HK 23: Heavy Ion Collisions and QCD phases

Time: Tuesday 14:00–16:00 Location: H-ZO 10

Invited Group Report HK 23.1 Tu 14:00 H-ZO 10

Leptons and heavy mesons - signals from high density/ high temperature matter? — •Joerg Aichelin and Pol-Bernard Gossiaux — Subatech, Nantes,France

Theory predicts that at high density/temperature a plasma of quarks and gluons is created but it is all but easy to find 'smoking gun' signals, experimentally as well as theoretically. The multiplicity and the spectra of most of the hadrons are well described assuming a thermally equilibrated hadron gaz and contain therefore no direct information on the high density/temperature phase. We discuss whether two particles which do not follow this trend, leptons and heavy hadrons (containing either a c or a b quark), give us the desired information. A comparision of the theoretical approaches with present RHIC and future LHC data is presented and the physical consequences are discussed.

Group Report HK 23.2 Tu 14:30 H-ZO 10

Strangeness production and thermal equalibration in the near-threshold heavy ion collisions in FOPI — •Krzysztof Piasecki for the FOPI-Collaboration — Physikalisches Institut, Universität Heidelberg, Germany — Institute of Experimental Physics, Univ. of Warsaw, Poland

In Heavy Ion collisions at 1-2A GeV dense baryonic systems are produced at moderate temperatures. Investigation of the production of Φ [1] mesons and Σ^* [2], K^* [3] strange resonances plays an important role in understanding the equilibration mechanism and quantification of the temperature and baryochemical potential reached in the collision.

Particle yield ratios at freeze out can be described surprisingly well by thermal model without suppression of strangeness production. On the other hand, the concept of thermalization is checked using dynamical models.

An overview of the experimental findings on the short-lived strange particles from the FOPI detector in GSI will be presented.

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[1] A. Mangiarotti *et al.*, Nucl. Phys. A **714** (2003) 89

[2] X. Lopez *et al.*, Phys. Rev. C **76**, 055203(**R**) (2007)

[3] X. Lopez (FOPI), J. Phys. G: Nucl. Part. Phys. **35** (2008) 044020

HK 23.3 Tu 15:00 H-ZO 10

Omega production in pp collisions at 3.5 GeV: line shape in the lepton decay channel. — •Attilio Tarantola[1], Anar Rustamov[2], Herbert Stroebele[1], and Joachim Stroth[1,2] for the HADES-Collaboration — [1]Institut für Kernphysik Goethe-Universität, 60486 Frankfurt, Germany — [2]GSI Helmholtzzentrum für Schwerionenforschung GmbH, 64291 Darmstadt, Germany

HADES (High Acceptance Di-Electron Spectrometer) operates at SIS18 of GSI, Darmstadt. It is used to study in-medium properties of light vector mesons in ground state and excited nuclear matter. The observables of interest are their spectral functions and in particular possible modifications of width and mass. These can be identified by comparing the results obtained from pp, pA and AA reactions. In this contribution the reconstructed inclusive dilepton spectrum from pp data at 3.5 GeV kinetic beam energy will be presented. Preliminary results of a differential analysis of the omega meson production will be shown as well. The reconstructed omega meson line shape will be the reference for dilepton spectra obtained in pA reaction measured with HADES.

HK 23.4 Tu 15:15 H-ZO 10

Physics with the High Level Trigger of ALICE — •Kalliopi Kanaki for the ALICE-HLT-Collaboration — University of Bergen, Norway

The High Level Trigger (HLT) for the ALICE experiment at LHC will serve a dual role: it will deal with the large amount of data of the detectors and compress them to fit the mass storage capabilities, while enriching at the same time the statistics with meaningful physics content. Most major ALICE detectors are included in the HLT system at the moment, with event reconstruction, monitoring and calibration being some of the tasks performed on-line. In this presentation we will address the physics capabilities of HLT. We will present the methods of event characterization, mainly focusing on jet reconstruction, open charm, J/ψ and Υ production, and γ detection via conversions.

HK 23.5 Tu 15:30 H-ZO 10

Direct Photons in heavy-ion collisions from microscopic transport theory and fluid dynamics — •Bjørn Bäuchle[1,2] and Marcus Bleicher[2] — [1]Frankfurt Institute for Advanced Studies — [2]Institut für Theoretische Physik

Direct photons are a unique probe to get information about the early stages of a heavy-ion reaction. Due to the small rescattering cross-section they can leave the medium unperturbed.

The emission of direct photons in heavy-ion collisions is calculated within the relativistic microscopic transport model UrQMD. We compare results from the pure transport calculation to a hybrid-model calculation, where the high-density part of the evolution is replaced by an ideal 3D fluiddynamic calculation. We also compare the thermal rates from infinite matter-calculations to those used in the fluiddynamic part.

Furthermore, we study the contribution of different production channels and non-thermal collisions to the spectrum of direct photons. Detailed comparison to the measurements by experiments at CERN-SPS (WA98) are undertaken.

HK 23.6 Tu 15:45 H-ZO 10

Resonance Recombination Model for Quarks in the Quark-Gluon Plasma — •Hendrik van Hees[1], Lorenzo Ravagli[2], and Ralf Rapp[2] — [1]Institut für Theoretische Physik, Universität Giessen, Germany — [2]Cyclotron Institute and Physics Department, Texas A&M University, College Station, Texas 77843-3366, U.S.A.

We investigate a quark-recombination model based on the Boltzmann equation, assuming the survival of hadron-resonance like correlations in the sQGP near the hadronisation phase transition. The quark phase-space distributions are taken from a relativistic Langevin simulation for quark diffusion in an equilibrated QGP, described by a thermal elliptically cylindric fireball model, adjusted to the results of hydrodynamic calculations. The drag and diffusion coefficients are inferred from leading-order pQCD interactions augmented by effective Lagrangians with resonances smoothly merging into hadronic states at the phase transition, consistent with our assumption of resonance recombination at T_c. This resonance-recombination model, obeying energy-momentum conservation and leading to thermal equilibrium for the hadrons, reproduces the observed CQNS of $v_2(K_T)$ for the here investigated ϕ, J/ψ, and D-mesons.

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