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Probing the onset of QCD's Hard-Soft Factorization via Deep Exclusive Meson Production

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The conventional picture of the hadron, in which partons play the dominant role, predicts a separation of short-distance (hard) and long-distance (soft) physics, known as 'factorization'. It has been proven that for certain processes, at sufficiently high Q^2, the reaction amplitude factorizes into a hard part, representing the interaction of the incident virtual photon probe with the parton, and a soft part, representing the response of the nucleon to this interaction. One class of such processes is Deep Exclusive Meson Production (DEMP), which provide access to a novel class of hadron structure observables known as Generalized Parton Distributions (GPDs). Unifying the concepts of parton distributions and of hadronic form factors, GPDs correlate different parton configurations in the hadron at the quantum mechanical level, and contain a wealth of new information about how partons make up hadrons. However, access to such GPD information requires that the 'factorization regime' has been reached kinematically, and this can be tested only experimentally. I will summarize prior and planned tests of the validity of GPD factorization in DEMP reactions, such as exclusive pion and kaon production, using the Jefferson Lab Hall C apparatus.

Keyword-1

hadrons/QCD

Keyword-2

electron scattering

Keyword-3

Author: Prof. HUBER, Garth

Presenter: Prof. HUBER, Garth

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