T 83: Elektroschwache Wechselwirkung II

Zeit: Donnerstag 16:30–18:30 Raum: Z6 - SR 1.005

T 83.1 Do 16:30 Z6 - SR 1.005

The measurement of W-charge asymmetry at 13 TeV with the CMS detector — •Vladyslav Danilov[1], Mariarosaria D'Alfonso[2], Elisabetta Gallo[1], Volodymyr Myronenko[1], and Katarzyna Wichmann[1] — [1]DESY, Hamburg, Germany — [2]MIT, Cambridge, Massachusetts, USA

In pp collisions at the LHC, rates of $u\bar{d}$ annihilation dominate over $d\bar{u}$. Consequently, W^+-boson production prevails over W^-, which results in an effect called W-charge asymmetry, A.
The analysis is based on the data sample corresponding to an integrated luminosity of 2.3 fb^{-1} recorded by the CMS detector over the year 2015. The events with W bosons decaying via the muon channel are selected. The signal extraction and background determination are performed using template fits to missing E_T distributions. The differential cross sections are used to calculate the W asymmetry in bins of rapidity, $A(\eta)$.
The presented measurement is sensitive to u/d ratio and the sea quark content in the proton and is used in global QCD analysis to determine parton density function.

T 83.2 Do 16:45 Z6 - SR 1.005

Separating WW and ZZ events in their hadronic decays at the International Linear Collider — •Jakob Beyer[1,2], Michael Kobel[2], and Jenny List[1] — [1]DESY Hamburg — [2]Technische Universität Dresden

Electroweak precision measurements at an e^+e^- collider are the next step in testing the Standard Model - and complementary to the LHC. Such measurements can be provided at the future International Linear collider (ILC). Its polarized electron and positron beams, the precise event reconstruction using state-of-the-art detectors as well as the excellent theoretical calculability present an ideal environment for this enterprise.

The baseline design of the ILC provides a center-of-mass energy of 250 GeV but extensions up to 1 TeV are possible. With such an extension additional important physics measurements, e.g. of the quartic gauge coupling, could be performed. At the ILC, these studies can include the dominant hadronic decay modes of the W and Z due to the low QCD background. Even VBS-like signatures like $e^+e^- \to \nu\nu WW/\nu\nu ZZ$ are then accessible in their hadronic final states, allowing for a significant increase in signal events. For such measurements the separability of the W and Z decays to two jets is important and constitutes a benchmark for the detectors.

A study of this separation power at International Large Detector is performed in the case of diboson $(WW/ZZ)+\nu\nu$ events at the $\sqrt{s} = 1$ TeV ILC.

T 83.3 Do 17:00 Z6 - SR 1.005

Search for lepton flavour violation in Z boson decays — •David Brunner, Jordy Degens, Peter Fackeldey, Olena Hlushchenko, Wolfgang Lohmann, Johannes Merz, Thomas Müller, Alexander Nehrkorn, Claudia Pistone, Dennis Roy, Hale Sert, Achim Stahl, and Dominik Wolfschläger — Physics Institute III B, RWTH Aachen University

In interactions of charged leptons only processes conserving the lepton flavour are observed. Since there is no known symmetry requiring this, a model independent search for Z bosons decays violating lepton flavour conservation is done in final states with electrons, muons and tau-leptons.

For this purpose a cut based analysis strategy is choosen. Bayesian statistics are used to calculate exclusion limits on the braching ratios of Z decays violating lepton flavour conversation. This analysis is done with the CMS data of 2016 with a center of mass energy of $\sqrt{s} = 13$TeV and an integrated luminosity of $\mathcal{L} = 35.9\text{fb}^{-1}$.

T 83.4 Do 17:15 Z6 - SR 1.005

Measurement of the Scattering of Electroweak Gauge Bosons in the WZjj Final State with the ATLAS Detector at the LHC — •Carsten Bittrich, Tim Herrmann, Michael Kobel, Franziska Iltzsche, Joany Manjarres, and Stefanie Todt — IKTP, TU Dresden

The scattering of massive gauge bosons, measurable at the LHC in the final states with decay products of two massive gauge bosons and two additional jets, is an essential process for the studies of the mechanism of electroweak symmetry breaking (EWSB) and provides a mean to study the gauge structure of the Standard Model via the quartic gauge couplings. The channel of $WZ/\gamma \to WZ$ scattering provides a good compromise between reconstructability of the boson kinematics and expected number of events. This process is studied in the final state with three charged leptons, missing energy and two jets at a center of mass energy of 13 TeV using the 2015 and 2016 dataset of the ATLAS detector in Run 2 of the LHC. Machine learning techniques are used to extract signal-like events allowing for the first measurement of this process.

T 83.5 Do 17:30 Z6 - SR 1.005

Search for Anomalous Triple Gauge Couplings in the Semileptonic WW and WZ Decays Using the CMS Experiment — •Muhammad Ansar Iqbal, Matthias Mozer, Thomas Müller, and Ivan Shvetsov — Institut für Experimentelle Teilchenphysik (ETP), Karlsruher Institut für Technologie (KIT)

One of the best ways to search for physics beyond the Standard Model (SM) is in the framework of the Effective Field Theory. The Large Hadron Collider (LHC) at CERN with 13 TeV center of mass energy in Run II has opened new doors for such novel searches. We work with the Compact Muon Solenoid (CMS) experiment of the LHC on an analysis which focuses on anomalous triple gauge couplings (aTGC) in the electroweak sector. The analysis deals with the WW/WZ final states in the semileptonic decay channel, where the hadronically decaying vector boson is reconstructed in the boosted regime.

In this talk we present the on-going analysis with the steps involved in order to model our backgrounds and extraction of signal. We discuss the statistical techniques important for the analysis and show various results and plots we have for 36 fb^{-1} of 2016 data. We also present the limits on aTGC parameters already obtained with a previous iteration of the analysis.

T 83.6 Do 17:45 Z6 - SR 1.005

Study of different unfolding methods of kinematic distributions of the WZ → WZ Scattering with Simulations of the ATLAS Detector at the LHC — •Tim Herrmann, Carsten Bittrich, Franziska Iltzsche, Michael Kobel, Joany Manjarres, and Stefanie Todt — TU Dresden, Germany

In this talk different unfolding methods will be compared in order to determine which is the best suited for the P-value resp. CLs calculation in statistical tests. The different unfolding methods are compared on the example of the Vector Boson Scattering in the channel WZ → WZ for fully leptonic final states. The WZ → WZ scattering from the Standard Model is sensitive to the presence of new physics. New physics can manifest as modified cross section and kinematics distributions. For this study two sensitive kinematic distributions are used, the transverse mass of the WZ system and the transverse momentum of the Z boson.

The study show that for comparisons between data and theory predictions detector effects need to be considered, to do so two alternatives are possible either the theory has to be folded or the data unfolded. In this study, no significant advantage of using the unfolding approach instead of the folding approach have been found for computer based statistical tests using P-values resp. CLs.

T 83.7 Do 18:00 Z6 - SR 1.005

Polarization and Electroweak Precision Measurements at the ILC for $\sqrt{s} = 250$ GeV — •Robert Karl[1,2] and Jenny List[1] — [1]DESY Hamburg — [2]University of Hamburg

The International Linear Collider (ILC) is a planned electron-positron collider with a first stage at a center-of-mass energy of 250 GeV. Thereby, the electron beam will be polarized to 80% and the positron beam to 30%. This allows very precise measurements of Standard Model (SM) parameters, properties of the Higgs boson and unique searches for physics beyond the SM. In particular, the ILC will provide very precise measurements of electroweak observables, aiming for up to 2 order of magnitude better precision than previously achieved. This will provide a deep insight into the chiral structure of the SM and open an additional portal to physics beyond the SM.
In this contribution, a new study at 250 GeV will be presented using

a combined analysis of W- and Z-pair production, as well as single-W production and s-channel Z/γ exchange including multiple decay channels. This analysis will provide a coherent extraction of the total cross section and the left-right asymmetry for each channel, anomalous Triple Gauge Couplings and the luminosity-weighted average polarization, which is used as the absolute scale calibration of the polarization for all physics analyses. Furthermore, systematic uncertainties (e.g. of the detector selection efficiency) including their correlations are considered in this analysis and their impact on the measurement precision of the electroweak observables will be presented.

T 83.8 Do 18:15 Z6 - SR 1.005

Measurement of the W^+W^- cross section in pp collisions at $\sqrt{s}$ = 13 TeV at the ATLAS Detector — •Baishali Dutta — DESY Zeuthen, Zeuthen, Germany

W boson pair production plays an important role to understand the Standard Model electroweak sector. Due to the involvement of the triple gauge boson couplings, this process is sensitive to the occurrence of new physics beyond the Standard Model.

With the data collected by the ATLAS experiment in 2015 comprising an integrated luminosity of 3.16 fb^{-1}, the fiducial and total W^+W^- cross sections have been measured at a centre-of-mass energy of $\sqrt{s}$ = 13 TeV. Signal events are selected where the two W bosons produce an electron, a muon and two associated neutrinos in the final state. This talk presents the results of this cross-section measurement and shows prospects of more precise and differential measurements with the combined 2015 and 2016 ATLAS data.