

Paddy@H4 in October 2016

F.Petrucci – 4 November

NOT a detailed analysis report...

...preliminary studies and overall scan of some runs (inclined runs not considered so far), can be useful for everybody to start up analysis:

- NTUA_MM tracking
- first look at Paddy charge and resolution

Software:

- using TBReco with some modifications:
- new selection cuts and analysis tools
- Paddy mapping (from Michela)
- current sw version on cernbox:

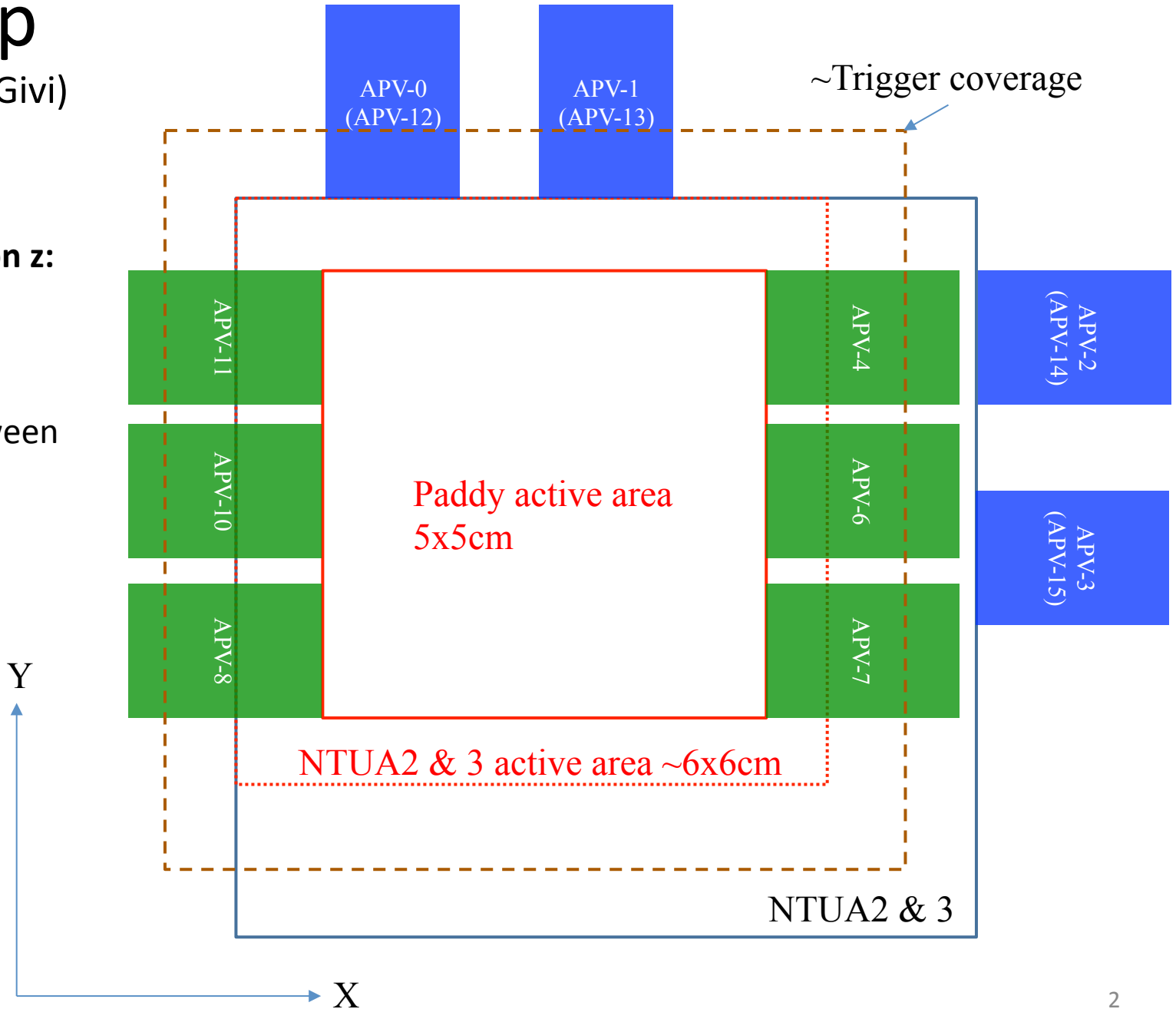
<https://cernbox.cern.ch/index.php/s/X1GNvxAIMQDAhcn>

Setup

(thanks to Givi)

beam direction z:
entering the
screen...

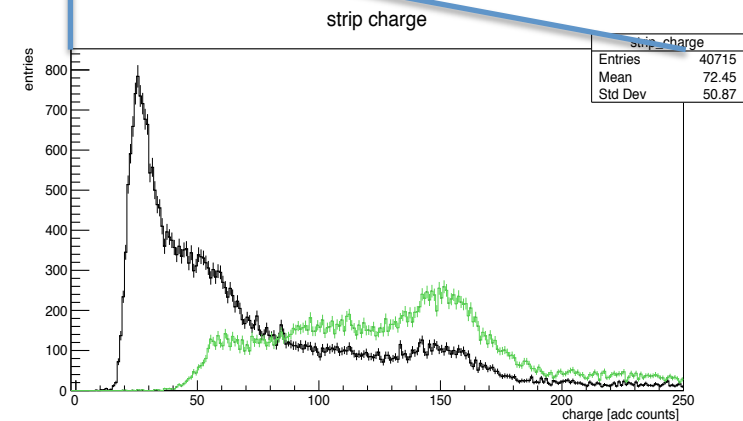
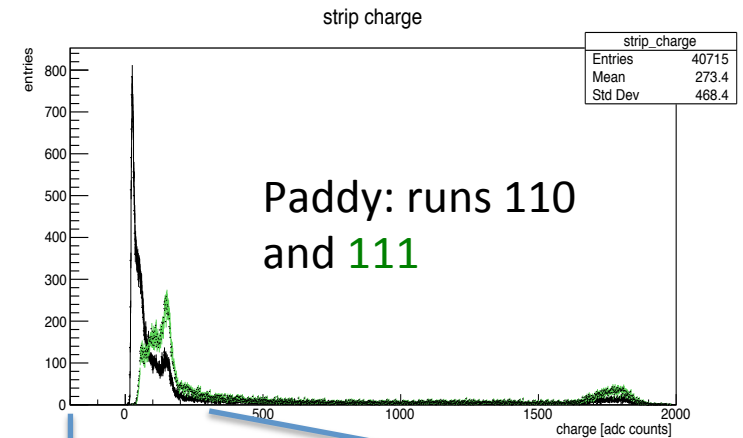
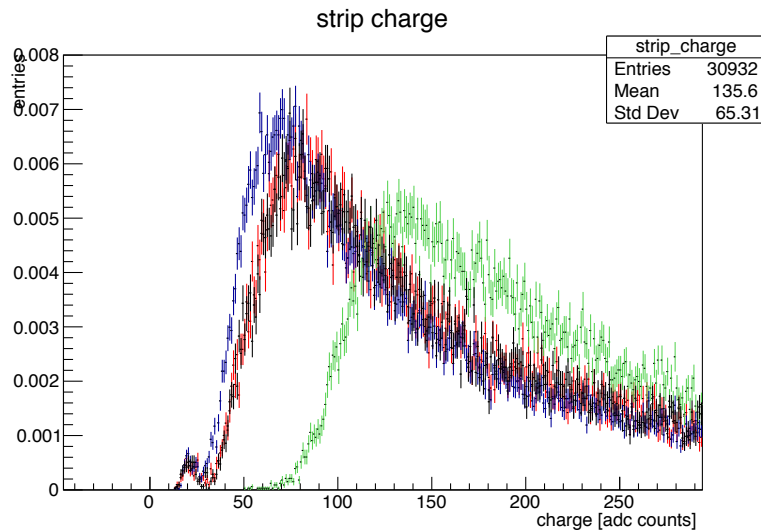
Distance between
the chambers
along z: 5 cm



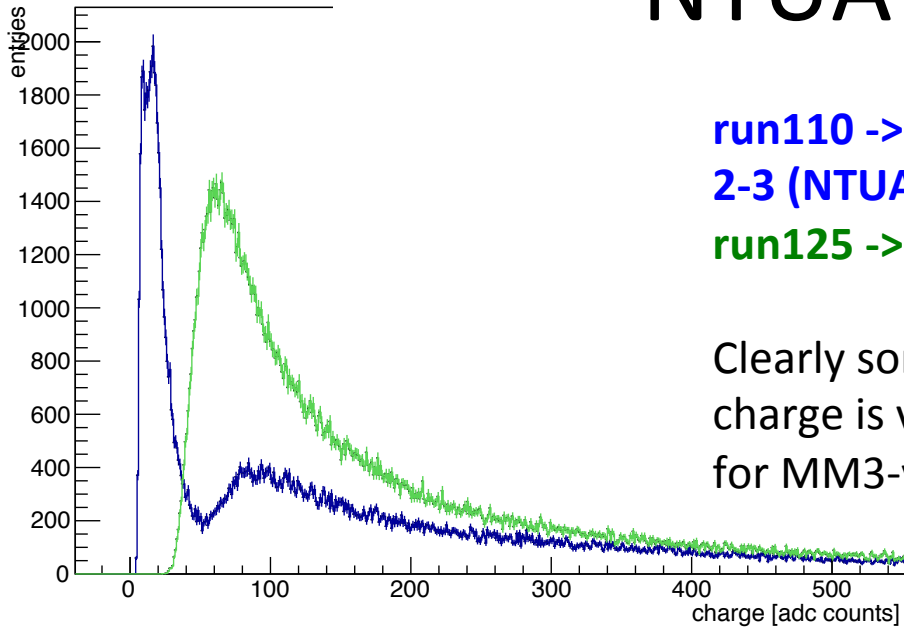
A note on zero suppression

- Zero suppression affects data and NOT only online display;
- Zero suppression was 1 for all the runs except run 111 (it was 2);
- This should have a limited impact on Tmm chambers used only for tracking
- Could affect Paddy Vdrift studies
- → Drop run 111 and use 126 (same conditions)

NTUA_MM2 x example:
runs 101, 110, 111 and 117



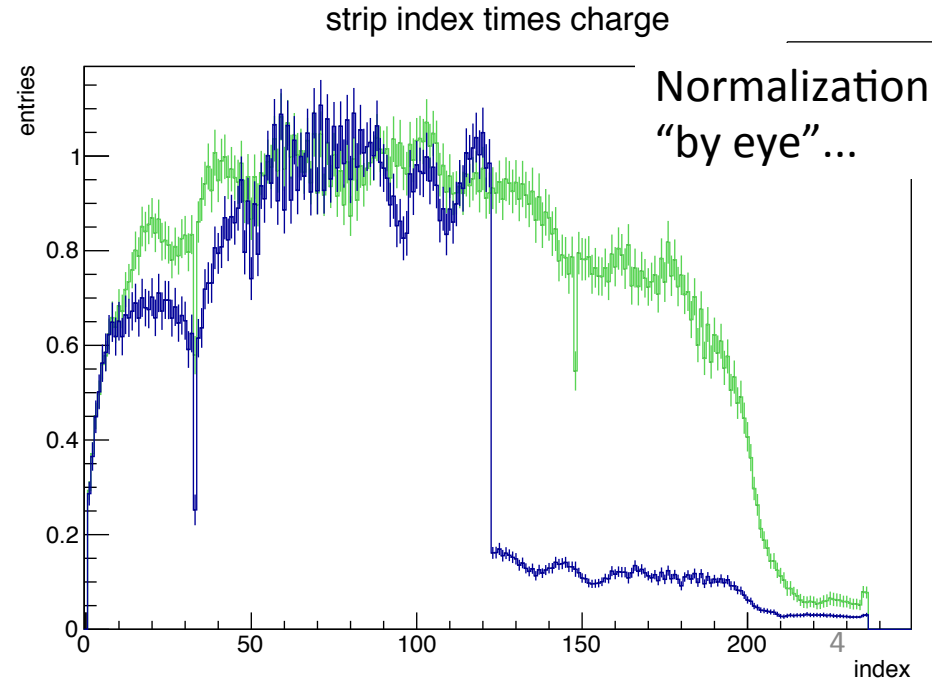
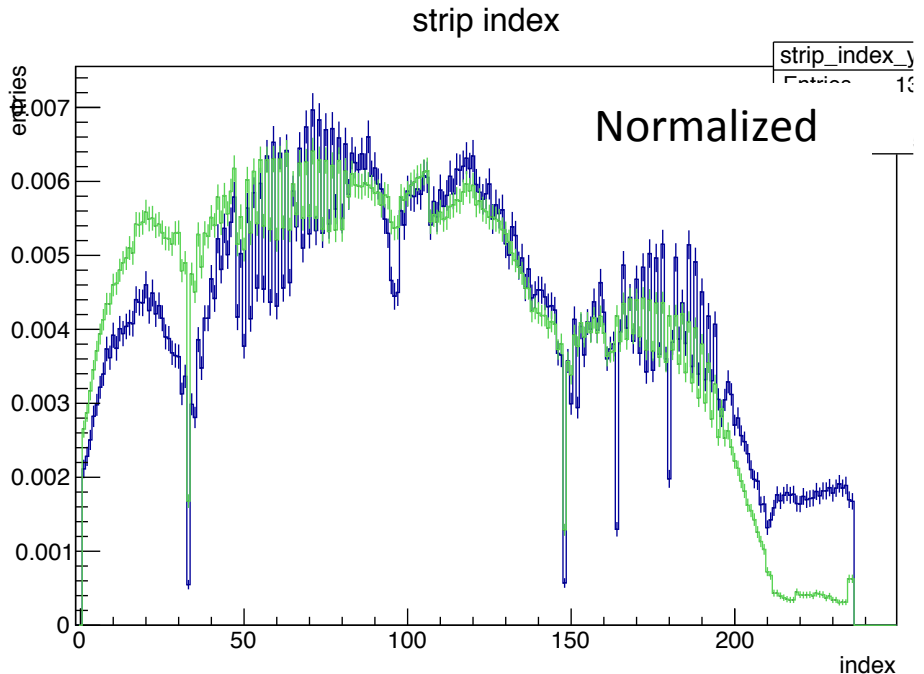
NTUA-MM3 issues



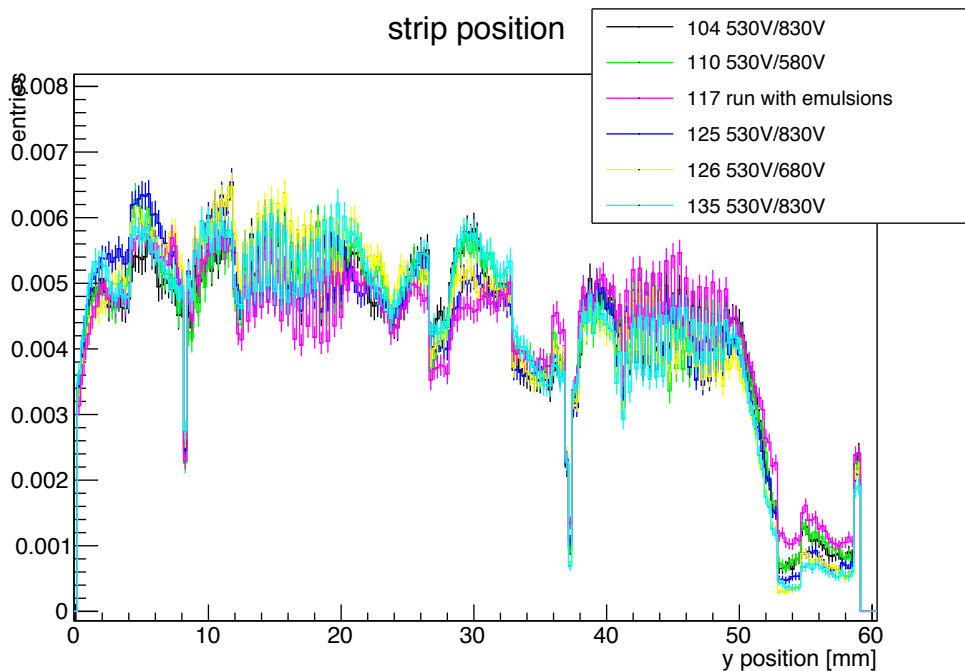
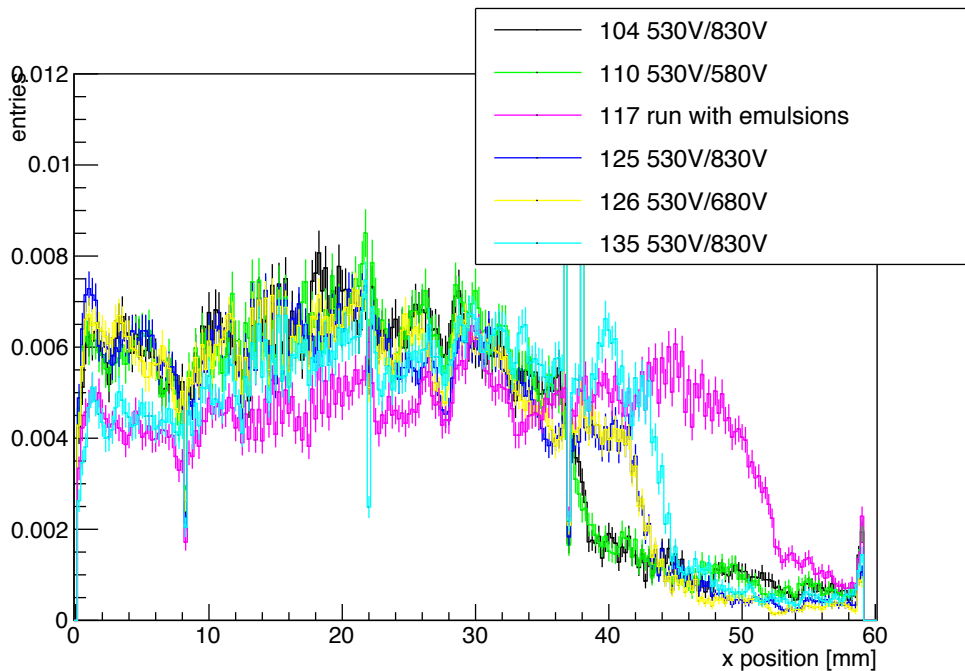
run110 -> before changing HDMI cable connectin APV 2-3 (NTUA-MM3 y view)

run125 -> after changing HDMI cable

Clearly some problems before changing HDMI cables, charge is very low, drop the (already loose) selection cuts for MM3-y for runs<125.



NTUA-MM beam profile



X (horizontal) beam profile changes with time.

Setup moved for emulsion runs.

The profile for emulsion runs is clearly different.

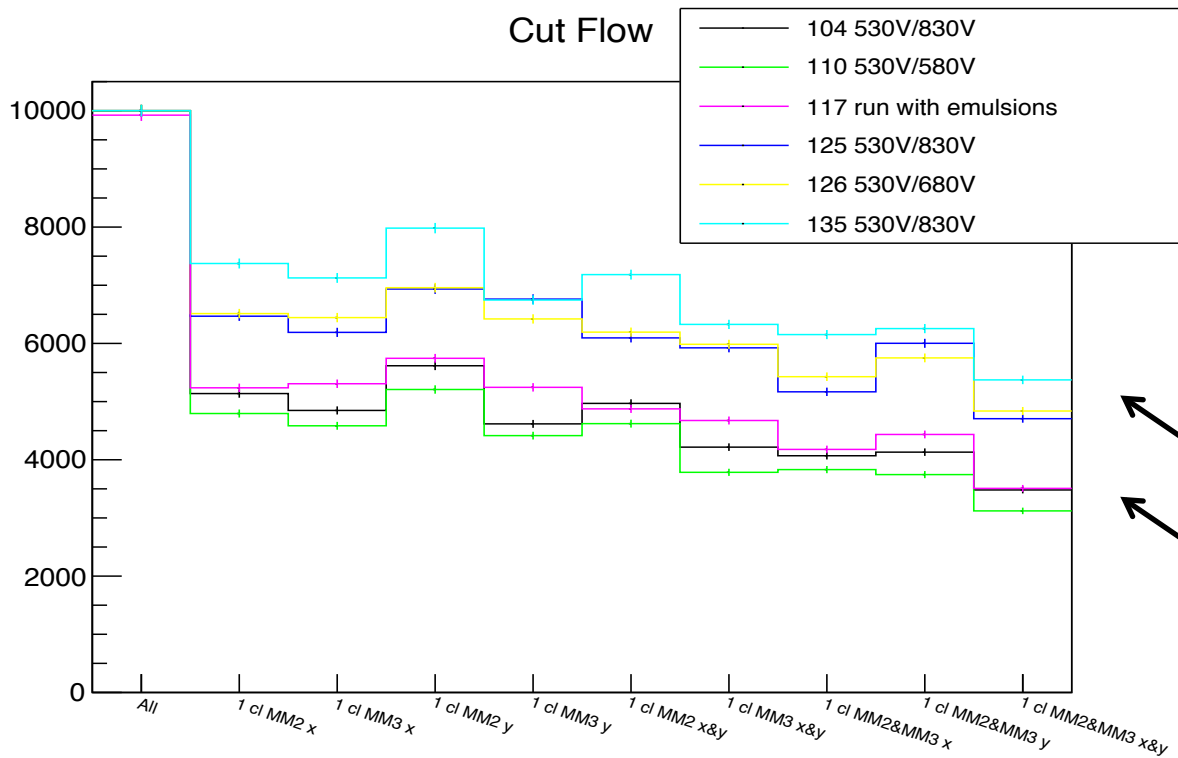
Run125: setup back on the beam (in a slightly different position);

Run135: setup moved ~1cm to the left wrt the beam.

Nothing strange, but this affects the fraction of good events with respect to the trigger.

Y (vertical) beam profile is constant with time

Selecting good events for tracking



Requiring one and only one cluster on both MM & both views:
 ~50% of the statistics in the second part of the run period
 ~30% of the statistics in the first part of the run period

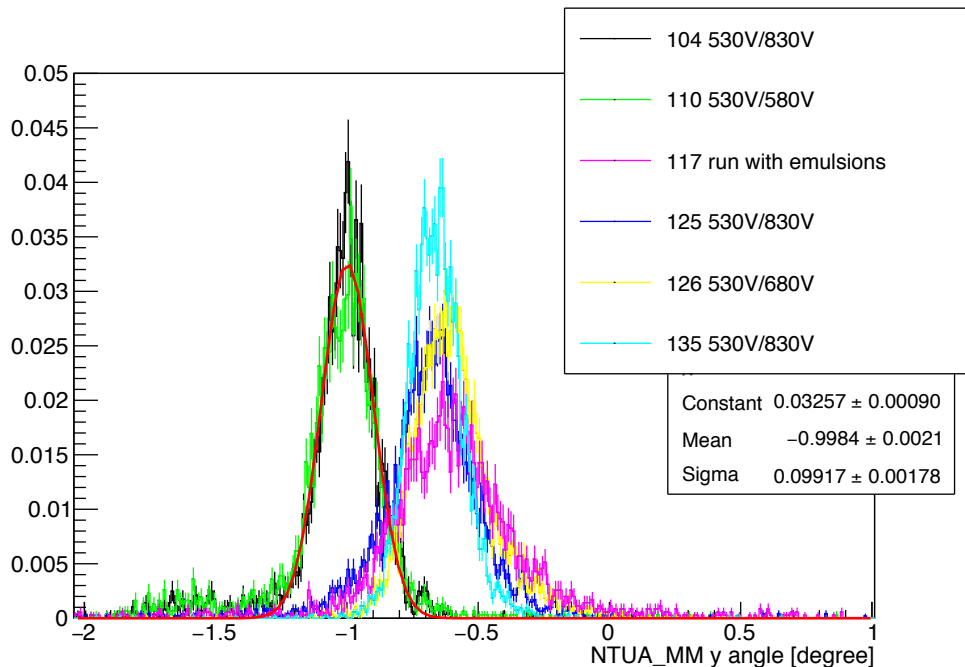
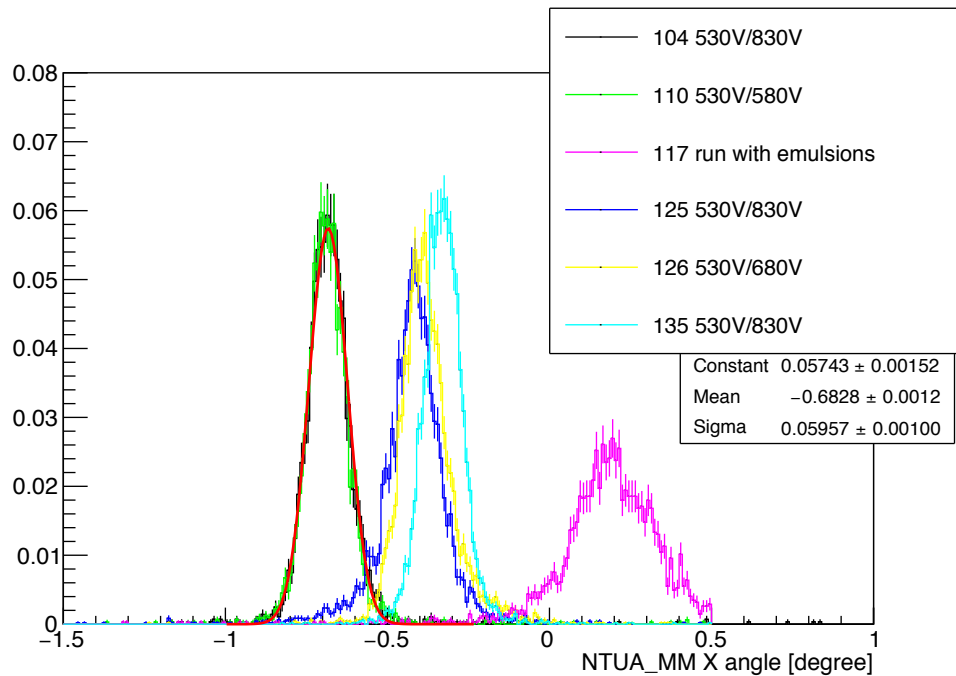
The requests of one (and only one) cluster on each MM chamber (and view) are highly correlated (in fact, it's mainly a trigger&beam coverage issue)

Setup moved for emulsion runs, replaced HDMI cable on NTUA_MM3-Y.

Run125: setup back on the beam (more centered position);

Run135: setup moved ~1cm to the left wrt the beam.

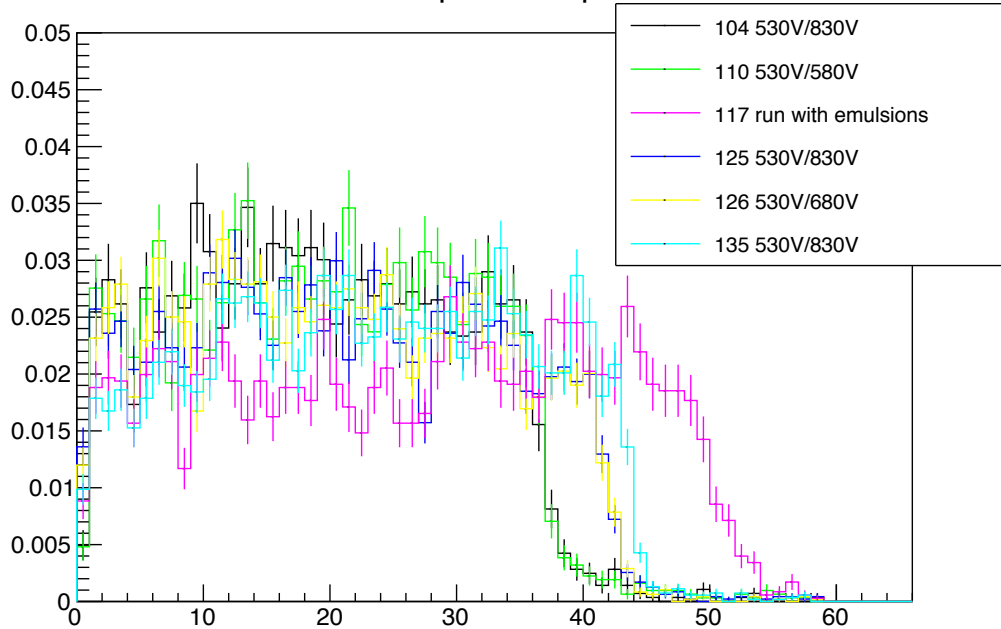
Tracking with NTUA_MM: tracks angle



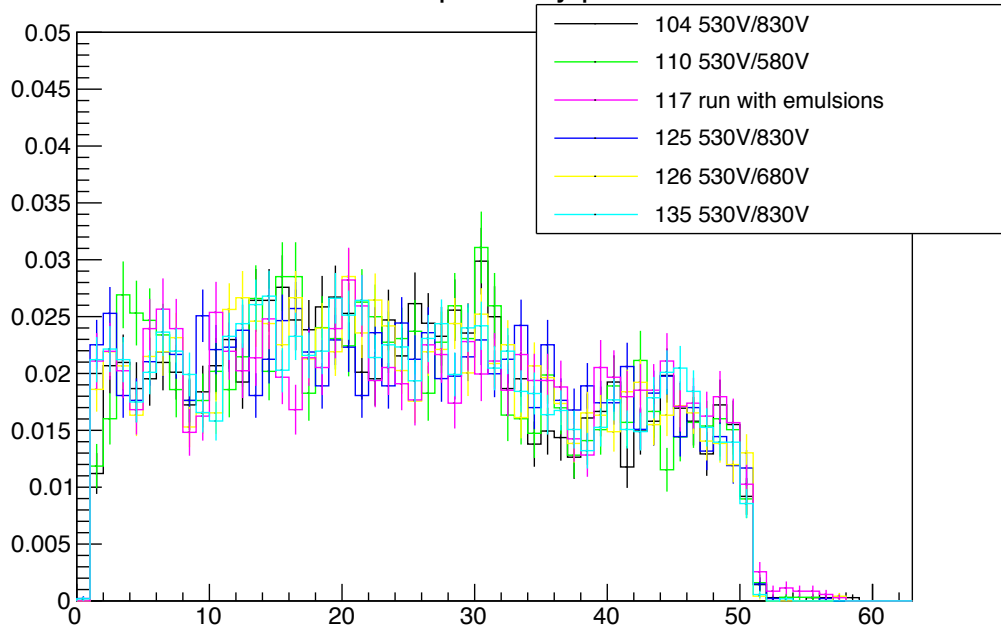
The different positioning of the frame are clearly visible.

Apart from the wider emulsion run, tracks angle distribution have a width of:
 ~ 0.06 degrees in X
 ~ 0.1 degrees in Y

track extrapolated x position



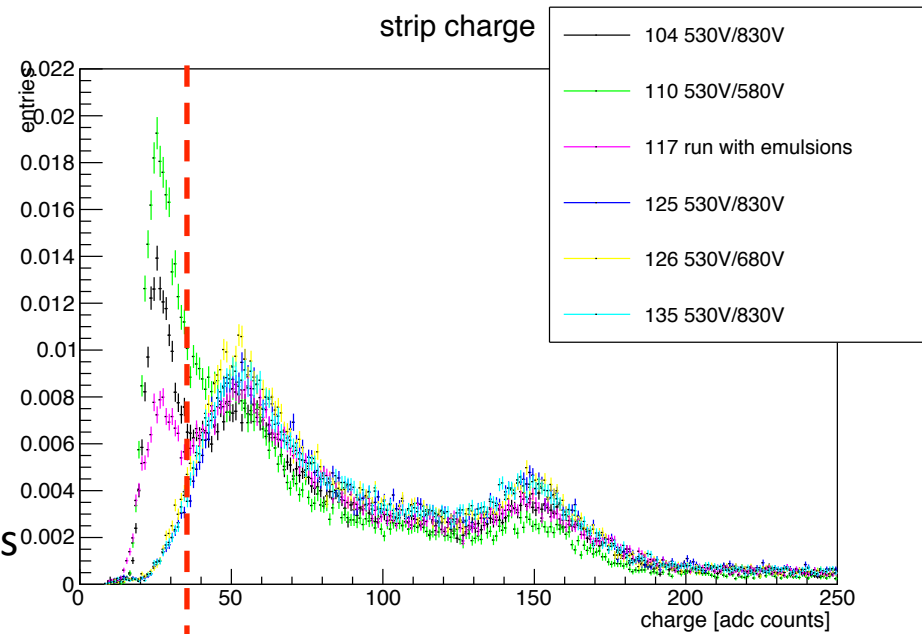
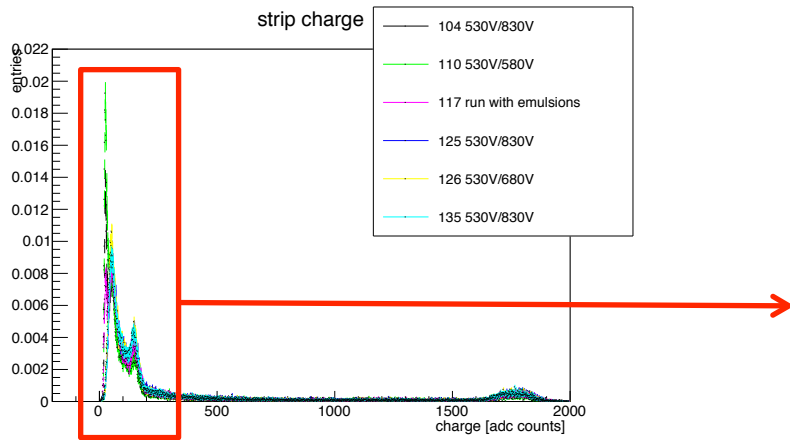
track extrapolated y position



Tracking with
NTUA_MM:
extrapolated
position

Start looking @ Paddy ...

Paddy charge



Noise (?):

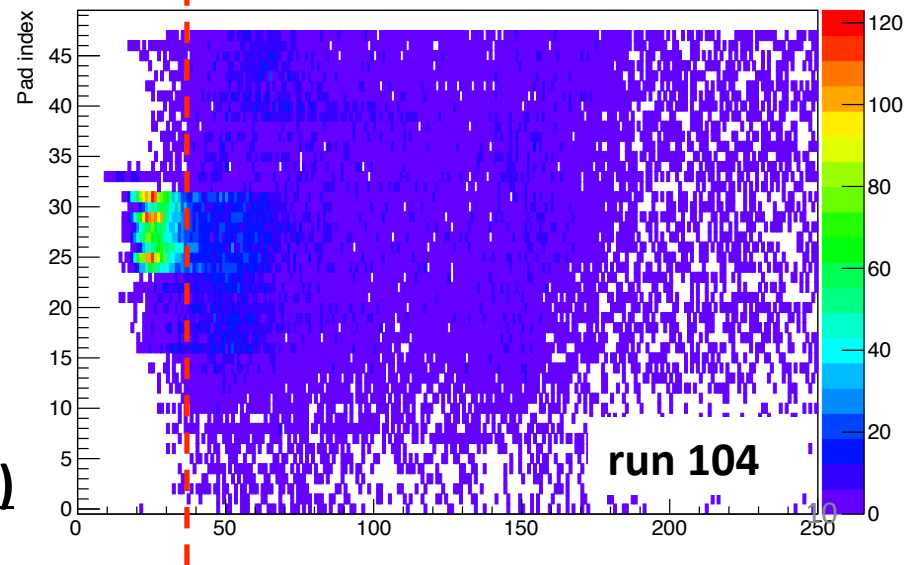
A peak at ~ 25 counts only for 1 APV and for runs < 125 .

Not clear what happened. FE electronics disconnected and reconnected 2 times to move the setup for emulsion runs and then back in position:

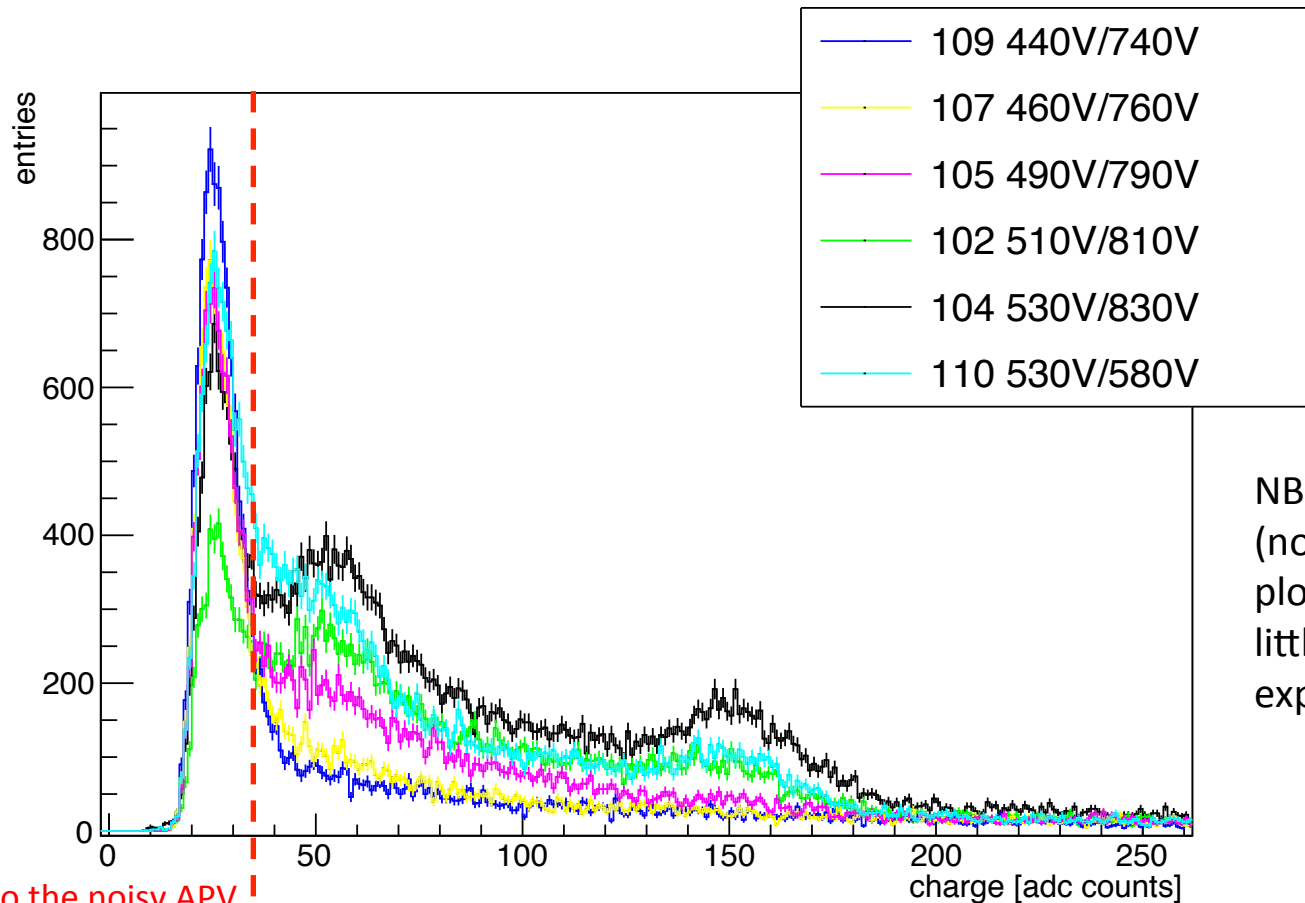
1) before run 117 (slightly better) and 2) before run 125 (ok).

A cut @ 35/40 counts is needed in earlier runs?

Double peak: what is that? (see next slide)



Paddy charge 2

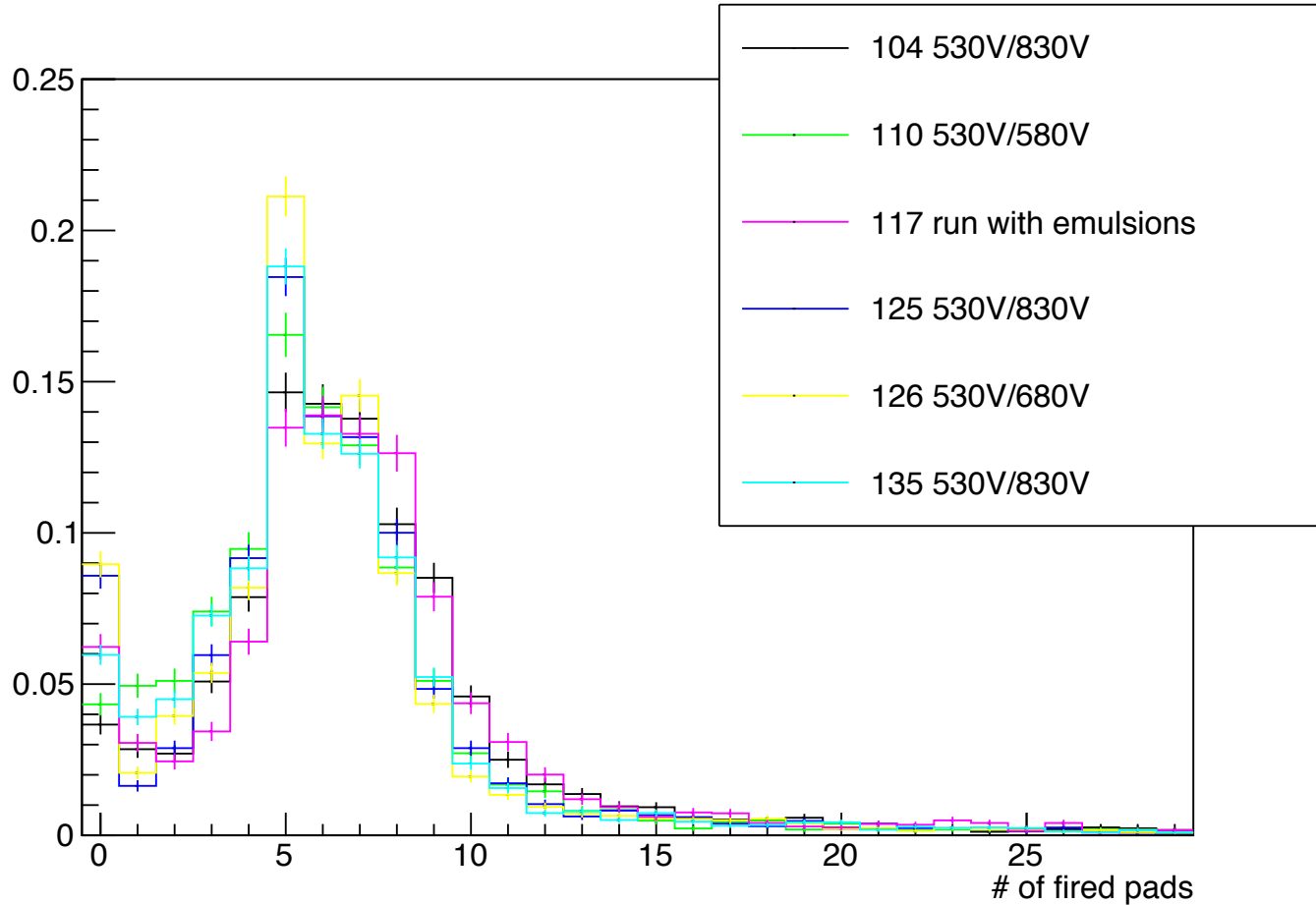


NB: saturation
(not shown in the
plot) increases a
little bit as
expected

mostly due to the noisy APV
(all runs are before run125...)

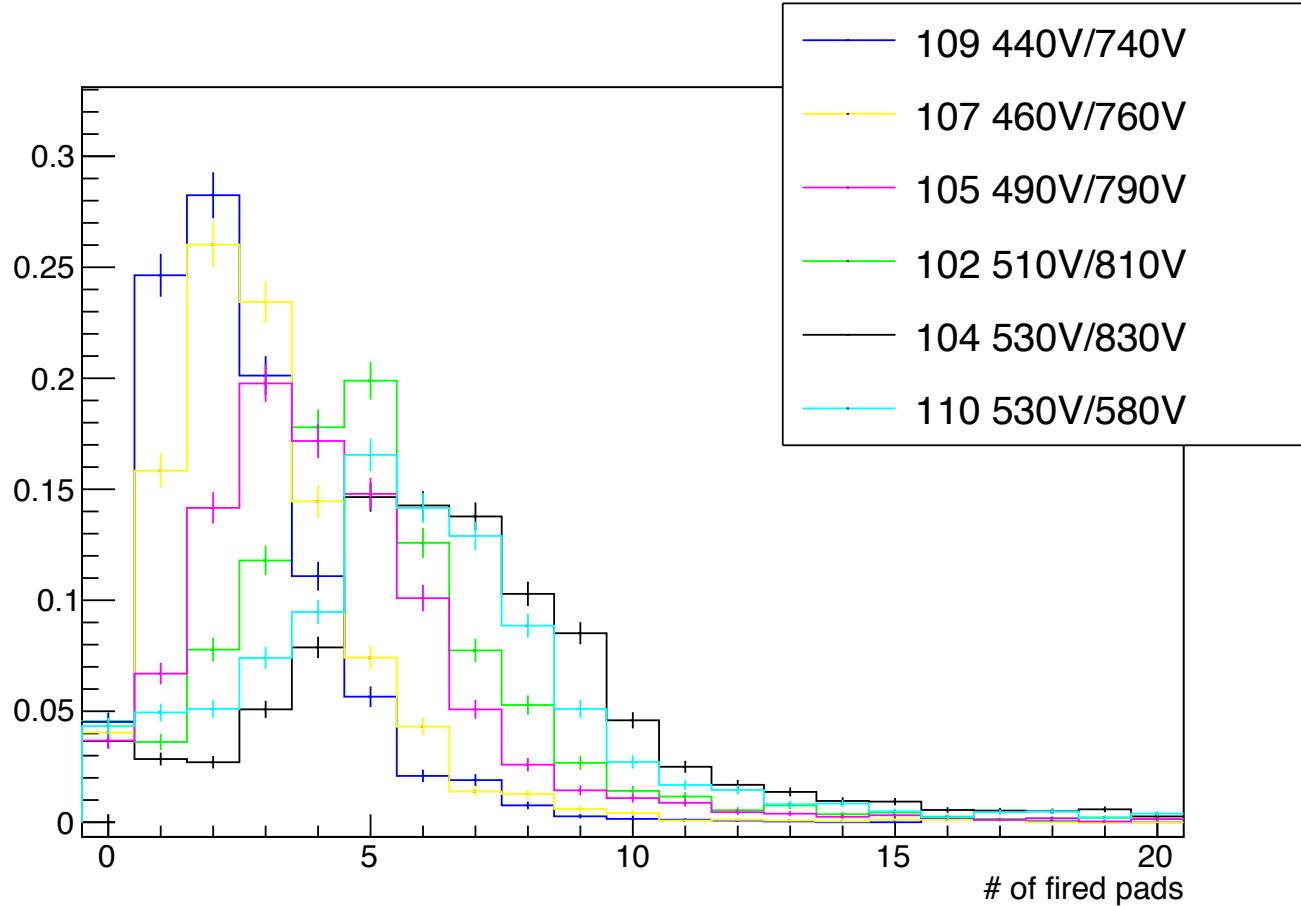
Charge distribution changes with Vamp (larger charges more probable) → OK
The double peak is present at larger Vamp and depends on Vdrift (see 104 vs 110)
→ we should check it in the Vdrift scan (unfortunately we have it only
@Vamp=530V...)

Paddy number of pads



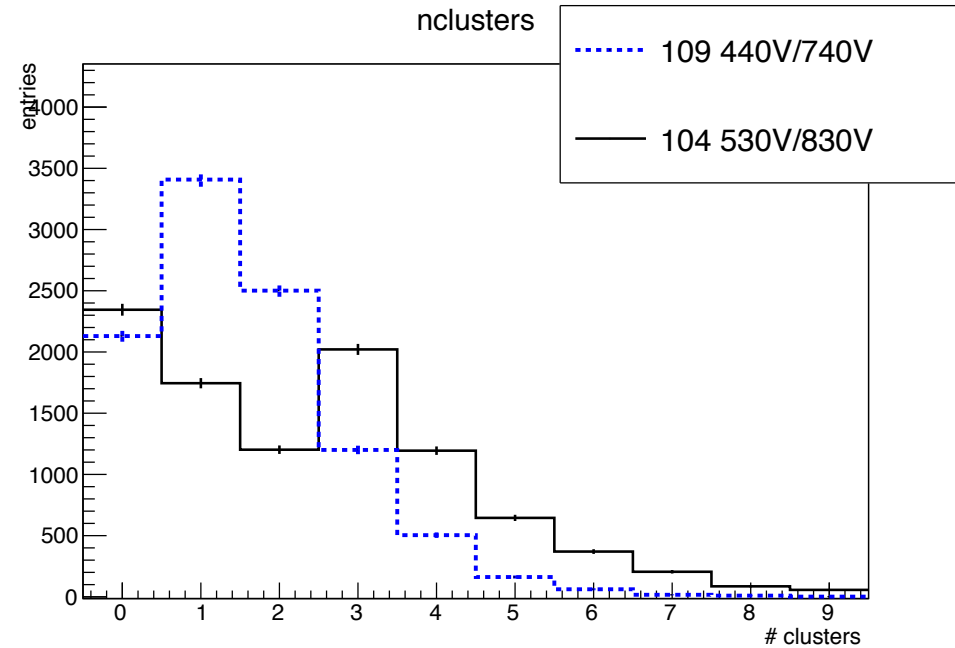
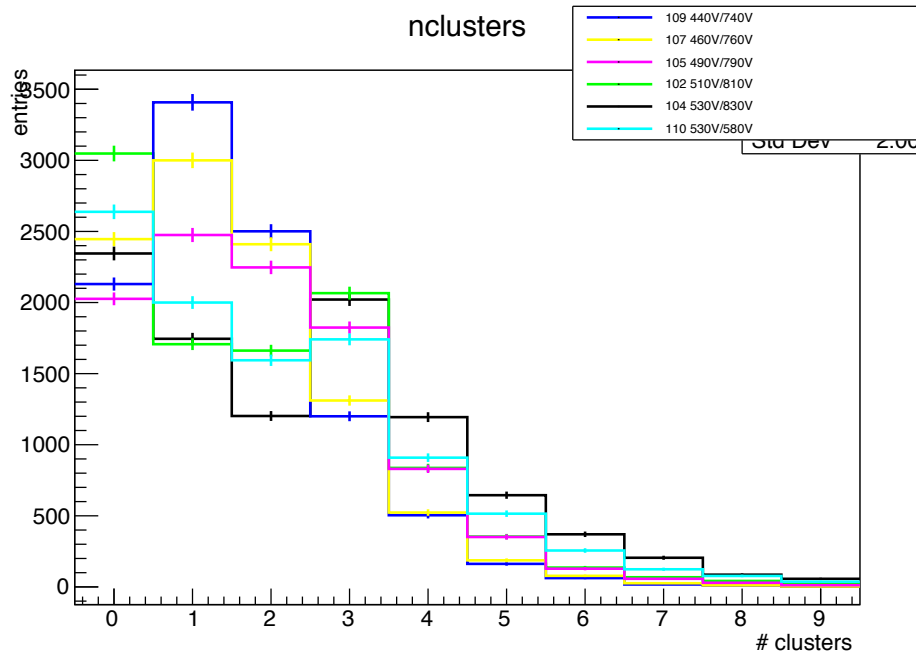
Quite large number of fired pads per event @Vamp=530V
(back to this in following slides...)
Rather constant during data taking

Paddy number of pads 2



number of fired pads increases with amplification voltage

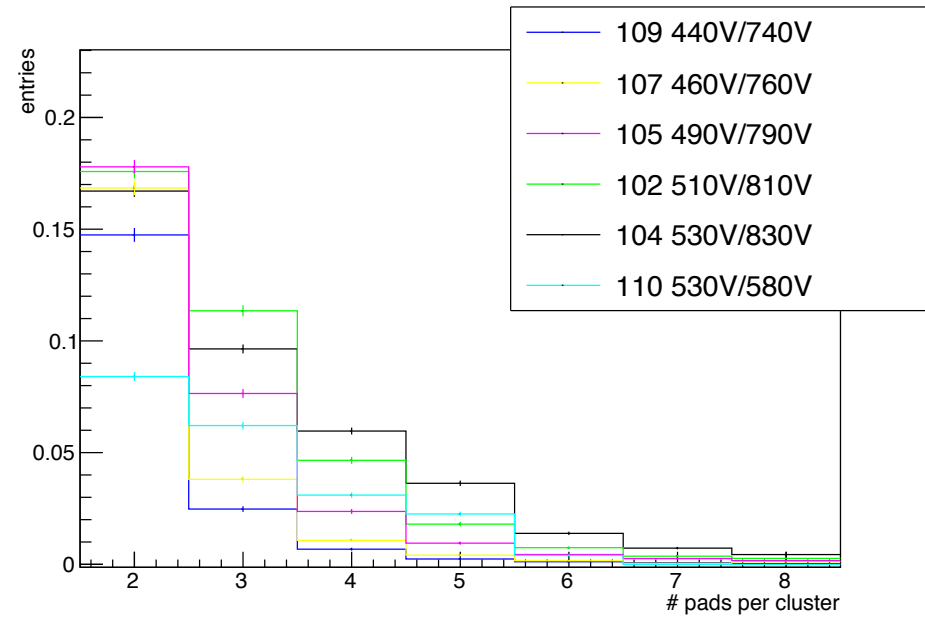
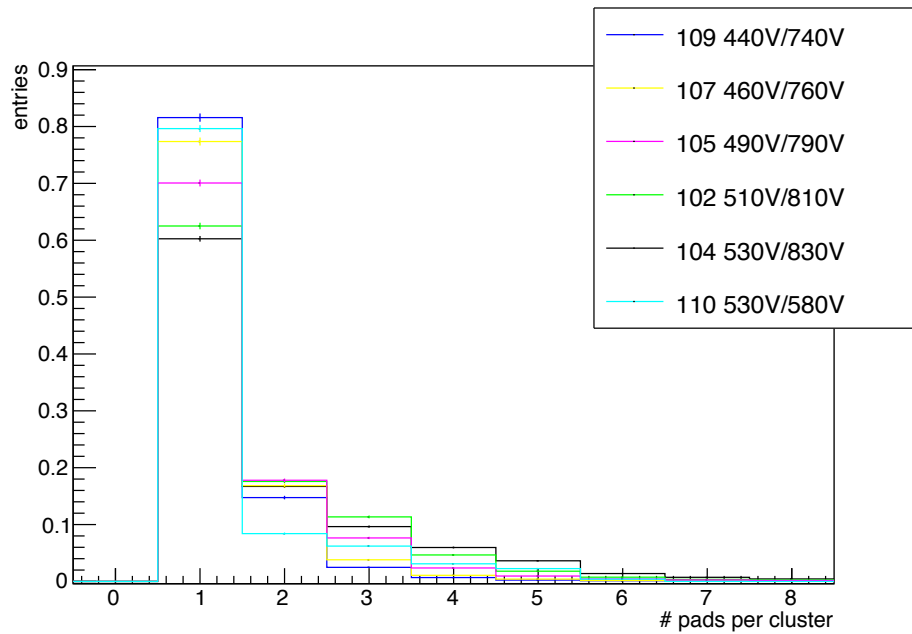
Paddy Clusters



Clusters simply defined as neighboring strips in both coordinates

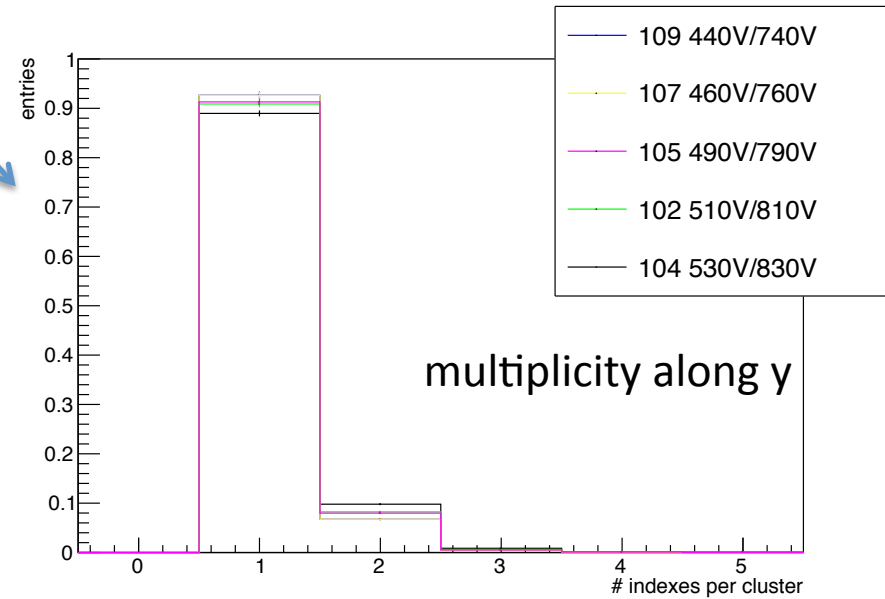
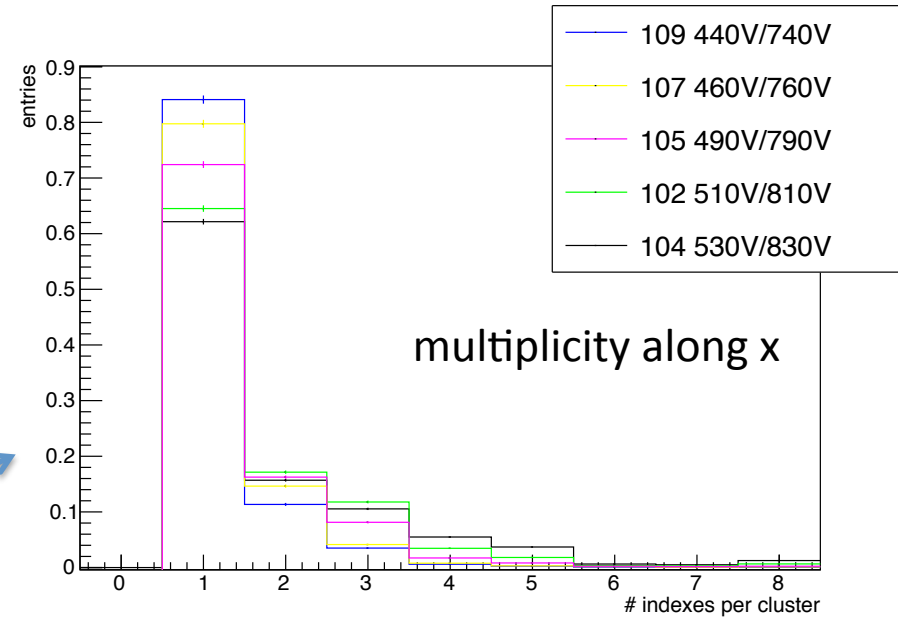
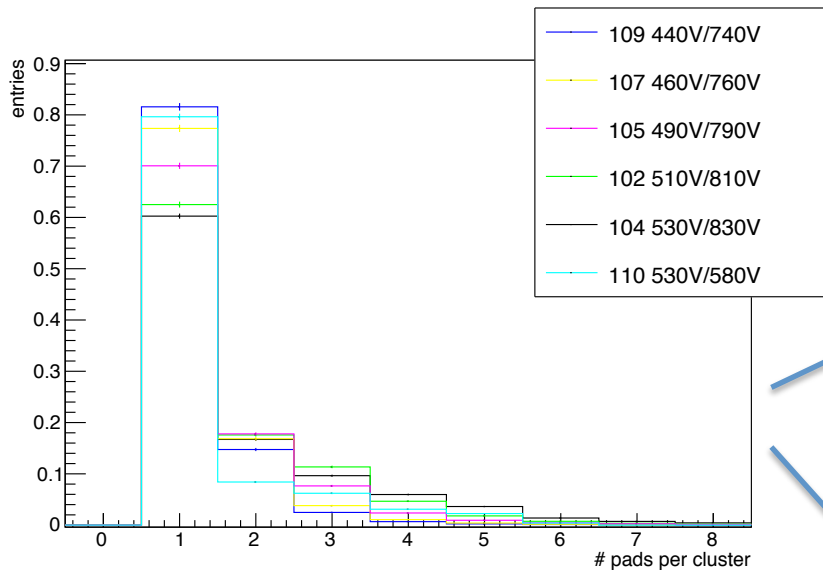
- Number of clusters is quite large
- A peak at 3 appears @Vamp=530V
- possibly some problems in cluster formation method...
- cross talk? (see next slides)

Paddy clusters 2



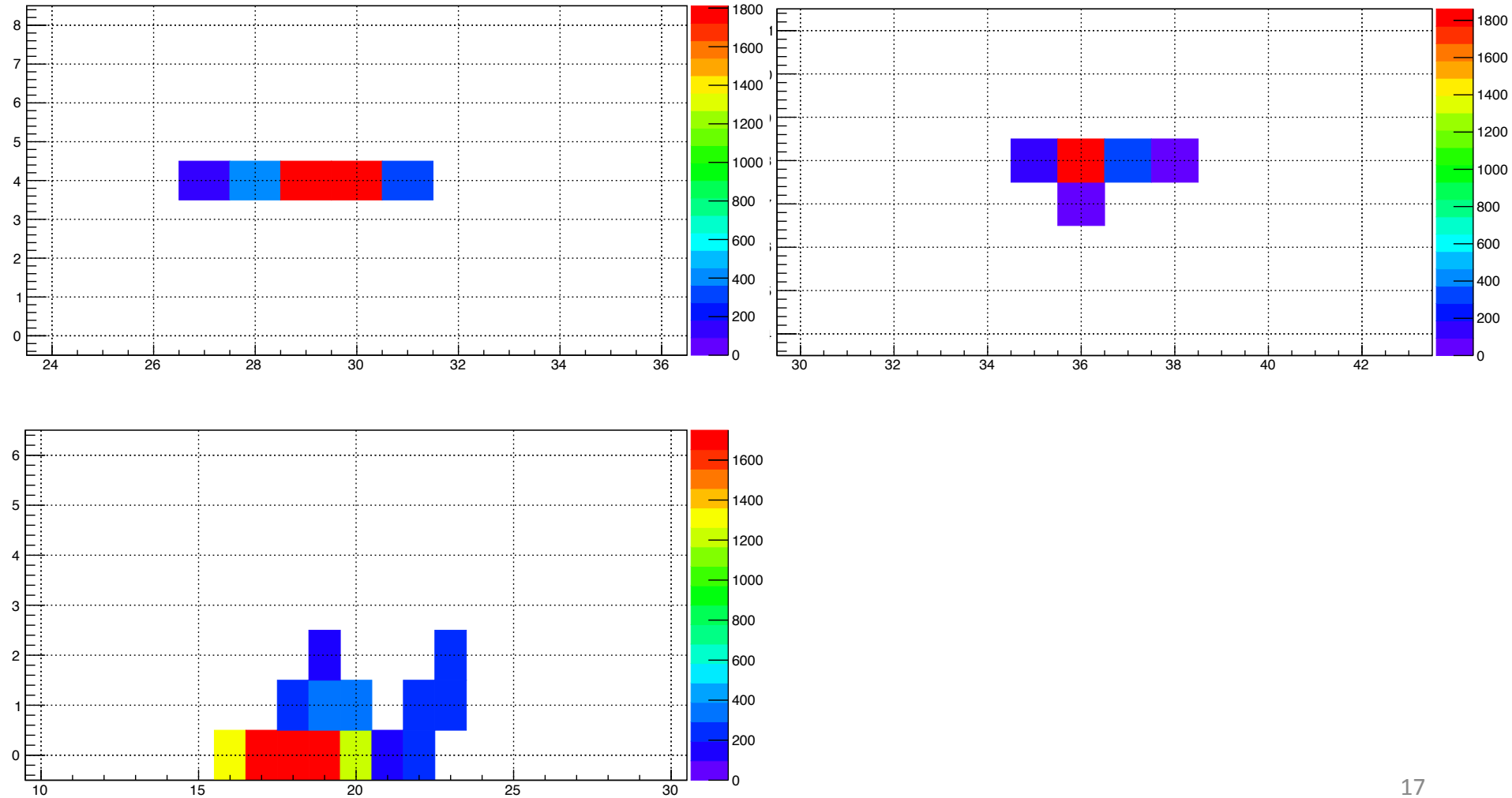
- number of pads per cluster slightly increases with Vamp (and decreases with Vdrift...)

Paddy clusters 3



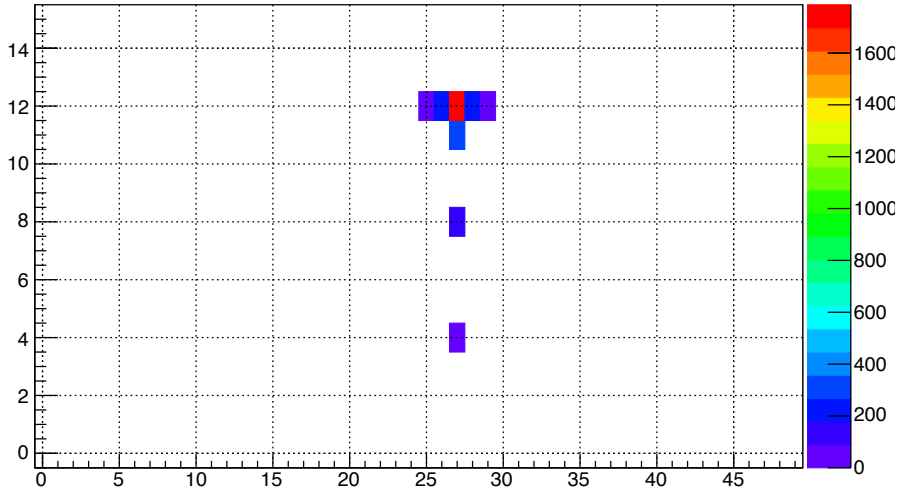
- number of pads distribution divided in the two coordinates

Paddy Clusters displays

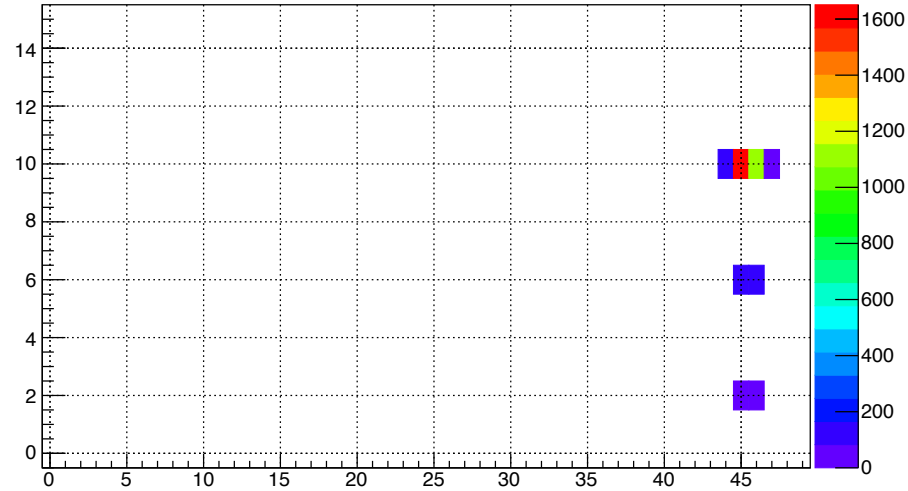


cross talk?

clu

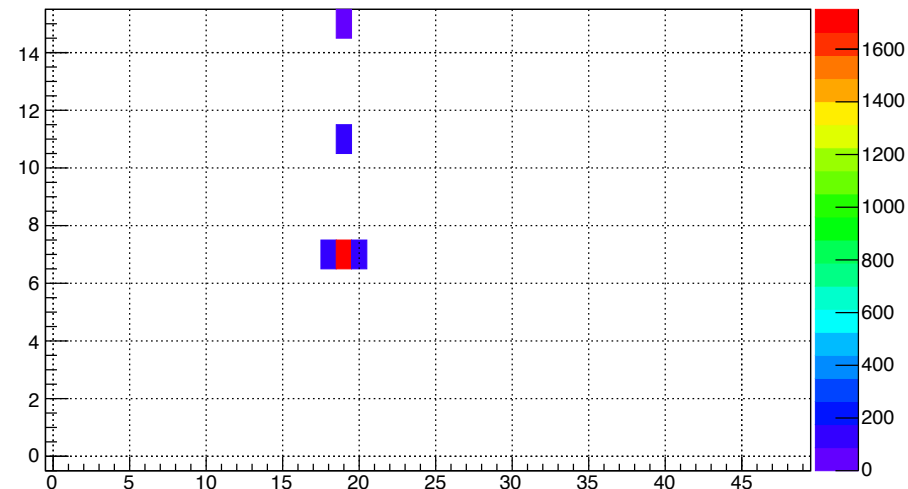


clu

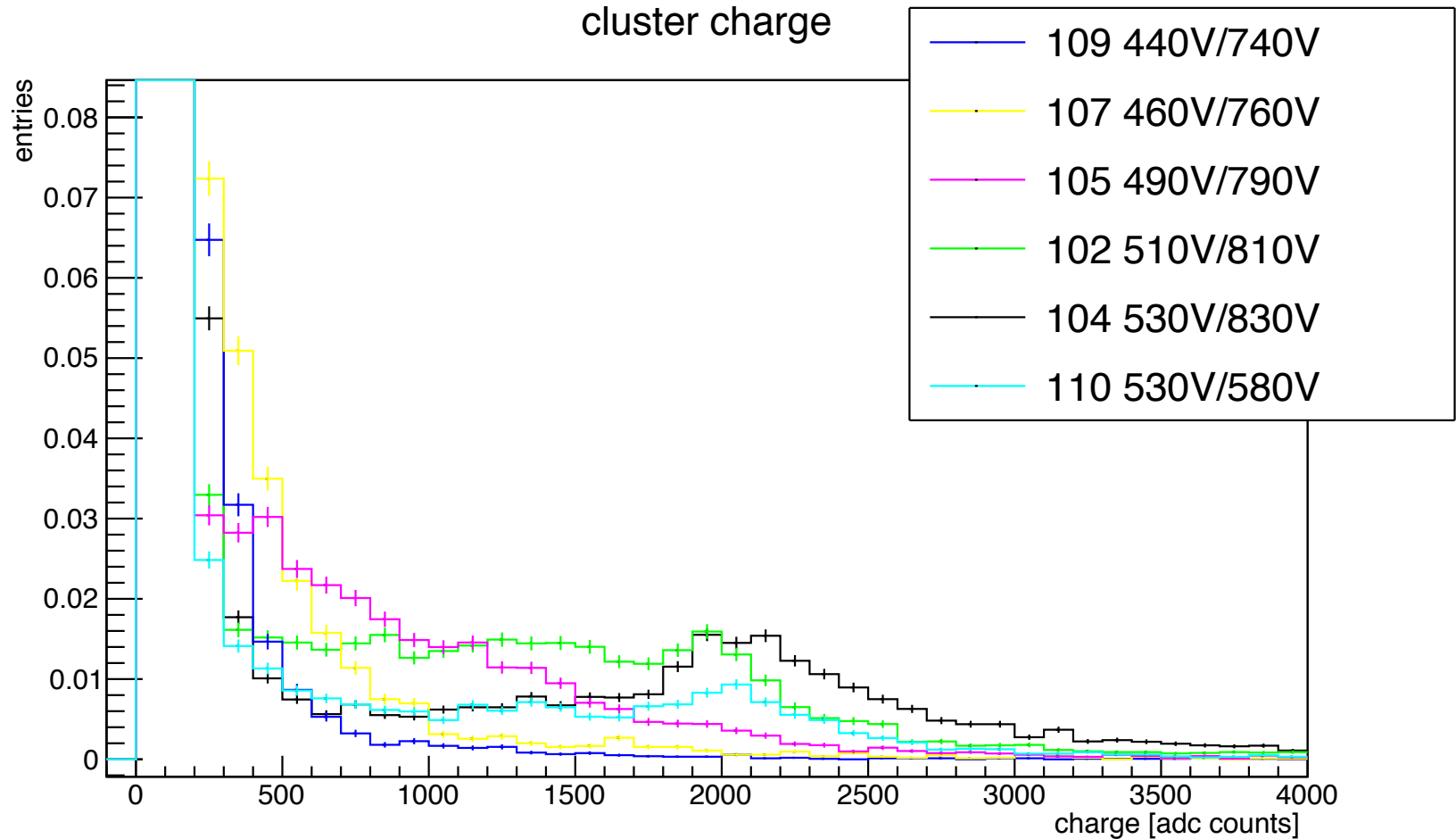


when there is a strip with large charge, other strips with same x-index and y-index +/- 4 fire as well

clu

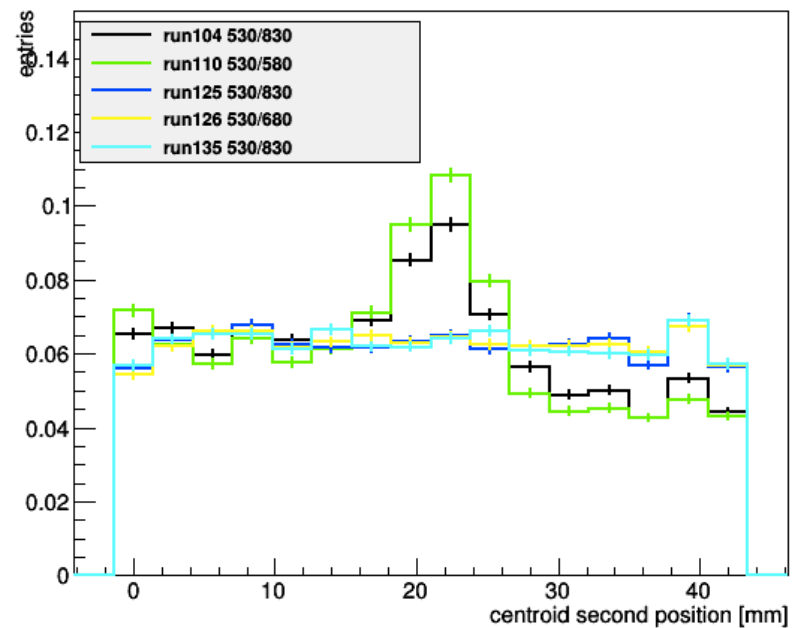
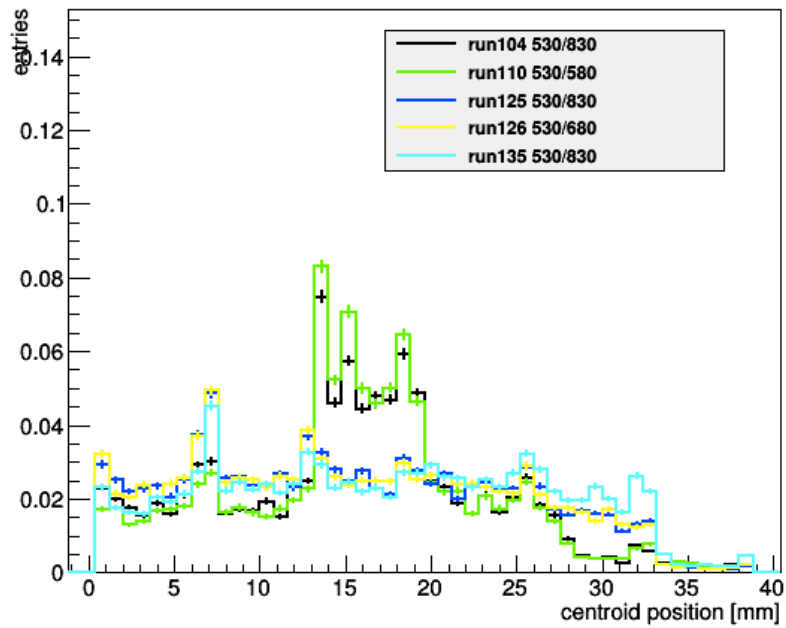


Cluster charge

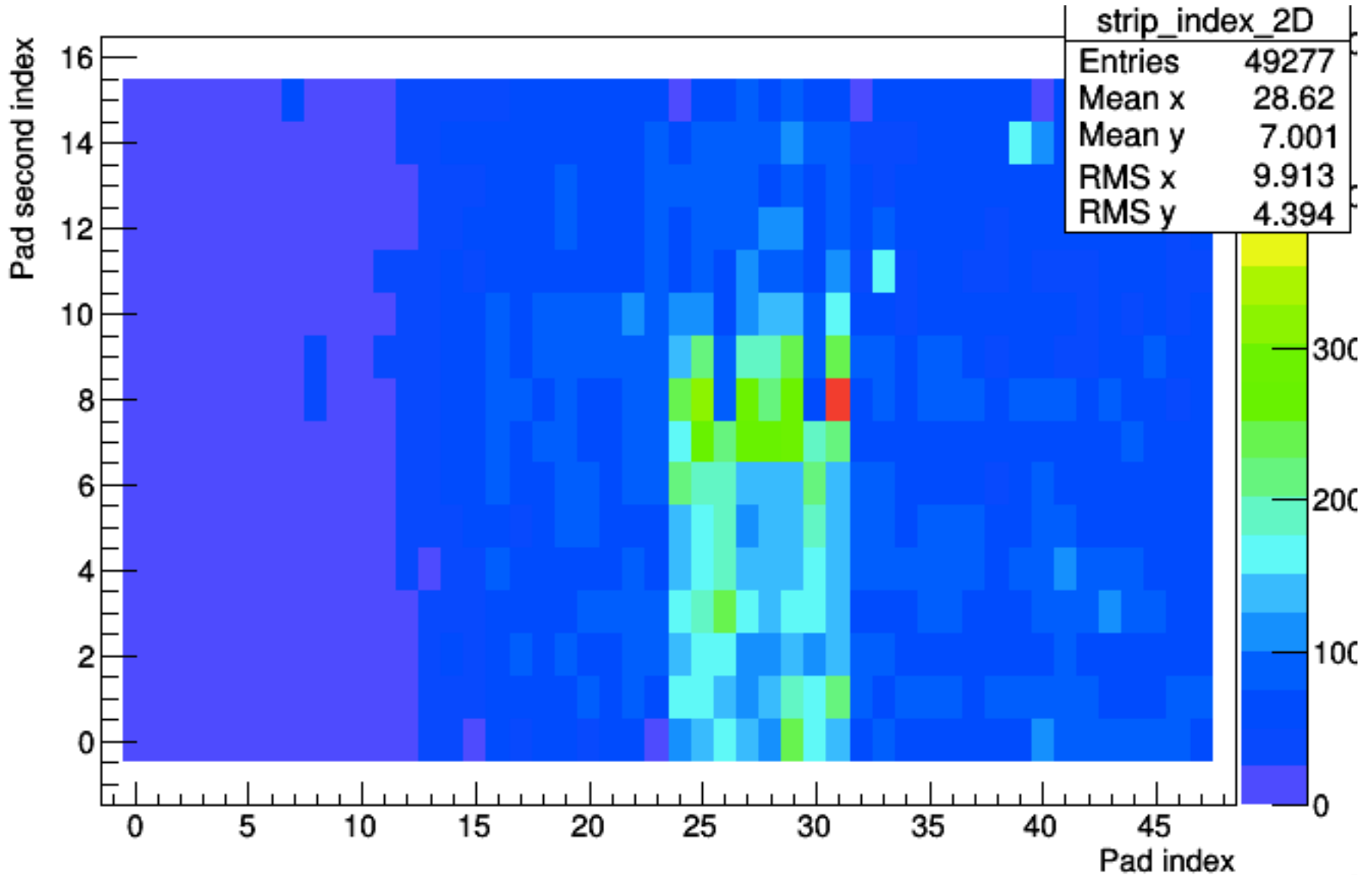


backup slides

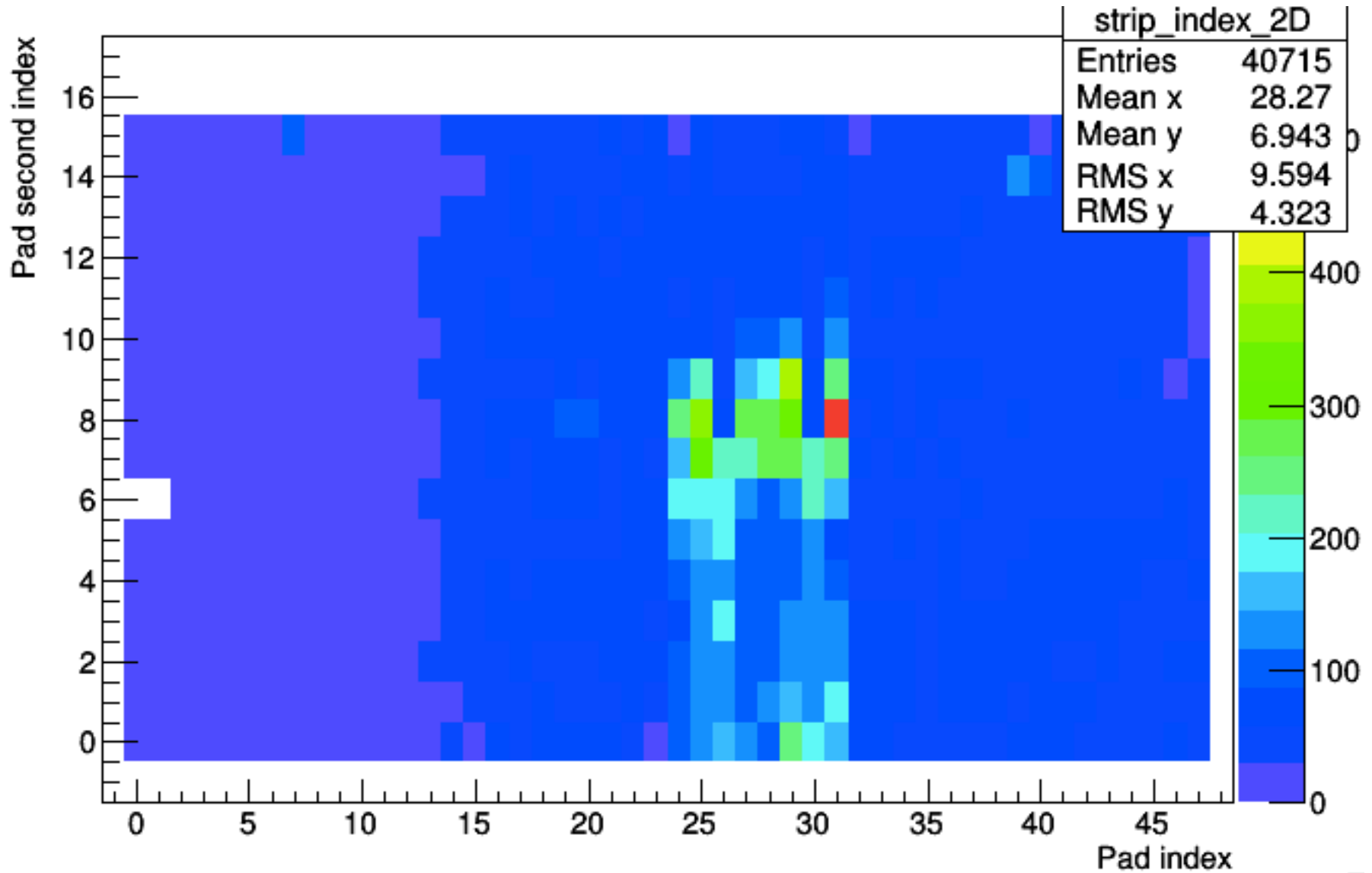
Centroid positions



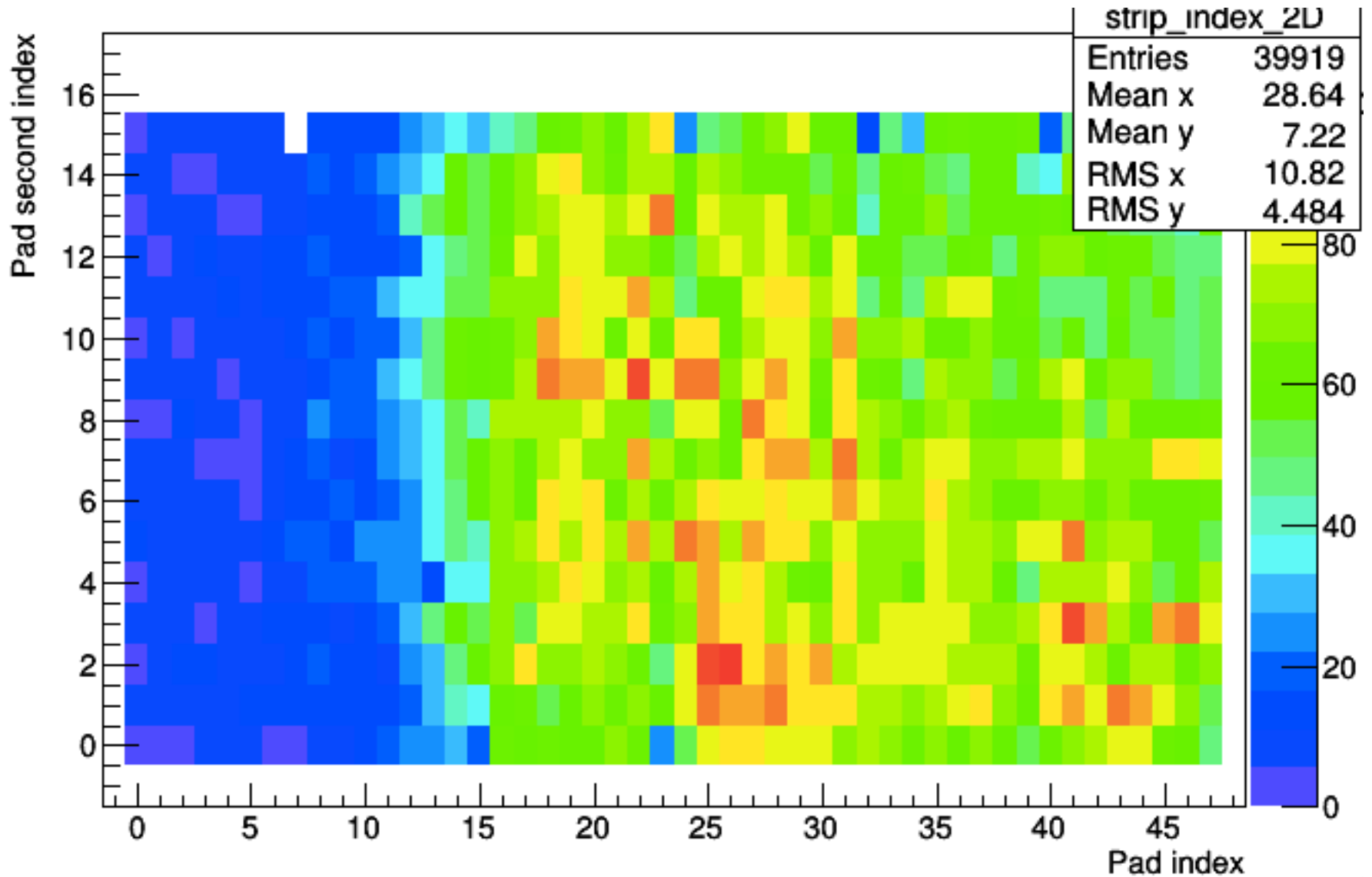
Hit map run104



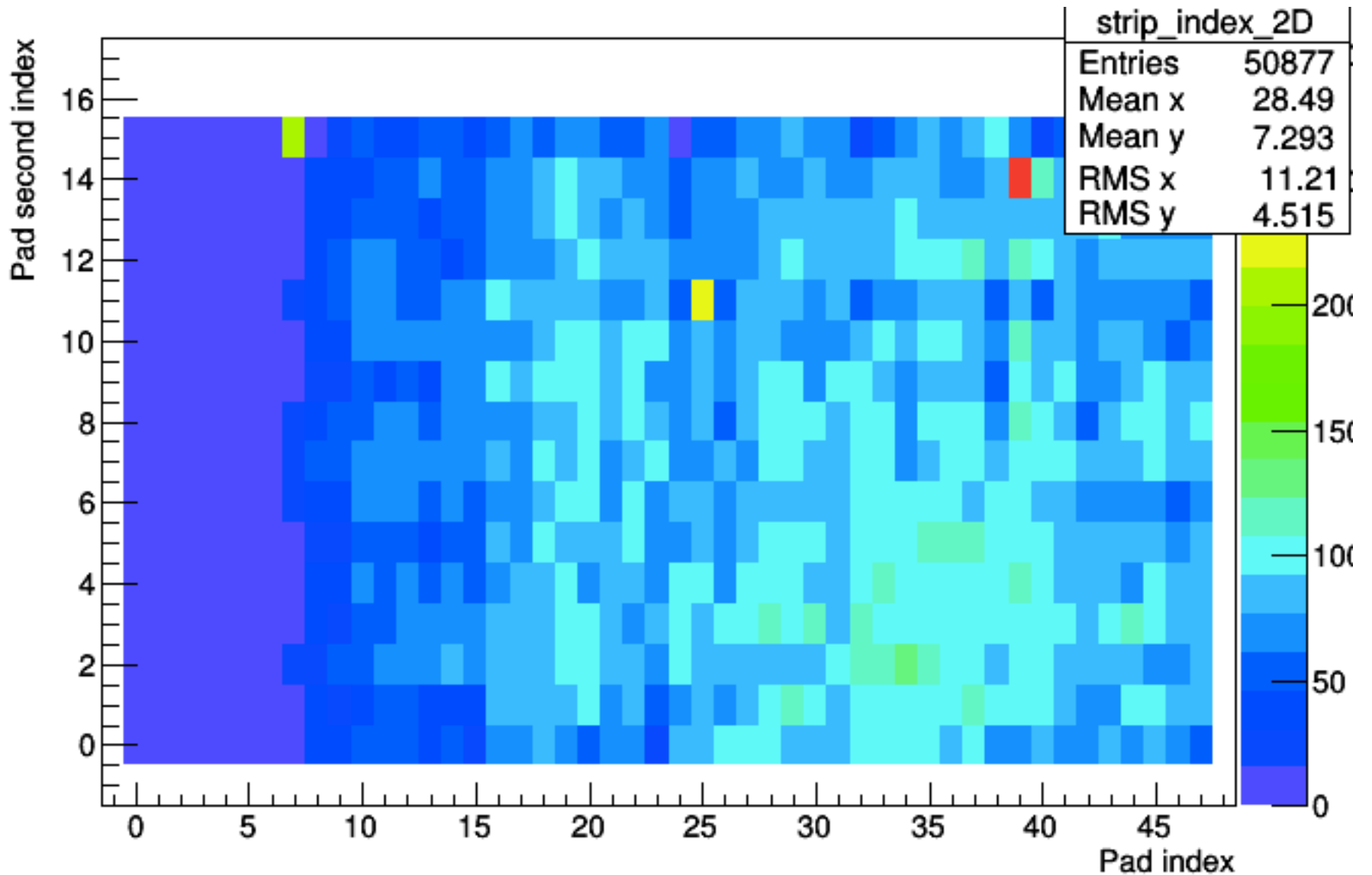
Hit map run110



run111



run 125



run 126

