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Beam Polarization Correction for Neutron-Deuteron Scattering Cross Section KIMBERLY BODDY, TAYLAN AKDOGAN, MAXIM CHTANGEEV, WILBUR FRANKLIN, JOHN HOUGH, JUNE MATTHEWS, Massachusetts Institute of Technology — An MIT-led collaboration has performed a measurement of the differential cross section for neutron-deuteron elastic scattering at the WNR facility of the Los Alamos Neutron Science Center. The linear accelerator provides an 800 MeV, unpolarized proton beam, which is directed toward a tungsten spallation source to produce beams of high energy neutrons. The neutrons are polarized due to spin-orbit interactions between the proton beam and the tungsten nuclei. In our experiment, a collimated neutron beam is incident on a liquid deuterium target, and the incident neutron energy is determined from time of flight information. The neutron-deuteron scattering cross section is measured by observing the scattered neutrons and recoiling deuterons in coincidence using an array of plastic and CsI scintillators. After a correction to the data to take the polarization of the neutron beam into account, the results are compared to previous nd and pd experimental results and to theoretical predictions that suggest the differential cross section at large angles is sensitive to a three-nucleon force.

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