

Measurement of Vector and Tensor Asymmetries in Quasielastic Electron Scattering from Deuterium

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The measurement of the beam-vector and tensor asymmetries in quasielastic electrodisintegration of the deuteron at the MIT-Bates Linear Accelerator Center up to missing momentum of 500 MeV/c. Data were collected simultaneously over a momentum transfer range $0.1 < Q^2 < 0.5$ (GeV/c)² with the Bates Large Acceptance Spectrometer Toroid using an internal deuterium gas target, polarized sequentially in both vector and tensor states. The data are compared with calculations. The beam-vector asymmetry is found to be directly sensitive to the D-wave component of the deuteron and have a zero-crossing at a missing momentum of about 320 MeV/c, as predicted. The tensor asymmetry A at large missing momentum is found to be dominated by the influence of the tensor force in the neutron-proton final-state interaction. The new data provide a strong constraint on theoretical models.

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