High Q^2 Neutral Current interactions at H1 and an extraction of $x\tilde{F}_3$.

by

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Abstract

A measurement is presented of the inclusive e^+p neutral current cross section, measured single and double differentially, as a function of Q^2 and Bjorken-x. The data used for this measurement were taken by the HERA detector H1 in the 1999-2000 data-taking period, at a centre of mass energy of $\sqrt{s} = 319$ GeV and corresponding to an integrated luminosity of $\mathcal{L} = 65.2$ pb^{-1}.

An overview of the phenomenology of deep inelastic scattering is given, the experimental apparatus is described and the measurement and analysis procedures are detailed. The neutral current cross section is measured single differentially as a function of Q^2 and x and also double differentially. The cross sections were obtained using an Object Orientated analysis framework and the results were found to be compatible with published data obtained in an independent analysis. The parity violating generalised structure function $x\tilde{F}_3$ is extracted from the measured cross section and compared to the latest published values for the measurement. The analysis results are found to be consistent with the Standard Model expectation, both in terms of QCD and electroweak effects.

In 2002 the HERA accelerator and H1 detector were upgraded. The first data after the upgrade are presented, along with a description of the HERA II data quality efforts.