Strangeness production in Au+Au collisions at $\sqrt{s_{NN}}$ = 7.7 - 19.6 GeV from BES-II with the STAR experiment

Yi Fang(for the STAR collaboration)

One of main motivations of the Beam Energy Scan (BES) program at RHIC is to search for the QCD critical point and the onset of deconfinement. Strangeness production has been suggested as a sensitive probe to the early dynamics of the deconfined matter created in heavy-ion collisions. The rapidity density of (anti-)strange baryons may give insight into the baryon stopping mechanism. Ratios of particle yields involving strange particles are often utilized to understand the hadronization mechanism. Furthermore, the collision energy threshold of QGP production in heavy-ion collisions can be explored by measuring the colliding energy dependence of baryon-to-meson enhancement. In particular, results from BES-I indicate potential changes in the Ω/ϕ ratio at and below 11.5 GeV, which may be indicative of a change in the underlying strange quark dynamics. However, the limited statistics prohibit a strong conclusion.

During BES-II, STAR has accumulated high statistics data in Au+Au collisions, which can help reduce the uncertainties in the strange hadron measurements, particularly for the multi-strange hadrons. Benefiting from the iTPC upgrade, the strangeness measurements are now extended from the previous rapidity window of |y|<0.5 to |y|<1.5. In this talk, we will present new STAR measurements of strange hadron (K^0_s, Λ, $\bar{\Lambda}$, Ξ, $\bar{\Xi}$, Ω, $\bar{\Omega}$, ϕ) production in Au+Au collisions at $\sqrt{s_{NN}}$ = 7.7, 9.2, 11.5, 14.6, 17.3 and 19.6 GeV from BES-II. We will report transverse-momentum and rapidity spectra, nuclear modification factors, antibaryon-to-baryon ratios and baryon-to-meson ratios. In particular, precise measurements of the energy and centrality dependence of Ω/ϕ ratios down to $\sqrt{s_{NN}}$ = 7.7 GeV will be presented. These results will be compared to theoretical calculations and physics implications will be discussed.