Contribution ID: **444** Type: **Oral**

Towards measurements of Chiral Magnetic (Vortical) Effect Using Identified Particles from STAR

Tuesday, 7 February 2017 16:30 (20 minutes)

The chiral magnetic effect (CME) and the chiral vortical effect (CVE) have been under intensive theoretical and experimental investigations in recent years [1]. A three-point correlator, γ [2], has been used to measure electric/baryonic charge separations across the reaction plane as the experimental manifestation of the CME/CVE. Considerable background sources arising from charge/momentum conservation coupled with elliptic flow anisotropy (v2) have been identified. Disentanglement of background and the possible CME/CVE signal has been the central focal point of theoretical and experimental efforts. We report recent progresses from the STAR experiment in searching for the CME/CVE with identified particles using background suppression methods. The γ correlator measurements of π–π, π–K, p–π, K–K, p–K, p–p, p–Λ pairs are presented as a function of centrality and beam energy in Au+Au collisions from $\sqrt{s_{NN}}$ = 7.7 to 200 GeV. We explore the range of background variations to establish where a signal may exist. We use event-shape engineering [3] as well as mixed-event subtraction as a function of the event-by-event elliptic anisotropy [4,5] to reduce the flow background. In addition, preliminary results of small system 200 GeV d+Au collisions will also be discussed. These measurements will represent a major advance in our understanding of possible CME/CVE contributions to the three-point correlation.

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[3] F. Wen, L. Wen, G. Wang, arXiv:1608.03205.

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Preferred Track

Correlations and Fluctuations

Collaboration

STAR

Primary author: WEN, Liwen

Presenter: WEN, Liwen

Session Classification: Parallel Session 4.2: CME, Vorticity and Spin Polarization (II)

Track Classification: Correlations and Fluctuations