Strangeness production in Au+Au collisions at $\sqrt{s_{NN}} = 7.7$, 14.6, 19.6, and 200 GeV with the STAR experiment

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One main motivation 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. Ratios of particle yields involving strange particles are often utilized to study various properties of the nuclear matter, such as the strangeness and baryon chemical potentials at the chemical freeze-out temperature ($\mu_S/T_{\rm ch}$ and $\mu_B/T_{\rm ch}$).

Measurements from the first phase of the BES program have indicated potential changes in the medium properties with decreasing collision energy. However, the precision of those measurements is not sufficient to draw definitive conclusions. During BES phase-II (BES-II), STAR has accumulated high statistics data in Au+Au collisions at various energies, which can help reduce the uncertainties in the strange hadron measurements, in particular for the multi-strange hadrons. Benefiting from the iTPC upgrade, the strangeness measurements are now extended from mid-rapidity (|y|<0.5) to a larger rapidity range (|y|<1.0) as well. In this talk, we will present new STAR measurements of strange hadron (K^0_s, Λ, $\bar{\Lambda}$, Ξ, $\bar{\Xi}$, Ω, $\bar{\Omega}$) production in Au+Au collisions at $\sqrt{s_{NN}}$ = 7.7, 14.6, 19.6 GeV from BES-II and $\Omega(\bar{\Omega})$ production in Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV, including transverse-momentum and rapidity spectra, nuclear modification factors, baryon-to-meson and antibaryon-to-baryon ratios. New insights on the collision dynamics will be discussed.