

MSHT20 Approximate N³LO Parton Distribution Functions with Theoretical Uncertainties

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We present a general formalism for the inclusion of theoretical uncertainties from missing higher orders into a parton distribution function (PDF) fit. We demonstrate how using the currently available knowledge about the next-to-next-to-next-to-leading order (N³LO), an order above the standard NNLO used in current PDF fits, can provide consistent, justifiable and explainable estimates for missing higher order uncertainties (MHOUs). With N³LO approximations we allow for a fully consistent approximate N³LO global fit. Using an expanded Hessian procedure from previous MSHT fits, we present the first approximate N³LO PDF fit with theoretical uncertainties, and analyse the differences between these N³LO PDFs and the standard NNLO PDFs.

Submitted on behalf of a Collaboration?

No

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