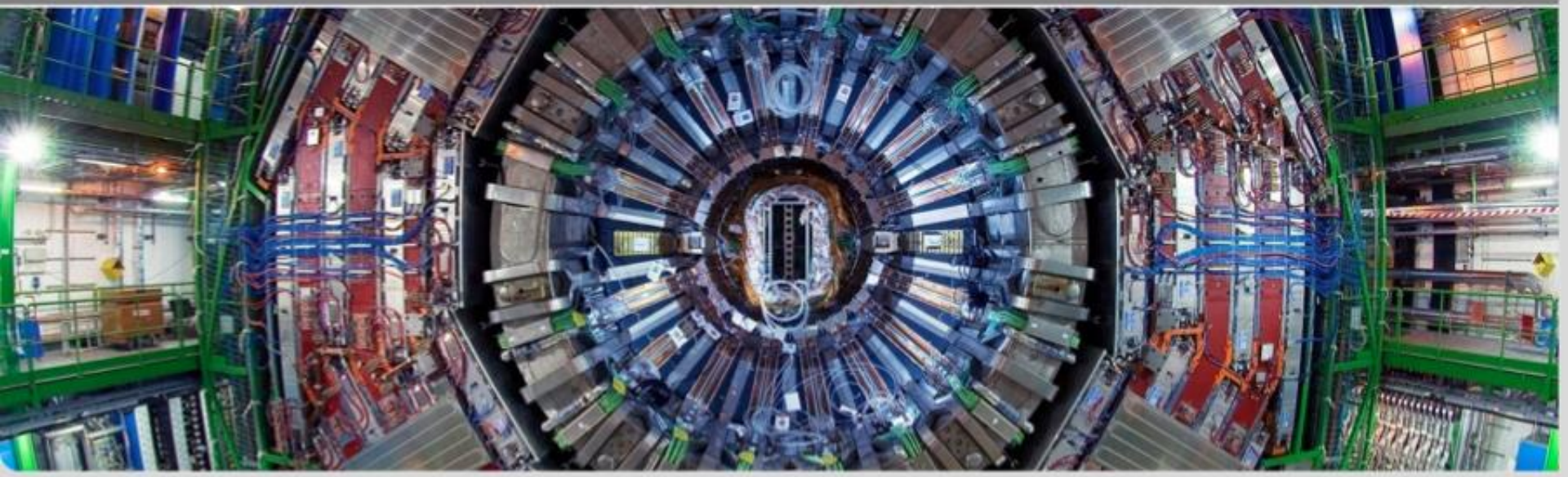
Highlights of SMP-12-028

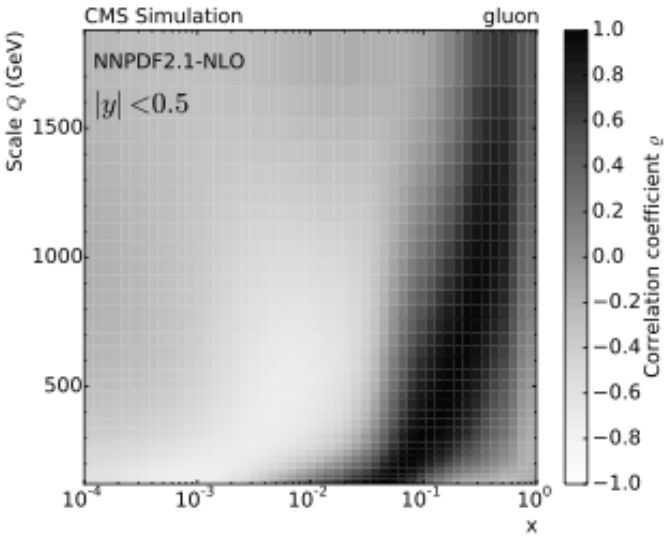
A.Savin, University of Wisconsin, for CMS

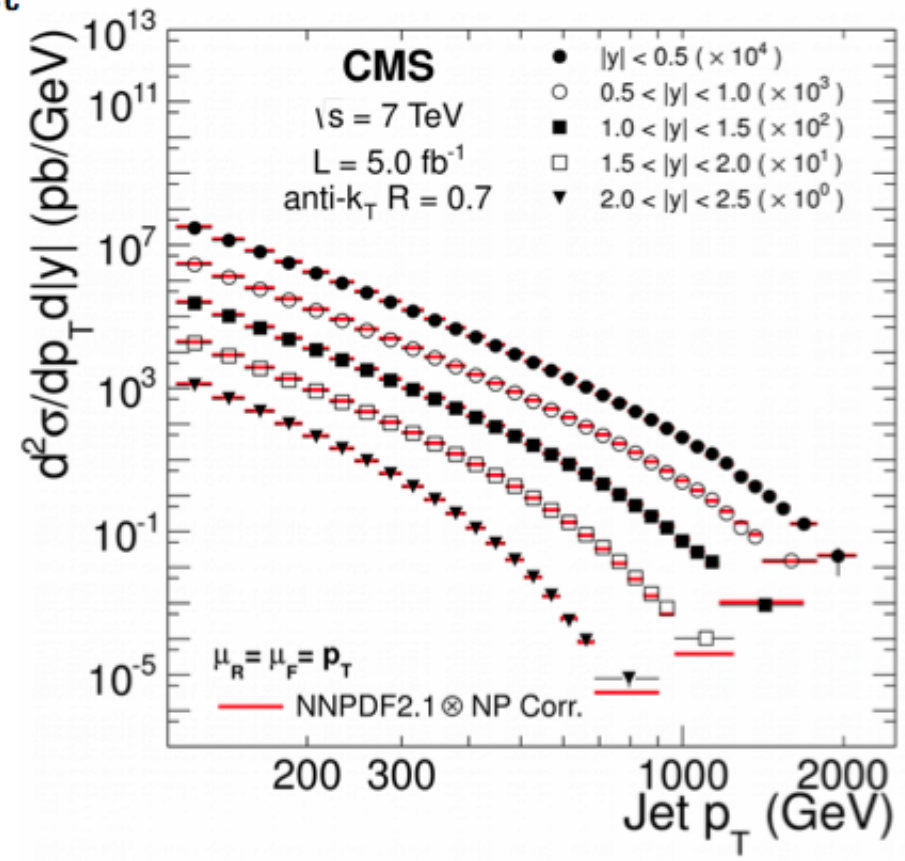
*thanks to Georg Sieber for preparing the slides



QCD Analysis of CMS Inclusive Jets

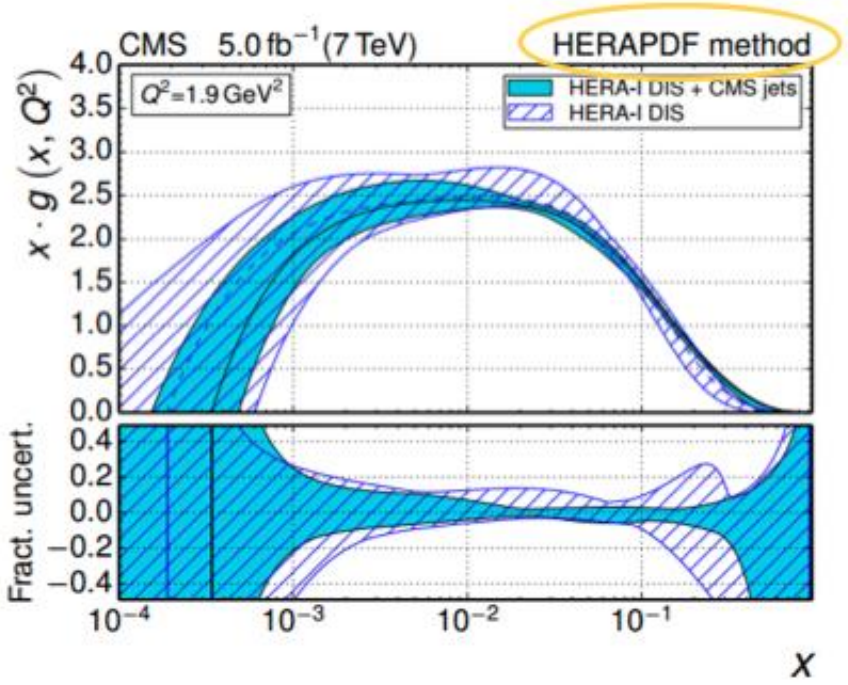
- 7 TeV Inclusive Jet measurement employed to improve PDFs and extract the strong coupling
- Constraints on PDFs, especially the high-x gluon observed
- Strong coupling constant extracted at TeV scale
- Results of PAS finalized and submitted to EPJC, `arXiv:1410.6765`

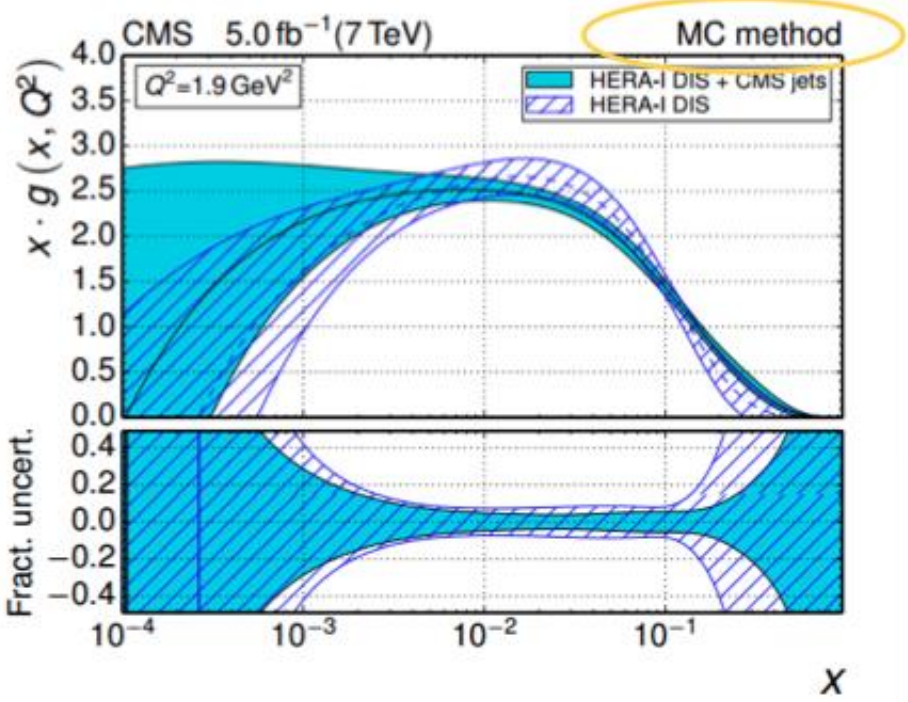




Constraints on the PDFs

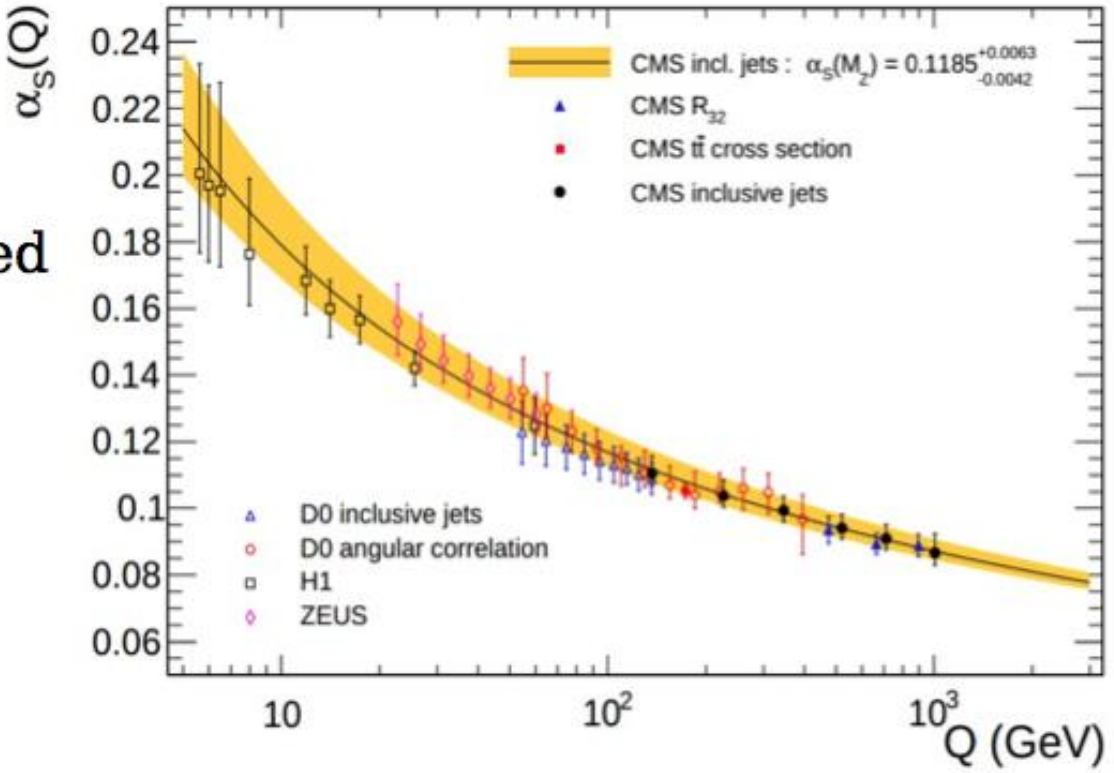
- Constraints on high-x gluon PDF and valence quarks observed in a setup close the HERAPDF prescription
- Fit method tested using a MC method (similar to NNPDF approach)
  - Similar conclusions on uncertainty reduction by jet data,
  - In general larger uncertainties with MC method
  - Some changes on valence quark distributions observed





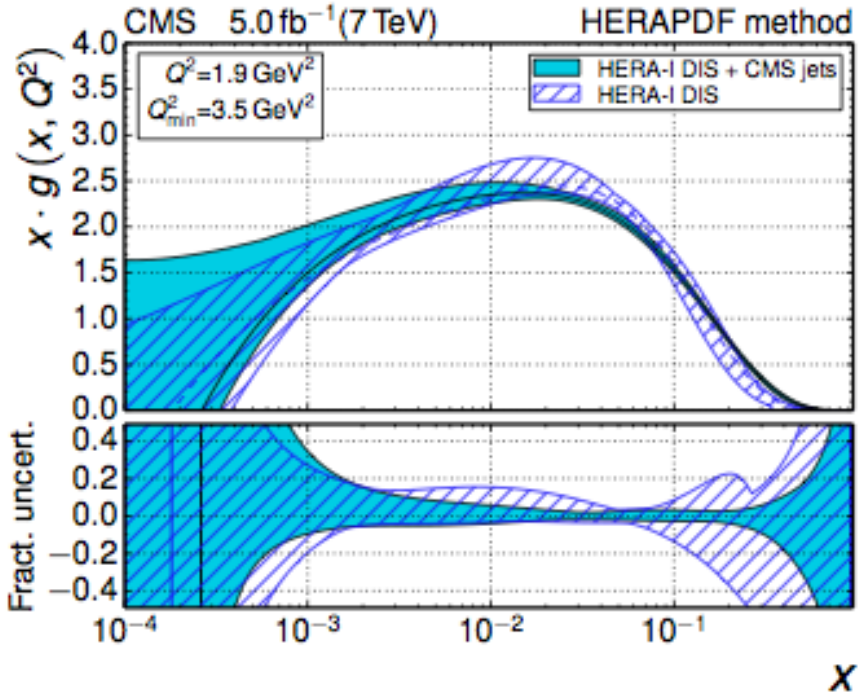
Extraction of the Strong Coupling

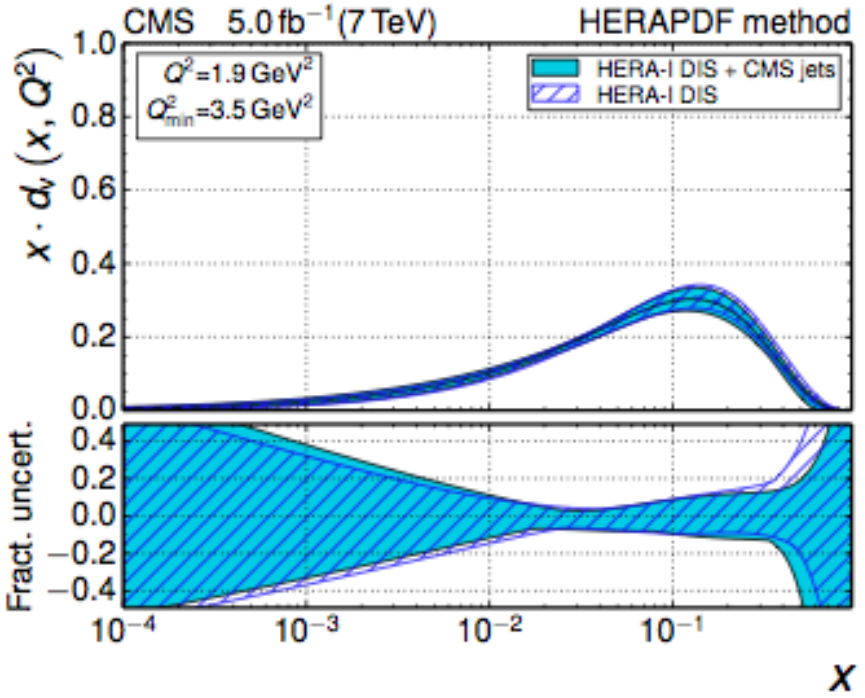
- Fit of the strong coupling constant in multiples Q regions, binned in jet pT
- Very good agreement with world average
- Consistent with predicted running up to 1 TeV



$$\alpha_S(M_Z) = 0.1185 \pm 0.0019\,(\text{exp.}) \pm 0.0028\,(\text{PDF}) \pm 0.0004\,(\text{NP})\,^{+0.0053}_{-0.0024}\,(\text{scale})$$

Backup


CMS 5.0 fb^{-1} (7 TeV)
HERAPDF method
Q^2=1.9 GeV^2
Q^2_{min}=3.5 GeV^2
HERA-I DIS + CMS jets
HERA-I DIS
$x \cdot g(x, Q^2)$
Fract. uncert.
x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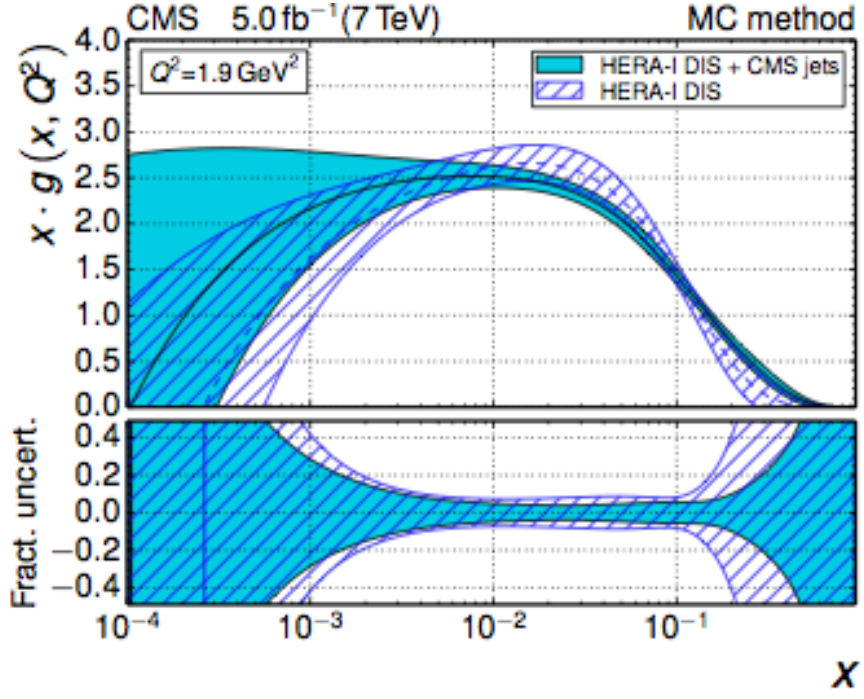
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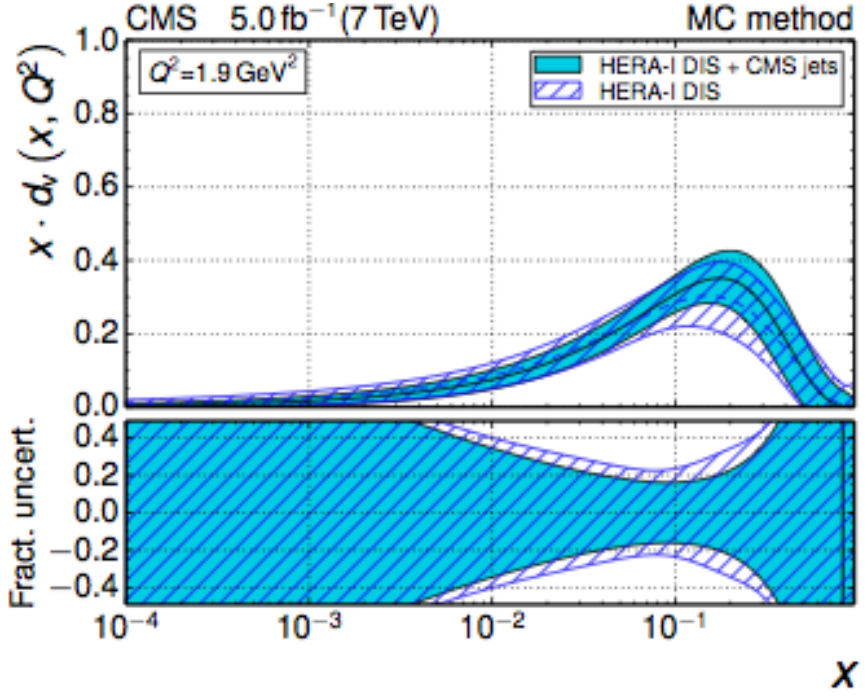
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Constraints on PDFs

- Overview of fitted PDF distributions