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Charged Current Cross Section Measurement at HERA

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Appendix A

Bin Property and Background Tables

Table A.1. Bin properties, number of events in data and from MC simulation (signal and background) for $d\sigma^{CC}/dQ^2$ in e^-p interactions.

Q^2 range (GeV ²)	\mathcal{P}	\mathcal{E}	\mathcal{A}	C_{rad}	N_{data}	$N_{\text{CC}}^{\text{MC}}$	background expectation				
							NC	php	l^+l^-	W^\pm	tot
200– 400	0.67	0.13	0.19	0.97	19	23.8	0.0	1.1	0.1	0.1	1.2
400– 711	0.61	0.15	0.25	0.98	29	34.4	0.0	0.3	0.1	0.1	0.5
711– 1265	0.65	0.30	0.45	0.99	79	76.5	0.0	0.4	0.1	0.2	0.7
1265– 2249	0.70	0.47	0.68	1.00	124	127.3	0.0	0.0	0.0	0.3	0.4
2249– 4000	0.71	0.55	0.77	1.01	138	138.5	0.0	0.1	0.0	0.2	0.3
4000– 7113	0.70	0.58	0.83	1.04	118	117.8	0.0	0.0	0.0	0.1	0.2
7113–12649	0.69	0.57	0.82	1.06	85	71.9	0.0	0.0	0.0	0.1	0.1
12649–22494	0.66	0.51	0.78	1.09	28	30.1	0.0	0.0	0.0	0.0	0.0
22494–60000	0.58	0.48	0.82	1.14	7	9.0	0.0	0.0	0.0	0.0	0.0

Table A.2. Bin properties, number of events in data and from MC simulation (signal and background) for $d\sigma^{CC}/dQ^2$ in e^+p interactions.

Q^2 range (GeV ²)	\mathcal{P}	\mathcal{E}	\mathcal{A}	C_{rad}	N_{data}	$N_{\text{CC}}^{\text{MC}}$	background expectation				
							NC	php	l^+l^-	W^\pm	tot
200– 400	0.66	0.28	0.42	0.98	159	155.7	0.0	13.1	0.9	0.1	14.2
400– 711	0.64	0.38	0.59	0.99	204	230.0	0.0	1.3	0.9	0.2	2.3
711– 1265	0.67	0.48	0.72	1.00	306	299.3	0.2	3.2	0.6	0.2	4.2
1265– 2249	0.68	0.54	0.80	1.02	324	312.4	0.4	0.3	0.3	0.3	1.4
2249– 4000	0.70	0.56	0.80	1.03	235	247.9	0.2	0.3	0.2	0.2	0.9
4000– 7113	0.69	0.57	0.83	1.06	155	147.3	0.0	0.0	0.0	0.1	0.2
7113–12649	0.66	0.56	0.85	1.09	59	58.5	0.1	0.0	0.0	0.1	0.2
12649–22494	0.58	0.51	0.88	1.13	11	14.5	0.0	0.0	0.0	0.0	0.0
22494–60000	0.44	0.49	1.12	1.17	3	2.0	0.0	0.0	0.0	0.0	0.0

Appendix A: Bin Property and Background Tables

Table A.3. Bin properties, number of events in data and from MC simulation (signal and background) for $d\sigma^{\text{CC}}/dx$ in e^-p interactions.

x range	\mathcal{P}	\mathcal{E}	\mathcal{A}	C_{rad}	N_{data}	$N_{\text{CC}}^{\text{MC}}$	background expectation				
							NC	php	l^+l^-	W^\pm	tot
0.010–0.022	0.66	0.16	0.24	1.06	35	32.8	0.0	0.5	0.0	0.1	0.6
0.022–0.046	0.73	0.33	0.45	1.06	78	88.9	0.0	0.9	0.1	0.2	1.2
0.046–0.100	0.81	0.54	0.67	1.02	167	178.3	0.0	0.2	0.2	0.4	0.8
0.100–0.178	0.81	0.56	0.70	0.98	163	150.0	0.0	0.0	0.0	0.3	0.3
0.178–0.316	0.85	0.57	0.67	0.93	123	121.6	0.0	0.0	0.0	0.1	0.2
0.316–0.562	0.87	0.47	0.54	0.82	51	48.5	0.0	0.0	0.0	0.0	0.0
0.562–1.000	0.72	0.30	0.41	0.71	3	3.8	0.0	0.0	0.0	0.0	0.0

Table A.4. Bin properties, number of events in data and from MC simulation (signal and background) for $d\sigma^{\text{CC}}/dx$ in e^+p interactions.

x range	\mathcal{P}	\mathcal{E}	\mathcal{A}	C_{rad}	N_{data}	$N_{\text{CC}}^{\text{MC}}$	background expectation				
							NC	php	l^+l^-	W^\pm	tot
0.010–0.022	0.69	0.28	0.40	1.05	167	164.1	0.0	7.3	0.3	0.1	7.7
0.022–0.046	0.77	0.54	0.69	1.03	351	370.9	0.5	5.0	0.6	0.2	6.2
0.046–0.100	0.83	0.64	0.78	1.00	425	434.5	0.2	3.0	1.2	0.4	4.8
0.100–0.178	0.83	0.63	0.76	0.93	258	268.9	0.1	0.0	0.6	0.3	0.9
0.178–0.316	0.87	0.58	0.67	0.87	173	155.2	0.2	0.0	0.2	0.1	0.5
0.316–0.562	0.89	0.45	0.51	0.79	45	41.6	0.0	0.0	0.0	0.0	0.1
0.562–1.000	0.73	0.24	0.33	0.65	2	1.7	0.0	0.0	0.0	0.0	0.0

Table A.5. Bin properties, number of events in data and from MC simulation (signal and background) for $d\sigma^{\text{CC}}/dy$ in e^-p interactions.

y range	\mathcal{P}	\mathcal{E}	\mathcal{A}	C_{rad}	N_{data}	$N_{\text{CC}}^{\text{MC}}$	background expectation				
							NC	php	l^+l^-	W^\pm	tot
0.00–0.10	0.87	0.19	0.22	0.87	60	66.5	0.0	0.6	0.1	0.1	0.9
0.10–0.20	0.84	0.56	0.66	0.97	145	134.9	0.0	0.3	0.1	0.3	0.7
0.20–0.34	0.82	0.55	0.67	1.02	149	144.9	0.0	0.3	0.1	0.2	0.6
0.34–0.48	0.75	0.50	0.67	1.06	94	106.9	0.0	0.2	0.0	0.2	0.4
0.48–0.62	0.71	0.44	0.63	1.07	80	80.7	0.0	0.2	0.0	0.1	0.4
0.62–0.76	0.66	0.36	0.54	1.07	66	57.2	0.0	0.2	0.0	0.1	0.3
0.76–0.90	0.64	0.27	0.42	1.08	33	38.3	0.0	0.1	0.0	0.1	0.2

Table A.6. Bin properties, number of events in data and from MC simulation (signal and background) for $d\sigma^{\text{CC}}/dy$ in e^+p interactions.

y range	\mathcal{P}	\mathcal{E}	\mathcal{A}	C_{rad}	N_{data}	$N_{\text{CC}}^{\text{MC}}$	background expectation				
							NC	php	l^+l^-	W^\pm	tot
0.00–0.10	0.90	0.35	0.40	0.87	264	268.6	0.2	5.1	1.5	0.2	7.0
0.10–0.20	0.81	0.57	0.70	0.99	360	337.7	0.0	5.2	0.9	0.3	6.3
0.20–0.34	0.79	0.55	0.69	1.04	316	335.6	0.0	3.7	0.2	0.2	4.1
0.34–0.48	0.74	0.48	0.65	1.05	219	224.5	0.1	1.4	0.2	0.2	1.9
0.48–0.62	0.69	0.39	0.56	1.08	146	146.7	0.6	1.5	0.1	0.1	2.3
0.62–0.76	0.65	0.30	0.47	1.08	102	98.1	0.0	1.3	0.0	0.1	1.4
0.76–0.90	0.62	0.20	0.33	1.08	49	56.6	0.1	0.2	0.1	0.1	0.4

Table A.7. Bin properties, number of events in data and from MC simulation (signal and background) for $d^2\sigma^{\text{CC}}/dx dQ^2$ in e^-p interactions.

Q_c^2 (GeV ²)	x_c	\mathcal{P}	\mathcal{E}	\mathcal{A}	C_{rad}	N_{data}	$N_{\text{CC}}^{\text{MC}}$	background expectation				
								NC	php	l^+l^-	W^\pm	tot
280	0.032	0.60	0.28	0.47	0.94	6	10.1	0.0	0.5	0.0	0.0	0.5
530	0.015	0.44	0.14	0.32	1.06	11	10.1	0.0	0.1	0.0	0.0	0.1
530	0.032	0.53	0.27	0.50	1.04	12	13.3	0.0	0.1	0.1	0.1	0.2
530	0.068	0.65	0.22	0.34	0.91	4	8.5	0.0	0.0	0.1	0.0	0.1
950	0.015	0.38	0.12	0.32	1.12	16	11.8	0.0	0.3	0.0	0.0	0.3
950	0.032	0.55	0.29	0.52	1.06	14	21.6	0.0	0.1	0.1	0.1	0.2
950	0.068	0.63	0.41	0.65	0.97	29	24.6	0.0	0.0	0.0	0.1	0.2
950	0.130	0.64	0.39	0.61	0.90	16	14.2	0.0	0.0	0.0	0.0	0.0
1700	0.032	0.48	0.27	0.56	1.10	30	29.0	0.0	0.0	0.0	0.1	0.1
1700	0.068	0.62	0.58	0.93	1.01	49	47.9	0.0	0.0	0.0	0.1	0.2
1700	0.130	0.68	0.58	0.85	0.94	29	28.0	0.0	0.0	0.0	0.1	0.1
1700	0.240	0.68	0.53	0.78	0.85	15	17.9	0.0	0.0	0.0	0.0	0.1
3000	0.068	0.60	0.53	0.89	1.05	52	53.7	0.0	0.0	0.0	0.1	0.1
3000	0.130	0.66	0.62	0.94	0.99	36	36.9	0.0	0.0	0.0	0.1	0.1
3000	0.240	0.70	0.61	0.87	0.92	27	25.1	0.0	0.0	0.0	0.0	0.0
3000	0.420	0.74	0.45	0.61	0.79	7	7.9	0.0	0.0	0.0	0.0	0.0
5300	0.068	0.49	0.38	0.77	1.17	32	37.7	0.0	0.0	0.0	0.1	0.1
5300	0.130	0.64	0.57	0.90	1.02	45	39.1	0.0	0.0	0.0	0.1	0.1
5300	0.240	0.72	0.64	0.89	0.94	21	28.6	0.0	0.0	0.0	0.0	0.0
5300	0.420	0.73	0.59	0.81	0.84	18	11.6	0.0	0.0	0.0	0.0	0.0
9500	0.130	0.52	0.43	0.83	1.13	35	29.1	0.0	0.0	0.0	0.1	0.1
9500	0.240	0.67	0.61	0.91	1.01	37	27.2	0.0	0.0	0.0	0.0	0.0
9500	0.420	0.77	0.64	0.83	0.89	13	11.3	0.0	0.0	0.0	0.0	0.0
17000	0.240	0.54	0.44	0.82	1.13	18	17.4	0.0	0.0	0.0	0.0	0.0
17000	0.420	0.69	0.61	0.88	0.96	8	9.5	0.0	0.0	0.0	0.0	0.0
30000	0.420	0.53	0.47	0.89	1.12	5	6.4	0.0	0.0	0.0	0.0	0.0

Appendix A: Bin Property and Background Tables

Table A.8. Bin properties, number of events in data and from MC simulation (signal and background) for $d^2\sigma^{CC}/dx dQ^2$ in e^+p interactions.

Q_c^2 (GeV ²)	x_c	\mathcal{P}	\mathcal{E}	\mathcal{A}	C_{rad}	N_{data}	$N_{\text{CC}}^{\text{MC}}$	background expectation				
								NC	php	l^+l^-	W^\pm	tot
280	0.008	0.40	0.14	0.35	1.07	26	18.4	0.0	2.4	0.1	0.0	2.5
280	0.015	0.48	0.26	0.54	1.03	49	43.3	0.0	5.0	0.2	0.0	5.3
280	0.032	0.59	0.44	0.75	0.95	55	53.2	0.0	3.1	0.2	0.0	3.3
280	0.068	0.65	0.43	0.66	0.89	24	33.8	0.0	2.4	0.4	0.0	2.8
530	0.015	0.48	0.28	0.58	1.06	52	56.6	0.0	0.4	0.0	0.0	0.5
530	0.032	0.53	0.46	0.87	0.99	57	74.7	0.0	0.5	0.2	0.1	0.7
530	0.068	0.60	0.52	0.87	0.92	59	58.8	0.0	0.1	0.5	0.1	0.6
530	0.130	0.60	0.46	0.77	0.83	25	25.3	0.0	0.0	0.2	0.0	0.2
950	0.015	0.43	0.21	0.49	1.09	52	52.5	0.0	1.9	0.1	0.0	2.0
950	0.032	0.57	0.51	0.89	1.04	102	102.0	0.0	0.7	0.0	0.1	0.8
950	0.068	0.63	0.58	0.92	0.96	84	85.7	0.0	0.5	0.2	0.1	0.8
950	0.130	0.66	0.55	0.84	0.88	48	41.3	0.0	0.0	0.2	0.0	0.2
950	0.240	0.67	0.40	0.60	0.82	20	16.5	0.2	0.0	0.0	0.0	0.3
1700	0.032	0.52	0.42	0.82	1.09	105	100.4	0.4	0.3	0.1	0.1	0.9
1700	0.068	0.64	0.59	0.93	1.02	105	106.6	0.0	0.0	0.0	0.1	0.2
1700	0.130	0.68	0.61	0.90	0.92	57	57.6	0.0	0.0	0.1	0.1	0.2
1700	0.240	0.70	0.56	0.81	0.87	39	31.4	0.0	0.0	0.1	0.0	0.1
3000	0.068	0.61	0.53	0.86	1.08	97	95.6	0.2	0.0	0.0	0.1	0.3
3000	0.130	0.69	0.61	0.90	0.98	55	62.5	0.0	0.0	0.1	0.1	0.1
3000	0.240	0.72	0.62	0.87	0.90	44	39.0	0.0	0.0	0.1	0.0	0.1
3000	0.420	0.71	0.51	0.72	0.81	7	10.5	0.0	0.0	0.0	0.0	0.0
5300	0.068	0.50	0.37	0.74	1.15	49	50.1	0.0	0.0	0.0	0.1	0.1
5300	0.130	0.63	0.58	0.93	1.07	45	50.2	0.0	0.0	0.0	0.0	0.0
5300	0.240	0.70	0.65	0.93	0.95	41	35.1	0.0	0.0	0.0	0.0	0.0
5300	0.420	0.74	0.60	0.82	0.85	20	11.0	0.0	0.0	0.0	0.0	0.0
9500	0.130	0.49	0.43	0.89	1.16	21	23.9	0.1	0.0	0.0	0.1	0.1
9500	0.240	0.67	0.60	0.90	1.04	22	21.6	0.0	0.0	0.0	0.0	0.0
9500	0.420	0.74	0.64	0.86	0.92	8	8.8	0.0	0.0	0.0	0.0	0.0
17000	0.240	0.48	0.46	0.95	1.17	3	8.1	0.0	0.0	0.0	0.0	0.0
17000	0.420	0.65	0.62	0.96	1.02	6	4.6	0.0	0.0	0.0	0.0	0.0