

# Combination of H1 and ZEUS Deep Inelastic ep Scattering Cross Section Measurements and NLO-QCD analysis

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Deep inelastic scattering cross section measurements previously published by the H1 and ZEUS collaborations are combined. The procedure takes into account the systematic error correlations in a coherent approach, leading to a significantly reduced overall cross section uncertainty by cross calibrating the various data sets. The analysis is based on data with momentum transfers  $Q^2 > 0.045 \text{ GeV}^2$  collected by the H1 and ZEUS collaborations between the years 1995 and 2000. This combined HERA-I data set, of neutral and charged current inclusive cross sections for e+p and e-p scattering, is used as the sole input for a next-to-leading order (NLO) QCD parton distribution function (PDF) fit. The consistent treatment of systematic uncertainties in the joint data set ensures that experimental uncertainties on the PDFs can be calculated without need for an increased  $\chi^2$  tolerance. This results in PDFs with greatly reduced experimental uncertainties compared to the separate analyses of the ZEUS and H1 experiments. Model uncertainties, including those arising from parametrization dependence, are also carefully considered. The resulting HERA PDFs have impressive precision compared to the global fits.

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