

1 **Probing Chiral Magnetic Wave in isobar**
2 **collisions at $\sqrt{s_{\text{NN}}} = 200$ GeV at RHIC-STAR**

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4 **Abstract**

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