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Production yield and azimuthal anisotropy measurements of strange hadrons from BES at STAR

Thursday, 7 April 2022 15:00 (20 minutes)

Searches for the onset of deconfinement are one of the main motivations of the Beam Energy Scan (BES) program at RHIC. Strangeness production has been suggested as a sensitive probe to the early-time dynamics of the deconfined matter, due to their small hadronic interaction cross section, early freezeout from the medium and short lifetime for some resonances, e.g. K^{*0} . The BES Phase I (BES-I) data taken during 2010 and 2011 have indicated signatures of the first-order phase transition and potential changes of medium properties at low energies. However, the statistics collected during BES-I is not sufficient to draw definitive conclusions. Since 2018, STAR has accumulated high statistics Au+Au datasets at various energies below 27 GeV during BES-II program.

Measurements of yield and flow harmonic coefficients (v_1 , v_2 , and v_3) of K_S^0 , Λ , Ξ , Ω , and ϕ from BES-II Au+Au collisions at $\sqrt{s_{NN}} = 3 - 27$ GeV with both fixed-target and collider modes will be presented in this talk. The strange hadron spectra, nuclear modification factors, particle ratios, rapidity density distributions, and flow coefficients will be reported. The physics implications on the collision dynamics from these measurements will be discussed. The energy dependence of hadronic phase lifetime will also be studied through measurements of the mass, width, and invariant yields of K^{*0} using BES-I data ($\sqrt{s_{NN}} = 7.7-39$ GeV). The average transverse momenta, as well as the resonance to non-resonance particle ratios will be shown and compared to measurements at SPS and LHC energies.

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