

Validphys Report

NNPDF revision 528M

The NNPDF Collaboration

February 5, 2013

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VALIDPHYS 528M	Current Fit	Reference	CTEQ	MSTW
PDF set name	NNPDF23 nlo FFN NF5 as 0118 mc	NNPDF23 nlo FFN NF5 as 0118	CT10nlo	MSTW2008nlo90c

Table 1: Configuration file

1 Fit summary

- This is the description block, please update these lines before run.

Parameter	Current Fit	Reference Fit
χ_{tot}^2 (exp)	1.14	1.09
$\langle E \rangle \pm \sigma_E$	2.21±0.06	2.21±0.06
$\langle E_{\text{tr}} \rangle \pm \sigma_{E_{\text{tr}}}$	2.17±0.09	2.17±0.09
$\langle E_{\text{val}} \rangle \pm \sigma_{E_{\text{val}}}$	2.25±0.08	2.25±0.08
$\langle \text{TL} \rangle \pm \sigma_{\text{TL}}$	18539±6918	18539±6918
$\langle \chi^{2(k)} \rangle \pm \sigma_{\chi^{2(k)}}$	1.15±0.07	1.15±0.06
$\langle \sigma^{(\text{exp})} \rangle_{\text{dat}}$	14.89%	14.89%
$\langle \sigma^{(\text{net})} \rangle_{\text{dat}}$	2.99%	3.16%
$\langle \rho^{(\text{exp})} \rangle_{\text{dat}}$	3.81e-01	3.81e-01
$\langle \rho^{(\text{net})} \rangle_{\text{dat}}$	6.14e-01	5.96e-01
$\langle \text{cov}^{(\text{exp})} \rangle_{\text{dat}}$	1.87e+08	1.87e+08
$\langle \text{cov}^{(\text{net})} \rangle_{\text{dat}}$	1.41e+06	1.00e+06
$x\Sigma + xg$	1.00647e+00±3.63391e-03	1.00007e+00±9.98626e-04
u_v	2.00180e+00±2.12924e-02	2.00026e+00±3.18329e-03
d_v	1.00118e+00±2.07796e-02	9.99875e-01±3.17094e-03
s_v	-1.42822e-03±3.35335e-03	2.57373e-05±2.20505e-04
xs_v	1.96326e-03±1.37676e-03	3.11441e-03±1.91984e-03
K_s	3.48177e-01±6.90246e-02	3.01337e-01±7.88285e-02
Δ_s	1.29872e-01±3.78605e-02	1.29353e-01±3.80011e-02

Table 2: Summary.

2 Comparing PDFs

2.1 Distances

NNPDF Fit vs Reference Distances

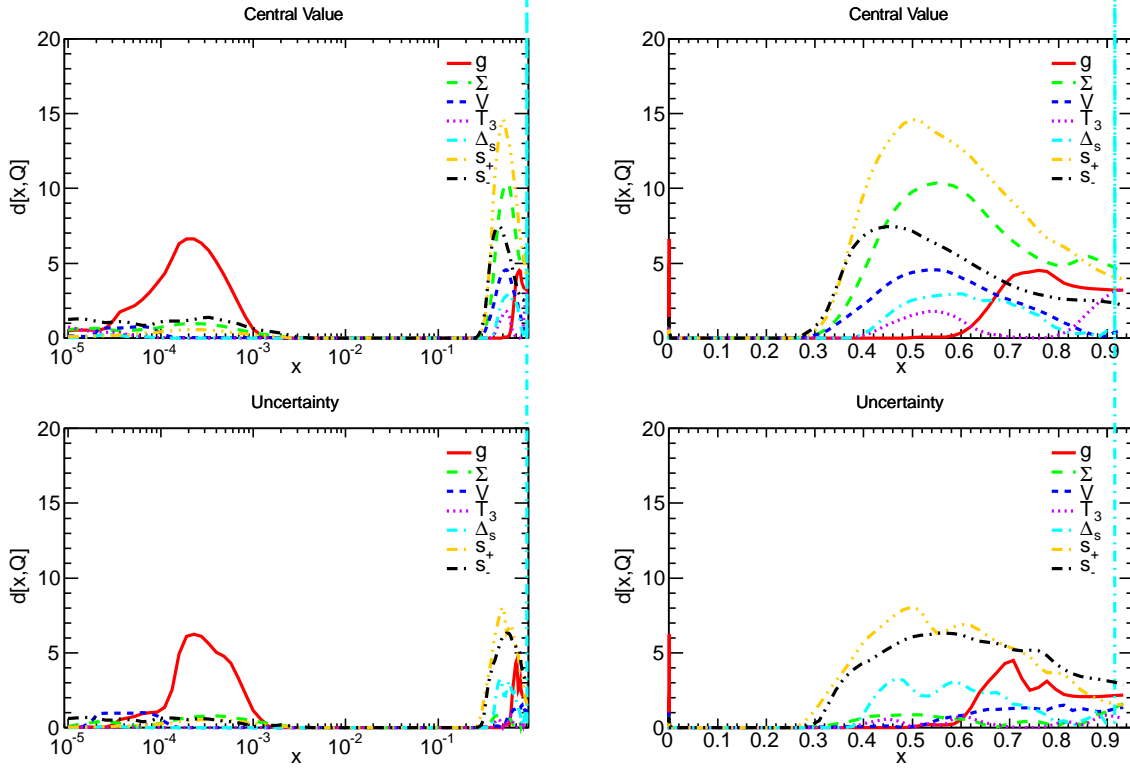


Figure 1: Distances in the fitting basis.

NNPDF Fit vs Reference Distances

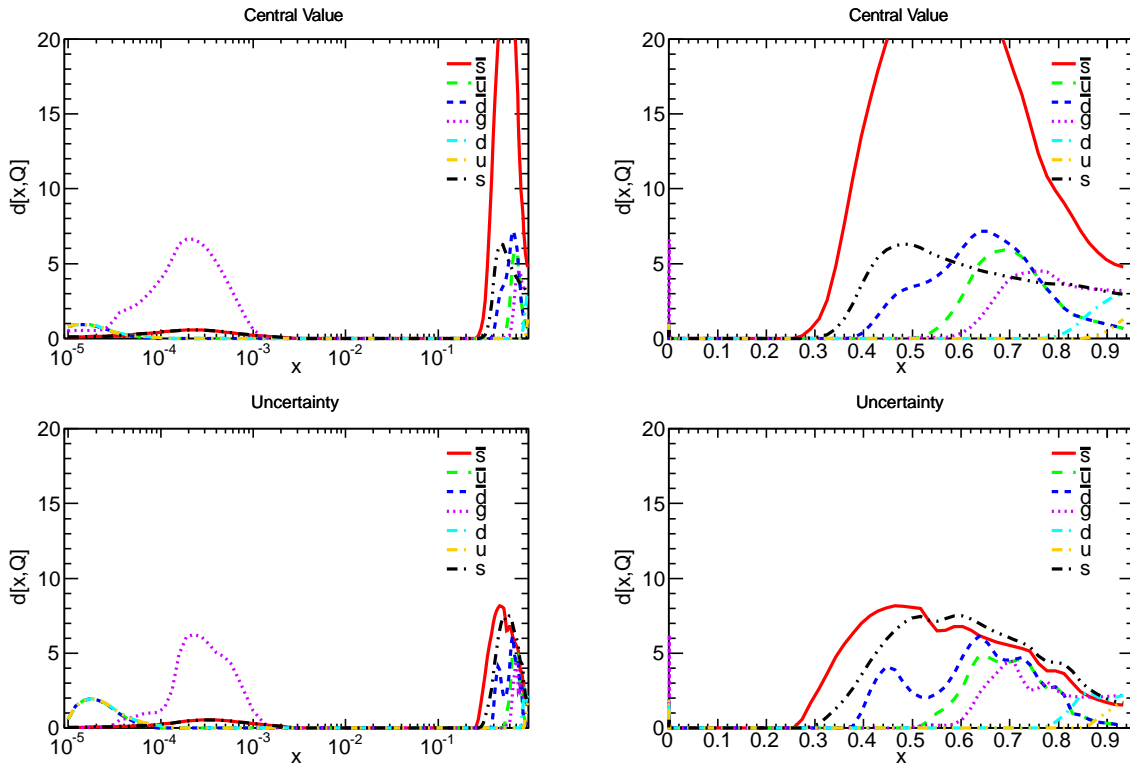


Figure 2: Distances in the flavour basis.

2.2 Comparing PDFs in evolution basis

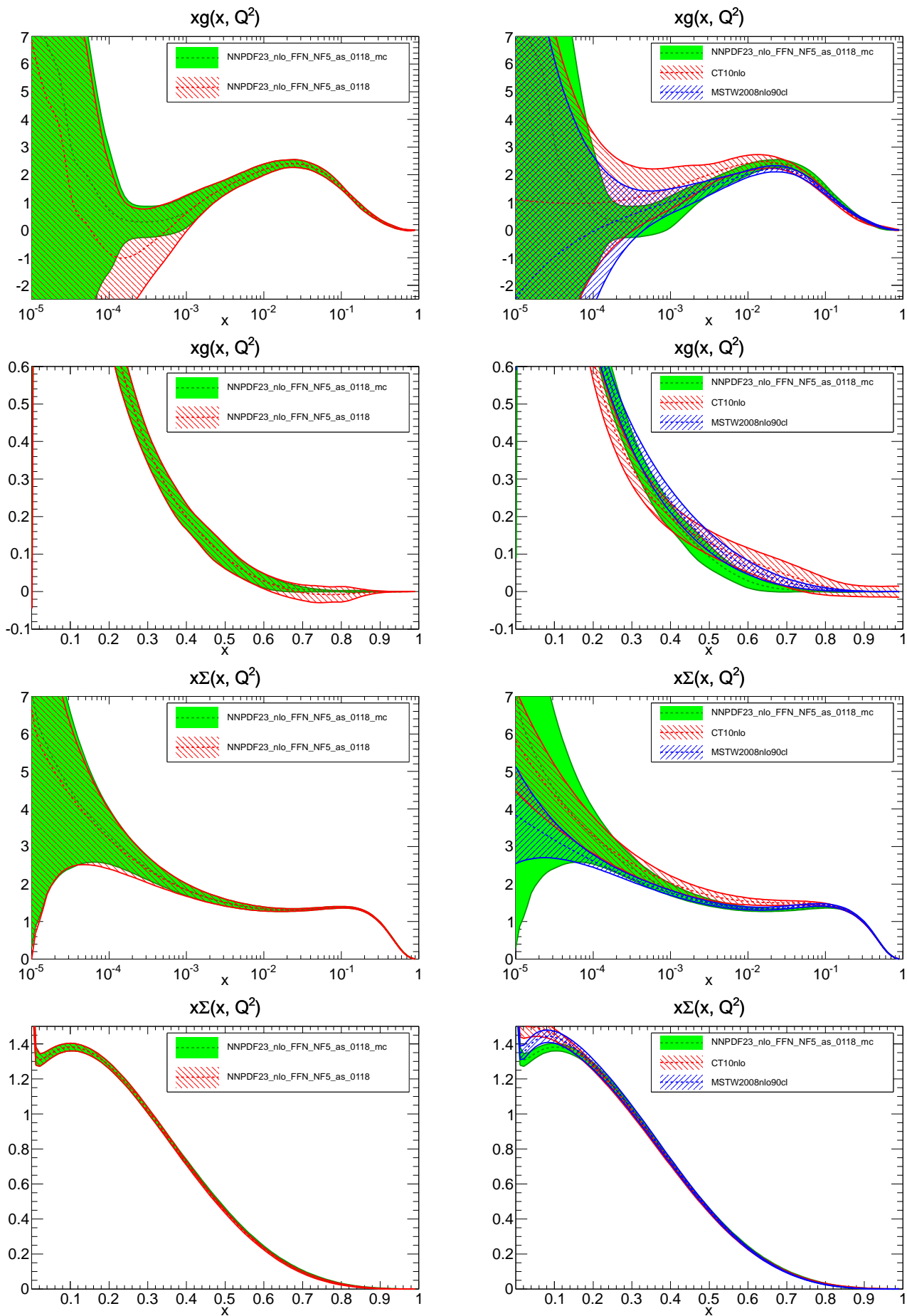


Figure 3: Comparison between PDFs at $Q^2 = 2.0e + 00 \text{ GeV}^2$.

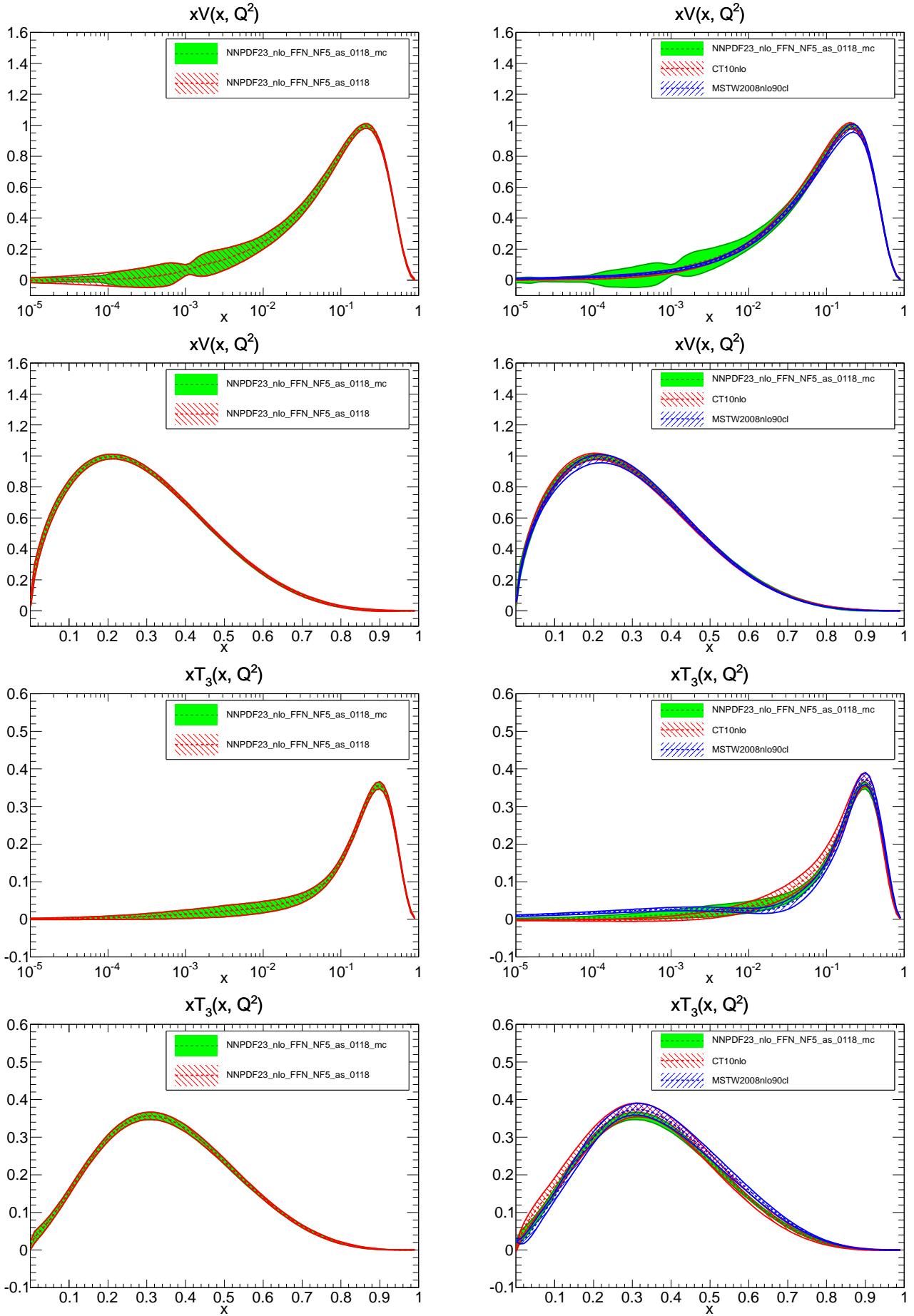


Figure 4: Comparison between PDFs at $Q^2 = 2.0e + 00 \text{ GeV}^2$.

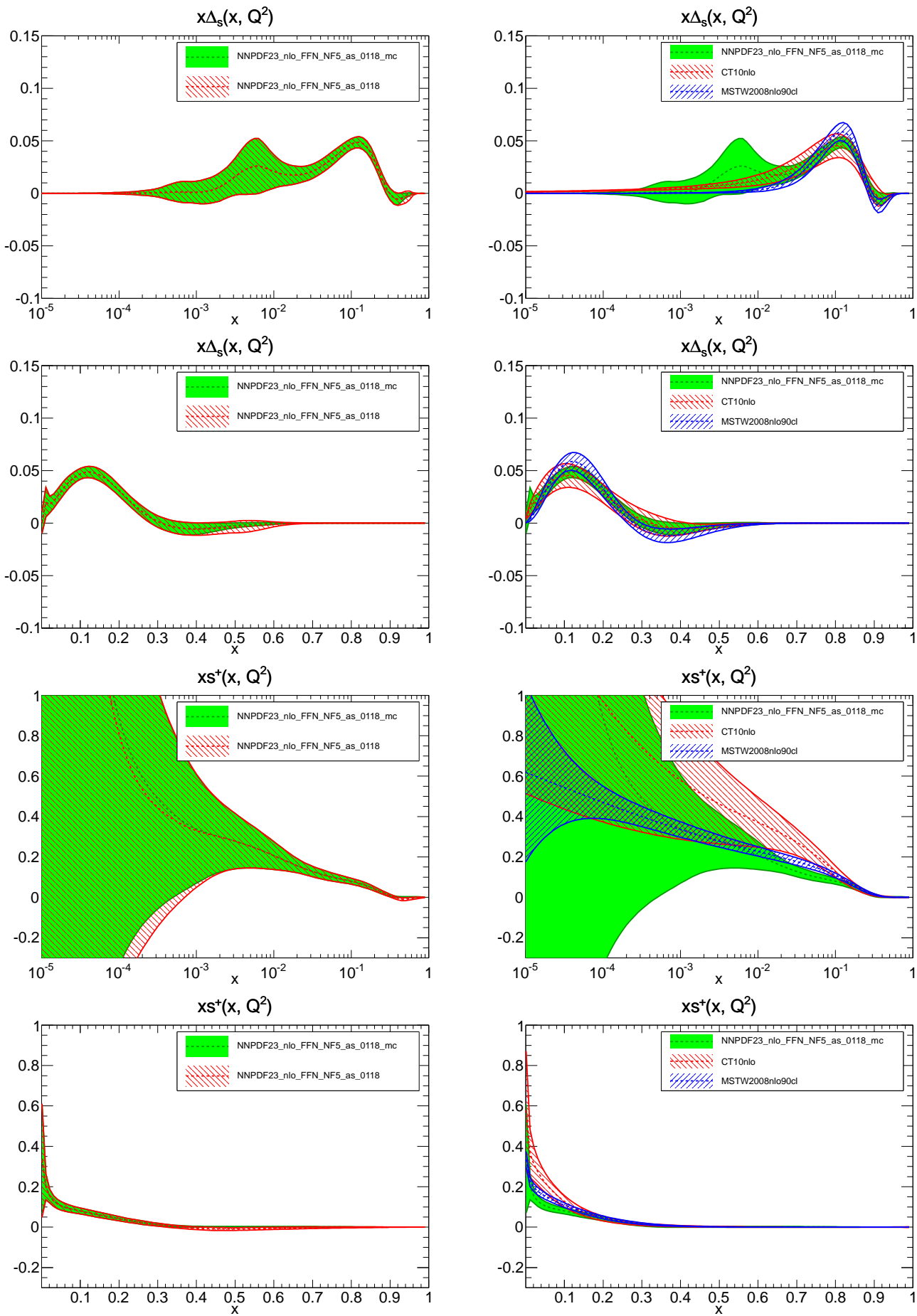


Figure 5: Comparison between PDFs at $Q^2 = 2.0e + 00 \text{ GeV}^2$.

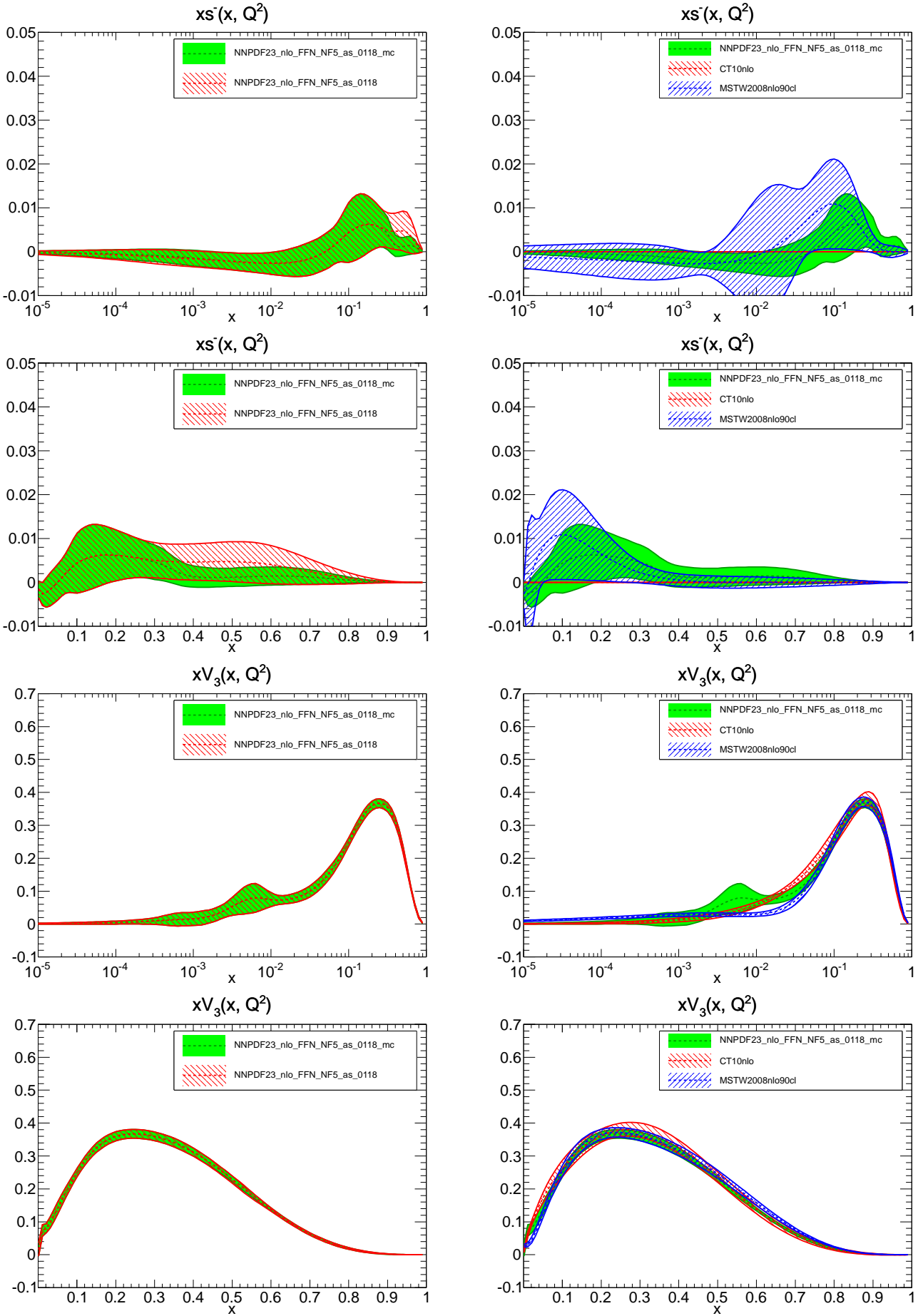


Figure 6: Comparison between PDFs at $Q^2 = 2.0e + 00 \text{ GeV}^2$.

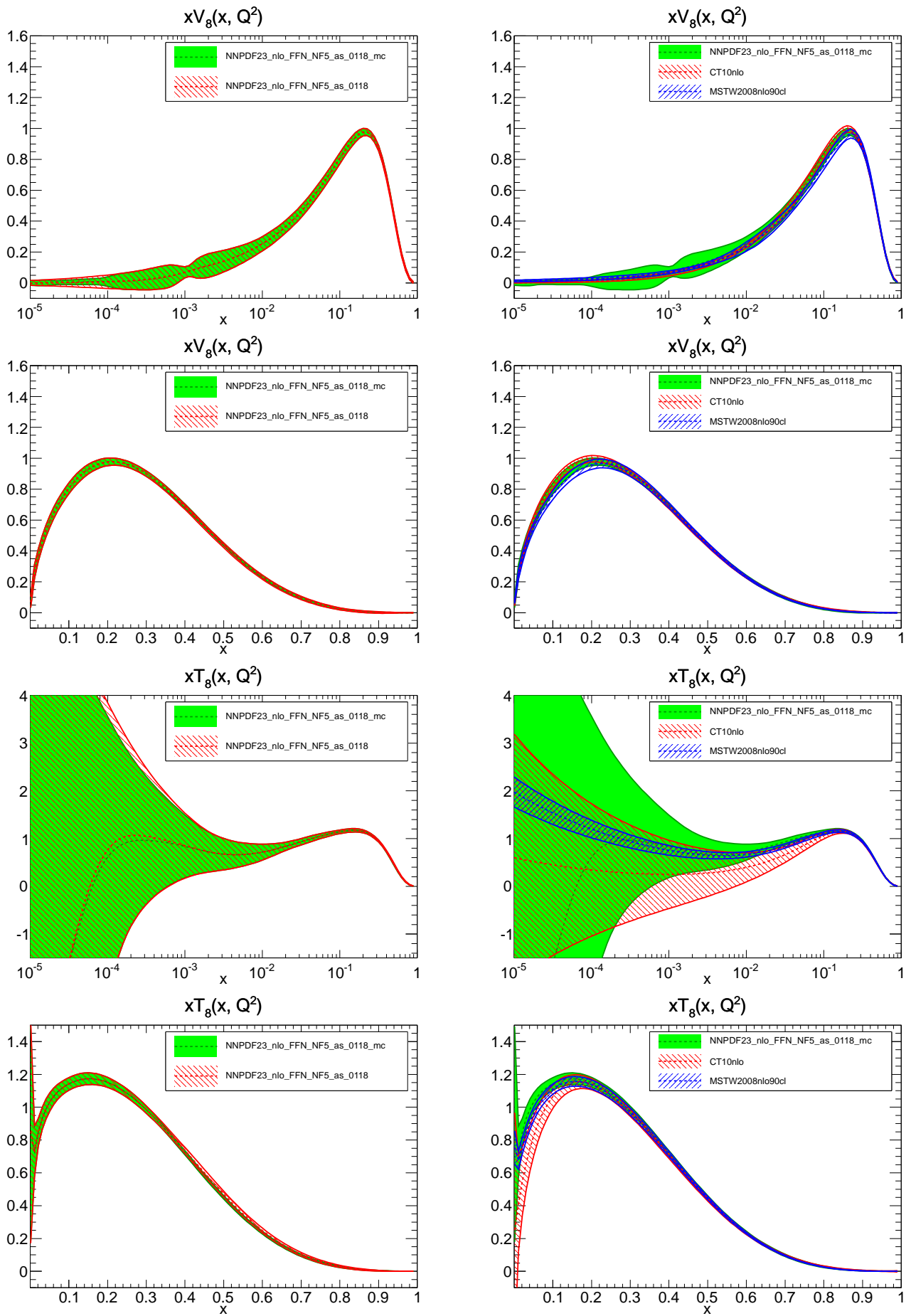


Figure 7: Comparison between PDFs at $Q^2 = 2.0e + 00 \text{ GeV}^2$.

2.3 Comparing PDFs in LHA basis

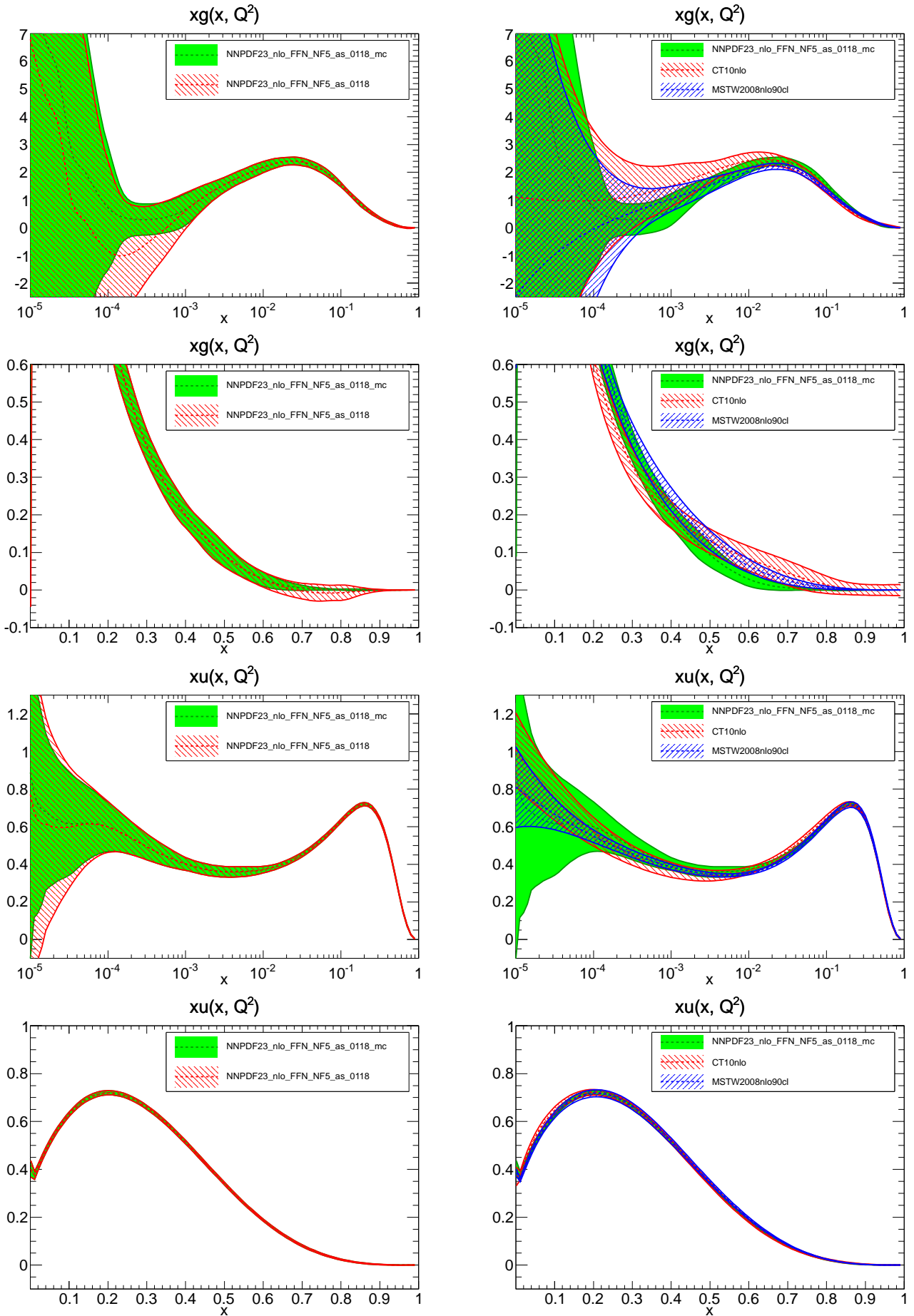


Figure 8: Comparison between PDFs at $Q^2 = 2.0e + 00 \text{ GeV}^2$.

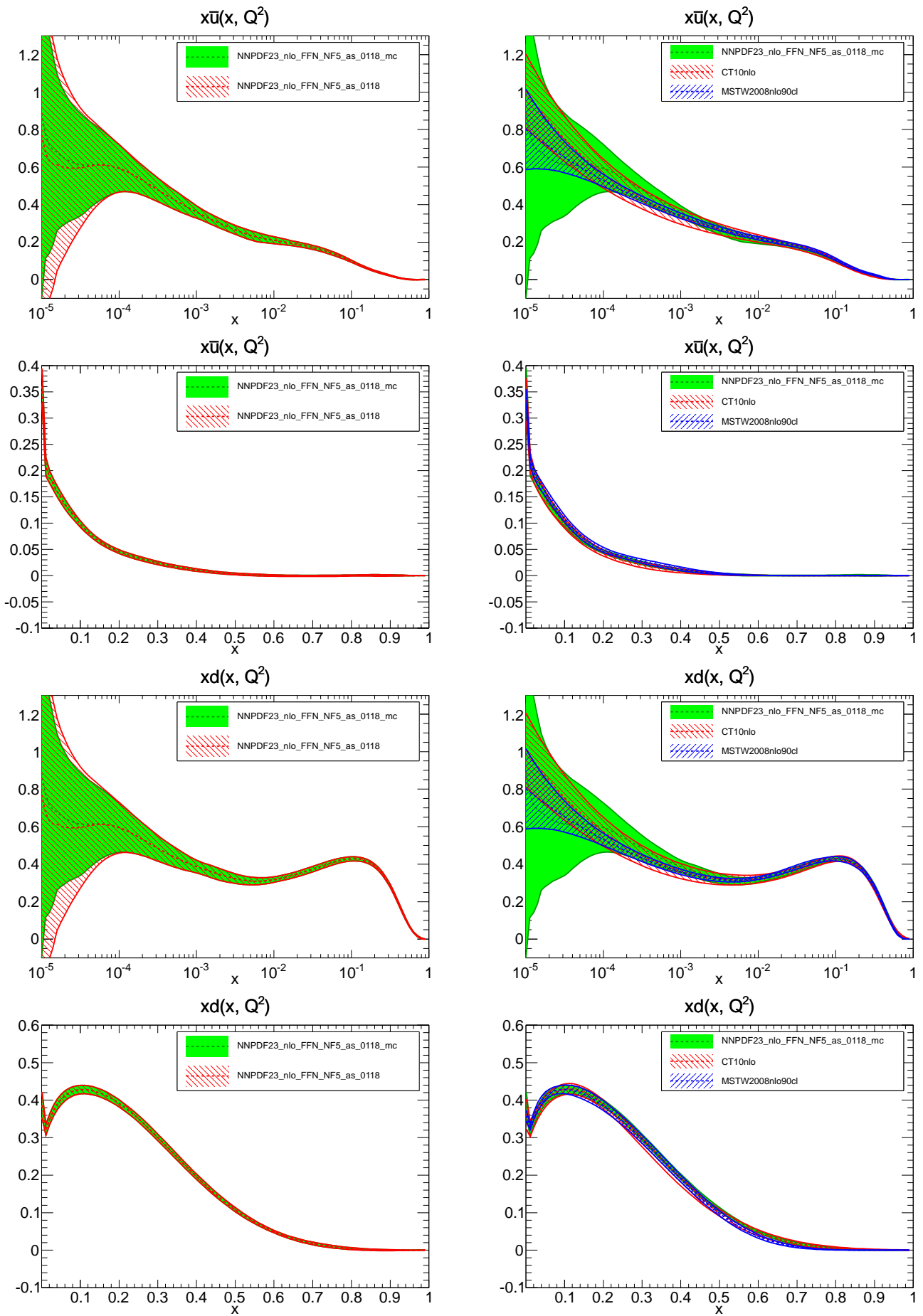


Figure 9: Comparison between PDFs at $Q^2 = 2.0e + 00 \text{ GeV}^2$.

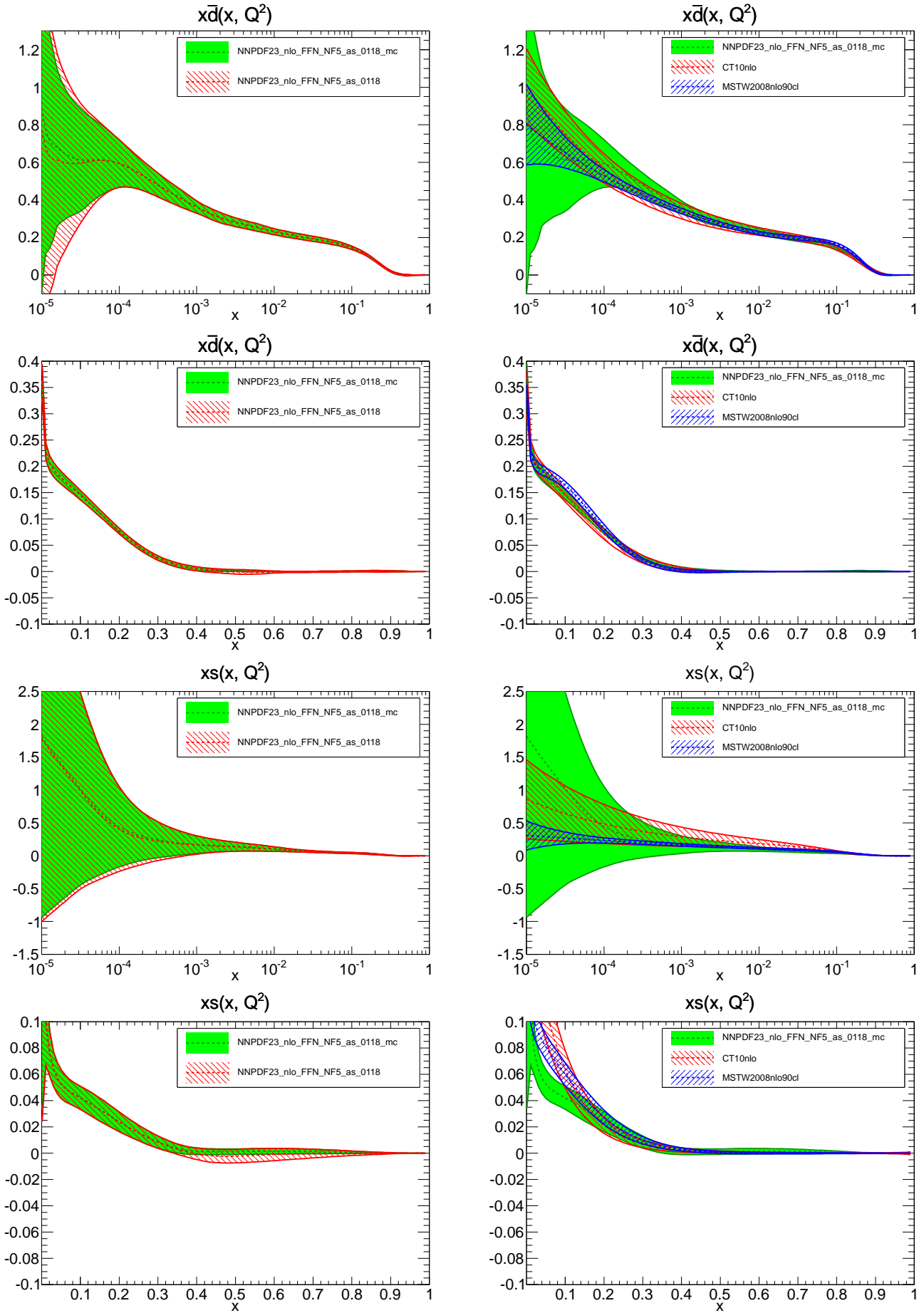


Figure 10: Comparison between PDFs at $Q^2 = 2.0e + 00 \text{ GeV}^2$.

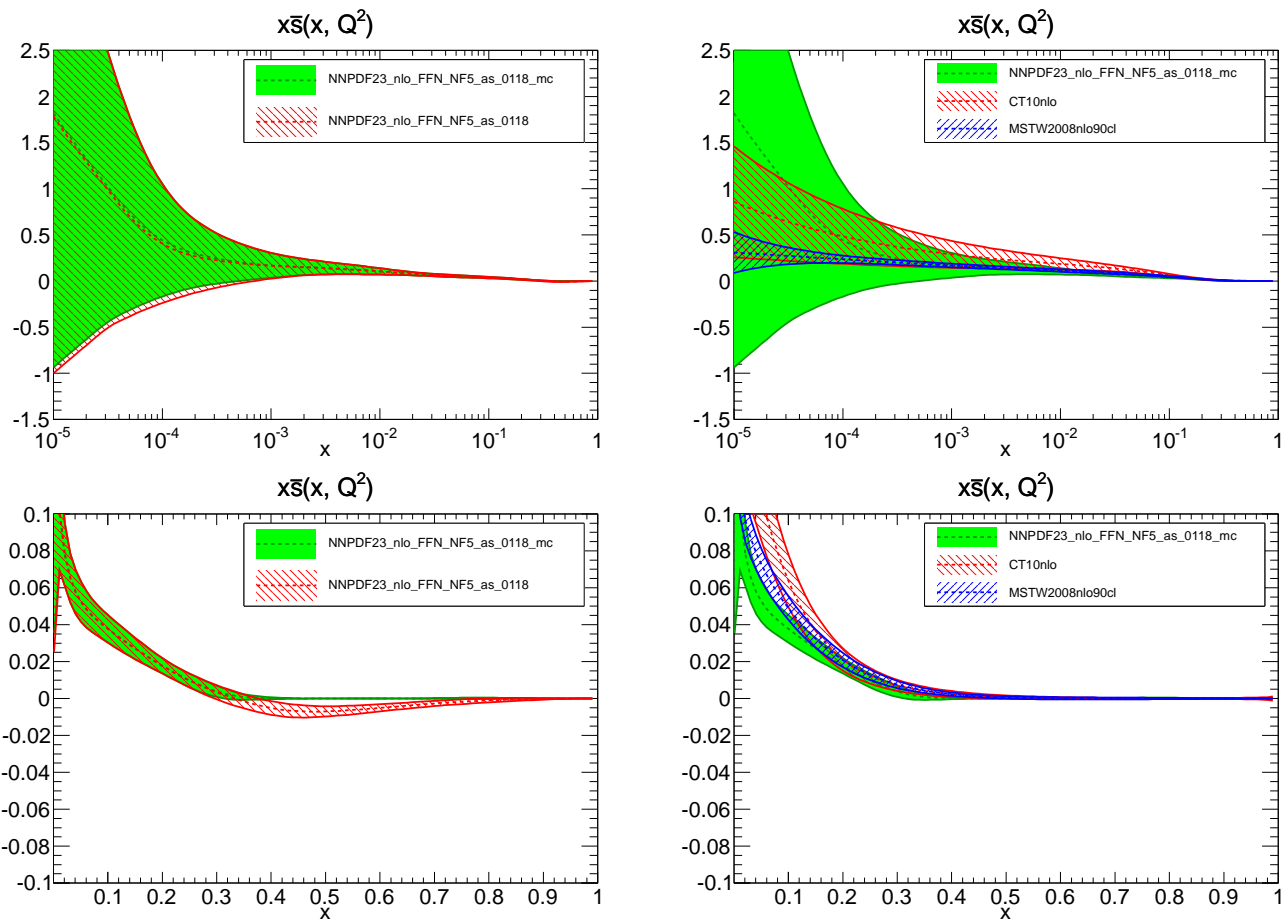


Figure 11: Comparison between PDFs at $Q^2 = 2.0e + 00 \text{ GeV}^2$.

2.4 Replicas in the evolution basis

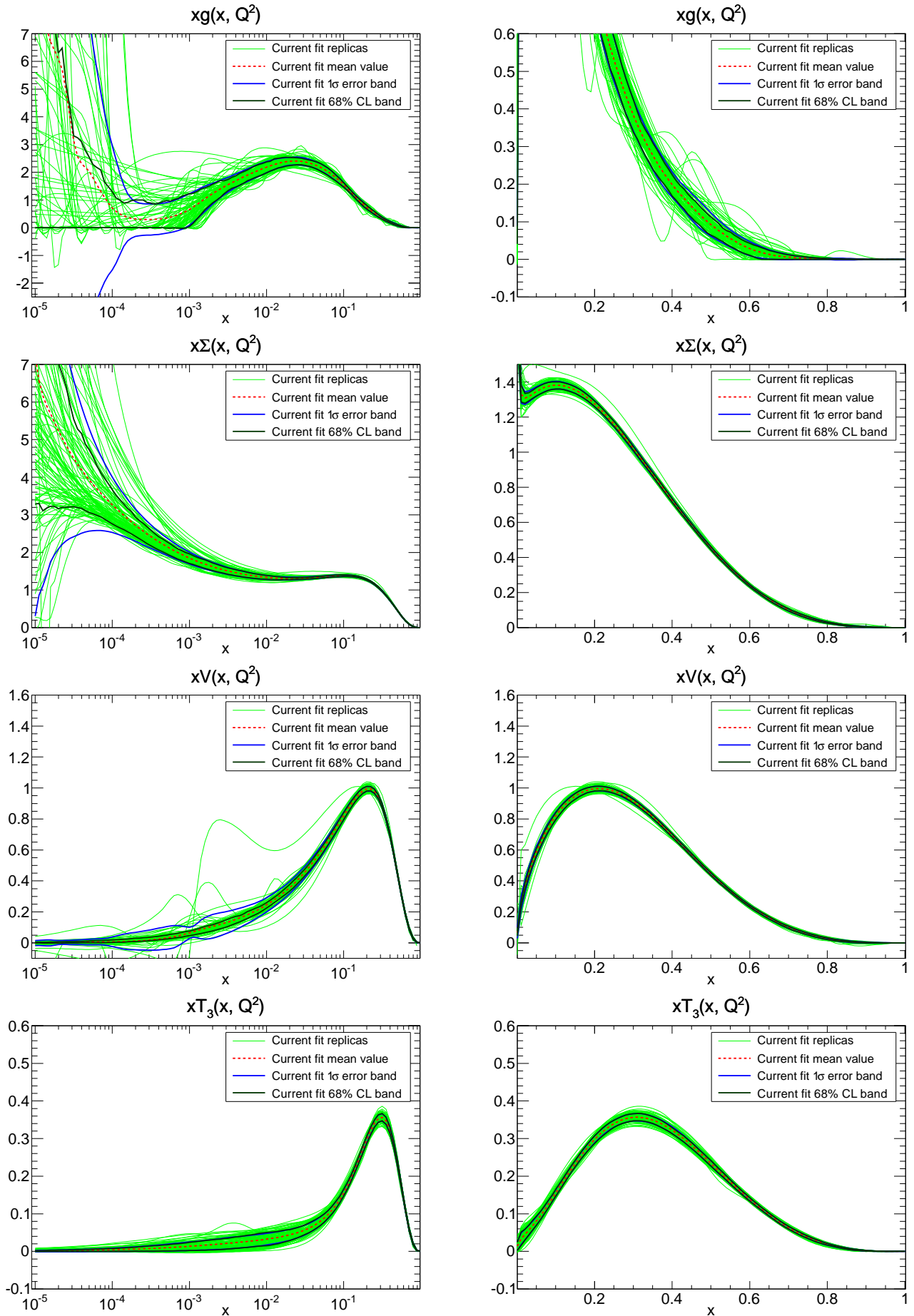


Figure 12: Current fit PDFs in the evolution basis at $Q^2 = 2.0e + 00 \text{ GeV}^2$.

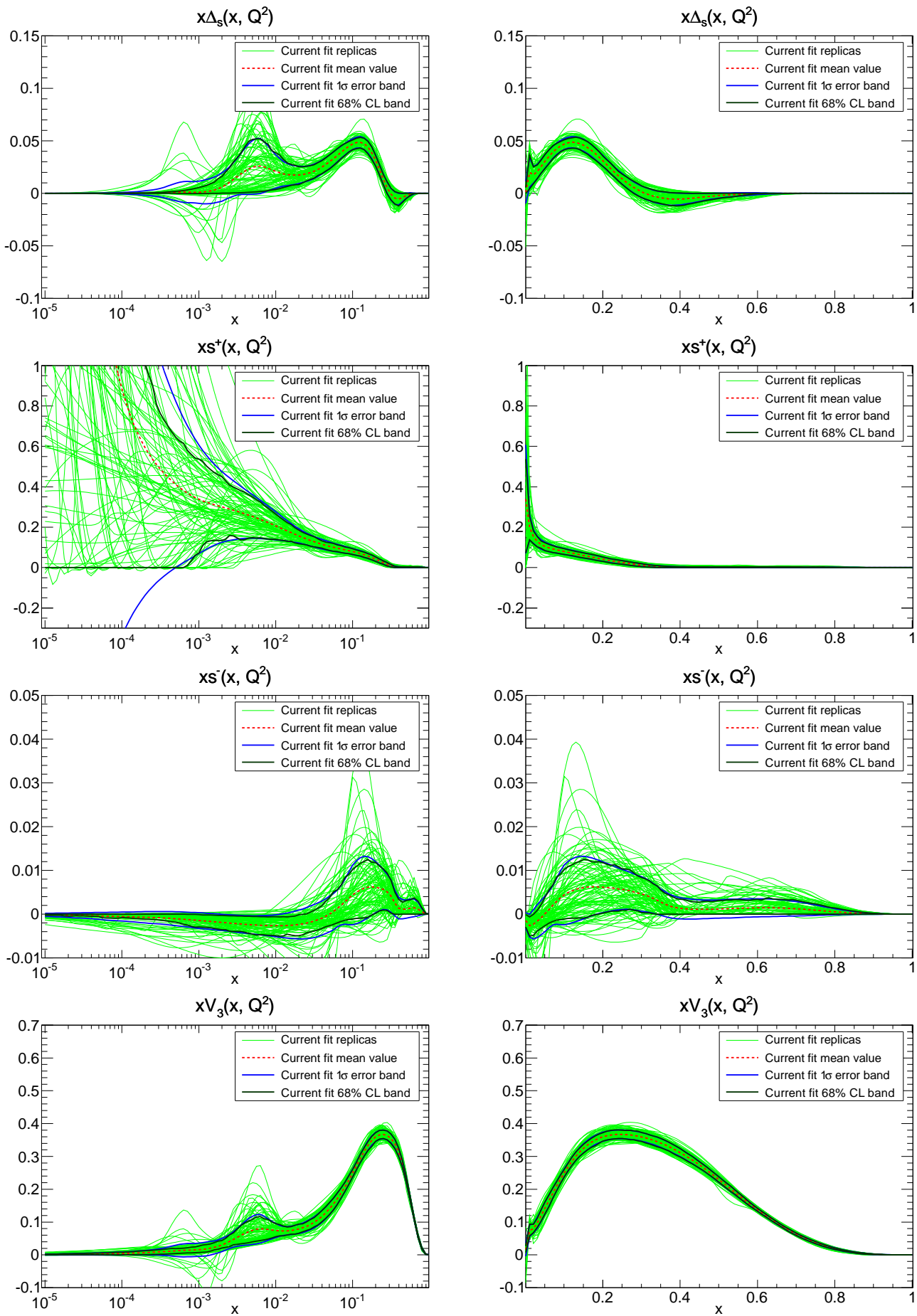


Figure 13: Current fit PDFs in the evolution basis at $Q^2 = 2.0e+00 \text{ GeV}^2$.

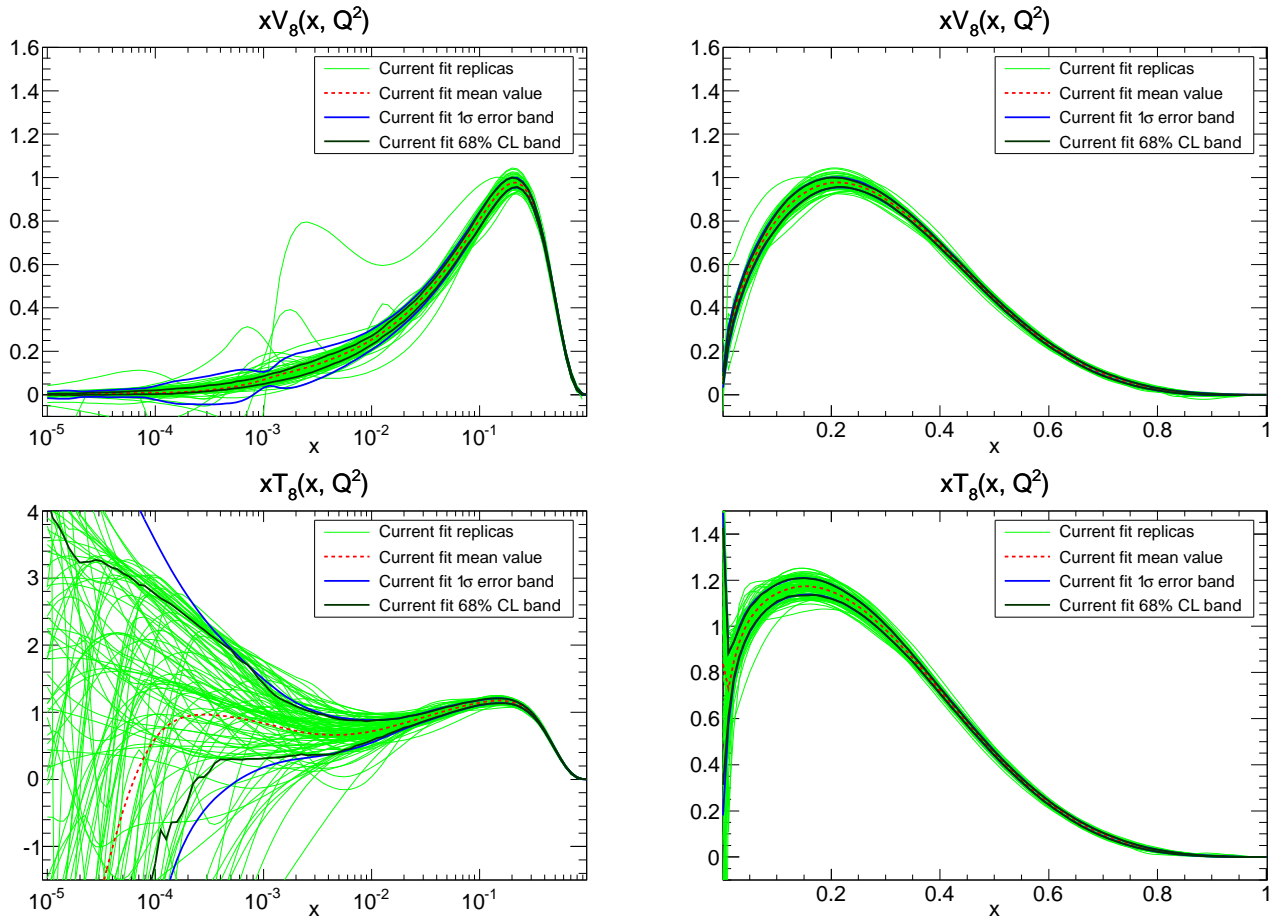


Figure 14: Current fit PDFs in the evolution basis at $Q^2 = 2.0e + 00 \text{ GeV}^2$.

2.5 Replicas in the LH basis

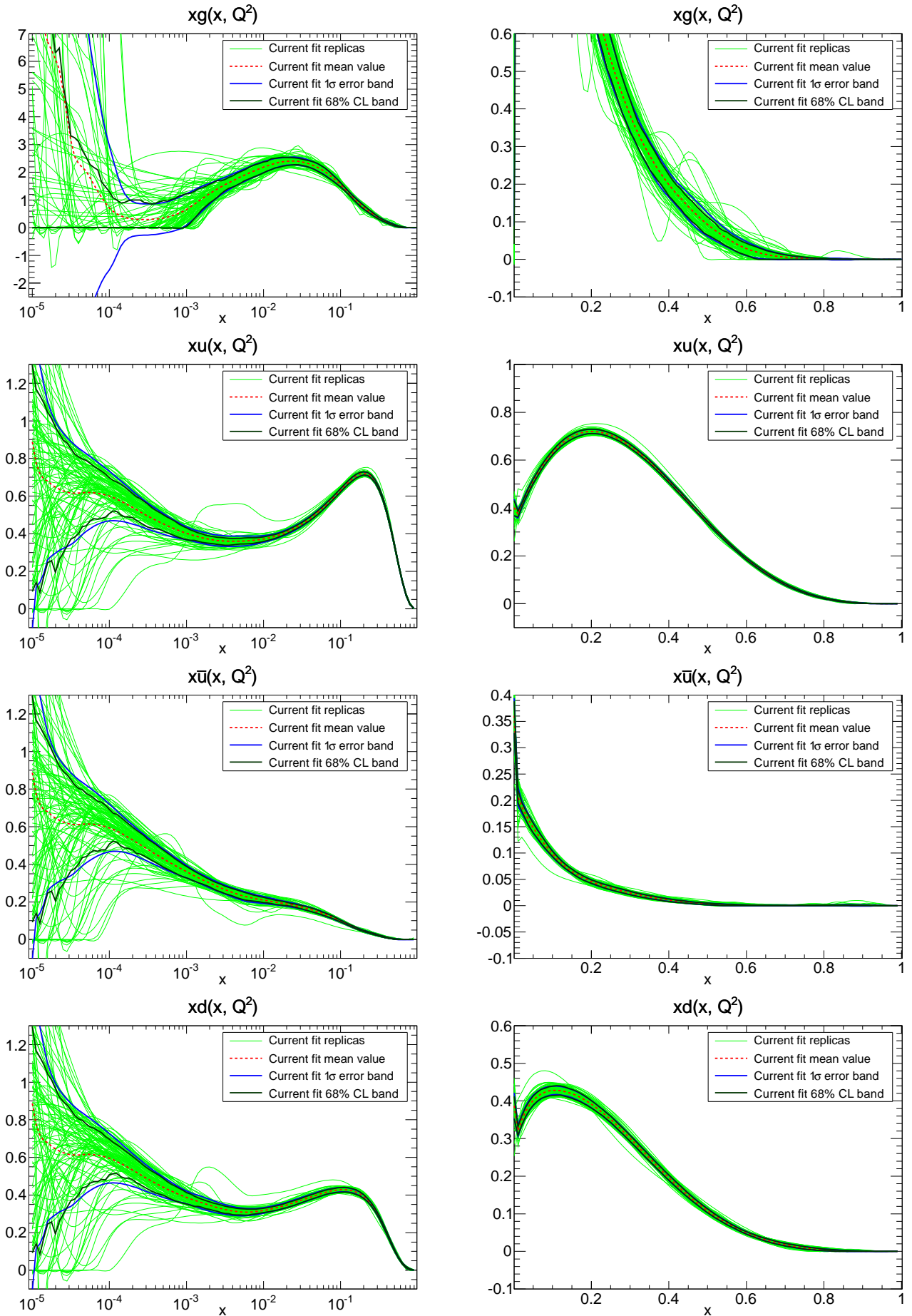


Figure 15: Current fit PDFs in the LH basis at $Q^2 = 2.0e + 00 \text{ GeV}^2$.

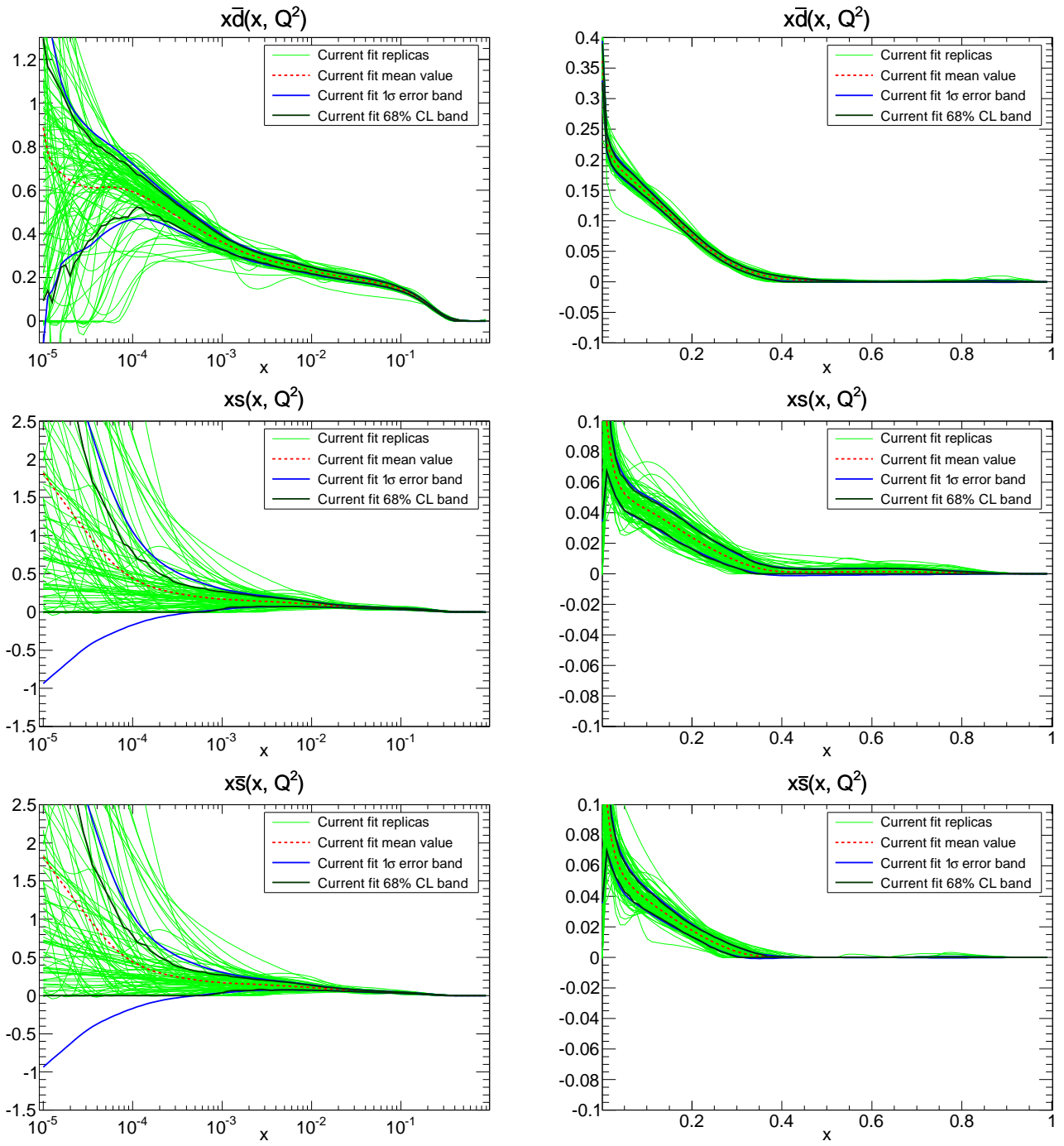


Figure 16: Current fit PDFs in the LH basis at $Q^2 = 2.0e + 00 \text{ GeV}^2$.

3 Fit properties

Distribution of χ^2 for experiments

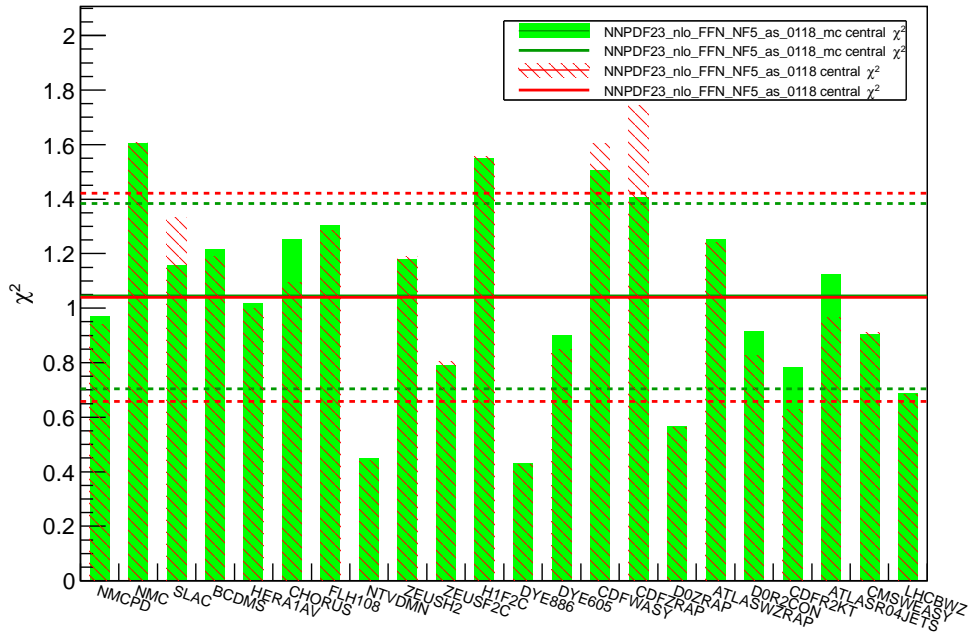


Figure 17: Total χ^2 for each experiment.

3.1 χ^2 details - experimental covariance matrix

Experiment	Dataset	DOF	Current χ^2	Reference χ^2	CTEQ χ^2	MSTW χ^2
NMCPD	NMCPD	132	0.97045	0.94006	0.97318	0.98639
NMC	NMC	224	1.60683	1.60719	1.66213	1.45188
SLAC	SLACP	74	1.15740	1.33165	1.57654	1.27903
	SLACD	37	1.27928	1.41126	1.58930	1.23805
		37	0.97952	1.18689	1.36322	1.19214
BCDMS	BCDMS	581	1.21631	1.18919	1.59984	1.41406
	BCDMSP	333	1.20160	1.19879	1.74201	1.39422
	BCDMSD	248	1.18439	1.14361	1.38324	1.32911
HERA1AV	HERA1NCEP	592	1.01760	1.00008	1.09597	1.36518
	HERA1NCEM	379	1.17285	1.14783	1.26855	1.67474
	HERA1CCEP	145	0.79018	0.78313	0.80083	0.96171
	HERA1CCEM	34	0.89367	0.91201	1.02661	0.91325
CHORUS	CHORUS	34	0.55967	0.56518	0.56570	0.54676
	CHORUSNU	862	1.25135	1.09437	1.40086	1.28766
	CHORUSNB	431	1.18270	1.14337	1.35830	1.20847
FLH108	FLH108	431	1.19655	0.98192	1.33197	1.26997
		8	1.30325	1.28623	1.40253	1.32322
NTVDMN	NTVDMN	79	0.45098	0.44272	4.06636	1.01038
	NTVNUDMN	41	0.27469	0.26671	2.58212	0.63535
	NTVNBDMN	38	0.62702	0.62125	6.31736	1.65951
ZEUSH2	ZEUSH2	127	1.17975	1.18872	1.22661	1.30392
	ZO6NC	90	1.12972	1.13240	1.14726	1.29167
	ZO6CC	37	1.16390	1.18775	1.23456	1.14408
ZEUSF2C	ZEUSF2C	50	0.79158	0.80427	0.68270	0.80730
	ZEUSF2C99	14	0.74827	0.75887	0.59677	0.80580
	ZEUSF2C03	21	1.31579	1.33939	1.11601	1.33271
	ZEUSF2C08	7	0.18438	0.18405	0.23883	0.16653
H1F2C	ZEUSF2C09	8	0.11648	0.11622	0.15473	0.09943
	H1F2C	38	1.55158	1.55499	1.33553	1.40702
	H1F2C01	6	1.01485	1.02590	0.85152	1.26520
	H1F2C09	6	2.73806	2.71064	2.19089	2.01185
DYE886	H1F2C10	26	1.32459	1.33395	1.19542	1.25356
	DYE886R	15	0.43236	0.42686	0.48801	0.74632
DYE605	DYE605	119	0.90062	0.84750	0.76839	0.99336
CDFWASY	CDFWASYM	13	1.50546	1.60544	3.46417	9.02926
CDFZRAP	CDFZRAP	29	1.40840	1.74571	1.72852	2.15457
DOZRAP	DOZRAP	28	0.56594	0.56390	0.54960	0.57805
ATLASWZRAP	ATLASWZRAP36PB	30	1.25235	1.24007	1.05249	2.02653
DOR2CON	DOR2CON	110	0.91563	0.82667	1.01154	0.97770
CDFR2KT	CDFR2KT	76	0.78375	0.62660	1.04789	0.76482
ATLASR04JETS	ATLASR04JETS36PB	90	1.12493	0.96469	1.27345	1.09459
CMSWEASY	CMSWEASY840PB	11	0.90321	0.90975	1.43782	4.32355
LHCBWZ	LHCBWZ36PB	10	0.68625	0.68159	1.03085	0.90041
Total (sets)		3298	1.12	1.07	1.37	1.00
Total (exps)		3298	1.14	1.09	1.38	1.32

Table 3: Fit quality for datasets.

4 Configuration file of the training

```
#
# Configuration file for NNPDF++,
# comments start with # or ; or [
#

[Description]
This is the description block, please update these lines before run.
[/Description]

#####
[Experiments & Datasets]
EXPERIMENT: NMCPD
    DATASET = NMCPD 0.5
EXPERIMENT: NMC
    DATASET = NMC 0.5
EXPERIMENT: SLAC
    DATASET = SLACP 0.5
    DATASET = SLACD 0.5
EXPERIMENT: BCDMS
    DATASET = BCDMSF 0.5
    DATASET = BCDMSD 0.5
EXPERIMENT: HERA1AV
    DATASET = HERA1NCF 0.5
    DATASET = HERA1NCEM 0.5
    DATASET = HERA1CF 0.5
    DATASET = HERA1CCEM 0.5
EXPERIMENT: CHORUS
    DATASET = CHORUSNU 0.5
    DATASET = CHORUSNB 0.5
EXPERIMENT: FLH108
    DATASET = FLH108 1
EXPERIMENT: NTVDMN
    DATASET = NTVNUDMN 0.5
    DATASET = NTVNBDMN 0.5
EXPERIMENT: ZEUSH2
    DATASET = Z06NC 0.5
    DATASET = Z06CC 0.5
EXPERIMENT: ZEUSF2C
    DATASET = ZEUSF2C99 0.5
    DATASET = ZEUSF2C03 0.5
    DATASET = ZEUSF2C08 0.5
    DATASET = ZEUSF2C09 0.5
EXPERIMENT: H1F2C
    DATASET = H1F2C01 0.5
    DATASET = H1F2C09 0.5
    DATASET = H1F2C10 0.5
EXPERIMENT: DYE886
    DATASET = DYE886R 1
EXPERIMENT: DYE605
    DATASET = DYE605 0.5
EXPERIMENT: CDFWASY
    DATASET = CDFWASYM 1
EXPERIMENT: CDFZRAP
    DATASET = CDFZRAP 1
EXPERIMENT: DOZRAP
    DATASET = DOZRAP 1
EXPERIMENT: ATLASWZRAP
    DATASET = ATLASWZRAP36PB 1
EXPERIMENT: DOR2CON
    DATASET = DOR2CON 0.5
EXPERIMENT: CDFR2KT
    DATASET = CDFR2KT 0.5
EXPERIMENT: ATLASR04JETS
    DATASET = ATLASR04JETS36PB 0.5
EXPERIMENT: CMSWEASY
    DATASET = CMSWEASY840PB 1
EXPERIMENT: LHCBWZ
    DATASET = LHCBWZ36PB 1
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[Theory]
NFL = 7
PTORD = 1
ALPHAS = 118
Q20 = 2
VFNS = GMVN
VFNSTYPE = 1
[/Theory]

#####
[Experimental Data]
TOPDFSET = NNPDF-t0-set-nlo
IQ2CUT = 0
NPARSAT = 2
PARSAT = 1.5 0.333333
IREG = 1
Q2MINCUT = 3
Q2MIN = 3
W2MIN = 12.5
[/Experimental Data]

#####
[Replica Properties]
SEED = 0
GENREP = 1
RNGALGORITHM = 0
[/Replica Properties]

#####
[Fit Properties]
NGEN = 50000
DYNSTOP = 0
POSITIVITY = 0
MINCHI2 = 6
NSMEAR = 200
DELTASM = 200
RV = 1.0003
RT = 0.9999
[/Fit Properties]

#####
[Positivity]
PGSDATASET = FCPGS
PGSDATASET = FLPGS
PGSDATASET = DMPGS
[/Positivity]

#####
[NN Properties]
NMUTANTS = 80
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NLAYERS = 4
NNODES = 2 5 3 1
SMALLXSNG = 1.05 1.35
LARGXSNG = 2.55 3.45
SMALLXGLU = 1.05 1.35
LARGXGLU = 3.55 4.45
SMALLXT3 = 0 0.5
LARGXT3 = 2.55 3.45
SMALLXV = 0 0.5
LARGXV = 2.55 3.45
SMALLXDS = -0.95 -0.65
LARGXDS = 12 14
SMALLXSP = 1.05 1.35
LARGXSP = 2.55 3.45
SMALLXSM = 0 0.5
LARGXSM = 2.55 3.45
[/NN Properties]
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```
#####
[Output Folder]
RESULTSDIR = results
[/Output Folder]
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