Invariant yield and azimuthal anisotropy measurements of strange and multi-strange hadrons in Au+Au collisions at $\sqrt{s_{NN}} = 27$ and 54.4 GeV at STAR

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Abstract

Multi-strange hadrons are considered as an excellent probe to study different properties of QGP medium produced in the heavy-ion collisions. The particle ratios of strange hadrons provide us various chemical freeze-out parameters while their azimuthal anisotropic flow allows one to study the collective properties of the medium at the early stages of the collisions. The STAR experiment has recorded high statistics data for Au+Au collisions at the centre-of-mass energies $\sqrt{s_{NN}}$ of 27 and 54.4 GeV, and production of various strange hadrons (K^0_S, Λ, Ξ, Ω, ϕ) are measured at mid-rapidity. We will present invariant yield (at 54.4 GeV) and azimuthal anisotropy (at 27 and 54.4 GeV) of strange hadrons in Au+Au collisions. The transverse momentum spectra, nuclear modification factor R_{cp}, particle ratios (e.g. baryon-to-meson ratios, strange-hadron-to-pion ratios) and overall integrated yield of these hadrons will be presented. The second-order flow coefficient (v_2) and third-order flow coefficient (v_3) of multi-strange hadrons such as ϕ, Ξ, and Ω as a function of transverse momentum (p_T) and centrality will be shown. The number of constituent quark scaling will be studied for all these particles at these energies. The results will be compared to transport model calculations. Finally, physics implications of our measurements will be discussed.