Anisotropic Flow of Strange and Multi-Strange Hadrons in O+O Collisions at $\sqrt{s_{\mathrm{NN}}}$ = 200 GeV

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Abstract

Recent measurements on collectivity of charged hadrons in both asymmetric and symmetric small collision systems have far-reaching implications on the origins of final state momentum anisotropy driven by nucleonic as well as sub-nucleonic degrees of freedom present during initial state. During the data taking in 2021, STAR had recorded large statistics of minimum bias and high multiplicity events of O+O collisions at $\sqrt{s_{\mathrm{NN}}}$ = 200 GeV. We present the first measurements of anisotropic flow of strange and multi-strange hadrons in O+O collisions. These hadrons are considered as good probes for initial state dynamics given their production at the early stages of medium evolution. In particular, we study the transverse momentum (p_{T}) and centrality dependence of elliptic (v_2) and triangular (v_3) flow of $\mathrm{K}^0_{\mathrm{S}}$, $\Lambda + \overline{\Lambda}$ and ϕ. System size dependence of the same is also shown by comparing with existing measurements of strange hadron collectivity in relatively larger systems (such as Cu+Cu, Au+Au and U+U) at the same collision energy. Formation of Quark-Gluon Plasma (QGP) in small collision systems has long been argued given their extremely short lifetime. In this regard, we test the number-of-constituent-quark (NCQ) scaling hypothesis for strange hadron v_2 and v_3 in central O+O collisions to understand the influence of partonic phase on the origins of collectivity.