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The pion form factor and deep exclusive pion production¹

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Meson electroproduction data play an important role in our understanding of hadron structure and the dynamics that bind the basic elements of nuclear physics. Pion and kaon form factors are of particular interest as they are connected to the Goldstone modes of chiral dynamical symmetry breaking. The last decade saw a dramatic improvement in precision of charged pion form factor data and new results have become available on the pion transition form factor. Increasing the virtual photon mass in electron scattering experiments allows one to reach smaller distance scales. In this regime one becomes more and more sensitive to the partonic picture where hard and soft physics have been shown to factorize and Generalized Parton Distributions (GPDs) provide the most complete description of the non-perturbative physics. Recent data and prospects for deep exclusive pion electroproduction are presented. Experimental tests of our theoretical understanding of the reaction mechanism are shown including longitudinal-transverse separated charged-pion cross section data and ratios. The prospects to use projected charged- and neutral pion data to further determine the spin, charge-parity and flavor of GPDs, including the helicity-flip GPDs, are discussed.

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