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Quasi-Elastic dd Processes at the SPD as a Probe of Spin Dependent Nucleon Scattering

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Interpretation of the spin observables in nuclear collisions data require spin dependent nucleon scattering (pp and pn) amplitudes. These quantities can be extracted from the asymmetries in the polarized pd collisions. At the SPD, although the asymmetric pd collisions are unlikely, the desired quantities can still be accessed via the quasi-elastic scattering $dd \rightarrow npd$ from the collisions of polarized deuteron beams. It has been proven [1] that the asymmetries measured from polarized dd process, under the S-wave Impulse Approximation, are directly related to the relevant counterparts from the desired pd process. This work used an event generator based on unpolarized Glauber cross-sections and Geant4 detector simulation to study the feasibility and statistical accuracy of measurements of the relevant vector and tensor polarized asymmetries like A_y , A_{yy} , $C_{y,y}$, $C_{yy,y}$ at the SPD during the first stage of operations.

[1] Y. N. Uzikov, Phys. Part. Nucl. Lett. 22, no.6, 1392-1397 (2025)

Primary author(s) : DATTA, Amaresh (JINR)

Presenter(s) : DATTA, Amaresh (JINR)

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