

## T 120: QCD 2

Zeit: Donnerstag 16:45–18:50

Raum: GFH 01-721

**Gruppenbericht**

T 120.1 Do 16:45 GFH 01-721

**Rapidity gaps in proton-lead collisions with the CMS experiment** — ●IGOR KATKOV, MELIKE AKBIYIK, SEBASTIAN BAUR, COLIN BAUS, HAUKE WÖHRMANN, and RALF ULRICH — KIT, Karlsruhe, Germany

During 2013 there was for the first time an extended run with asymmetric beams of protons and lead ions at the center of mass energy of 5.02 TeV per nucleon at the LHC. Proton-ion collision data allow to explore the interplay with cosmic ray physics, where the formation of extensive air showers is dominated by collisions of protons with nitrogen or oxygen nuclei. At the highest energies little is experimentally known about diffractive processes, which are crucial for full understanding of many aspects of proton-ion interactions. The presence of large angular regions without hadronic activity, called rapidity gaps, is a characteristic signature of a diffractive process in particle detectors. First results of an analysis of proton-lead collision events with rapidity gaps in the CMS detector are presented and discussed.

T 120.2 Do 17:05 GFH 01-721

**Total cross section measurement via elastic proton-proton scattering with the ALFA detector of ATLAS at the LHC** — ●KRISTOF KREUTZFELDT, MICHAEL DÜREN, and HASKO STENZEL — 2. Physikalisches Institut, Universität Gießen

The ALFA (Absolute Luminosity for ATLAS) detector is one of the ATLAS forward detectors and is located about 240 m away from the ATLAS interaction point in the LHC tunnel. ALFA is a scintillating fibre tracking detector, that is designed to measure elastic proton-proton scattering up to the smallest scattering angles. The detector is housed in roman pots and can approach the beam to distances of about 1 millimetre range. In 2011 data was taken at a center-of-mass energy of  $\sqrt{s} = 7$  TeV and with a special low intensity fill of LHC with high  $\beta^* = 90$  m. The aim was to measure the  $t$ -spectrum, the elastic and total cross sections and the nuclear slope  $B$ . Preliminary results of the analysis will be presented in this talk.

T 120.3 Do 17:20 GFH 01-721

**Isolated photons in photoproduction at HERA** — ●VOLODYMYR MYRONENKO — ZEUS (DESY), Notkestraße 85, 22607 Hamburg, Germany

Isolated photons, inclusive and with accompanying hadronic jet, have been measured by the ZEUS detector at HERA collider, using an integrated luminosity of  $374 \text{ pb}^{-1}$ . Differential cross sections as a function of photon transverse energy and pseudorapidity are presented in ranges of  $6 < E_T^\gamma < 15 \text{ GeV}$  and  $-0.7 < \eta^\gamma < 0.9$  for inclusive production. Differential cross sections for photons with jets are measured as a function of jet transverse energy and pseudorapidity in ranges of  $4 < E_T^{jet} < 35 \text{ GeV}$  and  $-1.5 < \eta^{jet} < 1.8$ . The comparison of the experimental results to theoretical predictions is shown.

T 120.4 Do 17:35 GFH 01-721

**Combination of D\* Differential Cross Section Measurements in Deep-Inelastic ep Scattering at HERA** — ●OLEKSANDR ZENAEV — DESY, Notkestraße 85, 22607 Hamburg, Germany

H1 and ZEUS have recently published differential cross sections for D\* production from their respective final data sets, for photon virtualities  $Q^2 > 5 \text{ GeV}^2$ . These cross sections are combined at the visible cross section level, taking into account all relevant correlations. This significantly reduces the experimental uncertainties, while theory uncertainties from the combination procedure remain almost negligible. To extend the kinematic range down to  $Q^2 > 1.5 \text{ GeV}^2$ , double differential cross sections are also combined with a subset of earlier D\* data. NLO QCD predictions are compared to the results.

T 120.5 Do 17:50 GFH 01-721

**Vermessung der Hadron-Produktion in Pion-Kohlenstoff-Wechselwirkungen mit dem NA61/SHINE-Experiment** — ●HANS DEMBINSKI für die NA61/SHINE-Kollaboration — IKP, KIT Karlsruhe

NA61/SHINE ist ein Cern-Experiment bei dem Strahlen des Super-

Proton-Synchrotrons auf ein ruhendes Ziel gelenkt werden. Seit 2007 werden dort Hadron-Hadron-Wechselwirkungen bei Strahlenergien von 13 bis 350 GeV mit einem Spektrometer gemessen. NA61/SHINE sucht nach dem kritischen Punkt stark wechselwirkender Materie, bzw. dem Punkt der Entstehung von Quark-Gluon-Plasma. Für die Interpretation von Luftschauermessungen und ist ein detailliertes Verständnis solcher hadronischen Wechselwirkungen ebenfalls unerlässlich, da ein Großteil der Sekundärteilchen im Luftschauer bei Strahlenergien im Bereich von 10 bis 1000 GeV erzeugt werden. In diesem Vortrag zeigen wir Messungen des Wirkungsquerschnitts der Produktion geladener Hadronen in Pion-Kohlenstoff Kollisionen und vergleichen mit Modellvorhersagen.

T 120.6 Do 18:05 GFH 01-721

**XYZ physics at BESIII experiment** — ●ZHIQING LIU — Johannes Gutenberg University of Mainz, Johann-Joachim-Becher-Weg 45, D-55099 Mainz, Germany

Searching for exotic particles (XYZ particles) with quark content different from conventional baryons and mesons are of high interest in particle physics. Using the large data samples collected above 4 GeV, the BESIII experiment was able to study the XYZ particles in an improve precision. Recently, BESIII has discovered the charged charmoniumlike states  $Z_c(3900)$ ,  $Z_c(4020)/Z_c(4025)$ , which is obviously good candidates for four quark state. In addition, BESIII also observed the  $X(3872)$  particle in  $Y(4260)$  radiative transition and  $Z_c(3900)$  in  $DD^*$  decay channel, which would help us understand their nature in a more deeper way. In this talk, I'll review all the recent results at the BESIII experiment, together with our future plan toward the study of XYZ physics.

T 120.7 Do 18:20 GFH 01-721

**Study of  $\rho_0$  production in pion-carbon interactions with NA61/SHINE.** — ●ALEXANDER HERVE for the NA61/SHINE-Collaboration — KIT Karlsruhe

NA61/SHINE is an fixed target experiment at the CERN Super Proton Synchrotron, studying hadron production in hadron-nucleus and nucleus-nucleus collisions to provide valuable contributions to a number of subjects, from neutrino through cosmic-ray to heavy-ion physics.

Pion-Carbon interactions have been performed to give precise particle production measurements for the most numerous projectile in air showers, the  $\pi$  meson. The ability to measure the production of  $\rho_0$  mesons is particularly important to predict the number of muons produced in air showers.

Experimentally, the  $\rho_0$ s can be measured by studying the invariant mass distribution, which is calculated by combining all possible pairings of tracks from an event. This also leads to a combinatorial background, which can be estimated by two different methods, event mixing and charge mixing.

In this contribution, we present an analysis of simulated data to demonstrate the performance of these two methods.

T 120.8 Do 18:35 GFH 01-721

**selected charmonium and charmonium-like states at BESIII** — ●YU-PING GUO — Institut für Kernphysik Johannes Gutenberg-Universität Mainz, Mainz, Germany

Using large data samples collected at  $\psi(3686)$  peak and around the peaks of the vector charmonium resonances above 4.0 GeV, study of the charmonium (charmonium-like) states are performed at BESIII experiment.

Comparing to the charmonium states above the charm threshold, the states below the charm threshold are well understood, except the three spin-singlet states,  $\eta_c$ ,  $h_c$  and  $\eta_c(2S)$ . With the data accumulated at the  $\psi(3686)$  peak, the properties of these states are measured with high precision or at the first time. Based on the data samples taken above 4.0 GeV, the process of  $\pi^+\pi^-h_c$  has been studied, the cross section line-shape will help us to understand the Y-states above the charm threshold. In addition, in the Dalitz study of the  $\pi^+\pi^-h_c$  system, a charged charmonium-like state  $Z_c(4020)$  has been observed, whose property is similar to the previous observed  $Z_c(3900)$  in  $\pi^+\pi^-J/\psi$  system.