avenue to examine electroweak (EW) symmetry breaking mechanism and to search for possible new physics effects. In this study, two photons along with two jets ($\gamma\gamma$jj) are taken into account as the final state. The measurement of the VBS $\gamma\gamma$jj process comes along with two main challenges as the background coming from QCD induced $\gamma\gamma$jj and misidentified jets as photon. In this talk, it will be presented an ongoing work which mainly covers the separation of EW $\gamma\gamma$jj from QCD $\gamma\gamma$jj, the signal-control region strategy for misidentified jets and the comparison of the different Monte Carlo event generators for the signal phase space.

T 29.5 Tue 18:00 HSZ/0103

Electroweak production of two jets in association with a Z boson in proton-proton collisions — •Keila Moral Figueroa — Deutsches Elektronen-Synchrotron DESY, Notkestraße 85, D-22607 Hamburg

In recent years, the Large Hadron Collider (LHC) has played an important role in constraining extensions of the Standard Model (SM). One of the measurements which can contribute to it, is the electroweak production of the Z boson in association with two jets (EW Zjj). This process limits the anomalous weak-boson self-interactions, due to its sensitivity to the weak vector-boson scattering (VBS), an increasingly relevant process at the LHC.

So far, the theoretical predictions of the EW Zjj process diverge slightly among different Monte Carlo event generators. As a consequence, further studies are needed in order to obtain reliable model-independent measurements. The EW Zjj process is identified by imposing large invariant dijet mass and dijet pseudaripidty separation. First distributions are shown using the full Run 2 dataset.

T 29.6 Tue 18:15 HSZ/0103

A data-driven multijet background estimation method for the measurement of the electroweak Wjj production with the ATLAS experiment — •Lisa Marie Baltes — Kirchhoff-Institute for Physics, University Heidelberg, Germany

The observation and measurement of self-interactions of weak gauge bosons provide an indirect search for physics beyond the Standard Model. The electroweak production of a W boson in association with two jets includes the vector-boson-fusion (VBF) production of a W boson and is thus sensitive to the triple gauge boson vertices WWγ and WWZ. In proton-proton collisions, the characteristic signature of VBF includes two high-momentum jets at small angles with respect to the incoming beams and a centrally produced lepton-neutrino pair originating from the W boson decay. A significant background for this analysis is multijet production via the strong interaction where a jet is misidentified as a lepton. Monte-Carlo simulation generally do not provide a proper description of QCD backgrounds. Therefore, data-driven techniques are used to estimate this background. In this talk, the current status of the analysis including the multijet background estimation using the matrix method is presented.