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More Gluons in the Pion[1] PATRICK BARRY, North Carolina State University, NOBUO SATO, Old Dominion University, WALLY MELNITCHOUK, Jefferson Lab, CHUENG JI, North Carolina State University — Looking at the QCD-motivated picture of the pion, we can use parton distribution functions (PDFs) to describe the probability of finding a quark, antiquark, or gluon in the pion at a certain momentum fraction, x, and energy scale, Q^2. Because PDFs are universal in observables in which factorization occurs, we may use data from multiple QCD processes to shape them. In the case of pions, people have traditionally used Drell-Yan (DY) data to fit pion PDFs, but DY data only exist at large-x. In this region, the valence quark distributions are known to dominate. Any PDFs determined from DY data alone in the small$x$ region are mere extrapolations and cannot be trusted. More recently, we have used Leading Neutron (LN) data to shape the PDFs at small$x$. The determinations of these PDFs using both DY and LN datasets show that gluons contribute to 30% of the total momentum of the pion at the input scale compared with 10% from determinations using strictly DY data. Current work includes soft gluon resummation, which improves perturbative calculations in the DY process. Soft gluon radiation from quark lines contribute nontrivially to the cross-section at large-x, which helps to constrain the valence quark distribution as x goes to 1.

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