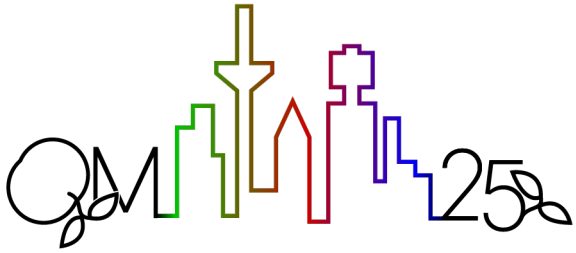

Contribution ID: **410** Type: **Oral**

Longitudinal dynamics of large and small systems from a 3D Bayesian calibration with RHIC top energy data

Over the past several years, significant progress has been made in leveraging rapidity-dependent measurements from colliders to gain insight about the early and late-time dynamics of relativistic nuclear collisions. In this study, we perform a systematic model-to-data comparison using simulations of Au-Au and d-Au collisions and a broad range of measurements from the PHENIX, STAR, PHOBOS, and BRAHMS Collaborations spanning nearly two decades of RHIC operations. In particular, we perform fully 3D multi-stage simulations including rapidity-dependent energy deposition with global energy conservation, along with relativistic viscous hydrodynamics and a hadronic afterburner [1]. We calibrate on rapidity- and pT-differential observables–examining the respective constraints on initial state and transport properties–and highlight the tension between them within our model. We quantify the additional constraints provided by rapidity dependent measurements and we emphasize the similarity in posteriors from separate calibrations of large and small systems. We use our calibrated model to make predictions of observables in additional smaller systems in p-Au and ^{3}He-Au, as well as statistically-sensitive or proposed measurements in the calibrated systems. Furthermore, we predict longitudinal de-correlations, highlighting the dependence of flow measurements on the rapidity of the regions of interest and reference.

[1] C. Shen and B. Schenke, "Longitudinal dynamics and particle production in relativistic nuclear collisions," Phys. Rev. C 105, no.6, 064905 (2022) [arXiv:2203.04685 [nucl-th]]

Category

Theory

Collaboration (if applicable)

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Track Classification: Collective dynamics & small systems