

HERAFitter: Releases and Updates

December, 2013

HERAFitter versions are labeled as **herafitter-i.j.k** where **i** is the stable release number, **j** is beta release number, and **k** is bug fixes.

Release	Date	Description
herafitter-1.0.0	10.12.2013	<ul style="list-style-type: none">• Added possibility to change the name of the output directory in <code>steering.txt</code>• Added a dummy reaction type for testing data formats.• Centralised implementation of the scale variations for the DIS processes.• Enabled possibility to perform LO PDF fits.• Added possibility to determine generalised minima based on multiple sampling of <code>minuit</code> files.• Improved quantitative comparison of data to predictions by adding:<ul style="list-style-type: none">– Possibility to include PDF uncertainties in the χ^2 evaluation;– Possibility to use external predictions as text les (similar format style as for data) in the χ^2 evaluation;• Added more options for χ^2 representation:<ul style="list-style-type: none">– Use of covariance and/or correlation matrix (statistical or systematic);– Use of parabolic approximation for asymmetric uncertainties.• Considerable improvements in the drawing tools:<ul style="list-style-type: none">– Added new executable to draw PDFs: <code>DrawPdfs</code>;– Added possibility of multiple overlays, each PDF can be plotted separately;– Possibility to visualise the pulls (only for data sets that provide bin ranges).• Possibility to fit Lead PDF;• Improved interface to Transverse Momentum Distributions (TMDs):<ul style="list-style-type: none">– Evolution is fully integrated into <code>HERAFitter</code>;– Evolution of valence quarks is also included;– Calculation of the longitudinal cross-section is also included;• Simplified interface to the parametrisation style;• Fixes to the LHAPDF reweighted PDFs due to random seed generator causing large fluctuations.• New generalised <code>APPLGRID</code> interface:<ul style="list-style-type: none">– Added parser to identify theory expressions;– Added possibility to select the values for the CKM matrix elements from <code>APPLGRID</code> or <code>HERAFitter</code> .– Added possibility to flag a data bin to be excluded from the fit.• Tool to convert covariance matrix to nuisance parameter representation.

Release	Date	Description
herafitter-0.3.1	11.06.2013	<ul style="list-style-type: none"> • Fixing interface with LHAPDF when fitting only α_S • Fixing the floating point error for negative predictions in χ^2 calculation • Fixing the treatment of the statistical correlations • Fixing treatment for asymmetric uncertainties
herafitter-0.3.0	26.03.2013	<ul style="list-style-type: none"> • The <code>theoryfiles</code> directory is detached from the release (to be downloaded separately) • Added via automake tools a <code>make check</code> to test sanity of the codes. • Added a User Example directory for reference outputs. • Inclusion of more data sets (like CMS, Tevatron). • Implemented a treatment for asymmetric systematic uncertainties. • Added updates to ACOT code which include higher order contributions for F_2 and F_L. • Added new dipole models. • Implementation of treatment for the unintegrated PDFs (or TMDs). • Reorganisation of the χ^2 module, the old style is preserved and it should be used for the offset method and covariance matrix for chisquare representation. • Implementation of PDF reweighting based on eigenvectors. • Added new parametrisation styles and regularisation techniques. • A New FastNLO format was introduced.

Release	Date	Description
herafitter-0.2.1	13.07.2012	<ul style="list-style-type: none"> • Fixing the RT Fast scheme: the k-factors were determined for single point instead for each data point which is now fixed.
herafitter-0.2.0	9.05.2012	<ul style="list-style-type: none"> • New implementation of RT scheme (VFNS): Standard and Optimal NLO and NNLO. • New module for heavy flavour treatment using VFNS ACOT scheme using k-factor technique. Different variants of ACOT scheme available, as well as ZM-VFNS. • New module for heavy flavour treatment using FFNS ABM scheme. • New module for DIPOLE models (GBW, IIM). • New Hathor module for $t\bar{t}$ cross section calculation - optional via configure flag. • New Diffractive module for fits to diffractive data. • New data sets from HERA, Fixed target experiments, Tevatron and LHC. • New interface to LHAPDF to access external PDFs for prediction estimation - optional via configure flag. • New module for NNPDF reweighting tool - optional via configure flag. • New addition for error handling providing a summary of errors. • Improved interface to FASTNLO module via FASTNLOREADER. • Improved interfaces between QCDNUM and cross-section calculation codes. PDF caching mechanisms for faster computations. • Improved modularity of the structure by separating the chisquare definition from minimisation routine. • New common interfaces to access PDFs and alphas, in interface/src . • Improved handling of PDF parametrisation, in src/pdf_param.f . • Centralised passing of the constants to EW module via ewparam.txt card. • New implementation for scale variation for APPLGRID and FASTNLO via steering.txt card
herafitter-0.1.0	15.09.2011	<ul style="list-style-type: none"> • Initial release