The HERAPDF2.0 data combination and QCD fit

Volodymyr Myronenko on behalf of H1 and ZEUS collaborations

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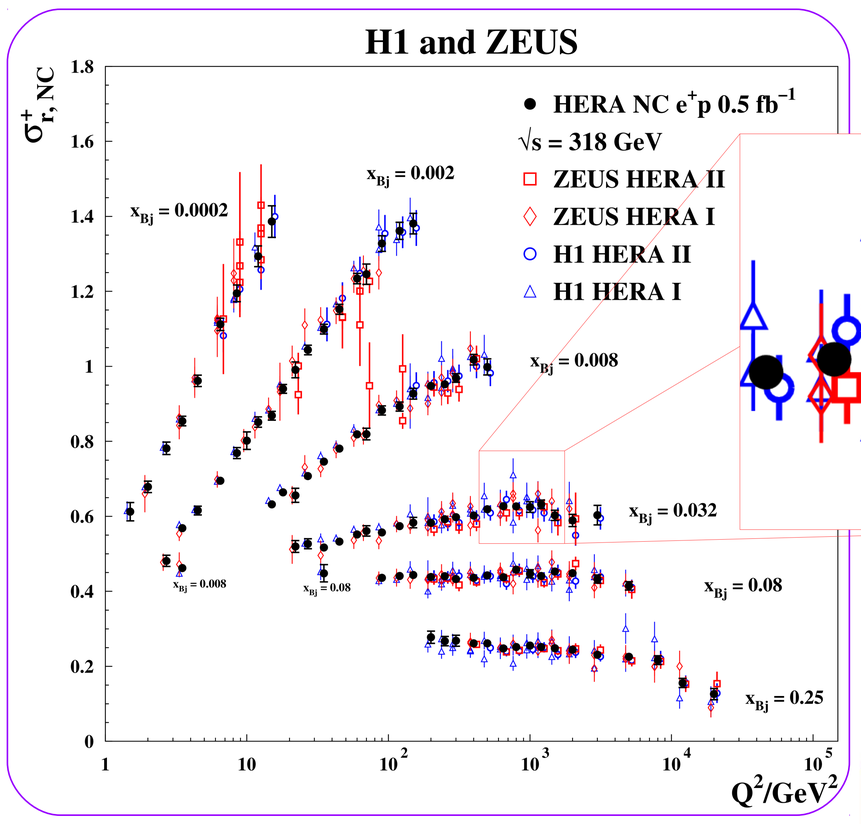
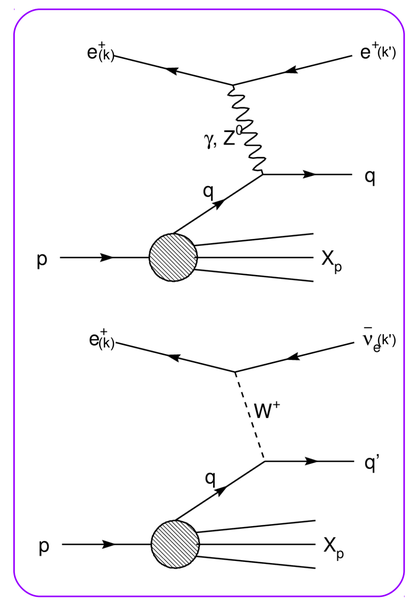
Final inclusive DIS **CCe±p** and **NCe±p** data form HERAI+II are now combined:

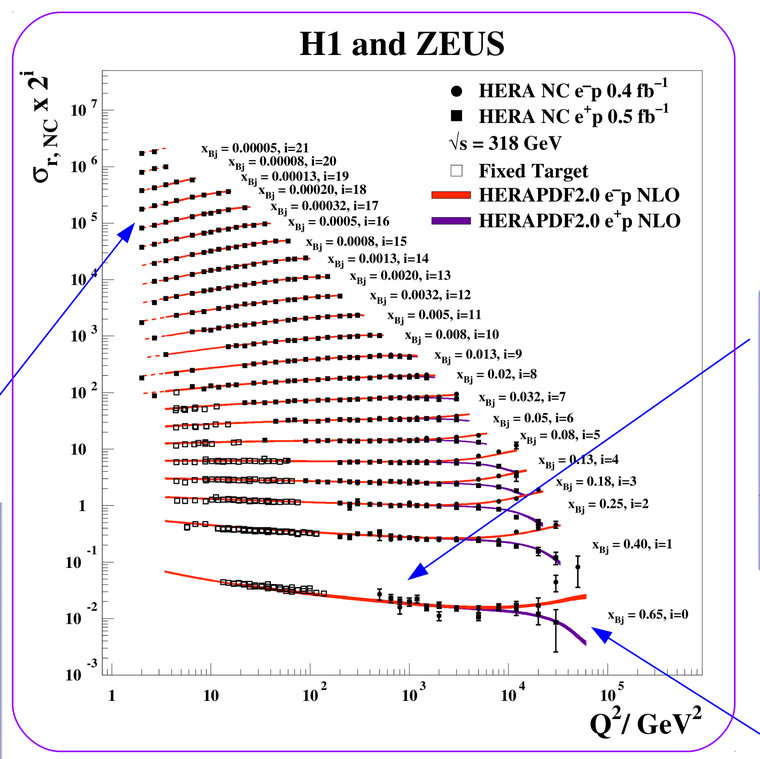
- **22** publications, **2927** experimental points → **7** data sets, **1307** points;
- NCe+p measurements presented at **√s = 318 (300, 252, 225)** GeV;
- Correlations of systematic uncertainties are accounted for (**161** correlates sources).



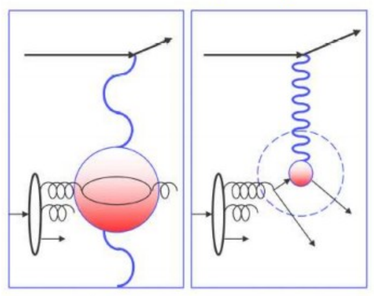
$$Q^2 = -q^2 = -(k-k')^2 \qquad x_{Bj} = \frac{Q^2}{2pq} \qquad y = \frac{pq}{pk}$$

$$s = (p+k)^2 \qquad Q^2 = xys \qquad Y_\pm = 1 \pm (1-y)^2$$



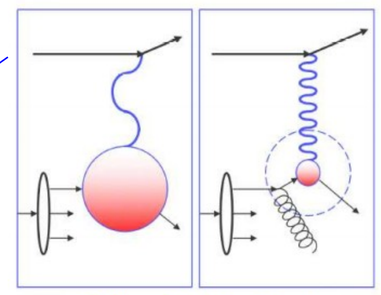


Small x: Gluons, sea quarks

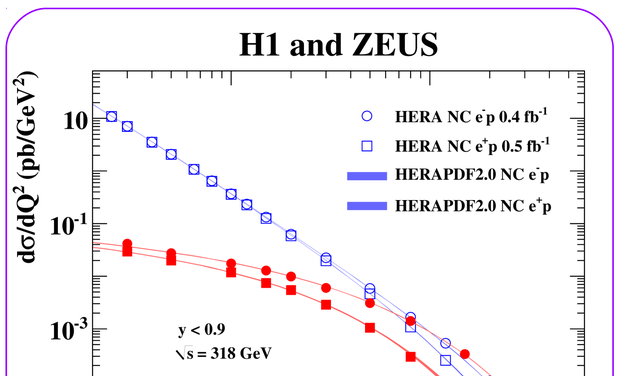


$Q^2 \uparrow \Rightarrow F_2 \uparrow$ for fixed x

Large x: valence quarks

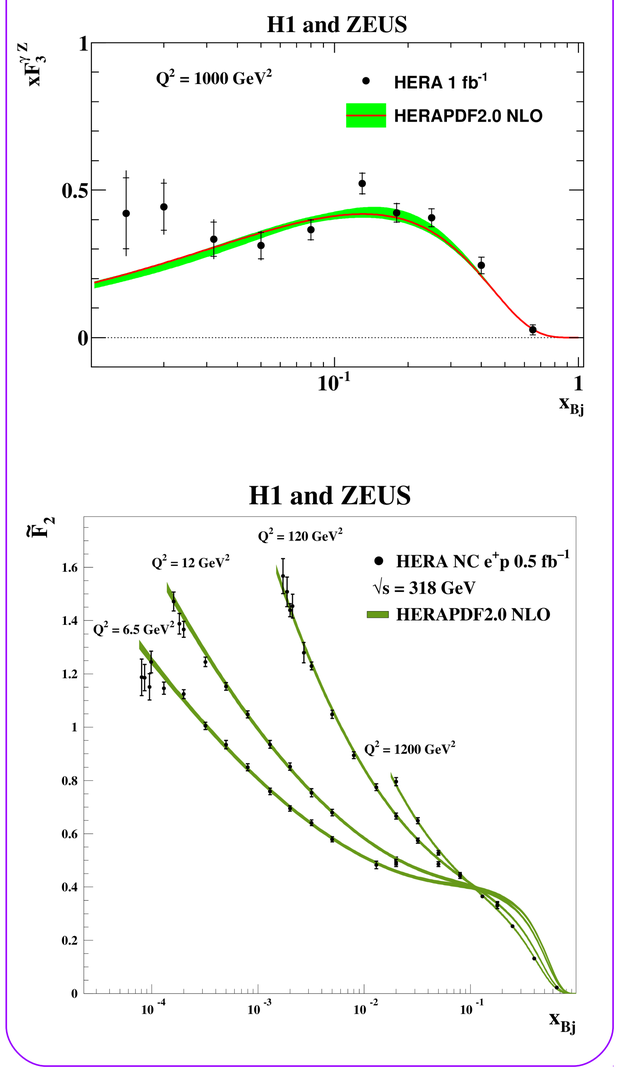


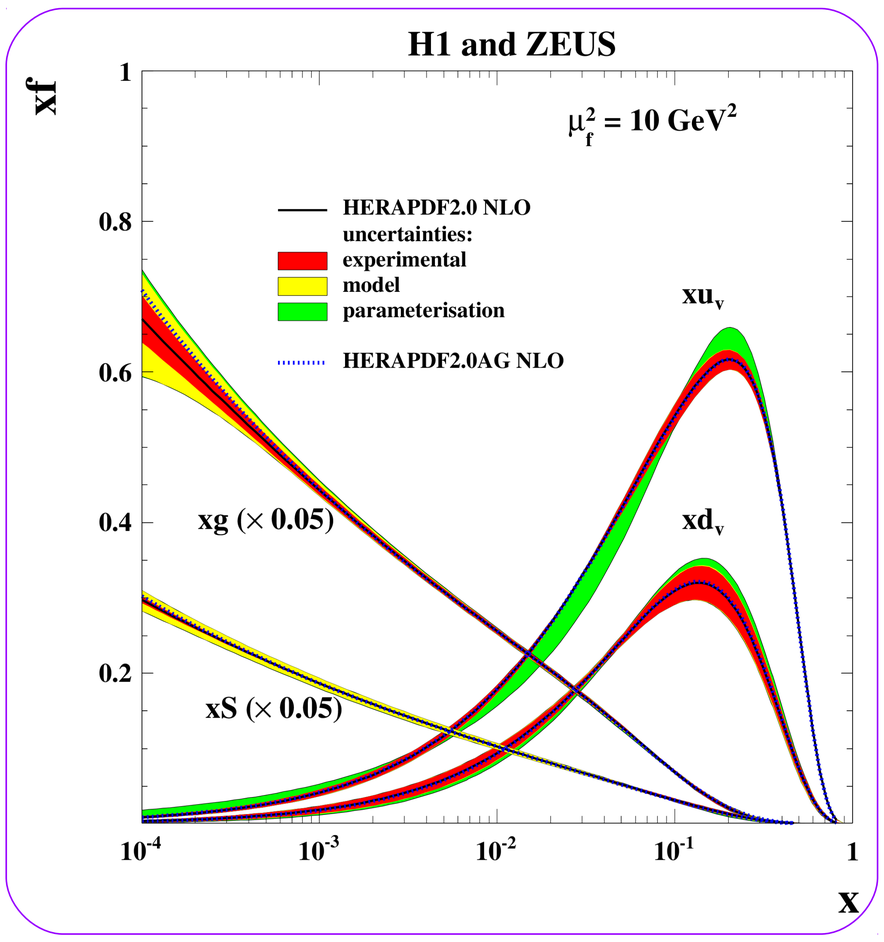
$Q^2 \uparrow \Rightarrow F_2 \downarrow$ for fixed x



$$\sigma^{\pm}_{r,NC} = \frac{Q^4 x}{2\pi\alpha^2 Y_+}\frac{d^2\sigma^{e^\pm p}_{NC}}{dxdQ^2} = \tilde{F}_2 \mp \frac{Y_-}{Y_+} x\tilde{F}_3 - \frac{y^2}{Y_+}\tilde{F}_L$$

Electroweak and scaling violation effects seen with ultimate precision.





Various PDF sets available

- LO, NLO, NNLO;
- GM VFNS, FFNS;
- Different input data collections
- Various gluon shapes;
- Alternative values of α_S.

All PDFs sets are now public

HERAFitter

www.herafitter.org

Parton density functions are extracted within QCD analysis using HERAFitter.

Data files & LHAPDF grids:
https://www.desy.de/h1zeus/herapdf20

Publication:
arXiv:1506.06042