

Impact of jet-production data on the next-to-next-to-leading-order determination of HERAPDF2.0 parton distributions

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The HERAPDF2.0 ensemble of parton distribution functions (PDFs) was introduced in 2015. The final stage is presented, a next-to-next-to-leading-order (NNLO) analysis of the HERA data on inclusive deep inelastic ep scattering together with jet data as published by the H1 and ZEUS collaborations. A perturbative QCD fit, simultaneously of $\alpha_S(M_Z^2)$ and the PDFs, was performed with the result $\alpha_S(M_Z^2) = 0.1156 \pm 0.0011$ (exp) $^{+0.0001}_{-0.0002}$ (model +parameterisation) ± 0.0029 (scale). The PDF sets of HERAPDF2.0Jets NNLO were determined with separate fits using two fixed values of $\alpha_S(M_Z^2)$, $\alpha_S(M_Z^2) = 0.1155$ and 0.118 , since the latter value was already chosen for the published HERAPDF2.0 NNLO analysis based on HERA inclusive DIS data only. The different sets of PDFs are presented, evaluated and compared. The consistency of the PDFs determined with and without the jet data demonstrates the consistency of HERA inclusive and jet-production cross-section data. The inclusion of the jet data reduced the uncertainty on the gluon PDF. Predictions based on the PDFs of HERAPDF2.0Jets NNLO give an excellent description of the jet-production data used as input.

Submitted on behalf of a Collaboration?

Yes

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