Kaon Mass Data Analysis

Nick Graf
MIPP Collaboration Meeting
April 8,2006

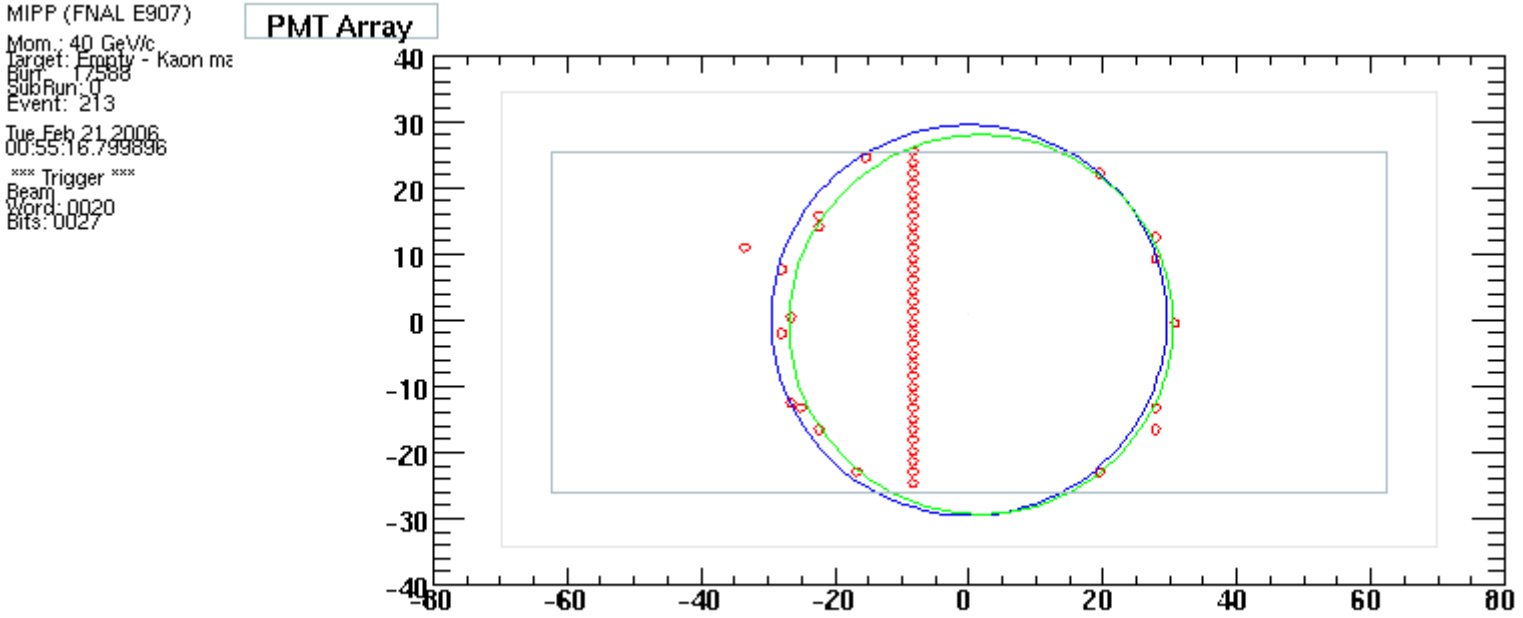
Amount of Data Taken

	Total	Protons		Kaons		Pions	
		Triggers	Fraction	Triggers	Fraction	Triggers	Fraction
37.5 GeV	1687073	475471	28.18%	587449	34.82%	599236	35.52%
40 GeV	2884920	934740	32.40%	904835	31.36%	1007062	34.91%
42.5 GeV	911701	339881	37.28%	282775	31.02%	276703	30.35%
All	5483694	1750092	31.91%	1775059	32.37%	1883001	34.34%

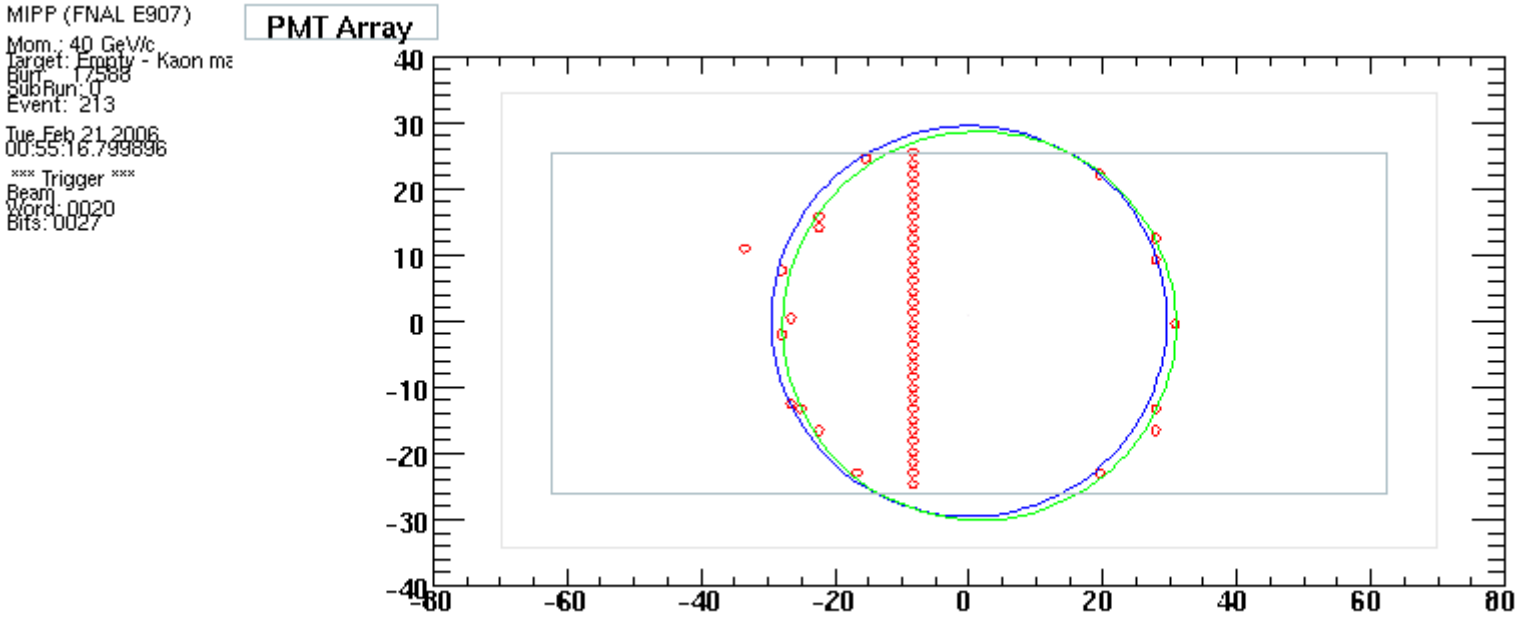
+60 GeV - 4,687,321
+56 GeV - 497,633
+63 GeV - 957,474
- 60 GeV – 2,701,458

Optimal Fractions
20% Proton
45% Kaon
35% Pions

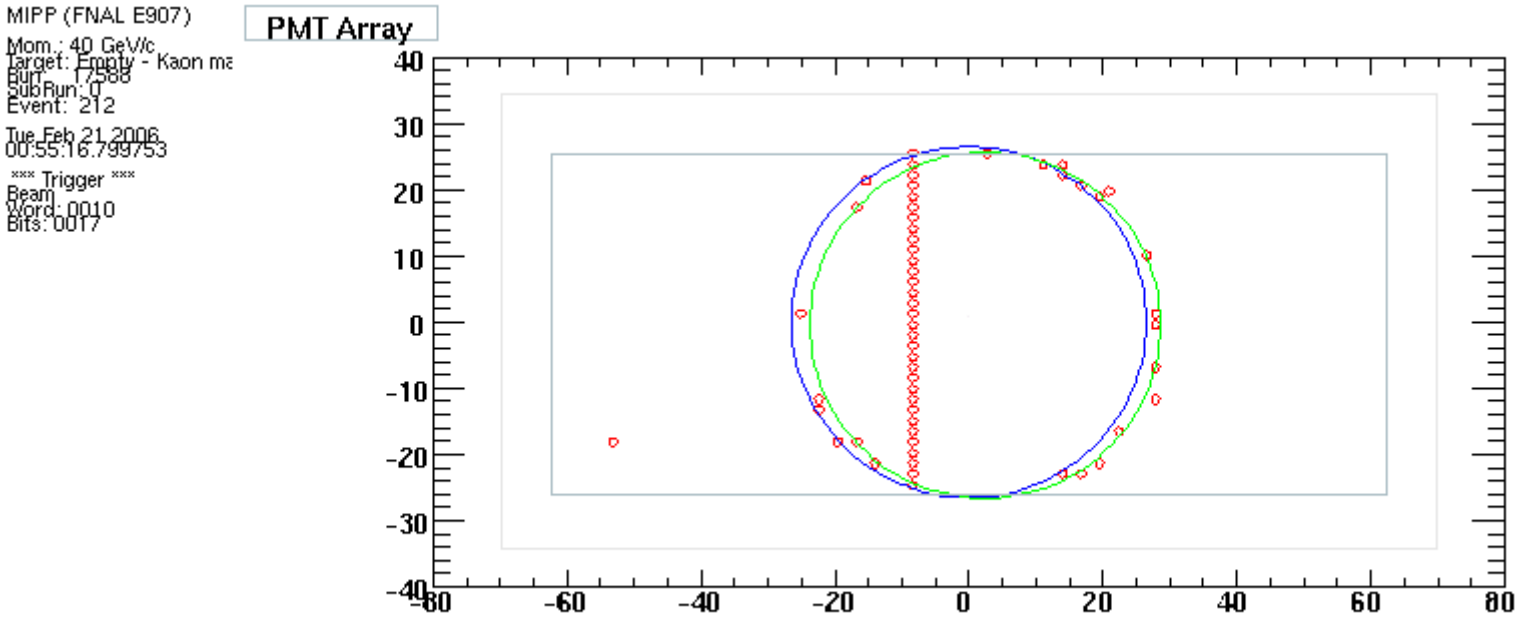
Total Events: 14,327,580



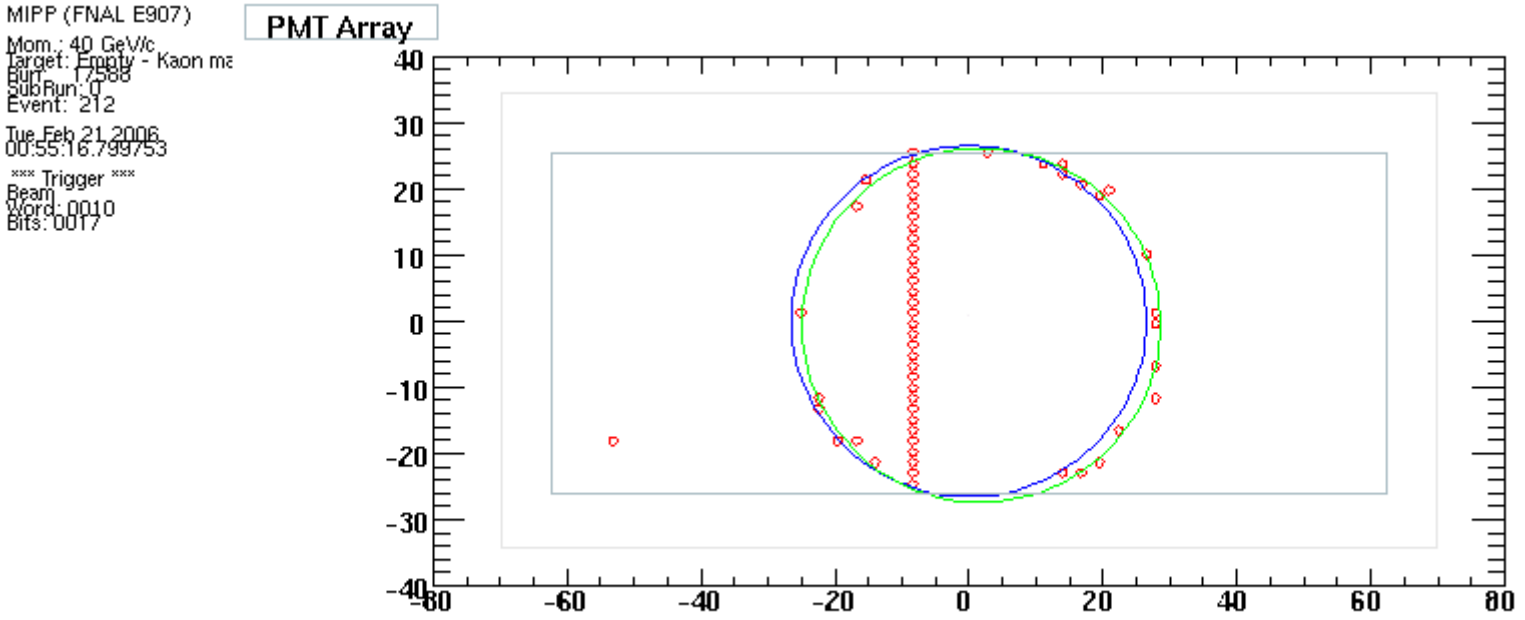
Before removing hot column



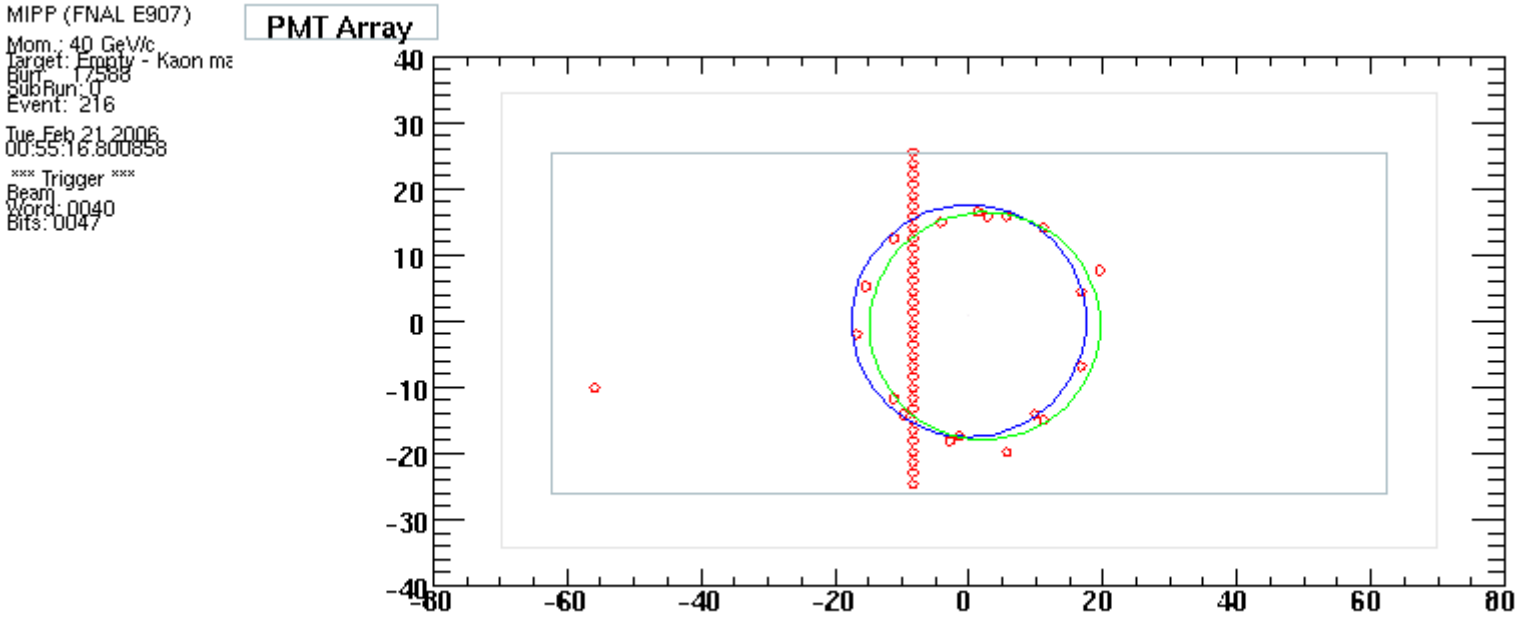
After removing hot column



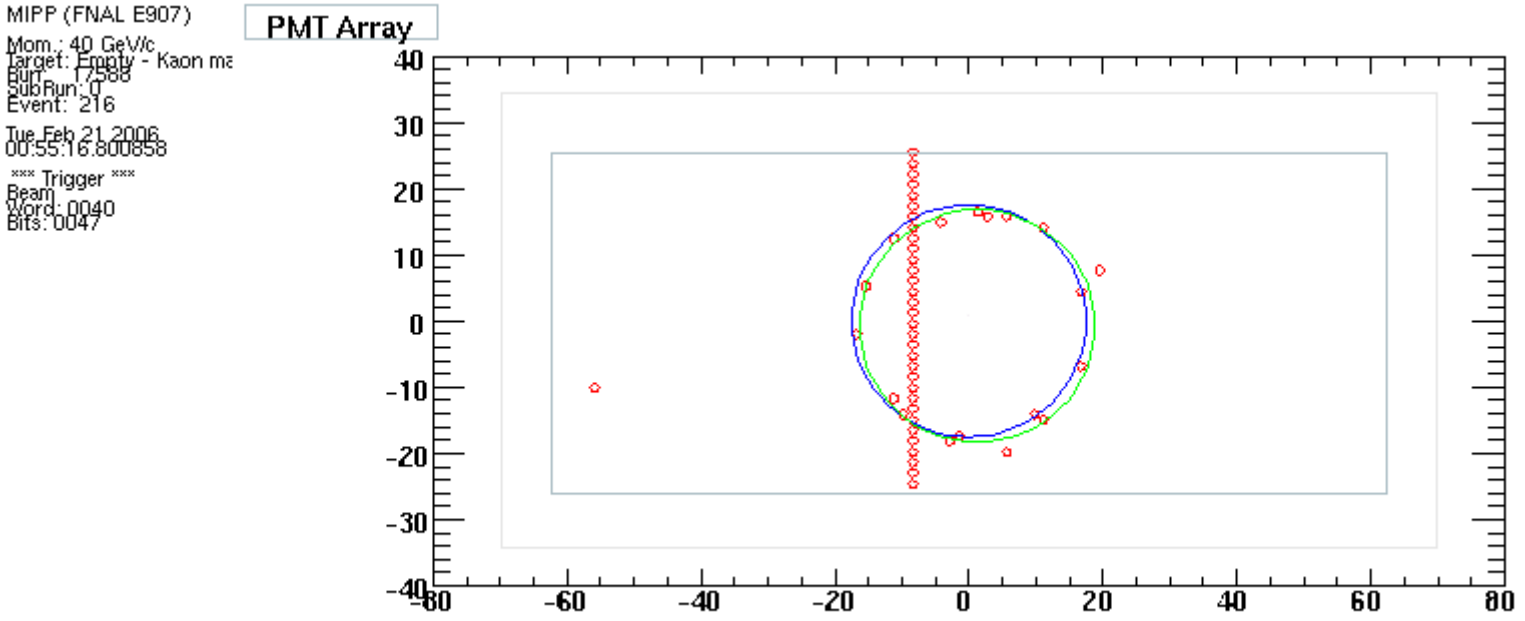
Before removing hot column



After removing hot column

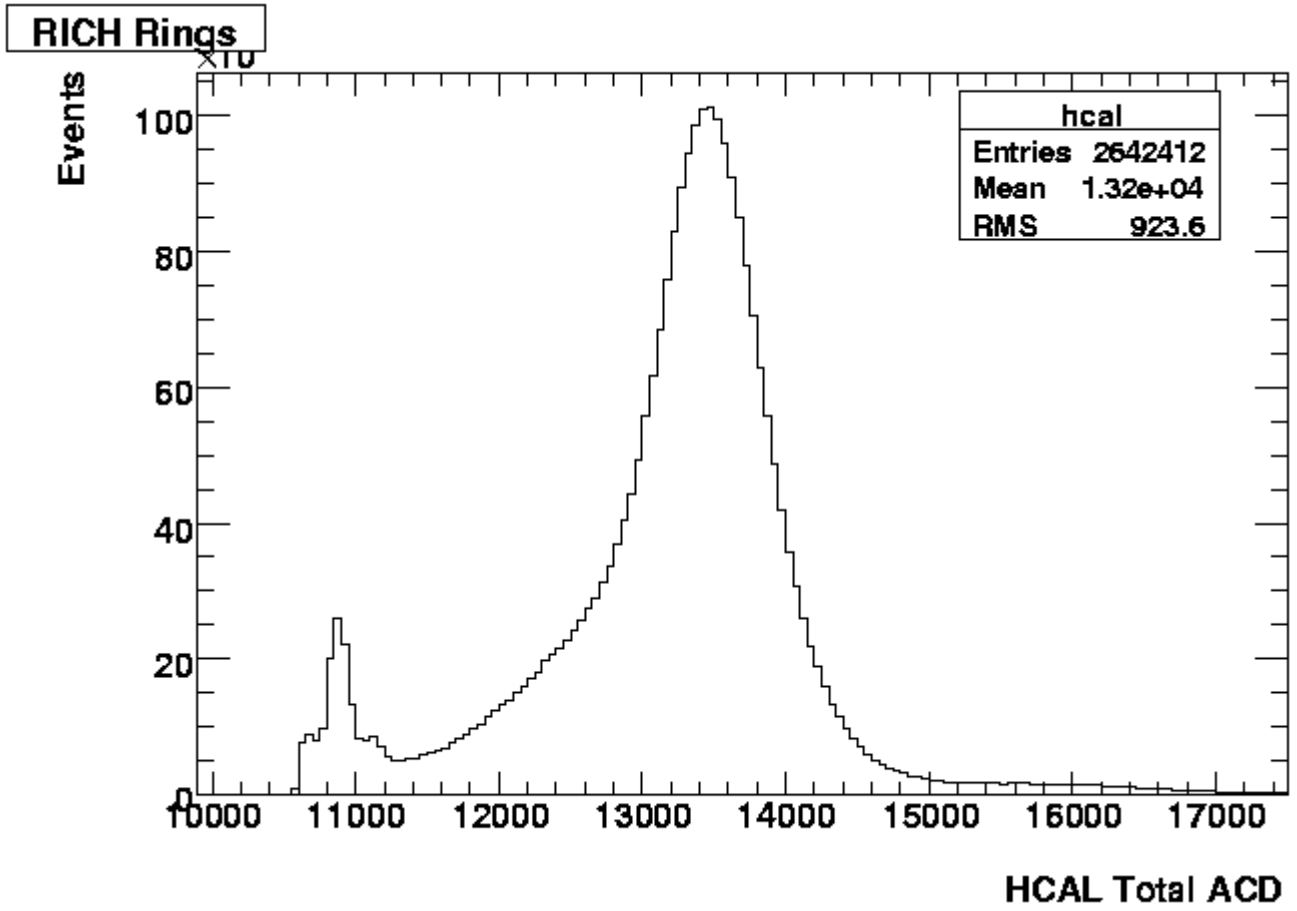


Before removing hot column



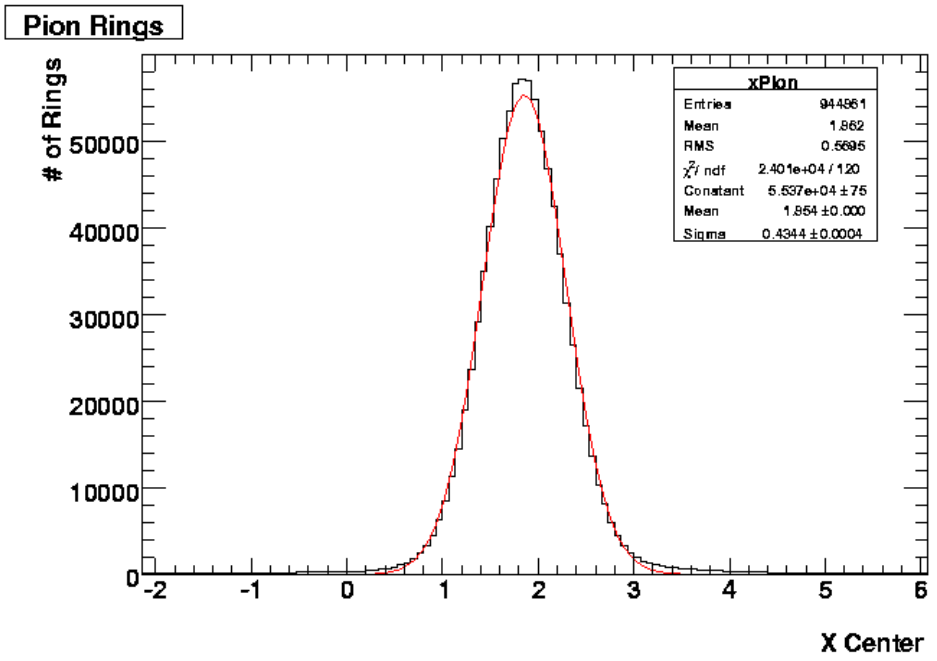
After removing hot column

Hcal ADC Distributions



Keep region between 12,000 - 15,000

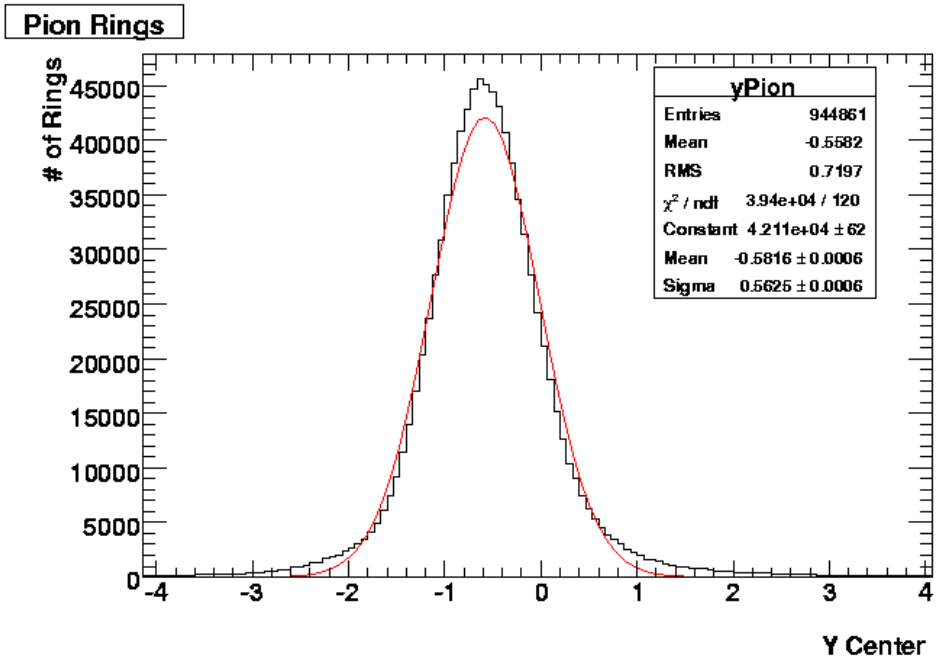
Ring Center Position – 40 GeV Pions



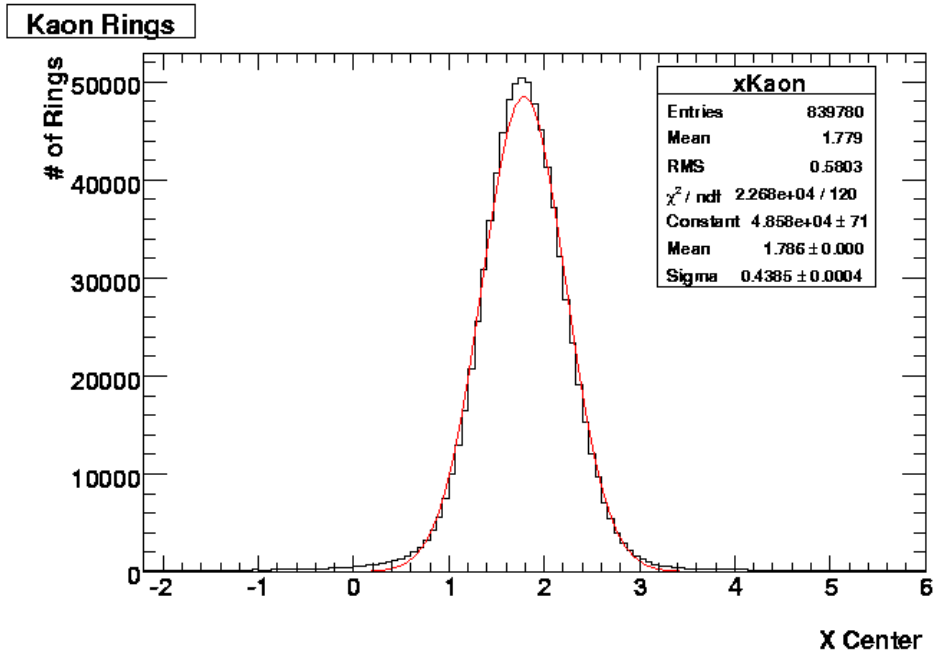
<x> = 1.95 cm
Sigma x = 0.43 cm

<y> = -0.58 cm
Sigma y = 0.56

Keep data within 2 std. dev. of mean



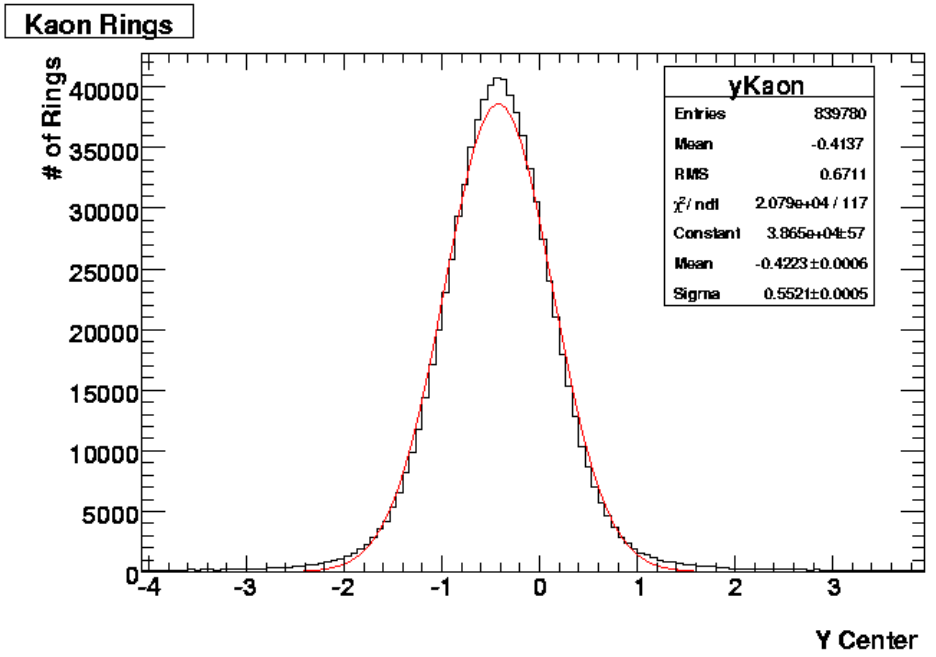
Ring Center Position – 40 GeV Kaons



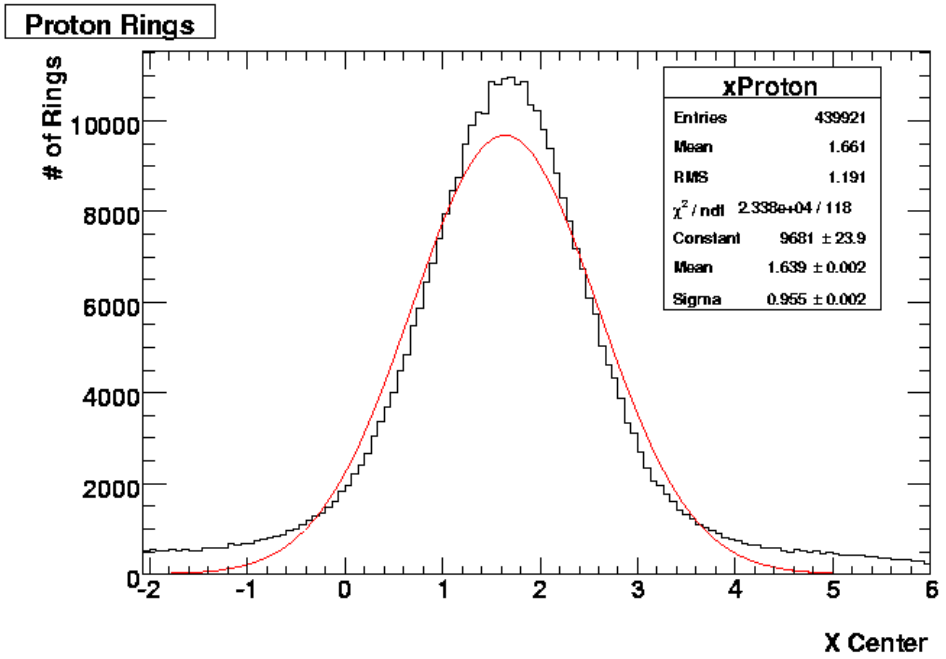
<x> = 1.79 cm
Sigma x = 0.44 cm

<y> = -0.42 cm
Sigma y = 0.55

Keep data within 2 std. dev. of mean



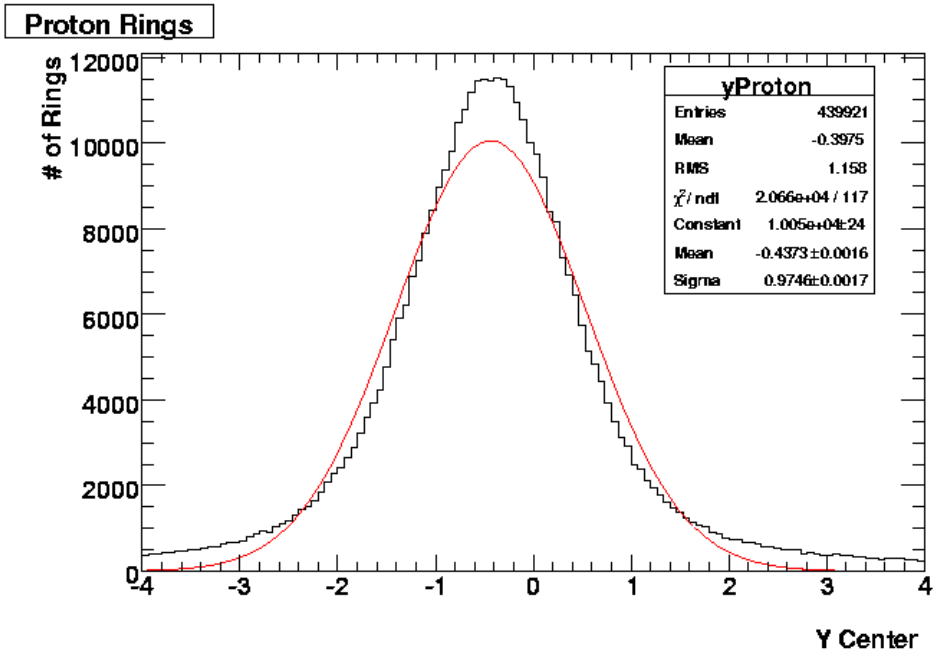
Ring Center Position – 40 GeV Protons



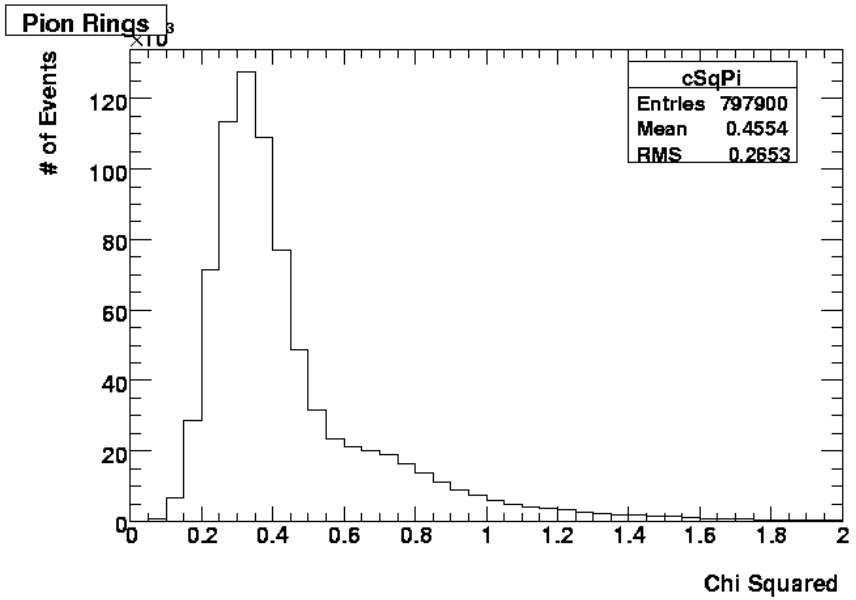
<x> = 1.60 cm
Sigma x = 0.96 cm

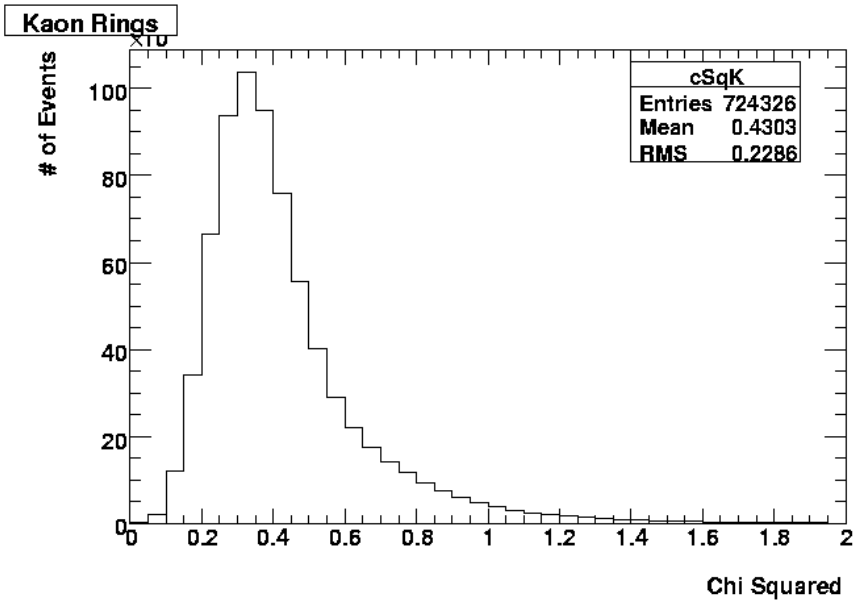
<y> = -0.44 cm
Sigma y = 0.97

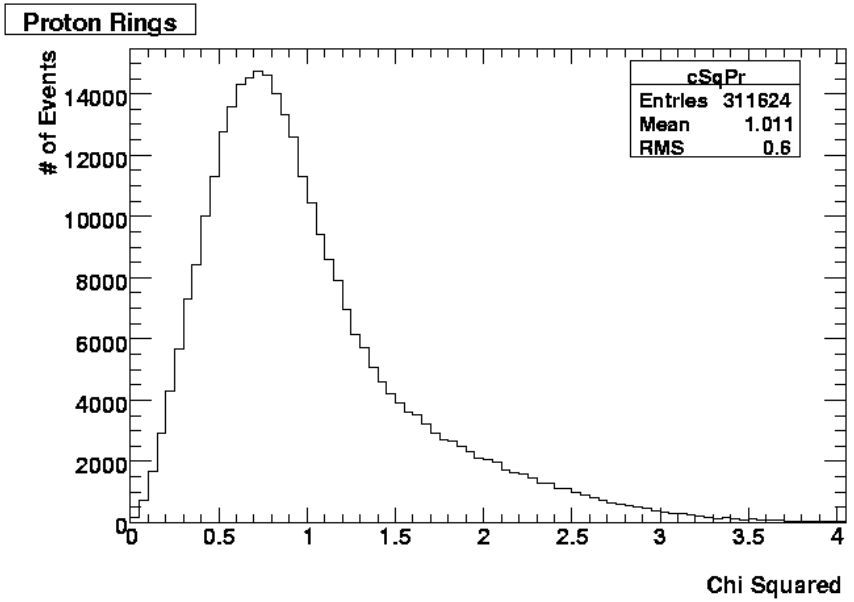
Keep data within 2 std. dev. of mean



Goodnes of Fit







Chi^2/ndf from circle fits

Cut out low end of tails. Require:
< 1 for pions and kaons
<3 for protons

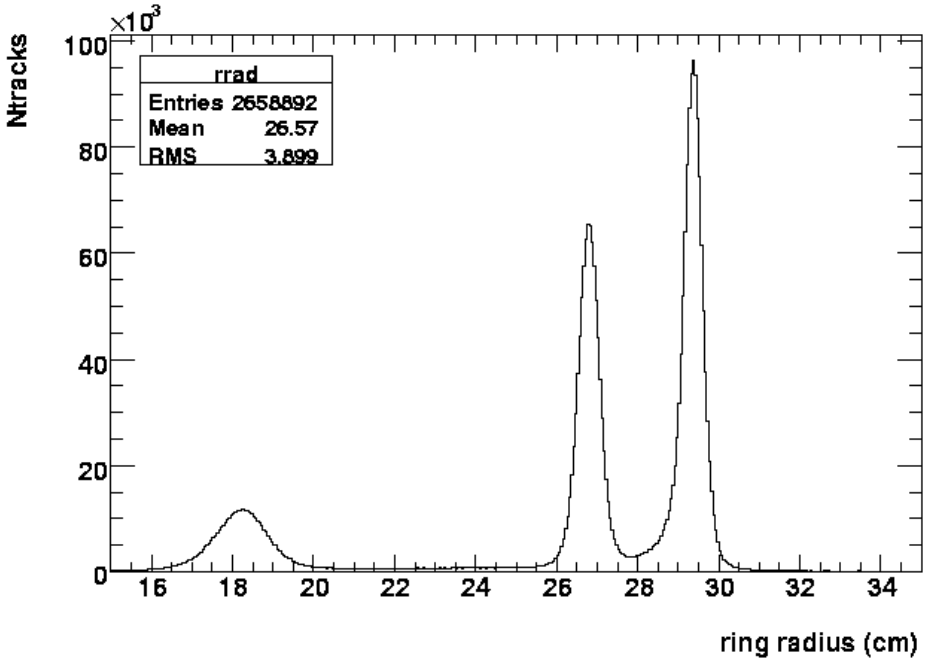
Summary of Cuts for 40 GeV

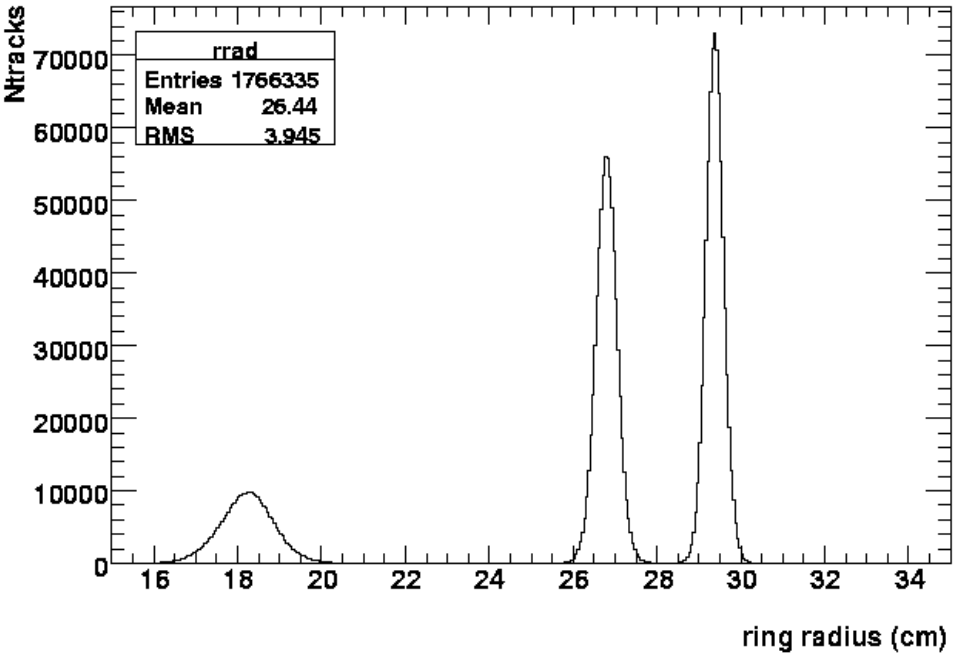
Cut	Total	Protons	Kaons	Pions
None	2658892			
Beam Tag	2642412	513793	984112	1144507
One Ring	2527766	494396	961039	1072331
Hcal	2224562	439921	839780	944861
Ring Center X	1957694	333943	763844	859907
Ring Center Y	1833850	311624	724326	797900
GOF	1766355	308610	701202	756523

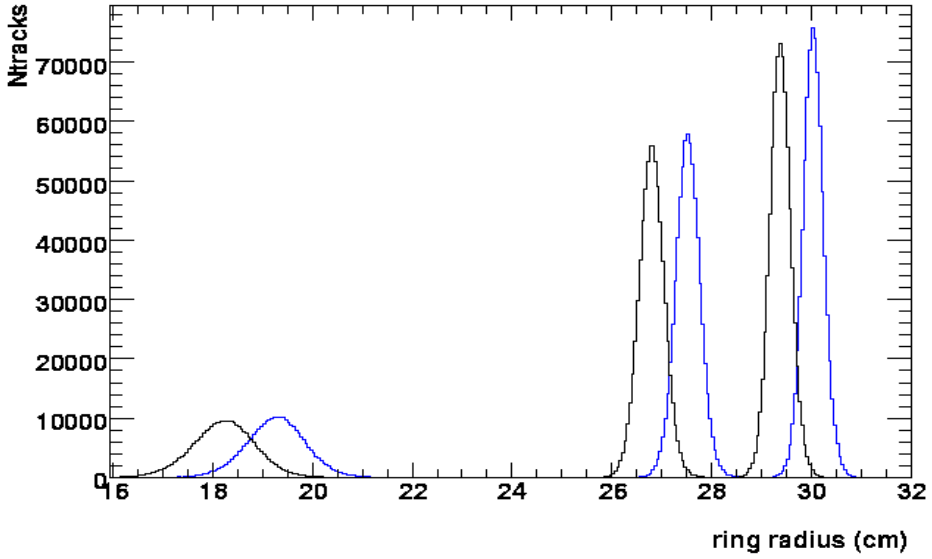
Final Fractions After Cuts:

Protons: 17.5%
Kaons: 39.7%
Pions: 42.8%

Ring Radius Plots for 40 GeV





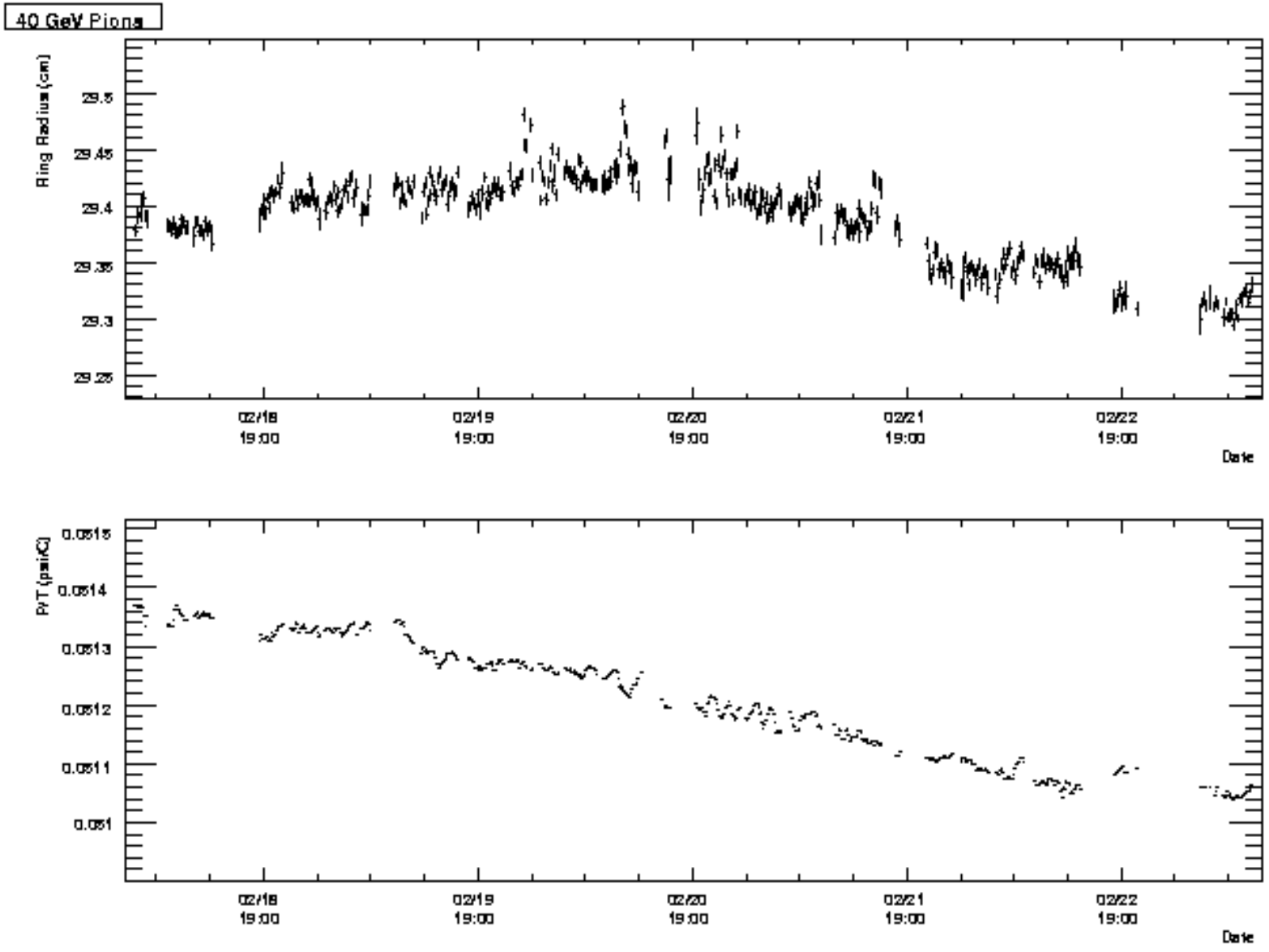


Top Left: Befor cuts
Top Right: After cuts

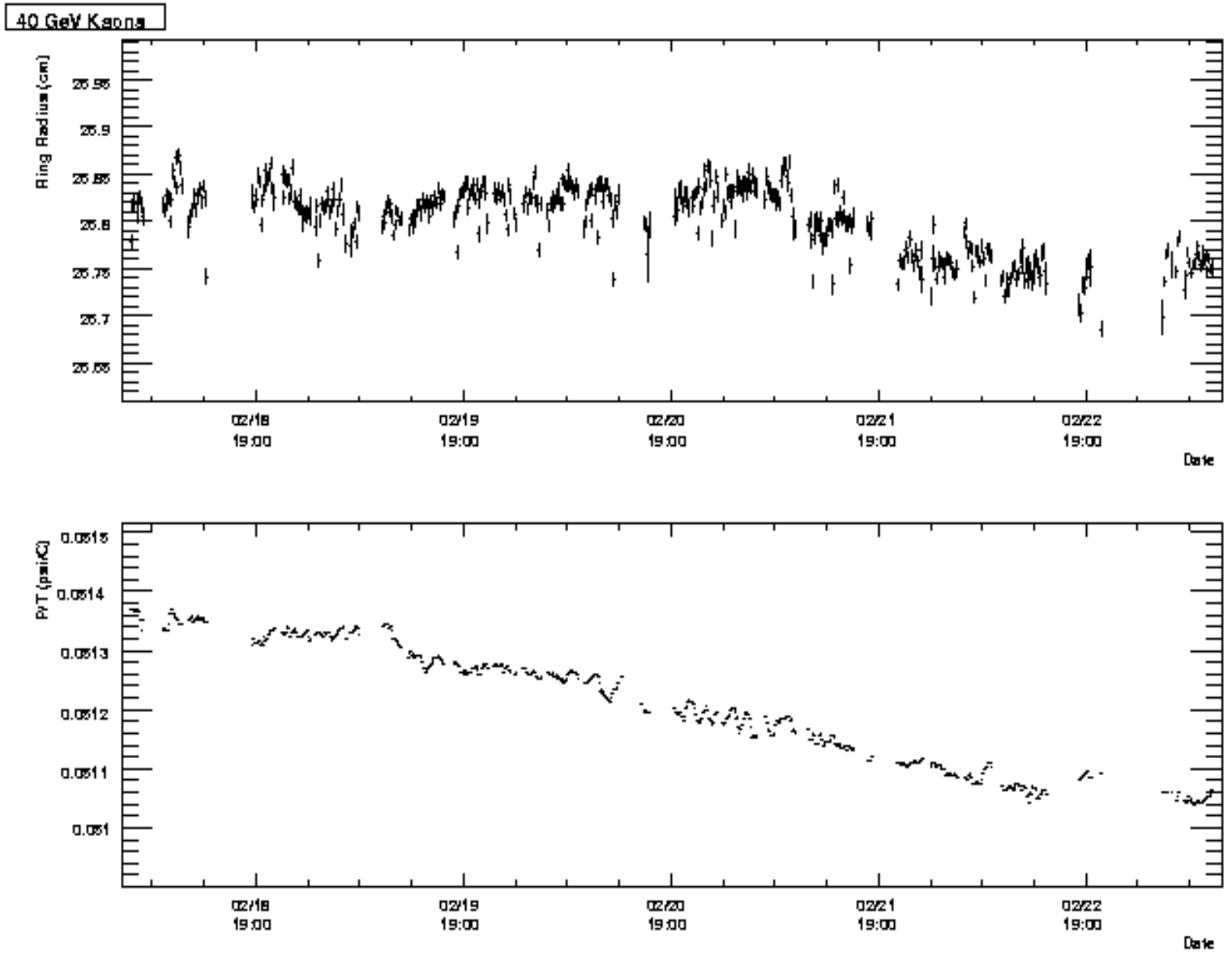
Bottom Left: Comparison after extrapolation to STP

(n-1) ~ density ~ pressure/temp

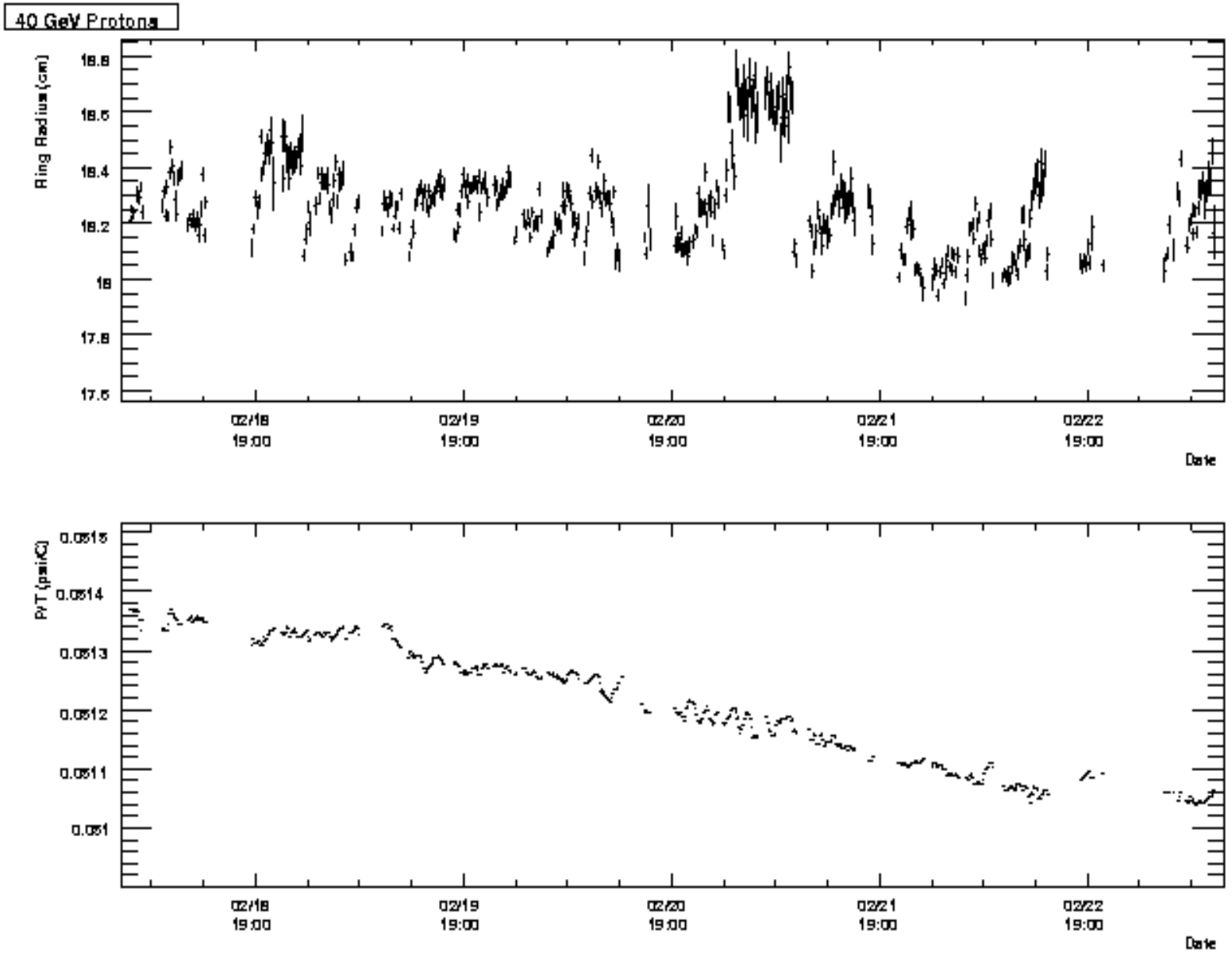
Pion Radius Stability



Kaon Radius Stability



Proton Radius Stability



Things To Do

Flatten out radius stability plots

-- Better temperature value

-- Take into account oxygen content

-- Index of refraction scaling not correct?

Make use of likelihood calculations