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Erratum

Erratum to: Measurement of $D^{*\pm}$ meson production and determination of $F_2^{c\bar{c}}$ at low Q^2 in deep-inelastic scattering at HERA

The H1 Collaboration

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In the extraction of the charm contribution $F_2^{c\bar{c}}$ to the proton structure function F_2 in our recent publication [1], we have not properly taken into account the running of the electromagnetic coupling α_{em}. The measured cross sections were corrected to the Born level for QED radiation, but not for the running of α_{em}. This was not taken properly into account in the extraction of $F_2^{c\bar{c}}$.

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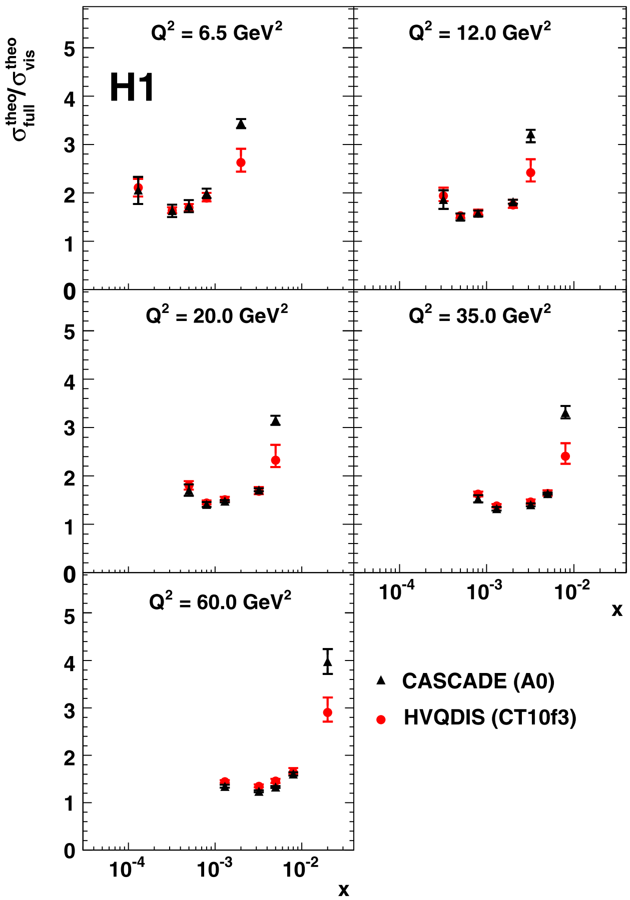

Fig. 1 Extrapolation factors from the visible phase space to the total phase space for the D^* meson as determined from HVQDIS and CASCADE. The error bars show the extrapolation uncertainty which is determined by varying the theory parameters listed in Tables 1 and 2 of [1]

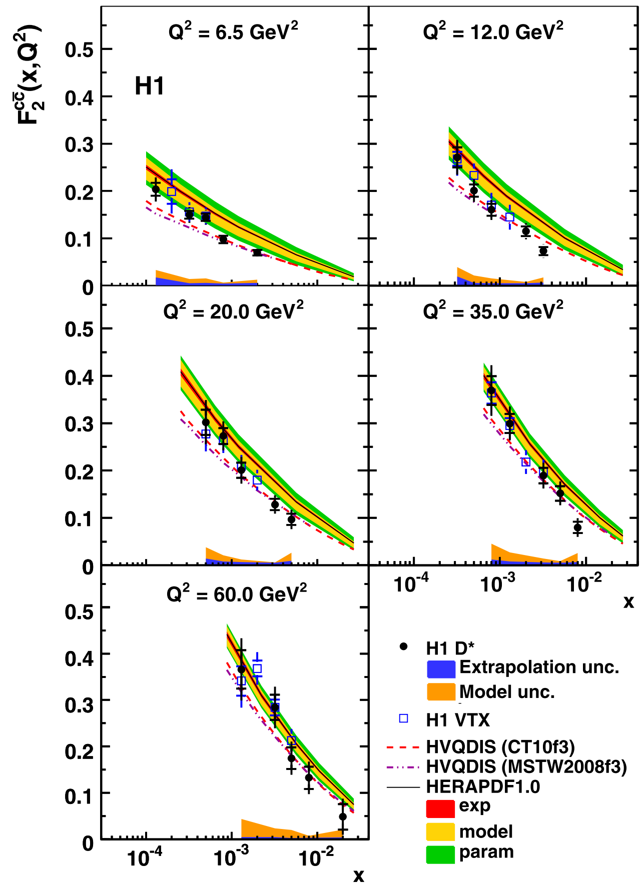

Fig. 2 $F_2^{c\bar{c}}$ as derived from D^* data with HVQDIS (*points*). The inner error bars show the statistical uncertainty, the outer error bar the statistical and experimental systematic uncertainty added in quadrature. The extrapolation uncertainty within the HVQDIS model is shown as a *blue band* in the bottom of the plots. The outer (*orange*) band shows the model uncertainty obtained from the difference in $F_2^{c\bar{c}}$ determined with HVQDIS and CASCADE. The data are compared to the measurement of $F_2^{c\bar{c}}$ with the H1 vertex detector [2] (*open squares*), to NLO DGLAP predictions from HVQDIS with two different proton PDFs, and to the $F_2^{c\bar{c}}$ prediction of HERAPDF1.0

In addition, the cross-section predictions of the CASCADE program were calculated with fixed α_{em}. The cross section in the visible range calculated with running α_{em} is 5.63 nb (instead of 5.09 nb given in [1]). The conclusions on the description of the data by CASCADE are unchanged. The extrapolation factors, defined as the ratios of the full cross section σ^{theo}_{full} to the cross section σ^{theo}_{vis} in the visible phase space of the D^* meson, are changed slightly. In the determination of the uncertainties of the CASCADE extrapolation factors, an inconsistent proton parton distribution function (PDF) was used in [1] for the factorisation scale variation. Using the correct PDF set leads to reduced uncertainties of the extrapolation factors. The amended values are shown in Fig. 1, which replaces Fig. 15 of [1].

The amended values of $F_2^{c\bar{c}}$ extracted from measured $D^{*\pm}$ cross sections with the HVQDIS program and with the CASCADE program are lower by about 6 up to 11% as compared to [1]. The corrected values of $F_2^{c\bar{c}}$ and its uncertainties are given in Table 1, which replaces Table 11 of [1]. The amended $F_2^{c\bar{c}}$ values are compared to a measurement based on lifetime information determined with the H1 silicon vertex detector [2] and with theoretical predictions in Figs. 2, 3 and 4, which replace Figs. 16, 17 and 18 of [1], respectively.

Table 1 $F_2^{c\bar{c}}$ in bins of Q^2 and x extracted from measured D^* cross sections with two different programs, HVQDIS and CASCADE. The extrapolation uncertainty δ_{ext} is determined by varying model parameters within a program. The statistical (δ_{stat}) and systematic (δ_{syst}) uncertainties arise from the determination of the D^* cross section and are the same for both programs

Q^2 [GeV^2]	x	HVQDIS		δ_{stat} [%]	δ_{syst} [%]	CASCADE	
		$F_2^{c\bar{c}}$	δ_{ext} [%]			$F_2^{c\bar{c}}$	δ_{ext} [%]
6.5	1.3×10^{-4}	0.2036	$\pm^{8.5}_{8.7}$	± 6.7	$\pm^{8.1}_{7.6}$	0.1750	$\pm^{13.1}_{13.9}$
6.5	3.2×10^{-4}	0.1497	$\pm^{4.3}_{3.2}$	± 5.5	$\pm^{8.1}_{7.6}$	0.1364	$\pm^{7.5}_{8.3}$
6.5	5.0×10^{-4}	0.1446	$\pm^{4.2}_{4.5}$	± 5.4	$\pm^{7.2}_{7.2}$	0.1305	$\pm^{7.2}_{7.3}$
6.5	8.0×10^{-4}	0.0979	$\pm^{5.7}_{3.4}$	± 8.1	$\pm^{7.4}_{7.0}$	0.0925	$\pm^{4.8}_{5.2}$
6.5	2.0×10^{-3}	0.0698	$\pm^{10.8}_{7.2}$	± 8.6	$\pm^{9.8}_{10.5}$	0.0812	$\pm^{2.4}_{3.1}$
12.0	3.2×10^{-4}	0.2711	$\pm^{8.7}_{5.6}$	± 7.7	$\pm^{7.9}_{7.6}$	0.2368	$\pm^{10.0}_{10.5}$
12.0	5.0×10^{-4}	0.2009	$\pm^{3.1}_{2.9}$	± 6.6	$\pm^{7.2}_{7.0}$	0.1799	$\pm^{4.7}_{4.6}$
12.0	8.0×10^{-4}	0.1605	$\pm^{4.6}_{2.3}$	± 7.8	$\pm^{7.3}_{7.4}$	0.1462	$\pm^{3.7}_{4.0}$
12.0	2.0×10^{-3}	0.1149	$\pm^{6.1}_{3.5}$	± 8.9	$\pm^{7.6}_{7.8}$	0.1093	$\pm^{2.2}_{2.1}$
12.0	3.2×10^{-3}	0.0732	$\pm^{11.6}_{7.4}$	± 12.0	$\pm^{9.3}_{10.2}$	0.0890	$\pm^{2.4}_{5.5}$
20.0	5.0×10^{-4}	0.3019	$\pm^{4.6}_{5.0}$	± 8.8	$\pm^{9.0}_{8.7}$	0.2664	$\pm^{6.9}_{7.0}$
20.0	8.0×10^{-4}	0.2730	$\pm^{3.8}_{2.1}$	± 6.1	$\pm^{7.1}_{7.4}$	0.2538	$\pm^{3.4}_{3.7}$
20.0	1.3×10^{-3}	0.2007	$\pm^{4.0}_{2.9}$	± 8.0	$\pm^{8.4}_{8.1}$	0.1908	$\pm^{1.5}_{1.8}$
20.0	3.2×10^{-3}	0.1283	$\pm^{5.3}_{3.5}$	± 9.3	$\pm^{7.0}_{7.5}$	0.1261	$\pm^{1.7}_{1.7}$
20.0	5.0×10^{-3}	0.0970	$\pm^{13.6}_{6.0}$	± 12.5	$\pm^{11.7}_{11.1}$	0.1214	$\pm^{2.9}_{3.2}$
35.0	8.0×10^{-4}	0.3690	$\pm^{3.6}_{3.0}$	± 8.3	$\pm^{8.2}_{8.0}$	0.3247	$\pm^{5.0}_{5.0}$
35.0	1.3×10^{-3}	0.2993	$\pm^{2.8}_{2.4}$	± 6.7	$\pm^{7.0}_{7.3}$	0.2735	$\pm^{2.5}_{2.8}$
35.0	3.2×10^{-3}	0.1894	$\pm^{3.7}_{2.4}$	± 8.5	$\pm^{7.7}_{7.6}$	0.1767	$\pm^{2.1}_{2.3}$
35.0	5.0×10^{-3}	0.1516	$\pm^{4.2}_{2.7}$	± 9.9	$\pm^{8.4}_{8.6}$	0.1445	$\pm^{1.2}_{1.3}$
35.0	8.0×10^{-3}	0.0799	$\pm^{11.2}_{6.5}$	± 14.9	$\pm^{11.8}_{10.5}$	0.1046	$\pm^{4.1}_{3.6}$
60.0	1.3×10^{-3}	0.3659	$\pm^{2.8}_{1.5}$	± 11.3	$\pm^{8.2}_{8.2}$	0.3227	$\pm^{2.4}_{2.4}$
60.0	3.2×10^{-3}	0.2843	$\pm^{3.4}_{1.3}$	± 9.5	$\pm^{8.1}_{7.7}$	0.2613	$\pm^{1.9}_{1.8}$
60.0	5.0×10^{-3}	0.1748	$\pm^{3.5}_{2.6}$	± 13.2	$\pm^{8.2}_{7.7}$	0.1551	$\pm^{1.7}_{1.6}$
60.0	8.0×10^{-3}	0.1326	$\pm^{5.5}_{1.4}$	± 17.9	$\pm^{7.9}_{8.0}$	0.1259	$\pm^{2.4}_{2.3}$
60.0	2.0×10^{-2}	0.0484	$\pm^{10.9}_{6.8}$	± 56.4	$\pm^{10.3}_{13.2}$	0.0687	$\pm^{6.5}_{6.7}$

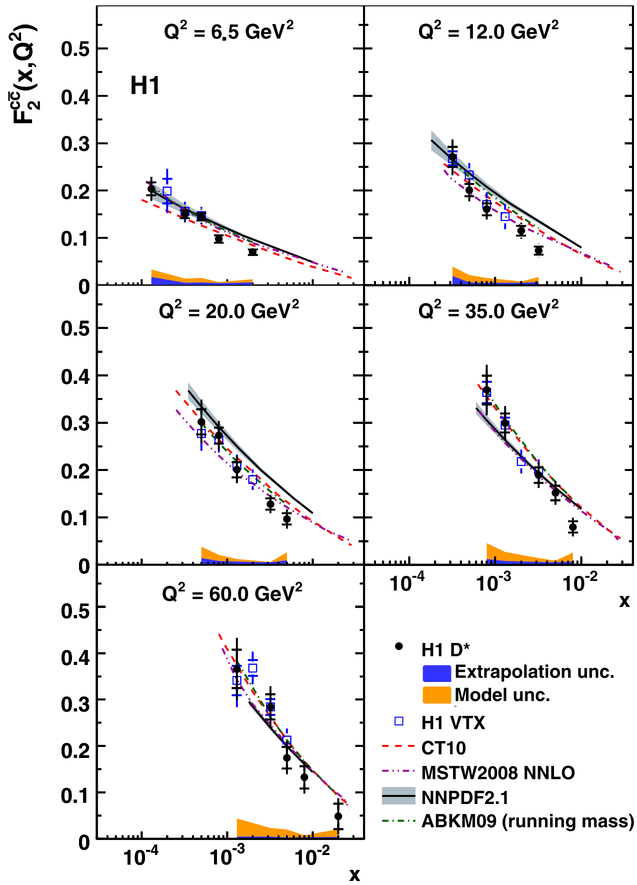

Fig. 3 $F_2^{c\bar{c}}$ as derived from D^* data with HVQDIS (*points*). The inner error bars show the statistical uncertainty, the outer error bars the statistical and experimental systematic uncertainty added in quadrature. The extrapolation uncertainty within the HVQDIS model is shown as a blue band in the *bottom* of the plots. The outer (*orange*) band shows the model uncertainty obtained from the difference in $F_2^{c\bar{c}}$ determined with HVQDIS and CASCADE. The data are compared to the measurement of $F_2^{c\bar{c}}$ with the H1 vertex detector [2] (*open squares*) and to predictions from the global PDF fits CT10 (*dashed line*), MSTW08 at NNLO (*dark dashed-dotted line*), NNPDF2.1 (*shaded band*) and ABKM (*light dashed-dotted line*)

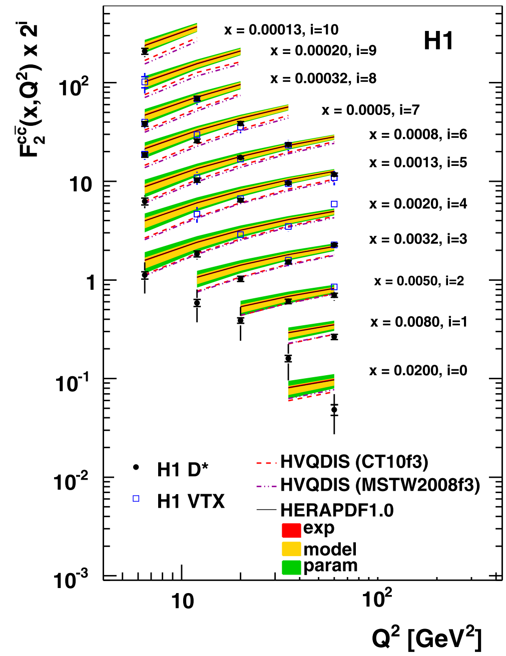

Fig. 4 $F_2^{c\bar{c}}$ as a function of Q^2 for different x, as derived from D^* data with HVQDIS (*points*). The inner error bars show the statistical uncertainty, the outer error bar the total uncertainty, including statistical, experimental systematic, extrapolation and model uncertainty added in quadrature. The data are compared to the measurement of $F_2^{c\bar{c}}$ with the H1 vertex detector [2] (*open squares*), to NLO DGLAP predictions from HVQDIS with two different proton PDFs, and to the $F_2^{c\bar{c}}$ prediction of HERAPDF1.0

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