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Stabilizing BFKL via heavy-flavor and NRQCD fragmentation

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It is widely recognized that high-energy calculations performed via the NLL BFKL resummation of energy logarithms suffer from strong instabilities that become manifest when renormalization and factorization scales are varied from their *natural* values, namely the ones dictated by kinematics. In the case of observables featuring light-particle emissions, such as Muller–Navelet and light-hadron plus jet correlations, these instabilities are so strong to hamper any possibility to perform precision studies at natural scales. We provide evidence that LHC final states sensitive to heavy-flavored hadrons exhibit a fair and solid stability of these observables under higher-order corrections and scale variations. The stabilization mechanism is encoded in the peculiar behavior of the gluon collinear fragmentation function (FF) describing the heavy hadron. It comes out as is an *intrinsic* that becomes manifest whenever a species with heavy flavor is detected. This remarkable property, called *natural stability* of the high-energy resummation, emerges both in the case of a single-charmed or single-bottomed hadron emission, depicted by means of a heavy-flavor FF parametrization fitted to data, and also when a vector quarkonium state or a charmed B-meson is described in term of a DGLAP-evolving NRQCD FF set.

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