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

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Abstract

The multi-strange hadrons are less sensitive to the hadronic rescatterings due to their small hadronic cross sections. Hence, the study of azimuthal anisotropy of these particles allows one to study the collective properties of the medium at the early stages of heavy-ion collisions. The STAR experiment recorded high statistics data for Au+Au collisions at the centre-of-mass energies ($\sqrt{s_{NN}}$) of 54.4 GeV (∼600 million events) and 27 GeV (∼350 million events). In this talk, we will present new results on the second-order flow coefficient (v_2) and the third-order flow coefficient (v_3) of multi-strange hadrons such as ϕ, Ξ, and Ω measured at midrapidity ($|y|$ <1.0) as a function of transverse momentum (p_T) and centrality using high statistics Au+Au datasets at $\sqrt{s_{NN}}$= 27 and 54.4 GeV. The number of constituent quark scaling will be studied for all these particles at both the energies. The results will be compared to transport model calculations. We will show comparison of the new results with the existing data on other particle species ($\pi^{\pm}$, $K^{\pm}$, K^0_S, Λ) and energies from the Beam Energy Scan phase-I. Finally, physics implications of our measurements in the context of the evolution of partonic collectivity with collision energy will be discussed.