

T 11: QCD / Partonstruktur

Zeit: Montag 16:00–18:15

Raum: Z6 - SR 1.002

T 11.1 Mo 16:00 Z6 - SR 1.002

Messung des Wirkungsquerschnitts der Z+Jet-Produktion im myonischen Zerfallskanal mit dem CMS-Detektor bei $\sqrt{s} = 13$ TeV zur Verbesserung der Proton-PDFs — ●THOMAS BERGER und KLAUS RABBERTZ — Institut für Experimentelle Teilchenphysik, KIT, Karlsruhe, Deutschland

Die Messung des Z+Jet-Wirkungsquerschnitts am LHC bietet aufgrund der klaren Signatur des Prozesses einen hervorragenden Test für die Vorhersagen des Standardmodells. Durch die präzise Rekonstruktion des Z-Bosons im myonischen Zerfallskanal können zusätzlich die Parameter der Partonverteilungsfunktion (PDF) des Protons weiter eingeschränkt werden.

Die präsentierte Analyse basiert auf dem vollständigen Datensatz, der vom CMS-Experiment im Jahr 2016 aufgenommen wurde. Der Z+Jet-Wirkungsquerschnitt wird dreifach-differentiell in Abhängigkeit von Transversalimpuls p_T^Z des Z-Bosons, sowie Rapiditätsdifferenz y^* und Gesamtboost y_b des Z+Jet-Systems gemessen. Diese Herangehensweise erlaubt die Entkopplung der PDFs vom Matrixelement und ermöglicht damit eine genauere Bestimmung ebenjener Verteilungsfunktionen.

T 11.2 Mo 16:15 Z6 - SR 1.002

Measurements of Durham, anti- k_t and SIScone jet rates at LEP with the OPAL detector — ●ANDRII VERBYTSKYI — Max-Planck-Institut für Physik, Föhringer Ring 6, 80805 München

The jet production in e^+e^- annihilation to hadrons is studied with data recorded by the OPAL experiment at LEP at multiple centre-of-mass energies. The jet production rates were measured with Durham and for the first time with the anti- k_t and SIScone jet clustering algorithms and compared to predictions by modern Monte Carlo event generators.

T 11.3 Mo 16:30 Z6 - SR 1.002

Measurement of the diffractive cross sections with the CMS experiment at 13TeV — ●MELIKE AKBAYIK, RALF ULRICH, and SEBASTIAN BAUR — KIT, Hermann-von-Helmholtz-Platz 1, 76344 Eggenstein-Leopoldshafen

The cross section for single and double diffractive processes is measured at the CERN LHC with the CMS experiment in proton-proton collisions at 13TeV. The CASTOR calorimeter is a crucial part of the analysis, since it is suited to distinguish between single and double diffraction. A multivariate classification with BDTs is employed for the core task. As input serve pixel tracks (with no magnetic field in CMS) combined with towers from all calorimeters, covering the enormous continuous acceptance from $-6.6 < \eta < +5.2$. The results are the first measurements of diffractive cross sections at 13TeV so far. The data challenges some of the model predictions, and favors smaller values of single diffraction towards the highest energies.

T 11.4 Mo 16:45 Z6 - SR 1.002

Measurement of observables sensitive to the underlying event in inclusive Z boson production at a centre of mass energy of 13 TeV with the ATLAS detector — ●LENNART ADAM — Institut für Physik, Staudingerweg 7, 55128 Mainz

This talk will summarize a full measurement of observables sensitive to the underlying event in proton-proton collisions at a centre-of-mass energy of 13 TeV. It is based on a data set collected during 2015 with the ATLAS detector at the Large Hadron Collider. The underlying event refers to all processes of a single proton-proton interaction which are not attributed to the hard scattering process. It is a background to all hadron collider experiments. Thus, a precise modelling of the underlying event is crucial to precision measurements, such as of the W boson mass. The analysis presented here evaluates the accuracy of recent MC models in simulating the underlying event. In order to measure the overall activity of the underlying event, the charged particle multiplicity, the sum of transverse momenta and the general p_T -spectra of charged particles are investigated. The observables are measured as a function of the hard scatter process represented by the creation of a Z boson subsequently decaying into a muon pair. A dedicated discussion of systematic uncertainties, e.g. pile-up effects, is included.

T 11.5 Mo 17:00 Z6 - SR 1.002

Determination of $\alpha_s(M_Z)$ from energy-energy correlations in electron positron annihilation — ●ANDRII VERBYTSKYI¹, ADAM KARDOS², STEFAN KLUTH¹, GABOR SOMOGYI², and ZOLTAN TULIPANT² — ¹Max-Planck-Institut für Physik, Föhringer Ring 6, 80805 München — ²MTA-DE Particle Physics Research Group, University of Debrecen, 4010 Debrecen, PO Box 105, Hungary

A determination of the strong coupling constant from data collected in e^+e^- collisions is presented. The measurements of energy-energy correlation from multiple experiments confronted with perturbative and resummed QCD predictions. The nonperturbative effects are studied and incorporated in the analysis via Monte Carlo models that include modern shower algorithms and higher order corrections to QCD matrix elements.

T 11.6 Mo 17:15 Z6 - SR 1.002

Measurement of W/Z production in the high p_T , boosted region at CMS — ●JINDRICH LIDRYCH, HANNES JUNG, and PAOLO GUNNELLINI — DESY, Hamburg, Germany

Decay products of the W/Z boson with the very high transverse momentum (p_T) are collimated in the momentum direction of the mother particle and are merged into a fat jet with the characteristic substructure. Since the properties of the W and Z boson are precisely predicted by the Standard Model (SM), the measurements with the boosted W/Z boson can be in particular interesting for probing the SM at the extreme energies.

In this talk, we will present the Monte Carlo simulations on the detector level for the the measurement of W/Z production in the boosted region at CMS. This study will be used for the experimental reconstruction of boosted objects to measure the production of W/Z with the high p_T in proton-proton collisions at $\sqrt{s} = 13$ TeV collected by the CMS experiment at the LHC.

T 11.7 Mo 17:30 Z6 - SR 1.002

Determination of the total cross section and the ρ -parameter in proton-proton collisions at the LHC at $\sqrt{s} = 13$ TeV from elastic scattering using the ALFA sub-detector of ATLAS — ●CHRISTIAN HEINZ, HASKO STENZEL, and MICHAEL DÜREN — 2. Physikalisches Institut, Universität Gießen

The ALFA (Absolute Luminosity for ATLAS) Roman Pot detector system is part of the forward instrumentation of ATLAS located about 240 m downstream of the interaction point in the LHC tunnel. ALFA consists of scintillating fibre trackers housed in vertical Roman Pots which enable the measurement of elastic proton-proton scattering at small scattering angles. In 2016, data were recorded at a centre-of-mass energy of $\sqrt{s} = 13$ TeV during several fills with special beam optics of the LHC with $\beta^* = 2.5$ km 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 including the Coulomb nuclear interference region. In this talk a progress report of the determination of the total cross section, the nuclear slope of the elastic cross section and of $\rho = \frac{\Re f_{el}(t \rightarrow 0)}{\Im f_{el}(t \rightarrow 0)}$ at small $|t|$ is given.

T 11.8 Mo 17:45 Z6 - SR 1.002

Studien zur PDF-Sensitivität anhand des dreifach-differentiellen Z+Jet-Wirkungsquerschnitts — ●MIGUEL SANTOS CORREA, JAKOB STARK und KLAUS RABBERTZ — Institut für Experimentelle Teilchenphysik, KIT, Karlsruhe, Deutschland

Die Produktion von Jets in Assoziation mit einem Z-Boson bietet eine gute Möglichkeit für die präzise Bestimmung der Partonverteilungsfunktionen (PDFs) des Protons. Aufgrund des hohen Anteils von Quark-Gluon-Streueignissen können Messungen des Z+Jet Wirkungsquerschnitts insbesondere Auskunft über die Gluon-PDF geben.

Für eine Studie der PDF-Sensitivität werden Messungen und Theorievorhersagen des dreifach-differentiellen Z+Jet Wirkungsquerschnitts untersucht. Dieser wird in Abhängigkeit vom Transversalimpuls des Z-Bosons und zweier geometrischer Variablen betrachtet: die Rapiditätsdifferenz y^* und der Gesamtboost y_b des Z+Jet-Systems. Diese Aufteilung bewirkt eine bessere Trennung von Matrixelement- und PDF-bezogenen Effekten, wodurch eine erhöhte Präzision der PDF-Bestimmung zu erwarten ist.

Die Theorievorhersagen werden als fastNLO-Interpolationstabellen bereitgestellt und in Vergleichen mit Daten vom CMS-Experiment am

LHC für die Bestimmung der PDFs verwendet.

T 11.9 Mo 18:00 Z6 - SR 1.002

Measurement of Associated Production of $W+c$ and Determination of the Strange-Quark Content of the Proton —
•SVENJA PFLITSCH, KATERINA LIPKA, and BENOIT ROLAND — 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.

We focus on $W \rightarrow l\nu$ and $c \rightarrow D^*$ as probes of $W+c$ since both, W -

boson and D-Meson, can be measured with good accuracy by the CMS-detector. Further 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 coming from the decay of the W-boson. We present the results for the inclusive and differential cross section of $W+c$ charm, as well as comparisons to theoretical predictions at Next-to-Leading order (NLO).

The results from this analysis are used as input for a QCD analysis at NLO to determine the strange-quark distribution and extract the strangeness fraction of the proton.