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Gluon TMDs in quarkonium production at an EIC

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We describe two recent ideas to probe gluon TMDs in electron-proton collisions using quarkonium production. In the first one, we study the semi-inclusive production of a J/ψ or Υ meson in deep-inelastic scattering off a (un)polarized proton. In the regime where the small transverse momentum of the quarkonium is much smaller than the virtuality of the process, the cross section is directly sensitive to the gluon TMDs of the proton, which can be disentangled using the different azimuthal modulations that appear. We discuss the role of the long-distance matrix elements (LDMEs), which appear in the color octet production mechanism in non-relativistic QCD (NRQCD), and look at the low- x limit in which the gluon contribution is enhanced. Finally, we discuss recent progress in the calculation of quarkonium + jet production, where the quarkonium and the jet are almost back to back in the transverse plane

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