

CME search at STAR using the Event Plane Detector

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Abstract

Finding a conclusive experimental signature of the Chiral Magnetic Effect (CME) has become one of the major scientific goals of the heavy-ion physics program at the Relativistic Heavy Ion Collider (RHIC). Recently STAR collided isobars (Ru+Ru and Zr+Zr) and STAR collaboration is currently performing blind analysis [1] to make a decisive test of the observability of CME Chiral Magnetic Effect (CME) at the top RHIC energy ($\sqrt{s_{NN}} = 200$ GeV). Meanwhile, the CME signal observability of CME has been conjectured to be dependent on $\sqrt{s_{NN}}$ due to changes in the lifetime of the magnetic field, the strength of CME signal and non-CME background. So what happens at lower energies? The Event Plane Detector (EPD) installed in the year 2018 provides an a unique capability for CME search over a wide range of energies. At lower $\sqrt{s_{NN}}$, energies the EPD acceptance ($2.1 < |\eta| < 5.1$) covers the region where particle production is accompanied by a large directed flow of beam fragments, stopped protons and spectators. Therefore, EPD can measure the event plane associated with the spectators, which is correlated to magnetic field and strength strongly correlated to the magnetic field, with good precision. This opens up new opportunities to revisit CME search at lower energies with the BES-II data recently collected by STAR. In this presentation, I will focus on the CME search at STAR using the EPD and present the first measurements in Au+Au collision at $\sqrt{s_{NN}} = 27$ GeV. I will also discuss STAR's plan for blind analysis of the isobar data as outlined in Ref. [1].

References

[1] J. Adam et al. , STAR collaboration, arXiv:1911.00596 [nucl-ex]. 2019.