Elliptic flow of strange and multi-strange hadrons in isobar collisions at RHIC

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Abstract

Elliptic flow (v_2) primarily arises from the initial spatial anisotropy of the collision geometry. Elliptic flow of charged hadrons has been observed to differ in magnitude between the isobar collisions, $^{96}_{44}$Ru+$^{96}_{44}$Ru and $^{96}_{40}$Zr+$^{96}_{40}$Zr, at $\sqrt{s_{\rm NN}}$ = 200 GeV despite the same nucleon number. This indicates a difference in nuclear structure and deformation between these nuclei. Moreover, 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 presentation, 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.