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HIGH ENERGY PHYSICS COLLOQUIA

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THREE-DIMENSIONAL IMAGING OF THE NUCLEON

Abstract

Transverse momentum dependent parton distribution and fragmentation functions (TMDs) are fundamental objects that encode information on the intrinsic motion of quarks and gluons inside the nucleon. As such, they provide a three-dimensional picture of nucleons in momentum space. After describing the main features of TMDs and their phenomenological implications, we report on the first extraction of unpolarized quark TMDs through a simultaneous analysis of semi-inclusive deep-inelastic scattering, Drell-Yan and Z-boson hadroproduction processes. Several proposals to access the so-far basically unknown gluon TMDs are also discussed.

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