

**PR12-13-011: *The Deuteron Tensor Structure
Function b_1***

J.W. Van Orden, W. Melnitchouk

This proposal is based on the letter of intent LOI-11-003 from PAC 37. The objective is to measure the b_1 structure function, which is proportional to the P_{zz} tensor polarization of the deuteron, and should therefore be sensitive to collective properties of the deuteron that could provide new information on configurations not accessible from experiments on the proton. Data from HERMES, albeit with relatively large error, and several calculations suggest that b_1 may be sizable, and there exists the possibility that new information on the QCD structure of the deuteron may be obtained from such measurements. With very little experimental information currently available, any new data on b_1 would be clearly welcome.

The proposed experiment would measure b_1 over the approximate range $0.15 < x < 0.5$, overlapping with the three highest- x points from HERMES. Since there may be sizable contributions from the unmeasured region, $x < 0.15$ and $x > 0.5$, it is not clear that a meaningful measurement of the integral (Close-Kumano sum rule) can be made, however. Measurement of b_1 over a restricted x range would nevertheless be interesting.

Some quantities in the proposal could be clarified or at least defined; e.g. δQ_s in Eq. (14). The authors should also be aware of the calculation of Nikolaev and Schaefer, Phys. Lett. B398 (1997) 245, for the double scattering contributions to b_1 .