

Quark jet rates and quark gluon discrimination in multi-jet final states

Monday 16 July 2018 17:00 (25 minutes)

We calculate quark and gluon jet fraction in multi-jet final states at the LHC, which is based on perturbative QCD at next-to-double logarithmic accuracy. We find a measurable scaling pattern of the fraction. This is related to a performance of new physics searches using quark-gluon jet discrimination in multi-jet final states, and would be useful for more understanding of QCD and tuning of Monte-Carlo generators. We also introduce a variable related to jet flavors in multi-jet final states, and propose a data-driven method using the variable to improve the performance of BSM searches and to reduce systematic uncertainties of the analysis. We show how the background rejection increase for signals which produce many quark jets.

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Session Classification: Calculations