

# 2024 Meeting on Lattice Parton Physics from Large Momentum Effective Theory (LaMET2024)



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## Threshold resummation for computing large- $x$ PDF under LaMET

*Monday 12 August 2024 09:00 (25 minutes)*

Parton distribution functions (PDFs) at large  $x$  are difficult to be extracted from experimental data, but are extremely important in understanding hadron structures as well as searching for new physics beyond the Standard Model. We study the large  $x$  PDFs under the framework of large momentum  $P^z$  expansion of lattice quasi-PDFs. In the threshold limit, the matching kernel of quasi-PDF can be factorized into the heavy light Sudakov hard kernel and space-like jet function, and their renormalization group equations allow us to resum the threshold logarithms regarding the spectator momentum. The pion valence PDFs calculated with the resummed matching kernel clearly expose the breaking down of perturbative matching for the spectator momentum  $(1-x)P^z \sim \Lambda_{\text{QCD}}$ , and at the same time validate the perturbative matching if both spectator and active quark momenta  $(1-x)P^z, xP^z$  are much larger than  $\Lambda_{\text{QCD}}$ , where a good perturbative convergence is observed after the implementation of threshold resummation with leading renormalon resummation.

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