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HERAPDF

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A preliminary global NLO QCD analysis of the HERA data is presented. The following data sets are used in this analysis:
the NC and CC inclusive DIS cross sections obtained from the combination of the measurements from H1 and ZEUS based on HERA I and HERA II data at the nominal proton beam energy, the preliminary combined inclusive NC DIS cross sections at reduced proton beam energies, the inclusive jet cross sections from H1 and ZEUS and the preliminary combined HERA results on the structure function F2(charm).

A NLO QCD PDF fit analysis with simultaneous determination of the strong coupling constant $\alpha_s(M_Z)$ is presented. The analysis is based on the same combined H1 and ZEUS inclusive DIS measurements as HERAPDF1.5 fit, together with jet measurements provided by both H1 and ZEUS collaborations. The inclusion of jet data in the analysis significantly reduces the correlation etween the gluon parton density function and the strong coupling, improving the precision of the gluon PDF and providing an accurate determination of $\alpha_s(m_Z)$.

The PDF set HERAPDF1.5 represents the QCD analysis of the combined HERA I including the preliminary combination of the HERA II data. Such, higher precision at high Q2 and high x is achieved. The precision of the PDFs at high x is significantly improved, particularly in the valence sector. The results of the NNLO fit variant are presented: the PDFs and their uncertainties. The fit was performed with 14 free PDF parameters. There are also comparisons to the previous HERAPDF1.0 NNLO PDF, based on HERA I data only, and to the new HERAPDF1.5f, which is a NLO version with also 14 free parameters in the fit.

A next-to-leading order QCD analysis is performed based on the preliminary combination of the H1 and ZEUS F2c measurements together with the published HERA inclusive neutral and charged current cross sections. Different variable flavour number schemes were used for the heavy flavour treatment. The fits are used to estimate the optimal value of the charm quark mass parameter mcˆmodel within a given heavy flavour scheme. Depending on the scheme, the optimal values of mcˆmodel range between 1.26 GeV and 1.68 GeV, and are determined with a precision of 0.04 GeV including statistical, model and parameterisation uncertainties.The parton distribution functions determined using the above heavy quark schemes at their optimal values of mcˆmodel are further used to predict the W± and Z production cross sections at the LHC. Good agreement between these predictions for the W± and Z cross sections is observed which allows to reduce the uncertainty due to the heavy flavour treatment, to below 1.0%.

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