Analysis method and status of transverse and global polarization in $\sqrt{S_{NN}} = 3.9$ GeV Au+Au collisions at RHIC-STAR experiment

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Transverse polarization of Λ hyperons in unpolarized hadronic collisions has been studied since its discovery [1]. While significant polarization has been observed in small collision systems such as p+p and p+A collisions, its underlying mechanism is still not fully understood. This transverse polarization is conventionally measured for each Λ candidate with respect to its production plane. In this poster, the analysis of transverse and global polarization in large systems is presented, utilizing Au+Au collision data at $\sqrt{s_{NN}} = 3.9$ GeV collected by the STAR experiment. We investigate its dependence on the event plane and its connection to global polarization. In particular, we explore the possible role of transverse polarization in global polarization driven by the system's vorticity, providing insight into the interplay between these polarization phenomena in the hot and dense medium created in heavy-ion collisions.

[1] G. Bunce et al. "Λ^0 Hyperon Polarization in Inclusive Production by 300-GeV Protons on Beryllium". In: Phys. Rev. Lett. 36 (1976), 1113.