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Estimating missing higher orders in transverse momentum distributions using resummations

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Missing higher order uncertainties (MHOU) in perturbative computations are usually estimated by varying the unphysical scales present in the process. However, it is known that scale variation prescriptions often underestimate the actual uncertainty. In this talk, we present a more reliable approach to approximate the unknown next-to-next-to-leading order (NNLO) transverse momentum distribution of colourless final states, namely the Higgs boson produced via gluon fusion and the lepton pair produced via Drell–Yan (DY) mechanism. The approximation we construct relies on the combination of the various resummation formalisms, namely threshold, small-pt and high energy resummations, by exploiting the singularity structure of the large logarithms in Mellin space. We show that for the case of the Higgs boson production, the approximate NNLO transverse momentum distribution amounts to a correction of a few percent with respect to the NLO result with a reduction in the scale dependence.

Submitted on behalf of a Collaboration?

No

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