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Lambda polarization in heavy-ion collisions at RHIC energies from a hydrodynamic model: an update

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Polarization of Lambda hyperons, produced in relativistic heavy-ion collisions, has been discovered in 2017 by STAR experiment in the Beam-Energy Scan program at RHIC. The trends in the global Lambda polarization are in good agreement with hydrodynamic models. However, the transverse momentum dependence of polarization components in the out-of-plane direction and beam direction does not agree with the models, which constitutes a puzzle.

In this talk we present practical calculations of lambda polarization components in the out-of-plane and beam directions, in heavy-ion collisions at $\sqrt{s_{NN}} = 200$ GeV, in a 3+1 dimensional viscous hydrodynamic model vHLL. We show that the inclusion of a recently found additional term of the spin polarization vector at local equilibrium which is linear in the symmetrized gradients of the velocity field, and the assumption of hadron production at constant temperature restore the quantitative agreement between hydrodynamic model predictions and local polarization measurements in relativistic heavy ion collisions at $\sqrt{s_{NN}} = 200$ GeV.

Preferred track

Collectivity & Multiple Scattering

Primary authors: PALERMO, Andrea (Università degli studi di Firenze); Dr KARPENKO, Iurii (FNSPE CTU in Prague); BECATTINI, Francesco (University of Florence); INGHIRAMI, Gabriele (GSI); BUZZEGOLI, Matteo

Presenter: Dr KARPENKO, Iurii (FNSPE CTU in Prague)

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