Update on the CERN data analysis

Marco Mirazita
INFN Frascati

- **Data quality check**
- **Analysis of MAROC data**
- **Alignment runs**

Data quality check

Reflected light, first runs

Direct light, first run

Direct light E=6-7 GeV

				RUNS														
PMT	GEO	maroc	pixel	796: 809								1046	1050: 1055					1141: 1146
3	19	1217	62	X								X	X					X
4	55	3524	63	X								X	X					X
		3522	58	X														
5	20	1281	62	X								X	X					X
6	21	1345	62	X								X	X					X
		1346	58	X								X	X					
		1402	2	X														
7	22	1409	62	X								X	X					X
8	23	1473	62	X														X
		1475	60	X								X	X					X
9	24	1540	63	X								X	X					X
		1537	62	X														
10	25	1604	63	X								X	X					X
		1602	58															X
		1601	62	X														
11	26	1669	61									X	X					X
		1665	62	X														
12	56	3588	63	X								X	X					X
14	49	3136	64	X														X
16	51	3265	62	X								X	X					X
18	53	3394	58	X								X						X
19	57	3653	61	X								X	X					X
20	27	1733	61									X	X					X
21	60	3846	57									X	X					X
23	58	3717	61	X														
24	37	2370	58															X
26	54	3459	60	X								X						
27	59	3782	57									X	X					X
		3781	61	X														

X noisy pixel
X dead pixel

Noisy pixels in last row

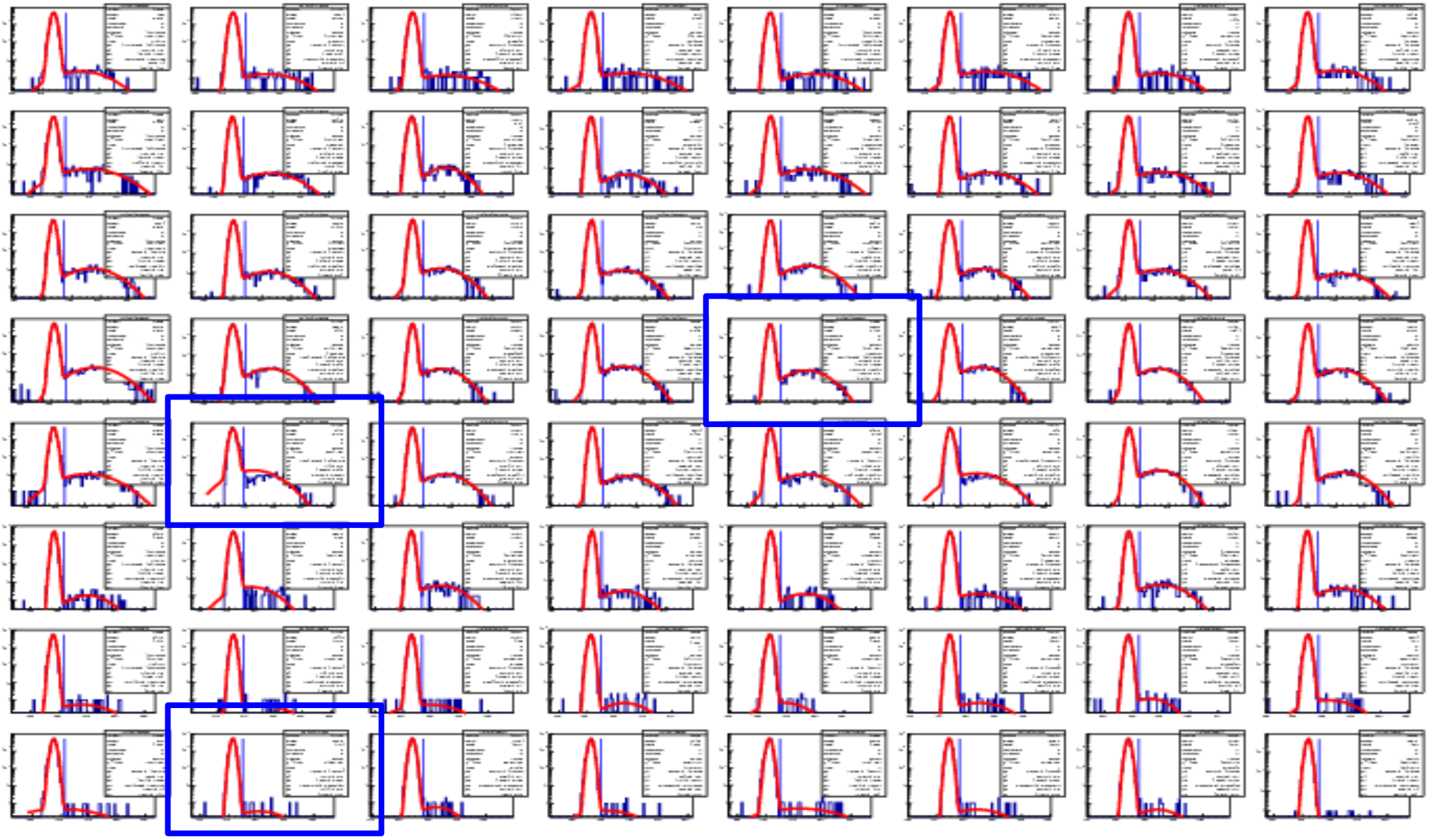
Almost same noisy/dead pixels for all runs (apart form PMT 6 for runs 1046-1055)

MAROC data

Fit of ADC spectra

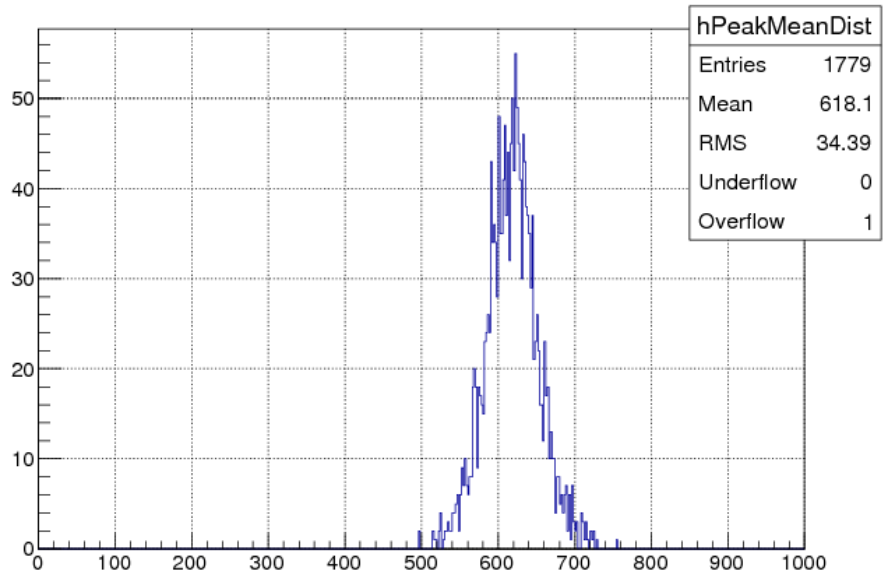
$$F(q) = A\left(e^{-\mu} PED(q) + \sum_{k=1}^{N} \frac{e^{-\mu}\mu^{k}}{k!} SIG_{k}(q) \right)$$

RUN 1051

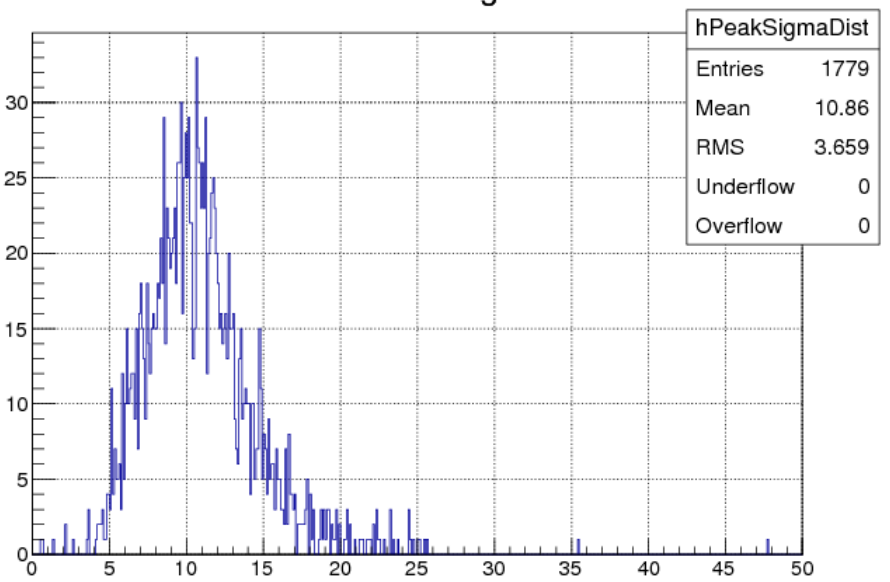


Spectrum parameters

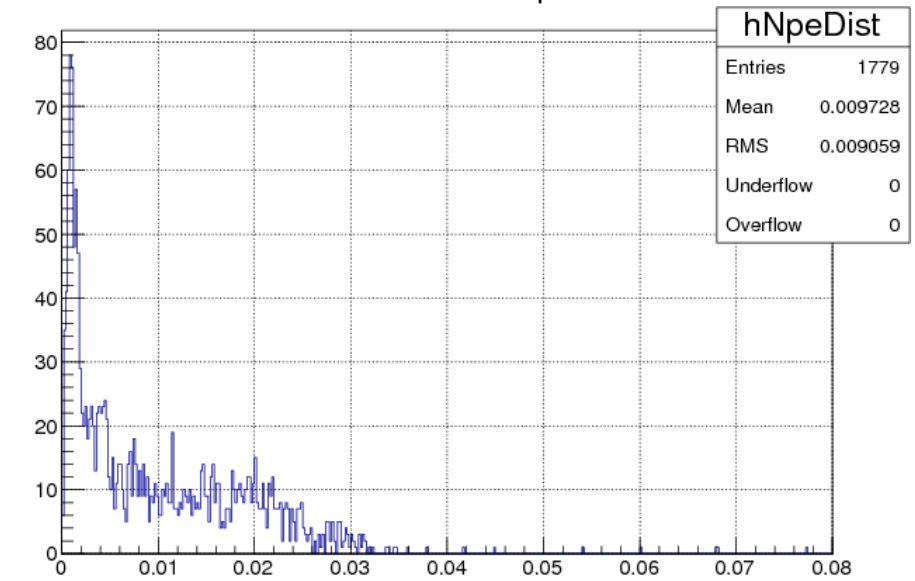
Peak fitted Mean



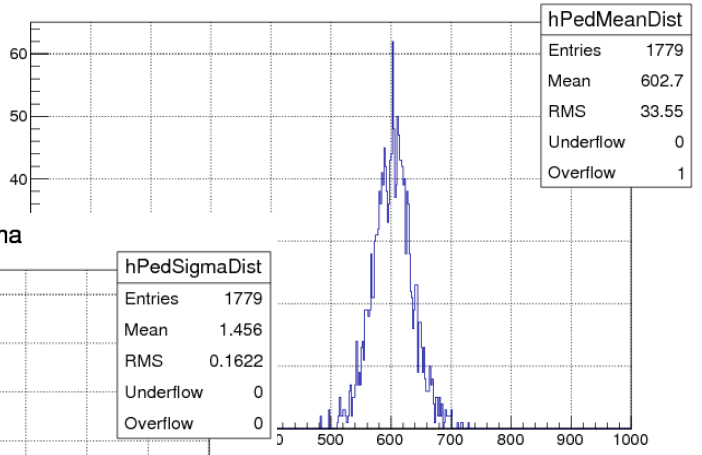
Peak fitted Sigma



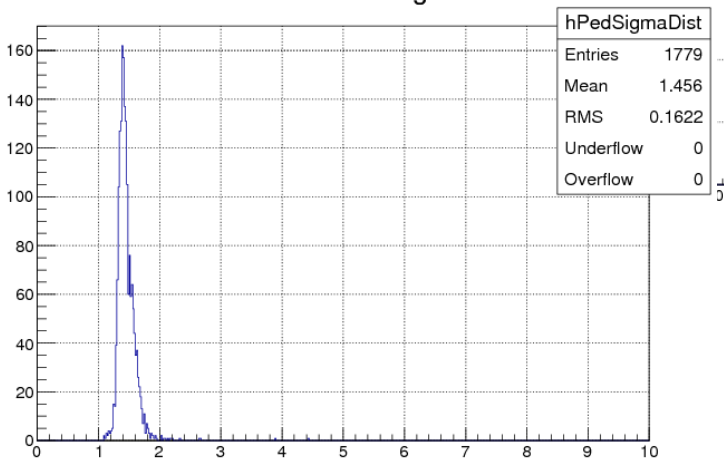
Fitted number of p.e.



Pedestal fitted Mean

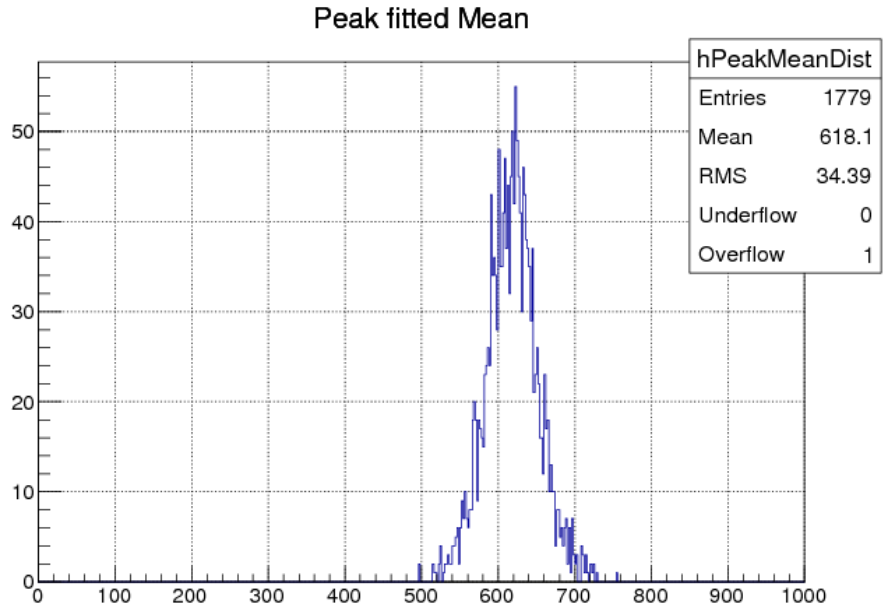


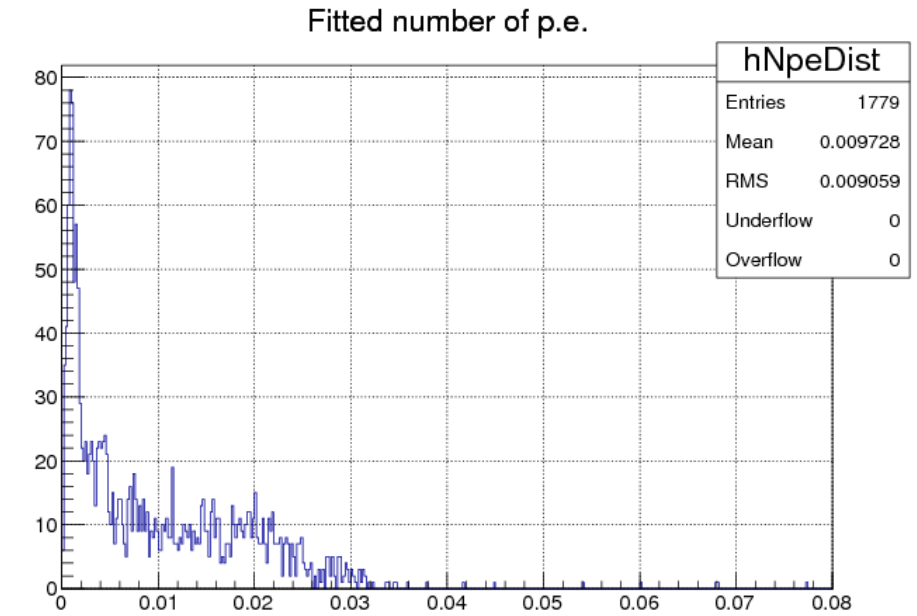
Pedestal fitted Sigma



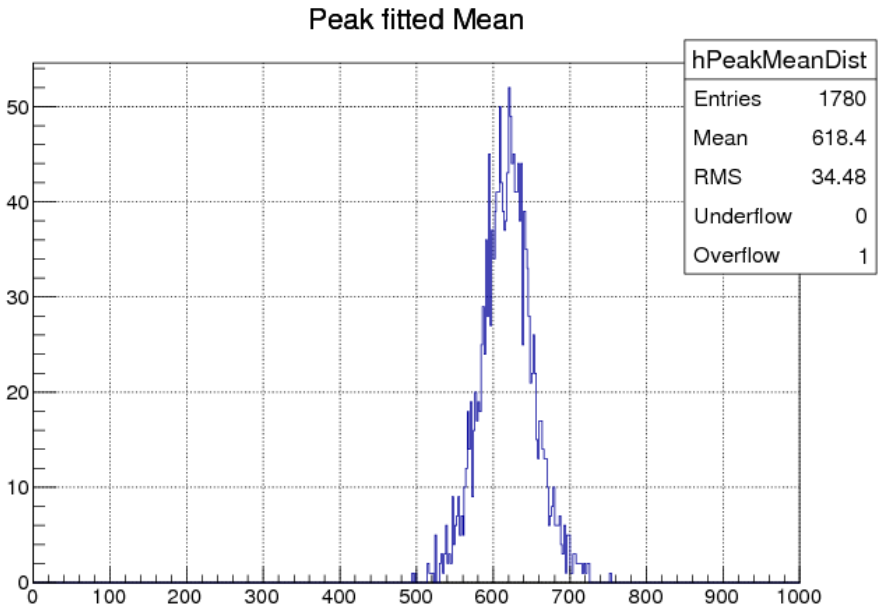
Run dependence

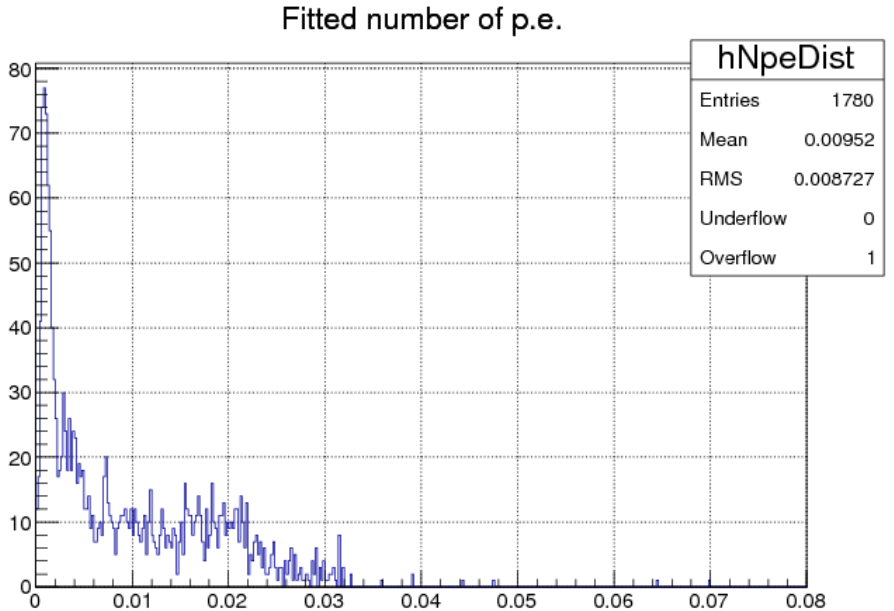
RUN 1054



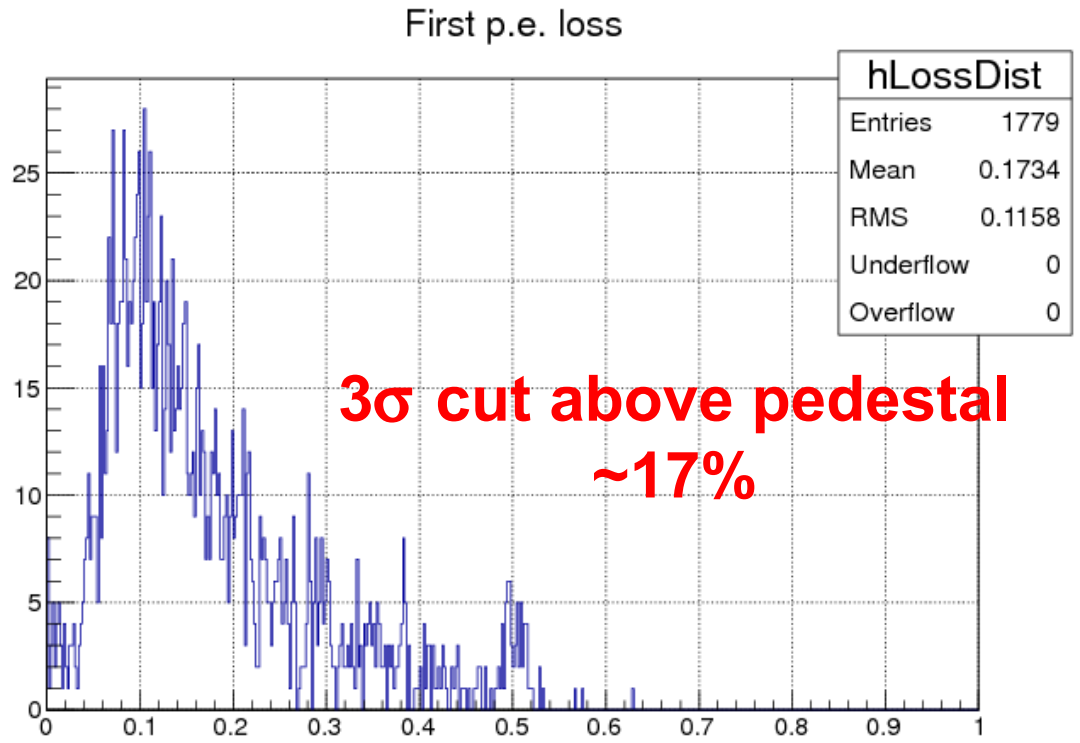


RUN 1051

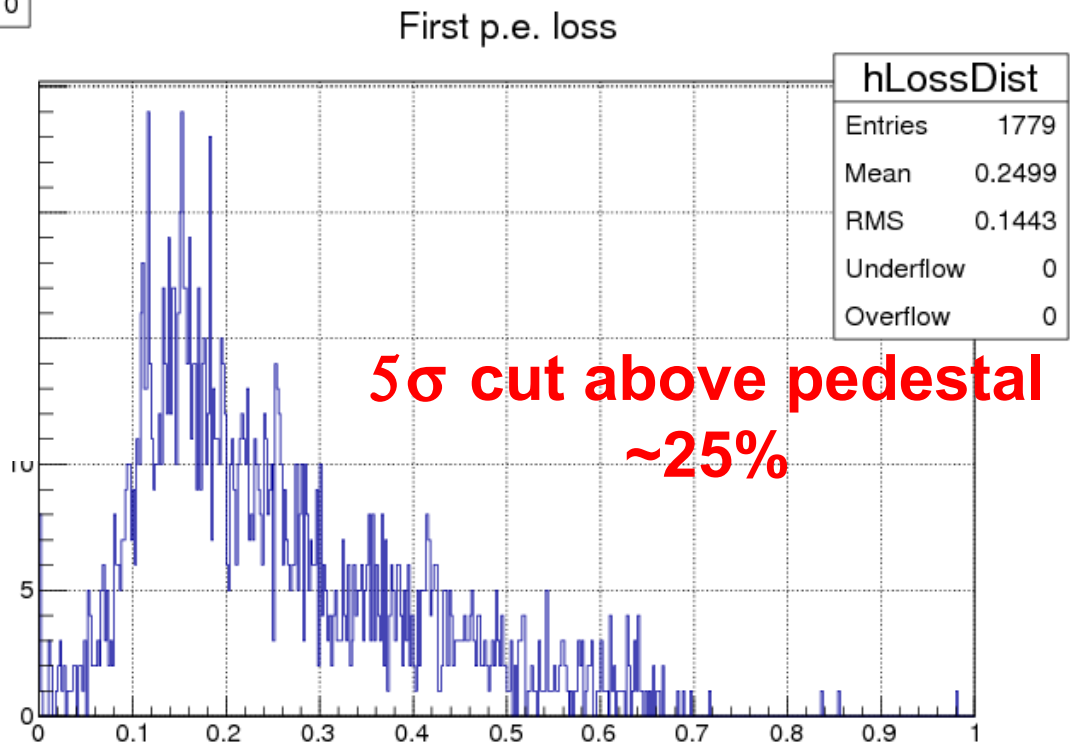




Inefficiency

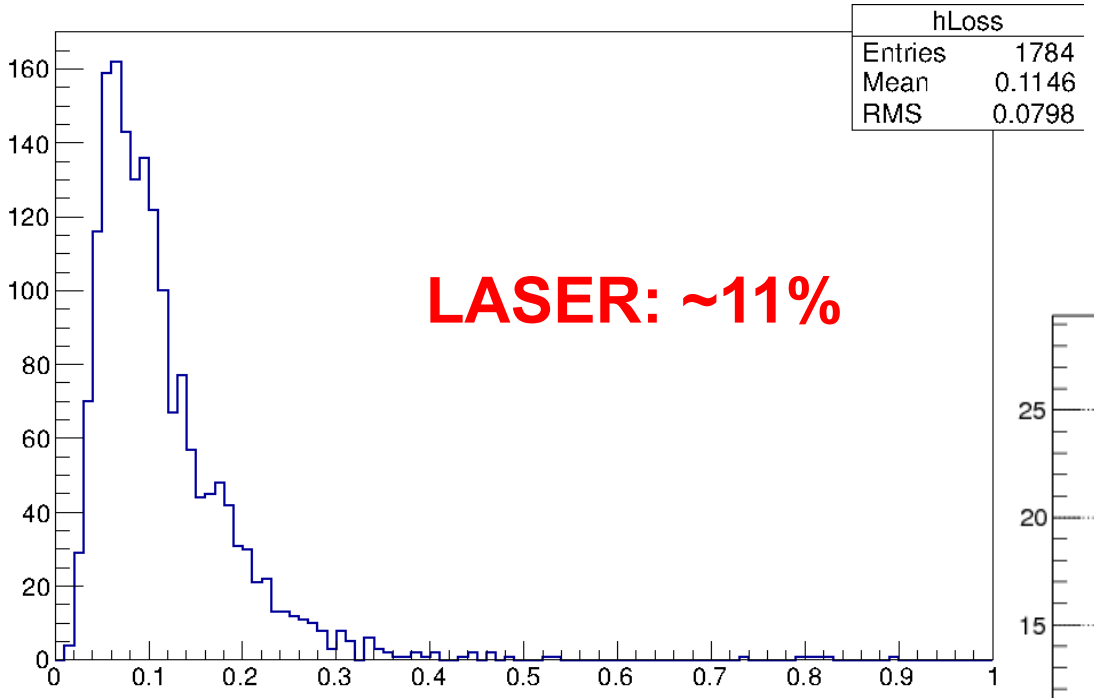


3σ cut above pedestal
~17%



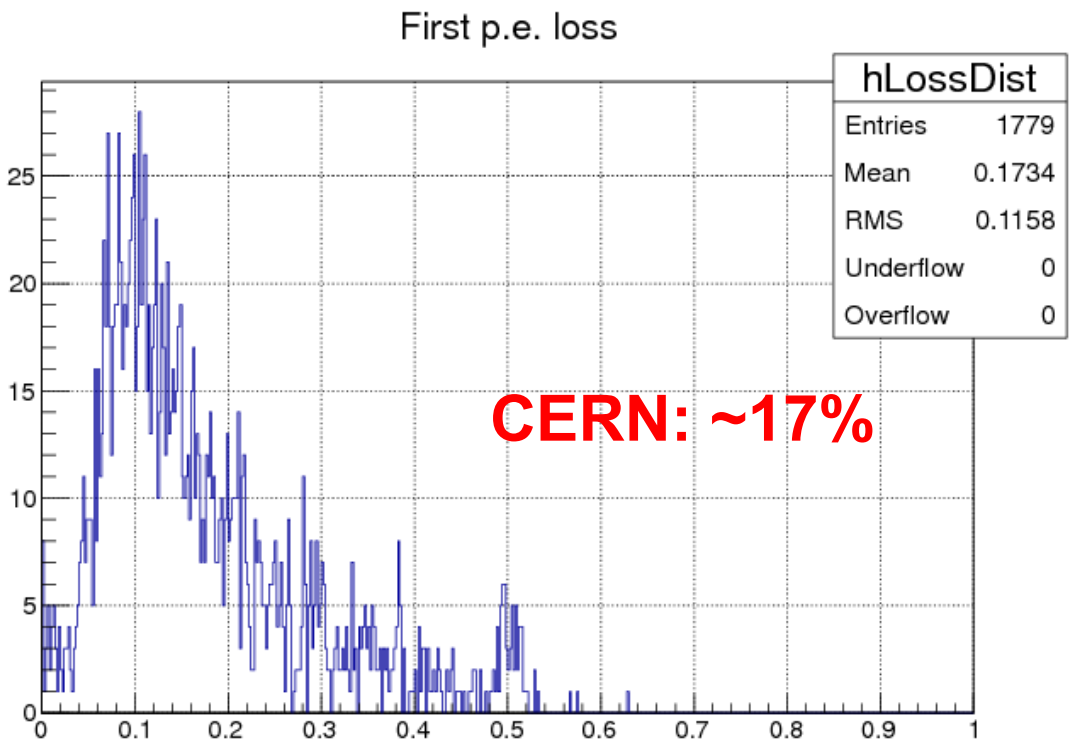
5σ cut above pedestal
~25%

MAROC vs CAEN electronics



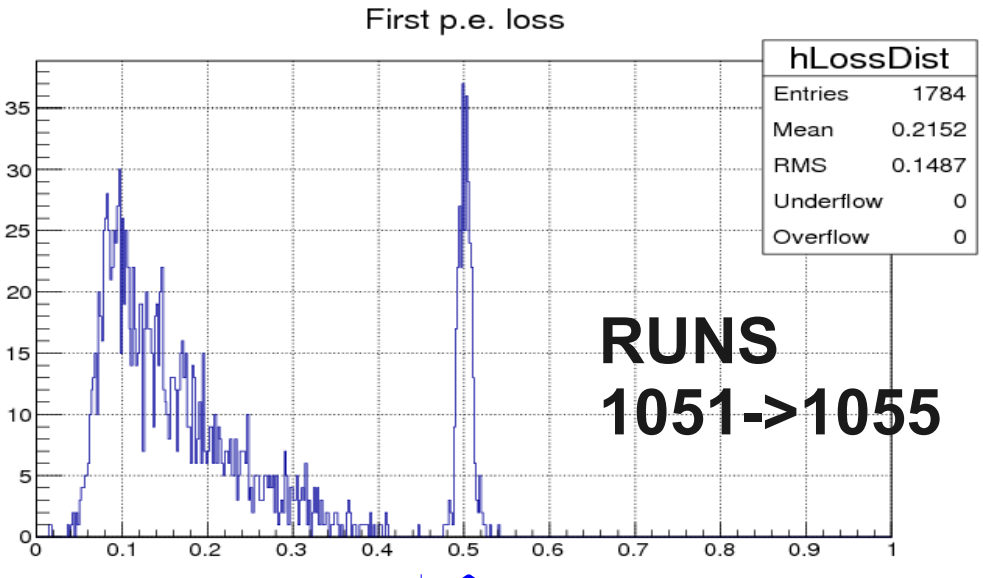
LASER: ~11%

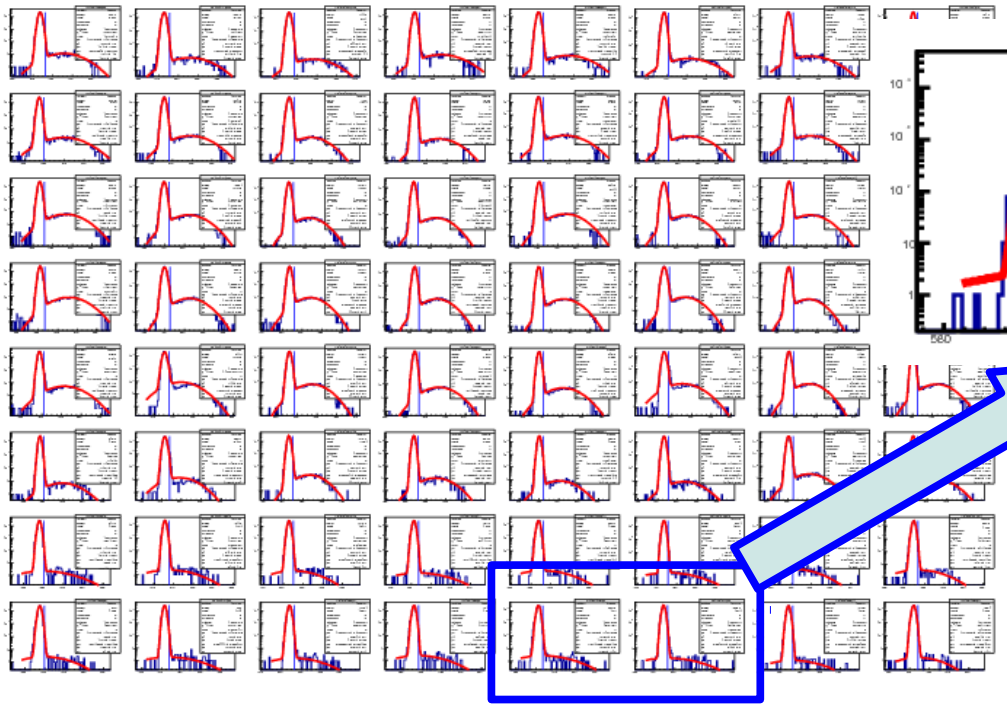
3σ cut above pedestal

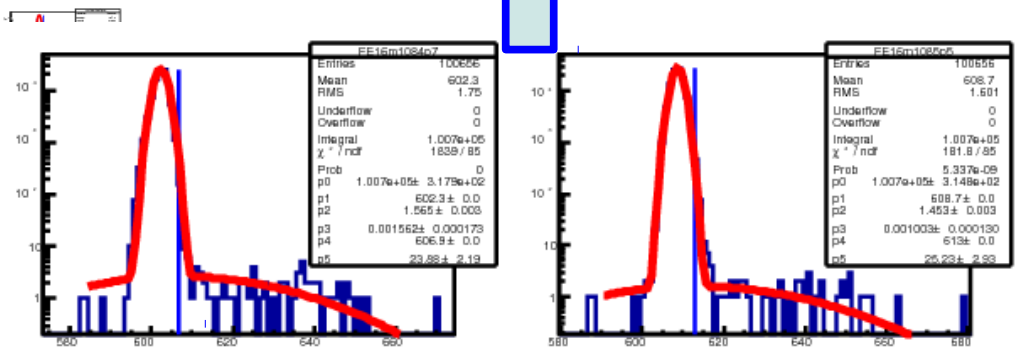


CERN: ~17%

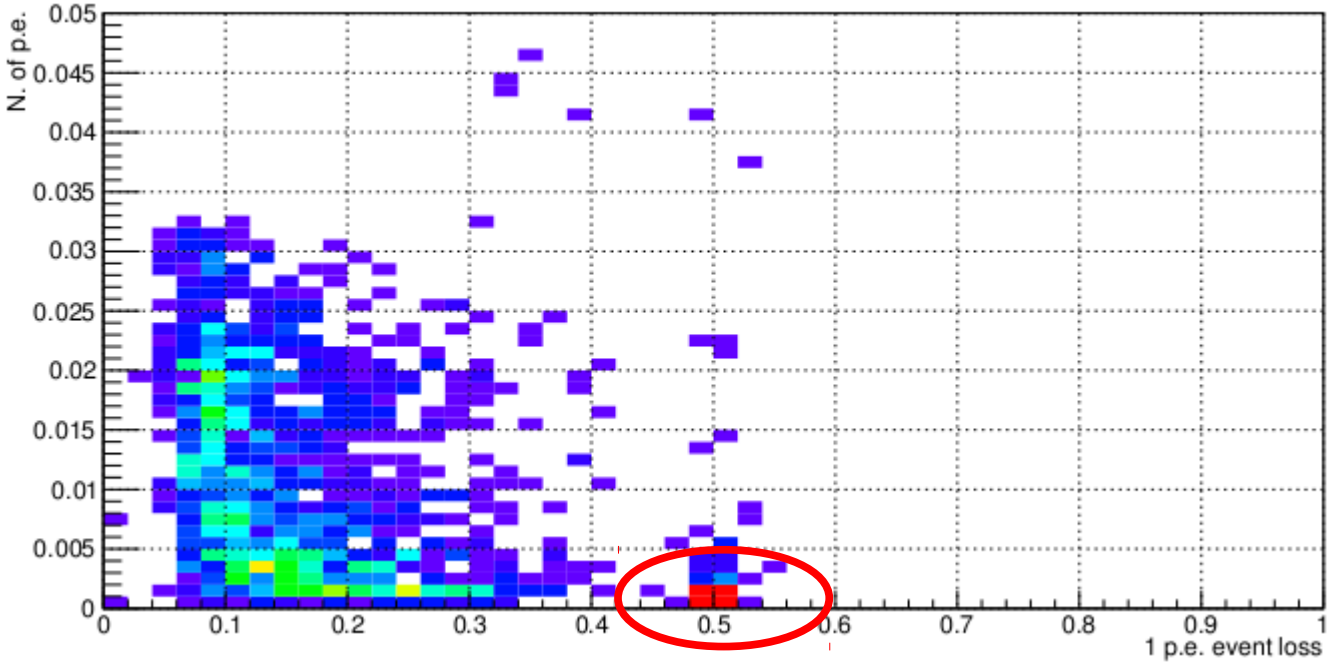
Fits with more statistics

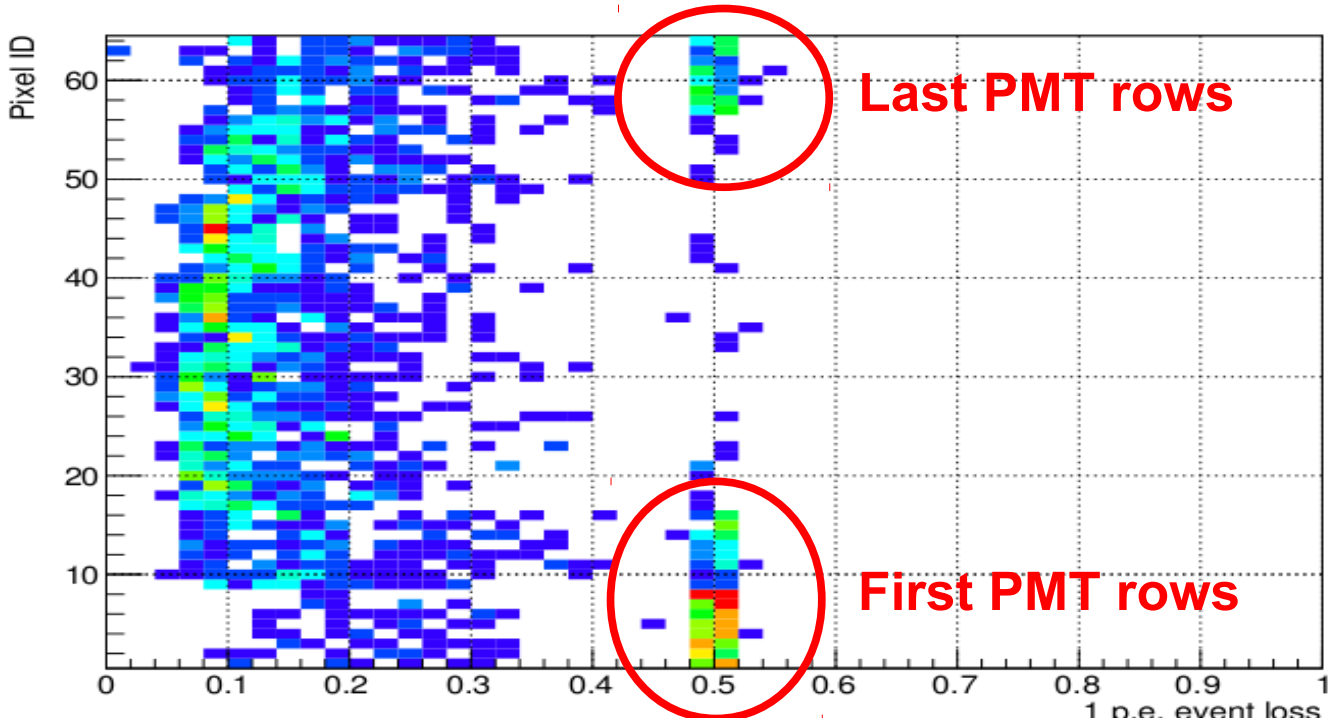






Event loss correlations



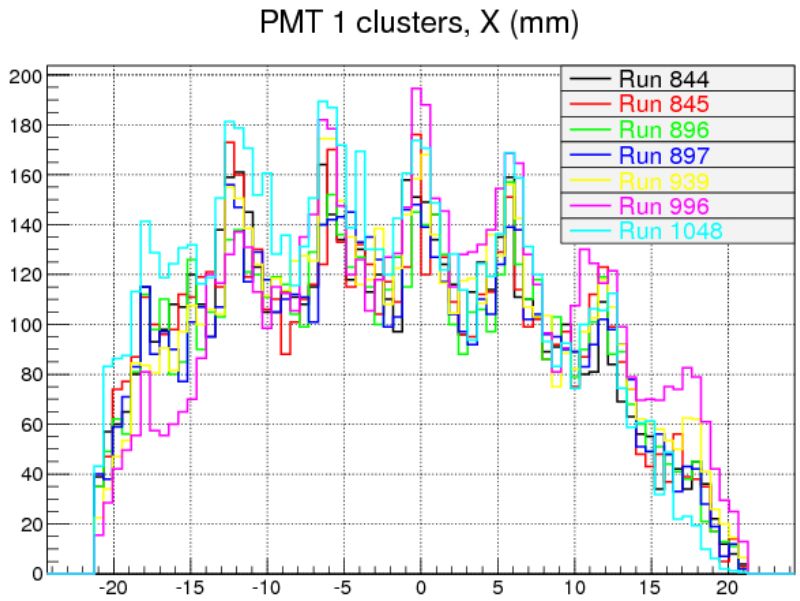


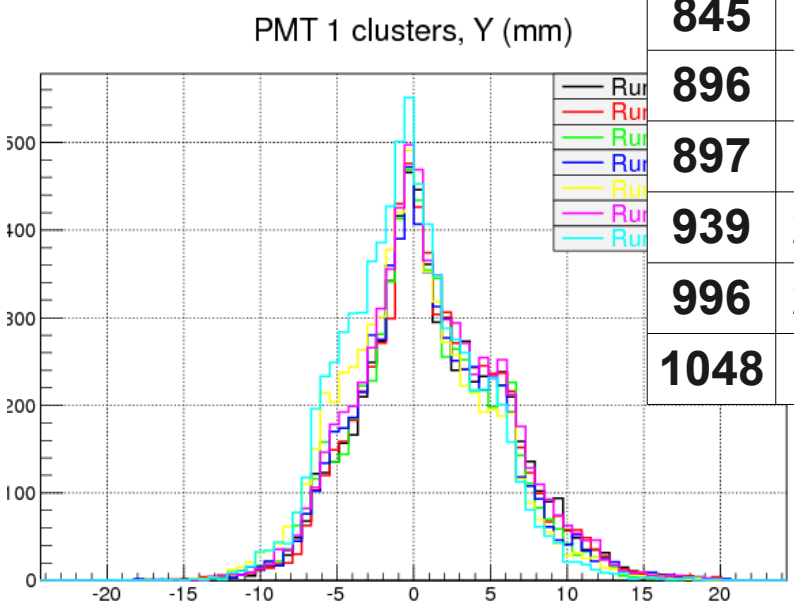
Higher event loss correlated with small N. of p.e. → last and first PMT rows

Alignment runs

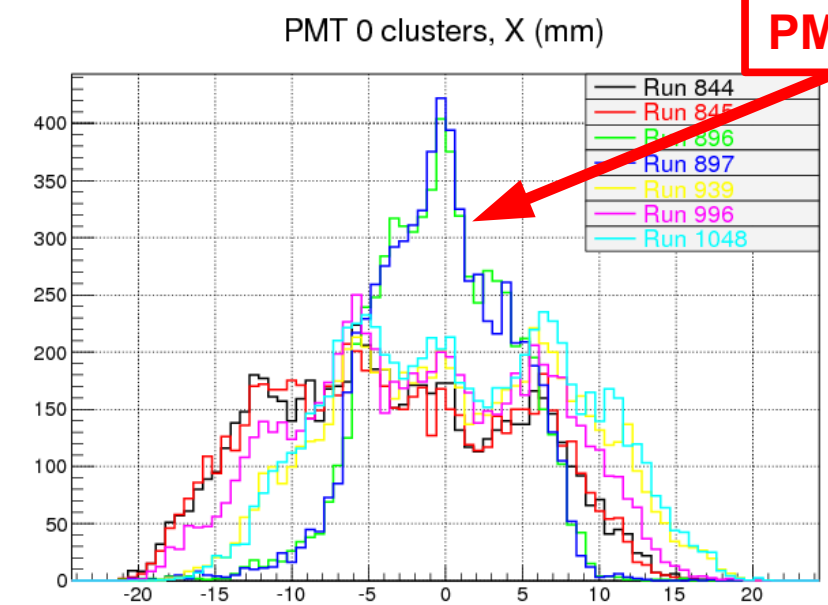
Alignment of PMTs

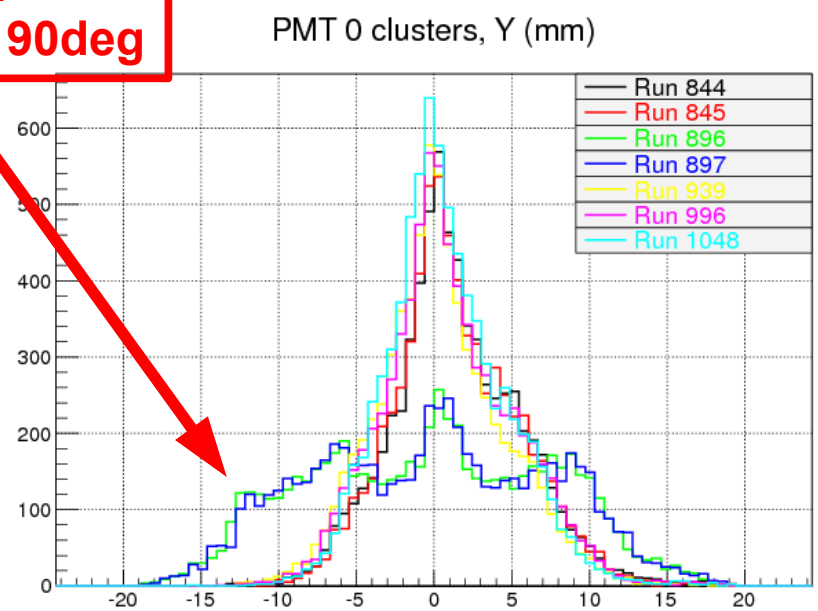
run	evts	Config.	Ebeam
844	10k	reflected	6
845	10k	reflected	6
896	10k	reflected	6
897	10k	reflected	6
939	20k	reflected	6
996	20k	reflected	6
1048	16k	direct	8





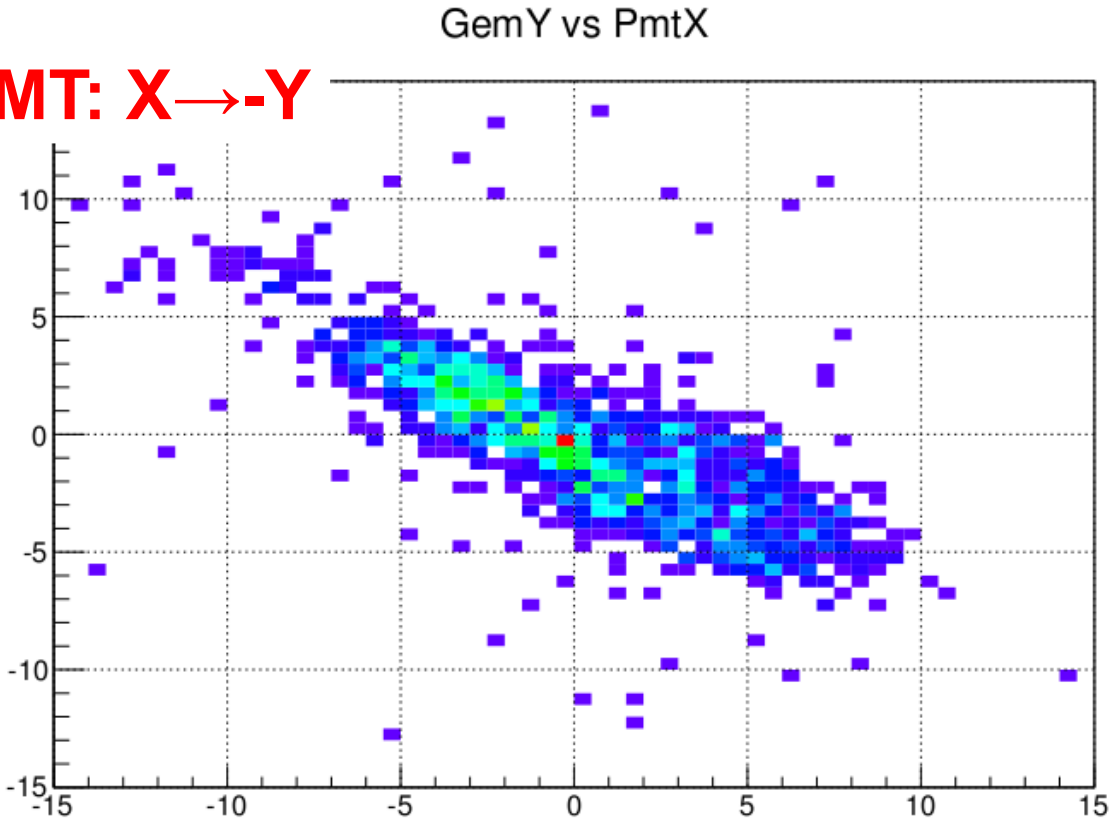
Run896-897
PMT0 rotated by 90deg

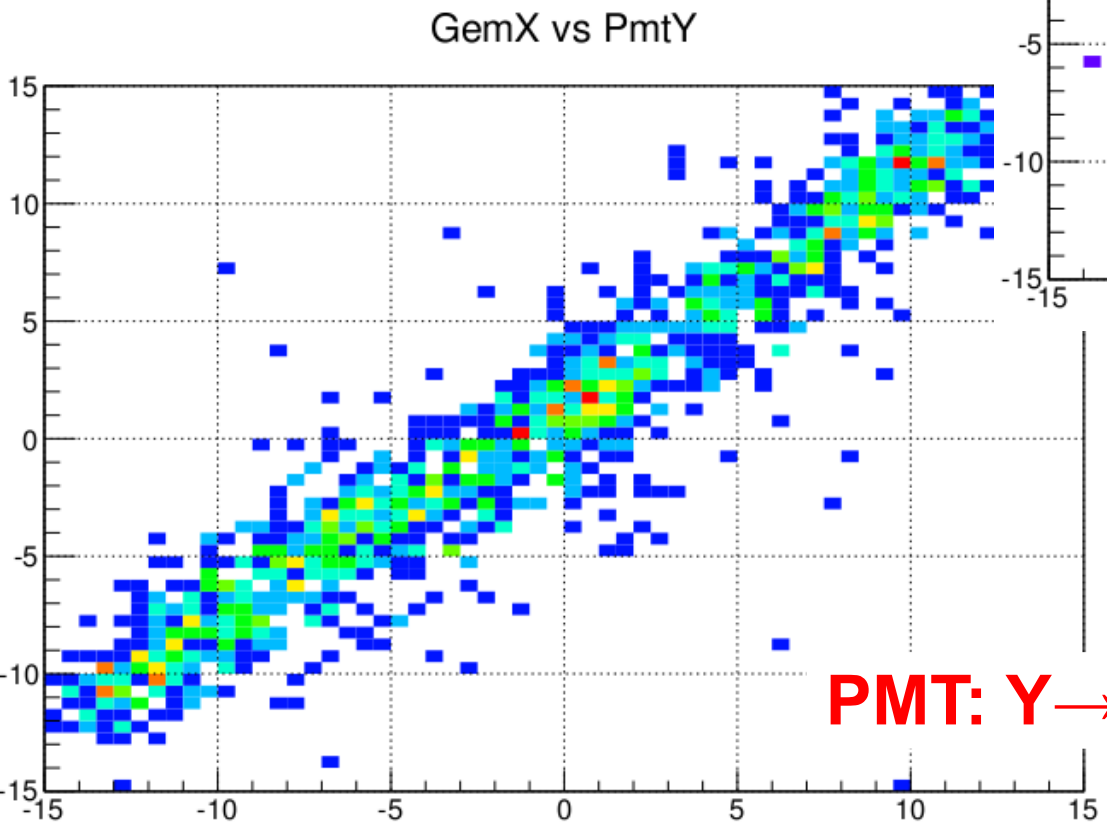


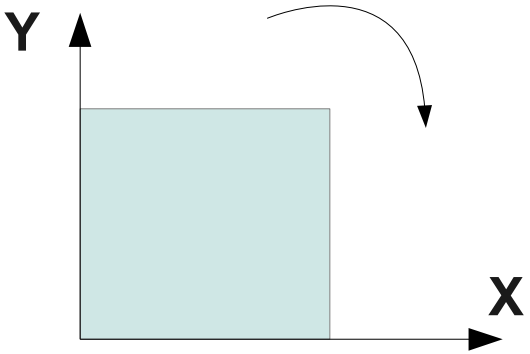


PMT 0 for runs 896-897

Correlation between GEM track projection and PMT hit position







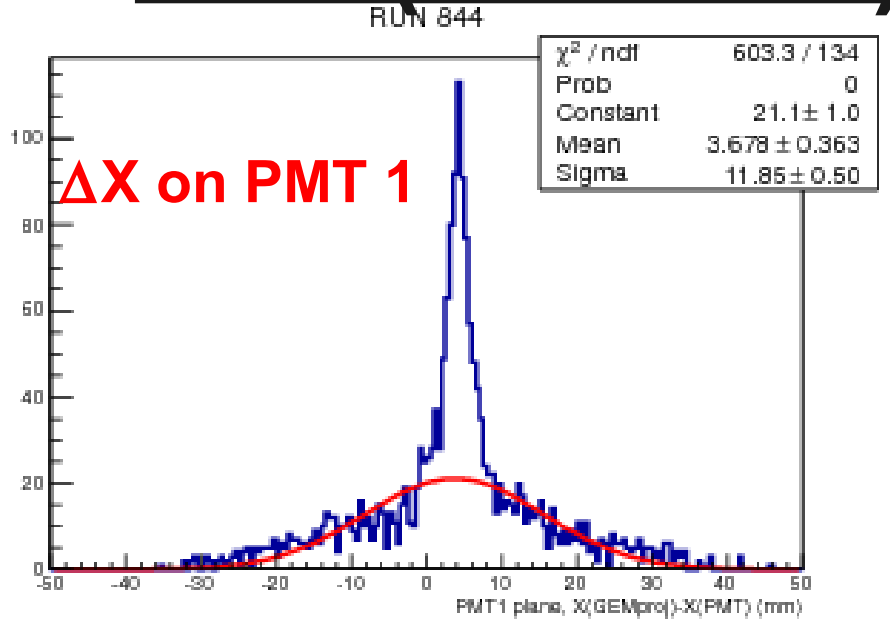
PMT alignment

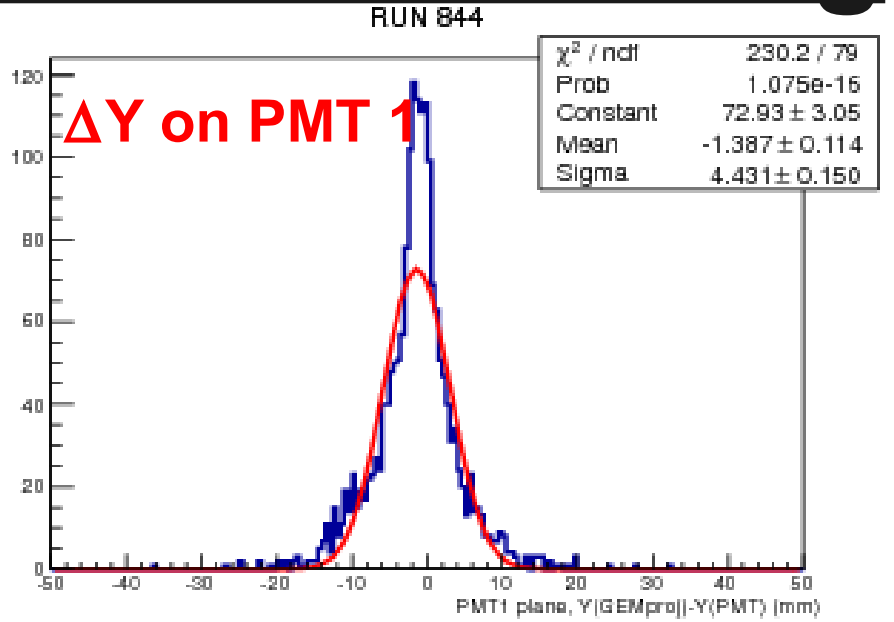
Runs 844-845: two alignment runs made without touching the anything in the RICH => must give same distributions

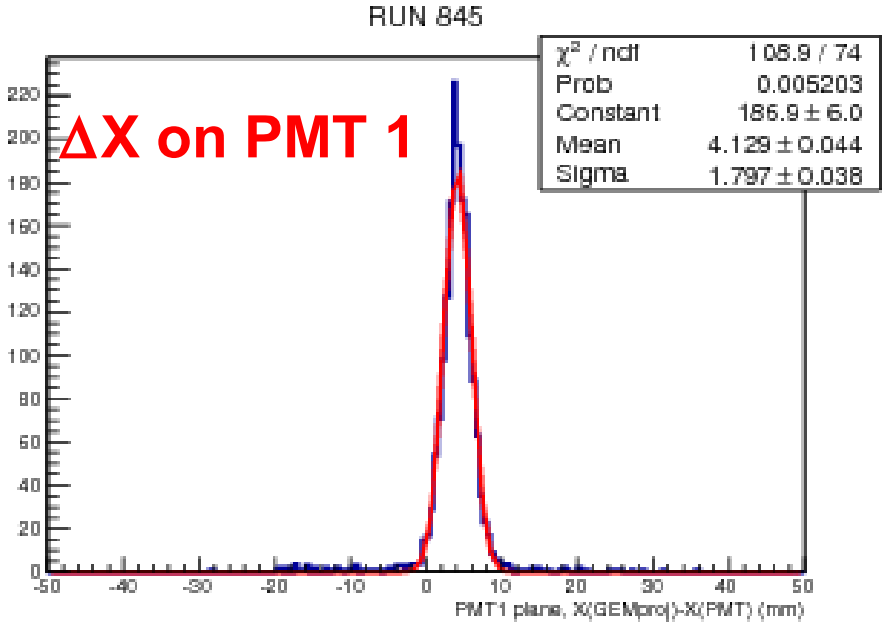
- **Take a PMT track**
- **Take a GEM track and project on the beam PMT planes**
- **Calculate the difference ΔX and ΔY between the GEM projection and the PMT position**

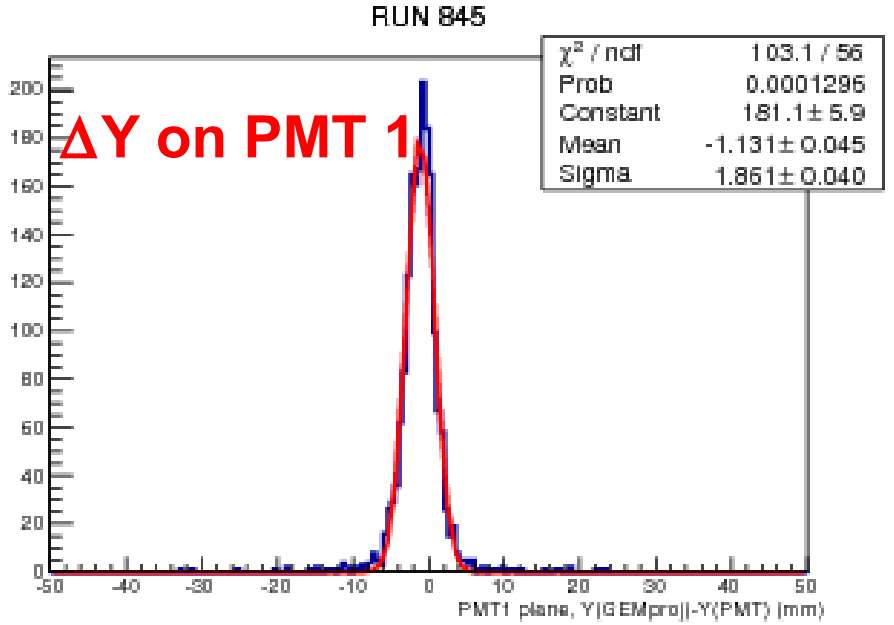
- **GEM alignment constants applied**
- **PMT track computed weighted average of all hits**

PMT(clusters) vs GEM tracking

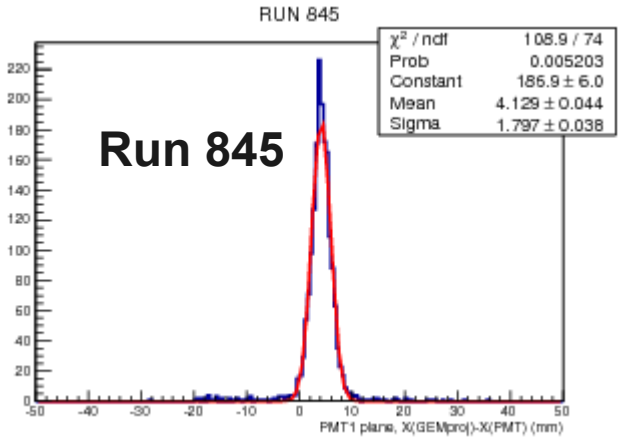


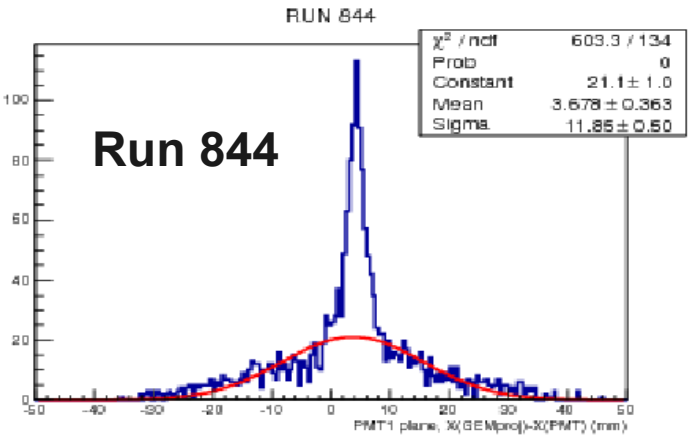




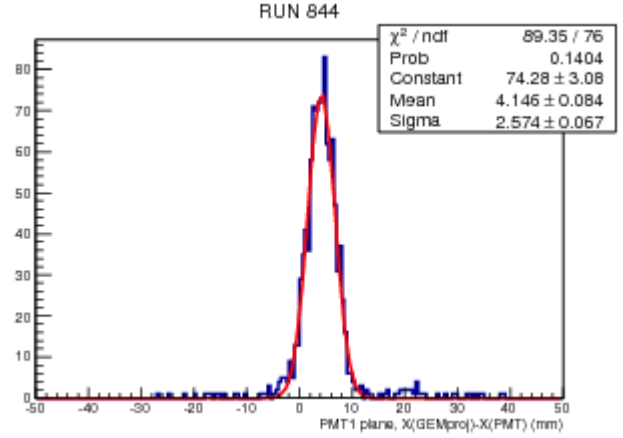


Time dependence

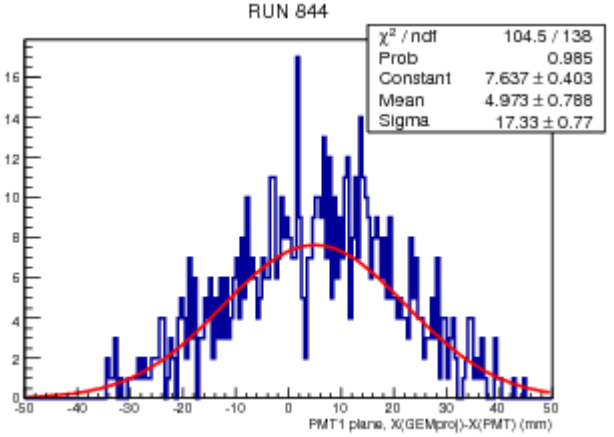




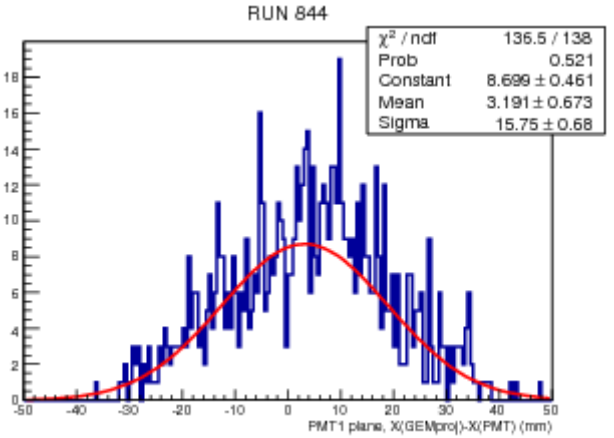
Run 844
events 0-4000



Run 844
events 4001-7000



Run 844
events 7001-10000



Misalignment between MAROC and GEM at event 3654-3662
- one GEM event missing

Conclusions

- **The pattern of noisy/dead MAROC channels seems to be relatively stable with time**
  - **all noisy pixels in the last row**
  - **PMT 6 to be removed for run 1046 -> 1075(?)**

- **First look at Maroc ADC data shows detection efficiency not far from laser tests**
  - **selection of illuminated pixels**
  - **remove noisy pixels**

- **One PMT was 90deg rotated in alignment run 896-897**

- **More work to do on the data cooking**