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INCLUSIVE AND SEMI-INCLUSIVE RESULTS FROM THE HERMES EXPERIMENT AT DESY

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ABSTRACT

The study of the spin structure of the nucleon is the principle object of the HERMES experiment. Preliminary results of the inclusive proton asymmetry and of the deep inelastic contribution to the generalized GDH integral for proton, as well as pion asymmetries and polarised quark distributions from semi-inclusive measurements are presented.

1 The HERMES experiment

HERMES (**HERA MEasurement of Spin**) is an experiment designed to study in a precise and complete way the spin structure of the nucleon by deep inelastic scattering (DIS) of polarised positrons from polarised protons and neutrons [1, 2]. Simultaneously, both inclusive and semi-inclusive spin dependent scattering are measured to high precision with good particle identification. Moreover, by measuring semi-inclusive channels HERMES is able to disentangle the spin contributions of different quark flavours and possible also of gluons, with good chances of solving the spin puzzle [3].

2 Inclusive results

The HERMES measurement of g_1^n from the 1995 data have been reported in [2]. The preliminary result on the proton asymmetry A_1^p and on the structure function g_1^p are shown in fig. 1. The results are in agreement with the SLAC data [4]. The same data have been used for the determination of the DIS contribution to the generalised GDH

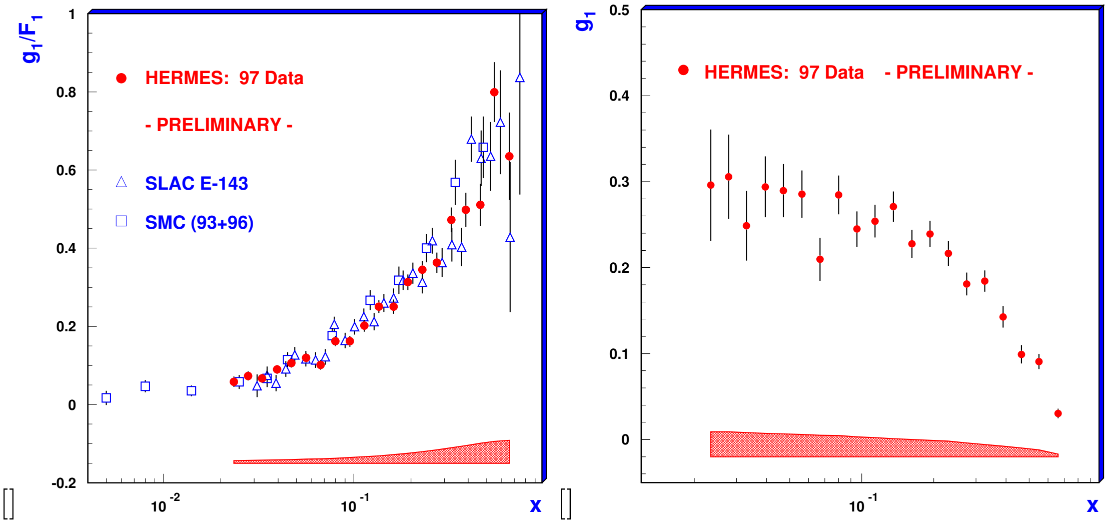

Figure 1: HERMES preliminary measurement of the longitudinal asymmetry $A_1^p \approx g_1^p(x)/F_1^p(x)$ in comparison with SMC and SLAC data and preliminary g_1^p.

integral $I(Q^2)$ for the proton. It has been found that for $Q^2 \geq 1$ GeV^2, the contribution is at least of the same order of magnitude as the existing phenomenological predictions for the resonance part of $I(Q^2)$. Therefore measurements above the resonance region are necessary to give an accurate determination of the integral $I(Q^2)$.

3 Semi-inclusive results

Semi-inclusive measurements with detection of leading pions and kaons in coincidence with the scattered lepton offer a means of "flavour-tagging" the struck quark to help isolate the contributions to the nucleon spin of the individual quark flavours, including the sea quarks. This is a central theme of the HERMES experiment which can identify pions and will add kaon identification for 1998. Preliminary results from measurements of semi-inclusive asymmetries on the proton and a comparison between the normalised polarised quark distributions from HERMES and SMC are shown.

References

1. HERMES Collaboration, Technical Design Report, DESY-PRC **93/06** (1993).
2. K. Ackerstaff et al., Phys. Lett. **B404** 383 (1997).
3. V. Hughes and C. Cavata, *Symposium on the internal spin structure of the nucleon* - Yale University 1994, World Scientific (1995).
4. K. Abe et al., Phys. Rev. Lett. **74**, 346 (1995).