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An investigation of the HERA combined data at low Q^2

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In the HERAPDF2.0 PDF analysis it was noted that the fit chi^2 worsens significantly at low Q^2 for both NLO and NNLO fits. The turn over of the reduced cross section at low-x and low Q^2 due to the contribution of the longitudinal cross section F_L is also not very well described. In this paper the prediction for F_L is highlighted and the corresponding extraction of F_2 from the data is further investigated, showing discrepancies with description of HERAPDF2.0 at low x and Q^2. The effect of adding a simple higher twist term of the form ~constant/Q^2 to the description of F_L is investigated. This results in a significantly better description of the reduced cross-sections, F2 and FL at low x, Q^2 and a significantly lower χ^2 for the NNLO fit as compared to the NLO fit. This is not the case if the higher twist term is added to F_2.

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