

Search for the Chiral Magnetic Effect with the BES-II data aided by the Event Plane Detector at STAR

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Abstract

The Quark-Gluon Plasma droplets produced in relativistic heavy-ion collisions have been conjectured to exhibit a spontaneous electric-charge separation in the direction of strong magnetic field through a phenomenon known as the Chiral Magnetic Effect (CME). Recently, STAR experiment has performed a precision measurement of charge separation difference between Ru+Ru and Zr+Zr collisions at $\sqrt{s_{NN}} = 200$ GeV, and showed that the magnitude of possible difference in the charge separation attributable to the different magnetic fields in the two systems is much smaller than previously expected [1]. We present results of the CME search from the RHIC BES-II data, where the magnetic field may last longer than those at the high energy collisions and the non-flow related background is expected to be smaller. For the BES-II program, the Event Plane Detector (EPD) installed in the year 2018 at STAR provides a unique capability for the CME search. The EPD can determine the event plane angles at forward/backward rapidity. With the reconstructed EPD plane, this opens up new event shape selection capabilities, to enhance the sensitivity for the CME search with the BES-II data recently collected by STAR. In this poster, We will present the CME search results at STAR using the EPD from Au+Au collisions at $\sqrt{s_{NN}} = 27$ GeV, 19 GeV, and 14.5 GeV.

References

- [1] J. Adam, et al. STAR Collaboration, Search for the Chiral Magnetic Effect with Iso-bar Collisions at $\sqrt{s_{NN}} = 200$ GeV by the STAR Collaboration at RHIC, (2021), arXiv:2109.00131[nucl-ex].