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Measurements of elliptic flow and local polarization of Λ hyperons with event shape engineering in 19.6 GeV Au+Au collisions at RHIC-STAR

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Anisotropic flow is expected to generate local vorticities along the beam direction, which in turn leads to local polarization. While local polarization of hyperons has been observed at RHIC and the LHC, current theoretical models cannot completely explain data observed in experiments. Some theoretical calculations suggest that the local polarization of hyperons can be from mechanisms other than anisotropic-flow induced vorticities, highlighting the need for more detailed experimental measurements to resolve this puzzle.

To address this, we employ Event Shape Engineering (ESE), which selects events with different magnitudes of the final-state flow vector within a narrow centrality range. By selecting events with different elliptic flow magnitudes, we can more precisely investigate the contribution of flow-related effects to local polarization. In this talk, we report on the experimental measurements of elliptic flow and local polarization of Λ and $\bar{\Lambda}$ using ESE method at $\sqrt{s_{NN}} = 19.6$ GeV Au+Au collisions from the STAR experiment. We will discuss the relation among the initial geometry, elliptic flow, and local polarization.

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