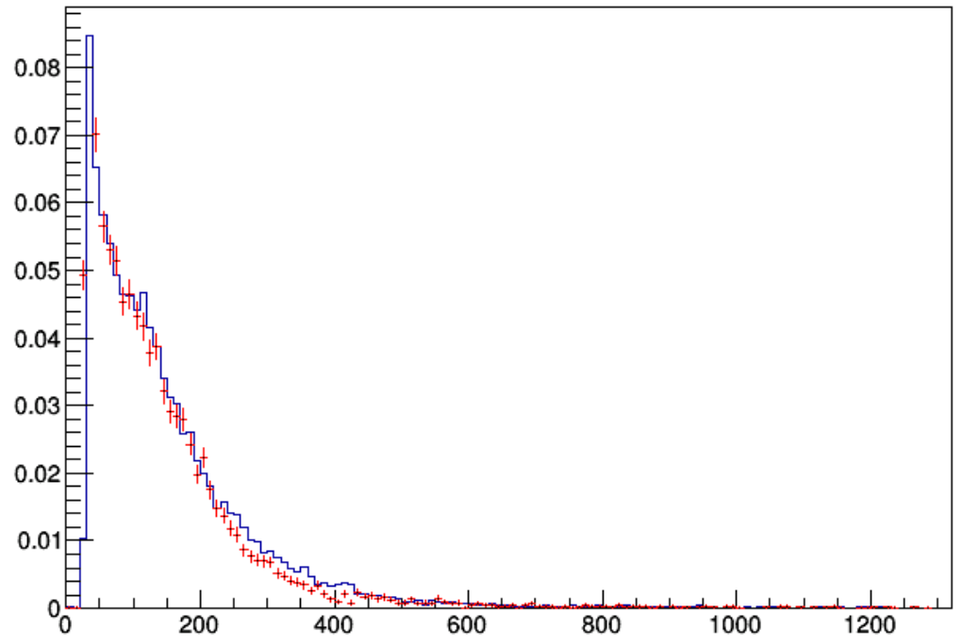
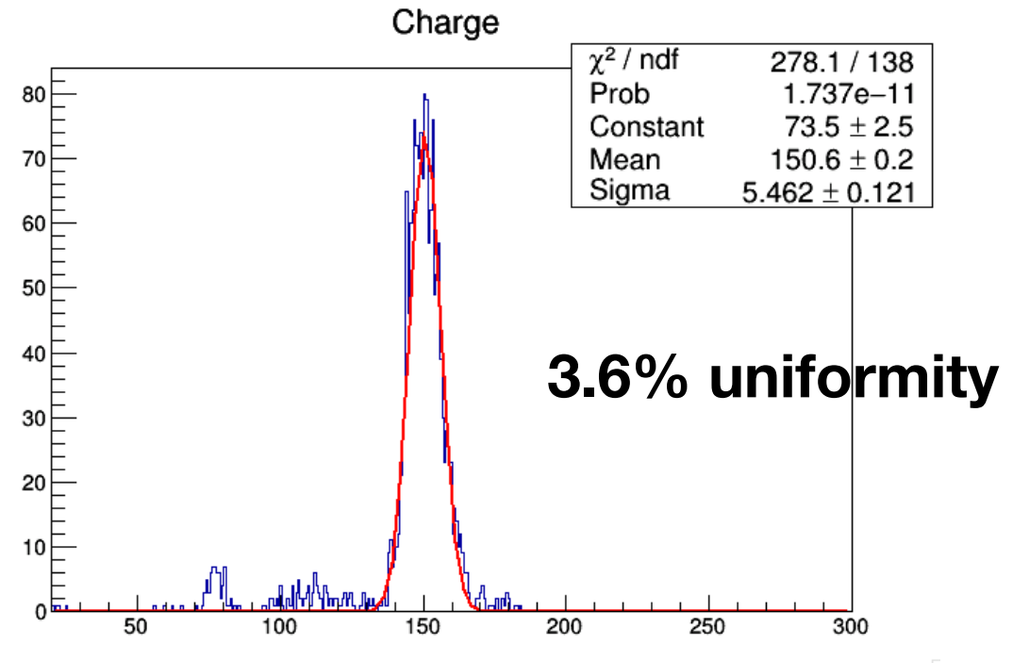
MM gain uniformity

Claudio Giganti

Selection

- Cosmics from several runs (from 386 to 412)
- Select only vertical tracks crossing the entire TPC
  - |Xtop - Xbot| < 3
- Look at the charge deposited on each pad
- Take the average

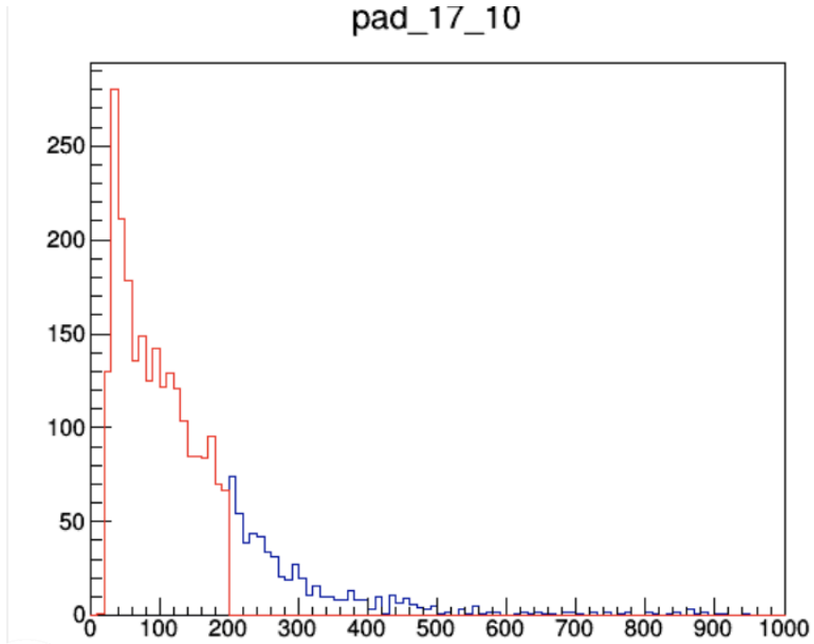




3.6% uniformity

Effect of the tails

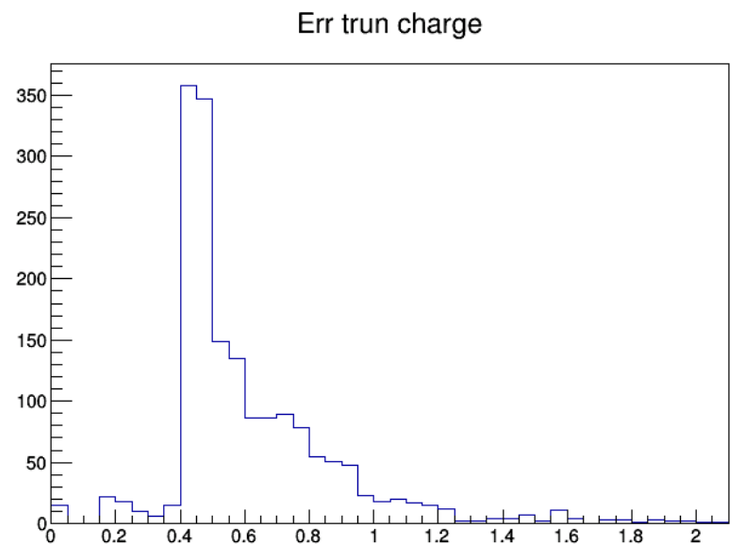
- To avoid large fluctuations in the tail I took only the 80% of the hits with less charge and compute the average



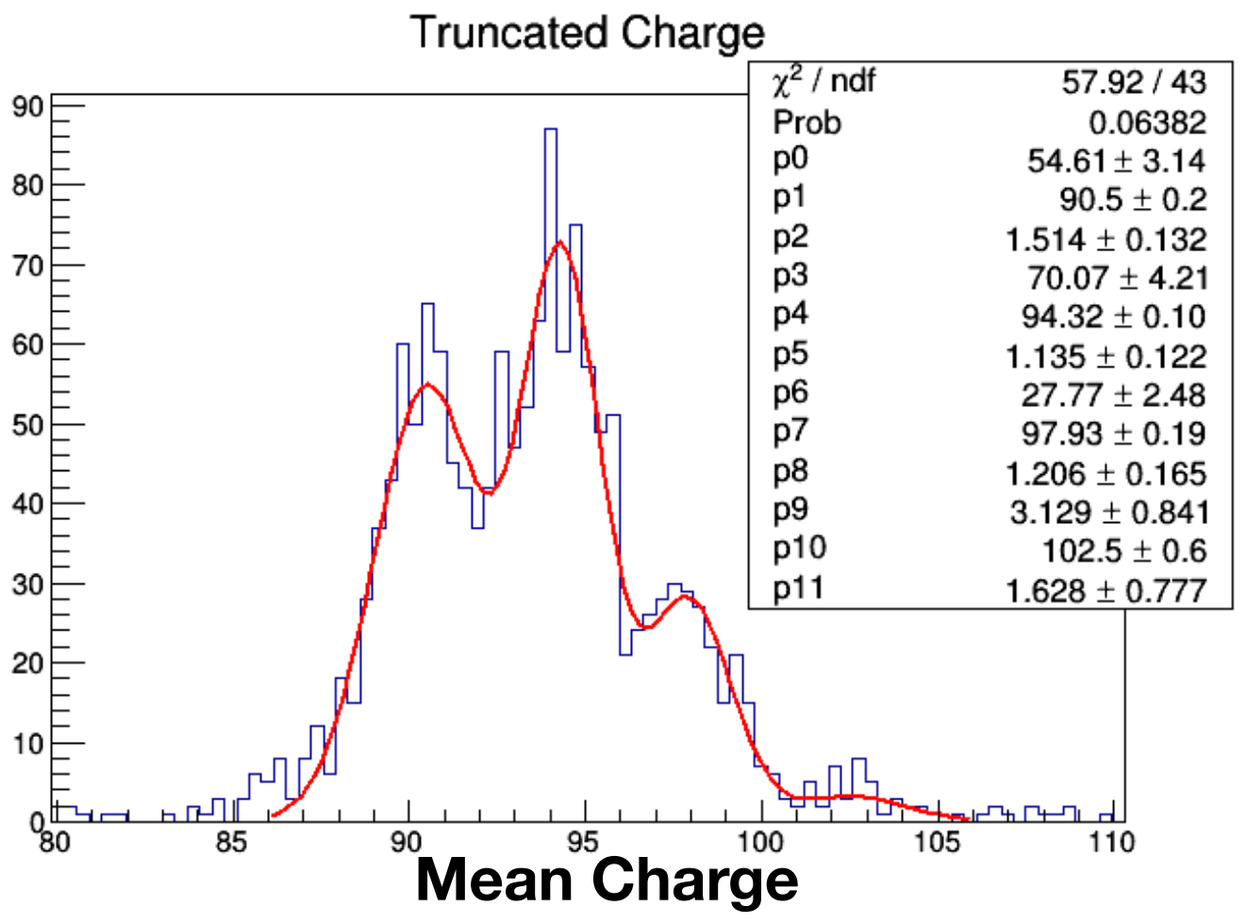
- By doing this we recognize different population for the pads
  - We can fit with 3-4 gaussians

- The sigma of each gaussian is ~1%

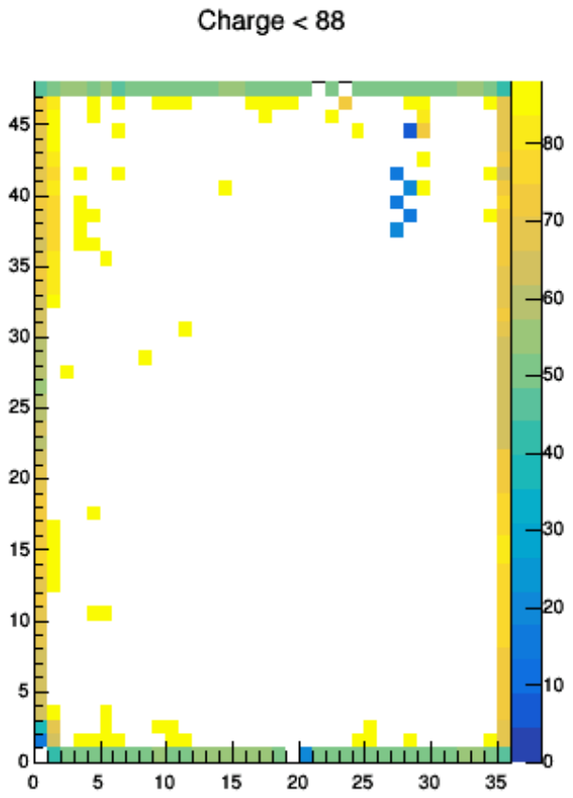
- Error on the mean of each pad is ~0.5%

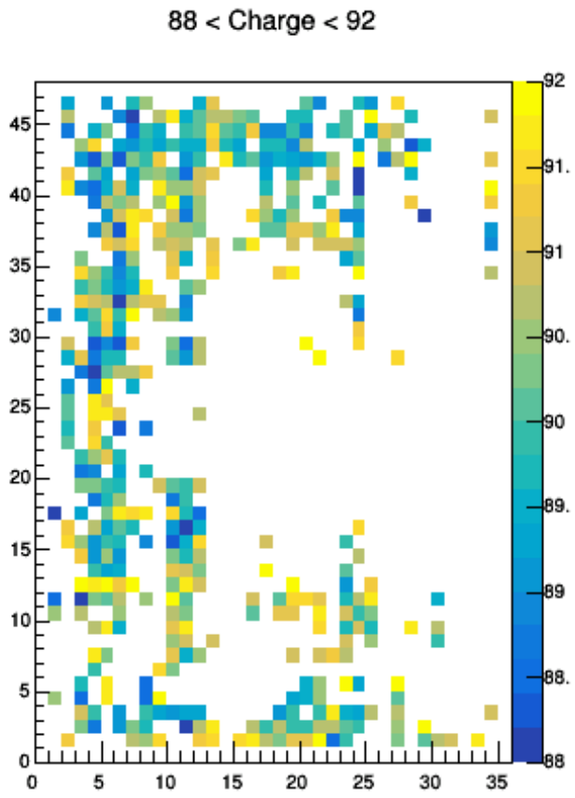


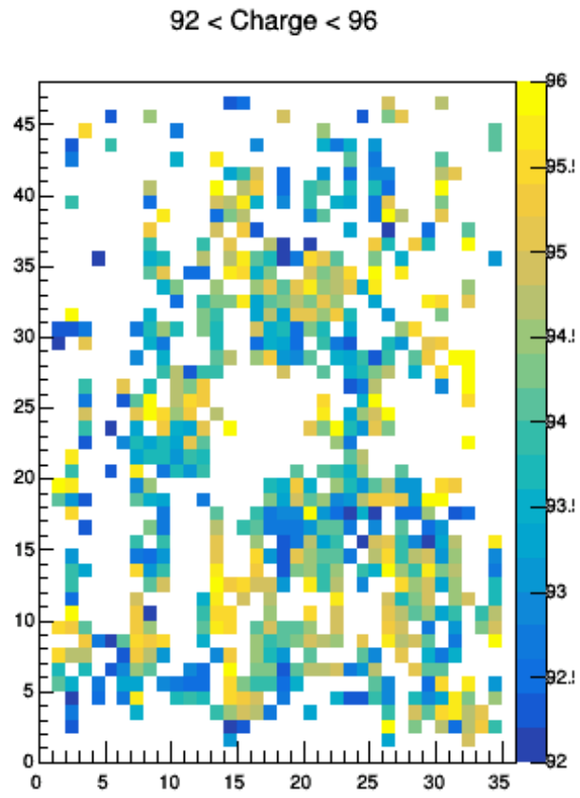
Error on the mean

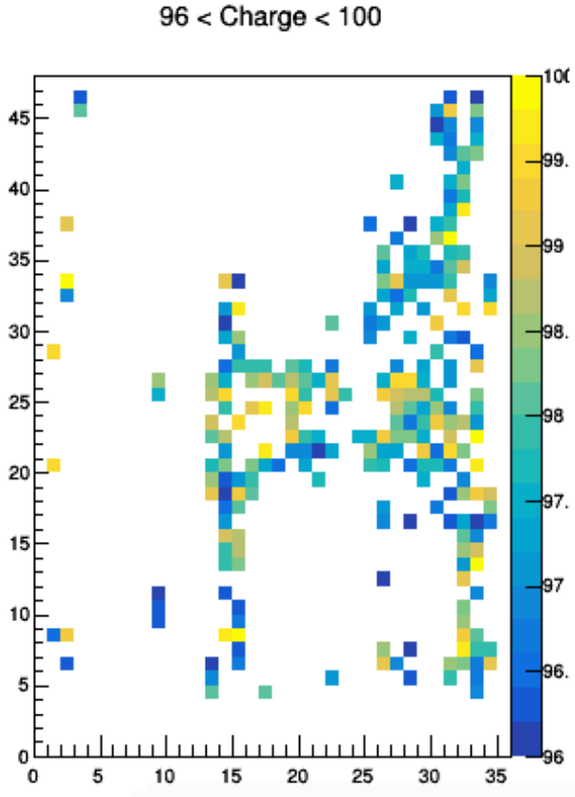


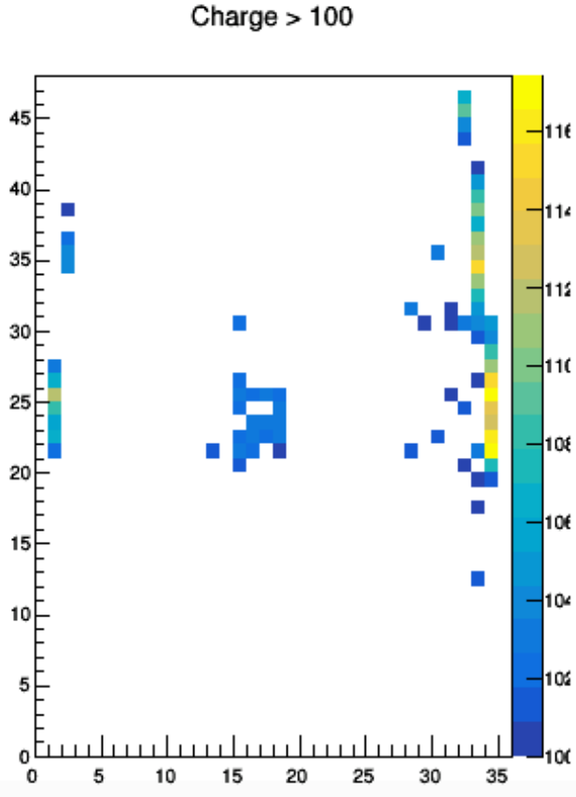
Mean Charge







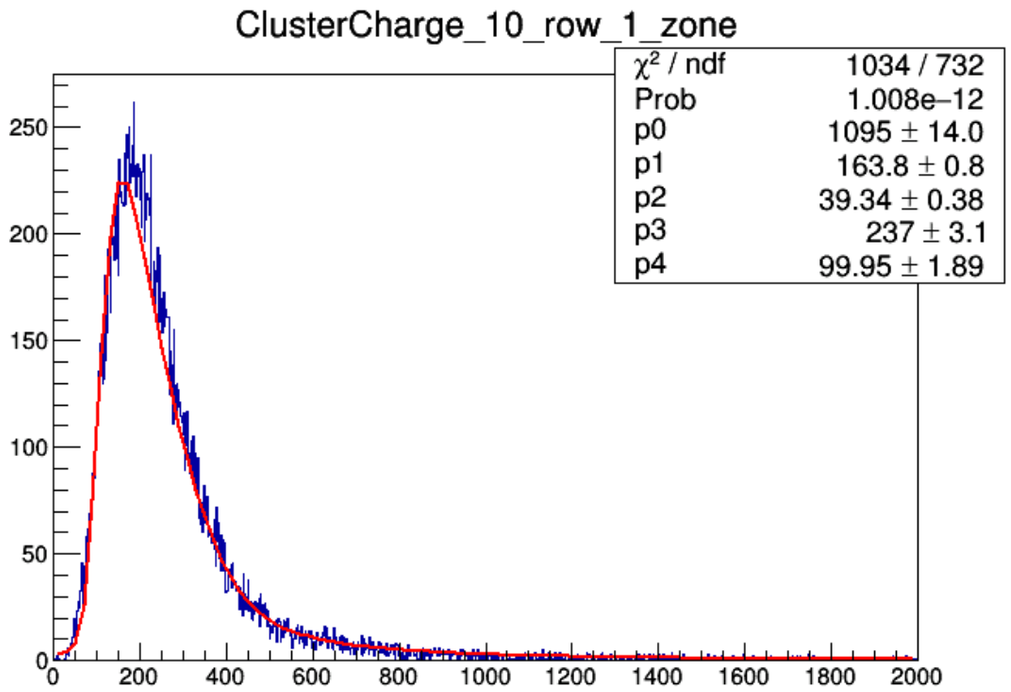




With some imagination
We see that different gains correspond
to different region in the MM

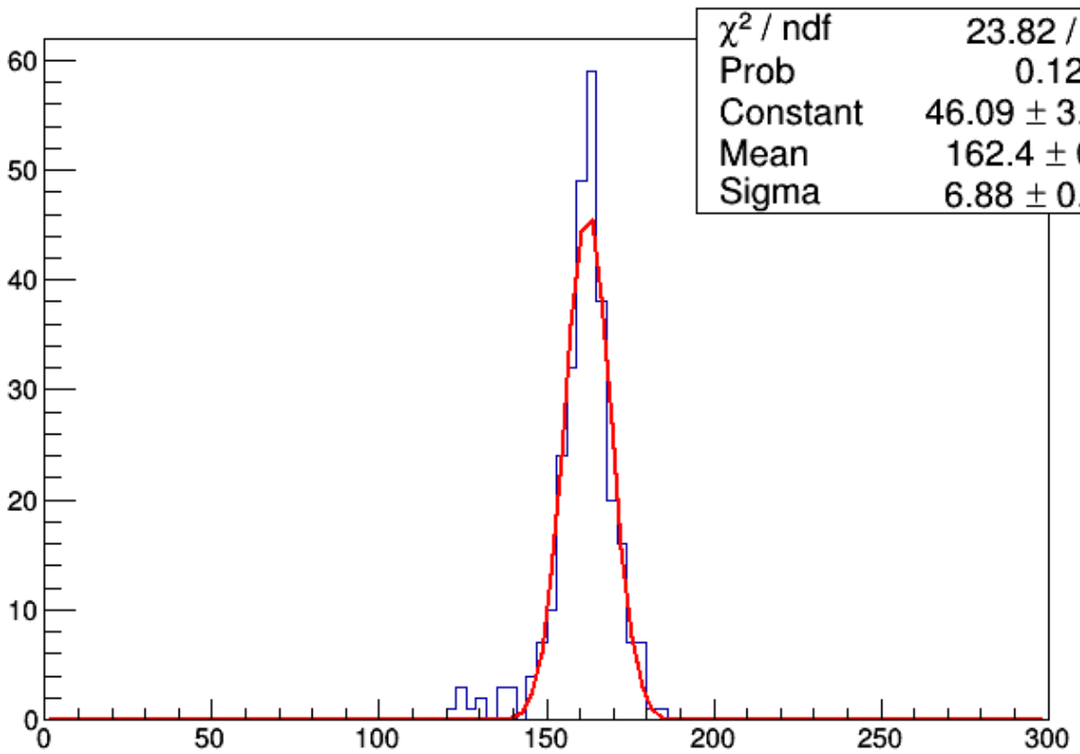
Charge > 100 we have some contamination
from the source

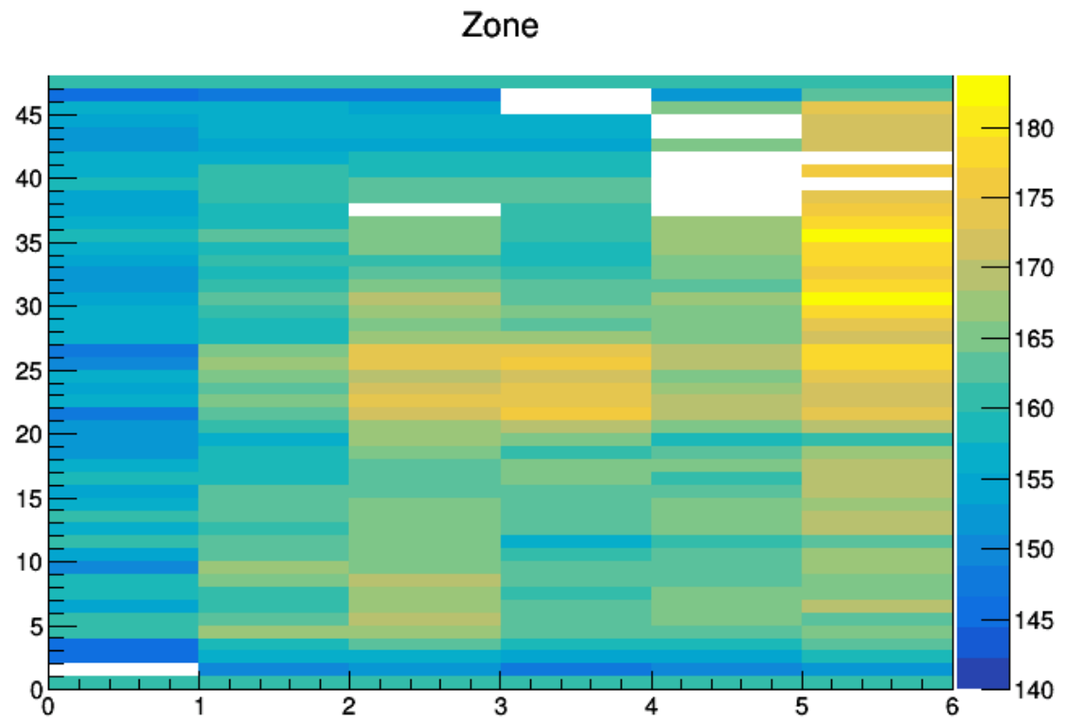
Clusters



- Another possibility to study the gain uniformity is to use clusters
- In this case I took the charge per cluster for each MM row and divided it in 6 different regions in X
- We fit the distributions with a convolution of a Landau + Gauss
- Took the MPV

Most Probable Value





- Uniform within 4%

- The pads on the left have a smaller gain then the one on the right as in the case of the charge per pad

Conclusions

- The MM gain was uniform within ~3% (except for the pads on the edge as expected)
- By removing the tails we obtain a better measurement of the gain
- Identify non-uniformities in the gain populating different regions of the MM
    - 3 gaussians with a sigma of ~1% each and mean value differences of 2-3%