

Update of ABKM PDFs

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ABKM ingredients

DATA:

cross sections for DIS (NC inclusive, $\mu\mu$ CC production)
and fixed-targeted DY

QCD:

NNLO evolution

NNLO massless DIS and DY coefficient functions

NLO+ massive DIS coefficient function (FFNS)

Power corrections:

target mass effects

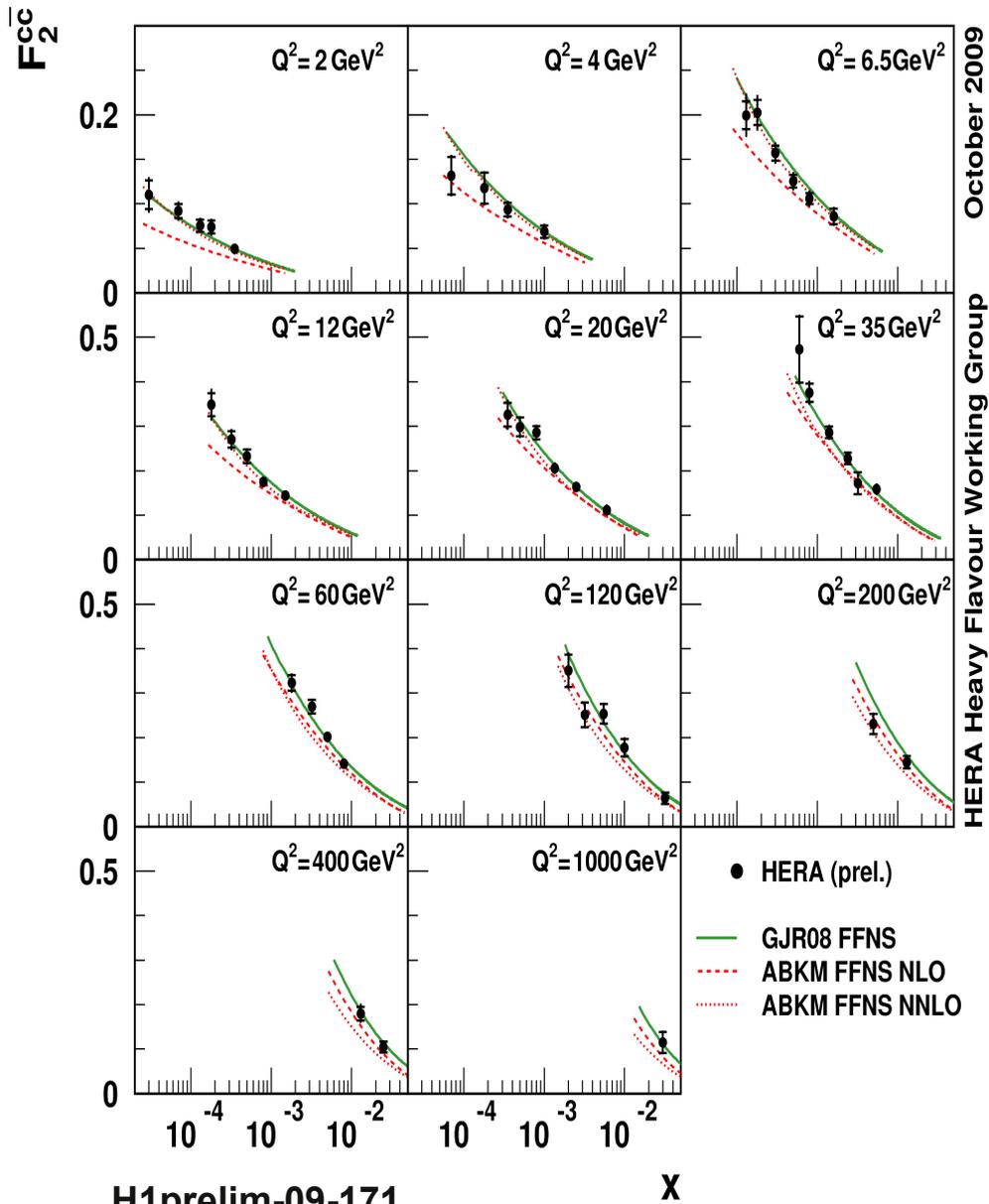
dynamical twist-4 terms

Deuteron corrections:

Fermi motion

off-shell effects

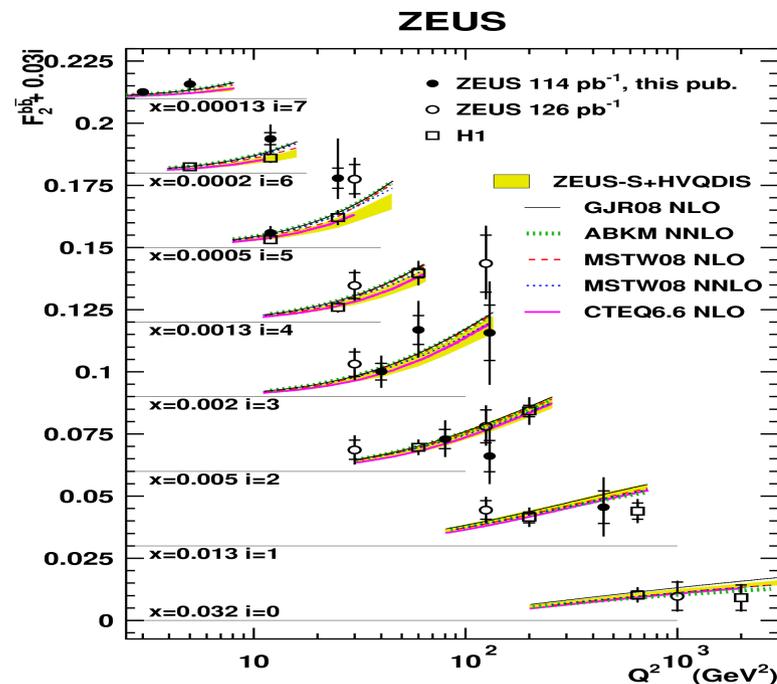
FFNS versus semi-inclusive HERA data



H1prelim-09-171

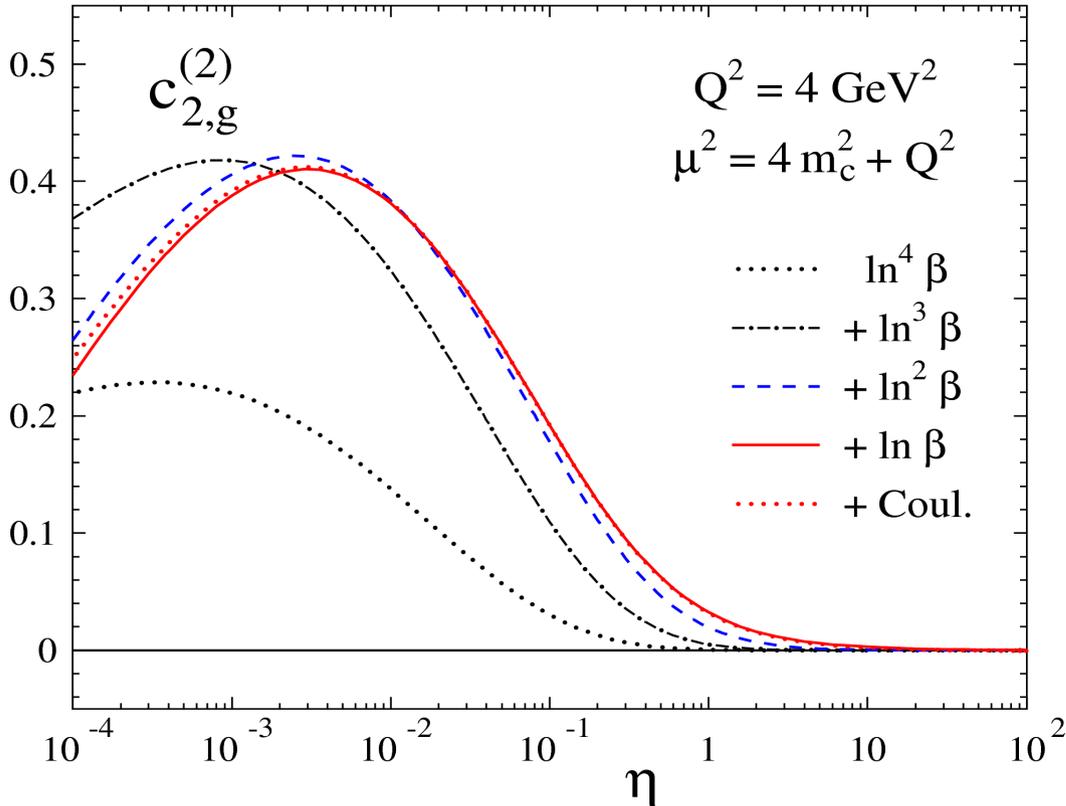
ZEUS-prel-09-015

- The FFNS predictions with account of the threshold NNLO corrections are in a good agreement with the charm-production HERA data at small and moderate Q .
- For the b-quark production agreement is even better, the threshold approximation is applicable for wider kinematics.



DESY-10-047

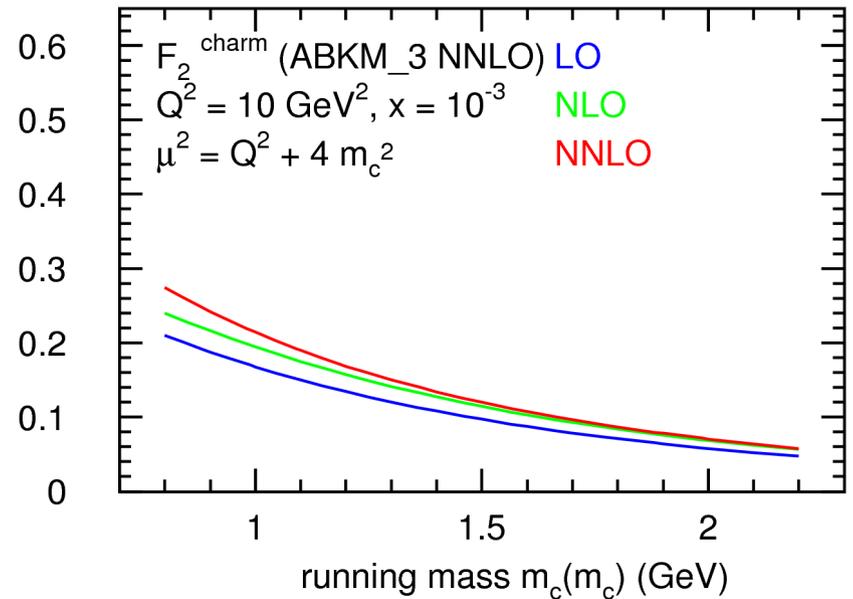
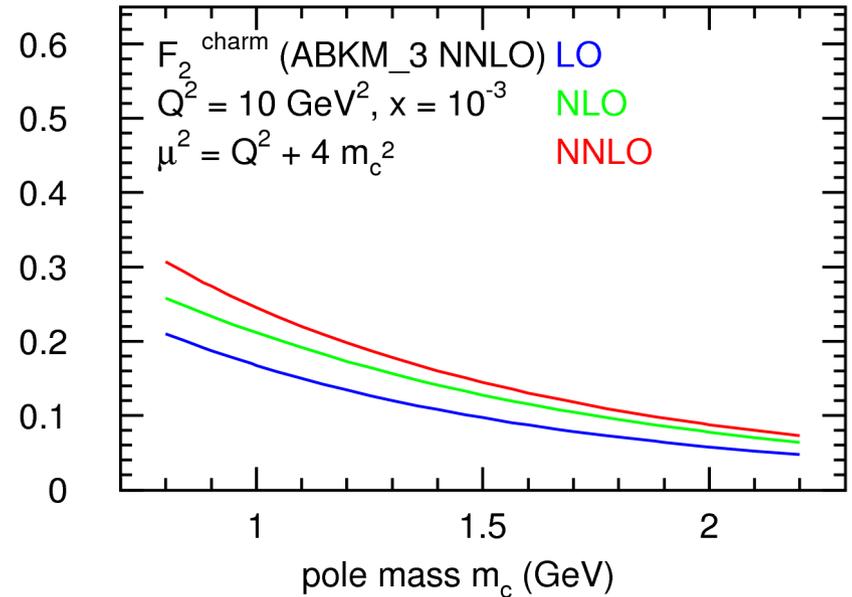
Theoretical progress



Lo Presti, Kawamura, Moch, Vogt [hep-ph 1008.0951]

- The threshold expansion has been extended
→ somewhat smaller contribution at small x

- The running c-quark mass
 $m_c = m_c(m_R) [1 + a_s(m_R) d_1 + a_s^2(m_R) d_2 + \dots]$ →
 better perturbative convergence and
 reduced scale dependence of semi-
 inclusive structure functions



sa, Moch in progress

Heavy-quark mass definition

m_c (GeV)	χ_{global}^2 (2615 pts.)	$\chi_{F_2}^2$ (83 pts.)	$\alpha_S(M_Z^2)$
1.1	2498	113	0.1159
1.2	2463	88	0.1162
1.26	2456	82	0.1165
1.3	2458	82	0.1166
1.4	2480	95	0.1171
1.5	2528	126	0.1175
1.6	2589	167	0.1180
1.7	2666	217	0.1184

The values of pole masses m_{cb} used by different groups are systematically lower than the PDF values

	MSTW	ABKM	JR	CTEQ	PDG
m_c (GeV)	1.40	1.5	1.3	1.3	1.66
m_b (GeV)	4.75	4.5	4.2	4.5	4.79

MSTW Collaboration [hep-ph 1007.2624]

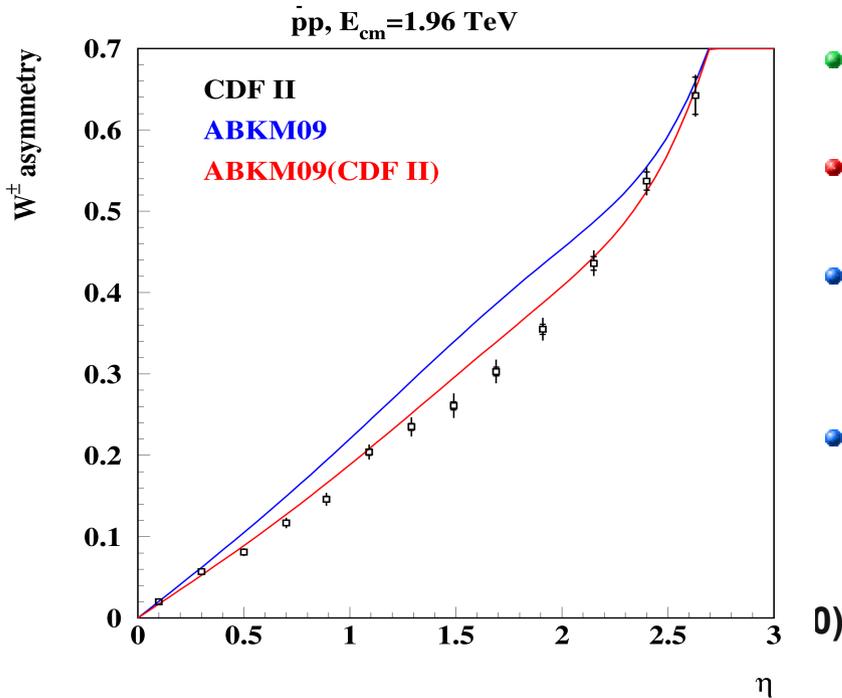
The global fits are sensitive to the heavy quark masses, the values depend on the order

In contrast, from the fit to inclusive DIS data with the running mass definition of semiinclusive SFs

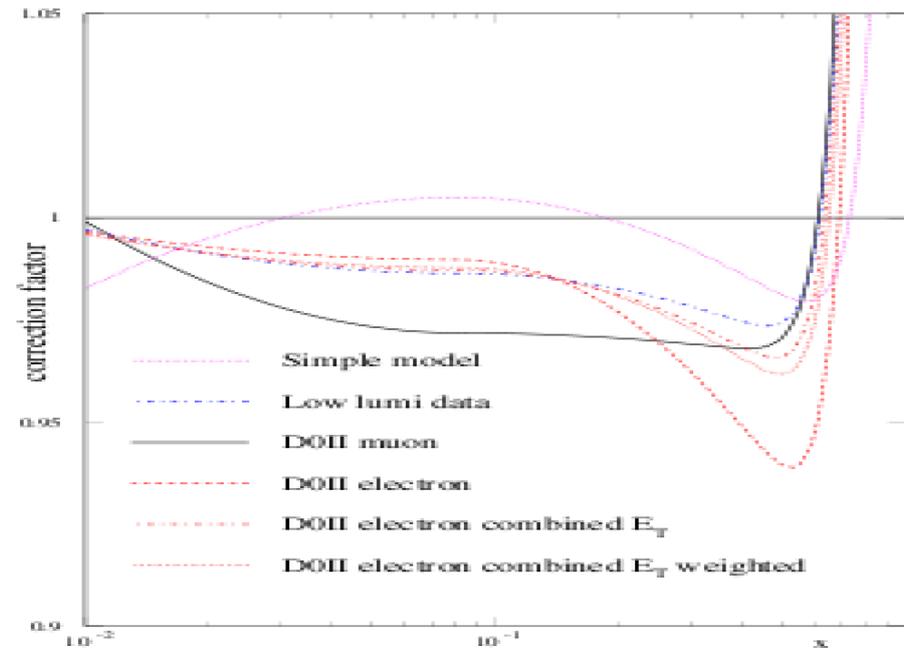
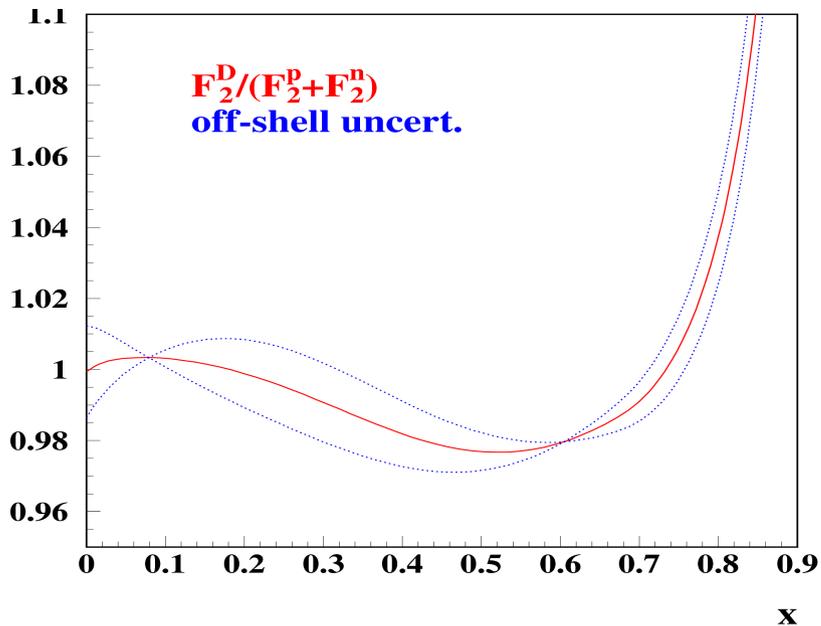
$$m_c(m_c) = 1.31 \pm 0.12 \text{ GeV (prel),}$$

in good agreement to the PDG value.

The W asymmetry data in the fit



- The W production is standard candle process, calculated up to the NNLO.
- The distributions are poorly described by the existing PDFs (for the JR PDFs agreement is better).
- The Tevatron data are sensitive to the d/u ratio at $x \sim 0.2$ and small Q, which is defined by the fixed target data and in turn are sensitive to the nuclear corrections.
- MSTW: the deuteron correction with a reasonable shape cannot improve agreement



Summary

- The Tevatron jet data are being included (cf. ABKM talk in the morning)
→ improvement in the large- x gluon accuracy, study of the scale dependence in progress.
- The running mass scheme was implemented for the neutral current SFs, for the CC case work in progress
- The W -asymmetry data have a poor description in the ABKM fit, similarly to other groups