

NP Internal Report 72-12  
27 June 19725 GeV/c DIFFERENTIAL CROSS-SECTIONS FOR

$$\pi^{\pm} p \rightarrow \pi^{\pm} p, K^{\pm} p \rightarrow K^{\pm} p, \bar{p} p \rightarrow \bar{p} p,$$

$$\bar{p} p \rightarrow \pi^+ \pi^-, \text{ and } \bar{p} p \rightarrow K^+ K^-$$

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ABSTRACT

Listed are final absolute differential cross-sections with statistical errors obtained in our experiment. Our previously published data<sup>1)</sup> were normalized to earlier measurements.

- 1) V. Chabaud et al., Phys. Letters 38 B, 441-451 (1972).

G E N E V A

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Table 1

 $\pi^+ p$  elastic scattering

$-t$ (GeV/c) <sup>2</sup>	$d\sigma/dt$ $\mu\text{b}/(\text{GeV}/c)^2$	
1.35	77.3970 ±	23.6520
1.45	35.9090 ±	2.7953
1.55	27.8750 ±	1.3290
1.65	19.3900 ±	0.8335
1.75	13.9760 ±	0.6155
1.85	10.2800 ±	0.4909
1.95	6.5533 ±	0.3485
2.10	3.8888 ±	0.1603
2.30	1.8044 ±	0.0943
2.50	0.5890 ±	0.0527
2.70	0.2178 ±	0.0283
2.90	0.0885 ±	0.0168
3.10	0.1494 ±	0.0213
3.30	0.2013 ±	0.0241
3.50	0.1738 ±	0.0196
3.70	0.1856 ±	0.0186
3.90	0.1803 ±	0.0169
4.10	0.1927 ±	0.0223
4.30	0.2177 ±	0.0214
4.50	0.1334 ±	0.0167
4.70	0.0676 ±	0.0137
4.90	0.0766 ±	0.0150
5.10	0.0845 ±	0.0161
5.30	0.1555 ±	0.0273
5.50	0.1596 ±	0.0259
5.70	0.1504 ±	0.0297
5.90	0.3060 ±	0.0481
6.10	0.3876 ±	0.0516
6.30	0.5186 ±	0.0534
6.50	0.7112 ±	0.0595
6.70	0.9586 ±	0.0791
6.90	1.3278 ±	0.1783
7.10	2.2976 ±	1.0345

Table 2

$K^+$  p elastic scattering

$-t$ $(\text{GeV}/c)^2$	$d\sigma/dt$ $\mu\text{b}/(\text{GeV}/c)^2$
0.16	8818.0000 $\pm$ 118.9300
0.18	7348.1000 $\pm$ 87.1630
0.20	6873.2000 $\pm$ 82.5980
0.22	6753.9000 $\pm$ 83.1970
0.24	6033.8000 $\pm$ 73.4250
0.26	5340.2000 $\pm$ 64.4700
0.28	4759.1000 $\pm$ 57.2680
0.30	4396.6000 $\pm$ 53.3500
0.32	4087.0000 $\pm$ 50.6770
0.34	3829.7000 $\pm$ 48.0450
0.36	3327.6000 $\pm$ 42.9650
0.38	3065.5000 $\pm$ 40.8040
0.40	2836.3000 $\pm$ 37.6980
0.42	2437.8000 $\pm$ 34.4140
0.44	2229.0000 $\pm$ 32.6530
0.46	1885.8000 $\pm$ 29.0880
0.48	1761.6000 $\pm$ 27.8020
0.50	1557.5000 $\pm$ 26.6890
0.52	1479.5000 $\pm$ 27.7410
0.54	1317.1000 $\pm$ 25.3300
0.56	1140.9000 $\pm$ 22.8490
0.58	1077.3000 $\pm$ 22.0760
0.60	945.8600 $\pm$ 20.5600
0.62	841.2700 $\pm$ 19.0170
0.64	761.6100 $\pm$ 17.5650
0.66	680.2200 $\pm$ 16.4160
0.68	616.5400 $\pm$ 15.6240
0.70	537.1900 $\pm$ 14.3370
0.72	510.9100 $\pm$ 14.2430
0.74	461.9100 $\pm$ 13.2760
0.76	409.4000 $\pm$ 12.3050
0.78	370.6000 $\pm$ 11.6810
0.80	337.2500 $\pm$ 11.0340
0.82	328.9500 $\pm$ 11.0780
0.84	271.2600 $\pm$ 9.9556
0.86	257.7000 $\pm$ 9.7044
0.88	249.2600 $\pm$ 9.3929
0.90	239.1600 $\pm$ 9.4727
0.92	192.9800 $\pm$ 8.4714
0.94	184.2300 $\pm$ 8.0495

Table 2 (cont.)

-t (GeV/c) <sup>2</sup>	dσ/dt μb/(GeV/c) <sup>2</sup>	
0.96	159.2900 ±	7.4579
0.98	155.5600 ±	7.3896
1.00	137.1300 ±	7.2236
1.03	128.9700 ±	4.9584
1.09	107.5000 ±	4.4333
1.13	79.8180 ±	3.7327
1.19	61.2810 ±	3.1499
1.23	53.1620 ±	3.0440
1.28	41.9520 ±	2.5892
1.34	32.1110 ±	2.3538
1.38	27.3910 ±	2.1456
1.44	17.6990 ±	1.7887
1.48	13.8630 ±	1.4769
1.56	12.0860 ±	1.0466
1.66	6.1180 ±	0.7564
1.76	5.0900 ±	0.6900
1.86	3.2600 ±	0.5800
1.962	1.8900 ±	0.4400
2.25	0.7500 ±	0.1700
2.65	0.1900 ±	0.0800
3.05	0.2600 ±	0.0800
3.45	0.1500 ±	0.0600
3.85	0.1600 ±	0.0500
4.25	0.1100 ±	0.0500
4.65	0.1700 ±	0.0700
5.05	0.1300 ±	0.0700
5.45	0.1100 ±	0.0800
5.85	0.1200 ±	0.0600
6.15	0.1300 ±	0.0700
6.35	0.2500 ±	0.0900
6.55	0.3700 ±	0.1100
6.75	0.4400 ±	0.1000
6.95	0.5600 ±	0.1300
7.15	0.4700 ±	0.1300
7.35	0.6800 ±	0.1600
7.55	1.0300 ±	0.1600
7.75	1.5500 ±	0.2100
7.875	2.4400 ±	0.6000
7.925	3.2000 ±	0.6700
7.975	3.6000 ±	0.7200
8.025	6.0500 ±	0.9300
8.075	7.2500 ±	1.0500
8.125	8.9800 ±	1.1900
8.175	12.2000 ±	1.5000
8.225	19.3000 ±	2.2000

Table 3

$\pi^- p$  elastic scattering

$-t$ (GeV/c) <sup>2</sup>	$d\sigma/dt$ $\mu\text{b}/(\text{GeV}/c)^2$
0.175	11400.0000 ± 780.0000
0.225	8730.0000 ± 550.0000
0.275	6410.0000 ± 430.0000
0.325	3840.0000 ± 270.0000
0.375	2780.0000 ± 210.0000
0.425	1600.0000 ± 130.0000
0.475	1090.0000 ± 100.0000
0.525	1030.0000 ± 100.0000
0.575	666.0000 ± 82.0000
0.625	418.0000 ± 62.0000
0.675	398.0000 ± 63.0000
0.725	166.0000 ± 37.0000
0.775	134.0000 ± 34.0000
0.825	146.0000 ± 36.0000
0.875	92.0000 ± 30.0000
0.925	136.0000 ± 35.0000
0.975	96.0000 ± 30.0000
1.05	80.0000 ± 19.0000
1.15	90.0000 ± 21.0000
1.25	87.0000 ± 22.0000
1.35	62.0000 ± 17.0000
1.45	41.8000 ± 7.4000
1.55	30.7000 ± 4.3000
1.65	22.8000 ± 2.6000
1.75	20.0000 ± 1.9000
1.85	13.2000 ± 1.4000
1.95	7.0000 ± 0.9200
2.10	3.4000 ± 0.4600
2.30	1.5100 ± 0.3400
2.50	0.3400 ± 0.1100
2.70	0.1880 ± 0.0210
2.90	0.0732 ± 0.0083
3.10	0.1270 ± 0.0100
3.30	0.1590 ± 0.0110
3.50	0.1790 ± 0.0110
3.70	0.1870 ± 0.0100
3.90	0.1317 ± 0.0074
4.10	0.1099 ± 0.0081
4.30	0.1050 ± 0.0069
4.50	0.0793 ± 0.0060

Table 3 (cont.)

$-t$ $(\text{GeV}/c)^2$	$d\sigma/dt$ $\mu\text{b}/(\text{GeV}/c)^2$	
4.70	0.0694 $\pm$	0.0062
4.90	0.0926 $\pm$	0.0081
5.10	0.0963 $\pm$	0.0091
5.30	0.1210 $\pm$	0.0110
5.50	0.1300 $\pm$	0.0130
5.70	0.0940 $\pm$	0.0120
5.90	0.0980 $\pm$	0.0240
6.10	0.1590 $\pm$	0.0430
6.30	0.2460 $\pm$	0.0470
6.50	0.1630 $\pm$	0.0350
6.70	0.4270 $\pm$	0.0620
6.90	0.4900 $\pm$	0.1000
7.10	0.7100 $\pm$	0.1500
7.30	0.8600 $\pm$	0.1800

Table 4

$K^-p$  elastic scattering

$-t$ (GeV/c) <sup>2</sup>	$d\sigma/dt$ $\mu\text{b}/(\text{GeV}/c)^2$
0.175	7190.0000 ± 560.0000
0.225	5280.0000 ± 440.0000
0.275	3620.0000 ± 320.0000
0.325	2440.0000 ± 100.0000
0.375	1551.0000 ± 26.0000
0.425	1134.0000 ± 14.0000
0.475	877.0000 ± 11.0000
0.525	669.2000 ± 9.3000
0.575	461.0000 ± 7.1000
0.625	321.1000 ± 5.6000
0.675	226.0000 ± 4.4000
0.725	174.2000 ± 3.9000
0.775	137.3000 ± 3.4000
0.825	112.7000 ± 3.1000
0.875	81.9000 ± 2.6000
0.925	71.7000 ± 2.4000
0.975	68.0000 ± 2.4000
1.05	57.4000 ± 1.6000
1.15	51.7000 ± 1.6000
1.25	42.9000 ± 1.5000
1.35	36.9000 ± 1.4000
1.45	29.9000 ± 1.2000
1.55	23.6000 ± 1.3000
1.65	16.7000 ± 1.1000
1.75	12.3400 ± 0.9200
1.85	9.2500 ± 0.7700
1.95	6.2000 ± 0.6600
2.10	4.9700 ± 0.4400
2.30	3.6400 ± 0.4700
2.50	2.1900 ± 0.4200
2.70	1.0300 ± 0.2400
2.90	0.5800 ± 0.1600
3.10	0.6400 ± 0.1600
3.30	0.4200 ± 0.1300
3.50	0.2010 ± 0.0830
3.70	0.1690 ± 0.0690
4.00	0.0660 ± 0.0300
5.10	0.0230 ± 0.0094
6.70	0.0147 ± 0.0065
7.50	0.0310 ± 0.0220
7.70	0.0500 ± 0.0290
7.90	0.0750 ± 0.0360
8.10	0.2010 ± 0.0720

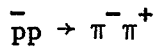
Table 5

$\bar{p}p$  elastic scattering

$-t$ (GeV/c) <sup>2</sup>	$d\sigma/dt$ $\mu\text{b}/(\text{GeV}/c)^2$
0.16	15600.0000 ± 1800.0000
0.18	10500.0000 ± 1200.0000
0.20	9300.0000 ± 1200.0000
0.22	6370.0000 ± 900.0000
0.24	5470.0000 ± 830.0000
0.26	5910.0000 ± 900.0000
0.28	2820.0000 ± 580.0000
0.30	2990.0000 ± 330.0000
0.32	1790.0000 ± 120.0000
0.34	1395.0000 ± 66.0000
0.36	1010.0000 ± 40.0000
0.38	749.0000 ± 25.0000
0.40	634.0000 ± 20.0000
0.42	475.0000 ± 15.0000
0.44	380.0000 ± 13.0000
0.46	281.0000 ± 10.0000
0.48	248.2000 ± 9.4000
0.50	198.2000 ± 8.3000
0.52	181.8000 ± 7.9000
0.54	219.0000 ± 8.8000
0.56	211.4000 ± 8.8000
0.58	229.2000 ± 9.1000
0.60	241.7000 ± 9.4000
0.62	243.3000 ± 9.2000
0.64	277.0000 ± 10.0000
0.66	272.0000 ± 10.0000
0.68	264.0000 ± 10.0000
0.70	304.0000 ± 11.0000
0.72	287.0000 ± 10.0000
0.74	290.0000 ± 10.0000
0.76	302.0000 ± 11.0000
0.78	278.0000 ± 11.0000
0.80	294.0000 ± 11.0000
0.82	264.0000 ± 10.0000
0.84	279.0000 ± 10.0000
0.86	230.6000 ± 9.2000
0.88	243.9000 ± 9.5000
0.90	238.5000 ± 9.5000
0.92	228.0000 ± 9.3000
0.94	215.1000 ± 9.0000

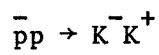


Table 6



$-t$ (GeV/c) <sup>2</sup>	$d\sigma/dt$ $\mu\text{b}/(\text{GeV}/c)^2$	
0.45	2.9200 ±	0.7300
0.55	3.4200 ±	0.5700
0.65	2.7300 ±	0.5000
0.75	3.1400 ±	0.5300
0.85	2.2400 ±	0.4000
0.95	2.2600 ±	0.4400
1.05	1.5300 ±	0.3400
1.15	1.7000 ±	0.3400
1.25	1.3700 ±	0.3400
1.35	1.4100 ±	0.3800
1.50	0.5700 ±	0.1500
1.70	0.6200 ±	0.1700
1.90	0.8600 ±	0.2000
2.10	0.7300 ±	0.1900
2.30	0.6000 ±	0.2100
2.50	0.9500 ±	0.3200
2.80	0.8300 ±	0.3100
4.00	0.0490 ±	0.0250
6.00	0.0350 ±	0.0180
7.70	0.0350 ±	0.0160
8.50	0.2000 ±	0.0900
8.70	0.4800 ±	0.1300
8.90	0.6300 ±	0.1600
9.05	1.7000 ±	0.3800
9.15	1.7300 ±	0.3700
9.25	1.8600 ±	0.4500

Table 7



$-t$ $(\text{GeV}/c)^2$	$d\sigma/dt$ $\mu\text{b}/(\text{GeV}/c)^2$	
0.35	12.0000 $\pm$	5.0000
0.45	3.2100 $\pm$	0.7300
0.55	3.6900 $\pm$	0.6500
0.65	1.6300 $\pm$	0.3800
0.75	0.9600 $\pm$	0.2700
0.85	1.1000 $\pm$	0.3100
0.95	0.9700 $\pm$	0.2800
1.05	0.9100 $\pm$	1.2800
1.15	1.0000 $\pm$	0.3100
1.30	0.3900 $\pm$	0.1400
1.50	0.6500 $\pm$	0.1800
1.70	0.5900 $\pm$	0.1900
1.90	0.5400 $\pm$	0.1700
2.20	0.4600 $\pm$	0.1400
3.70	0.0660 $\pm$	0.0250
6.70	0.0040 $\pm$	0.0040
8.65	0.0420 $\pm$	0.0300