Evolution of Λ polarization in the hadronic phase of heavy-ion collisions

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Using the AMPT+MUSIC+URQMD hybrid model [1-4], we have studied the global and local spin polarizations of Λ hyperons as functions of the freeze-out temperature of the spin degree of freedom in the hadronic phase of Au+Au collisions at $\sqrt{s_{NN}}$ =19.6 GeV [5]. Including contributions from both the thermal vorticity and thermal shear of the hadronic matter, we have found that with the spin freeze-out temperature dropping from the hadronization temperature of 160 MeV to 110 MeV at the kinetic freeze-

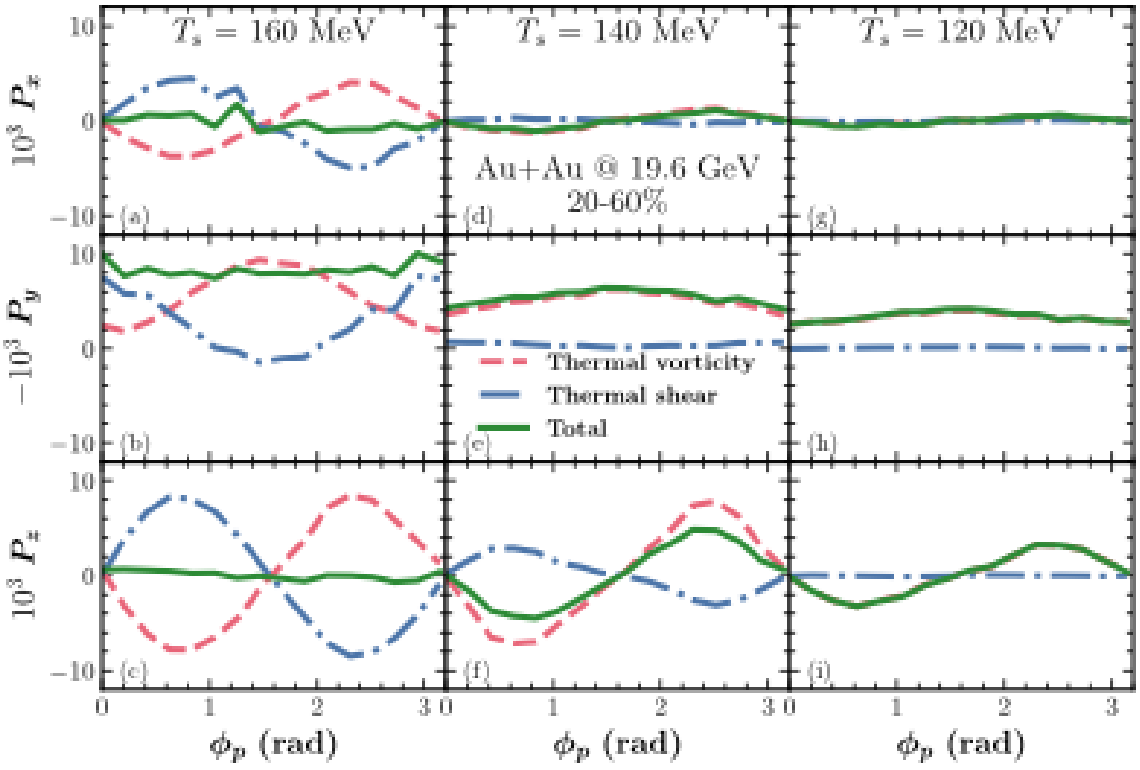

Fig. 1. The azimuthal angle dependence of the local spin polarizations $\boldsymbol{P_x}$, $\boldsymbol{-P_y}$, and $\boldsymbol{P_z}$ of **Λ** hyperons generated by thermal vorticity and thermal shear at the spin freeze-out temperatures $\boldsymbol{T_s}$ =160, 140, and 120 MeV.

out, both the global and local spin polarizations of Λ hyperons due to the thermal vorticity decrease by a factor of 2, while those due to the thermal shear decrease quickly and become negligibly small at 140 MeV, as shown in Fig.1. Our results thus suggest that it is important to consider the evolution of the spin degree of freedom in the hadronic stage of relativistic heavy-ion collisions when theoretically predicted global and local Λ spin polarizations are compared with the experimental measurements.

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