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Heavy-flavor jet production and nuclear modification in PbPb collisions at 5.02 TeV with CMS detector

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Jet quenching is an established signature of parton-medium interactions in Quark-Gluon Plasma. These interactions are expected to be influenced by the color charge, flavor, and/or mass of the propagating parton. To investigate this relationship, we look for possible differences in quenching for jets originating from heavy quarks compared to inclusive jets. Heavy partons tend to transfer more momentum to their daughter leptons (specifically muons), resulting in a broader muon-to-jet relative momentum distribution. Taking advantage of this fact, we use relative muon p_T to extract the fraction of b-jets present in the muon-tagged sample by template fitting. Unlike b-tagging techniques incorporating the shower shape and/or secondary vertex-based observables, the benefit of using muon-based b-jet identification comes from minimizing the impacts of the QGP on tagger properties. The analysis uses 5.02 TeV pp and PbPb collision data from the LHC Run II collected by the CMS experiment. The measurements of relative b- to inclusive jet abundances take advantage of the cancellation of major systematic uncertainty in central PbPb collisions and indicate less suppression for b-jets than inclusive jets in central PbPb collisions, consistent with expected mass dependence of jet quenching. The new measurements provide input for theoretical models, constraining the possible differences in the nuclear modification of light- and heavy-flavor jets.

Category

Experiment

Collaboration

CMS

Primary author: BENNETT, Clayton (University of Illinois at Chicago (US))

Presenter: BENNETT, Clayton (University of Illinois at Chicago (US))

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