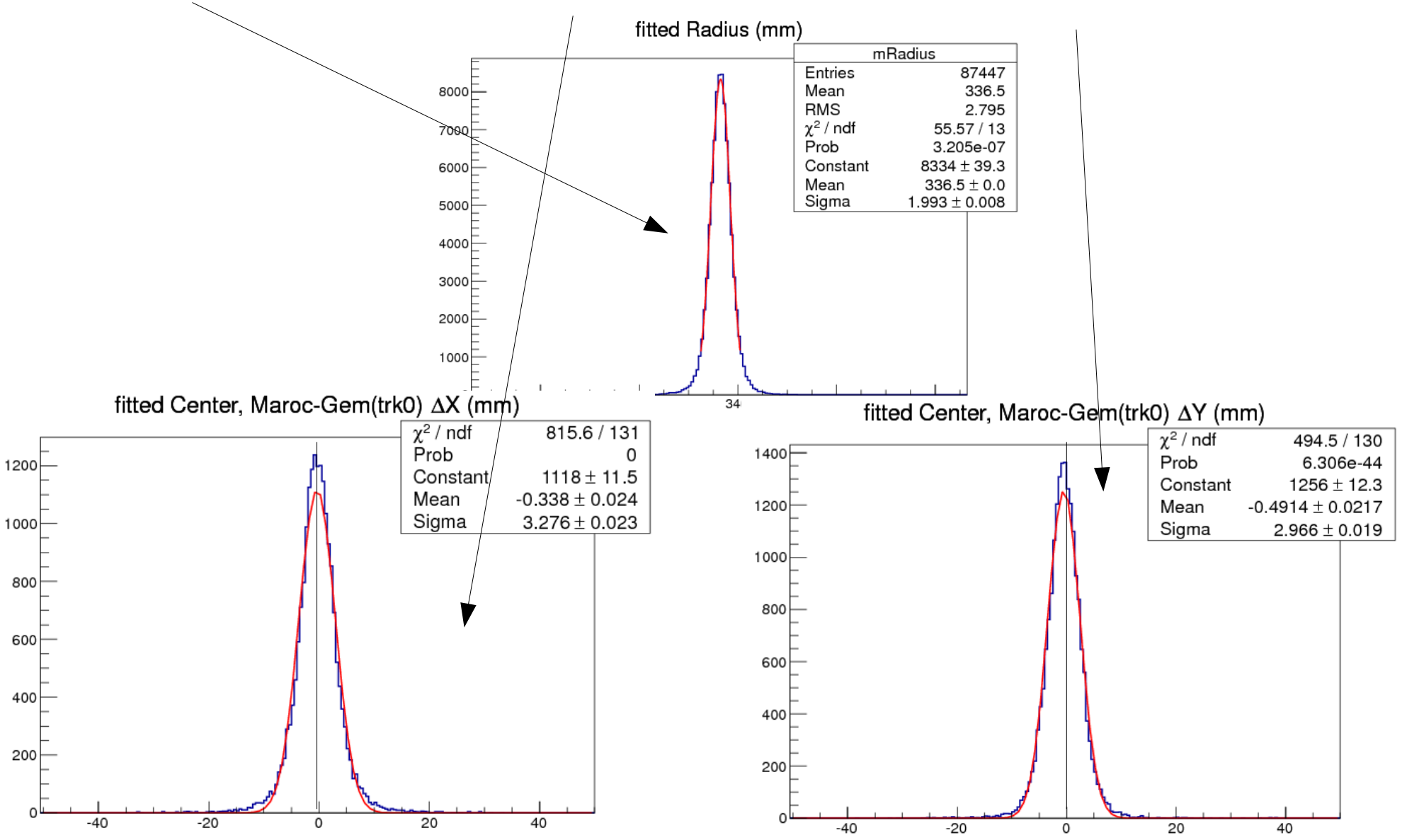
Fit of the GEM positions

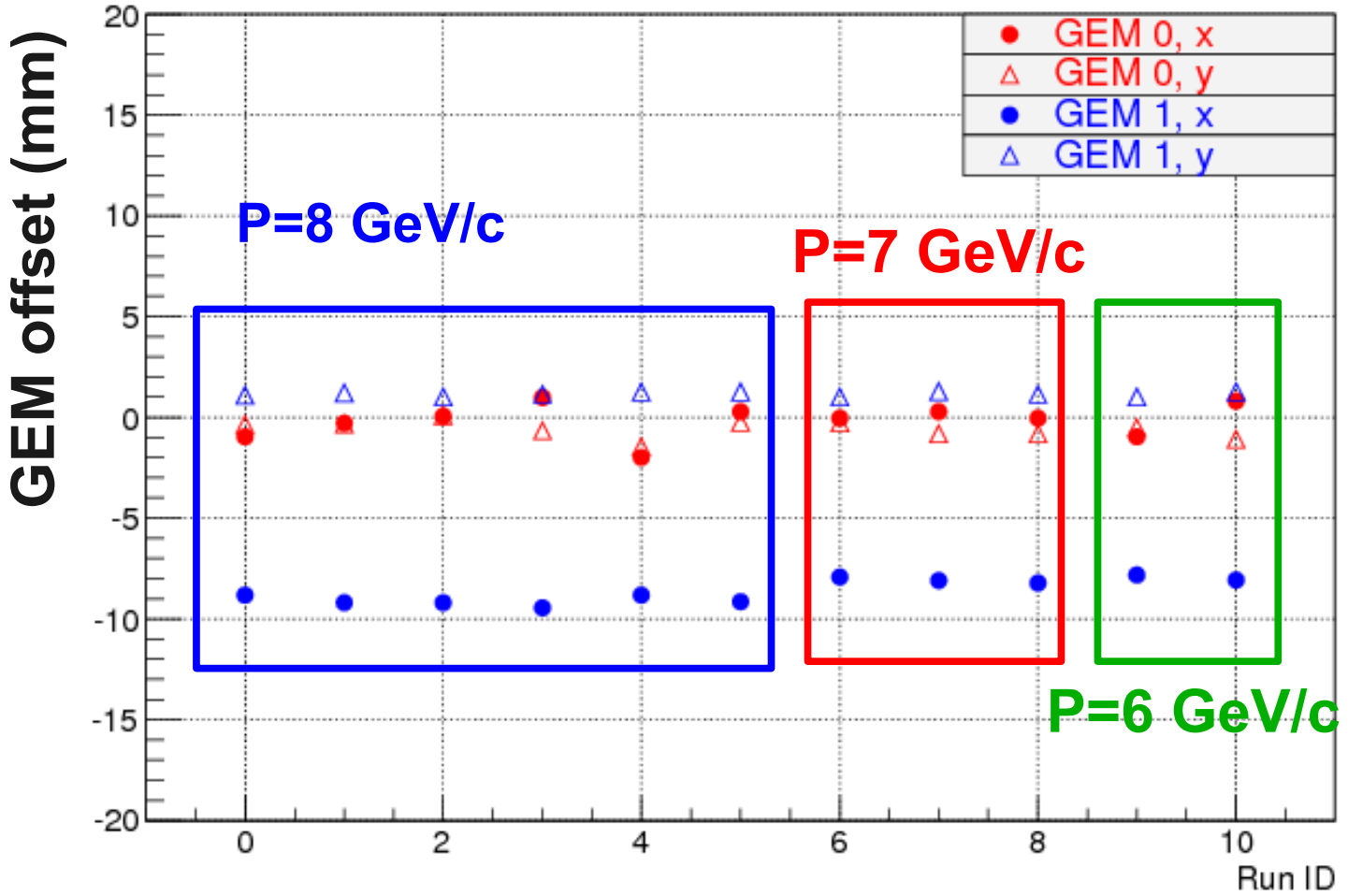
Look for the best GEM position offset by minimizing:

$$\chi^2 = RMS(R) + |X(GEM) - X(PMT)| + |Y(GEM) - Y(PMT)|$$



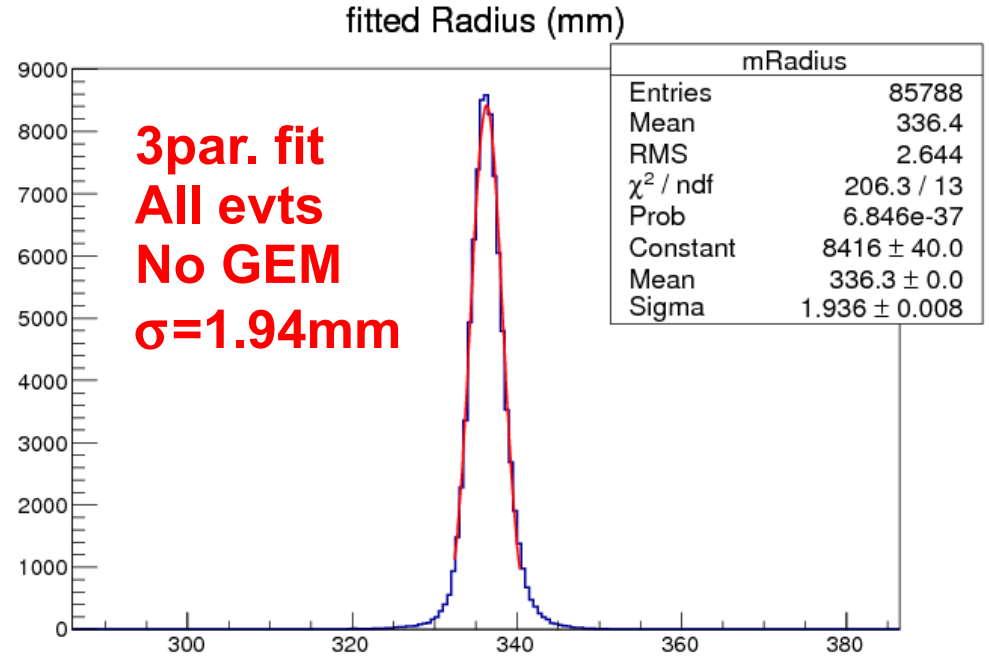
Results vs Run

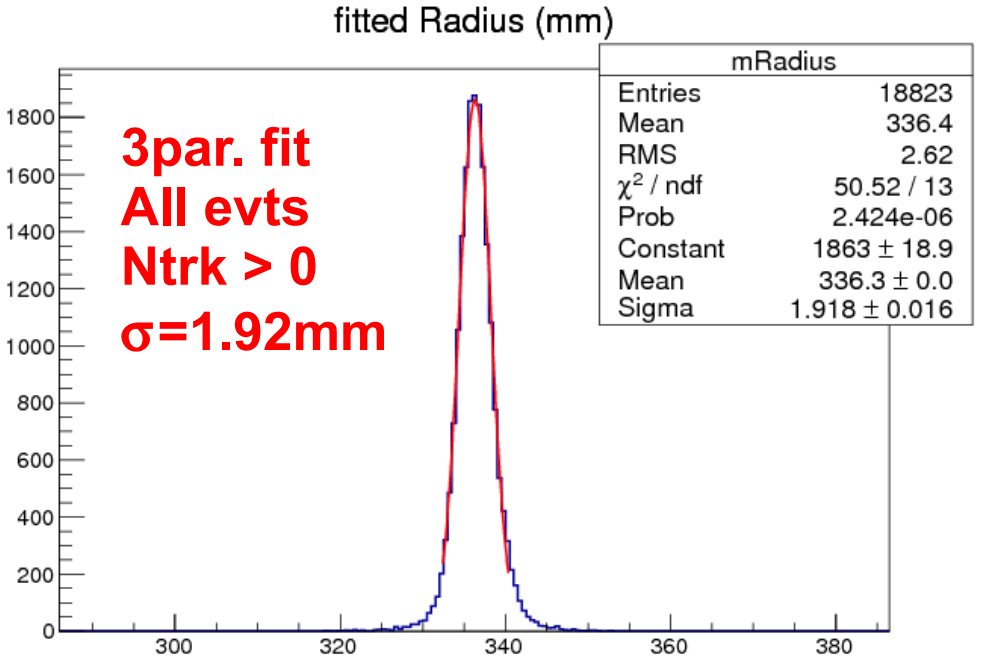
Pion events with at least 6 MAPMT hits
Aerogel: n=1.05 t=2cm

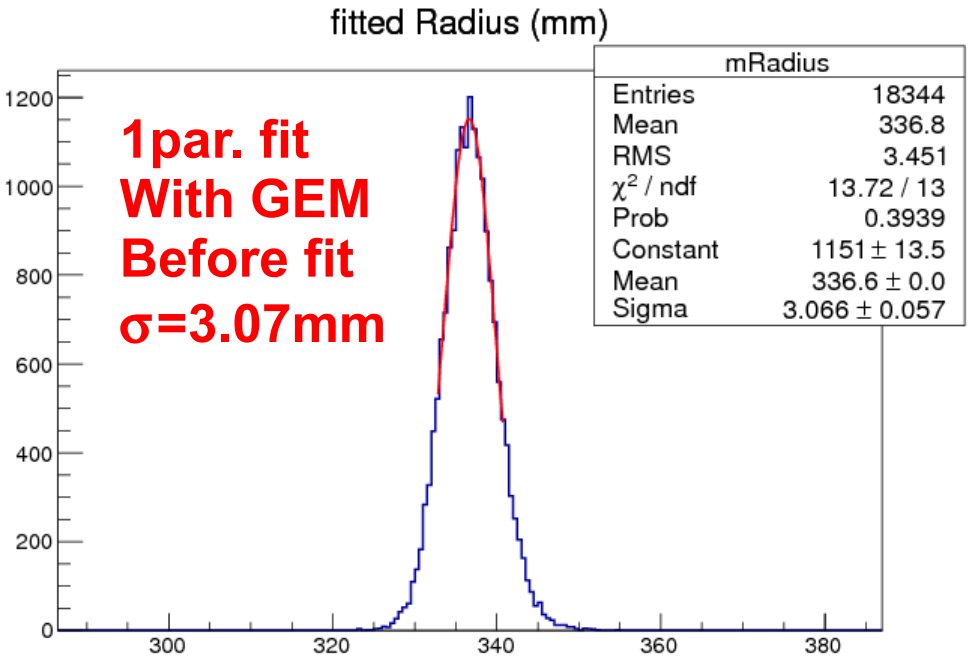


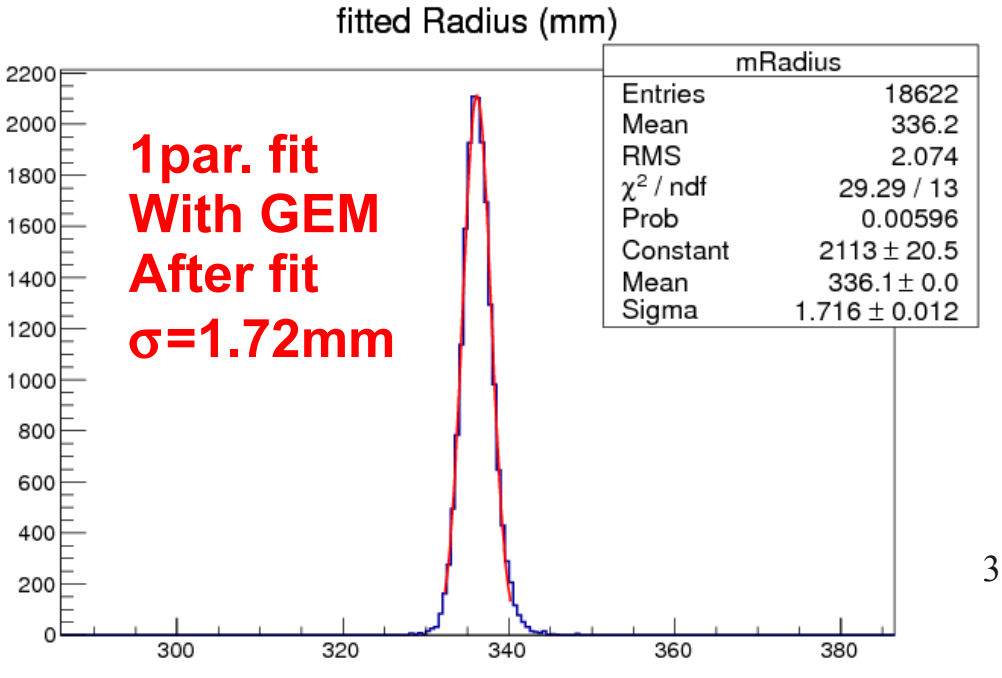
- Almost no vertical shifts
- Second GEM shifted horizontally by ~1 cm
- No dependence with run number (time)

Resolutions



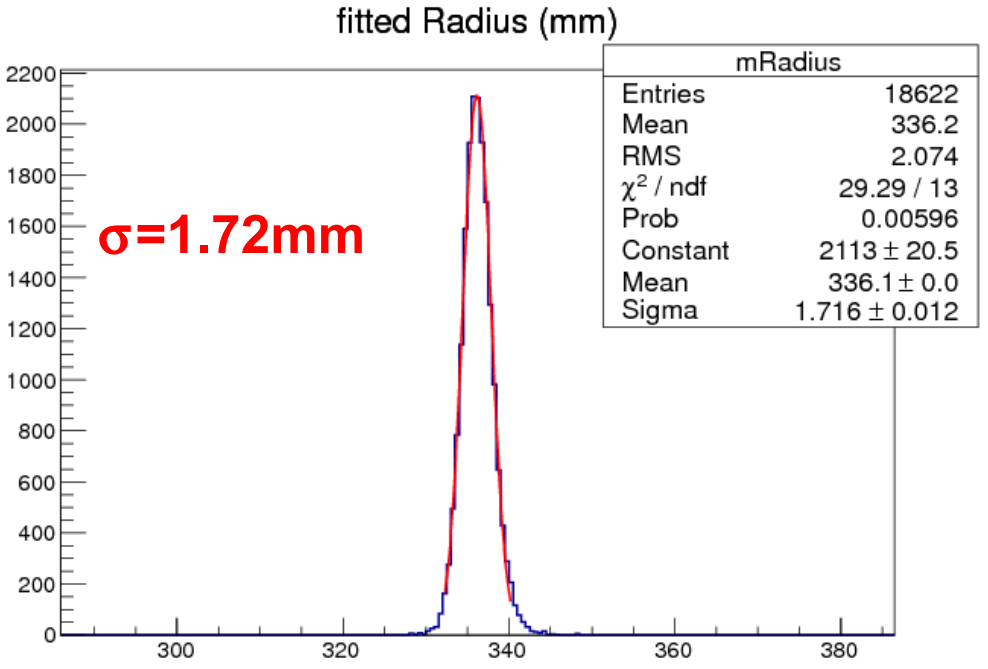


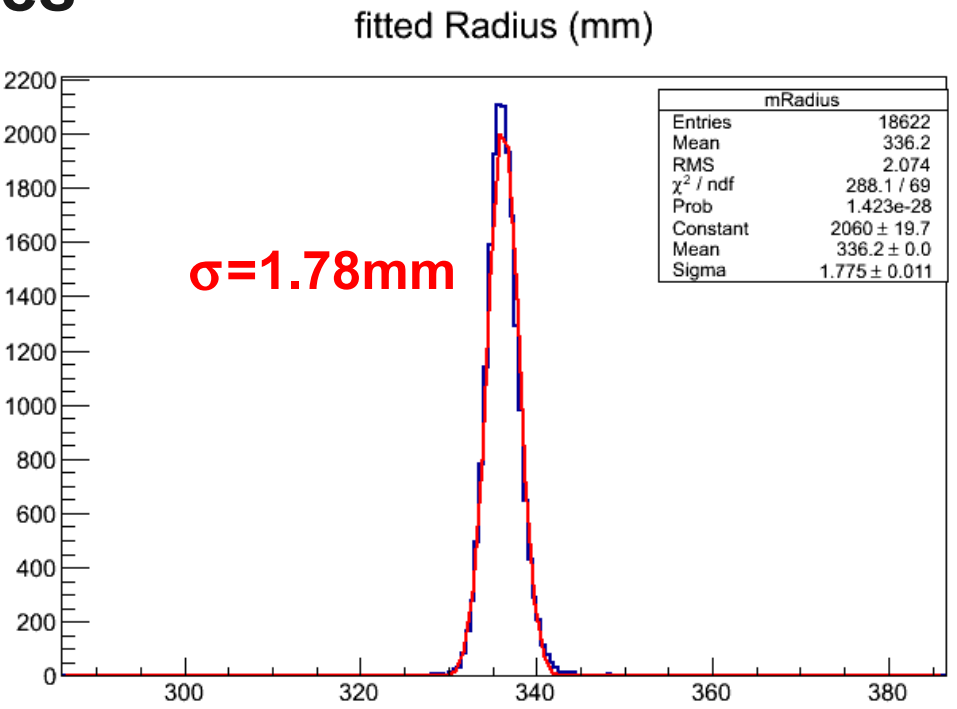




Ring Resolution - 2

Fitting different ranges

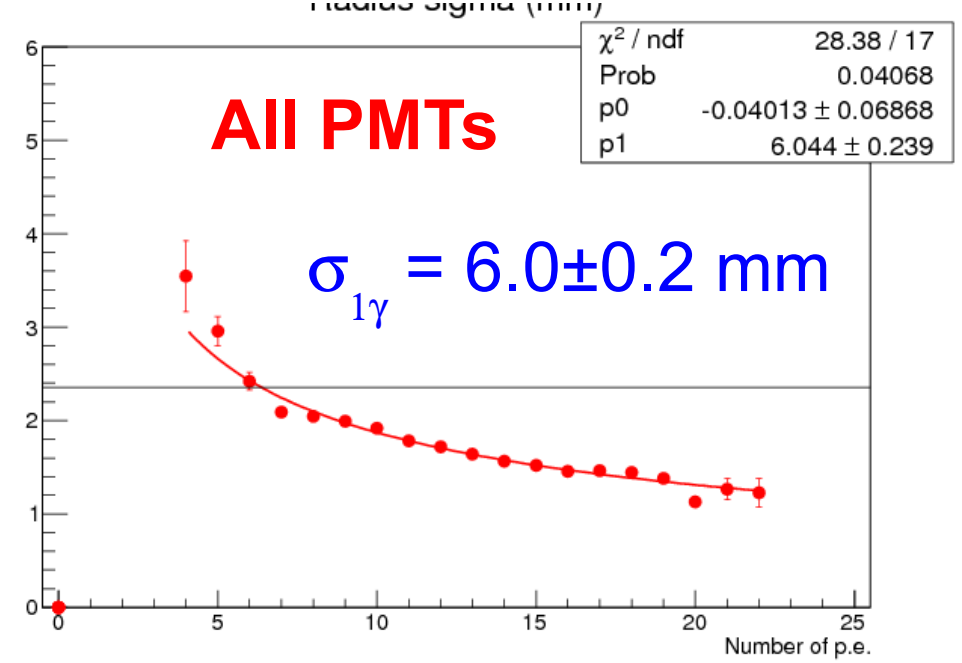




GEM shifts

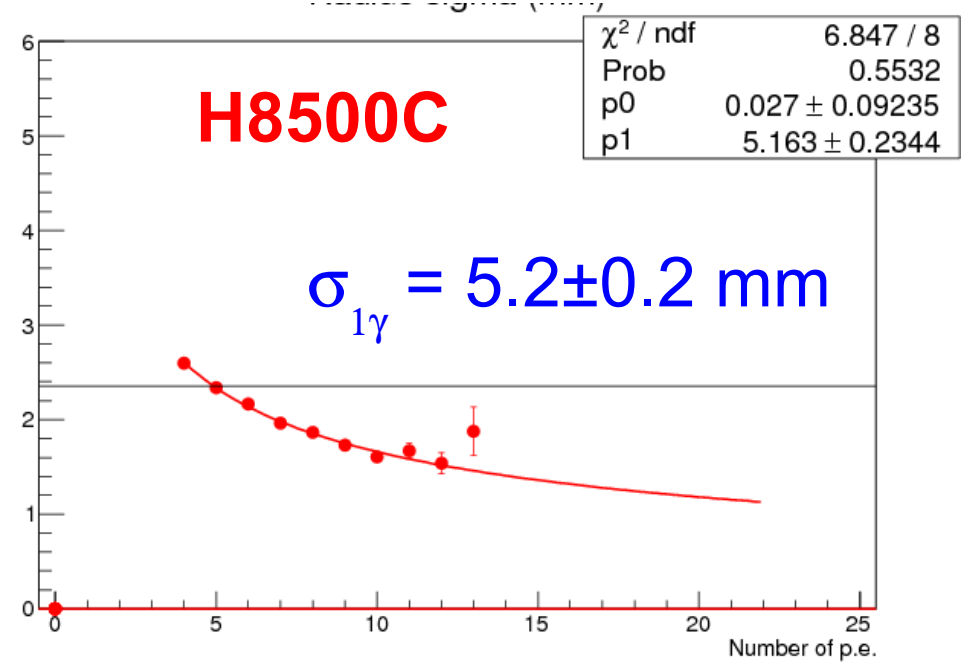
GEM	X_{offset}	Y_{offset}
0	-0.32±0.12	0.00±0.13
1	-9.14±0.03	1.04±0.02

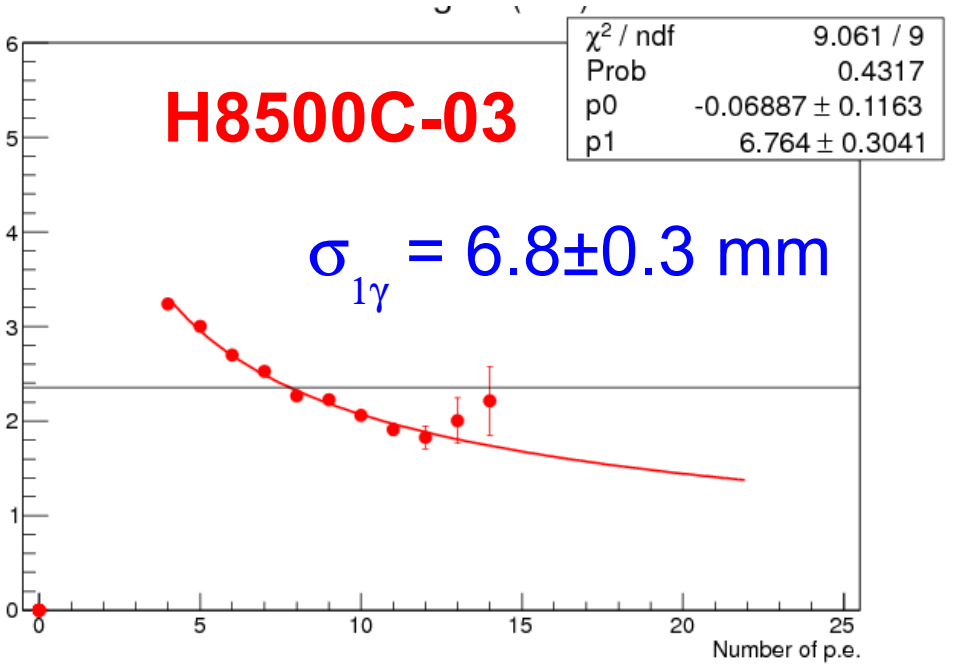
Ring resolution vs Npe



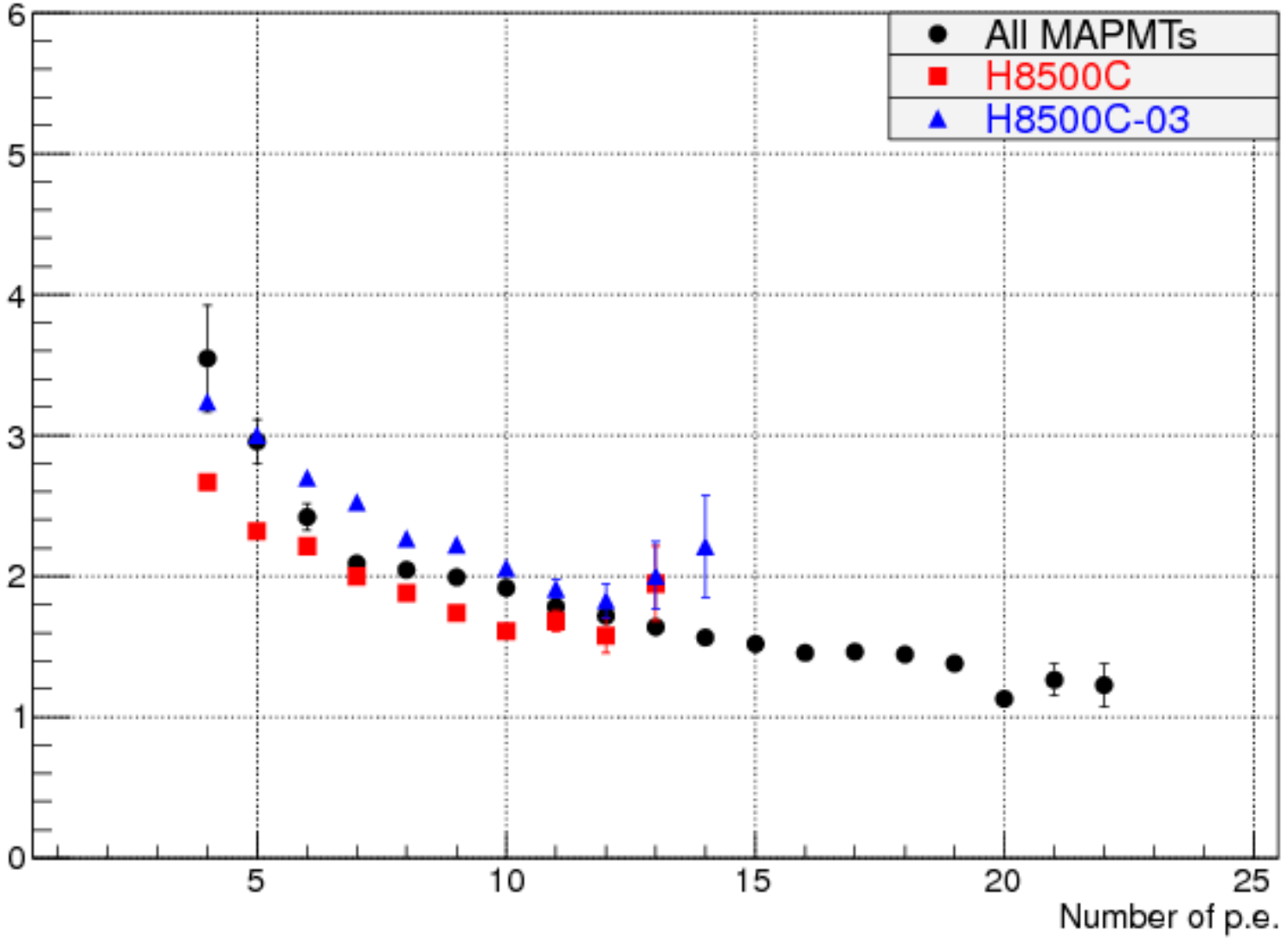
Fit function

$$\sigma = \sigma_0 + \frac{\sigma_{1\gamma}}{\sqrt{N_{pe}}}$$

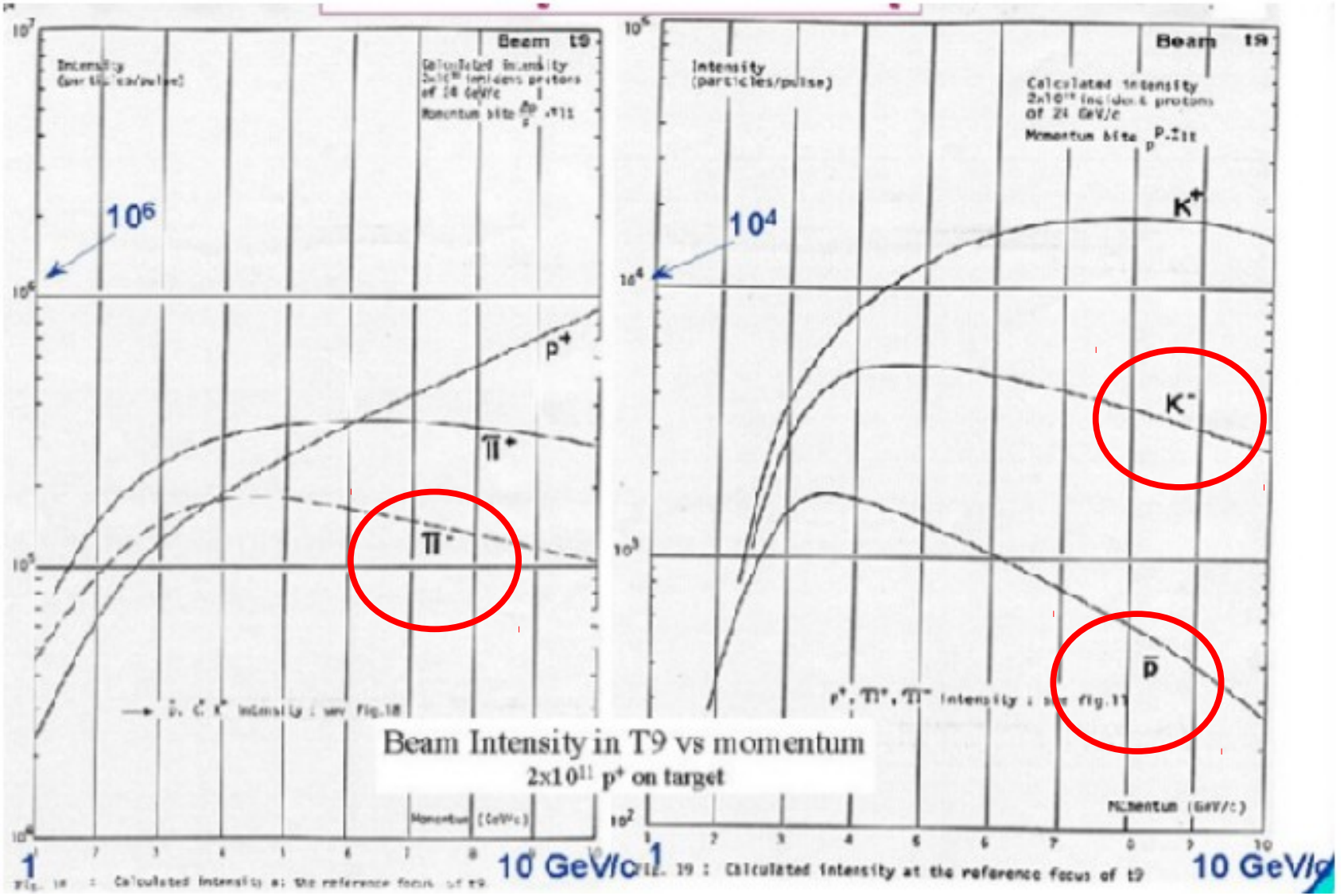




Ring resolution vs MAPMT



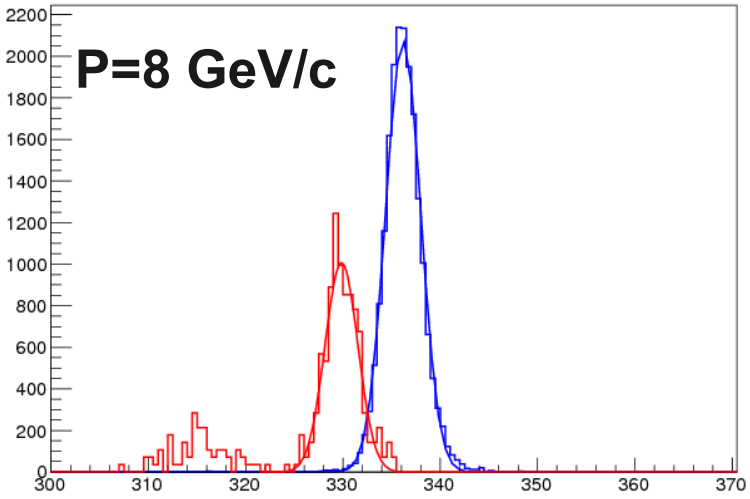
Hadron rates

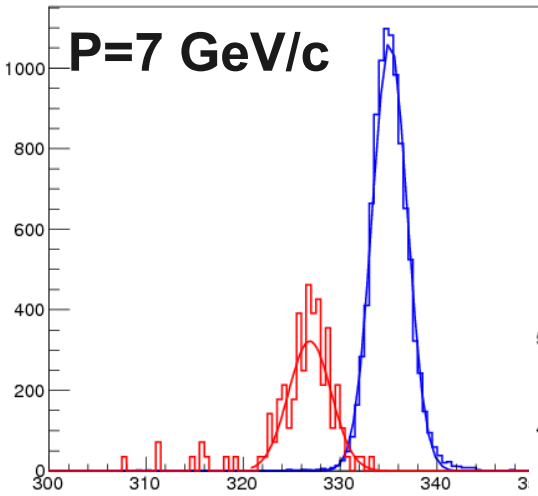


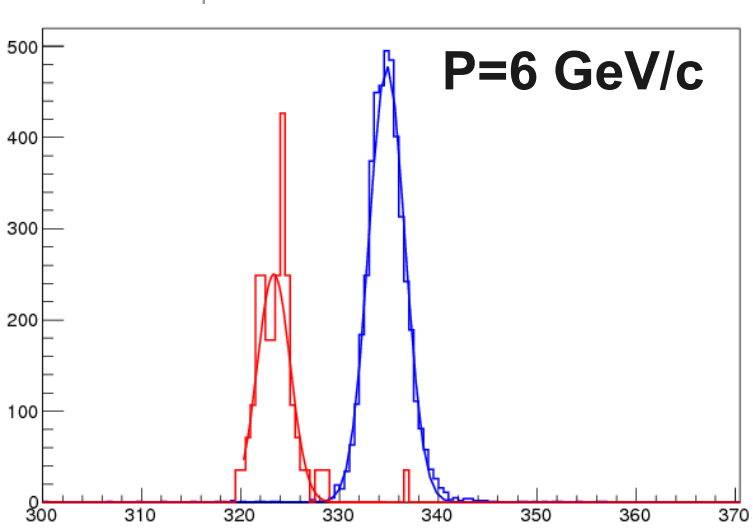
Relative intensity

π : K : pbar = 160 : 4.5 : 1

Pions vs Kaons







Kaon histogram rescaled by relative intensity

Pion/kaon separation:

$$n_\sigma = \frac{\Delta R}{\sqrt{\sigma_\pi^2 + \sigma_K^2}}$$

P (GeV/c)	R(π) (mm)	σ(π) (mm)	R(K) (mm)	σ(K) (mm)	n(σ)
8	336.18±0.01	1.80±0.01	329.85±0.02	1.69±0.02	2.6
7	335.12±0.02	1.80±0.01	326.88±0.04	2.20±0.04	2.9
6	334.79±0.03	1.82±0.02	323.36±0.04	1.66±0.04	4.6

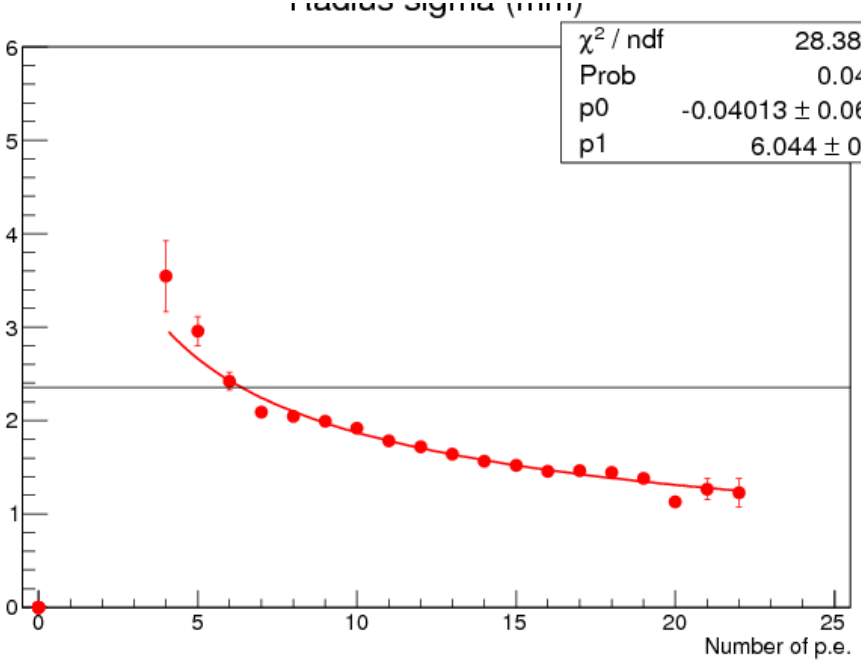
Improvements in π/K separation

$\sigma_{1\gamma}$ = 6.0±0.2 mm all PMTs

5.2±0.2 mm H8500C

15%

P (GeV/c)	n(σ) measured	n(σ) extrapolated
8	2.6	3.1
7	2.9	3.4
6	4.6	5.4



Number of p.e. expected to increase by 15-25% with full coverage

With Npe>3

n(σ) = 2.6

With Npe>7

n(σ) = 2.8 → 3.3

Pion loss is ~10% with present coverage