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Probing bottom quark mass effects in jet substructure with CMS using a novel technique to cluster the b-hadron decays

The substructure of bottom quark jets is of substantial interest, both in vacuum and in medium, in terms of understanding radiation emitted from heavy quarks. Unfortunately, the decays of b hadrons, which are typically cascading, obscure the parton level branching, by filling the radiative dead cone. To circumvent this, one may study exclusive b-hadron decays, but one then sacrifices the vast majority of the b-jet cross section. We have implemented a technique to partially reconstruct the b-hadrons by aggregating their charged hadron decay products, dramatically improving the sensitivity to the underlying QCD splitting. Using this technique, we report the first measurements of the soft drop groomed momentum fraction and jet radius for b-jets, as well as the b-jet charged fragmentation function.

Category

Experiment

Collaboration (if applicable)

CMS

Author: KALIPOLITI, Lida (LLR, École Polytechnique (FR))

Presenter: KALIPOLITI, Lida (LLR, École Polytechnique (FR))

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