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Calculation of pion distribution amplitude I: renormalization and power accuracy

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Calculating the x-dependence of pion distribution amplitude (DA) using the large-momentum effective theory has entered the era where the systematics need to be controlled. We demonstrate the necessity of a proper renormalization and a corresponding perturbative matching to achieve power accuracy $\sim O(\Lambda_{QCD}/xP_z)$. By resumming the leading renormalon in the perturbative series, we are able to extract renormalization factors that improve the consistency of the coordinate-space correlation with predictions from the operator product expansion. Using a matching kernel with the same renormalon resummation, we are able to eliminate the $\sim O(\Lambda_{QCD}/xP_z)$ uncertainties, thus improving the accuracy of the lightcone DA extraction.

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