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Proton Structure Function xF_3 from Charged Lepton Scattering

— •Burkard Reisert, Vladimir Chekelian and Ana Dubak — Max-Planck-Institut für Physik (Werner-Heisenberg-Institut), Föhringer Ring 6, 80805 München

Inclusive e^-p cross sections for neutral current processes are measured with the H1 detector at HERA, in the range of four-momentum transfer squared Q^2 between 100 and 30000 GeV^2, and Bjorken x between 0.0013 and 0.65. The data were taken in 1998 and 1999 with a center-of-mass energy of 320 GeV and correspond to an integrated luminosity of 16.4 pb^{-1}. The data are compared with recent measurements of the inclusive neutral current e^+p cross sections. Clear evidence is observed for an asymmetry between e^-p and e^+p neutral current scattering and the structure function $x\tilde{F}_3$ is extracted. The Standard Model predictions are found to be in good agreement with data. A sum rule is derived for the structure function $xF_3^{\gamma Z}$ measured in charged lepton scattering which is the analogue of the Gross Llewellyn-Smith sum rule for neutrino-nucleon scattering.

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Email:	reisert@mppmu.mpg.de
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