

Investigation of the sensitivities of observables for CME search by the STAR experiment using AVFD framework

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1 The chiral magnetic effect (CME) is a novel transport phenomenon, arising from
2 the interplay between quantum anomalies and strong magnetic fields in chiral sys-
3 tems. In high-energy nuclear collisions, the CME may survive the expansion of the
4 quark-gluon plasma fireball and be detected in experiments. Over the past two
5 decades, the experimental searches for the CME have aroused extensive interest at
6 the Relativistic Heavy Ion Collider (RHIC) and the Large Hadron Collider (LHC).
7 The main goal of this study is to investigate three pertinent experimental observ-
8 ables: the γ correlator, the R correlator, and the signed balance functions. We use
9 both simple Monte Carlo simulations and a realistic event generator (EBE-AVFD)
10 to verify the equivalence in the core components among these observables and to
11 ascertain their sensitivities to the CME signal and the background contributions in
12 the context of the isobar collisions at RHIC [1].

[1] S. Choudhury, *et al.* arXiv:2105.06044 [nucl-ex].