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Measurements of subjet fragmentation with ALICE

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Jet substructure, defined by observables constructed from the distribution of constituents within a jet, provides the versatility to tailor observables to specific regions of QCD radiation phase space. This flexibility provides exciting new opportunities to study jet quenching in heavy-ion collisions and to ultimately help reveal the nature of the quark-gluon plasma. In this talk, we focus on the momentum fraction z of reclustered subjets, which has recently been proposed to test the universality of jet fragmentation in the quark-gluon plasma, as well as to measure “energy loss” at the cross-section level.

Subjet fragmentation measurements are complementary to well-established measurements of the longitudinal momentum fraction of hadrons in jets, providing a new opportunity to study the relationship between hadrons and jets.

We report the first measurements of subjet fragmentation in both Pb-Pb and proton-proton collisions. These subjet measurements allow to extend to higher z than with hadrons, enabling access to a quark-dominated sample of jets and exposing the interplay of soft medium-induced radiation with the relative suppression of quark vs. gluon jets. These measurements will be compared to theoretical calculations and contrasted with related jet substructure measurements, helping to elucidate the physics underlying jet quenching.

Preferred track

High-temperature QCD

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