Directed flow of identified particles in Au+Au collisions at $\sqrt{s_{NN}}$ = 14.6 and 19.6 GeV from RHIC Beam Energy Scan

Zuowen Liu (for the STAR Collaboration)

Central China Normal University

Determination of equation of state for nuclear matter at high baryon density region is one of the most important motivations for RHIC Beam Energy Scan program. Directed flow (v_1), which is the first harmonic coefficient in the Fourier expansion of the final state azimuthal distribution of produced particles relative to the collision reaction plane, is one of good probes to early stage of collision dynamics for its high sensitivity.

STAR Beam Energy Scan program phase I (BES-I) covers collision energies from $\sqrt{s_{NN}}$ = 7.7 GeV to 200 GeV. We observed that v_1 slopes ($dv_1/dy|_{y=0}$) at mid-rapidity for net-proton and net-Λ show a double sign change with minimum when collision energy is around $\sqrt{s_{NN}}$ = 10-20 GeV [1, 2]. The slope of ϕ mesons has a hint of sign change at 11.5 GeV [2]. With large statistics from BES-II, we will present v_1 results of $\pi^{\pm}$, $K^{\pm}$, $p(\bar{p})$, $\Lambda(\bar{\Lambda})$, and construct corresponding net-particles. Their v_1 slopes will be studied as a function of centrality and collision energy. The precise data will help to constrain the model calculations and offer information about equation of state for nuclear matter.

References

[1] L. Adamczyk *et al.*(STAR Collaboration), Phys. Rev. Lett. 112, 162301 (2014).

[2] L. Adamczyk *et al.*(STAR Collaboration), Phys. Rev. Lett. 120, 062301 (2018).