

## HK 47: Heavy Ion Collisions and QCD Phases VIII

Zeit: Donnerstag 14:00–16:00

Raum: HZO 80

**Gruppenbericht** HK 47.1 Do 14:00 HZO 80  
**Transverse momentum distributions of charged particles in pp and nuclear collisions with ALICE at the LHC** — ●EDGAR PEREZ LEZAMA for the ALICE-Collaboration — Institut für Kernphysik, Goethe-Universität Frankfurt

The charged-particle transverse momentum spectrum in pp collisions is an important observable for testing pQCD (perturbative QCD) calculations and serves as a reference for pPb, Pb-Pb and Xe-Xe collisions to study the initial state effects and the properties of deconfined matter created in nucleus-nucleus collisions. The study of inclusive charged particle spectra gives information on parton energy loss in the medium created in AA collisions, leading to a suppression of hadron production at high transverse momentum ( $p_T$ ). This effect can be investigated by calculating the nuclear modification factor ( $R_{AA}$ ), defined as the ratio between the  $p_T$  spectrum measured in nucleus-nucleus collisions and a reference spectrum in pp collisions scaled by the number of binary collisions. ALICE measured pp collisions in a large energy range  $\sqrt{s} = 13\text{TeV}, 7\text{TeV}, 5.02\text{TeV}$  and  $2.76\text{TeV}$ , p-Pb at  $5.02\text{TeV}$ , Xe-Xe at  $5.44\text{TeV}$  and Pb-Pb at  $2.76\text{TeV}$  and  $5.02\text{TeV}$ . We discuss the  $p_T$  spectra in pp and nuclear collisions as well as the nuclear modification factors, which are compared to theoretical models.

**Gruppenbericht** HK 47.2 Do 14:30 HZO 80  
**Measurement of short-lived baryons and mesons reconstructed in Au+Au collisions at 1.23A GeV with HADES.\*** — ●GEORGY KORNAKOV for the HADES-Collaboration — TU Darmstadt

The study of hadron properties in hot and dense QCD matter is one of the main topics in nuclear physics. The short-lived states ( $\sim 1\text{ fm}/c$ ), produced and decayed within the QCD matter created in relativistic heavy-ion collisions, contain fundamental information about their properties and how they are modified by the surrounding medium. HADES measures rare and penetrating probes in the regime of 1-2 GeV kinetic energy per nucleon, where excitation of baryonic resonances is a key mechanism for meson, dilepton and strangeness production. However, reconstruction of the resonant signal is challenging. Despite the large branching ratios into charged pions and protons, the large combinatorial background demands precise techniques to identify the true signal. For such a purpose, an iterative method for background estimation has been developed. The measured  $\pi^{+/-p}$  and  $\pi^+\pi^-$  differential spectra from Au+Au collisions are going to be presented in this contribution as well as the developed methods for their reconstruction. *\*This work has been supported by the VH-NG-823, Helmholtz Alliance HA216/EMMI and GSI*

HK 47.3 Do 15:00 HZO 80  
**Can Baryon Stopping be understood within the String Model?** — ●JUSTIN MOHS<sup>1,2</sup>, SANGWOOK RYU<sup>1</sup>, and HANNAH PETERSEN<sup>1,2</sup> — <sup>1</sup>Frankfurt Institute for Advanced Studies, Frankfurt, Germany — <sup>2</sup>Institute für Theoretische Physik, Goethe Universität, Frankfurt, Germany

Baryon stopping, experimentally established by the changing shape of net-proton rapidity distributions as a function of beam energy, is still lacking a proper theoretical understanding. In this work, baryon stopping in heavy ion collisions is investigated. In a hadronic transport approach the colliding nucleons form a string, which fragments, producing new hadrons. From the comparison with data, it is possible to fix parameters of the string model (for example the formation time of

the produced hadrons) and to find out whether baryon stopping can be described within the string model or other mechanisms are needed.

HK 47.4 Do 15:15 HZO 80  
**Transverse momentum distributions of charged particles and nuclear modification factor in Xe-Xe collisions with ALICE at the LHC** — ●MICHAEL HABIB for the ALICE-Collaboration — GSI Helmholtzzentrum für Schwerionenforschung GmbH, Planckstraße 1, 64291 Darmstadt

The study of charged particle production indicates a suppression of hadrons at high transverse momentum ( $p_T$ ) when compared to pp collisions, as a consequence of parton energy loss in the medium.

In October 2017, a 6 hour pilot run with colliding Xenon beams opened up the opportunity to study system-size effects when compared to the usual operation with Lead beams.

In this talk we present transverse momentum spectra and nuclear modification factors ( $R_{AA}$ ) in Xe-Xe collisions at  $\sqrt{s_{NN}} = 5.44\text{ TeV}$  for nine centrality classes. Comparison to results in Pb-Pb collisions at  $\sqrt{s_{NN}} = 5.02\text{ TeV}$  are given.

HK 47.5 Do 15:30 HZO 80  
**Bayesian unfolding of charged particle  $p_T$  spectra with ALICE at the LHC** — ●MARIO KRÜGER for the ALICE-Collaboration — Institut für Kernphysik, Goethe-Universität Frankfurt

The study of the Quark-Gluon Plasma created in ultrarelativistic heavy-ion collisions at the CERN-LHC is complemented by reference measurements in proton-lead (p-Pb) and proton-proton (pp) collisions, where the effects of multiple-parton interactions and hadronization beyond independent string fragmentation can be investigated.

In this talk, we present a Bayesian unfolding procedure to reconstruct the correlation between transverse momentum ( $p_T$ ) spectra of charged particles and the corresponding charged particle multiplicities  $N_{ch}$ . The unfolded spectra are presented in single multiplicity ( $\Delta N_{ch} = 1$ ) bins and are used to derive moments of the  $p_T$  distributions.

We illustrate the unfolding procedure of the  $p_T$  spectra with MC simulations for pp collisions and compare the resulting  $\langle p_T \rangle$  of different systems and collision energies.

Supported by BMBF and the Helmholtz Association.

HK 47.6 Do 15:45 HZO 80  
**Multiplicity dependent nuclear modification of transverse momentum distributions in p-Pb collisions at  $\sqrt{s_{NN}} = 5.02\text{ TeV}$**  — ●PATRICK HUHN for the ALICE-Collaboration — Universität Frankfurt

The ALICE experiment at the LHC is designed to investigate the properties of the Quark-Gluon Plasma by studying high-energy pp, p-Pb and Pb-Pb collisions. Parton energy loss in the medium can be examined by measuring the production of charged particles and their nuclear modification factor at high transverse momentum.

In this talk, we present the measurement of transverse-momentum distributions of charged particles and their dependence of multiplicity and centrality in p-Pb collisions at  $\sqrt{s_{NN}} = 5.02\text{ TeV}$  recorded in the LHC run 2 data taking period in 2016. In particular, we focus on the multiplicity dependent nuclear modification factor  $Q_{pPb}$  to investigate a possible presence of parton energy loss in high multiplicity p-Pb collisions.

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