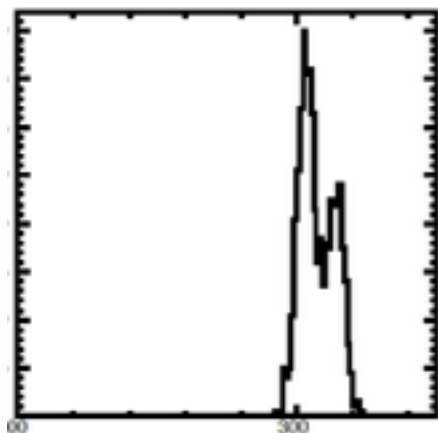


First Look at MIP Signals

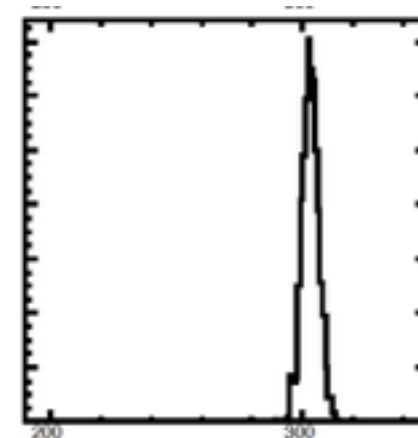
Sandhya Jain, Gobinda Majumder

Started looking at muon run at 150 GeV (0361), dif0 layer and channels only in the first buffer (nSCA = 1).

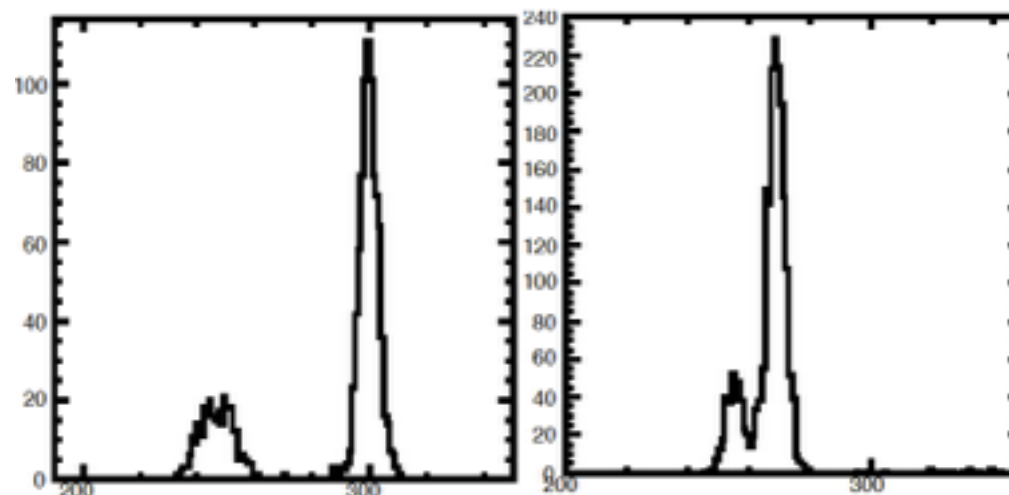
We know we had channels with re-trigger effect. To get rid of that, we removed BX altogether if re-triggering happened from BX+1, BX+2 or BX+3.



after removing retriggering effect, nice gaussian



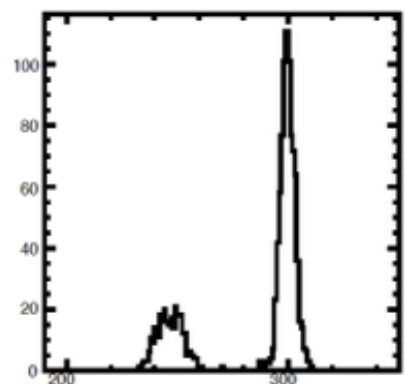
Many channels still left with negative signals separated from pedestal peak - sometimes not so well separated as well.



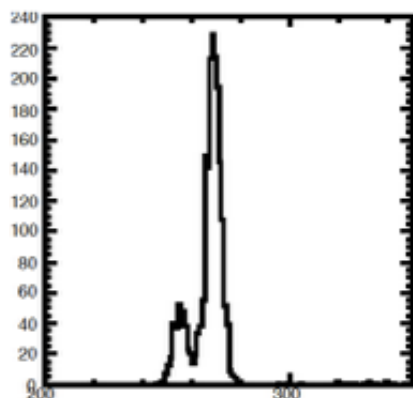
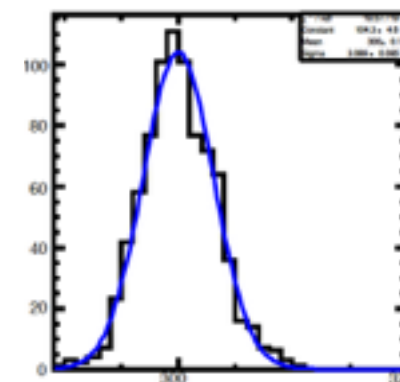


Pedestal extraction

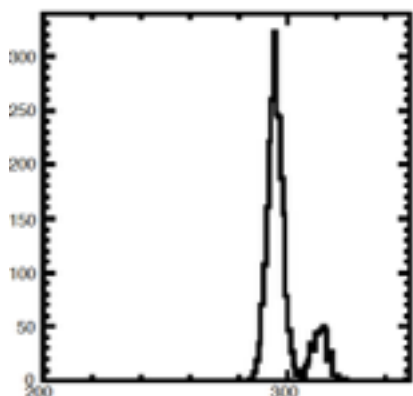
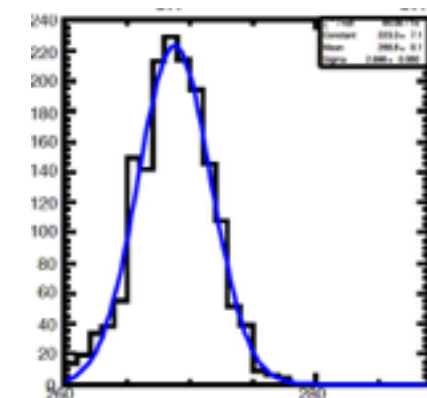
We need to get rid of these negative signals in first place to get rid of any bias these can produce on the pedestal calculation. What is done instead is looking for this double peak structure within ± 20 counts of the maximum of the histogram and fit the remaining distribution with gaussian.



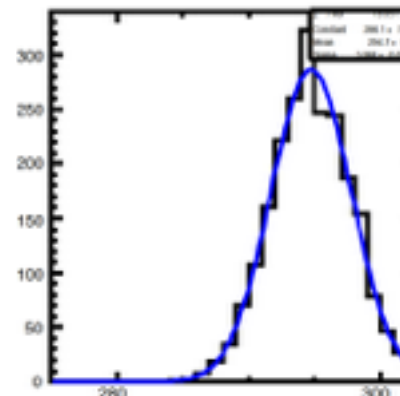
after finding this double peak, fitting it with gaussian



as soon as next peak is seen, fitting right part of it with gaussian



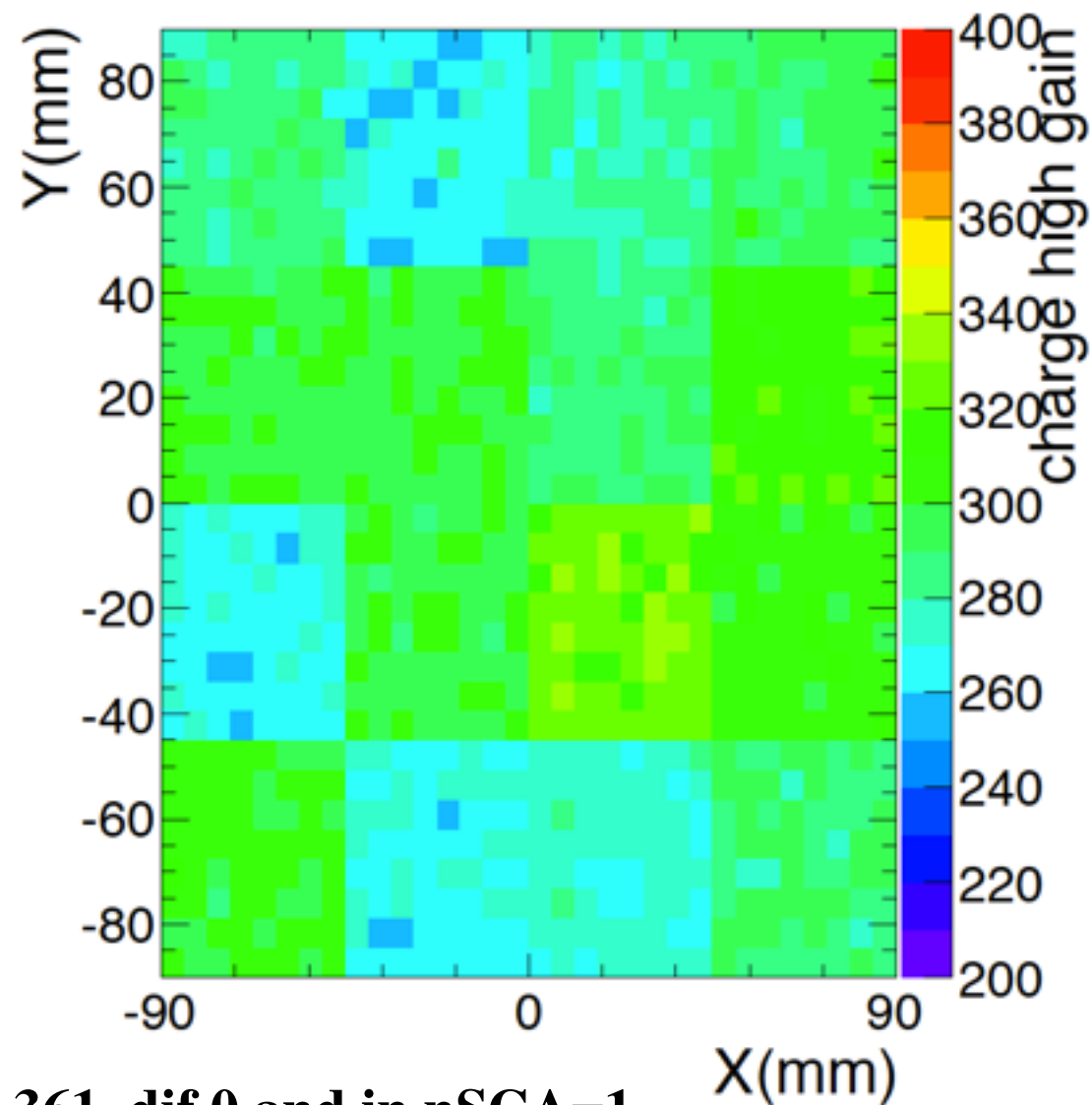
sometimes, some residual re-triggering effect is still seen on the positive side/or the MIP signal - removed and fitted in same way





Pedestal extraction - 2

This way, pedestal mean and rms has been scanned for various Muon runs taken for all the dif layers but only in first SCA: "0297", "0298", "0299", "0300", "0301", "0360", "0361", "0362", "0363", "0364", "0366", "0367", "0368", "0369", "0370", "0371", "0372", "0373", "0374", "0375", "0376", "0377", "0378", "0379", "0380", "0381", "0382", "0383", "0384", "0385", "0397", "0398", "0399", "0400", "0401", "0403", "0404", "0405", "0406", "0407"



Plotted here for run 361, dif 0 and in nSCA=1.

X, Y here is the position of the channels and z axis gives us the reported mean of gaussian for all the channels.



Signal Extraction

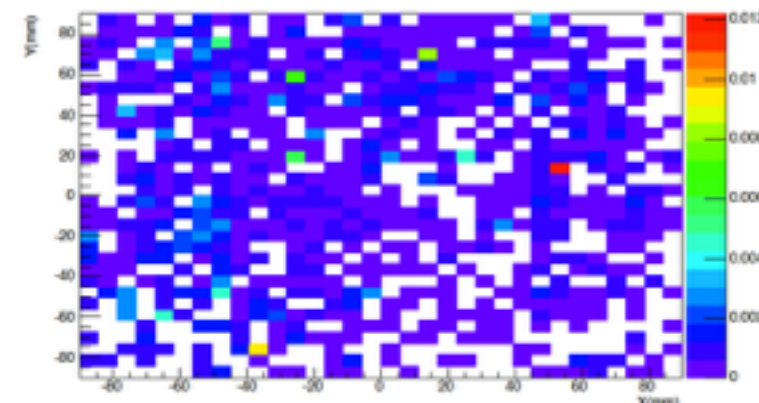
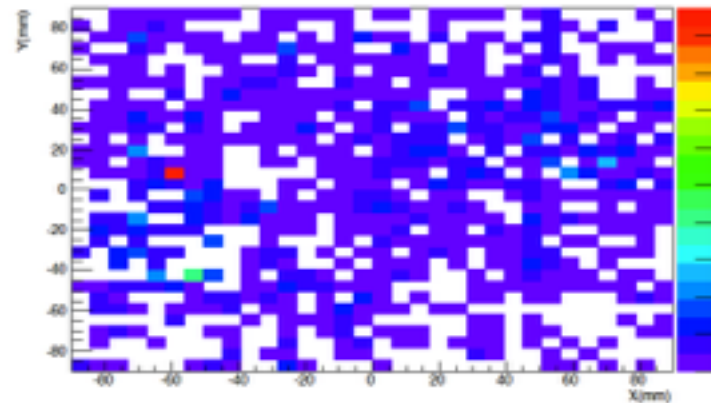
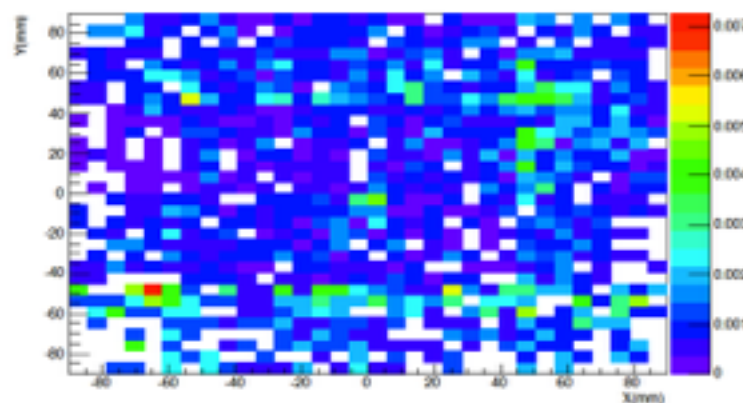
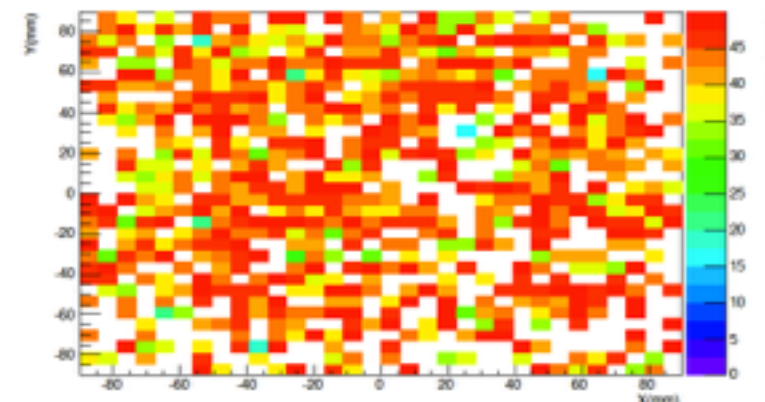
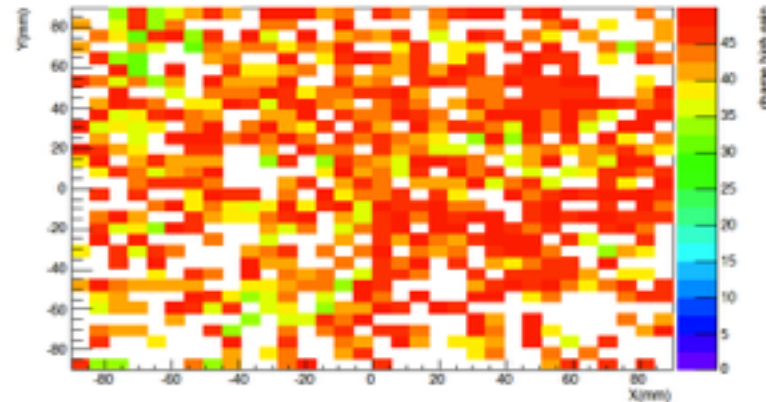
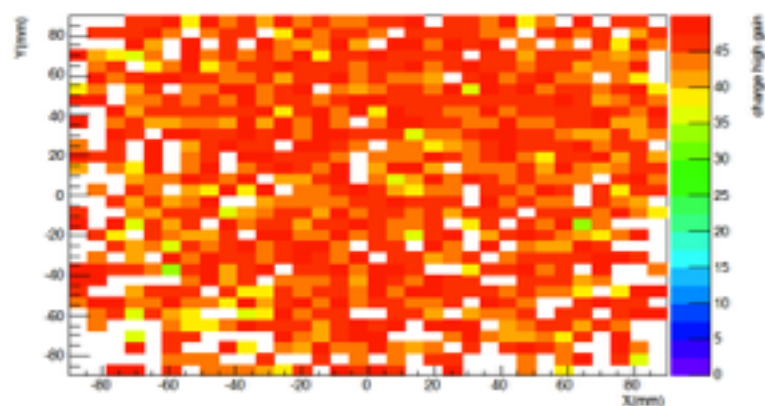
Having the information of the pedestal, we move forward to look for the MIP signal.

Criteria to have a MIP : 10 sigma away from pedestal (took reported mean and sigma of the gaussian for each channel). Sigma is generally between 2-4 ADC counts. Outliers are removed when ADC counts $>$ mean + 50 ADC counts.

dif1

dif2

dif0



Plotted here for run 361 in nSCA=1.

Top row shows the signal (ADC counts subtracted from the pedestal)

Bottom row shows the efficiency of number of events in each channel if a signal is seen. Clearly for this run, we don't have much statistics to be able to say anything concrete...



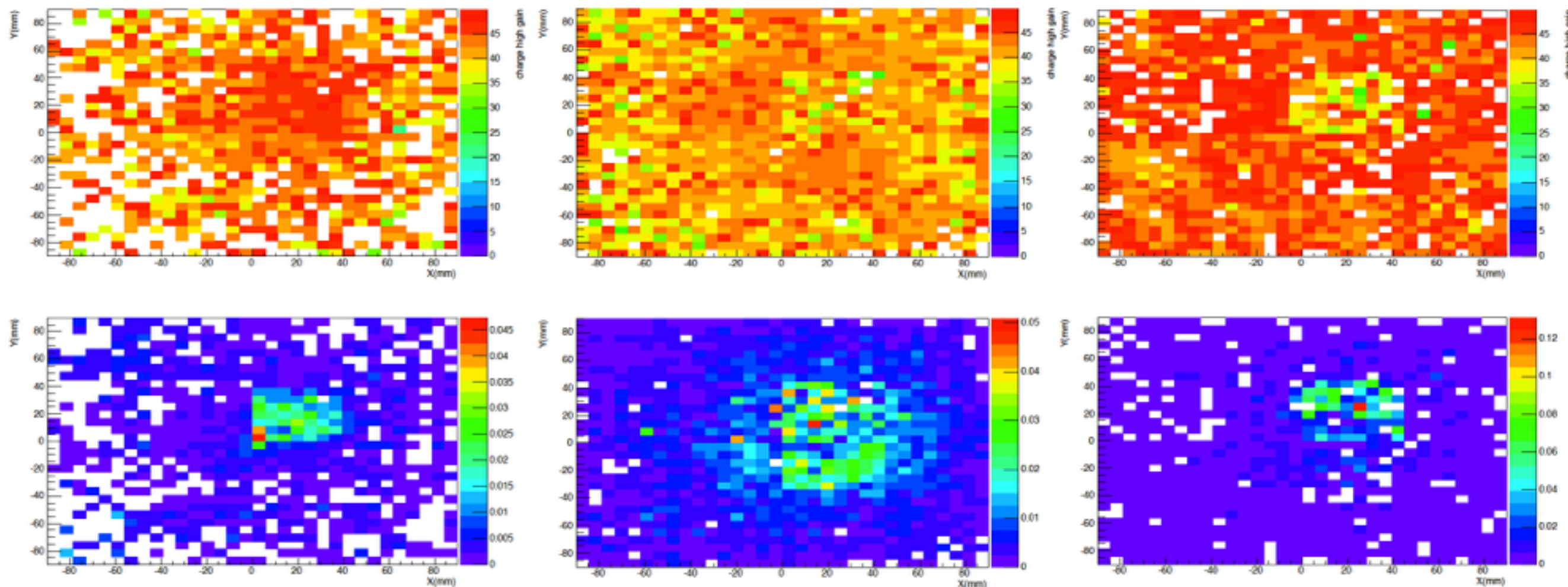
More runs scanned and signal seen

Plotted here for run 407 in nSCA=1.

dif1

dif2

dif0



From the bottom row, we clearly see some activity around the same region in 3 different dif layers and corresponding signal in the first row. Dif2 showing more activity.



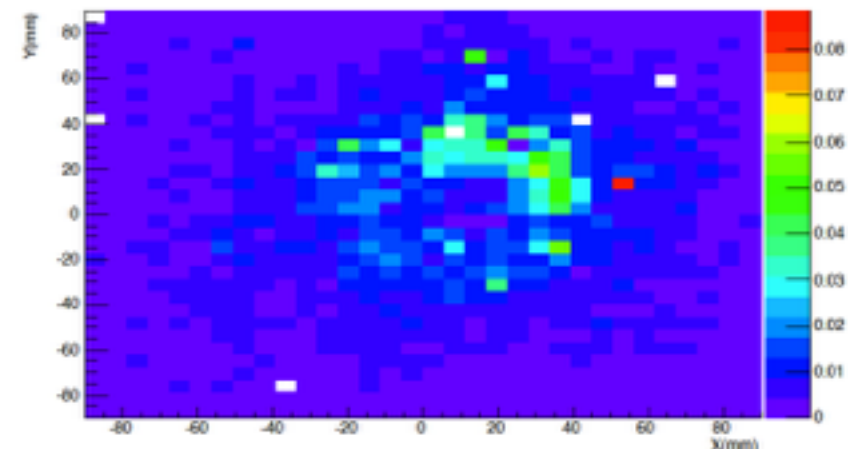
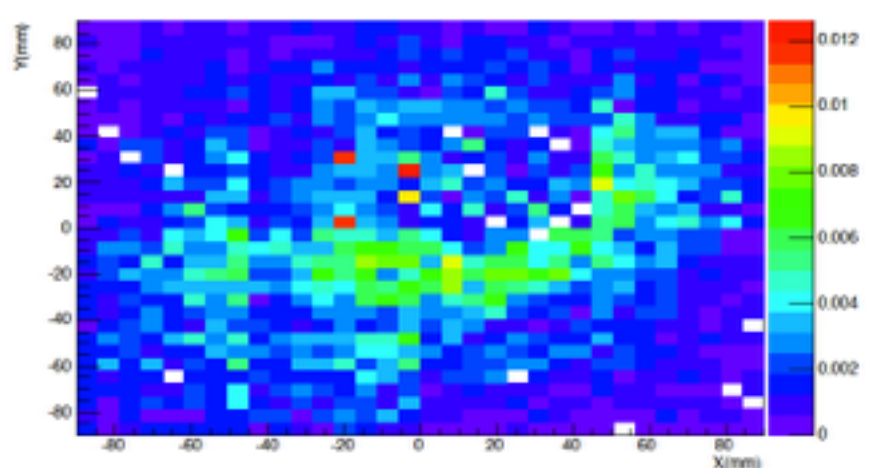
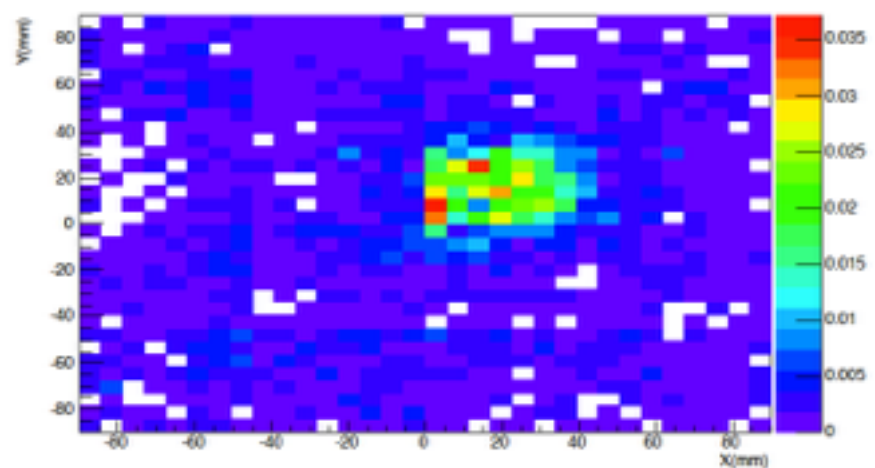
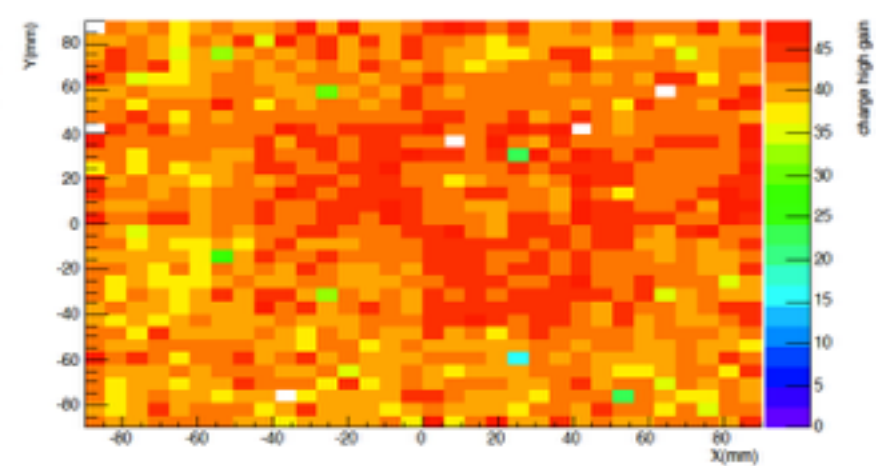
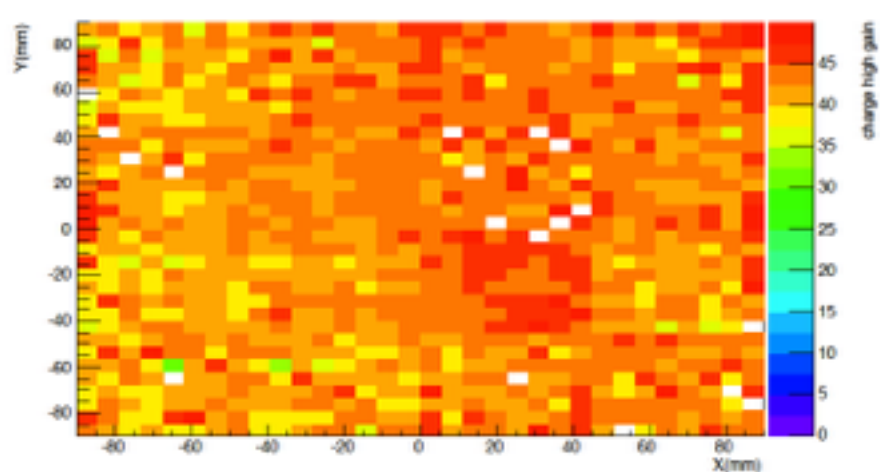
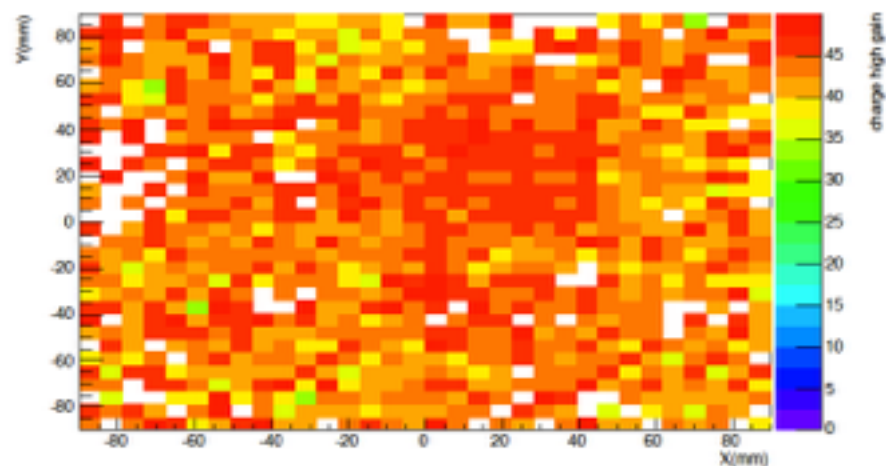
Signal seen

Plotted here for run 406 in nSCA=1.

dif1

dif2

dif0



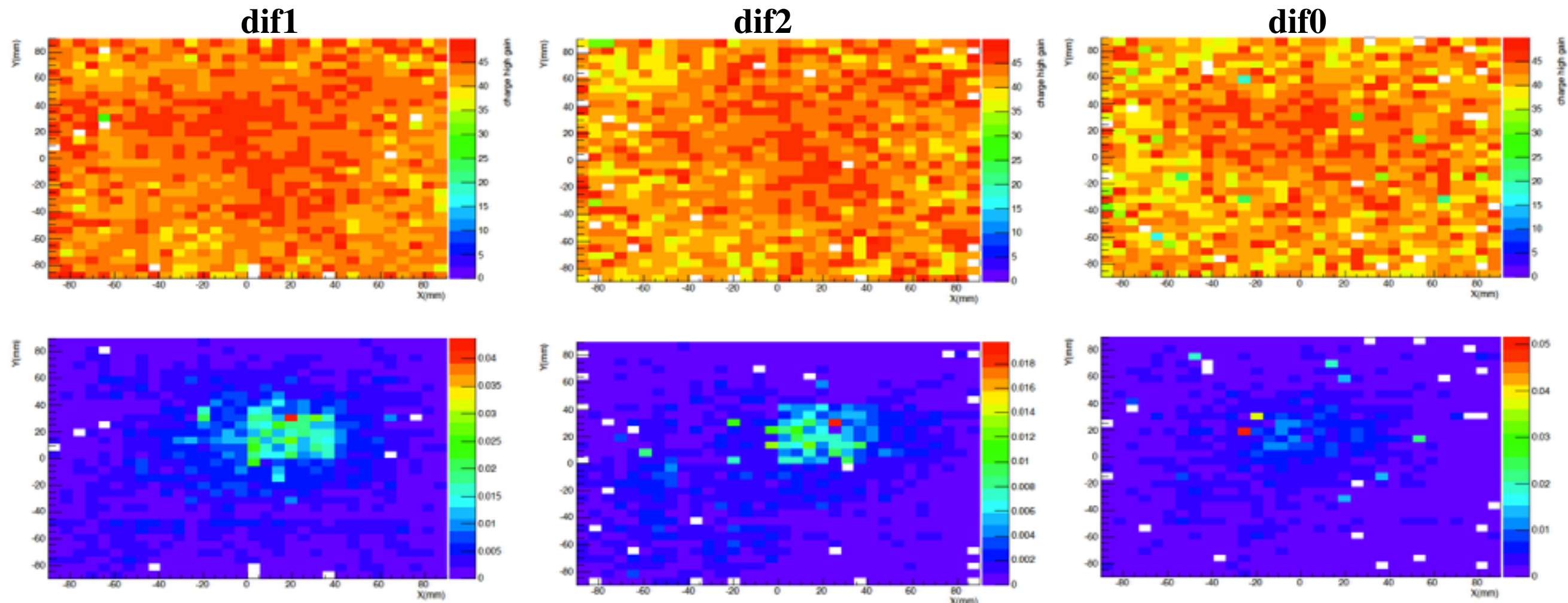
From the bottom row, we clearly see some activity around the same region in 3 different dif layers and corresponding signal in the first row.

Again, Dif2 showing more activity.



Signal seen

Plotted here for run 301 in nSCA=1.



From the bottom row, we clearly see some activity around the same region in 3 different dif layers and corresponding signal in the first row.

Dif 0 here shows more or less not many events.

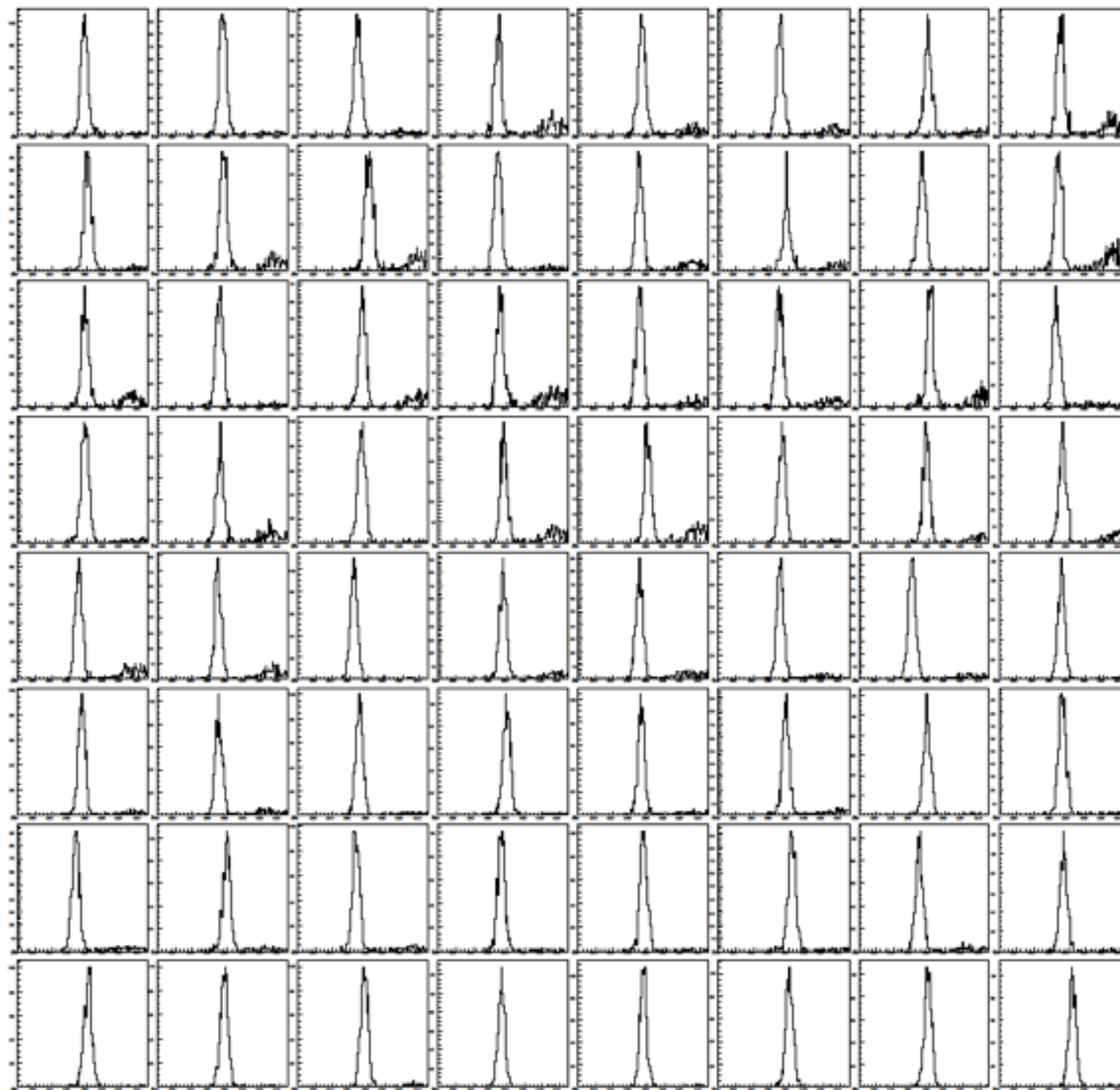


Outlook

- Look at the distribution of these signals in details.
- Scanned 40 runs so far, scan for “all” Muon runs.



ADC counts plotted here for run 407 in nSCA=1, chip =12, dif 0





ADC counts plotted here for run 407 in nSCA=1, chip =12, dif 0

