HK 37: Heavy-Ion Collisions and QCD Phases VII

Time: Wednesday 15:45–17:15 Location: SCH/A216

HK 37.1 Wed 15:45 SCH/A216

Anisotropic flow generation with $\eta/s(T,\mu_B)$ in a hybrid approach — •Niklas Götz[1,2], Lucas Constantin[1], and Hannah Elfner[3,1,2,4] — [1]Institute for Theoretical Physics, Goethe University, Max-von-Laue-Strasse 1, 60438 Frankfurt am Main, Germany — [2]Frankfurt Institute for Advanced Studies, Ruth-Moufang-Strasse 1, 60438 Frankfurt am Main, Germany — [3]Helmholtz Research Academy Hesse for FAIR (HFHF), GSI Helmholtz Center, Campus Frankfurt, Max-von- Laue-Straße 12, 60438 Frankfurt am Main, Germany — [4]GSI Helmholtzzentrum für Schwerionenforschung, Planckstr. 1, 64291 Darmstadt, Germany

In this work, the origin of anisotropic flow in hybrid approaches, combining different initial conditions, viscous relativistic hydrodynamics as well as hadronic transport, is studied. Previous works largely disregard a non-constant $\eta/s(\mu_B)$ and focus mainly on a temperature dependence. Here instead, we study qualitatively the effect of a generalized $\eta/s(T,\mu_B)$ in the hybrid approach SMASH-vHLLE-hybrid. The parameterization takes into account the constraints of matching to the transport coefficients in the hadronic phase and recent Bayesian analysis results. In addition, we quantify the uncertainty due to different initial state profiles, including the SMASH initial conditions as well as T_RENTo and IP-Glasma profiles. In order to investigate their interplay with the size of the transport coefficients and anisotropic flows as well as the impact of different initial state eccentricities, we compare the results with different inital conditions at $\sqrt{s_{NN}}$=200 GeV.

HK 37.2 Wed 16:00 SCH/A216

Flow Measurements of Λ, K^0_s and K^+ in $\sqrt{s_{NN}}$ = 2.55 GeV Ag+Ag Collisions with HADES — •Tan Lu for the HADES-Collaboration — Institute of Modern Physics, Chinese Academy of Sciences — GSI Helmholtzzentrum für Schwerionenforschung GmbH

The collective motion of particles (flow) is driven by pressure gradients in fireballs created in heavy-ion collisions and shows patterns that reflect properties of the nuclear matter equation of states of QCD matter under extreme conditions. Due to its high rate capability the High-Acceptance Di-Electron Spectrometer (HADES) provides excellent conditions to study the flow patterns of the rarely produced strange hadrons. Since the strange hadrons are produced near to the free NN threshold at SIS18 beam energies, they are expected to be particularly sensitive to the in-medium potential.

In this talk, we report the measurements of directed and elliptic flow of Λ, K^0_s and K^+ from $\sqrt{s_{NN}}$ =2.55 GeV Ag+Ag collisions. The dependence on collision centrality, rapidity and transverse momentum of the measured collectivity will compared to results from microscopic transport model calculations.

HK 37.3 Wed 16:15 SCH/A216

New publications on higher-order flow observables in ALICE — •Ante Bilandzic, Farid Taghavi, Marcel Lesch, and Anton Riedel for the ALICE Germany-Collaboration — Technical University of Munich

In this contribution, the results from the two new publications on higher-order flow observables in ALICE are presented.

The newly developed Gaussian Estimator for correlations between symmetry planes, which characterize the direction of the anisotropic emission of produced particles, is measured in Pb-Pb collisions with ALICE. This allows for the first time the study of these quantities without the influence of correlations between different flow amplitudes, and therefore the extraction of unique and independent information about initial conditions and properties of Quark-Gluon Plasma from symmetry plane correlations.

In the second publication, the correlations between different moments of two flow amplitudes are measured for the first time with the recently developed asymmetric cumulants, which generalize the previous studies using symmetric cumulants of flow amplitudes.

For both sets of observables, comparison to state-of-the-art hydrodynamic model calculations is presented.

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HK 37.4 Wed 16:30 SCH/A216

Bayesian analysis by using higher-order flow measurements at the LHC — •Seyed Farid Taghavi[1], Jasper Parkkila[2], Anna Onnerstad[3], Cindy Mordasini[4], Maxim Virta[5], Ante Bilandzic[6], and DongJo Kim[7] for the ALICE Germany-Collaboration — [1]Technische Universität München, Munich, Germany — [2]CERN, Experimental Physics Department, Geneva, Switzerland — [3]University of Jyväskylä, University of Jyväskylä, Finland — [4]University of Jyväskylä, University of Jyväskylä, Finland — [5]University of Jyväskylä, University of Jyväskylä, Finland — [6]Technische Universität München, Munich, Germany — [7]University of Jyväskylä, University of Jyväskylä, Finland

As a consequence of the theoretical improvements and a wide range of accurate experimental measurements, our understanding of the collective phenomena in heavy-ion collisions has advanced significantly over the past years. The Global Bayesian analysis has a substantial role in this advancement. In this talk, we present a global Bayesian analysis to infer the transport properties of QGP using the latest CERN Large Hadron Collider Pb-Pb data at $\sqrt{s_{\rm NN}}$=2.76 and 5.02 TeV. We show that including the latest multi-harmonic flow measurements significantly improves the uncertainties of the inferred specific shear and bulk viscosities. This observation shows the necessity of accurate measurements of collective flow observables in the future. Based on: PLB., 835 (2022) 137485. Funded by BMBF Verbundforschung (05P21WOCA1 ALICE), ERC European Unions Horizon 2020 (No. 759257), Academy of Finland, the Centre of Excellence in Quark Matter (No. 346324).

HK 37.5 Wed 16:45 SCH/A216

Emission of abundant hadrons from Au+Au Collisions at $\sqrt{s_{NN}}$ = 2.42 GeV with HADES — •Simon Spies for the HADES-Collaboration — Goethe-Universität Frankfurt

In April 2012 we recorded 7.3 × 10^9 Au(1.23A GeV)+Au events with the HADES detector located at the *GSI Helmholtzzentrum für Schwerionenforschung* in Darmstadt, Germany. Based on these data the emission/production of protons, light nuclei, pions, hyperons and strange mesons have been studied as a function of transverse momentum/mass, rapidity and centrality, yielding the most precise data set on hadron emission currently available at this energy. In this contribution we discuss the challenges in confronting experimental data with predictions from various state-of-the-art transport models and present first preliminary results. These are put in context with available world data from other collaborations.

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HK 37.6 Wed 17:00 SCH/A216

Quasi-deuterons as surrogate for two-particle correlations in nuclear matter — •Stefan Typel[1,2] and Stefano Burrello[3] — [1]TU Darmstadt, Germany — [2]GSI, Darmstadt, Germany — [3]LNS-INFN, Catania, Italy

Properties of dense nuclear matter are often described using energy density functionals with nucleons as degrees of freedom and effective phenomenological interactions. They usually lack in an explicit treatment of correlations that are responsible for the formation of nuclear clusters at sub-saturation densities. Two-body correlations are also essential to explain the high-momentum tails of single-particle momentum distributions that are deduced from two-nucleon knockout experiments with energetic electrons or hadronic probes. In this contribution, the concept of quasi-deuterons in nuclear matter is introduced in a relativistic density functional to effectively describe two-nucleon correlations in dense nuclear matter above saturation. It extends the description of clustering in dilute nuclear matter using the concept of medium-dependent mass shifts.