



Contribution ID: 1296

Type: Parallel Talk

Drell-Yan lepton-pair production: q_T resummation at N3LL and fiducial cross section at N3LO

Thursday, 7 July 2022 15:20 (15 minutes)

We present high-accuracy QCD predictions for the transverse-momentum (q_T) distribution and fiducial cross sections of Drell-Yan lepton pairs produced in hadronic collisions. At small values of q_T we resum to all perturbative orders the logarithmically enhanced contributions up to next-to-next-to-next-to-leading logarithmic (N3LL) accuracy, including all the next-to-next-to-next-to-leading order (N3LO) terms. Our resummed calculation has been implemented in the public numerical program DYTURBO, which produces fast and precise predictions with the full dependence on the final-state lepton kinematics. We consistently combine our resummed results with the known $O(\alpha_s^3)$ fixed-order predictions at large values of q_T obtaining full N3LO accuracy for fiducial cross sections. We show numerical results for Z and W production at LHC energies discussing the reduction of the perturbative uncertainty with respect to lower-order calculations. We comment on the effect of such high precision QCD predictions on the W boson mass measurement.

In-person participation

Yes

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Session Classification: Strong interactions and Hadron Physics

Track Classification: Strong interactions and Hadron Physics