Abstract Submitted
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Signatures of Chiral Magnetic Effect in the Collisions of Isobars[1]

JINFENG LIAO, Indiana Univ - Bloomington — Quantum anomaly is a fundamental feature of chiral fermions. In chiral materials, the microscopic anomaly leads to nontrivial macroscopic transport processes such as the chiral magnetic effect (CME), which has been in the spotlight lately across disciplines of physics. The quark-gluon plasma (QGP) created in relativistic nuclear collisions provides the unique example of a chiral material consisting of intrinsically relativistic chiral fermions. Potential discovery of CME in QGP is of utmost significance, with extensive experimental searches carried out over the past decade. A decisive new collider experiment, dedicated to detecting CME in the collisions of isobars, was performed in 2018 with analysis now underway. This contribution repots the latest theoretical results that play a pivotal role for such ongoing experimental search. We develop the state-of-the-art tool for describing CME phenomena in these collisions and propose an isobar subtraction strategy for best background removal. Based on that, we make quantitative predictions for signatures of CME in the collisions of isobars as well as propose a new and robust observable that is independent of axial charge uncertainty. Reference: Shuzhe Shi, Hui Zhang, Defu Hou, and Jinfeng Liao, Phys. Rev. Lett. 125, 242301(2020).

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