Contribution ID: **17** Type: **not specified**

Factorization connecting TMDs in SCET and lattice QCD

Wednesday, 20 April 2022 14:00 (20 minutes)

SCET enables the factorization of cross-sections into perturbative and non-perturbative components. The resulting non-perturbative functions are typically modeled with essentially no direct input from lattice QCD calculations. The fact that their dynamics are dominated by the lightcone typically renders them inaccessible to direct lattice QCD calculations due to a sign problem, a speculated NP-hard numerical difficulty. To circumvent this issue, one can try to construct lattice-calculable quantities that encode the same infrared physics as the desired functions and then prove a factorization theorem connecting the two distributions. In this talk, I demonstrate how to carry out this lattice factorization program for transverse-momentum-dependent PDFs (TMDs), which are key components of cross-sections for Drell-Yan, SIDIS, and other processes.

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Session Classification: TMDs and PDFs