

Perturbative RGE systematics in precision observables

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QCD calculations for collider physics make use of perturbative solutions of renormalisation group equations (RGEs). Ambiguities related to these solutions can contribute significantly to systematic uncertainties of theoretical predictions for physical observables.

We propose a general method to estimate these systematic effects using techniques inspired by soft-gluon and transverse-momentum resummation approaches.

We first discuss the cases of the evolution of strong coupling α_s , collinear parton-distribution functions (PDFs), and transverse-momentum-dependent distributions (TMDs).

We then study the implications for precision observables in hadron-collider processes, such as the deep-inelastic scattering structure functions and the transverse-momentum distribution of the lepton pair in Drell-Yan production.

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