SiW ECAL
2017 Beam Test
Analysis meeting

- Data location: new converter
- Definition of retrigger trains
  - As a function of max of consecutive bcids
- Retriggers: time correlation
- Pedestal studies:
  - Stability vs retrigger definition
  - Stability vs time after val_evt
  - Homogenity
- MIP homogeneity

A. Irles, LAL, Orsay 27th July 2017

Tagging bad events: badbcid

- Converted Data location, MIPscans:
  - https://cernbox.cern.ch/index.php/s/E8QfjrsuhU7wFdE
  - Notice that might be outdated... wait until tomorrow morning for download
- Commissioning data:
  - https://cernbox.cern.ch/index.php/s/V5yKF53BqxtAvyb
  - Notice that the converted data is completely outdated !!
- New converter:
  - https://github.com/SiWECAL-TestBeam/SiWECAL-TB-analysis

Tagging bad events: badbcid

- New badbcid definition:
  - if sca+1 is filled with **consec bcid ==1**, but sca+2 not, then badbcid[sca]==1 && badbcid[sca+1]==2 (bcid+1 issue, events are not bad, just the next sca is bad)
  - if sca+1 is filled with **consec bcid**, and sca+2 also, then badbcid[sca]==3 && badbcid[sca+1]==3 (retriggering)
  - if sca+1 is not filled with **consec bcid**, badbcid==0

- Consec bcid for retriggers are not bcid+1 but bcid + X
  - RAW2ROOT.cc accepts the + X as input:
  - 5,15,30 studied.

- badbcid==0 → ok
- badbcid==1 → 1st sca of bcid + 1 (keep this for hits)
- badbcid==2 → 2nd sca of bcid+1 (do not keep it)
- badbcid==3 → if sca+2 is filled, retriggers (do not keep it)
- badbcid+=32 → events with ADC=4 (not keep them)

- Conservative approach with respect to the last two SCAs.

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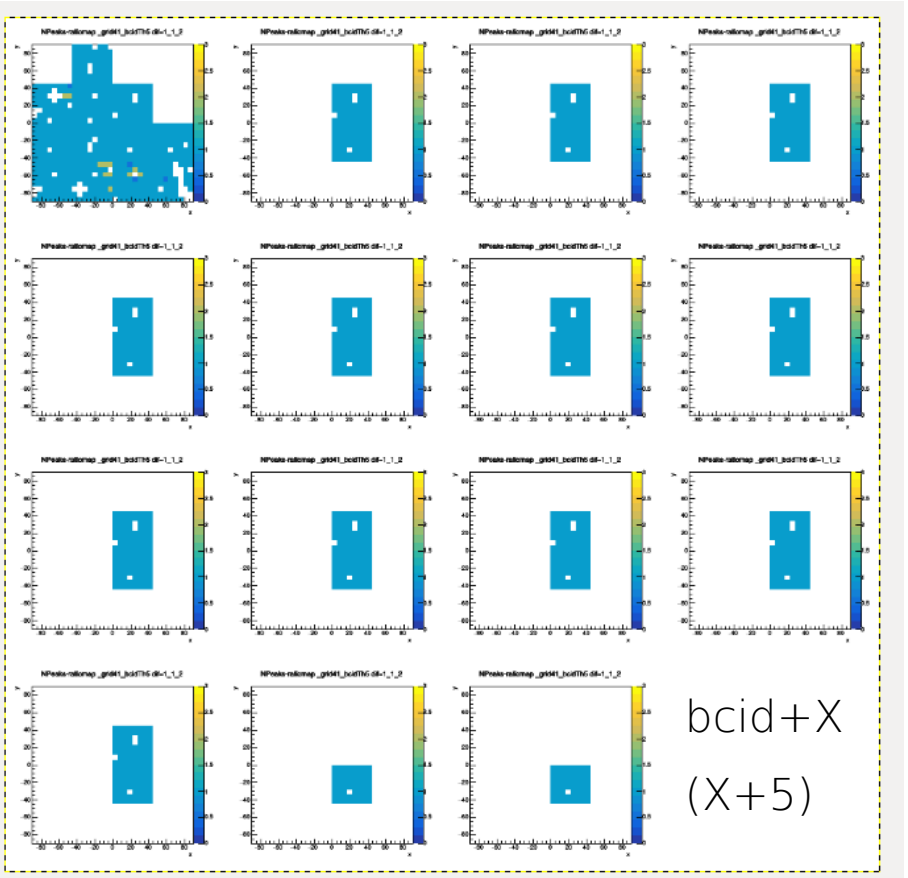
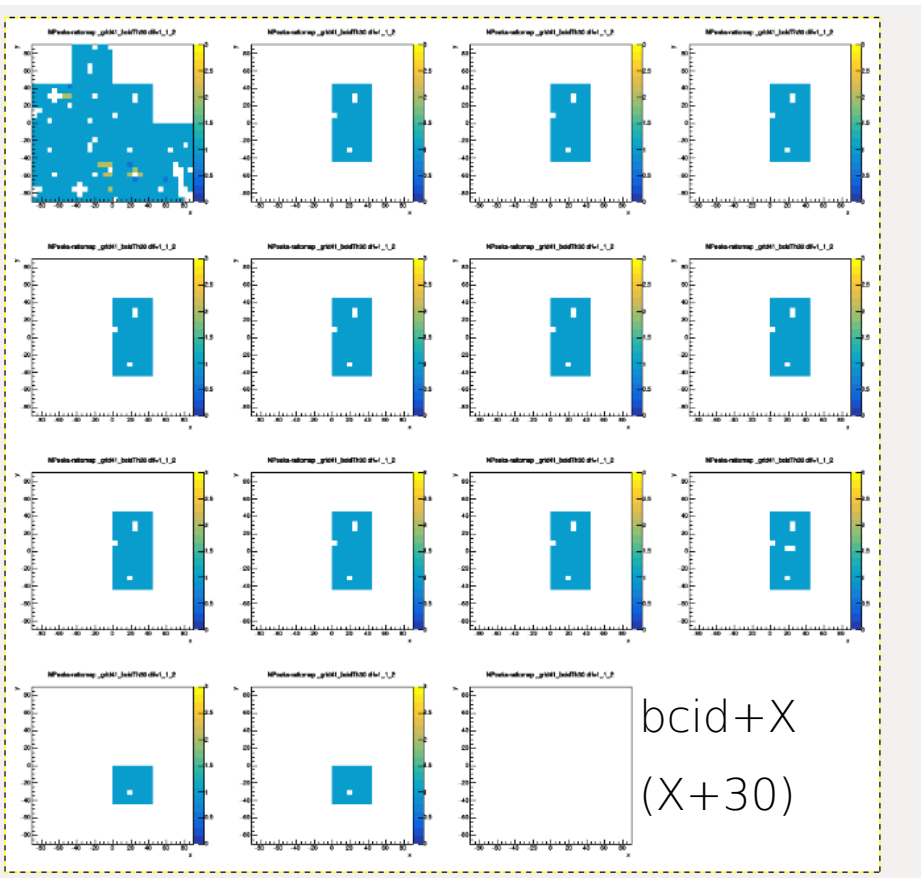
Pedestal distribution quality as a function of retrigged definition

- Npeaks of pedestal distribution after filtering. Dif_1_1_2, grid41, 14 SCA canvas





Pedestal distribution quality as a function of retrigged definition

- Npeaks of bad events pedestal distribution after filtering. Dif_1_1_2, grid41
- Both look quite reasonable:
  - In the beam spot (chips 3, 10), the population of double peaks is zero
- Compromise: bcid+X where X+15

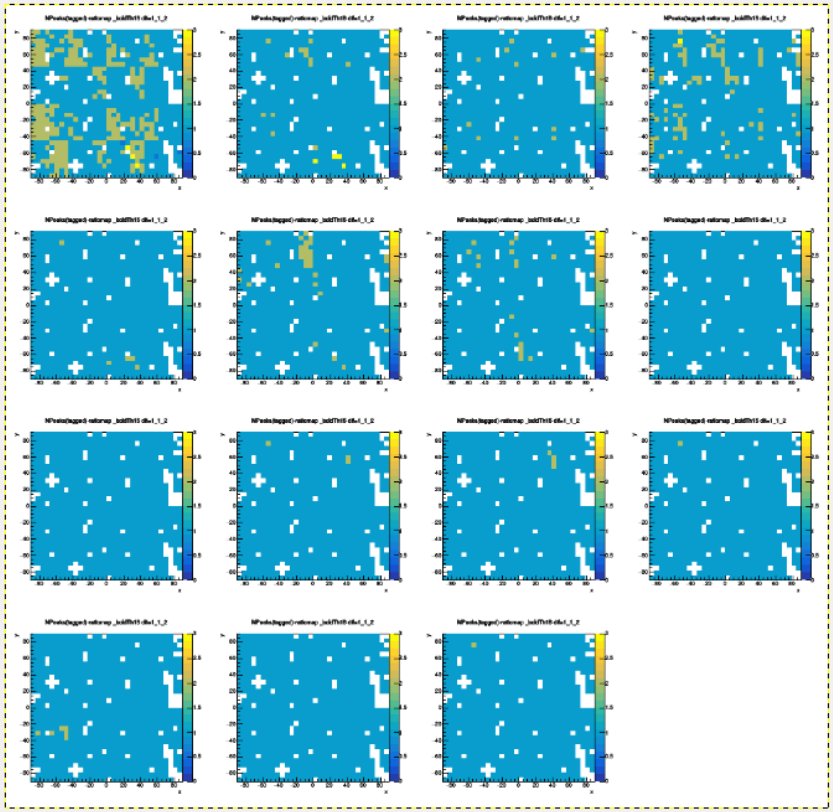
bcid+X (X+5)

bcid+X (X+30)

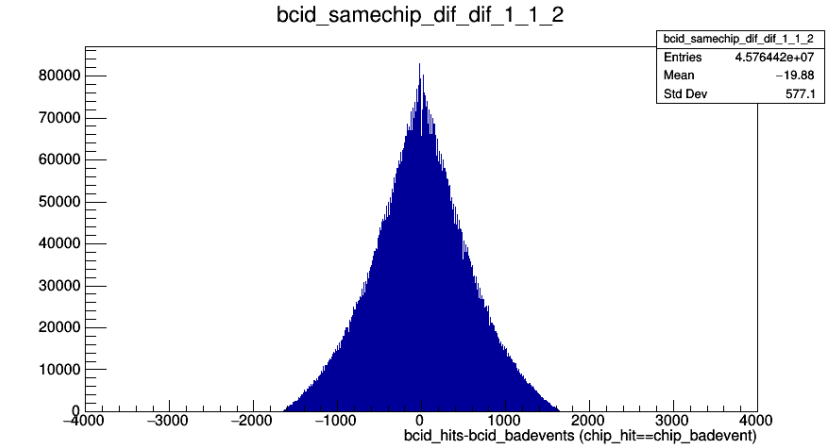
Pedestal distribution of tagged as bad events

- Npeaks of bad events pedestal distribution after filtering. Dif_1_1_2, all grids togethersise: bcid+X where X=15, 14 SCA canvas
- Notice the “funny” zig-zag structure on

  SCA = 0

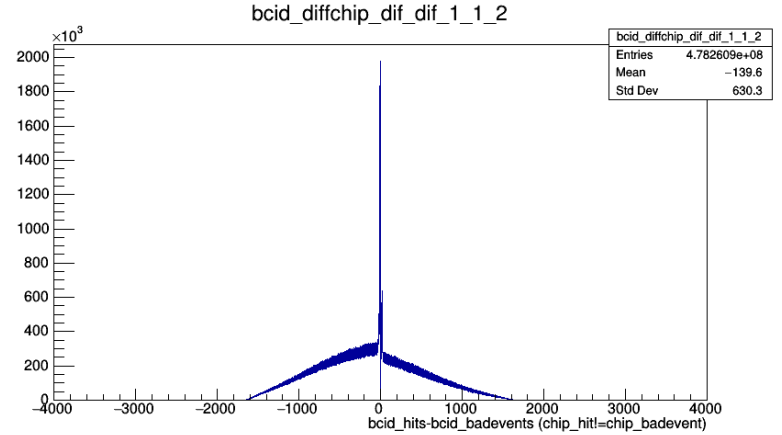


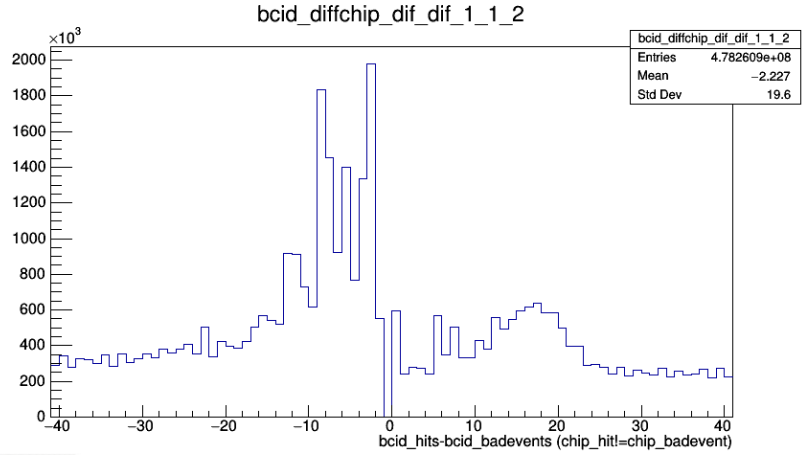
Retriggers: time correlations



- Dif_1_1_2, grid41
- Selection:
  - Good hits are selected firstly.
  - Then, bad hits are search in **THE SAME chip, different channel** were the good hit was generated
  - bcid are compared (within a spill)
- Badbcid == retrigger and/or plane event
- In the same chip, there is no correlation between triggers and following retriggers
  - Gaussian shape

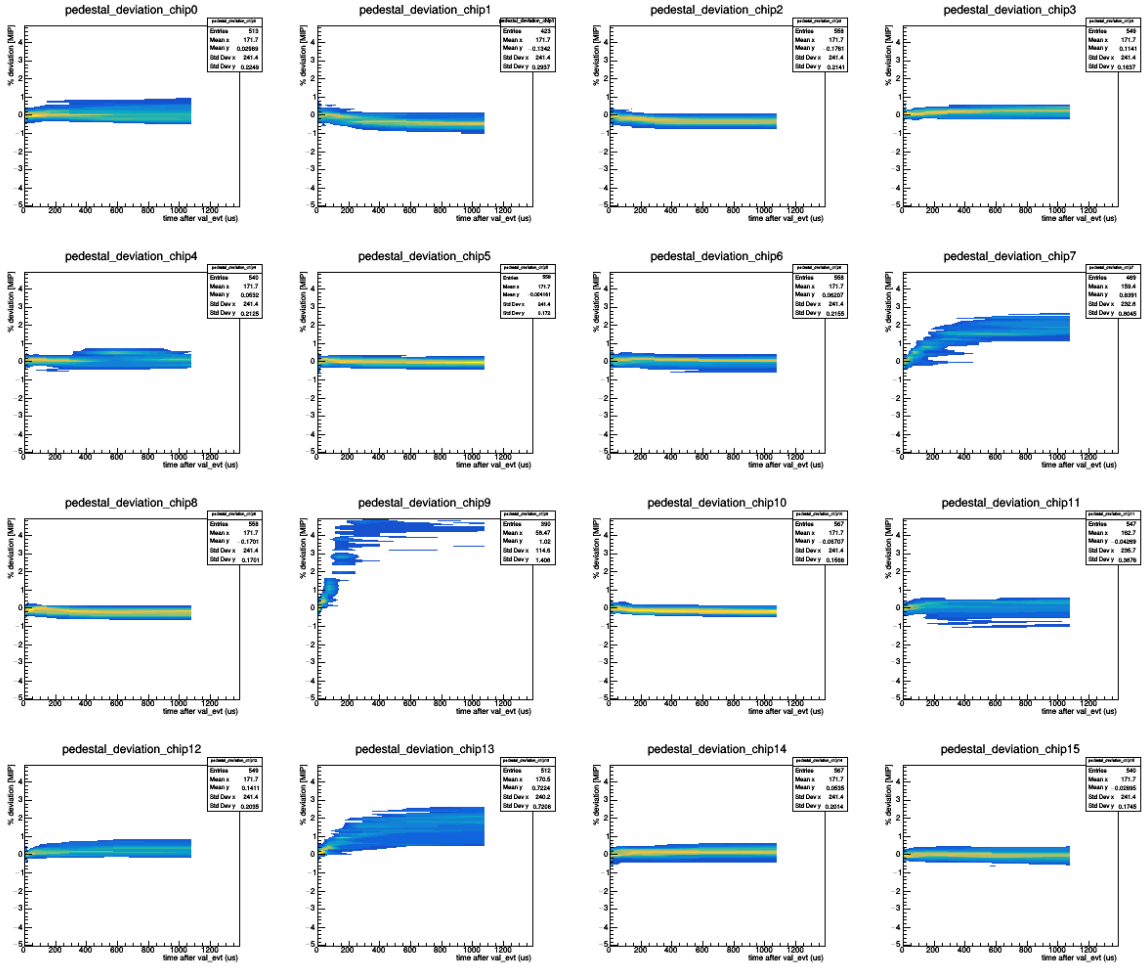
Retriggers: time correlations





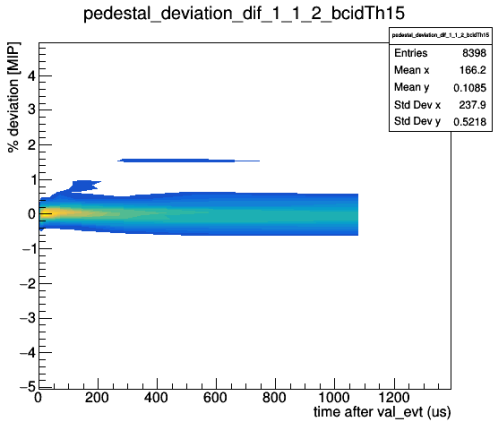
- Dif_1_1_2, grid41
- Selection:
  - Good hits are selected firstly.
  - Then, bad hits are search in **A DIFFERENT chip** were the good hit was generated
  - bcid are compared (within a spill)
- Badbcid == retrigger and/or plane event
- Pattern: 3,6,9,12,15 bcids after a hit, we see retriggers in other chips
- Also a bump of bad events happening before the good hits ?
  - To be understood.

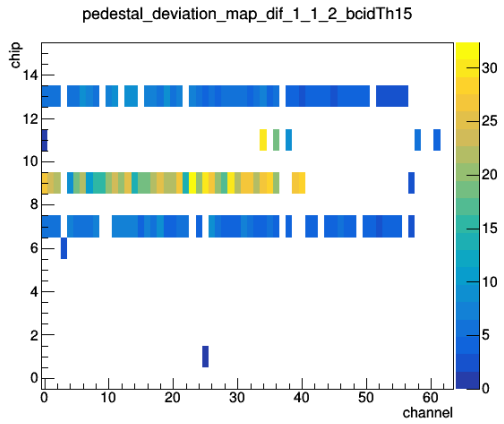
Pedestal stability within spill

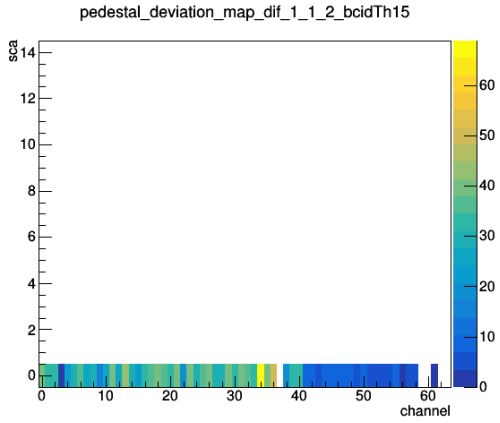


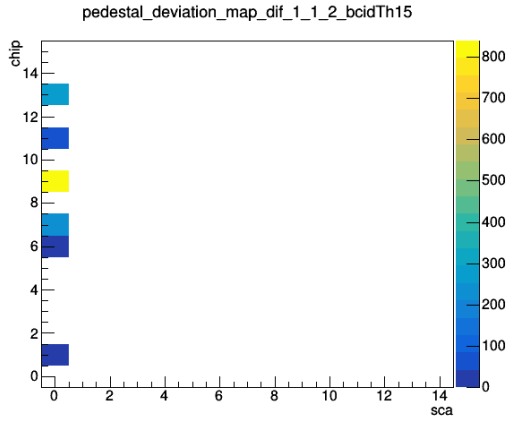
- Calculate for different bins of bcid, the pedestal mean and compare with the first bin.
- Contourn plot for all chips (including all channels/SCA)
- Deviation shown in % of MIP units (asumming MIP=70ADC)
- Chips 7,9, (13?) show large deviation (but low stats for these ranges of bcid.
- In total, not big impact → next slide

Pedestal stability within spill



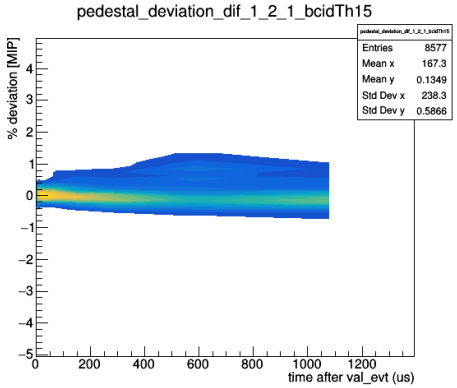


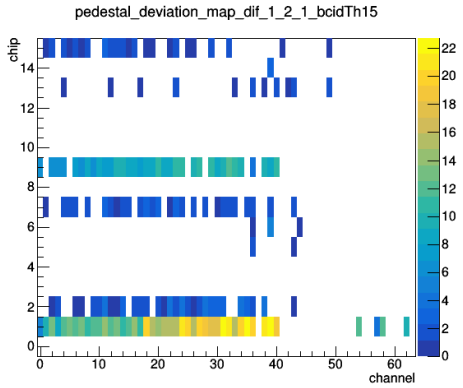


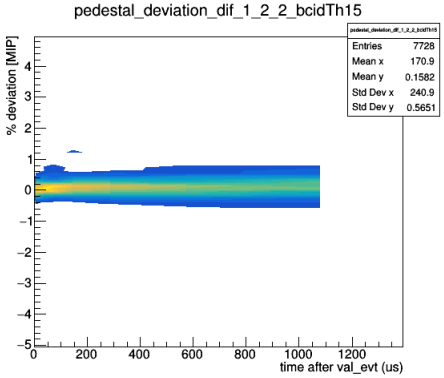


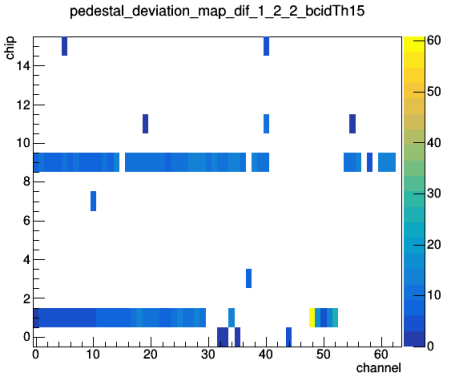
- Contourn plot for all chips/chn/sca together
- Also, plots showing where the deviations of >|2|% are produced
- Located in chip 9. What about other slabs ? Looking on all the other slabs, it seems that chips 1,9 (where ADC=4 are located!) are worst.
- Problems only in SCA=0

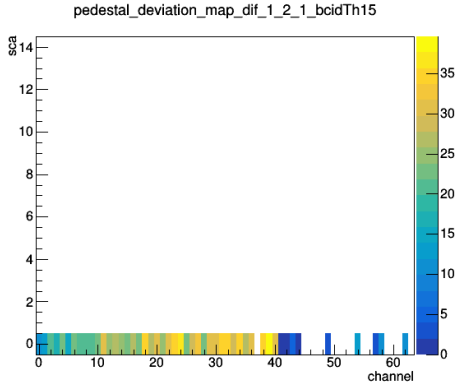
Pedestal stability within spill

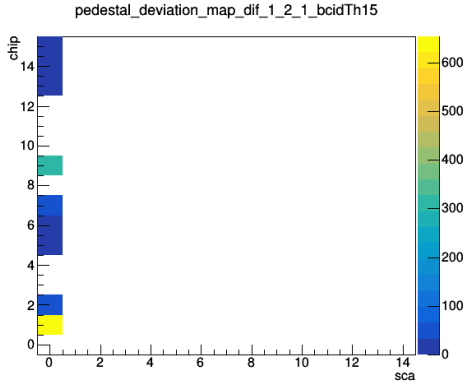


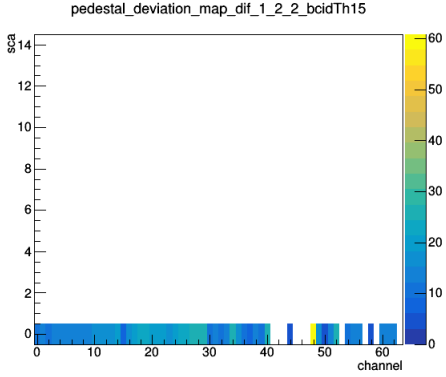


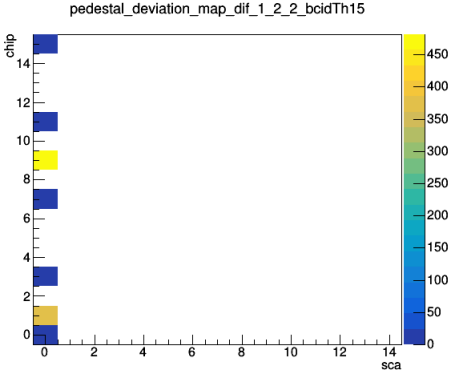






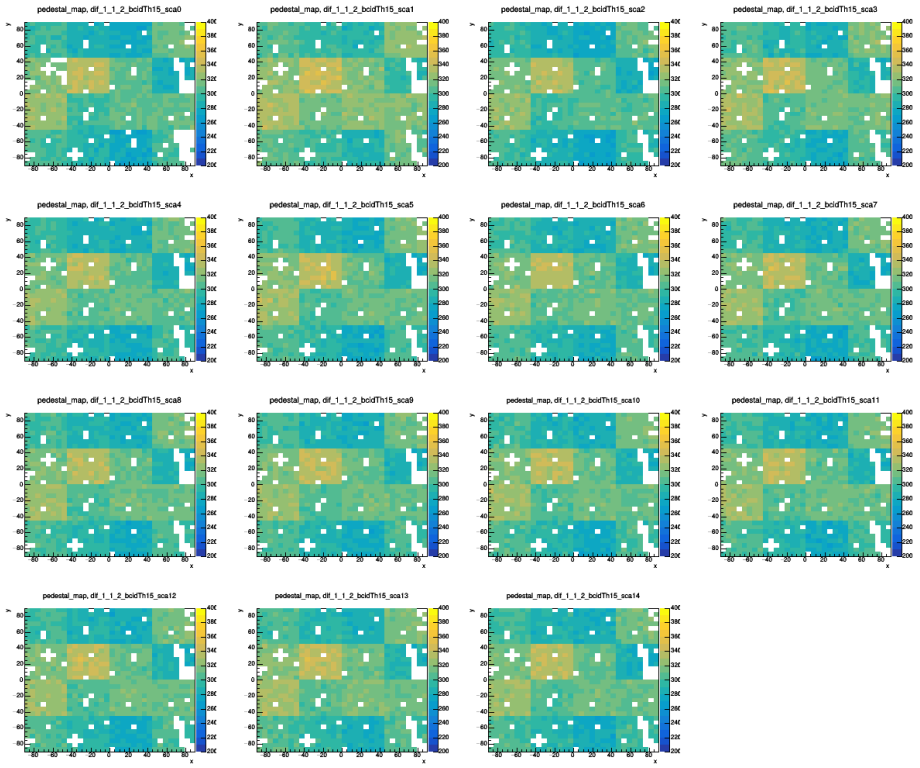




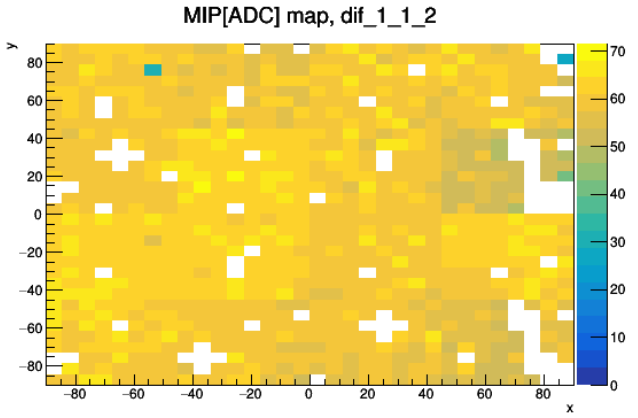


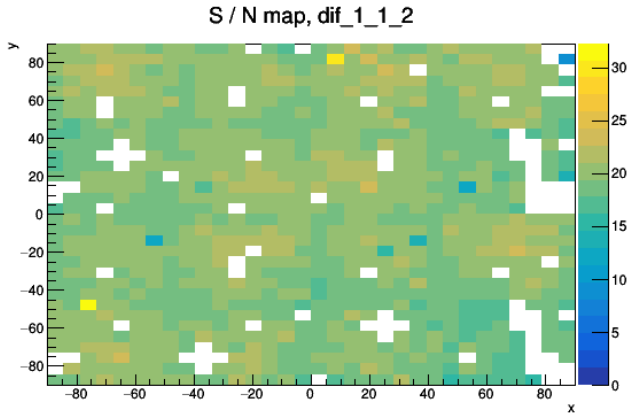
Pedestal homogenety

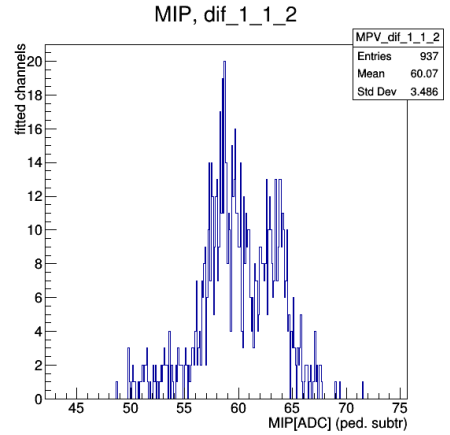
- Npeaks of bad events pedestal distribution after filtering. Dif_1_1_2 and dif_1_2_1, all grids together,14 SCA canvas

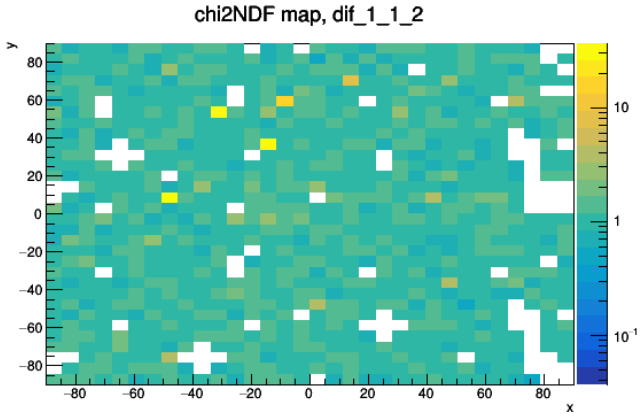


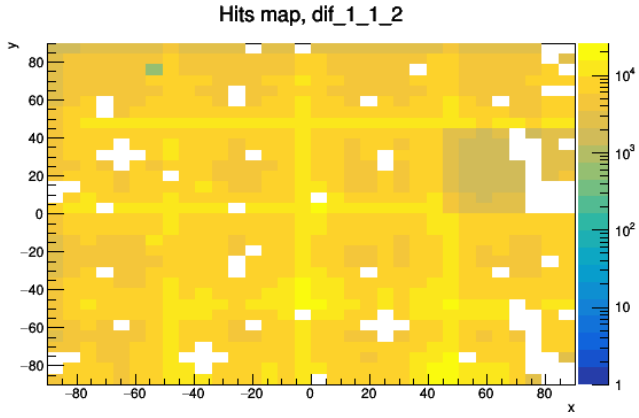
MIP, S/N, dif_1_1_2

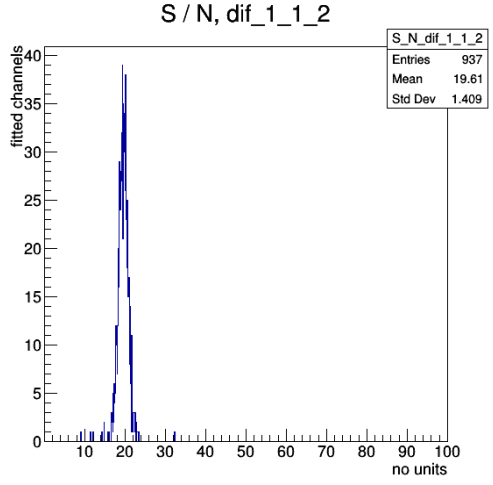




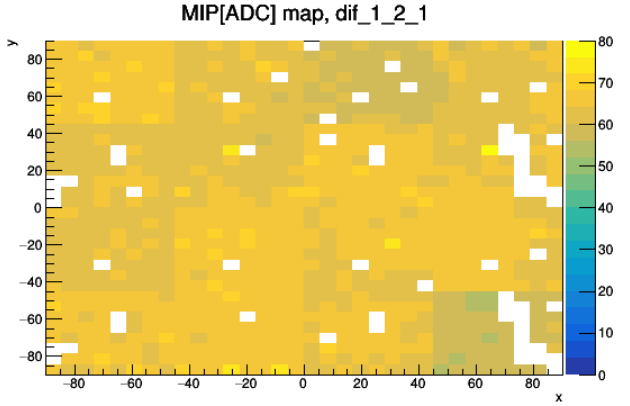


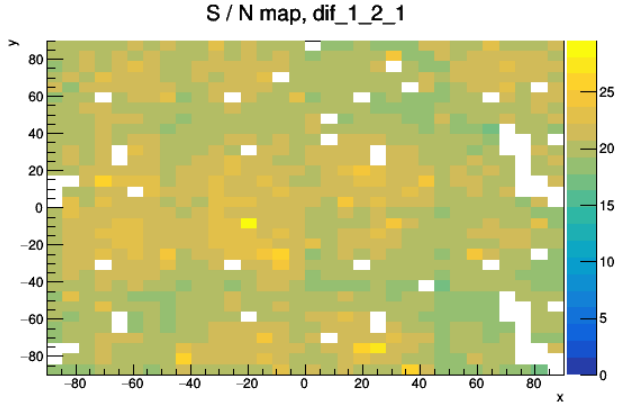


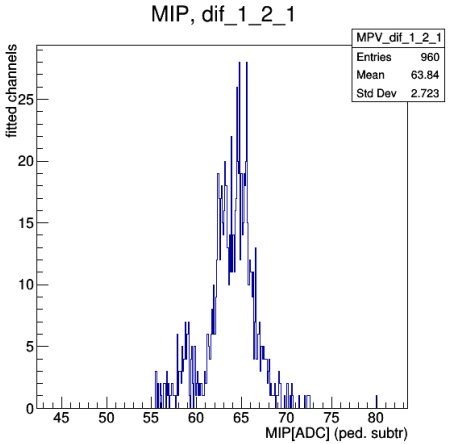


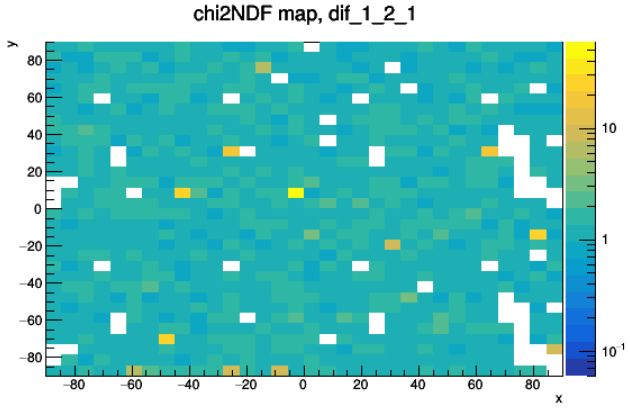


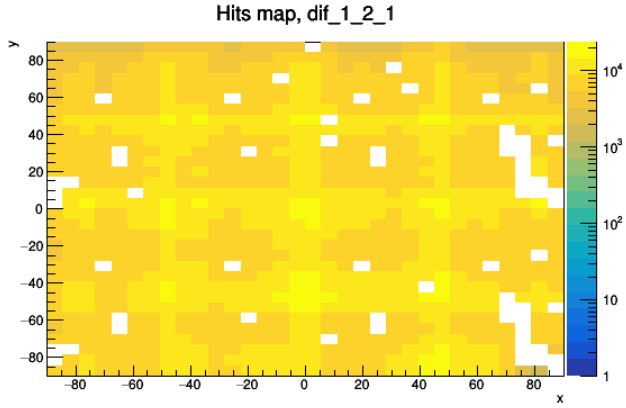
MIP, S/N, dif_1_2_1

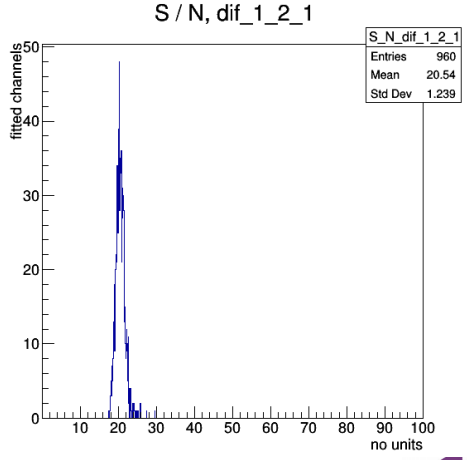












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