

α_s determination @ NNLO using HERA data

Second preliminary presentation:
update on figures requested for preliminary

Used jet samples

+

HERA DIS inclusive cross sections

Data Set	published	$Q^2[\text{GeV}^2]$ range		\mathcal{L} pb^{-1}	e^+/e^-	\sqrt{s} GeV	norma- lised	all points	used points
		from	to						
H1 HERAI normalised jets	2007	150	15000	65.4	$e^+ p$	301	yes	24	24
H1 HERAI low-Q2 jets	2010	5	100	43.5	$e^+ p$	301	no	22	16
H1 normalised inclusive high-Q2 jets	2014	150	15000	351	$e^+ p/e^- p$	319	yes	24	24
H1 normalised high-Q2 dijets	2014	150	15000	351	$e^+ p/e^- p$	319	yes	24	24
H1 normalised inclusive low-Q2 jets	2016	5	80	290	$e^+ p/e^- p$	319	yes	48	32
H1 normalised low-Q2 dijets	2016	5	80	290	$e^+ p/e^- p$	319	yes	48	32
ZEUS inclusive jets	2002	125	10000	38.6	$e^+ p$	301	no	30	30
ZEUS dijets	2010	125	20000	374	$e^+ p/e^- p$	318	no	22	16

Numbers asked for preliminary

- New NNLO result:

$$\alpha_s(M_Z) = 0.1150 \pm 0.0008_{(exp)} \begin{matrix} +0.0002 \\ -0.0005 \end{matrix}_{(model/param)} \pm 0.0006_{(had)} \pm 0.0027_{(scale)}$$

- Compare the NLO result as published:

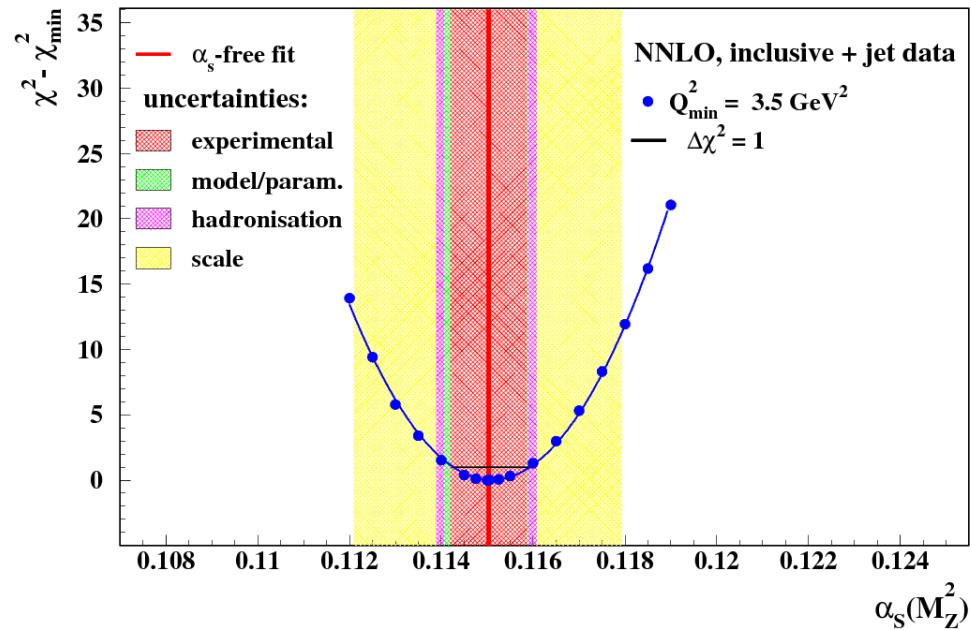
$$\alpha_s(M_Z) = 0.1183 \pm 0.0009_{(exp)} \pm 0.0005_{(model/param)} \pm 0.0012_{(had)} \begin{matrix} +0.0037 \\ -0.0030 \end{matrix}_{(scale)}$$

→ Visible improvement in scale uncertainties for NNLO
(as expected)

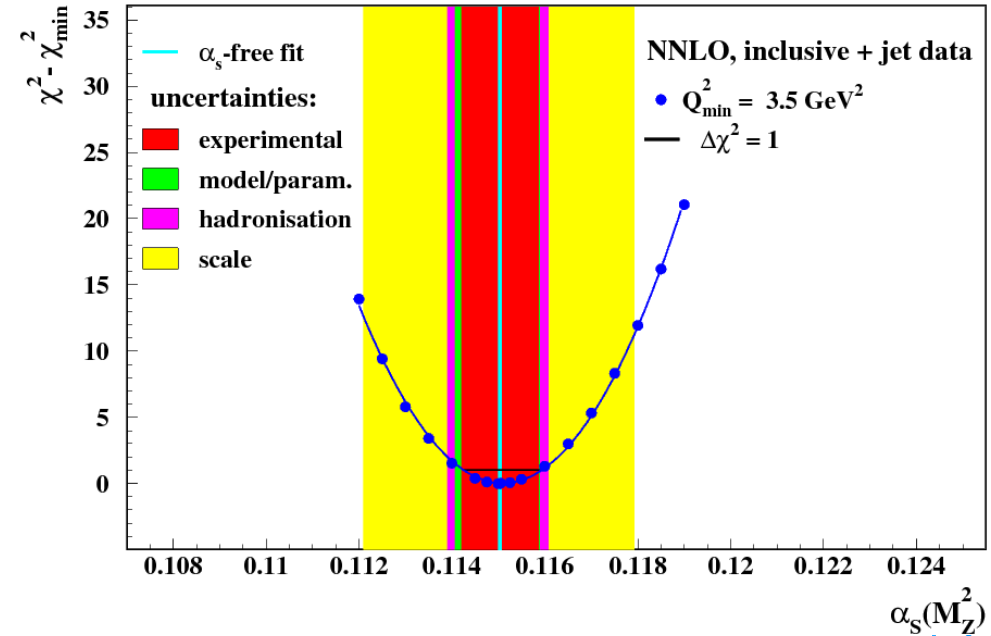
α_s scans

Scans for $Q_{\min}^2 = 3.5 \text{ GeV}^2$

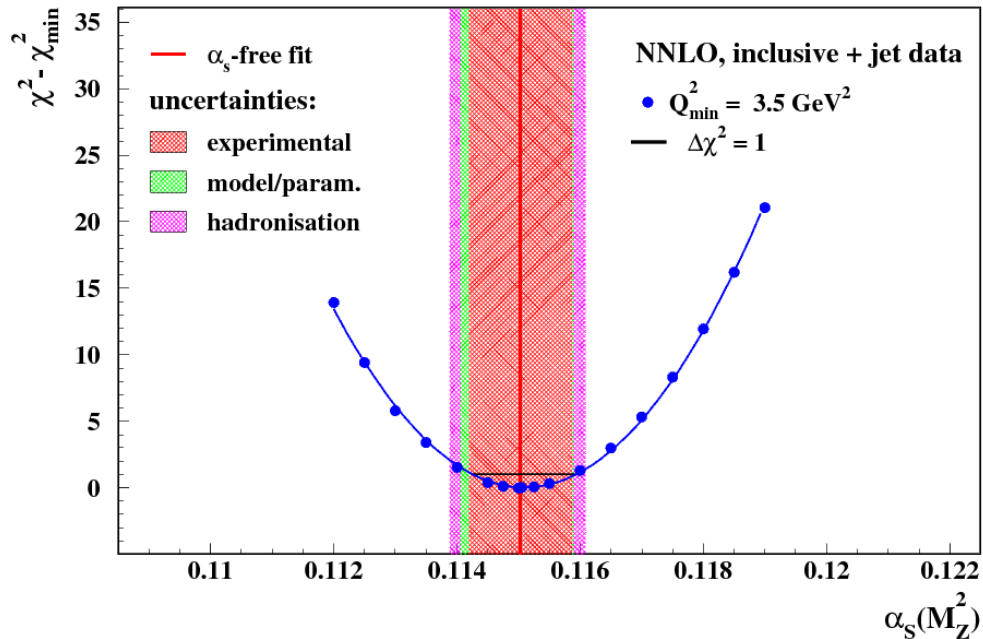
H1 and ZEUS preliminary



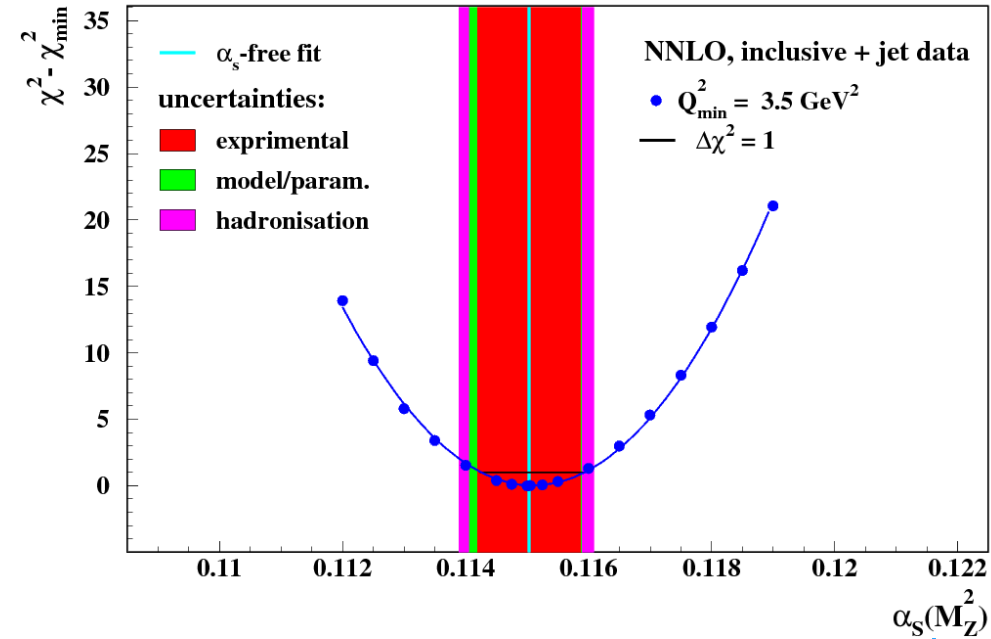
H1 and ZEUS preliminary



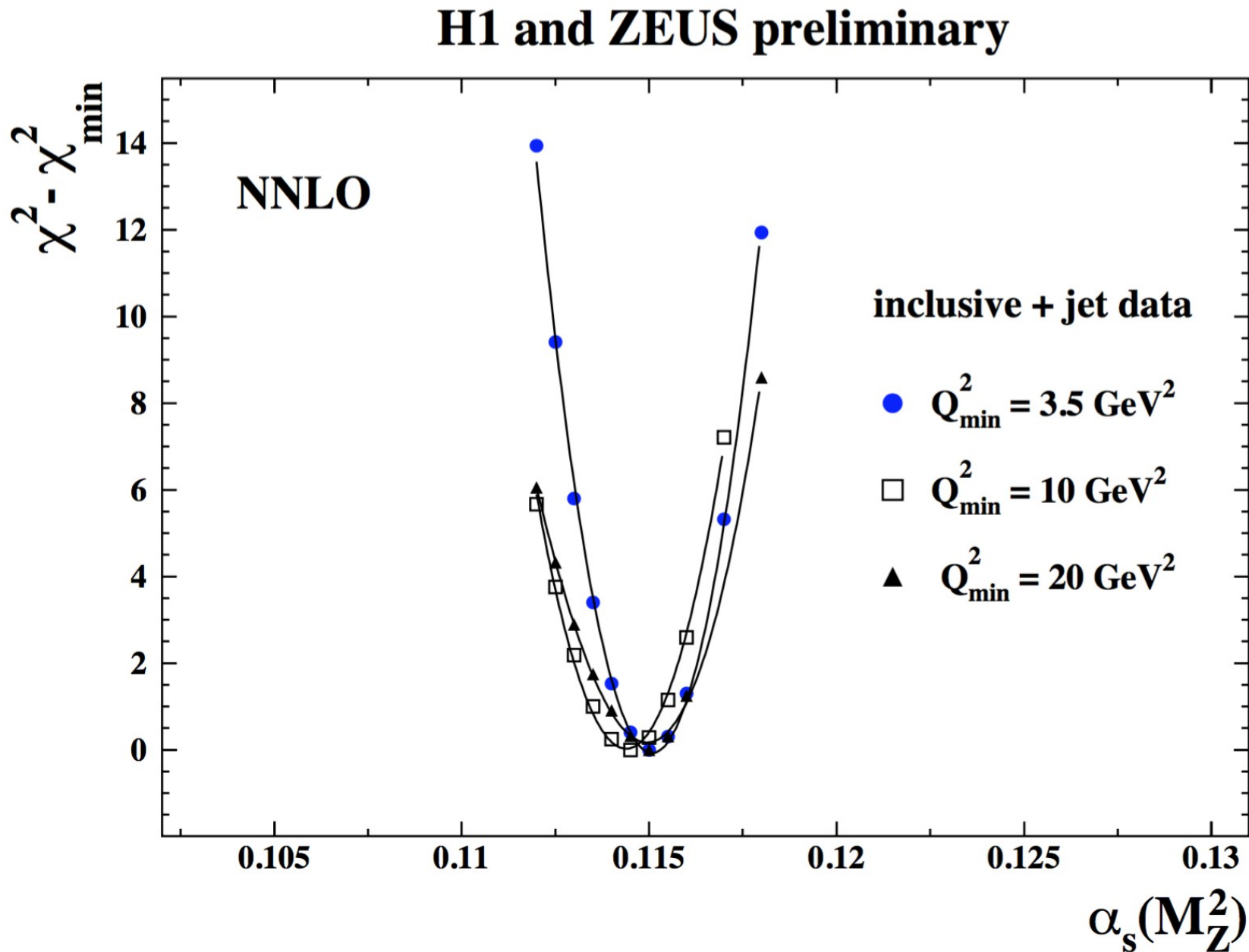
H1 and ZEUS preliminary



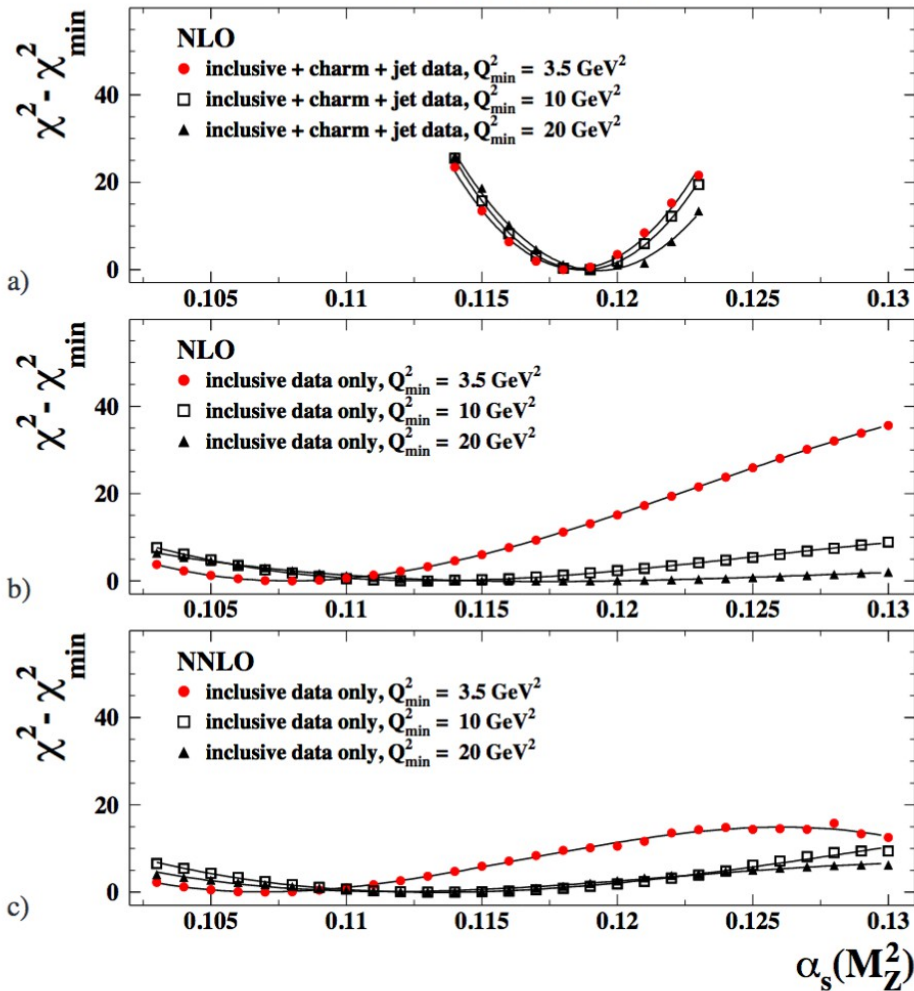
H1 and ZEUS preliminary



Scans for different Q^2 values

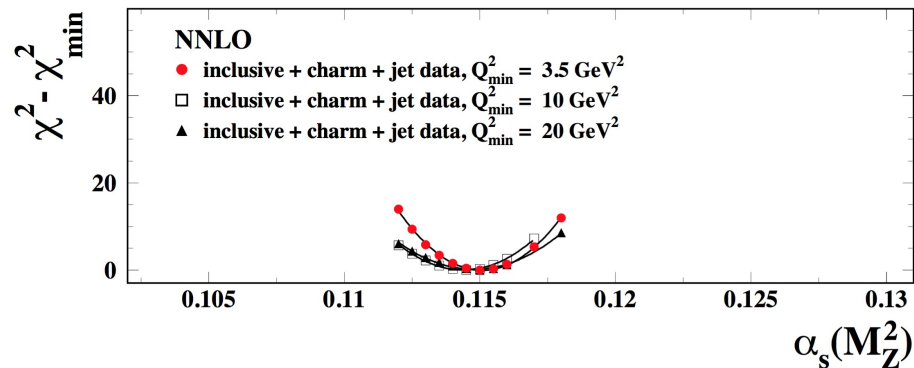


H1 and ZEUS



Possibility to compare
with HERAPDF2.0
plots with the same
scales/ratios

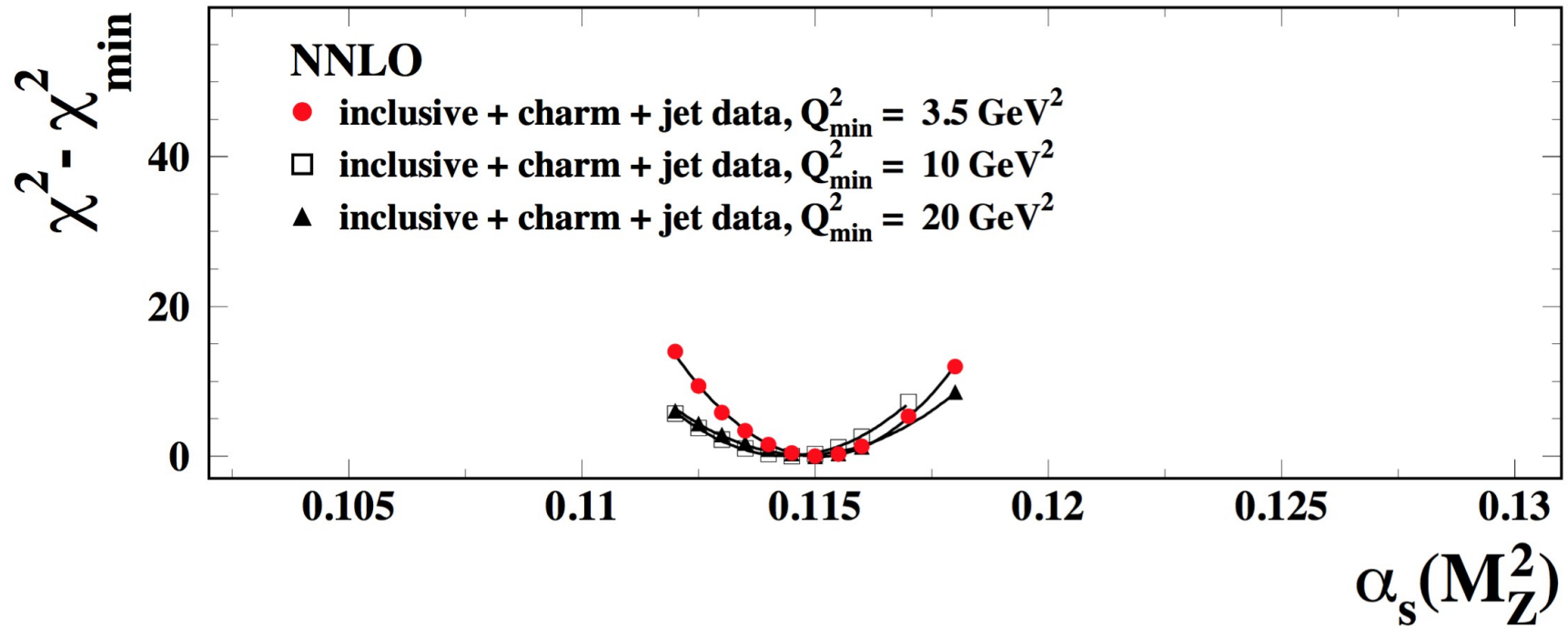
H1 and ZEUS preliminary



Scans for different Q^2 values

- Additional material
 - old, HERAPDF2.0 "style" (axis etc)

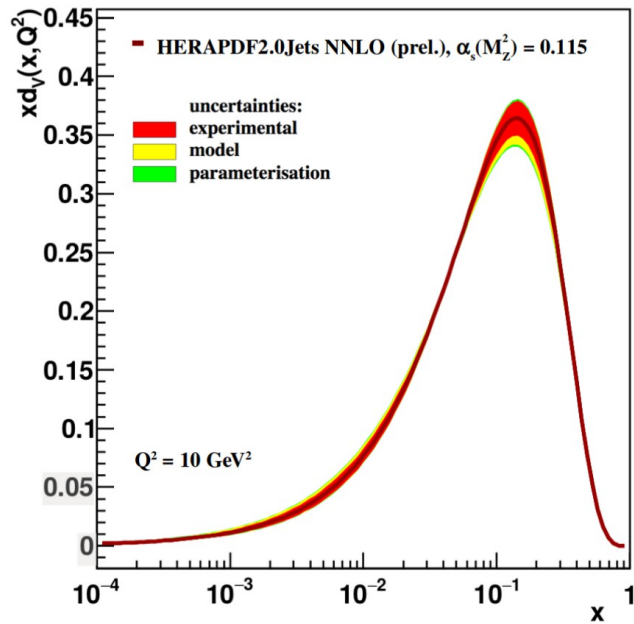
H1 and ZEUS preliminary



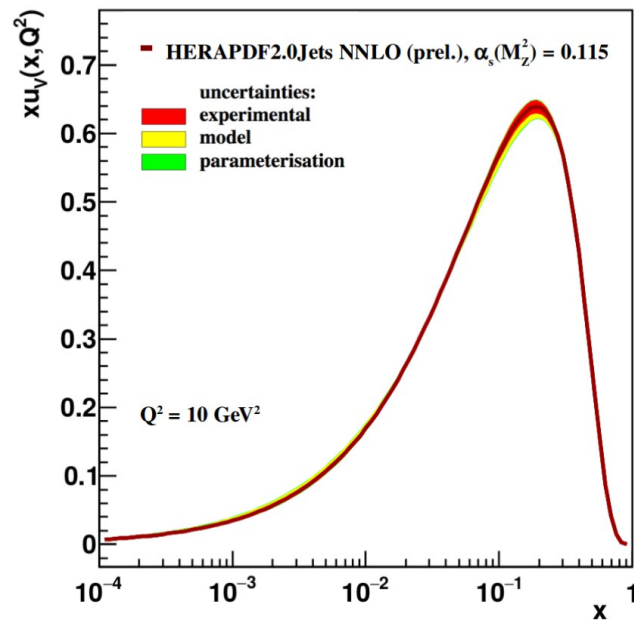
PDFs

PDFs, fixed $\alpha_s = 0.115$, $Q^2_{\min} = 3.5 \text{ GeV}^2$

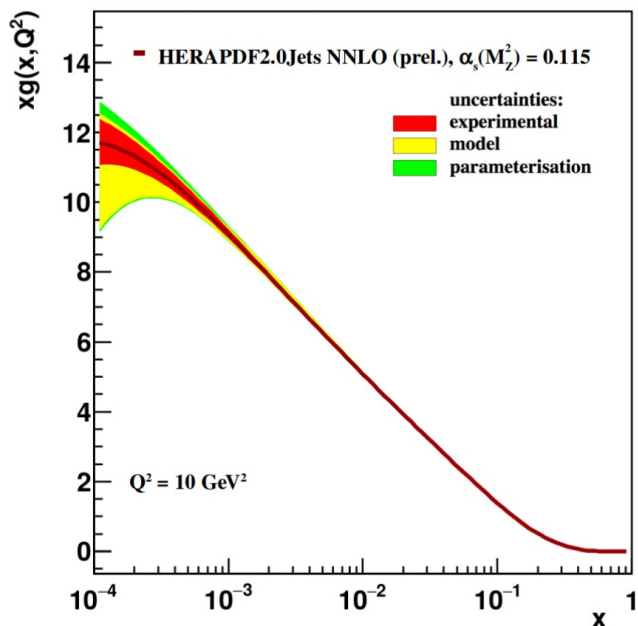
H1 and ZEUS preliminary



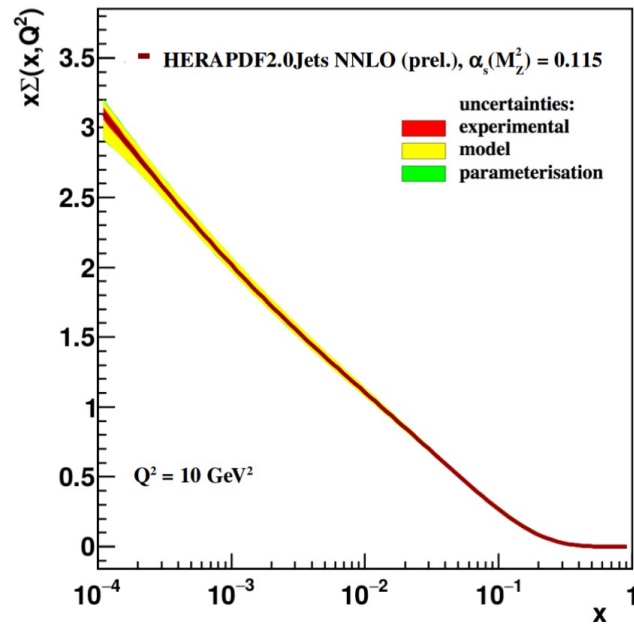
H1 and ZEUS preliminary



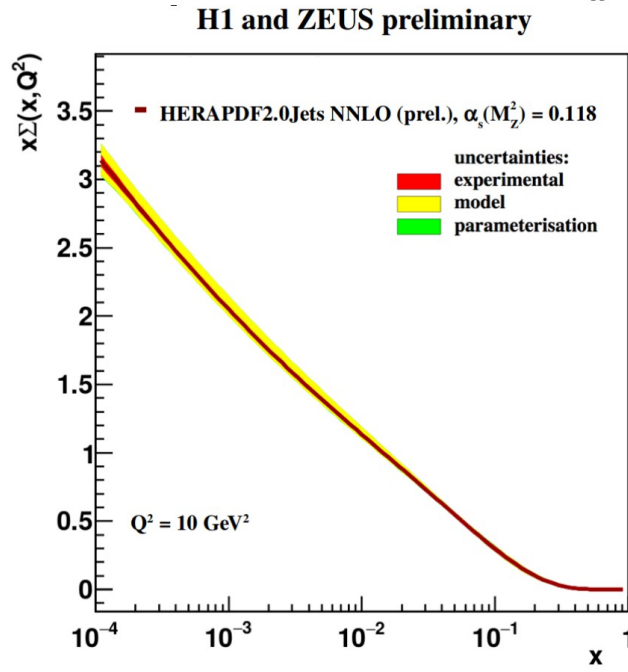
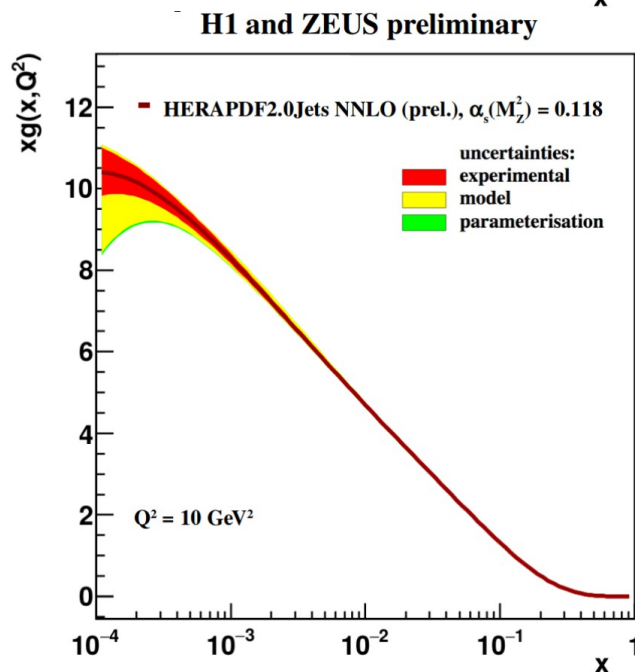
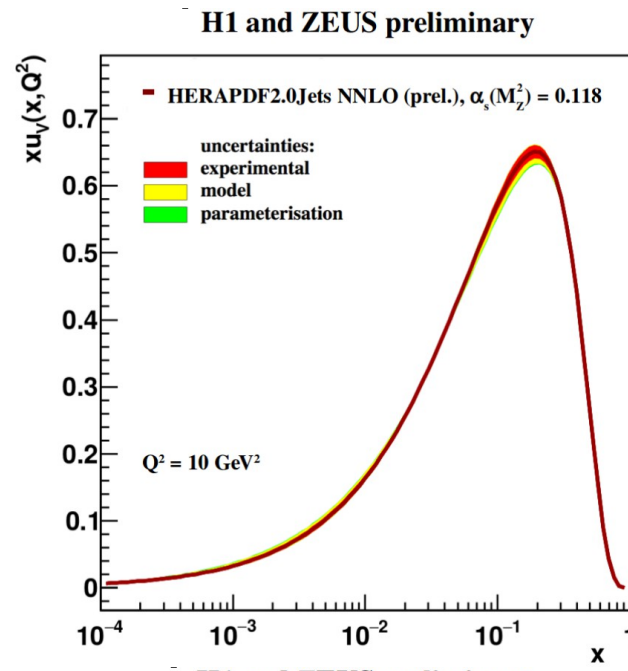
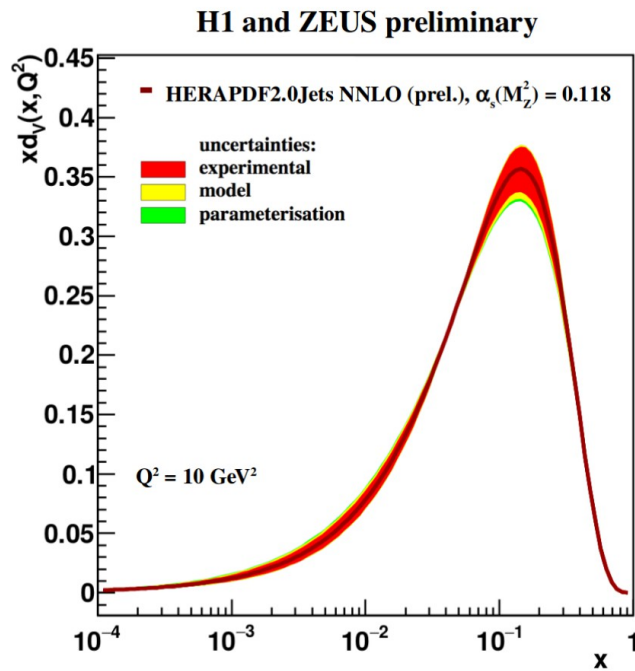
H1 and ZEUS preliminary



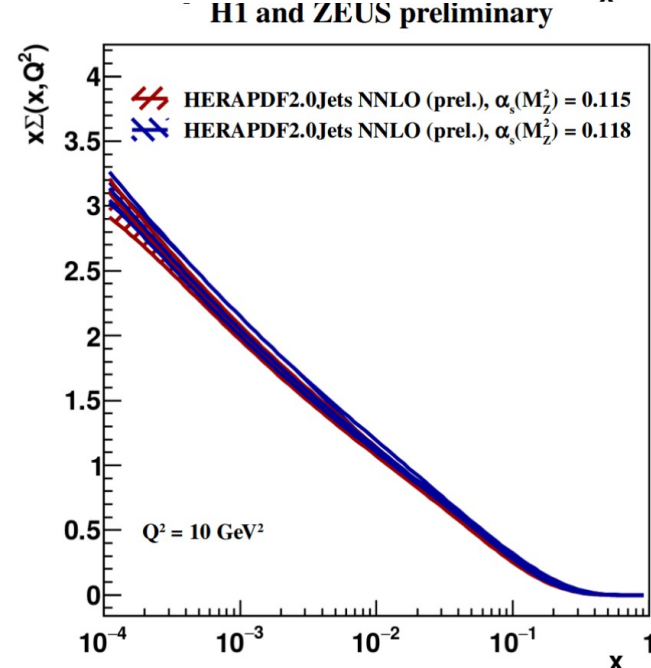
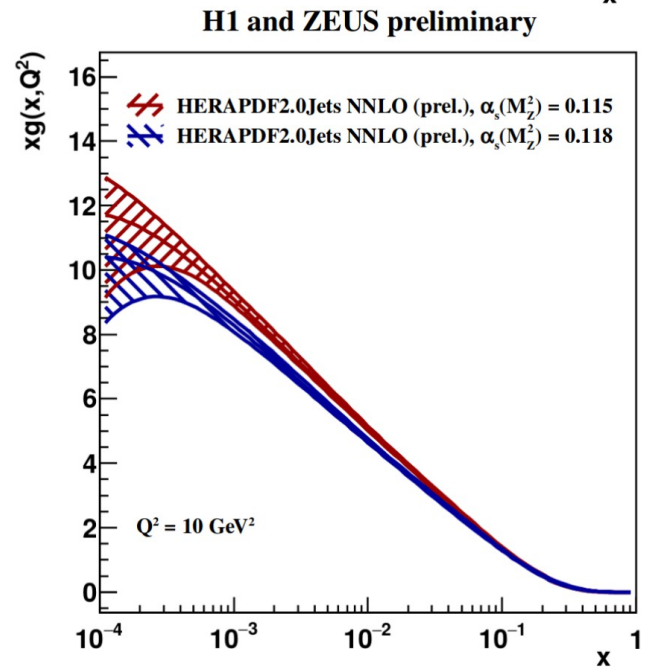
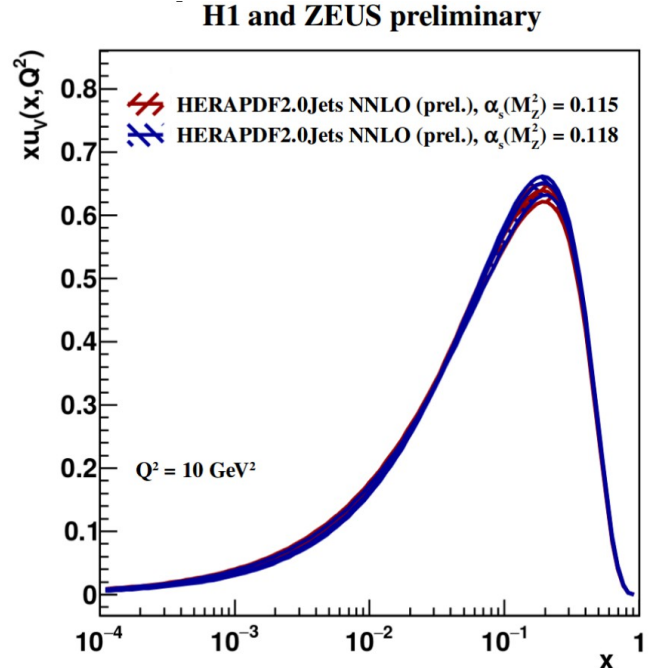
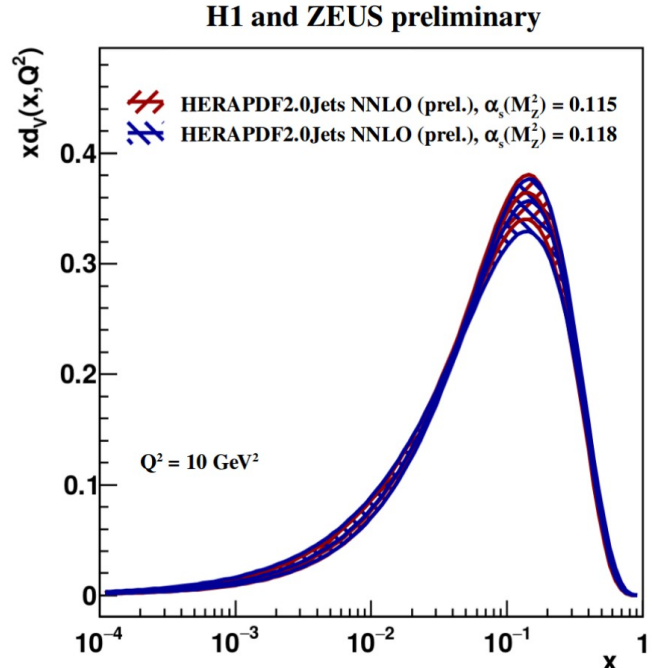
H1 and ZEUS preliminary



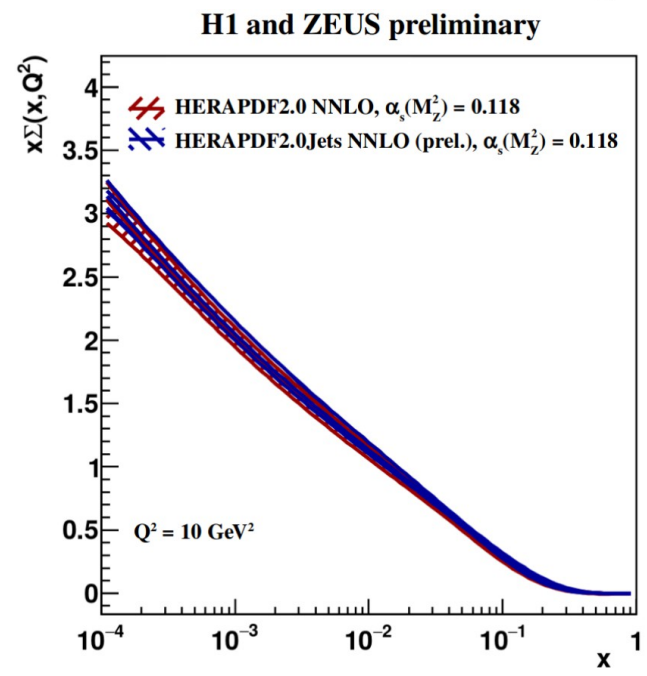
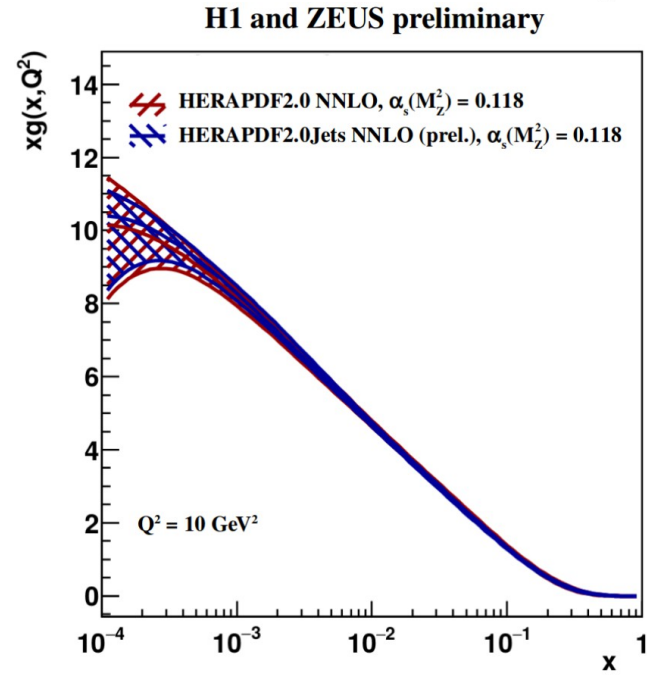
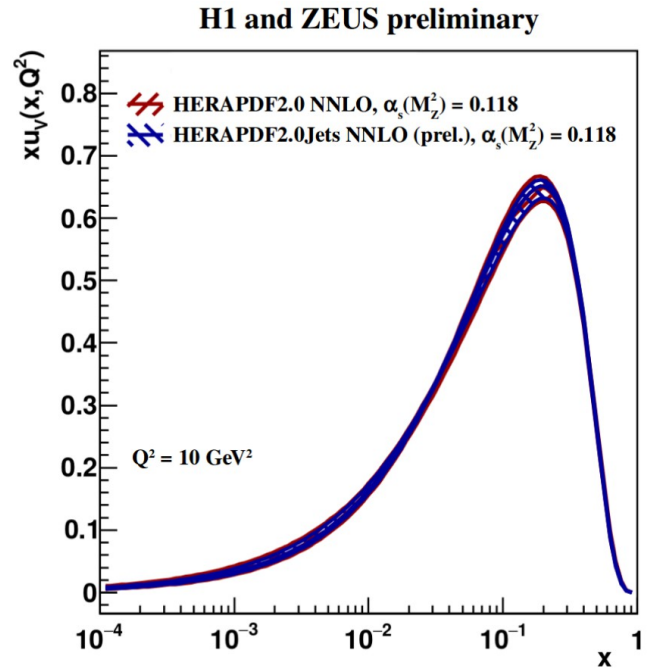
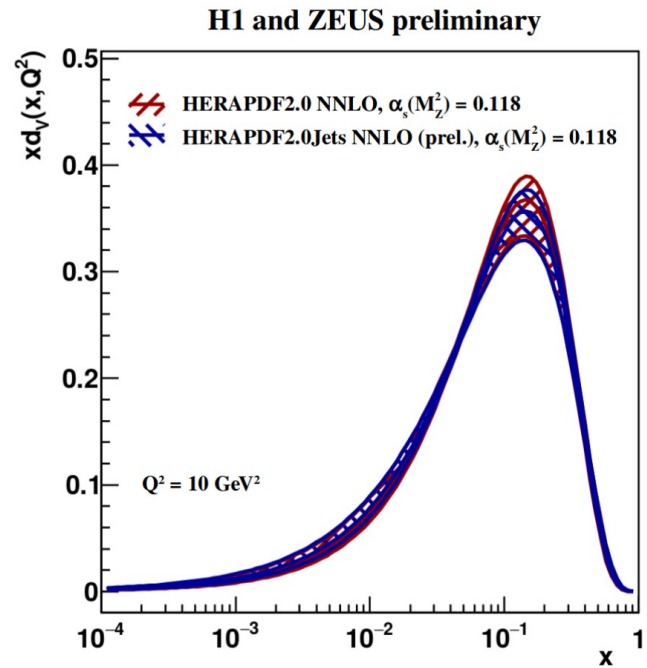
PDFs, fixed $\alpha_s = 0.118$, $Q^2_{\min} = 3.5 \text{ GeV}^2$



PDFs, fixed $\alpha_s = 0.115$ and 0.118 $Q^2_{\min} = 3.5 \text{ GeV}^2$

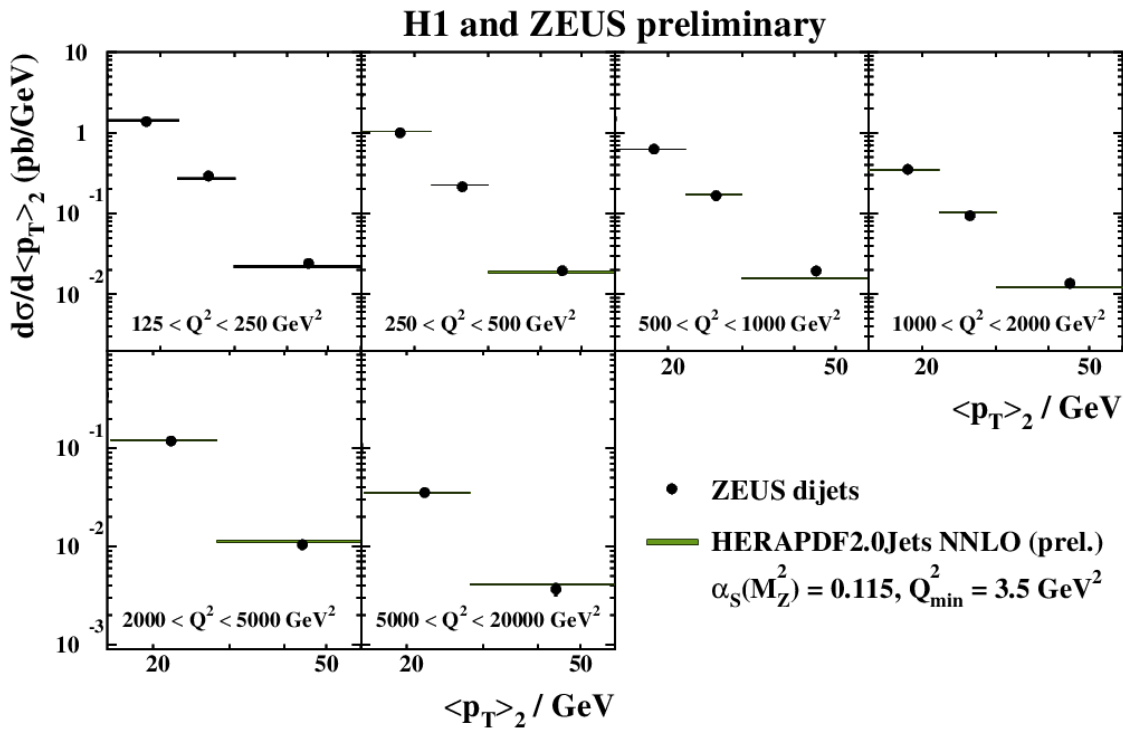
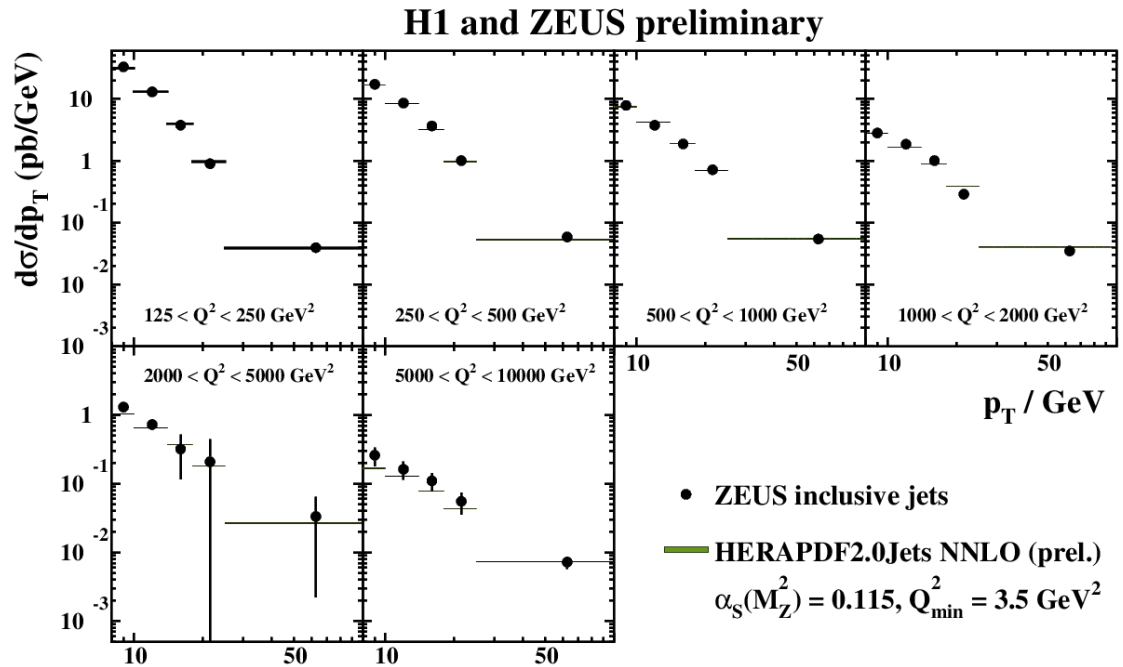


PDFs, comparison to HERAPDF2.0 NNLO



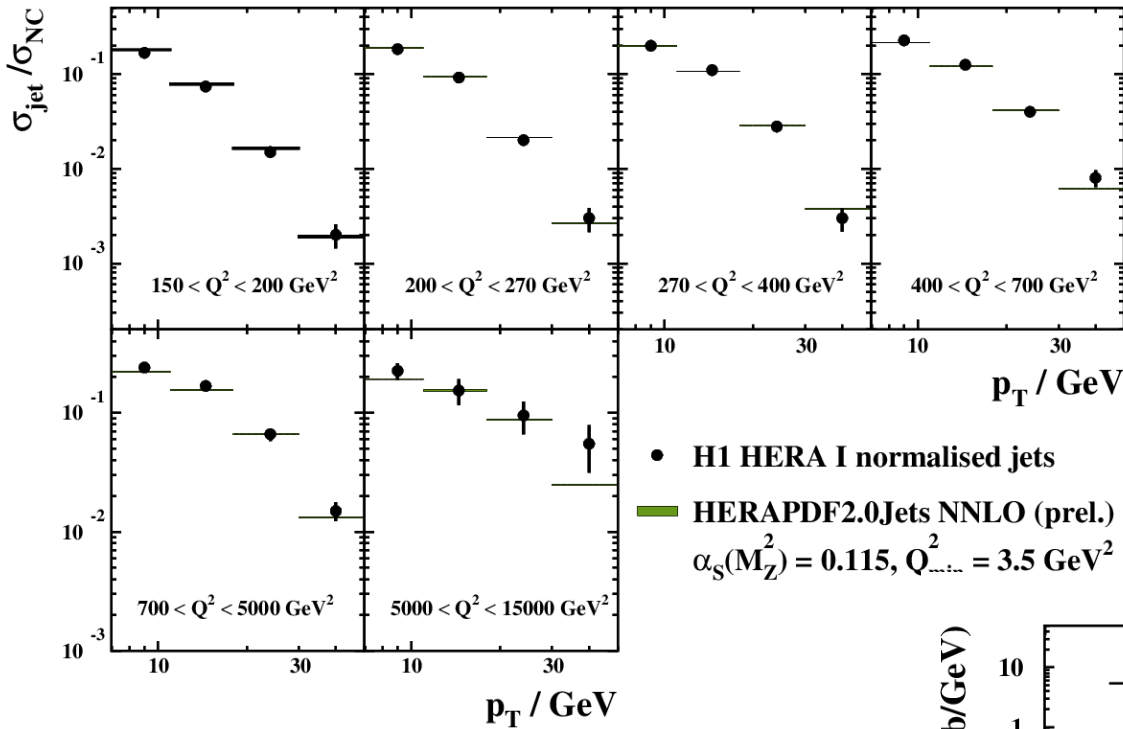
Comparison to data

Comparison to date: ZEUS jets

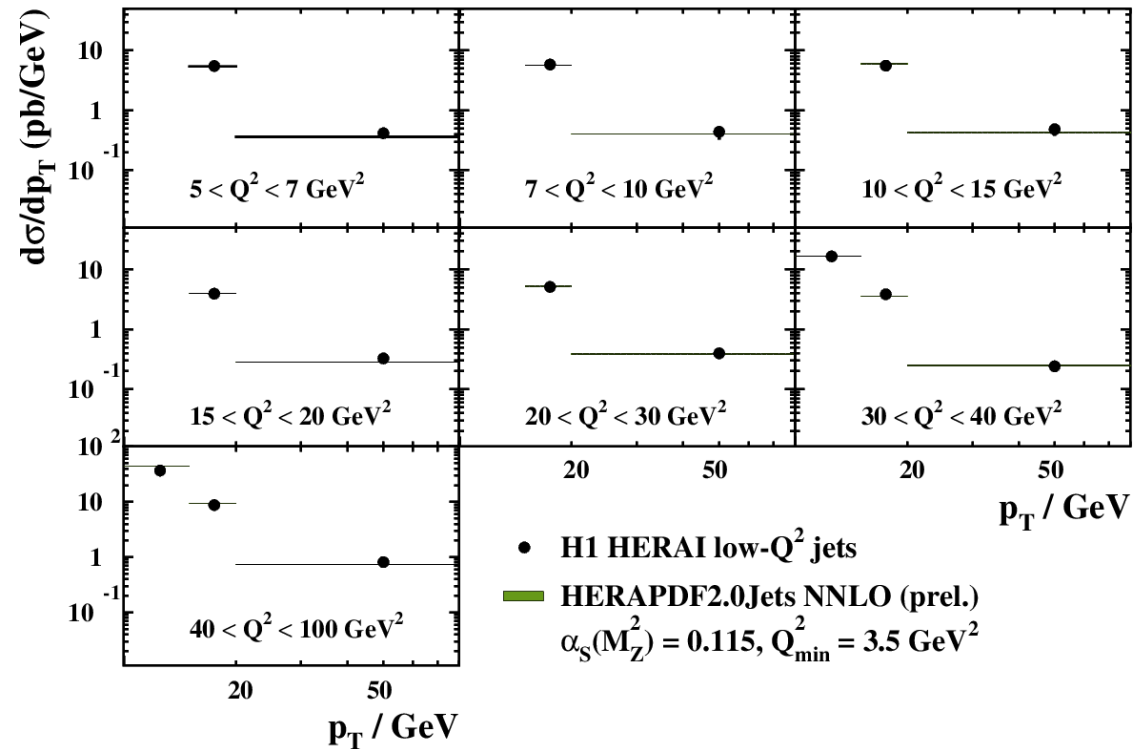


Comparison to data: H1 HERAI jets

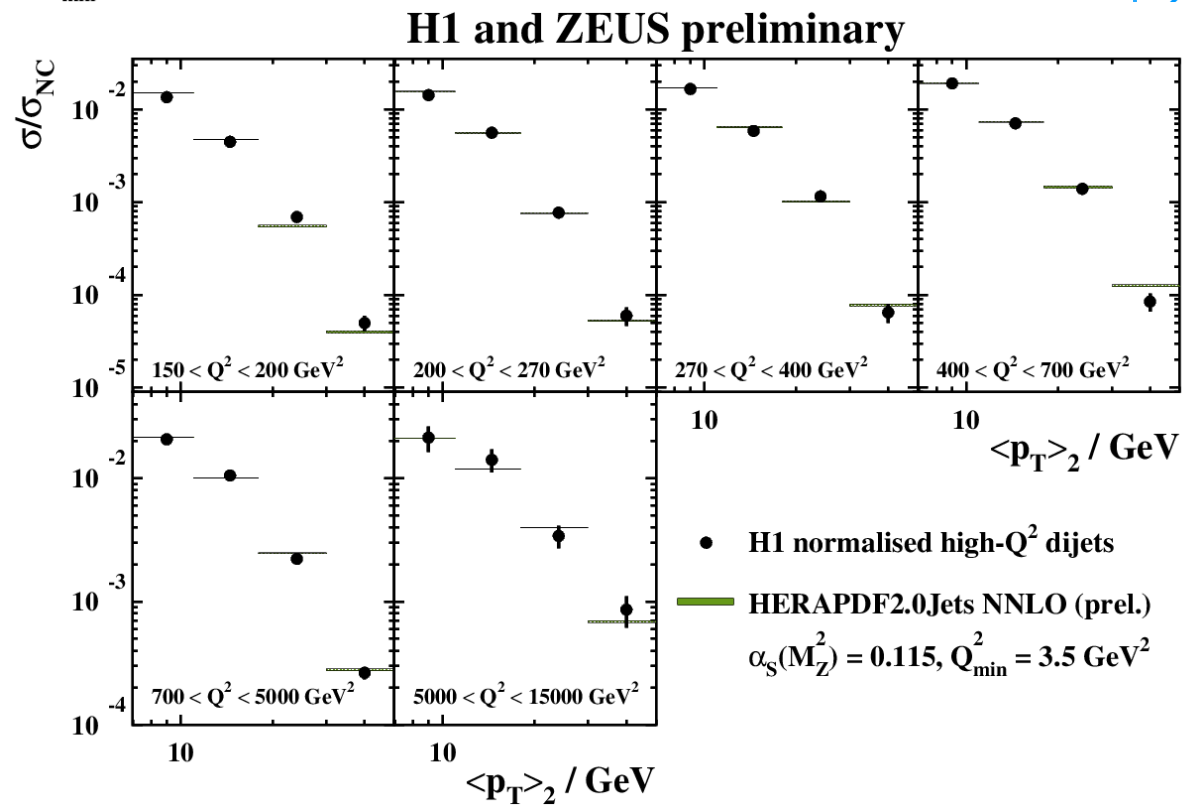
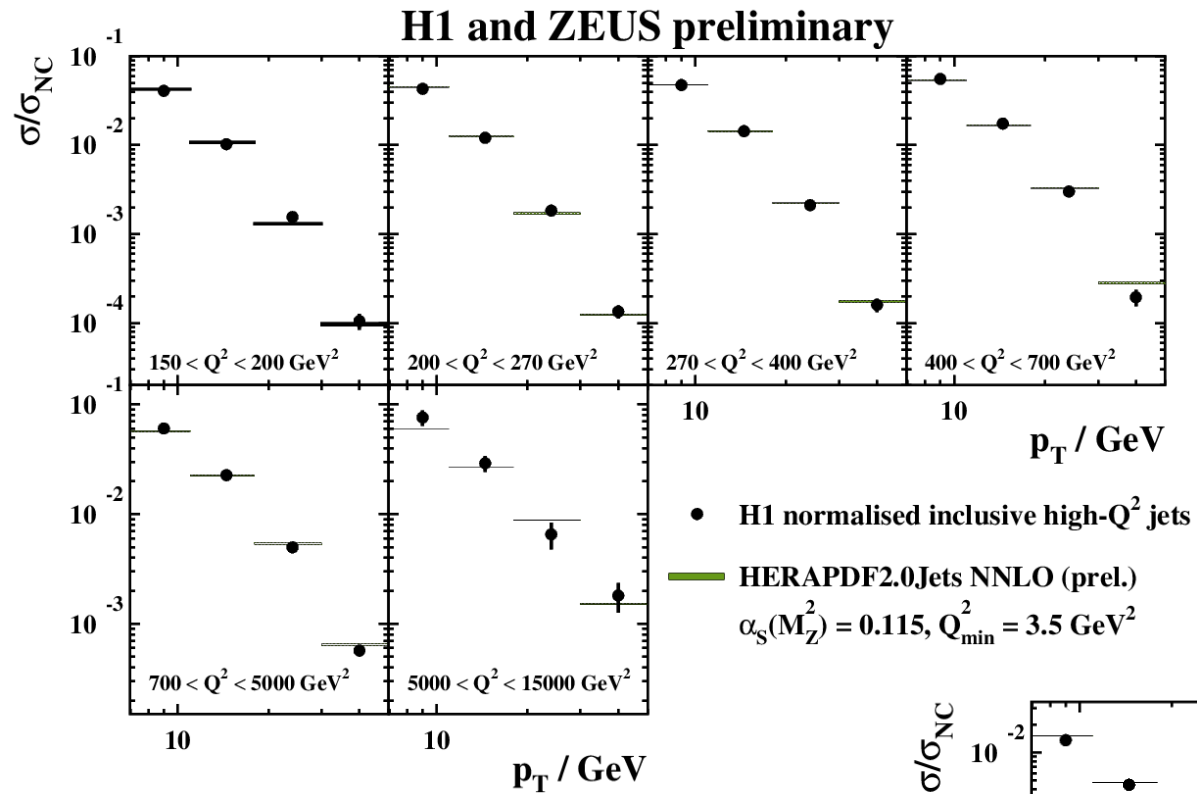
H1 and ZEUS preliminary



H1 and ZEUS preliminary

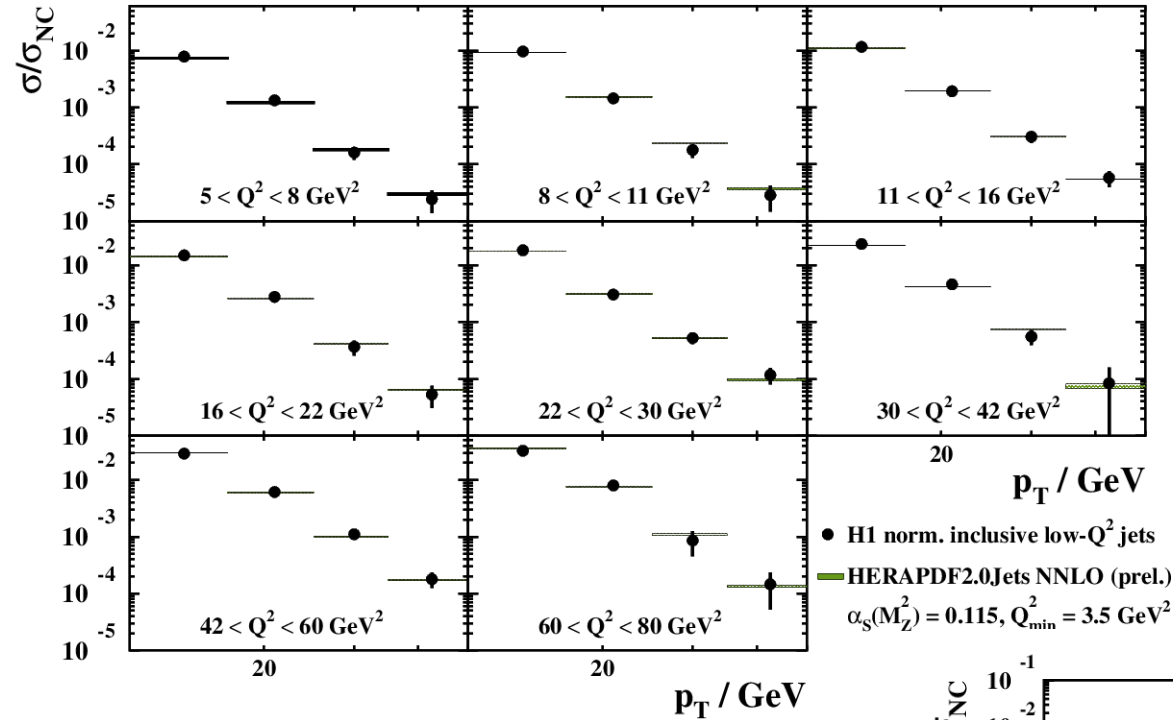


Comparison to data: H1 high- Q^2 jets



Comparison to data: H1 low- Q^2 jets

H1 and ZEUS preliminary



H1 and ZEUS preliminary

