

Medium modified jets, soft drop and leading hadrons in a single formalism

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We study the modification of reconstructed jets and high transverse momentum (high- p_T) hadrons, produced in the fragmentation of these jets, as they propagate through a dense medium. Vacuum and medium modified fragmentation functions are used to define the properties of hadrons produced in hard interactions, in p - p and A - A collisions respectively. Jets and jet modification are studied using a semi-analytical approach, based on defining a factorized jet function. The vacuum jet function is then measured in tuned PYTHIA simulations. Both the modification of the fragmentation function and that of the jet are carried out using an identical energy loss kernel (based on the higher-twist approach), with modifications introduced to make it compatible with jet algorithms. This approach treats jet and leading particle observables on an equal footing. This approach is then extended to di-hadron production within a jet and its modification within a medium (near side associated yield). Extensions of this formalism to a “di-sub-jet” function and its application to the soft-drop measurements are discussed. The methodology of extending these calculations to Monte-Carlo simulations is outlined. All calculations are carried out within a 2+1D viscous hydrodynamic simulation, and compared with experimental data from a variety of collision energies.

Summary

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