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Constraining the glue in the pion through Drell-Yan lepton-pair production

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Recently, a new global Monte Carlo analysis of parton distribution functions (PDFs) of the pion determined its valence quark distribution using Drell-Yan data from Fermilab and CERN and its sea quark and gluon PDFs from leading neutron electroproduction data from HERA [1]. While that analysis provided greater constraints at small parton momentum fractions x , the pion's gluon PDF remains poorly known at large values of x . In the present study, we explore the extent to which transverse momentum (p_T)-dependent Drell-Yan cross-section data can provide for greater sensitivity to the pion's gluon PDF at large x . We present the results of a combined QCD analysis of all available p_T -integrated and p_T -dependent pion data. This will provide the most complete imaging of the PDFs in the pion to date across all momentum fractions as well as serve as the first successful simultaneous fit of p_T -integrated and p_T -dependent pion data at low energies.

1. P. Barry et al., Phys. Rev. Lett. 121, 152001 (2018)

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