HERAPDF2.0

June 21st : arXiv:1506:06042

https://www.desy.de/h1zeus/herapdf20/

Data tables in HERAFitter format, including all sources of correlated uncertainties. [all data files in one tarball]

Individual Data tables in ASCII format. Please check the [README] in order to see how to use the correlated systematic uncertainties.
[Neutral Current e^-p E_p=920 GeV]
[Neutral Current e^+p E_p=460 GeV]
[Neutral Current e^+p E_p=575 GeV]
[Neutral Current e^+p E_p=820 GeV]
[Neutral Current e^+p E_p=920 GeV]
[Charged Current e^-p E_p=920 GeV]
[Charged Current e^+p E_p=920 GeV]

LHAPDF grids in LHAPDF6 format (unpack with *tar xvfz* before using)

HERAPDF2.0 (NNLO and NLO, RT-OPT scheme) Nominal fit

- HERAPDF20_NNLO_EIG NNLO fit - experimental uncertainties
- HERAPDF20_NNLO_VAR NNLO fit - model and parametrisation uncertainties
- HERAPDF20_NNLO_ALPHAS NNLO fit - alphas variations
- HERAPDF20_NLO_EIG NLO fit - experimental uncertainties
- HERAPDF20_NLO_VAR NLO fit - model and parametrisation uncertainties
- HERAPDF20_NLO_ALPHAS NLO fit - alphas variations

HERAPDF2.0HiQ2 (RT-OPT scheme, Q^2>10 GeV^2)

HERAPDF20_HiQ2_NNLO_EIG NNLO fit - experimental uncertainties
HERAPDF20_HiQ2_NLO_EIG NLO fit - experimental uncertainties
HERAPDF20_HiQ2_NNLO_VAR NNLO fit - model and parametrisation uncertainties
HERAPDF20_HiQ2_NLO_VAR NLO fit - model and parametrisation uncertainties

HERAPDF2.0AG (LO, NLO and NNLO, RT-OPT scheme, non-negative gluon)

HERAPDF20_LO_EIG LO fit - experimental uncertainties
HERAPDF20_AG_NLO_EIG NLO fit - experimental uncertainties
HERAPDF20_AG_NNLO_EIG NNLO fit - experimental uncertainties

Fixed Flavour Number Schemes

HERAPDF2.0FF3A (fixed-flavour-number scheme, variant A)

HERAPDF20_NLO_FF3A_EIG NLO fit - experimental uncertainties

HERAPDF20_NLO_FF3A_VAR NLO fit - model and parametrisation uncertainties

HERAPDF2.0FF3B (fixed-flavour-number scheme, variant B)

HERAPDF20_NLO_FF3B_EIG NLO fit - experimental uncertainties)

HERAPDF20_NLO_FF3B_VAR NLO fit - model and parametrisation uncertainties

Fits with jet data, charm data and free $\alpha_S(M_Z)$

HERAPDF2.0Jets (RT-scheme, also including HERA jet and HERA charm data)

HERAPDF20_Jets_NLO_EIG NLO fit - experimental uncertainties

HERAPDF20_Jets_NLO_VAR NLO fit - model and parametrisation uncertainties

Requirements for PDFs o be included in the META/CMC PDFs
Check-list that these are fulfilled by HERAPDF2.0

1. Are based on published data accompanied by a published paper **arXiv:1506.06042**
2. Theoretical cross sections are evaluated up to two loops in \alpha-s: **yes NNLO as well as NLO versions exist**
3. In a general –mass variable flavour scheme with up to 5-flavours: **yes Thorne-Roberts Optimized**
4. Using benchmarked code: **yes QCDNUM**
5. The central value **of \alpha_s(M_Z) =0.118**
6. **Additional sets are available for 0.117 and 0.119** (as well as many other values in the _ALPHAS sets)
7. **Charm and beauty pole masses are used compatible with world average values** (and variations are supplied)
8. **Jets are only included for HERA data and to NLO**, not at NNLO
9. **Experimental errors are evaluated using \Delta\chi^2=1 in the _EIG sets** but **other sorts of variation are available in the _VAR sets**. Experimental correlated systematic errors have been included using the standard procedure (**and are usually multiplicative**)
10. **For the _EIG sets the Hessian method should be used**. There is a central set mem=0 and 28 further sets representing 14 eigenvectors
11. **For the _VAR sets there is a central set plus 13 variations, we suggest the following:**

The central mem=0 of the _VAR sets is the same as for the EIG set

NNLO central (fs=0.4,mb=4.5,mc=1.47,q20=1.9,q2min=3.5,a_s(MZ)=0.118) ;

NLO central has the same settings except mc=1.43

The next 12 variations mem=1,12 of the VAR set represent up and down variations of model parameters and can thus be treated like the EIG,

so take VAR 1,2 as and add it to EIG as EIG 29,30 and so on as follows:

EIG 29, 30: mem=1 => fs=0.3; mem=2 => fs=0.5;

EIG 31, 32: mem=3 => fs=hermesfs-03; mem=4 => fs=hermesfs-05

EIG 33, 34: mem=5 => q2cut=2.5; mem=6 => q2cut=5.;

EIG 35, 36: mem=7 => mb=4.25; mem=8 => mb=4.75;

EIG 37, 38: mem=9 => mc=1.41; mem=10 => mc=1.53; NNLO

EIG 37, 38: mem=9 => mc=1.37(Q^2_0=1.6); mem=10 => mc=1.49; NLO

EIG 39, 40: mem=11 => Q^2_0=1.6; mem=12 =>Q^2_0=2.2 (mc=1.53/1.49);

(Choices 33,34 and 39,40 do not really reflect variations corresponding to 1sigma precision, as they are just ad hoc choices, but we think it is simplest to consider them as EIG)

for variation 13: mem=13 => has an additional parameter Duv

there are 2 options:

i) conservative way -symmetrise mem=13 => (Duv) around the central taking EIG 41 and 42 as down and up with modulus of the variation of mem=13 to central.

ii) asymmetric error with EIG 41 = central, EIG 42=variation up mem=13 => (Duv))

We think option ii) is probably best.