

Measurements of Global and Local Polarization of Hyperons in Heavy Ion Collisions from STAR

Xingrui Gou for the STAR Collaboration

In heavy-ion collisions, the observation of the global and local polarization of hyperons has revealed the existence of large vorticities perpendicular to the reaction plane due to the system's orbital angular momentum and along the beam direction due to the collective velocity field, respectively. Using the high-statistics data collected by the STAR experiment, we present the global polarization measurements for Λ , $\bar{\Lambda}$, Ξ^\pm , and Ω^\pm hyperons for Au+Au collisions at BES-II energies ($\sqrt{s_{NN}} = 7.7 - 27$ GeV) and isobar collisions of Ru+Ru and Zr+Zr at $\sqrt{s_{NN}} = 200$ GeV. These measurements allow us to study possible magnetic field-driven effects, as well as the collision system size or energy dependence of the vorticities in heavy-ion collisions. Furthermore, We present the measurements of Λ and $\bar{\Lambda}$ hyperon local polarization in isobar collisions at $\sqrt{s_{NN}} = 200$ GeV and Au+Au collisions at BES-II energies. These results provide new insights into polarization mechanism and vorticity fields in heavy-ion collisions as well as additional constraints on properties and dynamics of the matter created in the collisions.