T 6: QCD

Zeit: Montag 16:45–18:45 Raum: VSH 10

T 6.1 Mo 16:45 VSH 10

Bestimmung der PDFs des Protons durch Messungen des Z+Jet-Wirkungsquerschnitts im myonischen Zerfallskanal — •Anna Friedel, Günter Quast, Klaus Rabbertz, Stefan Wayand, Georg Sieber und Thomas Berger — Institut für Experimentelle Kernphysik, Karlsruher Institut für Technologie

Die Messung des Wirkungsquerschnitts der Z+Jet Produktion ist ein Prozess, der hervorragend geeignet ist, um die Vorhersagen des Standardmodells zu überprüfen und die Verteilungsfunktionen der Partonen im Proton (PDFs) mit hoher Genauigkeit zu bestimmen. Der Grund hierfür liegt in der klaren Signatur des Prozesses und der präzisen Rekonstruktion des Z-Bosons im myonischen Zerfallskanal. Analysiert werden Daten, die vom CMS-Detektor am LHC im Jahr 2016 aufgenommen wurden. Detektoreffekte werden durch Anwendung von Effizienzgewichten und Entfaltung berücksichtigt. Mit Hilfe von Monte Carlo Simulationen werden Vorhersagen des Wirkungsquerschnitts der Z+Jet-Produktion unter unterschiedlichen Annahmen für die PDFs berechnet. Aus dem Vergleich der Daten mit den Theorievorhersagen können die Proton-PDFs bestimmt werden.

T 6.2 Mo 17:00 VSH 10

Measurements of top-pair to Z-boson cross section ratios at center-of-mass energies of $\sqrt{s} = 13, 8, 7$ TeV with the ATLAS detector and evaluation of measured cross sections constraints on PDFs and strong coupling constant. — •Artur Trofymov — DESY, Hamburg, Germany

Ratios of top-quark pair to Z-boson production ($Z \to \ell^+\ell^-$ where $\ell = e, \mu$) cross sections at center-of-mass energies of $\sqrt{s} = 13, 8, 7$ TeV are measured using data recorded by the ATLAS experiment at the LHC. Data at $\sqrt{s} = 13$ TeV for both analyses are collected in 2015 with total integrated luminosity of 3.2 fb^{-1}. Previously published Z-boson and top-quark pair cross sections measured at $\sqrt{s} = 8$ and 7 TeV are corrected to phase space of measurements at $\sqrt{s} = 13$ TeV and used for the ratios calculation. Single cross section ratios at a given $\sqrt{s}$ for the two processes and same process at different $\sqrt{s}$, as well as double ratios of two processes at different $\sqrt{s}$, are evaluated. The ratio results are compared to the predictions calculated at next-to-next-to-leading order for different parton distribution functions (PDFs). The correlated cross section measurements are used to obtain constraints on PDFs and the strong coupling constant α_s.

T 6.3 Mo 17:15 VSH 10

Measurement of the Associated Production of W+c in 13 TeV pp-Collisions with the CMS Experiment — Benoit Roland, Katerina Lipka, and •Svenja Pflitsch — DESY

The measurement the of W+c production cross-section provides an opportunity to directly access the strange quark content of the proton at the electroweak scale.

This can lead to a significant reduction of the uncertainties connected to the strange-quark parton density functions.

We will focus on $W \to l\nu$ and $c \to D^*$ as probes of W+c since both, W-boson and D-Meson, can be measured with good accuracy by the CMS-detector. Furthermore, the fragmentation of charm quarks into D-mesons is well measured.

The data taken by the CMS-experiment at the LHC in 2016 offers sufficient statistics for an analysis of the pseudorapidity-distribution of the muon in detail and thus for an investigation of strange-, antistrange-quark asymmetry.

T 6.4 Mo 17:30 VSH 10

Determination of the Strong Coupling Constant from Inclusive Jet Data — Günter Quast, Klaus Rabbertz, •Daniel Savoiu, and Georg Sieber — Karlsruhe Institute of Technology

Inclusive jet production cross sections are among the most precise and well-understood jet-related observables measured at hadron colliders. In light of this, such measurements are an important asset for the determination of fundamental physical parameters, such as the strong coupling constant $\alpha_s(M_Z)$, to the high precision required by studies of QCD phenomenology. In this talk, we present a procedure for the determination of the strong coupling constant $\alpha_s(M_Z)$ from a combined set of measurements performed at multiple hadron colliders, as well as the results obtained.

T 6.5 Mo 17:45 VSH 10

Production of b jets and pairs of b jets with associated jets — •Patrick Connor, Hannes Jung, and Paolo Gunnellini — DESY, Hamburg, Germany

In the Standard Model, the b quark is the heaviest quark that can hadronise, and is therefore an excellent probe for higher-order QCD contributions. The CMS detector provides a sufficient resolution to measure the production of b-jets and pairs of b-jets and associated jets. In particular, we will investigate transverse-momentum effects in the parton density functions (TMDs). In the talk, we present Monte-Carlo studies and preliminary results from 13 TeV data.

T 6.6 Mo 18:00 VSH 10

NLO predictions for dijet azimuthal correlations — •Armando Bermudez Martinez, Daniela Dominguez Damiani, and Hannes Jung — DESY, Hamburg, Germany

Factorization theorems and the matching of matrix elements (ME) to parton showers (PS) are highly relevant topics of discussion especially in the simulation of hadron collider physics. For the study of possible breaking of factorization the so-called resummation region is particularly interesting. Within perturbative QCD, the resummation or Sudakov regions are sectors of the phase space where any fix order calculation does not give a reliable result and an all order computation approach is needed. MC generators implement this "all order" approximate calculation by means of PS. Here we present a study of the inclusive dijet cross section as a function of the azimuthal separation between the leading jets. We focus on the Sudakov region for high pt leading jets scenarios. The studies were performed using 3 final partons @ NLO ME as well as POWHEG three jets NLO matched to pt ordered PS.

T 6.7 Mo 18:15 VSH 10

Determination of the total cross section in proton–proton collisions at the LHC at $\sqrt{s} = 8$ from elastic scattering using the ALFA sub-detector of ATLAS — •Christian Heinz, Hasko Stenzel, and Michael Düren — Universität Gießen, 2. Physikalisches Institut

The ALFA (Absolute Luminosity for ATLAS) Roman Pot detector system is part of the forward instrumentation of ATLAS located about 240 m away from the interaction point in the LHC tunnel in both directions. ALFA consists of a scintillating fibre tracker housed in vertical Roman Pots which enables the measurement of elastic proton-proton scattering at small scattering angles. In 2012 data were recorded at a centre-of-mass energy of $\sqrt{s} = 8$ TeV during a fill with special beam optics of the LHC with $\beta^* = 90$ m and parallel-to-point focusing.

The four-momentum transfer t is measured for elastically scattered protons and used to extract the differential elastic cross section. The differential elastic cross section is fitted at small |t| using the optical theorem. In this talk the published results of the determination of the total cross section and of the slope of the elastic cross section is reported.

T 6.8 Mo 18:30 VSH 10

Hadron Production in Photon-Photon Processes at the International Linear Collider — •Kollassery Swathi Sasikumar[1,2], Carl Mikael Berggren[1], and Jenny List[1] — [1]Deutsches Electronen Synchrotron, Hamburg, Germany — [2]Universität Hamburg, Institut für Experimentalphysik, Luruper Chaussee 149, 22761 Hamburg

The International Linear Collider (ILC) is a proposed e^+e^- collider, tunable at a centre-of-mass energy between 250 - 500 GeV (with the possibility to upgrade to 1 TeV). Being an e^+e^- collider ILC has the prospect of providing very clean physics environment for making high precision measurements e.g of the Higgs bosons and to search for new particles. In addition to the desired e^+e^- collisions, parasitic collisions of real and virtual photons radiated off the e^+e^- beams occur at the rates of upto 1.2 $\gamma\gamma$ collisions per bunch crossings. The $\gamma\gamma$ centre-of-mass energies reach from few 100 MeV to the full e^+e^- centre-of-mass energy. At all these energies, in particular the production of hadrons need to be modelled correctly in order to estimate the impact of these backgrounds which pile-up on each e^+e^- event. It is equally important to develop advanced methods to remove these backgrounds from the important physics processes where the current methods remain inad-

equate. Thus in this contribution we discuss the simulations for $\gamma\gamma \rightarrow$ low P_T hadron processes, evaluate their impact on the detector and discuss the method developed to remove them from interesting physics events.