Contribution ID: **11** Type: **Oral**

Aspects of spin hydrodynamic frameworks in QCD medium

Saturday 6 September 2025 14:40 (20 minutes)

The quark-gluon plasma (QGP) produced in relativistic heavy-ion collision experiments exhibits collective behavior that can be effectively described using a relativistic hydrodynamic framework. In recent years, the experimental observation of spin polarization in various hadrons has opened a new avenue for probing the non-trivial vortical structure of the QGP medium. This has motivated the development of a consistent theoretical framework of relativistic spin hydrodynamics, which incorporates spin degrees of freedom into the hydrodynamic descriptions. Such a framework is essential for performing dynamical simulations of spin polarization phenomena. Spin hydrodynamics is formulated based on the conservation of total energy, linear momentum, and total angular momentum—including both orbital and spin contributions. In this talk, I will discuss various theoretical aspects of dissipative spin hydrodynamic frameworks, including approaches based on relativistic kinetic theory, entropy current analysis, etc. I will highlight several important features of spin hydrodynamics, such as pseudo-gauge dependence, spin transport coefficients, gradient ordering of spin-related variables, analytical solutions, etc.

Author: DAS, ARPAN (Birla Institute of Technology And Science Pilani, Pilani Campus)

Presenter: DAS, ARPAN (Birla Institute of Technology And Science Pilani, Pilani Campus)

Session Classification: Plenary Session