Intertwined chiral restoration and polarization dynamics

mardi 4 juin 2024 19:57 (1 minute)

The physics of the recently observed spin polarization of Λ hyperons in heavy-ion collisions is still ambiguous and is under intense investigation. The evolution of the medium is governed by QCD. Thus, it is necessary to incorporate the equation of state (EoS) for the hot QCD medium in our theory. This can be achieved by considering an effective model with a spacetime-dependent mass. Hence, we start from the semiclassical expansion of the Wigner function for spin-1/2 particles, whose kinetic equation is derived from the NJL model. We find the gradient of the effective mass can be interpreted as a source of the spin polarization. This is also consistent with the conservation of total angular momentum. While, under the simple boost-invariant dynamics the effective mass depends only on proper time and consequently decouples from the dynamics of spin, an extension to non-boost invariant expansion, shows a non-trivial dependence of the spin polarization on the effective mass. This implies a possible connection between the spin polarization and chiral restoration.

Based on: PLB 849 (2024) 138464.

Auteurs principaux: Dr DAS, Arpan (Birla Institute of Technology and Science, Pilani); M. K. K., Gowthama (Indian Institute of Technology Gandhinagar); Prof. RYBLEWSKI, Radoslaw (The Henryk Niewodniczański Institute of Nuclear Physics Polish Academy of Sciences); BHADURY, Samapan (Jagiellonian University); FLORKOWSKI, Wojciech (Jagiellonian University)

Orateur: BHADURY, Samapan (Jagiellonian University)

Classification de Session: Posters

Classification de thématique: Bulk matter phenomena, QCD phase diagram and Critical point