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Charge Asymmetry Correlations to Search for the Chiral Magnetic Effect from Beam Energy Scan by STAR

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STAR has reported the measurement of charge asymmetry correlations with respect to the event plane in search for the Chiral Magnetic Effect [1]. The charge separation parameter Δ after model-independent subtraction of elliptic flow (v_2) background, was measured to be $1.3 \pm 1.4(\text{stat.})_{-1.0}^{+4.0}(\text{syst.}) \times 10^{-5}$ for 20 – 40% Au+Au collisions at 200 GeV, consistent with zero. In this talk we report results obtained with higher statistics data. A statistically significant finite signal is observed. The improved statistical precision allows systematic studies of the charge separation and investigation of possible further physics background. It is found that the charge separation parameter Δ increases with decreasing centrality, but shows a weak beam-energy dependence.

We also report the application of a multi-particle correlation method [2] for the measurement of charge separation with model-independent background subtraction by the mixed-event technique. By comparing correlation functions along and perpendicular to the event plane, potential upper limits are set on the charge separation parameter in the high statistics 200 GeV Au+Au data.

These results will be discussed in terms of the possible Chiral Magnetic Effect and/or physics background.

[1] L. Adamczyk et al. (STAR Collaboration) Phys. Rev. C **89**, 044908 (2014).

[2] N. N. Ajitanand, R. A. Lacey, A. Taranenko, and J. M. Alexander, Phys. Rev. C **83**, 011901(R) (2011).

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