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Jet energy loss in small systems with finite-size effects and running coupling

In the LHC and RHIC experiments, strong collective behavior has been observed in high multiplicity events in the p-p and p-A collisions.
Such behavior strongly suggests that quark-gluon plasma (QGP) is being created even in small systems when enough entropy is produced.
In this work, we utilize an improved version of MARTINI to calculate the effect of the QGP droplet on the jet energy loss in p-A collisions with the well-calibrated 3+1D hydrodynamics medium[1].
The two important improvements implemented in this version of MARTINI are the finite medium size effect[2], and the running coupling effect[3].
Since the system we are dealing with is small, both of these improvements are critical.
Using realistic event-by-event initial conditions, we show that systematic measurements of jet quenching in small systems can provide a strong evidence of the QGP formation[4].
Rapidity dependence of R_{pA} and harmonic flows of energetic partons in small collision systems will be also presented.
In addition, to access information of the medium structure and of missing jet energies, we provide calculations of jet R_{pA} and di-jet imbalance through the full jet reconstruction.

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Preferred Track

QCD in small systems

Collaboration

Not applicable

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