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Erratum: Measurement of $D^{*\pm}$ production in deep inelastic scattering at HERA

The ZEUS collaboration

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In the analysis for our paper on D^* production, the beauty contribution was erroneously subtracted twice in the extraction of the reduced cross sections. This affected tables 9 and 10 as well as figures 9 and 10 that are reproduced here in a corrected version. The kinematical acceptances shown in the last colum of table 10 have been also corrected since they were calculated with a different value for the charm fragmentation fraction than what was used in the rest of the analysis and reported in the text. A misprint was found in table 7: the value in the third column at four rows from the bottom should read 49.8, not 59.8. Finally, one of the authors was missing from the author list: C. Uribe-Estrada (Department of Physics, University of Oxford, United Kingdom).

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Q^2 (GeV^2)	x	δ_{m_c} (%)	δ_μ (%)	δ_{α_s} (%)	δ_{α_K} (%)	δ_{k_T} (%)	$\delta_{\rm b}$ (%)
7	0.00160	$^{+8.3}_{-5.6}$	$^{-6.5}_{+14}$	$^{+0.6}_{+0.2}$	$^{-4.5}_{+7.5}$	$^{-0.2}_{+0.6}$	±0.0
	0.00080	$^{+0.3}_{+1.0}$	$^{-3.9}_{+7.8}$	$^{-0.3}_{+0.6}$	$^{-3.5}_{+6.1}$	$^{-1.3}_{+1.3}$	±0.3
	0.00050	$^{-1.3}_{+2.0}$	$^{-3.2}_{+5.0}$	$^{+0.1}_{+0.8}$	$^{-2.9}_{+6.5}$	$^{-1.3}_{+1.8}$	±0.6
	0.00030	$^{-3.2}_{+3.3}$	$^{-1.4}_{+0.2}$	$^{-0.9}_{+1.2}$	$^{-2.6}_{+5.9}$	$^{-2.5}_{+2.2}$	±1.0
	0.00013	$^{-3.7}_{+5.7}$	$^{+4.7}_{-6.3}$	$^{-1.6}_{+2.5}$	$^{-2.4}_{+5.9}$	$^{-4.0}_{+4.2}$	±2.1
12	0.00300	$^{+9.5}_{-6.2}$	$^{-6.5}_{+15}$	$^{+1.4}_{+0.0}$	$^{-3.6}_{+8.0}$	$^{+1.6}_{+0.1}$	±0.0
	0.00150	$^{+0.1}_{-1.1}$	$^{-5.4}_{+7.8}$	$^{-0.1}_{-0.6}$	$^{-3.3}_{+5.3}$	$^{-0.7}_{-0.1}$	±0.3
	0.00080	$^{-0.6}_{+0.8}$	$^{-3.8}_{+5.7}$	$^{-0.1}_{+0.1}$	$^{-2.5}_{+5.5}$	$^{-0.9}_{+1.0}$	±0.7
	0.00050	$^{-2.5}_{+2.2}$	$^{-2.5}_{+2.0}$	$^{-0.5}_{+0.0}$	$^{-2.4}_{+5.0}$	$^{-1.9}_{+1.2}$	±1.2
	0.00022	$^{-3.2}_{+3.9}$	$^{+3.1}_{-4.4}$	$^{-1.6}_{+1.7}$	$^{-2.2}_{+5.4}$	$^{-3.1}_{+1.8}$	±2.1
18	0.00450	$^{+8.8}_{-6.1}$	$^{-6.5}_{+13}$	$^{+0.9}_{+0.7}$	$^{-3.2}_{+6.2}$	$^{+1.1}_{-1.0}$	±0.1
	0.00250	$^{+0.3}_{-0.9}$	$^{-5.7}_{+7.0}$	$^{+0.4}_{-0.6}$	$^{-3.2}_{+3.7}$	$^{-0.3}_{-0.6}$	±0.4
	0.00135	$^{-0.4}_{+0.8}$	$^{-4.4}_{+6.1}$	$^{+0.6}_{+0.1}$	$^{-2.4}_{+4.8}$	$^{-0.5}_{+0.6}$	±0.8
	0.00080	$^{-1.5}_{+1.0}$	$^{-4.0}_{+3.2}$	$^{+0.3}_{+0.3}$	$^{-1.9}_{+4.4}$	$^{-0.9}_{+0.7}$	±1.7
	0.00035	$^{-3.0}_{+2.7}$	$^{+1.8}_{-3.7}$	$^{-1.0}_{+1.0}$	$^{-2.5}_{+4.5}$	$^{-2.9}_{+1.4}$	±2.9
32	0.00800	$^{+8.4}_{-7.3}$	$^{-7.0}_{+11}$	$^{+0.6}_{-0.5}$	$^{-3.5}_{+5.1}$	$^{+0.3}_{-1.7}$	±0.1
	0.00550	$^{+1.3}_{-0.0}$	$^{-5.8}_{+8.4}$	$^{+0.5}_{-0.3}$	$^{-1.9}_{+3.2}$	$^{+0.3}_{-0.3}$	±0.3
	0.00240	$^{+0.5}_{+0.5}$	$^{-3.6}_{+6.4}$	$^{-0.1}_{+0.3}$	$^{-1.7}_{+3.9}$	$^{-0.2}_{+0.0}$	±0.9
	0.00140	$^{-0.5}_{+1.3}$	$^{-3.5}_{+4.6}$	$^{+0.2}_{+0.1}$	$^{-1.6}_{+3.9}$	$^{-0.4}_{+0.6}$	±1.9
	0.00080	$^{-2.9}_{+3.0}$	$^{-0.4}_{-1.6}$	$^{-0.8}_{+0.5}$	$^{-2.2}_{+3.6}$	$^{-2.2}_{+1.1}$	±2.7
60	0.01500	$^{+9.3}_{-6.5}$	$^{-5.2}_{+10}$	$^{+0.6}_{+0.4}$	$^{-1.8}_{+6.2}$	$^{+1.6}_{+0.4}$	±0.0
	0.00800	$^{+0.6}_{-1.7}$	$^{-4.8}_{+6.0}$	$^{-0.3}_{-0.7}$	$^{-1.9}_{+2.3}$	$^{-0.1}_{-0.6}$	±0.9
	0.00500	$^{-0.2}_{+0.8}$	$^{-3.9}_{+5.2}$	$^{+0.1}_{-0.0}$	$^{-1.4}_{+2.7}$	$^{-0.3}_{+0.3}$	±2.3
	0.00320	$^{-0.9}_{+1.4}$	$^{-3.7}_{+5.0}$	$^{-0.1}_{-0.2}$	$^{-1.6}_{+2.8}$	$^{-0.4}_{+0.0}$	±2.7
	0.00140	$^{-2.4}_{+1.8}$	$^{-1.5}_{+1.3}$	$^{-0.1}_{-0.0}$	$^{-1.8}_{+2.8}$	$^{-1.3}_{+0.6}$	±4.4
120	0.01000	$^{+0.2}_{+0.8}$	$^{-4.6}_{+5.3}$	$^{+0.4}_{+0.1}$	$^{-1.5}_{+2.3}$	$^{+0.0}_{+0.3}$	±3.9
	0.00200	$^{-0.8}_{+1.3}$	$^{-2.0}_{+2.3}$	$^{+0.4}_{-0.5}$	$^{-1.3}_{+1.9}$	$^{-1.0}_{+0.8}$	±6.3
200	0.01300	$^{-0.1}_{-0.1}$	$^{-3.7}_{+3.8}$	$^{+0.4}_{-0.1}$	$^{-0.9}_{+1.4}$	$^{+0.1}_{+0.0}$	±3.8
	0.00500	$^{-1.9}_{+1.3}$	$^{-3.8}_{+3.8}$	$^{-0.3}_{-0.6}$	$^{-1.5}_{+1.2}$	$^{-0.1}_{+0.1}$	±6.5
350	0.02500	$^{-0.5}_{+0.4}$	$^{-3.8}_{+3.4}$	$^{-0.4}_{-0.0}$	$^{-0.7}_{+1.2}$	$^{+0.4}_{-0.4}$	±4.6
	0.01000	$^{-0.2}_{+1.3}$	$^{-2.8}_{+3.7}$	$^{+0.0}_{+0.3}$	$^{-0.6}_{+0.9}$	$^{+0.0}_{+0.1}$	±8.7

Table 9. Breakdown of the theoretical uncertainty on $\sigma_{\rm red}^{c\bar{c}}(x, Q^2)$, showing the uncertainty from the variation of charm mass (δ_{m_c}), of the renormalisation and factorisation scales (δ_μ), of α_S (δ_{α_s}), of the fragmentation function (δ_{α_K}), of the transverse fragmentation (δ_{k_T}), and of the expected beauty component ($\delta_{\rm b}$). The upper (lower) value gives the effect of a positive (negative) variation of the parameter.

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Q^2 (GeV^2)	x	$\sigma_{\rm red}^{c\bar{c}}$	$\delta_{\rm stat.}$ (%)	$\delta_{\rm syst.}$ (%)	$\delta_{\rm theo.}$ (%)	$\mathcal{A}_{ps}$ (%)
7	0.00160	0.057	23	$^{+19}_{-20}$	$^{+18}_{-9.7}$	0.248
	0.00080	0.124	10	$^{+11}_{-11}$	$^{+10}_{-5.4}$	0.412
	0.00050	0.166	6.1	$^{+6.8}_{-7.1}$	$^{+8.7}_{-4.7}$	0.480
	0.00030	0.191	5.4	$^{+6.7}_{-6.0}$	$^{+7.3}_{-5.2}$	0.481
	0.00013	0.258	7.1	$^{+6.6}_{-5.7}$	$^{+11}_{-9.0}$	0.327
12	0.00300	0.098	14	$^{+17}_{-12}$	$^{+19}_{-9.7}$	0.280
	0.00150	0.153	6.6	$^{+7.1}_{-6.0}$	$^{+9.4}_{-6.5}$	0.462
	0.00080	0.177	5.9	$^{+4.7}_{-4.6}$	$^{+8.1}_{-4.7}$	0.536
	0.00050	0.244	5.2	$^{+4.6}_{-3.8}$	$^{+6.0}_{-4.9}$	0.538
	0.00022	0.350	7.5	$^{+6.9}_{-5.2}$	$^{+8.1}_{-7.1}$	0.363
18	0.00450	0.081	15	$^{+16}_{-12}$	$^{+17}_{-9.5}$	0.286
	0.00250	0.169	6.5	$^{+6.2}_{-7.2}$	$^{+8.0}_{-6.7}$	0.499
	0.00135	0.202	5.7	$^{+4.7}_{-4.8}$	$^{+7.9}_{-5.1}$	0.578
	0.00080	0.224	6.1	$^{+5.1}_{-4.6}$	$^{+5.9}_{-5.0}$	0.595
	0.00035	0.343	7.8	$^{+6.1}_{-7.1}$	$^{+6.5}_{-6.8}$	0.404
32	0.00800	0.068	29	$^{+18}_{-18}$	$^{+15}_{-11}$	0.258
	0.00550	0.160	7.0	$^{+7.5}_{-7.9}$	$^{+9.1}_{-6.2}$	0.523
	0.00240	0.238	5.5	$^{+4.5}_{-4.4}$	$^{+7.6}_{-4.1}$	0.613
	0.00140	0.277	5.3	$^{+4.3}_{-3.5}$	$^{+6.5}_{-4.4}$	0.649
	0.00080	0.412	6.4	$^{+6.8}_{-4.7}$	$^{+5.6}_{-5.4}$	0.470
60	0.01500	0.068	38	$^{+35}_{-18}$	$^{+15}_{-8.6}$	0.182
	0.00800	0.176	9.7	$^{+8.1}_{-7.3}$	$^{+6.6}_{-5.6}$	0.508
	0.00500	0.169	8.8	$^{+5.1}_{-4.9}$	$^{+6.4}_{-4.7}$	0.624
	0.00320	0.273	6.0	$^{+5.6}_{-4.1}$	$^{+6.5}_{-5.0}$	0.682
	0.00140	0.359	8.2	$^{+7.2}_{-6.1}$	$^{+5.7}_{-5.7}$	0.564
120	0.01000	0.141	12	$^{+8.2}_{-4.5}$	$^{+7.0}_{-6.2}$	0.536
	0.00200	0.329	18	$^{+8.5}_{-8.8}$	$^{+7.1}_{-6.9}$	0.638
200	0.01300	0.191	16	$^{+5.1}_{-6.8}$	$^{+5.6}_{-5.4}$	0.508
	0.00500	0.275	19	$^{+7.4}_{-5.5}$	$^{+7.8}_{-8.0}$	0.682
350	0.02500	0.113	27	$^{+8.9}_{-11}$	$^{+5.8}_{-6.0}$	0.474
	0.01000	0.234	24	$^{+10}_{-6.0}$	$^{+9.6}_{-9.2}$	0.696

Table 10. The reduced cross-section $\sigma_{\rm red}^{c\bar{c}}(x, Q^2)$ with statistical, systematic and theoretical uncertainties. The last column shows the kinematical acceptance.

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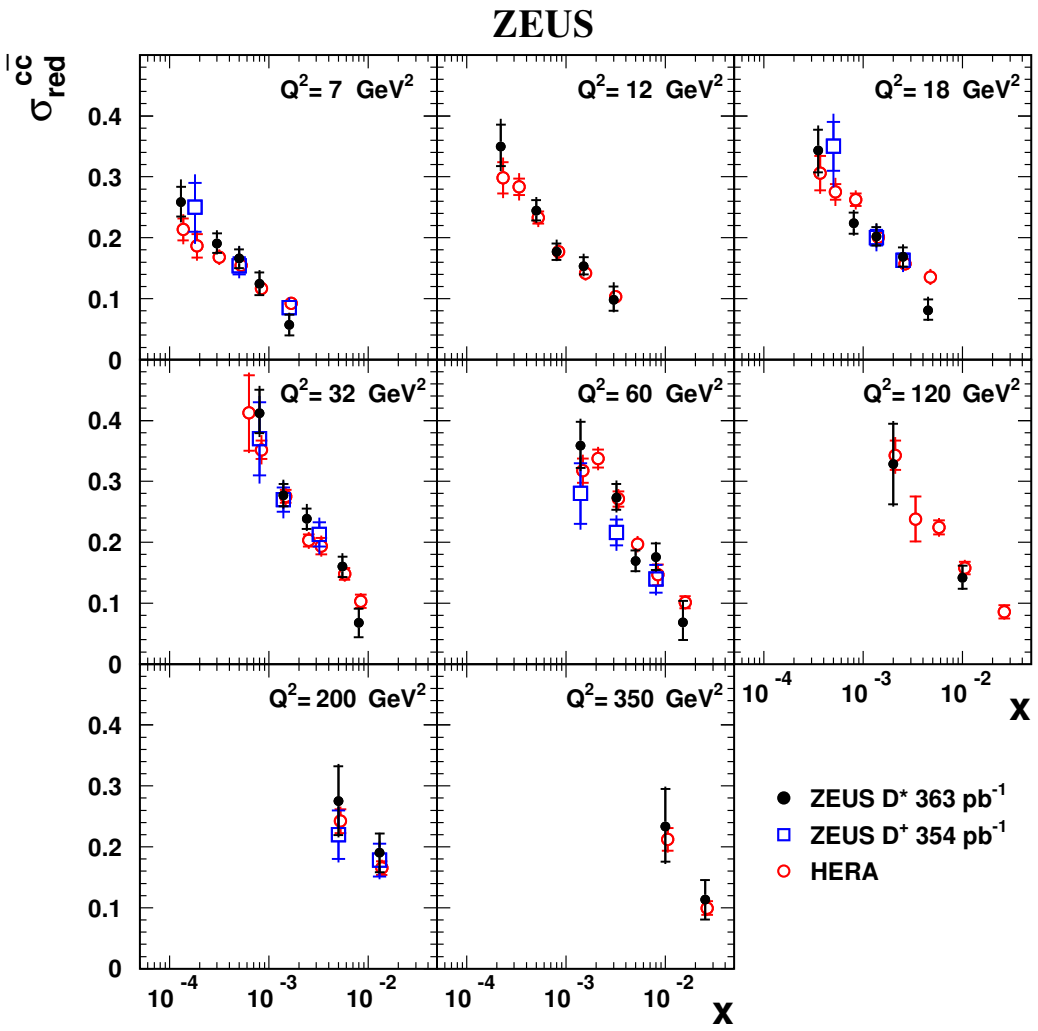

Figure 9. Reduced charm cross sections from $D^{*\pm}$ (filled circles) compared to the ZEUS D^+ measurement [9] (empty squares) and the combination of previous HERA results [5] (empty circles). The outer error bars include experimental and theoretical uncertainties added in quadrature. The inner error bars in the ZEUS D^* and D^+ measurements show the experimental uncertainties. The inner error bars of the combined HERA data represent the uncorrelated part of the uncertainty.

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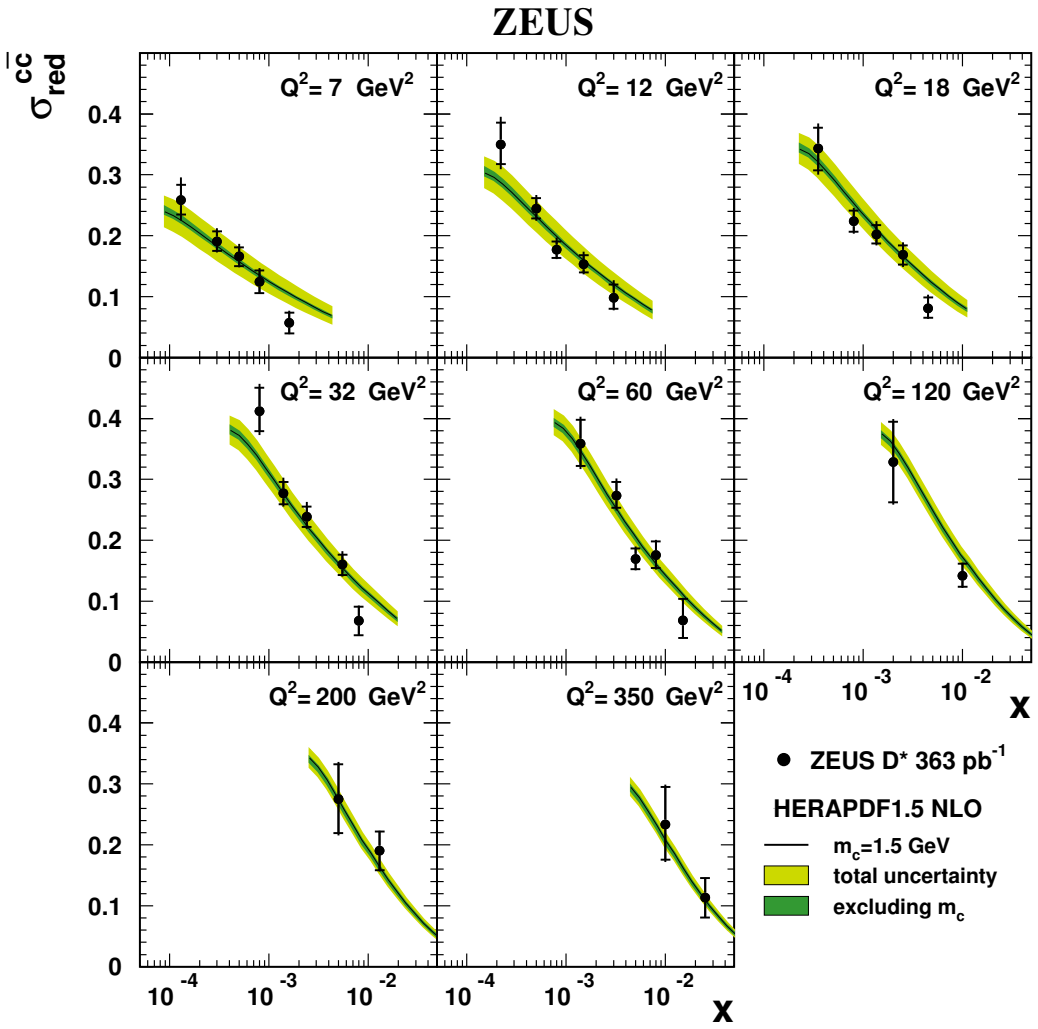

Figure 10. Reduced charm cross sections (filled circles) compared to a GM-VFNS calculation based on HERAPDF1.5 parton densities. The inner error bars show the experimental uncertainties and the outer error bars show the experimental and theoretical uncertainties added in quadrature. The outer bands on the HERAPDF1.5 predicition show the total uncertainty while the inner bands correspond to the sum in quadrature of all uncertainties excluding the charm-mass variation.

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