HK 65: Heavy Ion Collision and QCD Phases XII

Zeit: Freitag 14:00–16:00 Raum: S1/01 A01

Gruppenbericht HK 65.1 Fr 14:00 S1/01 A01

Jets with ALICE: from vacuum to QCD at high temperatures — •Cunqueiro Leticia for the ALICE-Collaboration — University of Muenster, Germany

The hot and dense medium created in heavy-ion collisions is expected to modify the yield and radiation pattern of jets relative to proton proton collisions. The study of medium-induced modifications in jets aims at the understanding of the detailed mechanisms of in medium energy loss of partons and of fundamental properties of QCD at high temperatures.

ALICE measures jets in pp, p–Pb and Pb–Pb collisions, where pp and p–Pb are conceived primarily as a reference for vacuum and cold nuclear effects respectively.

The jet program comprises measurements like yields for different resolution R, intra-jet and inter-jet modifications via jet shapes and hadron-jet correlations, path length dependence of energy loss via jet flow v_{2}, hadrochemistry via jet constituent identification, flavour/mass hierarchy of energy loss via heavy flavour tagging etc.

Several of the latest ALICE jet physics results will be presented and discussed with emphasis on new studies on jet substructure and jet shapes.

HK 65.2 Fr 14:30 S1/01 A01

Parallel 4-Dimensional Cellular Automaton Track Finder for the CBM Experiment — •Valentina Akishina[1,2,3,4] and Ivan Kisel[1,2,3] for the CBM-Collaboration — [1]Goethe-Universität Frankfurt am Main, Frankfurt am Main, Germany — [2]Frankfurt Institute for Advanced Studies, Frankfurt am Main, Germany — [3]GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt, Germany — [4]JINR Joint Institute for Nuclear Research, Dubna, Russia

The CBM experiment at FAIR will focus on the measurement of rare probes at interaction rates up to 10 MHz. The beam will provide free stream of particles, so that information about different collisions may overlap in time. It requires the full online event reconstruction not only in space, but also in time, so-called 4D (4-dimensional) event building. This is a task of the First-Level Event Selection (FLES) package. The FLES reconstruction package consists of several modules: track finding, track fitting, short-lived particles finding, event building and selection.

The Silicon Tracking System (STS) time measurement information was included into the Cellular Automaton (CA) track finder algorithm. The 4D track finder algorithm speed (8.5 ms per event in a time-slice) and efficiency is comparable with the event-based analysis. The CA track finder was fully parallelised inside the time-slice. The parallel version achieves a speed-up factor of 10.6 while parallelising between 10 Intel Xeon physical cores with a hyper-threading. The first version of event building based on 4D track finder was implemented. Supported by FIAS, HICforFAIR, HGS-HIRe and Hessischen Ministerium für Wissenschaft und Kunst.

HK 65.3 Fr 14:45 S1/01 A01

Analysis of charge-dependent azimuthal correlations with HADES — •Frederic Kornas[1], Ilya Selyuzhenkov[2], and Tetyana Galatyuk[1,2] for the HADES-Collaboration — [1]TU Darmstadt — [2]GSI

Charge-dependent azimuthal correlations relative to the reaction plane have been proposed as a probe in the search for the chiral magnetic effect in relativistic heavy-ion collisions. These type of correlations have been measured at the RHIC BES by STAR and at the LHC by ALICE. This contribution discusses two charged particle correlations with respect to the reaction plane measured with high statistic sample of Au+Au collisions at 1.23 AGeV collected by HADES. The Forward wall detector allows to reconstruct the reaction plane using the spectator fragments. The status of the analysis with protons and charged pions will be presented.
This work has been supported by VH-NG-823, Helmholtz Alliance HA216/EMMI and GSI.

HK 65.4 Fr 15:00 S1/01 A01

Production of charged pions at SIS 18 energies. — •Malgorzata Gumberidze for the HADES-Collaboration — TU Darmstadt, Darmstadt, Germany

The High Acceptance DiElectron Spectrometer HADES is devoted mainly to study production of dielectron pairs from proton, pion and nucleus induced reactions at 1-2 AGeV. At the same time, the spectrometer provides detection and high quality identification of charged-hadron with a large solid angle.

In this contribution we present the results of a study of charged pion production at SIS18 energies using the HADES spectrometer at GSI. The main focus is on 40% most central Au(1.23 GeV per nucleon)+Au collisions. The results contribute to the data base from previous systematic studies of pion production with an unprecendented statistics, and serve as an input for the normalization of the dielectron data obtained in the same experiment.

In particular we have performed a measurement of the transverse momentum distributions of pi+ and pi- mesons covering a fairly large rapidity interval. The yields, transverse mass and angular distributions are compared with transport model calculations as well as with existing data from other experiments.
This work has been supported by VH-NG-823, Helmholtz Alliance HA216/EMMI, GSI.

HK 65.5 Fr 15:15 S1/01 A01

Reconstruction of charged pions at SIS 18 energies. — •Malgorzata Gumberidze for the HADES-Collaboration — TU Darmstadt, Darmstadt, Germany

The High Acceptance DiElectron Spectrometer HADES is devoted mainly to study production of dielectron pairs from proton, pion and nucleus induced reactions at 1-2 AGeV. At the same time, the spectrometer provides detection and high quality identification of charged particles with a large solid angle.

In this contribution we present the results of a study of charged pion production at SIS18 energies using the HADES spectrometer at GSI. The main focus is on 40% most central Au(1.23 GeV per nucleon)+Au collisions. The results contribute to the data base from previous systematic studies of pion production with an unprecendented statistics, and serve as an input for the normalization of the dielectron data obtained in the same experiment.

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This work has been supported by VH-NG-823, Helmholtz Alliance HA216/EMMI, GSI.

HK 65.6 Fr 15:30 S1/01 A01

Investigations on corrections of higher order moments of (net-)proton number fluctuations in Au+Au collisions at 1.23 AGeV with HADES — •Melanie Szala for the HADES-Collaboration — Goethe Universität Frankfurt

Higher order moments of conserved quantities are promising probes of the structure of the QCD phase diagram and especially of the critical point. Investigations of heavy-ion collisions at low beam energies give access to the thermodynamics of QCD in the low T and high μ_B region of the phase diagram.

The HADES experiment at GSI Helmholtzzentrum fuer Schwerionenforschung in Darmstadt measured Au+Au collisions at $\sqrt{s_{NN}} = 2.41$ GeV in 2012. In this talk we present investigations on the efficiency correction of higher moments of (net-)proton multiplicity distributions as well as investigations on the centrality and rapidity/p_t dependence of the higher order moments.
This work has been supported by BMBF (05P12RFGHJ, 05P15RFFCA), GSI and HIC for FAIR.

HK 65.7 Fr 15:45 S1/01 A01

Particle production in nucleus-nucleus and pion-nucleus collisions at $E_{lab} = 0.8 - 2$ AGeV — •Vinzent Steinberg[1], Hannah Petersen[1,2,3], Dmytro Oliinychenko[1,4], and Janus Weil[1] — [1]Frankfurt Institute for Advanced Studies, Ruth-Moufang-Strasse 1, 60438 Frankfurt am Main, Germany — [2]Institute for Theoretical Physics, Goethe University, 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 is a new hadronic transport model designed to describe the non-equilibrium evolution of heavy-ion collisions. After a brief introduction to the model, it will be shown that SMASH correctly reproduces the cross sections and maintains detailed balance. First comparisons to pion spectra measured by FOPI and HADES will be presented, demonstrating that the energy deposition and transverse expansion are correctly described. Predictions for strangeness production in pion-nucleus collisions as recently measured by HADES will be given.