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Search for the chiral effect using isobar collisions and BES-II data from STAR

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Quantum Chromodynamics allows for the formation of parity-odd domains inside the medium produced in heavy-ion collisions associated with a net chirality of the quarks. As a consequence, the Chiral Magnetic Effect (CME) and Chiral Vortical Effect (CVE) are phenomena predicted to occur and cause electric-charge and baryonic-charge separation along the direction of the magnetic field and vorticity created in heavy-ion collisions, respectively. Recently, the STAR experiment has performed a precision measurement of the possible difference in charge separation along the magnetic field direction between isobar systems $^{96}_{44}\text{Ru} + ^{96}_{44}\text{Ru}$ and $^{96}_{40}\text{Zr} + ^{96}_{40}\text{Zr}$ at $\sqrt{s_{\text{NN}}} = 200$ GeV. In this talk, we will present the findings from the isobar blind analysis. While the isobar blind analyses were dedicated towards CME searches at the top RHIC energy, the RHIC BES-II program provides a unique opportunity and advantages at lower energies, where the magnetic field lifetime may be longer than those at the higher energy collisions. We will also present the latest results on the search for CME and CVE at 27 GeV Au+Au collisions with the unique capabilities of the STAR Event Plane Detector.

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