



The 215th HENPIC Seminar

Search for the Chiral Magnetic Effect with STAR Beam Energy Scan-II Data

Speaker: Dr. Zhiwan Xu

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Abstract:

The chiral magnetic effect (CME), a novel quantum chromodynamics (QCD) phenomenon, can lead to a charge separation along an external magnetic field for massless quarks with chirality imbalance. It violates local P and CP symmetries in strong interactions. Experiments at Relativistic Heavy-Ion Collider (RHIC) can create a deconfined quark matter with restored chiral symmetry, while generating powerful magnetic fields with spectator protons. This provides an opportunity to search for the CME, which not only probes the QCD topology but also enhances our understanding of the universe. The CME charge separation is measured with a three-point correlator $\Delta\gamma_{112}$. To minimize the major flow background in this observable, we developed an innovative Event Shape Selection method. Furthermore, the STAR Event Plane Detector allows the reconstruction of the reaction plane from spectator protons, thereby minimizing the nonflow background. Using the data collected from the RHIC Beam Energy Scan Phase II, a systematic evaluation of the CME with high precision was conducted. We will present the significant finding of remaining charge separation after the optimal suppression of known backgrounds and discuss the implications of our results.

About the speaker:

Zhiwan Xu received her B.S. from Fudan University and recently completed her Ph.D. at UCLA. In October 2024, she will begin her postdoctoral research at Los Alamos National Laboratory (LANL). Since joining the STAR collaboration in 2019, Zhiwan has been actively engaged in research on the Quark-Gluon Plasma (QGP), with a focus on the search for the Chiral Magnetic Effect (CME).



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