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Recent Results from the STAR Fixed-Target Program

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The data from RHIC Beam Energy Scan phase I (BES-I) have shown interesting results below $\sqrt{s_{NN}} < 19.6$ GeV in identified hadron anisotropy (v_1, v_2, v_3), kaon over pion ratios, and net-proton higher moments. These interesting features continue to the lowest energy, $\sqrt{s_{NN}}$ = 7.7 GeV, and motivate the investigation to even lower energy collisions. The STAR fixed-target program extends the energy reach from $\sqrt{s_{NN}}$ =7.7 GeV to $\sqrt{s_{NN}}$ = 3.0 GeV, corresponding to baryon chemical potential 420 MeV to about 700 MeV range. The comparison of the asymmetric system (Al+Au) and symmetric system (Au+Au) at almost equal number of participating nucleons from most central to mid-central collisions provides useful information on nucleon stopping, which is key to understanding the baryon chemical potential.

We present results from Al (beam)+Au (target) collisions at $\sqrt{s_{NN}}$ = 4.9 GeV and Au+Au collisions at $\sqrt{s_{NN}}$ = 4.5 GeV from the STAR fixed-target program. We will report transverse mass spectra, rapidity density distributions, particle ratios, centrality dependence and directed flow of protons, $\pi^{\pm}$, K_s and Λ, elliptic flow of protons, $\pi^{\pm}$ and K, and HBT homogeneity lengths of pions. Pion and proton elliptic flow show mass ordering. Number of constituent quark scaling tests will be presented. For the asymmetric Al+Au system, the peak of the rapidity density distributions is shifted from the nucleon-nucleon center-of-mass rapidity. The magnitude of this shift varies with centrality and is a measure of the nucleon stopping. These newly measured data will be compared with previously published results from the AGS and SPS. The implications of the results on future STAR fixed-target physics runs will be discussed.

Content type

Experiment

Collaboration

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Centralised submission by Collaboration

Presenter name already specified

Primary author: YE, Zhenyu (University of Illinois at Chicago)

Presenter: WU, Yang (Kent State University)

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