Contribution ID: **619** Type: **Poster**

Event-by-event charge separation in Au+Au collisions at $\sqrt{s_{NN}}$ = 200 GeV with the STAR detector at RHIC

Theoretical studies predict that some metastable states leading to the local parity violation may be created in relativistic heavy-ion collisions [1]. The interaction of the strong magnetic field produced in the non-central heavy-ion collisions and the deconfined state created in these collisions causes the separation of charges along the axis of the magnetic field. This phenomenon of the charge separation along the axis of the magnetic field and perpendicular to the reaction plane is called the Chiral Magnetic Effect (CME) [2]. We investigated the event-by-event charge separation using Sliding Dumbbell Method (SDM), similar to the Sliding Window Method [3]. In this method, we evaluate Db_{+-}, which is defined as:

$$Db_{+-} = \frac{N_{+}^{L}}{(N_{+}^{L}+N_{-}^{L})} + \frac{N_{-}^{R}}{(N_{+}^{R}+N_{-}^{R})} ,$$

where, N_{+}^{L} and N_{-}^{L}, respectively, are the numbers of positively and negatively charged particles on the left side of the dumbbell, whereas N_{+}^{R} and N_{-}^{R}, respectively, are the numbers of positively and negatively charged particles on the right side of the dumbbell. The whole azimuthal plane is scanned by sliding the $\Delta\phi$ =90° dumbbell in steps of $\delta\phi$ =1° and calculating the observable Db_{+-} for each $\Delta\phi$ region to extract the maximum value of Db_{+-} in each event. We have analysed the events with higher values of Db_{+-} and some interesting events displaying back to back charge separation are found. The data has been analysed for different dumbbell sizes i.e., $\Delta\phi$ =90°, 60° and 40° and the results will be presented.

References

[1] D. E. Kharzeev, L. D. McLerran and H. J. Warringa, Nucl. Phys. A **803**, 227.

[2] D. E. Kharzeev, J. Liao, S. A. Voloshin, G. Wang, Prog. Part. Nucl. Phys. **88**, 1-28 (2016).

[3] M.M. Aggarwal, G. Sood, Y.P. Viyogi, Phys. Lett. B **638**, 39 (2006).

Preferred Track

Collective Dynamics

Collaboration

STAR

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Session Classification: Poster Session