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Probing Chiral Magnetic Wave in isobar collisions at $\sqrt{sNN} = 200$ GeV at RHIC-STAR

Chiral anomalies in Quantum Chromodynamics (QCD) can lead to phenomena such as the Chiral Magnetic Wave (CMW), which is a collective excitation of chiral charges in the presence of a magnetic field. Investigating this effect could provide valuable insights into the interaction between magnetic fields and chiral anomalies during heavy-ion collisions. The CMW is expected to induce charge-dependent elliptic flow in heavy-ion collisions. In this study, we explore the CMW by examining the difference in elliptic flow (v_2) between positively and negatively charged particles in Ru+Ru and Zr+Zr collisions at $\sqrt{s_{textupNN}} = 200 \text{ GeV}$ at STAR. We analyze the covariance of v_2 and charge asymmetry (A_{ch}) for positive and negative charge particles, as well as their dependence on collision centrality, to detect the CMW signal. The results from both systems are compared to determine whether there is an enhanced signal in Ru+Ru collisions compared to Zr+Zr collisions, due to the presence of four additional protons in Ru and thereby stronger B-fields in Ru+Ru collisions.

Field of contribution

Experiment

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