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Combination and QCD Analysis of the HERA Inclusive Cross Sections

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Combined Measurement of Neutral and Charged Current Cross Sections at HERA
A combination is presented of the inclusive cross sections measured by the H1 and ZEUS Collaborations in neutral and charged current deep-inelastic ep scattering at HERA. The combination uses data from unpolarised ep scattering taken during the HERA-I phase as well as measurements with longitudinally polarised electron or positron beams from the HERA-II running period. The combination method takes the correlations of systematic uncertainties into account. The inclusion of the large HERA-II data set leads to an improved uncertainty especially at large four momentum transfer squared Q^2.

Combined measurement of the Inclusive e+p Scattering Cross Sections at HERA for Reduced Proton Beam Energy Runs and Determination of the Structure Function F_L
A combination of the inclusive deep inelastic cross sections measured by the H1 and ZEUS Collaborations for ep scattering with nominal and reduced proton-beam energies, Ep=920 GeV, Ep=460 GeV and 575 GeV, is presented. The combination method used takes the correlations of systematic uncertainties into account, resulting in improved accuracy. From the combined data the proton structure function, F_L, is extracted in the region of 2.5 < Q^2 < 800 GeV^2.

Combined Measurement and QCD Analysis of the Inclusive ep Scattering Cross Sections at HERA
A combination is presented of the inclusive deep inelastic cross sections measured by the H1 and ZEUS Collaborations in neutral and charged current unpolarised ep scattering at HERA during the period 1994-2000. The data span six orders of magnitude in negative four-momentum-transfer squared, Q^2, and in Bjorken x. The combination method used takes the correlations of systematic uncertainties into account, resulting in an improved accuracy. The combined data are the sole input in a NLO QCD analysis which determines a new set of parton distributions, HERAPDF1.0, with small experimental uncertainties. This set includes an estimate of the model and parametrisation uncertainties of the fit result.

PDF fits including HERA data with reduced proton beam energy
A QCD fit analysis to the combined HERA-I inclusive deep inelastic cross sections measured by the H1 and ZEUS collaborations for ep scattering, including the HERA-II measurements with reduced proton-beam energies, Ep = 460GeV and Ep = 575GeV, is presented. The effect of including the new data on the determination of HERA parton distribution functions is analysed, using fits similar to those performed for HERAPDF1.0. Some tension of the QCD fit with respect to the data is identified in the kinematic region of low Q^2 and low x. Furthermore, the data show sensitivity to various schemes of treating heavy flavours.

PDF fits including HERA-II high Q^2 data
The QCD fit analysis of the combined HERA-I inclusive deep inelastic cross sections has been extended to include combined HERA II measurements at high Q^2. The effect of including these data on the determination of parton distribution functions is analysed, using fits similar to those performed for HERAPDF1.0. The precision of the PDFs at high-x is considerably improved- particularly in the valence sector.

Primary author: THE H1 AND ZEUS COLLABORATIONS

Presenter: RADESCU, Voica Ana Maria (Deutsches Elektronen Synchrotron (DESY))

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