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Differential Study of Λ -hyperon Polarization in Central Heavy-Ion Collisions Within Transport Model Approach

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We present a comprehensive differential study of hyperon polarization in (ultra-)central Au+Au collisions at low and intermediate energies, employing the microscopic transport model UrQMD in conjunction with the statistical hadron-resonance gas model. This study entails a complex analysis of the fireball dynamics and thermal vorticity field evolution. The resulting thermal vorticity configuration effectively manifests as the formation of two vortex rings in the forward and backward rapidity regions. We demonstrate that the polarization of Λ -hyperons exhibits oscillatory behaviour as a function of the azimuthal angle, offering a novel means to probe the structure of the fireball in central heavy-ion collisions.

Auteur principal: VITIUK, Oleksandr (University of Wroclaw)

Orateur: VITIUK, Oleksandr (University of Wroclaw)

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