



Contribution ID: 460

Type: Talk

## Study of spin polarization of $\Lambda$ hyperons as indicator of QCD critical point

Thursday 15 December 2022 12:00 (15 minutes)

We study the effect on thermal vorticity near the QCD critical point. To evaluate thermal vorticity, we solve the equations for the relativistic causal hydrodynamics in (3+1) dimensions. The effects of the critical point is incorporated through the equation of state and the scaling behaviour of the transport coefficients. We observed a significant suppression in thermal vorticity at late times due to enhanced viscosities as the transport coefficients diverge in the critical region. Assuming local thermodynamic equilibrium for the spin degrees of freedom, the polarization vector for spin-1/2 particles is related linearly to thermal vorticity. Taking an average of the polarization over the freezeout hypersurface, we obtain the mean polarization observed in experiments. For the same global polarization, we find a significant suppression due to the critical point in the rapidity profile of the component of polarization along the angular momentum direction. The study suggests that the change induced by the critical point in the rapidity dependence of the spin polarization of  $\Lambda$  hyperons can be used as an indicator of the critical point.

### Session

Heavy Ions and QCD

**Author:** SINGH, Sushant Kumar (Variable Energy Cyclotron Centre, Kolkata)

**Co-author:** ALAM, Jan-e (Variable Energy Cyclotron Centre, 1/AF, Bidhan Nagar, Kolkata—700064, India)

**Presenter:** SINGH, Sushant Kumar (Variable Energy Cyclotron Centre, Kolkata)

**Session Classification:** WG5-Heavy Ions and QCD