New parton distributions in fixed flavour factorization scheme from recent deep-inelastic-scattering data

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In this article we present the results of our QCD analysis for the proton structure function $F_2^p(x, Q^2)$ in order to determine the parton distributions at the next-to-leading order (NLO). The heavy quark contributions to the proton structure function $F_2^i(x, Q^2)$, with $i = c, b$ have been added to the present analysis within the framework of the so called 'fixed flavour number scheme' (FFNS) parton model predictions at high energy colliders. The obtained results in the FFNS are compared with available reported results such as the general-mass variable-flavour-number scheme (GM-VFNS) and other prescriptions used in global fits of PDFs. In the present QCD analysis, we use a wide range of the inclusive neutral-current deep-inelastic-scattering (NC DIS) world data, especially the most recent data for charm F_2^c, bottom F_2^b, longitudinal F_L structure functions and also reduced DIS cross sections $\sigma_{r,NC}^{\pm}$, from HERA experiments. The most recent HERMES data for proton and deuteron structure functions also added. On the other hand we take into account ZEUS neutral current $e^{\pm}p$ DIS inclusive jet cross section from HERA together with the recent Tevatron Run-II inclusive jet cross section data from CDF and DØ. The impact of these recent DIS data on the PDFs extracted from the global fits are studied. We present two families of PDFs, KKT12 and KKT12C, without and with HERA 'combined' data sets on $e^{\pm}p$ DIS, which are in good agreement with the available theoretical models.

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