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3D structure of hadrons by high-energy exclusive processes

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Three dimensional (3D) structure of the nucleon has been investigated by generalized parton distributions (GPDs) and transverse-momentum-dependent parton distributions (TMDs). These distributions contain information on longitudinal momentum distributions of partons and transverse form factors. The GPDs have been measured by virtual-Compton and meson-production processes in lepton scattering. However, there is a possibility that the GPDs can be investigated at hadron facilities such as J-PARC by using $\pi N \rightarrow N' \mu^+ \mu^-$ and $NN \rightarrow N' \pi B$. First, possible GPD studies at hadron facilities are discussed. Next, the 3D studies could be extended to probe internal structure of exotic hadron candidates. Hard exclusive production of an exotic hadron should be used for determining the number of active constituents by the constituent-counting rule in perturbative QCD. The number of valence quarks should be reflected in the longitudinal parton distributions at medium and large x , and the transverse form factors contain information on exotic nature by the constituent-counting rule. We also suggest that generalized distribution amplitudes (GDAs), which are investigated by the s - t crossed process to the virtual Compton, should be appropriate quantities for determining the internal structure of hadrons.