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Splitting scales in reclustered large-radius jets in high-energy nuclear collisions.

Jet has been proposed as a excellent probe to jet quenching and the properties of Quark-gluon plasma. Recently, large radius jets using a radius parameter of R = 1.0, by re-clustering anti-k_t R = 0.2 jets having transverse momenta$p_T > 35$ GeV/c, are measured by ATLAS in Pb+Pb
collisions at 5.02 TeV. By re-clustering the large-radius jet constituents with k_t algorithm, its hardest parton splitting scale $\sqrt{d_{12}}$ are measured. Those measurements provide additional constraints on the jet-medium interaction and jet transport coefficient.

In the talk, we carry out the first theoretical investigation on the medium modification of the reclustered large-radius jets production, in particular, the hardest parton splitting of these jets in Pb+Pb relative to that in p+p collisions. Jet propagation and jet-induced medium excitation in the hot-dense medium is investigated within the Linear Boltzmann Transport (LBT) model.
The nuclear modification factor of the large radius jets evaluated as a function of jet transverse momentum is a little smaller than the value of inclusive $R = 0.4$ jets due to its complex structures. The large radius jet constituents are reclusted with the k_t algorithm to obtain the splitting scale $\sqrt{d_{12}}$, which characterizes the transverse momentum scale for the hardest splitting in the jet. The jet yields evaluated as a function of the splitting scale $\sqrt{d_{12}}$ of the hardest parton splitting is overall suppressed in Pb+Pb collisions relative to p+p collisions due to the reduction of jets yields.
A significant evolution of R_{AA} with $\sqrt{d_{12}}$ is observed at small $\sqrt{d_{12}}$ values, indicating a significant difference in the quenching of large-radius jets having single sub-jet and those with more complex substructure. We find that large radius jets with small splitting angle and small fragmentation function are less suppressed. A detailed analysis show that jet substructures is significantly modified due to the interactions between jet parton and therm medium constituents.

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