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The q_T spectrum of J/ψ production at the EIC

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The production of quarkonia, and in particular J/ψ, at the EIC is a valuable tool to probe the gluon transverse momentum dependent (TMD) distributions at lower energies as compared, for instance, to Higgs production. However, the proper factorization must be adopted to describe J/ψ production at small transverse momentum accurately. This requires the introduction of a new TMD object, the so-called TMD shape function (TMD-ShF), which encodes smearing effects associated with the quarkonium production mechanism. The J/ψ production is thus expressed in terms of the gluon TMD-PDF and the aforementioned TMD-ShF, identifying the W term, which can then be combined with the collinear fixed-order calculation to obtain a unified description valid across all transverse momenta.
In this talk I will present a phenomenological derivation of the TMD-ShF from the asymptotic behavior of the fixed-order cross section. I will then explore the combination of the W and fixed-order terms to investigate properties of the overall distribution, emphasizing the role of the TMD-ShF in shaping them.

Author: MAXIA, Luca (LPTHE - CNRS)

Presenter: MAXIA, Luca (LPTHE - CNRS)

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