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# High-purity gluon jet showers using secondary Lund jet planes

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The Lund jet plane (LJP) is an observable introduced to better understand the radiation pattern of jets in terms of the jets-within-the-jets found with iterative Cambridge/Aachen declustering. The LJP is a two-dimensional representation of the phase space of $1 \to 2$ branchings, where the logarithm of the relative transverse momentum ($k_t$) and the logarithm of the rapidity-azimuth distance ($\Delta$) of emissions with respect to their emitter are used for the vertical and horizontal axes. The primary LJP, the first triangular leaf of Lund diagrams, is well understood analytically, and measurements at the LHC show how it can be used to constrain parton showers and hadronization models in a factorized way. One can extend the exploration of the Lund jet tree by turning to the LJP of a primary emission, the secondary LJPs. Quark jet showers are strongly constrained in $e^+e^-$ collisions at LEP, whereas gluon jet showers are understood less well. If the primary emission is chosen judiciously, such that it corresponds to the first branching in the jet shower, one can constrain the modeling of gluon-initiated jet showers independently of the quark/gluon jet composition of the jet sample. In this talk, we discuss how one can use such a sample of gluon-rich jet radiation to constrain gluon-initiated parton showers in the secondary LJP. Because of the resilience to the quark/gluon jet fraction, other substructure observables calculated on the secondary LJP could be used for precision physics. These possibilities will also be discussed.

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