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Polarized electron-deuteron DIS with spectator nucleon tagging CHRISTIAN WEISS, Jefferson Lab, WIM COSYN, Florida International University — Polarized electron-deuteron DIS with detection of a spectator proton (spectator tagging) represents a unique method for extracting the neutron spin structure functions and studying spin-dependent nuclear modifications. The measured proton momentum fixes the nuclear configuration during the DIS process and enables a differential treatment of nuclear effects. We present a theoretical framework for polarized deuteron DIS with spectator tagging [1]. The spin density matrix formalism is used to describe general deuteron polarization (vector, tensor). Light-front quantum mechanics is employed to separate nuclear and nucleonic structure in the high-energy process. The spin-dependent light-front momentum distribution of the neutron in the polarized deuteron are computed and studied as functions of the tagged proton momentum. It is shown that the tagged proton momentum can be used to control the effective neutron polarization in the DIS process and eliminate D-wave depolarization. The free neutron structure functions can be obtained by pole extrapolation. Such measurements could be performed at the EIC with polarized deuteron beams and forward proton detectors. [1] W. Cosyn, C. Weiss, Phys. Rev. C 102, 065204 (2020)

Christian Weiss
Jefferson Lab

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