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Jet substructure measurements with ALICE

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Jet substructure measurements, based on the distribution of constituents within a jet, are able to probe specific regions of QCD radiation phase space for jet showers in vacuum. This powerful capability provides new opportunities to study fragmentation patterns of parton showers in vacuum and the dynamics of jet quenching in heavy-ion collisions.

The ALICE experiment has unique capabilities for jet substructure measurements, due to its high-precision tracking system and focus on jets with low transverse momenta. The excellent tracking of the ALICE detector also allows the study of jet substructure in the heavy-flavour sector by tagging jets with fully reconstructed charm hadrons. Heavy-flavour jets are declustered to trace all branchings of the charm quark and to reveal mass dependence of the shape and structure of the parton shower due to the dead-cone effect.

In this talk, we report several new jet substructure measurements in pp and Pb–Pb collisions by the ALICE Collaboration. These include the first fully corrected inclusive measurements of the groomed jet momentum fraction, z_{g}, and the groomed jet radius, $\theta_{\mathrm{g}} \equiv R_{\mathrm{g}}/R$, as well as the N-subjettiness distribution and the fragmentation distribution of reclustered subjets. We also report on the measurement of several groomed substructure observables of heavy-flavour jets in pp collisions, fragmentation functions and the new measurements of the radial distributions of D^0 mesons or Λ_{c}^+ baryons in jets. The measurements will be compared to theoretical calculations and provide new constraints on the physics underlying parton fragmentation and jet quenching.

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