

Azimuthal anisotropy measurement of (multi)strange hadrons and ϕ mesons in Au+Au collisions at $\sqrt{s_{NN}} = 3 - 19.6$ GeV in BES-II at STAR

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Abstract

Azimuthal anisotropies are sensitive observables to the initial stage of heavy-ion collisions. Strange and multi-strange hadrons are suitable candidates to measure these flow coefficients due to their small hadronic interaction cross section and early freezeout from the medium. Earlier in beam energy scan phase-I (BES-I), STAR collaboration measured the rapidity-odd directed flow for Λ , $\bar{\Lambda}$, K^\pm , K_S^0 , and ϕ at $\sqrt{s_{NN}} = 7.7 - 200$ GeV. The v_1 slope (dv/dy) at mid-rapidity shows a minimum value for the net-proton and net- Λ when the collision energy is around 10-20 GeV which may be related to a signature of the first-order phase transition in the QCD phase diagram. It has been observed that v_2 of ϕ mesons shows quite different trend at $\sqrt{s_{NN}} = 7.7$ and 11.5 GeV compared to other charged hadrons. The NCQ scaling also fails at these low energies for ϕ mesons and other anti-baryons which may indicate different hadron formation mechanism at these low energies. Due to less statistics, it was difficult to make any quantitative conclusion.

The STAR experiment has finished the data taking of BES-II program in 2021 with improved detector conditions. In this poster, we will present the high statistics measurements of $v_1(y)$ and $v_2(p_T)$ for K_S^0 , Λ , $\bar{\Lambda}$, Ξ^- , $\bar{\Xi}^+$, ϕ , Ω^- , and $\bar{\Omega}^+$ at $\sqrt{s_{NN}} = 3, 7.7, 14.6, \text{ and } 19.6$ GeV. The centrality dependence of v_2 and NCQ scaling will be shown for all the particles.