HERAFitter Users Meeting

24th of February 2014

- Feedback on the stable release
- Future developments
- Conferences and schools
- Today's agenda

Feedback on the Stable Release

HERAFitter-1.0.0 stable release

→ positive users feedback, so far no problems found

  → sometimes help with the package(s) installation required

    → reported issues with ./configure not finding lapack library (or didn't work with lapack3 where autoreconf was required)

  → steering file with line-by-line explanations is highly desired (will be added in the next release)

  → next release planned with the inclusion of the QED+QCD PDFs and other improvements (discussed later in slides)

The feedback from Users is very welcome on:

Technical aspects:
  → installation issues (gcc version, root, Cern lib dependencies?)
  → experience on different platforms (SL5/6, lxplus, MAC, linux..)

Documentation

Suggestions for further (web page, meetings, ...) improvements?

herafitter-help@desy.de

Post Stable Release Developments

Theory side:

→ QED+QCD PDFs: generalised evolution in QCDNUM   *→ see Ranat's talk*

Top sector:
→ ttbar differential cross sections DIFFTOP
→ inclusion of Top++

Heavy flavour sector:
→ ACOT scheme at NNLO
→ ACOT scheme inclusion in QCDNUM
→ BMSN and FF with variable n_f PDFs

Interfaces and code:
→ improvements to APPLGRID interface (e.g. normalisation, etc..)
→ APPLGRID interfaces to DYNNLO
→ More flexibility dealing with the data covariance/correlation matrices
→ MC replica method for data with covariance matrix
→ LHAPDF6 C++ interface
→ improvements to drawing tools
→ inclusion of more data (Tevatron W asymmetry)
→ OpenMP (extension to ACOT)

Longer term:
→ intrinsic charm
→ fitting photon PDFs
→ different evolution codes, ...

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→ APPLGRID interfaces to DYNNLO
→ More flexibility dealing with the data covariance/correlation matrices
→ MC replica method for data with covariance matrix
→ LHAPDF6 C++ interface *(presented in the last User's meeting)*
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More flexibility to read experimental data uncertainty covariance matrix
→ 'table' format systematic matrix (e.g. directly from publication) can be now used in HERAFitter

Example:

```
&StatCorr
    Name1 = 'D0 W asymmetry 2013'
    Name2 = 'D0 W asymmetry 2013'
    …
    NBins1 = 14
    NBins2 = 14
    MatrixFormatIsTable = true
```

fully backward compatible

```
    ! Matrix Type:
    !  'Statistical correlations':    Given are correlation factors that need to be applied to statistical errors
    !                                  needs 'stat' column in data files
    !  'Systematic correlations' :  Given are correlation factors that need to be applied to systematic errors
    !                                  needs 'uncor' column in data files
    !  'Systematic covariance matrix': Given is a systematic covariance matrix
    !  'Full covariance matrix':       Given is a full covariance matrix including stat and syst parts
    !  'Full correlation matrix':      Given is a full correlation matrix including stat and syst parts
```

← additional option

```
    MatrixType = 'Statistical correlations'
&End
```

		0.000	0.200	0.400	0.600	0.800	1.000	1.200	1.400	1.600	1.800	2.000	2.200	2.400	2.700
0	0	0.200	0.400	0.600	0.800	1.000	1.200	1.400	1.600	1.800	2.000	2.200	2.400	2.700	3.200
0.000	0.200	1	0.84	0.57	0.38	0.29	0.25	0.21	0.16	0.1	0.06	0.04	0.03	0.02	0.01
0.200	0.400	0.84	1	0.85	0.58	0.39	0.29	0.24	0.16	0.11	0.07	0.04	0.04	0.03	0.02
0.400	0.600	0.57	0.85	1	0.85	0.58	0.38	0.26	0.16	0.1	0.06	0.05	0.06	0.05	0.03

← bins

....

Improvements to Drawing Tools

```
bin/DrawPdfs [options] dir1[:label1] [dir2:[label2]] [...]

general options:
--help
--pdf (requires ps2pdf)
--outdir <output directory>
--splitplots          Produce also additional eps files for each plot
--splitplots-png
--colorpattern <1-3>  Select among 3 additional color patterns
--lowres              Low resolution plots (smaller file)
--highres             High resolution plots (paper quality)

options for PDF plots:
--no-pdfs             PDF plots are not produced
--bands               Draw PDF uncertainty band
--asymbands           PDF bands are not symmetrised
--filledbands         Filled uncertainty bands
--ratiorange min:max
--xrange min:max
--no-logx             Linear x scale in PDF plots
--absolute-errors
--relative-errors

options for data plots:
--no-data             Data plots are not produced
--therr               Plot theory errors if availables
--points              Plot theory as displaced marker points
--theory <label>
--2panels             Additional right bottom panels with pulls
--3panels             Additional right mid panels with theory+shifts
--only-theory
--ratio-to-theory     Use theory as reference for ratio plots

options for shifts plots:
--no-shifts
--shifts-per-plot <N> Number of shifts shown in each plot
--shifts-heigh <N>    Heigth reserved for each shift in points
```
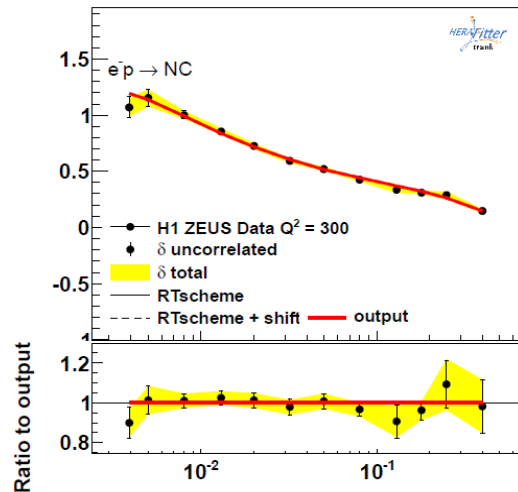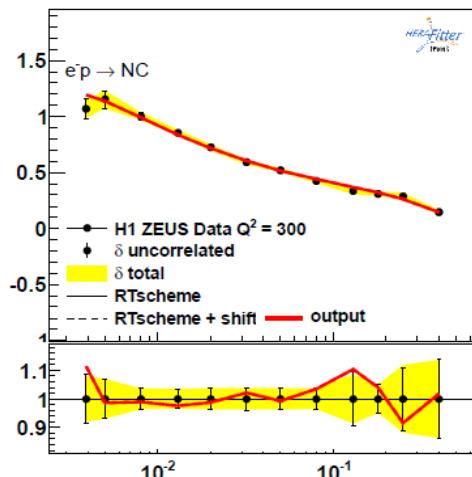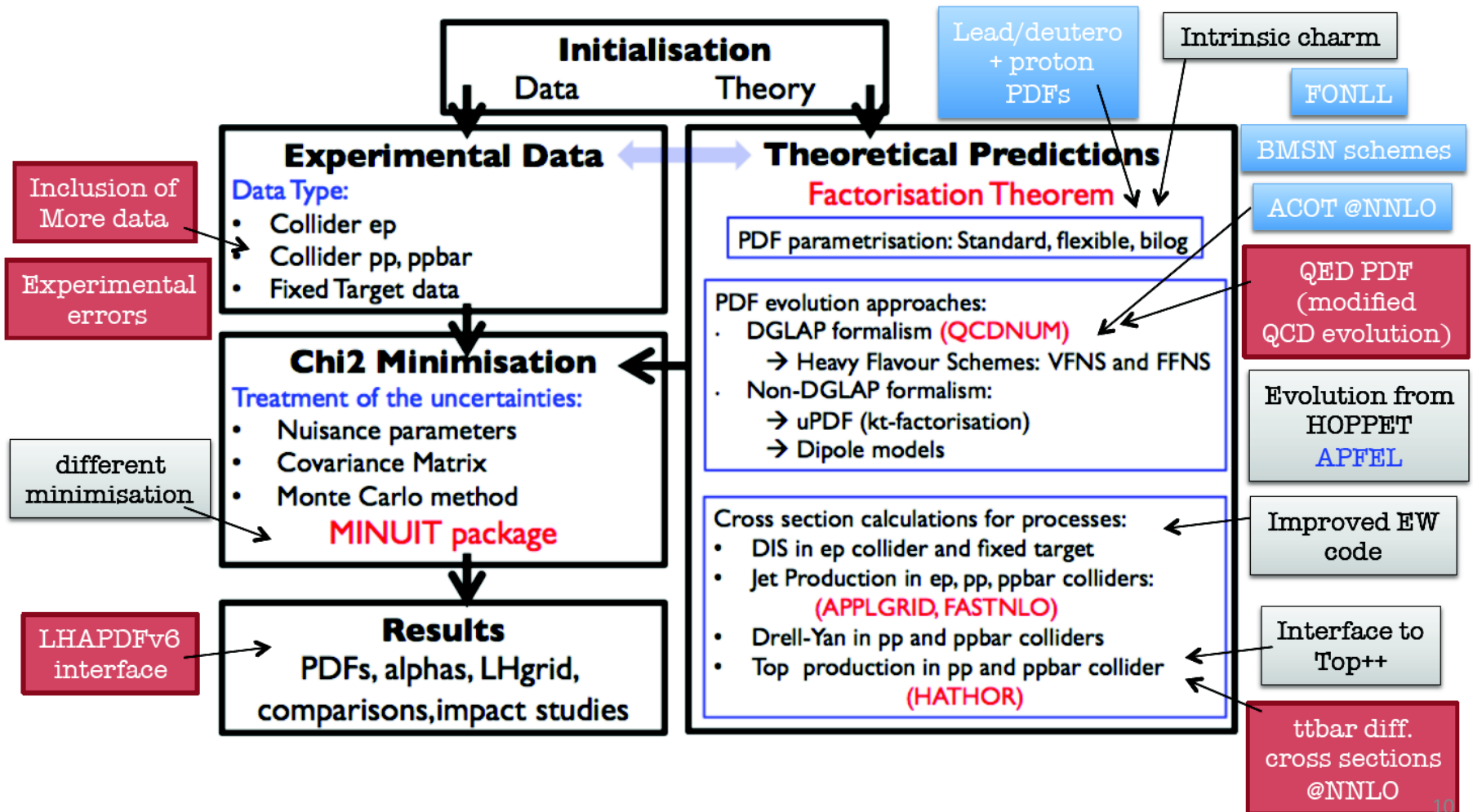
← new options (in red)
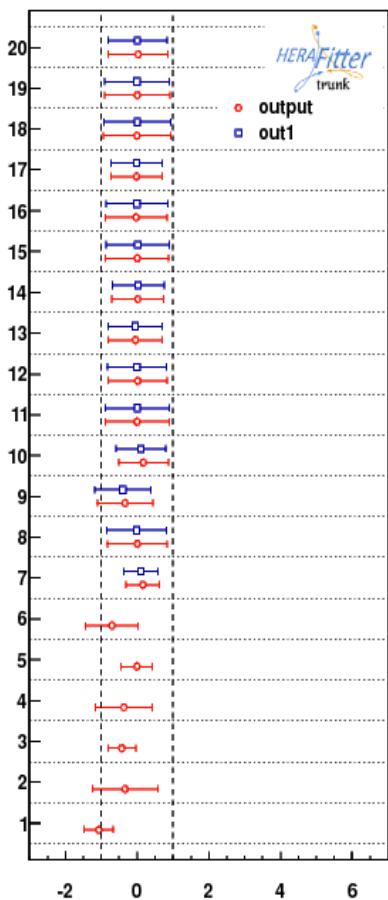
NEW: shift plots

NEW: ratio-to-theory
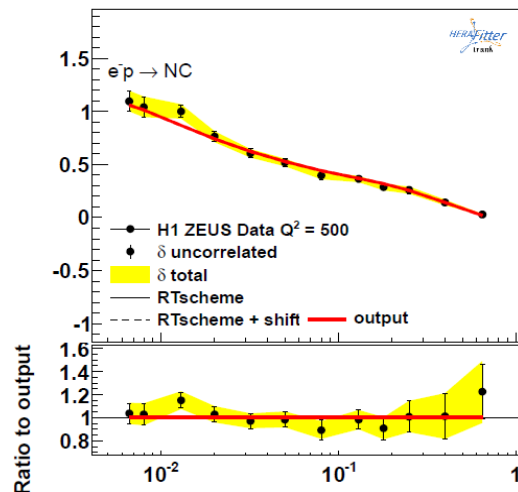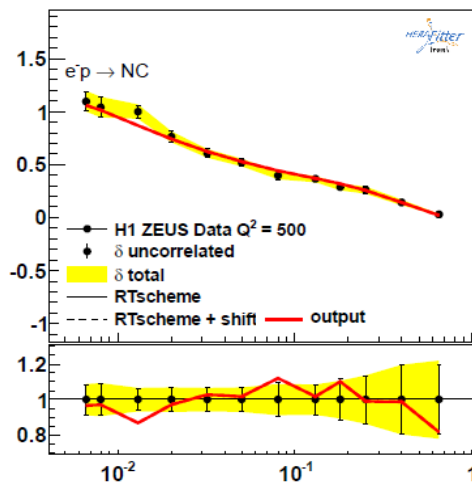
Longer term developments planed in HERAFitter:

Conferences

Conferences in 2014:

https://www.herafitter.org/HERAFitter/HERAFitter/HERAFitterTalks

Date	Conference/Workshop		Presenter	Link	Remarks
29.09-03.10.2014	Proton Structure in the LHC era		HERAFitter team	lecture/tutorials	PDF event at DESY
2-9.07.2014	🌐 ICHEP2014		speaker	HERAFitter talk/poster	abstract to be submitted
17-21.06.2014	🌐 LowX2014		speaker	HERAFitter talk/poster	abstract to be submitted
2-7.06.2014	🌐 LHCP2014		speaker	HERAFitter talk/poster	abstract to be submitted
18-23.05.2014	🌐 Blois2014		speaker	HERAFitter talk/poster	abstract to be submitted
5-8.05.2014	🌐 Pheno2014		speaker	HERAFitter talk/poster	abstract to be submitted
28.04-02.05.2014	🌐 DIS2014	2014	speaker	HERAFitter talk	abstract to be submitted
22-29.03.2014	🌐 MoriondQCD		V. Radescu	HERAFitter talk	stable release
16-22.02.2014	🌐 Lake Louise Winter Institute		S. Camarda	HERAFitter poster	HERAFitter project overview
16-20.12.2013	🌐 HEP in the LHC Era 2013		P. Laycock	HERAFitter talk	stable release
13.12. 2013	PDF4LHC		S. Camarda	HERAFitter 🌐 talk	stable release

Proton Structure in the LHC Era - School and Workshop

from 29 September 2014 to 02 October 2014 (Europe/Berlin) *DESY Hamburg*
Europe/Berlin timezone

[Search]

dates are fixed, other details to be announced later

Agenda

Today's agenda:

HERAFitter User's meeting

Monday, 24 February 2014 from **15:00** to **18:00** (Europe/Zurich)
at **CERN (42-R-031)**
DESY: SR 05

Description ONLY If default VIDYO fails ------- a backup VIDYO LINK:

Extension 9265520
Meeting PIN 2323
Auto-join URL http://vidyoportal.cern.ch/flex.html?roomdirect.html&key=QpFaaSZLsTe1

Video Services Vidyo public room : HERAFitter_Users_meeting More Info | **Join Now!** | ⚠42-R-031

Monday, 24 February 2014

15:00 - 15:20	**Status** *20'*
	Speakers: Voica Ana Maria Radescu (Deutsches Elektronen-Synchrotron (DE)), Ringaile Placakyte Elektronen-Synchrotron (DE))
15:20 - 15:40	**QED PDFs and implementation in the HERAFitter** *20'*
	Speakers: Renat Sadykov (Joint Inst. for Nuclear Research (RU)), Michiel Botje (NIKHEF (NL))
15:40 - 15:50	**Vector boson production with lead beams** *10'*
	Speaker: Benjamin Clark
	Material: **Slides** 📄
15:50 - 16:00	**Mathematica interface to LHAPDF6** *10'*
	Speaker: Eric Godat
	Material: **Slides** 📄