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Monte Carlo studies of energy-energy correlators for D^0-tagged jets in in pp collisions

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Energy-energy correlators (EECs) offer a novel way to study the structure of jets. Defined as the energy-weighted cross section of particle pairs inside jets, the correlation strength as a function of the pair opening angle allows a distinct separation of the perturbative and non-perturbative regimes. The evolution of parton dynamics in jets to their confinement into hadrons can be studied. We present ALICE studies of the EECs for D^0-tagged jets in pp collisions at 13 TeV using various Monte Carlo simulations. By comparing our results to EECs in inclusive (gluon-dominated) jets, we can search for modifications in the radiation pattern of jets due to mass effects from the presence of the dead cone or Casimir color factors. We specifically look at the difference between light- and heavy-quark initiated jets, as well as gluon-initiated jets in PYTHIA. We also study the D^0-tagged jets that decay from a D^* meson, to measure the contribution of the accompanying soft pion and its effect on the energy correlations. We compare the EECs of D^0-tagged jets in PYTHIA, Herwig, and Sherpa to study model differences and hadronization effects. These studies will serve as a baseline for future measurements in heavy-ion collisions, allowing for disentanglement of the dynamics of the dead cone from interactions with the quark-gluon plasma (QGP).

Category

Experiment

Collaboration

ALICE

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