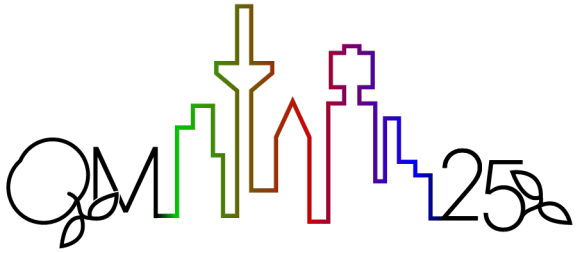

Contribution ID: **579** Type: **Poster**

Probing the properties of dense baryonic matter with collective flow measurements at HADES

Heavy-ion collisions in the few-GeV energy range allow the creation of strongly interacting matter under extreme net-baryon densities, conditions which are comparable to the ones in neutron star mergers. The precise investigation of the Equation-of-State (EoS) of this kind of matter is therefore of high relevance for the understanding of neutron stars.
In this contribution, we present new measurements by HADES, the High-Acceptance Dielectron Spectrometer located at the SIS18 at GSI in Darmstadt, which is currently the only experimental setup with the ability to measure rare and penetrating probes at the high-μB frontier of the QCD phase diagram. We present recent high statistics results on collective flow phenomena of protons and light nuclei in Au+Au and Ag+Ag collisions at $\sqrt{s_{NN}}$ = 2.42 and 2.55 GeV. In addition to the commonly discussed directed and elliptic flow, coefficients vn up to the 6th order are investigated for the first time in this energy regime. Their combined information allows to construct a full 3D-picture of the angular particle emission in momentum space and can provide more stringent constraints on the EoS. Furthermore, the event-by-event correlations between the different flow coefficients can be exploited for this purpose and will also be presented.
Additional sensitivity to the EoS is provided by a measurement of charged kaon flow, as K+ and K− are predicted to interact differently with dense nuclear matter. First results on a multi-differential analysis of their directed and elliptic flow will be discussed.
The multi-differential HADES flow data are confronted with various transport model approaches relevant for this energy region and current constraints e.g. derived via a Bayesian analysis on the EoS are discussed.

Category

Experiment

Collaboration (if applicable)

The HADES Collaboration

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Session Classification: Poster session 2

Track Classification: Collective dynamics & small systems