

Measurement of Lambda(Lambda-bar) hyperons' local spin polarization in Au+Au collisions from the RHIC Beam Energy Scan-II

Sunday, 27 April 2025 09:20 (20 minutes)

The second harmonic cosine and sine modulations of the local spin polarization of $\Lambda(\bar{\Lambda})$ hyperons out-of-plane (P_y) and in-plane (P_z), denoted as P_{2y} and P_{2z} , respectively, are newly proposed observables for probing spin Hall effect (SHE) driven by the gradient of baryonic chemical potential \cite{liu21, fu2021_she}. P_{2y} and P_{2z} are measured in Au+Au collisions at $\sqrt{s_{NN}} = 7.7, 9.2, 11.5, 14.6, 17.3, 19.6$ and 27 GeV from the RHIC Beam Energy Scan-II. A monotonic decrease of P_{2y} for Λ with increasing collision energy, and smaller positive P_{2z} with hints of sign change at $\sqrt{s_{NN}} = 7.7$ GeV are observed. However, P_{2y} and P_{2z} for $\bar{\Lambda}$ show no significant energy dependence within the large statistical uncertainties. The local polarization components are influenced by thermal vorticity, shear-induced effects, and baryon chemical potential. These measurements provide valuable insights into the spin dynamics of QCD matter in high baryon density environments.

Primary author: HU, Qiang (Institute of Modern Physics,CAS)

Presenter: HU, Qiang (Institute of Modern Physics,CAS)

Session Classification: 分会场二