Contribution ID: **225** Type: **Poster**

Local spin polarization and helicity polarization in hydrodynamic approaches

Wednesday 6 April 2022 17:54 (4 minutes)

We have studied local spin polarization and helicity polarization in the relativistic hydrodynamic model. Generalizing the Wigner functions previously obtained from chiral kinetic theory to the massive case, we present the possible contributions up to the order of hbar from thermal vorticity, shear viscous tensor, other terms associated with the temperature and chemical-potential gradients, and electromagnetic fields to the local spin polarization and helicity polarization. We then implement the (3+1) dimensional viscous hydrodynamic model to study the spin polarizations from these sources with a small chemical potential and ignorance of electromagnetic fields by adopting an equation of state different from those in other recent studies. Although the shear correction alone upon local polarization results in the sign and azimuthal-angle dependence more consistent with experimental observations, as also discovered in other recent studies, it is mostly suppressed by the contributions from thermal vorticity and other terms that yield an opposite trend. It is found that the total local spin polarization could be very sensitive to the equation of states, the ratio of shear viscosity over entropy density, and freezeout temperature.

Author: YI, Cong

Co-authors: PU, Shi; GAO, Jian-Hua; YANG, DL (RIKEN)

Presenter: YI, Cong

Session Classification: Poster Session 1 T02

Track Classification: Chirality, vorticity and spin polarization