Contribution ID: **33** Type: **not specified**

Full jet evolution in quark-gluon plasma and nuclear modification of jet structure in Pb+Pb collisions at the LHC

Sunday 25 September 2016 12:00 (20 minutes)

We study the evolution of full jets in quark-gluon plasma (QGP) via solving a set of coupled differential transport equations for the three-dimensional
momentum distributions of quarks and gluons contained in the full jet shower. In our jet evolution equations, we include all partonic splitting processes in the dense nuclear medium. We also include the collisional energy loss and transverse momentum broadening for both leading and radiated partons of the full jets due to elastic collisions with the medium constituents. We keep track of both the energies and the transverse momenta of all partons within the full jet shower, thus the modification of both jet energy and jet structure due to jet-medium interaction can be studied straightforwardly. Combining with realistic (2+1)-dimensional viscous hydrodynamic calculation for the space-time profile of the hot and dense nuclear medium produced in Pb+Pb collisions, we apply our formalism to calculate the nuclear modification of single inclusive jet spectra, and the momentum imbalance of photon-jet and dijet pairs at the LHC. The jet shape (at the partonic level) is also studied for the quenched/modified jets in Pb+Pb collisions at the LHC. We further present detailed studies on the roles of different jet-medium interaction mechanisms on the modification of jet energy and jet structure.

Summary

Presentation type

Oral

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Session Classification: Parallel Session VI: Jet Modification in A+A (IV)