

# HERAFitter Users Meeting



- **HERAFitter-0.3.0 release**
  - new features
  - documentation
- Status of HERAverage
- Post HERAFitter-0.3.0 developments

## Today's agenda:

26.03.2013

Tuesday, 26 March 2013

- |               |  |
|---------------|--|
| 14:00 - 14:30 | HERAFitter BETA-3 30'<br>Speakers: Ringaile Placakyte (Deutsches Elektronen-Synchrotron (DE)), Voica Ana Maria Radescu (Deutsches Elektronen-Synchrotron (DE)) |
| 14:30 - 14:50 | QCDNUM update 20'<br>Speaker: Michiel Botje (NIKHEF (NL))  |
| 14:50 - 15:10 | ACOT update 20'<br>Speaker: Prof. Fred Olness (Southern Methodist University)  |

## Meetings:

- [SM@LHC](#), 9-12 Apr, Freiburg (HERA, LHC talks)
- PDF4LHC, 17<sup>th</sup> April, CERN,: dedicated talk (VR)
- DIS13, April, Marseille: dedicated talk (RP)
- 5<sup>th</sup> Workshop of the APS Topical Group on Hadron Physics, 10-12 Apr, Denver, Colorado (LHC talk)
- Abstract submitted to LHCP 2013 May, Barselona

## HERAFitter-0.3.0 release TODAY

- tarball available, accessible from the web page
- theory files have been separated from tar file, can be downloaded from the web page
- registration will no longer be required for downloading of release (subscription optional)
- significant efforts on documentation:  
writeup, doxygen, release notes (next slides)

**Computing:** separate computing group for HERAFitter

## Revised HERAverager release candidate is in preparation

<https://wiki-zeuthen.desy.de/HERAverager>

- ◆ Pre-release studied by developers since Jan 2013
- ◆ Recently improved treatment of multi-process average with correlated uncertainties:
  - good separation of different processes, stable working
  - improved output, however plotting scripts need adjustment
- ◆ New format for the output of pulls
- ◆ Updated documentation: manual is supplemented by description of a few new options
- ◆ More feedback from developers is needed
- ◆ Target beta-release date: end of April

## New in HERAFitter-0.3.0:

- ✓ Flexible parametrisation and regularisation techniques
- ✓ New FastNLO format: upgrade to the official reader
- ✓ PDF Bayesian reweighting based on eigenvectors (Hessian method)
- ✓ Reorganisation of the chisquare module
- ✓ Offset method (in “old structure” of the chi2 module, will be dropped in the next release)
- ✓ TMD (uPDF), several fitting options with CCFM evolution (gluon uPDF)
- ✓ Dipole models: mixed dipole-DGLAP fits (BGK model)
- ✓ Newer EW code for DIS
- ✓ Updated ACOT code: QCDNUM for k-factors, higher orders, ACOT in QCDNUM → see *F. Olness talk*
- ✓ Asymmetric uncertainties added for Toy MC error propagation
- ✓ Inclusion of more data sets (CMS, Tevatron)
- ✓ User's examples, 'make check' sanity check via auto-tools

## Doxygen, Write-up and Release Notes

### Release Notes:

(accessible via the release download page)

#### HERAFitter: Releases and Updates March, 2013

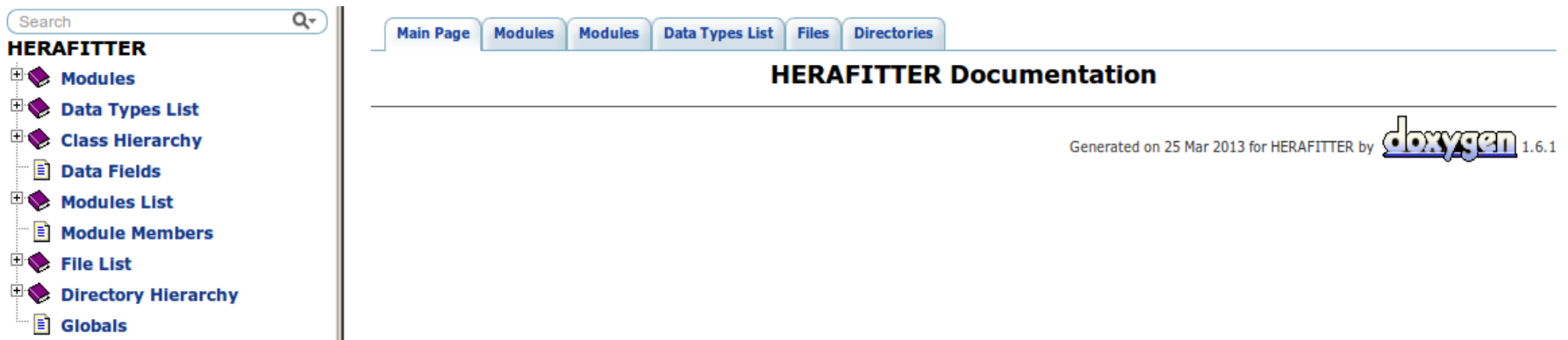
HERAFitter versions are labeled as `herafitter-i.j.k` where `i` is the stable release number, `j` is beta release number, and `k` is bug fixes.

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

## Doxygen:

Web based standard tool for generating documentation for C++ sources (supports many other programming languages)

→ implementation for HERAFitter by A. Sapronov



→ fully functioning, some improvements to implementation are ongoing

## Write-up:

Almost 50 pages of documentation

Incorporated comments from  
Steering Commity members  
(thanks Cristi and Olaf)

The next milestone is **stable release**

→ further improvements to document  
are welcome

HERAFitter  
PDF Fitting package



HERAFitter developers

March 25, 2013

### Abstract

The determination of the proton parton distribution functions is a complex endeavor involving several physics process. The main process is the deep-inelastic scattering and the central data set covering most of the proton structure phase space is provided at HERA ep collider. Further processes (fixed target DIS, ppbar collisions etc.) provide further constrains for particular aspects: flavor separation, very high Bjorken-x etc. In particular, the precise measurements obtained or to come from LHC will continue to improve the knowledge of the PDF. HERAFitter project aim at providing a framework for QCD analyses related to the proton structure in the context of multi-process and multi-experiment. The framework includes modules or interfaces enabling a large number of theoretical and methodological options, as well as a large number of relevant data sets from HERA, Tevatron and LHC. This manual explains the theoretical input used in the QCD analysis, the fit methodology as well as the the installation procedure of the program. More information and the package downloads can be found on the web site <http://herafitter.org>.





# DOCUMENTATION

## Contents

<b>1</b>	<b>Introduction</b>	<b>4</b>
<b>2</b>	<b>Theoretical Input</b>	<b>4</b>
2.1	Deep Inelastic Scattering Formalism and Schemes	5
2.1.1	Zero-Mass Variable Flavour Scheme	7
2.1.2	General Mass Variable Flavour Scheme: Thorne-Roberts scheme	7
2.1.3	General Mass Variable Flavour Scheme: ACOT scheme	7
2.1.4	Fixed -Flavour Number Scheme	8
2.1.5	Electroweak corrections for $ep$ scattering	9
2.2	Drell Yan processes	9
2.3	Cross Sections for $t\bar{t}$ production in $pp$ or $p\bar{p}$ collisions	11
2.4	Jets	11
2.4.1	FastNLO	11
2.4.2	APPLGRID	12
2.5	DIPOLE models	12
2.5.1	GBW model	13
2.5.2	IIM model	13
2.5.3	BGK model	13
2.5.4	BGK model with valence quarks	14
2.6	Transverse Momentum Dependent (unintegrated PDF) with CCFM	14
2.7	Diffraction PDFs	15
2.7.1	Cross-section	16
2.7.2	Regge factorization	16
<b>3</b>	<b>Methodology for PDF fits</b>	<b>17</b>
3.1	PDF Parameterisation	17
3.1.1	Standard Functional form	17
3.1.2	Bi-Log-Normal Functional Form	18
3.1.3	Chebyshev Polynomial Functional Form	18
3.1.4	Diffraction parametrisation Functional Form	19
3.2	Chisquare Definition	19
3.2.1	Using Nuisance Parameters	20
3.2.2	HERAFitter implementation	22
3.3	Treatment of the Experimental Uncertainties	23
3.3.1	Correlated errors and $\chi^2$	23
3.3.2	The Offset method	24
3.3.3	Monte Carlo Method	25
3.3.4	Implementation in HERAFitter	26
3.3.5	Regularisation methods	26

<b>4</b>	<b>Bayesian Reweighting Technique</b>	<b>27</b>
4.1	PDF probability distributions	28
4.2	Bayesian Reweighting of PDF sets	29
4.3	Usage of the PDF reweighting in the HERAFitter framework	29
<b>5</b>	<b>Program Manual</b>	<b>31</b>
5.1	Program Installation Instructions	31
5.1.1	Pre-requirements	31
5.1.2	Default Installation	31
5.1.3	Installation with APPLGRID	32
5.1.4	Installation with LHAPDF	32
5.2	Installation with PDF reweighting	32
5.2.1	Installation with HATHOR	33
5.2.2	Installation for TMD (uPDF) in high-energy factorisation (using CASCADE)	33
5.3	User Manual	34
5.3.1	Code Organisation	34
5.3.2	Steering files	36
5.3.3	Data file format	40
5.3.4	Understanding the output	45
5.4	User Example	46
5.4.1	DIS inclusive only	46
5.4.2	All processes	46
<b>A</b>	<b>How to add new data</b>	<b>46</b>



## Wiki

WikiPolicy  
RecentChanges  
FindPage  
HelpContents

HERAFitter/DownloadPage

## Page

Edit (Text)  
Edit (GUI)  
Info  
Subscribe  
Add Link  
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## Releases of the HERAFitter QCD analysis package

- Versioning convention: **i,j,k** with
  - i** - stable release
  - j** - beta release
  - k** - bug fixes.
- The release notes can be found in this attachment: [HERAFitter\\_release\\_notes.pdf](#).

Date	Version	Files	Remarks
03/2013	0.3.0	<a href="#">HERAFitter-0.3.0.tgz</a>	latest release Includes <a href="#">HERAFitter manual.pdf</a> and decoupled <a href="#">HERAFitter theoryfiles.tgz</a>
07/2012	0.2.1	<a href="#">HERAFitter-0.2.1.tgz</a>	fix release for 0.2.0
05/2012	0.2.0	<a href="#">HERAFitter-0.2.0.tgz</a>	added functionality for LHC users
09/2011	0.1.0	<a href="#">HERAFitter-0.1.0.tgz</a>	first release

## Documentation

- From 0.3.0 on a manual is provided together with an example directory.
- The **README** file (accessible via the package) gives an explanation for a quick start.

## Web access to SVN

- For users with a valid DESY account, the SVN repository is accessible on the web at <https://svnsrv.desy.de/k5viewvc/hifitter>.
- For users without DESY account, the SVN repository is accessible on the web at <https://svnsrv.desy.de/basviewvc/hifitter/> with [herafitter-user@desy.de](mailto:herafitter-user@desy.de) account and PDFfits password.

## Doxygen Documentation

- The doxygen documentation is located [here](#)

## Links to external packages

External packages that could be run with HERAFitter via configuration flags can be accessed for convenience [HERE](#).

## HERAverager data combination package

Information can be accessed here <https://wiki-zeuthen.desy.de/HERAverager>

## Subscription

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FindPage  
HelpContents

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Links to external packages that are set to run with HERAFitter:

Package	Description	Remarks
<a href="#">QCDNUM</a>	evolution code	<code>./configure</code>
<a href="#">APPLGRID</a>	interfaced to MCFM, access to jets and DY calculations	<code>./configure --enable-applgrid</code>
<a href="#">LHAPDF</a>	access to global PDFs	<code>./configure --enable-lhapdf</code>
<a href="#">HATHOR</a>	ttbar cross section calculations	<code>./configure --enable-hathor</code>



- QED PDFs (Renat, M. Botje) → *talk today*
- ACOT (F.Olness) and S-ACOT NNLO (M. Guzzi) → *talk today*
- Offset method in new chi2 scheme, restructuring (W. Slominski)
- OpenMP – parallel code (V. Kolesnikov)
- improvements to plotting tool (K. Nowak)
- EW (DIS) code, restructuring (H. Spiesberger, V. Radescu)

## Longer term:

- Blobel minimisation/chisquare (S. Schmitt)
- Nuclear PDFs (I. Schienbein)
- Fitting photon PDF (O. Kuprash)
- Additional low-x models
- Different evolution codes

Next User's meeting on 23<sup>th</sup> of April in DIS2013, Marseille

XXI INTERNATIONAL WORKSHOP ON  
DEEP-INELASTIC SCATTERING AND  
RELATED SUBJECTS  
Marseille Congress Centre April 22-26 2013



DIS 2013

## Agenda

	Sunday April 21	Monday April 22	Tuesday April 23	Wednesday April 24	Thursday April 25	Friday April 26
<b>AM</b>		Plenary Session	Parallel Session	Parallel Session	Parallel Session	Plenary Session
<b>PM</b>	Arrival, Registrations	Plenary Session	Parallel Session	Parallel Session	Excursions or topical meetings	Plenary Session
<b>Evening</b>		Reception Cocktail	Satellite Meetings	Conference Dinner - Excursion		Outreach Talk

The conference will host the [HERAFitter](#) Users Meeting on Tuesday April 23, 18h30-20h00 ([agenda](#)).

The next **stable release** is planned in October 2013