New precision results on the spin structure function g_1^{d}

Hermes Collaboration

The HERMES experiment studies the spin structure of the nucleon using the 27.6 GeV longitudinally polarized positron beam of HERA and an internal target of pure gases. Recently, Hermes presented preliminary results on the deuteron spin structure function g1d in the kinematic range 0.0021 ¡x¡0.85 and 0.1¡Q2¡20 GeV2 based on a restricted data set. Here, new, precise results will be presented using the superior statistics of the 2000 data taking period. The reduction of the systematic uncertainty which could be achieved in this preliminary analysis relies mainly on the excellent performance of the target. The data will be discussed in comparison with previous measurements performed at SLAC and CERN.

Furthermore, deuteron data have been taken using a dedicated target running mode with high tensor polarization. This allows for the first time to constrain the so far unknown tensor-polarized structure function b_1^{d}, a new leading twist function that occurs in case of scattering unpolarized electrons off a polarized spin-1 target[1].

References

[1] P. Hoodbhoy, R. L. Jaffe and A. Manohar, Nucl. Phys. **B 312** (1989) 571.
K. Bora, and R. L. Jaffe, arXiv: hep-ph/9711323 (1997).