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Collinear Drop (10'+5')

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We introduce collinear drop jet substructure observables, which are unaffected by contributions from collinear radiation, and systematically probe soft radiation within jets. These observables can be designed to be either sensitive or insensitive to process-dependent soft radiation originating from outside the jet. Such collinear drop observables can be exploited as variables to distinguish quark, gluon, and color neutral initiated jets, for testing predictions for perturbative soft radiation in Monte Carlo simulations, for assessing methods of determining hadronization corrections, for examining the efficiency of pileup subtraction methods, and for any other application that leaves an imprint on soft radiation. We discuss examples of collinear drop observables that are based both on clustering and on jet shapes. Using the soft-collinear effective theory we derive factorization expressions for collinear drop observables from QCD jets, and carry out a resummation of logarithmically enhanced contributions at next-to-leading-logarithmic order. We also identify an infinite class of collinear drop observables for which the leading double logarithms are absent.

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