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Looking at the Transverse Momentum Dependent content of the proton with quarkonia

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Transverse Momentum Dependent (TMD) factorisation is a systematic method to account for transverse parton momentum inside hadrons. In this formalism, the partonic scattering amplitude ("short-distance part" evaluated with Feynman rules) remains unmodified. It is instead factorised with correlators containing the transverse dependence.

TMD distributions are of great interest to improve our understanding of parton dynamics inside hadrons. For high energy hadron collisions, in which gluon density prevails over quark, knowledge of these gluon distributions helps to get better predictions.

A good way to determine TMD gluon distributions is to study quarkonium production in high energy proton collisions. Considering different processes allows to extract various, complementary informations. The features of TMD factorisation extend the phenomenology, adding new azimuthal modulations, but also azimuthally-independent terms to the differential cross-section. We may be able to detect these effects in data of big experiments such as LHC. Their measure would give us estimates of the gluon distributions inside protons at high energies.

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