

Searches for Chiral Effects and Prospects for Isobaric Collisions at STAR/RHIC

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Searches for the chiral effects (the Chiral Magnetic Effect, the Chiral Vortical Effect and the Chiral Magnetic Wave) in heavy-ion collisions have been under intensive theoretical and experimental investigations in recent years [1]. A three-point correlator γ , has been used to measure electric charge separations across the reaction plane [2]. Considerable background sources arising from charge/momentum conservation coupled with the elliptic flow have also been identified. Disentanglement of backgrounds and the CME signal has been central to theoretical and experimental efforts. Isobaric collisions are proposed to potentially disentangle the flow related background and real charge separation signals in heavy-ion collisions.

In this talk, we will report recent STAR results on the γ correlator using charged hadrons and identified particles in 200 GeV Au+Au collisions. As background references, γ correlators for 200 GeV p+Au and d+Au collisions evaluated with different event planes will be also presented. We will show the projection of the CME signal significance vs. background level [3] and a few other physics opportunities in the Zr+Zr and Ru+Ru collisions scheduled in 2018 RHIC run.

[1] Kharzeev, D.E. et al. Prog. Part. Nucl. Phys. 88, 1 (2016).

[2] S. A. Voloshin, Phys. Rev. C 70, 057901 (2004).

[3] W. Deng, X. Huang, G. Ma and G. Wang, Phys. Rev. C 94, 041901 (2016).

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