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Evolution of Track functions at order alpha_s^2

Using the tracking system at the LHC, one can efficiently suppress pile-up contamination and improve angular resolution. Observables that only depend on charged particles (tracks) are not infrared safe in perturbation theory, so any calculation of track-based observables must account for hadronization effects. This can be done by matching the partonic cross section onto perturbative objects that absorb the infrared divergences, called track functions. These track functions describe the energy fraction of a hard parton which is converted into charged hadrons. We demonstrate the validity of the track function approach at order alpha_s^2 by calculating its renormalisation group evolution at this order, using two different approaches: The first uses analytic results for the projected Energy-Energy Correlator to extract the evolution for moments of the track function. The second involves a calculation of a track-based jet function in Soft-Collinear Effective Theory. This result is also an important input for higher-order calculations of track-based observables.

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