HERAPDF

HI and ZEUS common initiatives since 2005/2006

- o Goal of HERA data combination
 - Best data precision
 - Impact on PDF knowledge
- First HERA PDF efforts since 2007:
 - HERAPDF0.1 @ DIS2008
 - HERAPDF0.2 @ DIS2009
 - o Publication of HERAPDFI.0 October 2009 [DESY 09-158]

Preliminary Results for DIS 2010:

- HERAPDFI.0
- HERAPDF1.0+ extensions
 - Inclusion of the HERA combined Charm data
 - Inclusion of the HERA combined low energy data
- Strong impact at HERA&LHC Workshop and PDF4LHC task force



Status of HERAPDF QCD fit

QCD Fit Package for HERAPDFI.0 [DESY 09-158]: cross checks between HI and ZEUS

Data:

- Includes combined HI-ZEUS data:
 - Inclusive Neutral and Charged Current cross section data, charm data

Model:

- Includes NLO and NNLO standard evolution code [QCDNUMv17.6 M. Botje]
- Includes various schemes to take into account heavy quark production [use of Physics at the Terascale Helmholtz Aliance]
 - → direct cross checks between various theory treatments
 - ACOT [CTEQ] Thanks to Fred Olness
 - RT [MSTW] Thanks to Robert Thorne
 - BMSN [ABKM] Thanks to Serghey Alekhin

Benchmarking for LHC



Next Steps for HERAPDF QCD fit [2010-2013]

DATA

- Main Objectives: Include new precise HERA data
 - Analysis of HERA-II high Q²/high x combined HI-ZEUS data
 - Publications using DIS-jets (HI-ZEUS)
 - → EW+PDF+alphas fits
- Related analysis:
 - Contact Interaction fits: it requires inclusion of fixed target data
 - Unifying efforts to include diffraction data
 - Include HERMES data on strange quark distribution to fix s(x)

Model improvement:

- More detailed studies of PDF uncertainties using Monte Carlo Methods
- More detailed studies of PDF parametrisation uncertainties
- Include latest developments from theory:
 - Continue close collaborations with theorists from ABKM, CTEQ, MSTW, NNPDF

Extensions

Usage in LHC experiments:

- Fitting platform for combined HERA-LHC data
- Used for ATLAS-SM studies on PDF flavour decomposition assumptions [Reported at ATLAS SM-Group Meeting]
- Extension to include of Drell-Yan W/Z production data, pp-jet data
- Feedback on impact of new data, detailed study on PDF uncertainties,
- In perspective, HERA QCD fitter could become global fitting platform:
 - Include data from fixed target, Tevatron, neutrino and the corresponding theory

Conclusion

HERAPDF has proved to be a successful framework:

- Brings expertise in data and error treatment
- Interface between experiment and theory:
 - Constructive collaboration with theory/phenomenological groups (ABKM, CTEQ, MSTW, NNPDF)

- Framework could be adapted for global fits:
 - Fixed target data, Tevatron data, new LHC data