

NNPDF LO PDFs for Monte Carlo codes

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On behalf of

The NNPDF Collaboration

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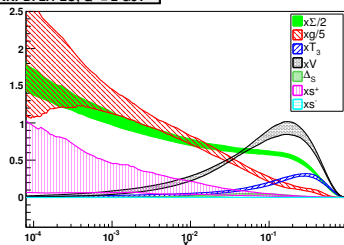
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NNPDF2.1 - Leading Order fits

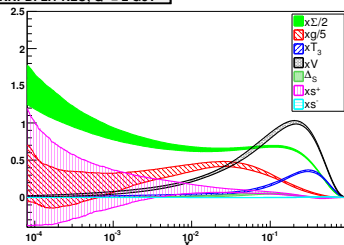
- Same dataset and parametrization of NLO/NNLO fits
- Extra theory constraint: Positive definite PDFs
- Fits with $\alpha_s(M_Z) = 0.119/0.130$ and with/without Momentum Sum Rule

PDF set	$\alpha_s(M_Z)$	Momentum SR
NNPDF2.1 LO	0.119	Yes
NNPDF2.1 LO	0.130	Yes
NNPDF2.1 LO*	0.119	No
NNPDF2.1 LO*	0.130	No

NNPDF2.1 LO, $Q^2 = 2 \text{ GeV}^2$



NNPDF2.1 NLO, $Q^2 = 2 \text{ GeV}^2$



68% C.L. error bands

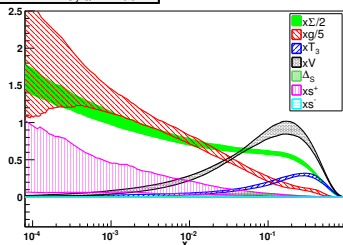


NNPDF2.1 - Leading Order fits

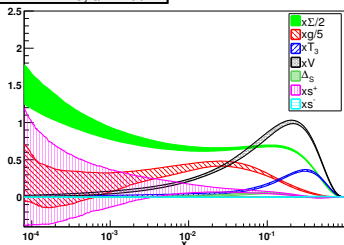
- Poorer quality of the fit $\chi^2_{LO} \sim 1.7$ due to inaccuracy of LO theory
- Same quality for LO and LO* fits: no advantage in changing $\alpha_S(M_Z^2)$ or relaxing momentum sum rules

PDF set	$\alpha_S(M_Z)$	Momentum SR	χ^2
NNPDF2.1 LO	0.119	Yes	1.74
NNPDF2.1 LO	0.130	Yes	1.68
NNPDF2.1 LO*	0.119	No	1.76
NNPDF2.1 LO*	0.130	No	1.74
NNPDF2.1 NLO	0.119	Yes	1.16

NNPDF2.1 LO, $Q^2 = 2 \text{ GeV}^2$



NNPDF2.1 NLO, $Q^2 = 2 \text{ GeV}^2$



LO PDFs for Monte Carlo codes

Points for discussion

- What are the deficiencies of a Standard LO fit?
- Why not use NLO PDFs with a LO Monte Carlo?
- Relaxing Momentum Sum rule or changing value of $\alpha_S(M_Z)$ and running (1- or 2-loop) seems to have little effect
- Relaxing positivity of PDFs leads to better χ^2
- My favourite (long-term) possible solution: include (Next-to-)Leading Log resummation in PDF fits

