Contribution ID: **154** Type: **Poster**

Probing the Initial State and Directed Flow of Charged Hadrons in Asymmetric Collisions

The directed flow in asymmetric collisions, such as Cu+Au, offers a valuable window into understanding the energy deposition mechanisms in heavy ion collisions, yet this remains an open challenge. In this work, we delve into the directed flow of charged hadrons in Cu+Au collisions at a center-of-mass energy of $\sqrt{s_{NN}} =$ 200 GeV. We develop a refined three-dimensional (3D) TRENTo initial condition model, incorporating a tilted deformation geometry of both energy density and net baryon density along the longitudinal axis, along with a non-zero longitudinal flow velocity gradient. By integrating this TRENTo initial condition with the (3+1)-D viscous hydrodynamic model CLVisc, we obtain a comprehensive and satisfactory description of the p_{T}-spectra and directed flow (v_1) of charged hadrons in Cu+Au collisions. Our analysis first reveals that the directed flow in asymmetric collisions is highly sensitive to the longitudinal flow velocity gradient in the initial state. Additionally, we present the global polarization of $\Lambda/\bar{\Lambda}$ hyperons as a function of rapidity, p_{T} and centrality bins, offering further insights of the initial state. Our findings provide tighter constraints on the initial conditions of asymmetric nuclear collisions in relativistic heavy-ion collisions.

Primary authors: Prof. ZHANG, Ben-Wei (Central China Normal University); Prof. CAO, Shanshan (Shandong University); Dr JIANG, Ze-Fang (Hubei Engineering University)

Presenter: Dr JIANG, Ze-Fang (Hubei Engineering University)

Session Classification: 墙报展及评选

Track Classification: 重离子物理