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Deuteron spin structure in inclusive and tagged spectator processes in the virtual nucleon approximation

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We discuss a model based on the virtual nucleon approximation used to describe DIS from a polarized deuteron. As the deuteron is a spin 1 hadron, it gives rise to additional observables compared to the spin 1/2 nucleon that provide new opportunities for spin studies.

For inclusive processes we concentrate on the A_{zz} observable which can be connected to the tensor b_1 structure function. We discuss the importance of higher twist contributions in Hermes and Jlab12 kinematics and show estimates for the effect of nuclear final-state interactions.

For tagged spectator processes, we derive the general form of the SIDIS cross section for a polarized spin 1 target. Through the technique of “pole extrapolation”, this process could enable high-precision, model independent extraction of neutron (spin) structure at an electron-ion collider with polarized deuteron beams. Simulations are shown that support this.

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