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How well do we know the neutron structure function?[1] JOHN ARRINGTON, JOSHUA G. RUBIN, Argonne National Lab, WALLY MELNITCHOUK, Jefferson Lab — Given a model of the nuclear effects in the deuteron, one can obtain the neutron structure function from a combination of proton and deuteron measurements. Historically, the results have been very sensitive to the details of the extraction, but recent works have shown that this is often the result of inconsistent kinematics between the calculations of nuclear effects and the structure function data. We present a detailed analysis of the uncertainty in the neutron F_{2n} structure function extracted from inclusive deuteron and proton deep-inelastic scattering data, including experimental uncertainties and the model dependence associated with the deuteron wave-function, the different convolution calculations for the deuteron, and the prescription for the off-shell corrections. We find a significantly smaller range of results than earlier comparisons. In addition to improving the extraction of the neutron structure, this also provided an important baseline that will allow future, model-independent extractions of neutron structure to be used to examine nuclear medium effects in the deuteron.

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