

Dead cone effect and charm quark mass effects in high- p_T D-jets with the CMS experiment

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The mass of heavy quarks modifies the radiation pattern of heavy-quark jets in comparison to their light quark counterparts, since the heavy quark mass effectively regularizes the soft and collinear divergences that would normally dominate the partonic cascade formation. This leads to the depletion of collinear gluon emissions relative to the heavy quark, an effect known as the dead cone effect. The dead cone of heavy-quark jets has been identified as a possible venue to isolate medium-induced radiation in a phase-space region where calculations are viable and where the large underlying event of a heavy-ion collision is absent. Previous measurements based on the construction of an angle-ordered tree of intrajet emissions have shown that it is possible to expose the dead cone experimentally. Novel jet substructure observables and algorithms are used to isolate hard and collinear emissions in the dead cone region with an improved sensitivity to charm quark mass effects using D^0 -tagged jets in pp collisions at 5.02 TeV. For the first time, the substructure of charm quark jets with a p_T greater than 100 GeV is analyzed, in a regime that should be relatively insensitive to nonperturbative effects. It is shown that the sensitivity to quark mass effects is present even at high p_T . This result also serves as a baseline for future measurements in heavy-ion collisions.

Category

Experiment

Collaboration

CMS

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