

APR06-2006-000580

Abstract for an Invited Paper
for the APR06 Meeting of
the American Physical Society

Parity-violating electron scattering on hydrogen and helium and strangeness in the nucleon

PAUL SOUDER, Syracuse University

Parity violation in elastic electron scattering is sensitive to possible strange quark contributions to the vector structure of the nucleon, and thus provides an opportunity to isolate effects of the $q\bar{q}$ sea. The small parity-violating asymmetry in the cross section for the scattering of polarized electrons, which arises from $\gamma - Z$ interference, when combined with the known electromagnetic form factors, provides access to strange quark matrix elements. The HAPPEX collaboration in Hall A at Jefferson Lab has measured the parity-violating asymmetry in the scattering of longitudinally-polarized 3 GeV electrons from both hydrogen and ^4He cryogenic targets, at a small scattering angle (6°) and low four-momentum transfer ($Q^2 = 0.1 \text{ GeV}^2$). The asymmetry for hydrogen is a function of a linear combination of G_E^s and G_M^s , the strange quark contributions to the electric and magnetic form factors of the nucleon respectively, and that for ^4He is a function solely of G_E^s . The combination of the two measurements therefore allows G_M^s and G_E^s to be separately determined. Preliminary results will be presented from the complete data set, obtained in runs in 2004 and 2005, yielding results of unprecedented precision.