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Generating functional for quenched observables

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Hard probes, and in particular jets, are at the same time both promising and challenging tools for probing the hot and dense nuclear matter created in high-energy heavy-ion collisions at the RHIC and LHC. Radiative processes in the medium lead to a redistribution of energy within the jet cone and an enhanced energy leakage out of it. These modifications are governed by the interplay of the relevant momentum- and time-scales, and are sensitive to the way partonic fluctuations within the jet are resolved by the medium. Mapping out all relevant regimes of jet-medium interactions onto the Lund kinematical plane, we establish a probabilistic picture of the fragmentation in the form of a generating functional (GF). In contrast to the GF in vacuum, in medium it contains terms describing fragmentation at short and long time-scales, compared to the medium scales, and the transition between them. Due to the mismatch between real and virtual emissions, the GF is normalized to the collimator function that describes how jet substructures are quenched and can be measured from the inclusive jet spectrum in heavy-ion collisions. We put a special emphasis on the role of color coherence for hard, small-angle fluctuations.

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