

## T 98: Soft QCD und PDF fits

Zeit: Donnerstag 16:45–19:05

Raum: K.11.20 (K5)

T 98.1 Do 16:45 K.11.20 (K5)

**Verbesserung der Proton PDFs aus Messungen des Jet Wirkungsquerschnitts am CMS Experiment** — ●GEORG SIEBER, KLAUS RABBERTZ, GÜNTER QUAST und FRED STÖBER — Institut für Experimentelle Kernphysik, Karlsruher Institut für Technologie

Bei QCD-Präzisionsstudien an Proton-Beschleunigern stellt die innere Struktur des Protons eine der dominierenden Unsicherheitsquellen dar. Das Proton lässt sich über Partonverteilungsfunktionen (PDFs) beschreiben. Die PDFs können nicht störungstheoretisch berechnet werden, sondern müssen aus experimentellen Messungen abgeleitet werden.

Die Produktion von hadronischen Jets ist einer der dominierenden Prozesse am Large Hadron Collider (LHC). Mit dem CMS-Detektor wurden eine Vielzahl von Jet-Observablen bei einer Schwerpunktsenergie von 7 TeV sowie 8 TeV gemessen.

Mit Hilfe dieser Messungen können die Proton PDFs, insbesondere die PDF des Gluons, bei hohen Partonimpulsanteilen  $x$  verbessert werden. Ebenso kann simultan mit der Protonstruktur die starke Kopplungskonstante bei hohen Energien extrahiert werden.

T 98.2 Do 17:00 K.11.20 (K5)

**Transverse polarization of lambda(anti) hyperons from quasireal photoproduction on nuclei at HERMES** — ●AVETIK HAYRAPETYAN, IRINA BRODSKI, ERIK ETZELMÜLLER, MICHAEL DÜREN, and VITALY ZAGREBALNY — II Phys. Inst., JLU Gießen, Heinrich-Buff ring 16, 35392 Gießen

The transverse polarization of lambda(anti) hyperons was measured in inclusive quasireal photoproduction for various target nuclei ranging from hydrogen to xenon. These data were taken at the HERMES Experiment at HERA/DESY using the 27.6 GeV lepton beam. They are compared to results from previous measurements of the HERMES experiment on hydrogen (H) and deuteron (D) targets. In comparison with earlier measurement a new improved track-fitting algorithm has been used leading to better vertex and momentum resolution. The HERMES data complement extensive transverse polarization studies of hyperons, using hadron beams.

T 98.3 Do 17:15 K.11.20 (K5)

**QCD fits to combined H1 and ZEUS inclusive DIS cross sections** — ●VOLODYMYR MYRONENKO — DESY (ZEUS), Hamburg, Germany

QCD fits to combined inclusive deep inelastic scattering cross sections in neutral and charged current  $e^\pm p$  are presented. The measurements used for fits cover six orders of magnitude in  $Q^2$  and Bjorken  $x$  and correspond to a luminosity of about  $1 \text{ fb}^{-1}$ . Within the QCD analysis at NLO (VFNS) parton distribution functions and some electroweak quantities were extracted.

T 98.4 Do 17:30 K.11.20 (K5)

**Application of a Regge Model to the Photoproduction of Pion Pairs** — ●ARTHUR BOLZ<sup>1</sup>, CARLO EWERTZ<sup>2,3</sup>, MARKOS MANIATIS<sup>4</sup>, OTTO NACHTMANN<sup>2</sup>, MICHEL SAUTER<sup>1</sup>, and ANDRÉ SCHÖNING<sup>1</sup> — <sup>1</sup>Physikalisches Institut, Universität Heidelberg, Im Neuenheimer Feld 226, D-69120 Heidelberg, Germany — <sup>2</sup>Institut für Theoretische Physik, Universität Heidelberg, Philosophenweg 16, D-69120 Heidelberg, Germany — <sup>3</sup>ExtreMe Matter Institute EMMI, GSI Helmholtzzentrum für Schwerionenforschung, Planckstraße 1, D-64291 Darmstadt, Germany — <sup>4</sup>Departamento de Ciencias Básicas, Universidad del Bío-Bío, Avda. Andrés Bello s/n, Casilla 447, Chillán 3780000, Chile

In a recent publication (arXiv:1409.8483) a model in the spirit of Regge theory is used to describe the reaction  $\gamma p \rightarrow \pi^+ \pi^- p$  at high energies. Both resonant pion-pion production via the meson resonances  $\rho(770)$ ,  $\omega(782)$ ,  $\rho(1450)$  and  $f_2(1270)$  as well as non-resonant amplitudes are considered. Photon and proton interact by the exchange of the photon, the pomeron and reggeons as well as by a yet unobserved but possible odderon.

Cross sections calculated from this model and their dependencies on various kinematic quantities will be discussed and compared to experimental data. The focus will be on angular distributions which feature asymmetries that could be used for an odderon discovery.

T 98.5 Do 17:45 K.11.20 (K5)

**Charge Asymmetry Studies in the Process  $ep \rightarrow \pi^+ \pi^- p$  at the H1 Detector at HERA** — ●ARTHUR BOLZ — Physikalisches Institut, Universität Heidelberg, Im Neuenheimer Feld 226, D-69120 Heidelberg, Germany

In a recent publication (arXiv:1409.8483) the possibility of charge asymmetries due to pomeron-odderon and pomeron-photon interference effects in the process  $\gamma p \rightarrow \pi^+ \pi^- p$  is discussed. Systematic studies are currently performed to see whether such asymmetries can be measured in data taken by the H1-detector at the HERA electron-proton collider. At H1 a large sample of photo-produced pion pairs triggered by the Fast Track Trigger exists, which can be used to search for such effects. Studies for detector effects that might spoil the sensitivity for the asymmetries discussed in the model are currently performed. First results will be presented.

T 98.6 Do 18:00 K.11.20 (K5)

**Measurement of the proton-proton total cross section at  $\sqrt{s} = 7 \text{ TeV}$  via elastic scattering with the ALFA sub-detector of ATLAS at the LHC** — ●KRISTOF KREUTZFELDT, MICHAEL DÜREN, CHRISTIAN HEINZ, and HASKO STENZEL — 2. Physikalisches Institut, Universität Gießen

The ALFA (Absolute Luminosity for ATLAS) detector is one of the ATLAS forward detectors located about 240 m away from the interaction point in the LHC tunnel. ALFA is a scintillating fibre tracking detector housed in Roman pots and designed to measure elastic proton-proton scattering up to the smallest scattering angles.

In 2011 data were taken at a centre-of-mass energy of  $\sqrt{s} = 7 \text{ TeV}$  during a special low intensity fill of LHC with high  $\beta^* = 90 \text{ m}$  beam optics. Results of the measurement of the differential elastic cross section  $d\sigma/dt$ , the total cross section  $\sigma_{\text{tot}}$ , the nuclear slope  $B$  and other derived quantities will be presented in this talk. In the analysis the luminosity determination, the fine tuning of beam optics parameters and a data-driven method to determine the reconstruction efficiency are emphasized.

T 98.7 Do 18:15 K.11.20 (K5)

**Determination of the total cross section in proton-proton collisions at the LHC at  $\sqrt{s} = 8 \text{ TeV}$  from elastic scattering using the ALFA sub-detector of ATLAS** — ●CHRISTIAN HEINZ, MICHAEL DÜREN, KRISTOF KREUTZFELDT, and HASKO STENZEL — JLU Giessen

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. 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  $\sqrt{s} = 8 \text{ TeV}$  during a fill with special beam optics of the LHC with  $\beta^* = 90 \text{ m}$  and parallel-to-point focusing.

The four-momentum transfer  $t$  is measured for elastically scattered protons and the differential elastic cross section is measured. In this talk a preliminary determination of the total cross section and of the slope of the elastic cross section at small  $|t|$  obtained from a fit to the differential cross section using the optical theorem is reported.

T 98.8 Do 18:30 K.11.20 (K5)

**Determination of the absolute LHC luminosity with photon-photon collisions during the pPb run at 5.02 TeV with CMS** — ●MELIKE AKBIYIK, SEBASTIAN BAUR, COLIN BAUS, IGOR KATKOV, ALAA METWALY, and RALF ULRICH — Institute of Experimental nuclear Physics (IEKP), Karlsruhe, Germany

Di-muon production in photon-photon collisions is a benchmark process that allow for the precise determination of the luminosity at LHC. In Particular in collisions, where at least one of the nuclei is a lead nucleus, the photon fluxes are large enough to make efficient use of it. CMS has, for example, measured the total inelastic proton-lead cross-section by detecting activity in the forward calorimeters. For this measurement the luminosity determination is based on van der Meer scans, which is cross checked here with di-muons.

In this analysis di-muon production during the pPb run in 2013 is measured and the absolute LHC luminosity determined. The exclusiv-

ity of di-muon photoproduction events is determined from the number of charged tracks and additional hits in the calorimeters. In particular the theforward calorimeters CASTOR and ZDC are very useful for this purpose. The efficiency of the trigger event selection and reconstruction is studied in detail

**Gruppenbericht** T 98.9 Do 18:45 K.11.20 (K5)  
**Diffraction in proton-ion collisions with the CMS experiment** — ●IGOR KATKOV<sup>1</sup>, MELIKE AKBIYIK<sup>1</sup>, SEBASTIAN BAUR<sup>1</sup>, COLIN BAUS<sup>1</sup>, VICTOR KIM<sup>2</sup>, KATERINA KUZNETSOVA<sup>2</sup>, HAUKE WÖHRMANN<sup>1</sup>, and RALF ULRICH<sup>1</sup> — <sup>1</sup>KIT, Karlsruhe, Germany — <sup>2</sup>PNPI, St.Petersburg, Russia

Total inelastic cross section is a fundamental quantity and one of the

key parameters characterizing the development of the cascade process in the extensive air showers initiated by cosmic ray particles, mostly protons, colliding with nitrogen or oxygen nuclei. According to the models the different diffractive contributions to the proton-ion cross section in the full phase space add up to around 10% at LHC energies but so far little is known experimentally while sensitivity of the models to diffraction is relatively high. Collisions of protons and lead ions at the centre of mass energy of 5.02 TeV per nucleon at the LHC recorded in 2013 allow for quantitative experimental studies of the process with diffractive topologies. Measurements are performed as a function of the size of the pseudorapidity interval without hadronic activity, rapidity gap, as well as dedicated studies of low mass diffraction are presented and discussed.