

Measurement of Charge Multiplicity Asymmetry Correlations to Search for Chiral Magnetic Effect in Heavy Ion Collisions by STAR

It has been suggested that local parity violation in QCD would lead to charge separation of quarks by the Chiral Magnetic Effect (CME) in heavy ion collisions.

Charge separation could yield a dynamical charge multiplicity asymmetry with respect to the reaction plane. In this poster, we report results on charge multiplicity asymmetry correlations in $\sqrt{s_{NN}} = 200$ GeV Au+Au and d+Au collisions by the STAR experiment, as well as from the RHIC beam energy scan.

We found that the correlation results could not be explained by CME alone.

To gain further insights, we study our results as a function of the measured azimuthal angle range as well as the event-by-event anisotropy parameter v_2 .

The results indicate that the charge separation effect appears to be in-plane rather than out-of-plane.

We found that the charge separation effect is proportional to the event-by-event v_2 and consistent with zero in events with $v_2 \approx 0$.

Our studies suggest that the charge separation effect, within the statistical error, may be a net effect of event anisotropy and correlated particle production. Possible upper limit on the CME imposed by our data will be discussed.

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