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Effective transverse momentum in multiple jet production at hadron colliders

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We consider the class of inclusive hadron collider processes in which several energetic jets are produced, possibly accompanied by colourless particles (such as Higgs boson(s), vector boson(s) with their leptonic decays, and so forth).
We propose a new variable that smoothly captures the
$N+1$ to N-jet transition. This variable, that we dub $k_T^{\rm ness}$, represents an effective transverse momentum controlling the singularities of the $N+1$-jet cross section when the additional jet is unresolved.
The $k_T^{\rm ness}$ variable offers novel opportunities to perform higher-order calculations in Quantum Chromodynamics (QCD) by using non-local subtraction schemes.
We study the singular behavior of the $N+1$-jet cross section as $k_T^{\rm ness} \to 0$ and, as a phenomenological application, we use the ensuing results to evaluate next-to-leading order corrections to H+jet and Z+2 jet production at the LHC.
We show that $k_T^{\rm ness}$ performs extremely well as a resolution variable and appears to be very stable with respect to hadronization and multiple-parton interactions.

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