

# Global polarization of Lambda hyperons in Au+Au Collisions at RHIC

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Non-central heavy-ion collisions have large ( $\sim 10^3\hbar$  in the BES) angular momentum which may be transferred, in part, to the quark-gluon plasma through shear forces that generate a vortical substructure in the hydrodynamic flow field. The vortical nature of the system is expected to polarize emitted hadrons along the direction of system angular momentum.  $\Lambda$  and  $\bar{\Lambda}$  hyperons, which reveal their polarization through their decay topology, should be polarized similarly.

These same collisions are also characterized by dynamic magnetic fields with magnitudes as large as  $10^{14}$  Tesla. A splitting between  $\Lambda$  and  $\bar{\Lambda}$  polarization may signal a magnetic coupling and provide a quantitative estimate of the field strength at freeze out.

This presentation will discuss the first observation of a global hyperon polarization in non-central Au+Au collisions at the RHIC suite of energies as well as the dependence of this signal on  $\Lambda$  kinematic variables ( $\phi$ ,  $y$ , and  $p_T$ ). The  $\phi$  dependence of the signal is of particular interest as one naively expects of larger vorticity in-plane vs. out-of-plane, but the opposite can be found in model calculations. Either way, an in-plane vs. out of plane asymmetry must be related to the details of the fluid properties, including the shear viscosity.

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