



Contribution ID: 5

Type: **Remote standard talk**

Proof of factorization enabling lattice calculation of TMDs

Thursday, May 26, 2022 5:55 PM (15 minutes)

Non-perturbative parton distributions that arise in the TMD factorization of cross-sections have dynamics dominated by the lightcone. This renders them inaccessible to direct lattice QCD calculations due to the sign problem in real-time calculations. To circumvent this issue, one may construct a lattice-calculable TMD that shares the same IR physics as the physical TMD appearing in cross-sections, and then must prove a factorization theorem connecting these two functions. In this talk, I prove such a relation for quasi-TMDs and Collins TMDs for leading power distributions of any spin, for both quarks and gluons.

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Session Classification: Plenary session