

# 2022 Meeting on Lattice Parton Physics from Large Momentum Effective Theory (LaMET2022)



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## Resumming Quark's Longitudinal Momentum Logarithms in LaMET Expansion of Lattice PDFs

*Thursday, December 1, 2022 12:00 PM (25 minutes)*

In the large-momentum expansion for parton distribution functions (PDFs), the natural physics scale is the longitudinal momentum ( $p_z$ ) of the quarks (or gluons) in a large-momentum hadron. We show how to expose this scale dependence through resumming logarithms of the type  $\ln^n p_z/\mu$  in the matching coefficient, where  $\mu$  is a fixed renormalization scale. The result enhances the accuracy of the expansion at moderate  $p_z > 1\text{-GeV}$ , and at the same time, clearly shows that the partons cannot be approximated from quarks with  $p_z \sim \Lambda_{\text{QCD}}$  which are not predominantly collinear with the parent hadron momentum, consistent with power counting of the large-momentum effective theory. The same physics mechanism constrains the coordinate space expansion at large distances  $z$ , the conjugate of  $p_z$ , as illustrated in the example of fitting the moments of the PDFs.

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**Session Classification:** Session II