HK 59: Heavy Ion Collisions and QCD Phases XII

Zeit: Freitag 14:00–16:15 Raum: F 3

Gruppenbericht HK 59.1 Fr 14:00 F 3

Strange News from HADES — •Manuel Lorenz for the HADES-Collaboration — Goethe-Universität Frankfurt

Strangeness production in heavy-ion collisions at energies below the free NN production threshold is an excellent tool to study medium properties of dense baryonic systems. For the first time, a nearly complete set of strange particles has been reconstructed in the 40% most central Au+Au collisions at 1.23A GeV. The multiplicities, together with those for non-strange hadrons, have been analyzed in the context of statistical hadronization models. We find a good agreement between data and model yields, if an additional parameter (R_c) handeling strangeness suppression is included. We find that about 30% of observed K^- are produced through ϕ-decay. If the observed K^- transverse momentum spectra are corrected for feed down from ϕ, we can fully explain the previously observed differences with respect to the K^+. Hence, no need for additional channels like e.g. strangeness exchange reactions are needed to explain the observed differences in inverse slope parameters of charged kaons, supporting also the assumption of a homogenous emission source for all particle types. This work has been supported by BMBF (05P15RFFCA), GSI and HIC for FAIR.

Gruppenbericht HK 59.2 Fr 14:30 F 3

Chiral symmetry restoration as seen by the K^+/π^+ ratio in heavy-ion collisions from PHSD transport approach — •Alessia Palmese[1], Wolfgang Cassing[1], Eduard Seifert[1], Thorsten Steinert[1], Pierre Moreau[2], and Elena Bratkovskaya[2,3] — [1]Institute for Theoretical Physics, University of Giessen, Giessen, Germany — [2]Institute for Theoretical Physics, Johann Wolfgang Goethe University, Frankfurt am Main, Germany — [3]GSI Helmholtzzentrum fuer Schwerionenforschung GmbH, Darmstadt, Germany

The Parton-Hadron-String-Dynamics (PHSD) is a microscopic off-shell transport approach, which successfully describes Heavy-Ion Collisions (HIC) in a wide range of energies from SIS to LHC energies. The PHSD includes the deconfinement phase transition as well as essential aspects of Chiral Symmetry Restoration (CSR) in the dense and hot hadronic medium, which are incorporated in the Schwinger mechanism for the hadronic particle production. We find that the CSR effects can be identified in many observables like particle ratios and rapidity spectra and provide the first microscopic explanation for the 'horn'-structure in the excitation function of the K^+/π^+ ratio. We study also the system size and centrality dependence of the strangeness production in HICs, in particular the appearance/disappearance of the 'horn'-structure of the K^+/π^+ and $(\Lambda + \Sigma^0)/\pi$ ratios in A+A and p+A collisions. The impact of CSR on the directed flow of charged hadrons is discussed in context of the data from the beam-energy-scan program at RHIC.

HK 59.3 Fr 15:00 F 3

Kaon and phi production in pion-induced reactions at 1.7 GeV/c — •Joana Wirth[1,2], Laura Fabbietti[1,2], Steffen Maurus[1,2], and Alessandro Scordo[3] for the HADES-Collaboration — [1]Physik Department, TUM, Garching, Germany — [2]Excellence Cluster "Universe", Garching, Germany — [3]LNF, INFN, Frascati, Italy

The production and properties of K^+, K^- and Φ in cold nuclear matter generated in pion-nucleon reactions ($\pi^- + A$, $A = C, W$) at $p_{\pi^-} = 1.7$ GeV/c has been investigated with the HADES detector at GSI.

Of particular interest is the K^- absorption in nuclear matter which should be apparent through strangeness exchange processes ($K^- N \to Y\pi$), contrary to the K^+ with no conventional absorption mechanism due to strangeness conservation. In this context also the Φ absorption ($\Phi \to K^+K^-$, $BR \sim 48.9\%$) is studied in light and heavy nuclei.

In this talk we are presenting the K^- absorption on the basis of the K^-/K^+ ratios in both nuclear environments and obtained cross-sections inside the HADES acceptance. In addition the Φ absorption in nuclear medium by comparing the production in carbon and tungsten is shown as well as the K^- production in terms of the Φ feed-down.

∗ supported by the DFG cluster of excellence "Origin and Structure of the Universe and SFB 1258"

HK 59.4 Fr 15:15 F 3

Strange particle production in nucleus-nucleus collisions at SIS energies — •Vinzent Steinberg[1,2], Ömür Erkiner[1,2], Dmytro Oliinychenko[1,4], and Hannah Petersen[1,2,3] — [1]Frankfurt Institute for Advanced Studies, Ruth-Moufang-Straße 1, 60438 Frankfurt am Main, Germany — [2]Institute for Theoretical Physics, Goethe University Frankfurt, Max-von-Laue-Straße 1, 60438 Frankfurt am Main, Germany — [3]GSI Helmholtzzentrum für Schwerionenforschung, Planckstr. 1, 64291 Darmstadt, Germany — [4]Bogolyubov Institute for Theoretical Physics, 14-b, Metrolohichna str., 03680 Kiev, Ukraine

SMASH (Simulating Many Accelerated Strongly-interacting Hadrons) is a new hadronic transport model designed to describe the non-equilibrium evolution of heavy-ion collisions. We study two different strangeness production mechanisms: one based on resonances and another one using forced canonical thermalization. Both approaches are compared to HADES and KAOS measurements of particle yields, momentum spectra and flow.

HK 59.5 Fr 15:30 F 3

Measurement of light-flavour hadron production with ALICE in pp collisions at $\sqrt{s}$ = 13 TeV — •Raul Tonatiuh Jimenez Bustamante for the ALICE-Collaboration — GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany — Physikalisches Institut, University of Heidelberg, Heidelberg, Germany

The ALICE detector has excellent Particle IDentification (PID) capabilities in the central barrel ($|\eta| < 0.9$). This allows identified hadron production to be measured over a wide transverse momentum (p_{T}) range, using various sub-detectors and techniques: the particles' specific energy loss ($\mathrm{d}E/\mathrm{d}x$), their velocity determination via time-of-flight measurement, their Cherenkov angle or their characteristic weak decay topology are exploited. Measurements of identified light-flavour hadron production at mid-rapidity with ALICE in proton-proton collisions at $\sqrt{s} = 13$ TeV are presented and compared with previous measurements performed at lower energies. The results cover a wide range of particle species including long-lived hadrons, resonances and multi-strange baryons over the p_{T} range from 150 MeV/c up to 20 GeV/c, depending on the particle species.

HK 59.6 Fr 15:45 F 3

J/ψ production as a function of charged-particle multiplicity in pp collisions at $\sqrt{s}$ = 13 TeV with ALICE at the LHC — •Steffen Weber — Research Division and ExtreMe Matter Institute, GSI Helmholtzzentrum für Schwerionenforschung, Planckstr. 1, 64291 Darmstadt — Institut für Kernphysik, Technische Universität Darmstadt, Schlossgrabenstr. 9, 64289 Darmstadt

The hadronic production of charmonium in proton-proton collisions is a complex and intrinsically multi-scale process. The dependence of J/ψ production on the event multiplicity is of special interest, since it relates the hard-scale charmonium production with the soft-scale physics of light-flavour particle production, and can give insight into the influence of multiple-parton interactions on the charmonium production. A previous measurement at $\sqrt{s} = 7$ TeV showed an approximately linear increase of J/ψ yield with event multiplicity.

In this talk the measurement of J/ψ production as a function of charged-particle multiplicity in pp collisions at $\sqrt{s} = 13$ TeV measured with ALICE at the LHC will be presented. By using triggers selecting events with high particle multiplicity the reach of the measurement could be extended to values of the event multiplicity of 8 times the average value in minimum bias collisions, expanding the reach by about a factor 2 compared to the results obtained with data at $\sqrt{s} = 7$ TeV.

HK 59.7 Fr 16:00 F 3

J/ψ production in Pb-Pb collisions with ALICE at the LHC — Raul Tonatiuh Jimenez Bustamante[1,2] and •Dennis Weiser[2] for the ALICE-Collaboration — [1]GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany — [2]Physikalisches Institut, University of Heidelberg, Heidelberg

ALICE at the Large Hadron Collider provides unique capabilities to study charmonium production at low transverse momenta. In the early and hottest phase of nucleus-nucleus collisions the formation of a Quark-Gluon Plasma (QGP) is expected. Several QGP induced effects,

such as the dissociation of charmonium states due to color screening and/or a (re)combination of uncorrelated charm and anti-charm quarks, can play a role. While a suppression of J/ψ with respect to pp collisions was indeed observed in heavy-ion collisions at all energies, recent measurements in Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ TeV indicate that (re)combination does seems to play an important role in the low p_{T} region at LHC energies.

At central rapidity ($|y| < 0.9$) J/ψ are reconstructed via their e^+e^- decay channel down to zero p_{T}. The status of the measurement of inclusive J/ψ production and the nuclear modification factor at higher energies will be shown.