

TMDs - Transverse Connections Between Nuclear and Particle Physics

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Uncertainties generated by our ignorance of hadronic structure hamper precision calculations for high-energy scattering processes.

Transverse-momentum-dependent (TMD) distributions give a quantitative representation of hadronic structure in a three-dimensional momentum space and encode all the possible spin and momentum correlations between a hadron and its constituents.

Extractions of TMDs from hard scattering experiments rely both on the availability of multi-dimensional data sets and on the applicability of the TMD formalism.

In this talk I will report about recent progress in the formalism that can have an impact on the phenomenology of TMD distributions.

In particular, I will discuss which kinematic regions are most sensitive to the nonperturbative structure of the TMDs and which current and future experiments can provide data in these regions.

I will also discuss how to access quark and gluon TMD distribution and fragmentation functions in specific scattering processes and, finally, investigate what is the expected impact of TMDs on very high energy scattering processes, such as W boson production at the Large Hadron Collider.

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