Hard Pion Electroproduction at Medium Energies

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Hard or high transverse momentum pion electroproduction, $ep \to e\pi X$, can be a tool for probing the parton structure of the beam and target, if perturbatively calculated processes dominate the cross section. For the real photon equivalent, the soft processes, estimated by vector meson dominance and data based parameterizations of hadronic processes, are subdominant for high enough transverse momentum and incoming energies of a few $\times$ 10 GeV. We shall report on an off-shell version of the same comparison, knowing that soft processes fall quickly as the photon goes off-shell, to see if there are regions where the perturbative kernel may dominate even at, say, JLab energies. In addition to the semiexclusive processes being interesting in its own right, the perturbative kernel is the same as for a generalized parton distribution calculation of $ep \to e\pi p$, and our results may cast light on how well generalized parton distribution experiments at these energies can be analyzed.

Reference

[1] A. Afanasev, C. E. Carlson and C. Wahlquist, Phys. Rev. D **61**, 034014 (2000) [arXiv:hep-ph/9903493].