CME search in isobar $\left(^{96}_{44}Ru+^{96}_{44}Ru \text{ and } ^{96}_{40}Zr+^{96}_{40}Zr\right)$ collisions at $\sqrt{s_{\mathrm{NN}}} = 200$ GeV using SDM at RHIC

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Abstract

Experiments conducted in the last decade to search for the Chiral Magnetic Effect (CME) in heavy-ion collisions have been inconclusive. Isobar program at RHIC was conducted to address this problem. Also, in order to study the CME, a new approach known as the Sliding Dumbbell Method (SDM) [1] has been developed. This method searches for the back-to-back charge separation on an event-by-event basis. The SDM facilitates the selection of events corresponding to various charge separations (f_{DbCS}) across the dumbbell. A partitioning of the charge separation distributions for each collision centrality into 10 percentile bins is done in order to find potential CME-like events that correspond to the highest charge separation across the dumbbell. Results for two- and three-particle correlators for isobar (Ru+Ru and Zr+Zr) collisions at $\sqrt{s_{\mathrm{NN}}} = 200$ GeV will be presented for each bin of f_{DbCS} in each collision centrality. The background contribution due to statistical fluctuations is obtained by randomly shuffling the charges of the particles in a particular collision centrality. Correlated backgrounds are calculated for each f_{DbCS} bin of charged shuffled events using their corresponding original events.

References

[1] J. Singh, A. Attri, and M. M. Aggarwal, Proceedings of the DAE Symp. on Nucl. Phys. **64**, 830 (2019) "http://www.sympnp.org/proceedings/64/E66.pdf".