

# Global spin polarization of $\Lambda$ and $\bar{\Lambda}$ hyperons in Au+Au collisions at RHIC-STAR

Tan LU (for the STAR collaboration)  
*Institute of Modern Physics, Chinese Academy of Sciences*

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## Abstract

In non-central heavy-ion collisions, large angular momentum is generated, leading to significant vorticity and subsequent spin polarization of particles with finite spin. The global polarization of  $\Lambda$  and  $\bar{\Lambda}$  hyperons ( $P_\Lambda$  and  $P_{\bar{\Lambda}}$ ), measured along the direction of global angular momentum, serves as an effective probe of both vorticity and spin degrees of freedom.  $P_\Lambda$  has been measured over a wide range of collision energies. The data from Beam Energy Scan II (BES-II) program at RHIC, including the collider and recent Fixed-Target (FXT), have provided a unique opportunity to study spin degrees of freedom in a wide region of baryon density. In this energy range,  $P_\Lambda$  is observed to be sensitive to the equation of state of the nuclear medium.

In this talk, we will present measurements of global  $\Lambda$  polarization in Au+Au collisions at  $\sqrt{s_{NN}} = 3.0, 3.2, 3.5, 3.9, 4.5, 5.2$ , and 6.2 GeV, along with global  $\Lambda$  and  $\bar{\Lambda}$  polarization and their differences in Au+Au collisions at  $\sqrt{s_{NN}} = 7.7, 9.2, 11.5, 14.6, 17.3$ , and 19.6 GeV from BES-II. The dependence of the measured global polarization on collision energy, centrality, rapidity, and transverse momentum will be discussed.