

Possibility of a QCD medium formation in LHC proton-proton collisions using light and heavy flavors: A Color String Percolation Approach

Wednesday, 16 November 2022 17:10 (20)

Recent findings of strangeness enhancement and ridge-like structures in pp collisions at the Large Hadron Collider (LHC) have captured much of the scientific interest in the search for QGP-droplets in pp high-multiplicity events. Thus, it is crucial to gather substantial evidence in this new direction. Studying various thermodynamic and transport properties of the matter formed at LHC can give us hints regarding a possible change in dynamics in the systems. We have used the Color String Percolation Model (CSPM), a Quantum Chromodynamics (QCD) inspired theoretical model, to explore this further. The jet quenching parameter (\hat{q}) has been estimated within the CSPM approach for pp collisions at $\sqrt{s} = 5.02$ and 13 TeV, Xe-Xe collisions at $\sqrt{s_{NN}} = 5.44$ TeV, Pb-Pb collisions at $\sqrt{s_{NN}} = 2.76$ and 5.02 TeV. The findings hint at QGP-like medium formation in high-multiplicity pp collisions. In addition, we have also explored the diffusion of charm quark in the deconfined medium with CSPM and estimated the momentum and spatial diffusion coefficients. Finally, we have compared our results with those obtained from various models, such as lattice-QCD. We found that our results reasonably agree with lattice-QCD and other established models, while revealing a hint for QCD medium formation in pp collisions after a threshold in final state multiplicity density.

Primary author(s) : SAHU, Dushmanta (Indian Institute of Technology Indore (IN))

Co-author(s) : SAHOO, Raghunath (Indian Institute of Technology Indore (IN))

Presenter(s) : SAHU, Dushmanta (Indian Institute of Technology Indore (IN))

Session Classification : Day 2: Session 4

Track Classification : Heavy flavor and Quarkonium production