Fei Yao – HEP Seminar – April 15, 2025
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Title: Extracting Meson Distribution Amplitudes from Nonlocal Euclidean Correlations at Next-to-Next-to-Leading Order

Abstract:
Light cone distribution amplitudes (DAs) are crucial for describing the longitudinal momentum distribution within mesons and serve as essential input for exclusive flavor physics studies. However, as intrinsically non-perturbative quantities, their reliable calculation from QCD remains challenging. Recent advancements in lattice QCD, particularly large-momentum effective theory (LaMET) and short-distance factorization, have significantly improved our understanding of the x-dependence of meson DAs.

In this seminar, I will review the latest progress in calculating light meson DAs using lattice QCD with LaMET and present the first complete result for the next-to-next-to-leading order (NNLO) hard matching kernel, which plays a key role in precisely extracting light meson distribution amplitudes from lattice calculations of equal-time nonlocal Euclidean correlation functions. Additionally, I will demonstrate the numerical impact of NNLO matching in reducing theoretical uncertainties in these calculations.