Anisotropic flow measurements of strange and multi-strange hadrons in isobar collisions at RHIC-STAR

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Abstract

Isobar collisions, $^{96}_{44}$Ru+$^{96}_{44}$Ru and $^{96}_{40}$Zr+$^{96}_{40}$Zr, at $\sqrt{s_{\rm NN}}$ = 200 GeV have been performed at RHIC. These collisions are considered to be an effective way to minimize the flow-driven background contribution to search for the possibly small CME signal. Anisotropic flow is an important tool to understand properties of the QGP medium. Elliptic flow (v_2) is the second-order coefficient in the Fourier expansion of the azimuthal angle distribution of produced particles with respect to the reaction plane. Elliptic flow of charged hadrons has been measured in the isobar collisions at $\sqrt{s_{\rm NN}} = 200$ GeV. The magnitude of v_2 shows difference between the two isobar collisions despite the same nucleon number. This indicates a difference in nuclear structure and deformation between these nuclei. The v_2 measurements of the strange and multi-strange hadrons are excellent probes for understanding these initial state anisotropies of the medium produced in these collisions, owing to their smaller hadronic cross-section compared to light hadrons. The collected datasets include approximately two billion events per isobaric species, offering a unique opportunity for making this statistically hungry measurement.

In this poster, we will report measurements of elliptic flow of K^0_s, Λ, $\overline{\Lambda}$, ϕ, Ξ^-, $\overline{\Xi}^+$, and Ω^-+ $\overline{\Omega}^+$ at mid-rapidity for Ru+Ru and Zr+Zr collisions at $\sqrt{s_{\rm NN}}$ = 200 GeV. The transverse momentum (p_T) dependence of v_2 for minimum bias collisions and various centrality intervals will be shown. The p_T-integrated v_2 of these strange and multi-strange hadrons will also be shown. System size dependence of v_2 will be investigated by comparing the results in isobar collisions with those from Cu+Cu, Au+Au, and U+U collisions. The number of constituent quark (NCQ) scaling for these strange hadrons will also be tested. Experimental data will be compared with transport model calculations to provide insight into the nuclear structure of the isobars.