LHCP2021
Online
The Ninth Annual Conference on Large Hadron Collider Physics
7-12 June 2021 Paris (France), Sorbonne Université (IN2P3/CNRS,IRFU/CEA)

Contribution ID: **492** Type: **Theory poster**

Study of the jet transport coefficient at the Large Hadron Collider energies using Color String Percolation Model

Thursday, June 10, 2021 6:45 PM (1 hour)

Jets are collimated emission of multitude of hadrons which originate from the hard partonic scatterings. They play an important role as hard probes of Quark-gluon plasma (QGP). These hard jets lose their energy through medium-induced gluon radiation and collisonal energy loss. This suppression of final state hadrons at high p_{T} is referred to as jet quenching. Jet quenching is an important signature of QGP and can be characterized by the jet transport parameter ($\hat{q}$), which encodes the parton energy loss in the medium. In this work, we have estimated $\hat{q}$ for pp and AA collisions using the Color String Percolation Model (CSPM). CSPM is a widely used QCD-inspired model which assumes that color strings are stretched between projectile and the target. These color strings can decay into new strings via quark-antiquark pair production and subsequently hadronize to produce observed final state hadrons.

We have studied the jet transport parameter ($\hat{q}$) as a function initial percolation temperature for pp and Pb-Pb collisions at LHC energies. We observe that $\hat{q}$ increases linearly with the increase in initial percolation temperature regardless of the collision system or collision energy. When studied as a function of charged particle multiplicity scaled with the nuclear overlap area, at low multiplicities, $\hat{q}$ shows a sharp increase and this dependency becomes weak at higher multiplicities. This suggests that at lower multiplicities, the system is not dense enough to quench the partonic jets, whereas with increase of multiplicity the jet quenching becomes higher. We have also studied $\hat{q}$ as a function of initial energy density and we found that in the low energy density regime, the system behaves almost like a massless hot pion gas. At higher energy densities, the system deviates from that of the ideal QGP. Finally we have also studied the dimensionless scaled jet transport parameter ($\hat{q}/T^3$) which can give us information about the hot and dense partonic medium. We have compared our results obtained from CSPM which has a similar behaviour with that obtained from JET collaboration.

Authors: SAHU, Dushmanta (Indian Institute of Technology Indore (IN)); MISHRA, Aditya Nath (Wigner Research Centre for Physics Budapest, Hungary); SAHOO, Raghunath (Indian Institute of Technology Indore (IN))

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

Session Classification: Poster Session

Track Classification: Heavy Ions