

Phy499 Programming in ROOT
First Homework Assignment
Due Tuesday Jan 19

On the last two pages are data for pions scattering elastically off of protons at a pion lab kinetic energy of 49.5 MeV . The data are from Phys. Rev. **D28** (1983) 1569-1585. Your assignment is the following:

1. Make a graph, in ROOT, for each of the data sets. using a linear scale for the differential cross section $d\sigma/d\Omega$.
2. Make a graph, in ROOT, for each of the data sets. using a log scale for the differential cross section $d\sigma/d\Omega$.
3. Write a Latex file that has a π^+p and a π^-p graph embedded in the file. Write a few words about each graph in a caption under the graph.

$\pi^+p \rightarrow \pi^+p$ elastic scattering

θ_{cm} (Deg)	$d\sigma/d\Omega$ (mb)	error (mb)
47.0	0.21	± 0.059
50.0	0.311	± 0.028
54.0	0.294	± 0.026
58.0	0.321	± 0.025
62.0	0.341	± 0.021
66.0	0.378	± 0.024
70.0	0.387	± 0.021
74.0	0.462	± 0.028
78.0	0.533	± 0.03
82.0	0.558	± 0.024
86.0	0.608	± 0.027
90.0	0.683	± 0.034
94.0	0.784	± 0.039
98.0	0.886	± 0.041
102.0	1.051	± 0.041
106.0	1.101	± 0.05
110.0	1.185	± 0.044
114.0	1.239	± 0.055
118.0	1.38	± 0.059
122.0	1.405	± 0.058
126.0	1.598	± 0.085
130.0	1.591	± 0.071
134.0	1.485	± 0.09
138.0	1.942	± 0.086
142.0	2.125	± 0.085
146.0	2.086	± 0.102
150.0	2.09	± 0.092
154.0	2.152	± 0.192

$\pi^- p \rightarrow \pi^- p$ elastic scattering

θ_{cm} (Deg)	$d\sigma/d\Omega$ (mb)	error (mb)
47.0	0.463	± 0.098
50.0	0.467	± 0.026
54.0	0.399	± 0.019
58.0	0.341	± 0.015
62.0	0.324	± 0.015
66.0	0.29	± 0.014
70.0	0.28	± 0.012
74.0	0.243	± 0.011
78.0	0.238	± 0.011
82.0	0.223	± 0.009
86.0	0.197	± 0.009
90.0	0.171	± 0.011
94.0	0.16	± 0.011
98.0	0.17	± 0.009
102.0	0.16	± 0.008
106.0	0.132	± 0.009
110.0	0.134	± 0.008
114.0	0.101	± 0.007
118.0	0.096	± 0.009
122.0	0.093	± 0.008
126.0	0.097	± 0.009
130.0	0.058	± 0.007
134.0	0.065	± 0.009
138.0	0.055	± 0.008
142.0	0.036	± 0.008
146.0	0.043	± 0.007
150.0	0.024	± 0.007
154.0	0.027	± 0.008