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Spin-Dependent Electron Scattering from Deuterium at BLAST[1]

DOUGLAS HASELL[2], Massachusetts Institute of Technology

The BLAST experiment, at the MIT-Bates Linear Accelerator Laboratory, was designed to study in a systematic manner the spin-dependent, electro-magnetic interaction in few-nucleon systems at momentum transfers below 1 GeV/c. In 2004 BLAST collected approximately 170 pb^{-1} of data with polarized electrons scattering from polarized deuterium at a beam energy of 850 MeV. The beam polarization was typically 65%. An internal gas target of isotopically pure, polarized deuterium was produced by an atomic beam source. Typical polarizations of around 75% for vector and 70% for tensor were achieved. The BLAST detector is a large acceptance general purpose detector based on a toroidal magnetic field with an approximate left-right symmetry. The trigger and data acquisition system allows simultaneous measurements of several reaction channels. Reversing the beam helicity each fill and frequent changing of the target polarization during each fill minimizes systematic errors and allows measurements to be made of both beam and target asymmetries for kinematics approximately parallel and perpendicular to the target polarization. The data are being analyzed for elastic eD scattering as well as quasi-elastic ($e'p$ and $e'n$) and inclusive channels. Preliminary results will be presented from each of these analyses. These results will include new information on the deuteron form factors as well as the extracted neutron form factors G_E^n and G_M^n. These results will be compared with existing data and current theoretical calculations.

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[2]for the BLAST Collaboration