



Contribution ID: 584

Type: **Parallel Talk**

Global Polarization of Lambda Hyperons in Au+Au Collisions at 200 GeV from STAR

Tuesday 15 May 2018 09:00 (20 minutes)

The matter created in non-central heavy-ion collisions is expected to possess a significant fraction of the initial angular momentum carried by the two colliding nuclei. This angular momentum can lead to vorticity of the system and be partially transferred to the spin of produced particles due to the spin-orbit coupling, leading to the phenomenon of global polarization. The STAR Collaboration observed finite signals in Au+Au collisions at $\sqrt{s_{NN}} = 7.7-39$ GeV, indicating non-zero vorticity of the system, where the polarization decreases with increasing energy. The energy dependence can be understood by a shear flow structure in the initial state and/or the initial tilt of the source in combination with baryon transparency. Such a tilt and vorticity are closely related to the directed flow, elliptic flow, and the chiral anomalous phenomena. According to model calculations, the vorticity is expected to have a strong dependence on the hyperon emission angle relative to the reaction plane, but the models differ in their predictions. More precise and detailed experimental results are needed for further understanding of vorticity in heavy-ion collisions.

We present new results on the global polarization of Lambda hyperons in Au+Au collisions at $\sqrt{s_{NN}} = 200$ GeV. Recent high-statistics data by a factor of hundred larger compared to previous results allow one to study differential dependencies of the polarization on the collision centrality, hyperon's transverse momentum, pseudorapidity, and emission angle relative to the reaction plane. The polarization dependence on the event-by-event charge asymmetry is presented and its possible relation to the axial current induced by the initial magnetic field is discussed. Furthermore, a possible local vortical structure along the beam direction caused by azimuthal anisotropic flow will be discussed.

Content type

Experiment

Collaboration

STAR

Centralised submission by Collaboration

Presenter name already specified

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Session Classification: Chirality, vorticity and polarisation effects

Track Classification: Chirality, vorticity and polarisation effects