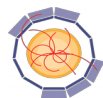


SiW ECAL 2017 Beam Test

- New badbcid definition
- Retriggers/plane events → same feature?
- List of masked channels
- Pedestal analysis
 - Pedestal/width/npeaks map
 - Tagged events → multiple peaks

LAL

A. Irles, Orsay 19th July 2017



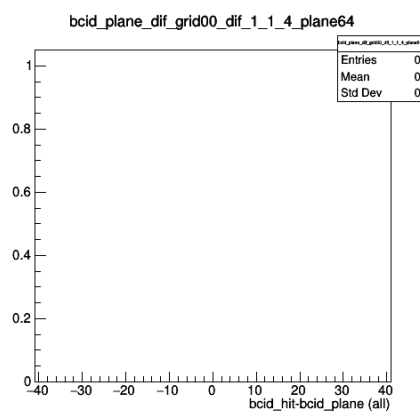
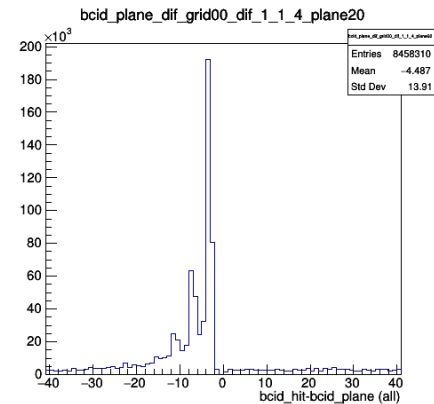
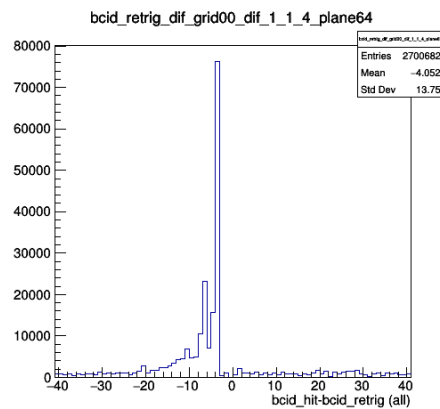
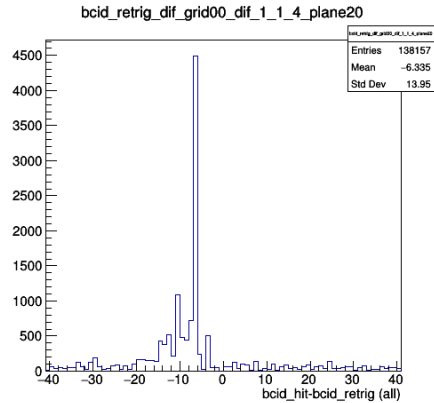
AIDA²⁰²⁰



■ New badbcid definition:

- if sca+1 is filled with consec bcid, but sca+2 not, then $\text{badbcid}[\text{sca}] == 1$ && $\text{badbcid}[\text{sca}+1] == 2$ (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 $\text{badbcid}[\text{sca}] == 3$ && $\text{badbcid}[\text{sca}+1] == 3$ (retriggering)
- if sca+1 is not filled with consec bcid, $\text{badbcid} == 0$

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



Selection:

- Up $\rightarrow$ badbcid==3, nhits<20(64)
- Down $\rightarrow$ badbcid>-1, nhits>20(64)

Same pattern in BCID[sca+1]-BCID[sca]
for retriggers/plane events

First burst of noise happens in $\sim$ bcid+3
with nhits $\sim$ 64.

- Smooth run for the 2 weeks with stable configuration
- But some minimal (and manual!) remasking of few channels was done during the MIP runs.
- After the MIPscan → the configuration was not changed.
- List of masked channels:
 - masked_dif_1_X_X.log , 3 columns
 - chip, chn, masked (0 if not masked, 1 if masked)

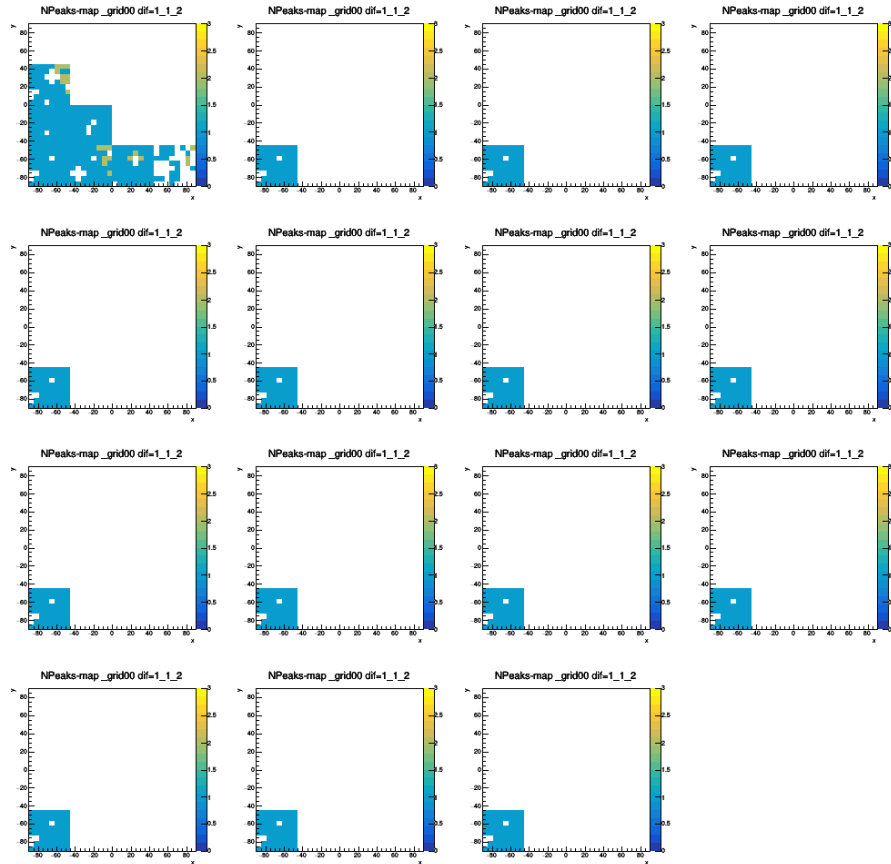
■ Good events:

- `badbcid==0`
- Histograms with at least 300 entries (per sca)
- TSpectrum to search peaks on the pedestal histogram
minimum height of secondary peaks = 0.2 max height
- Only fit histograms with one found peak (but still count number of peaks)

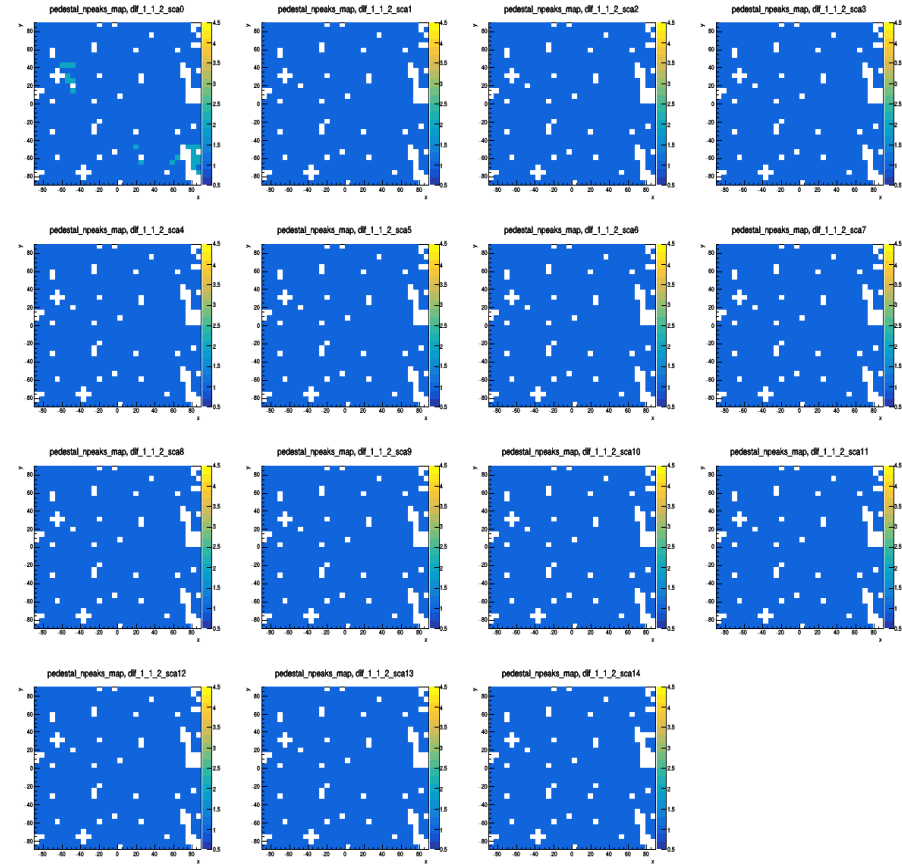
■ Tagged events (retriggers/plane events)

- `Badbcid==3` or `nhits > 5`
- Histograms with at least 150 entries (per sca)
- TSpectrum to search peaks on the pedestal histogram
minimum height of secondary peaks = 0.05 max height
- Only fit histograms with one found peak (but still count number of peaks)

Grid 0, dif_1_1_2

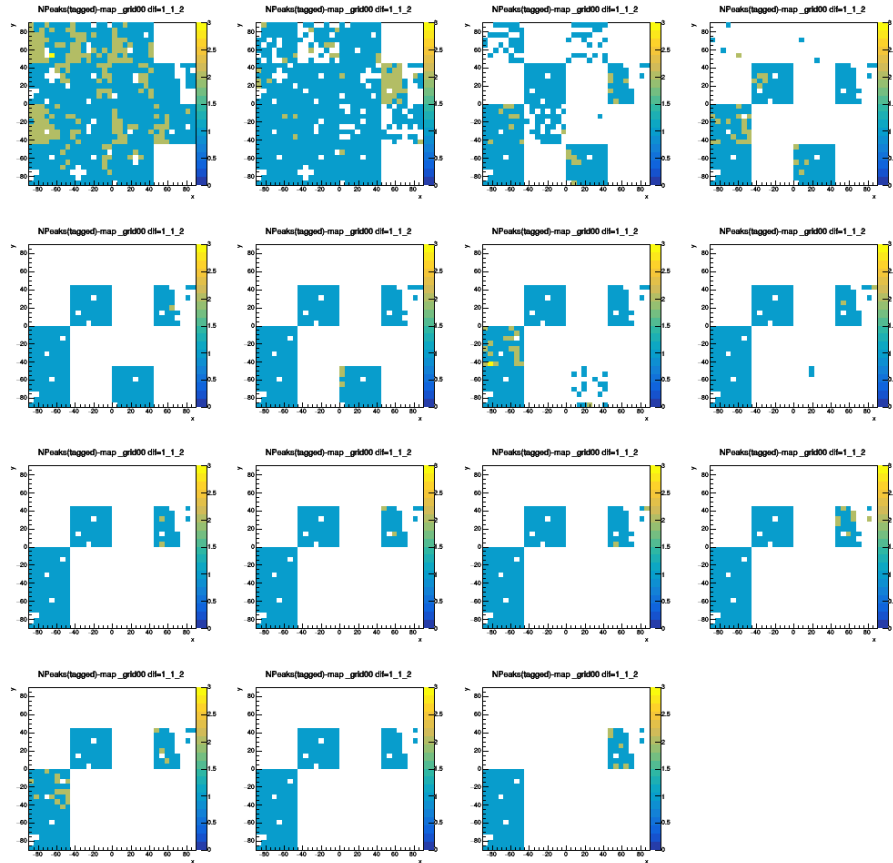


All grid points, dif_1_1_2

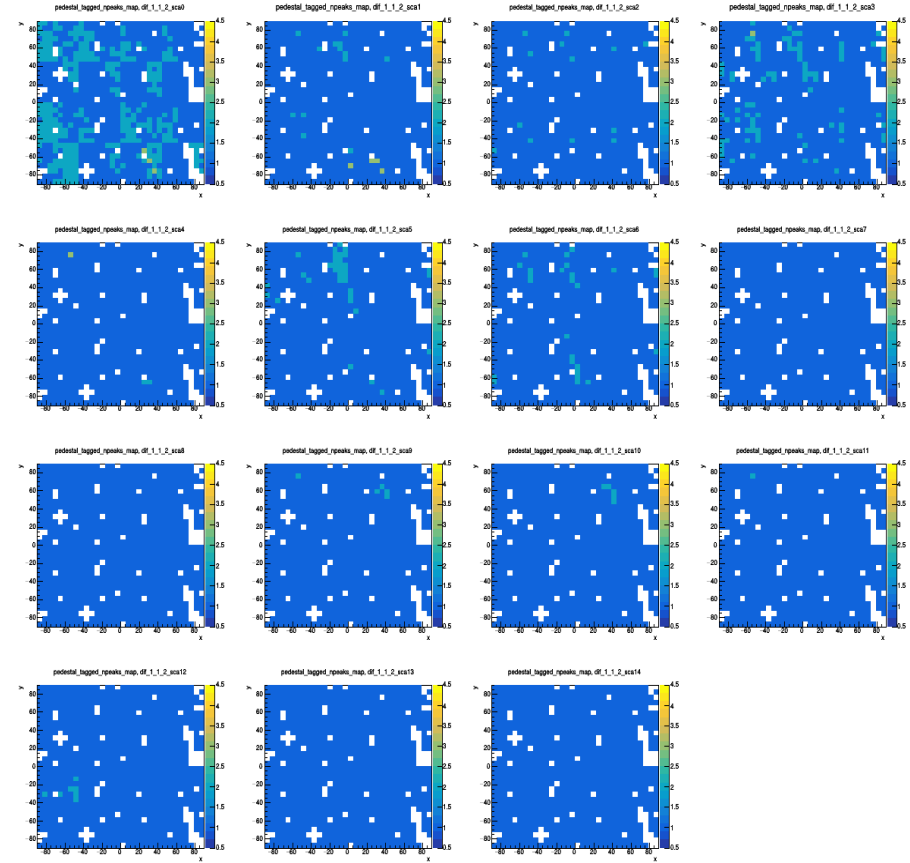


Pedestal npeaks (tagged events) maps

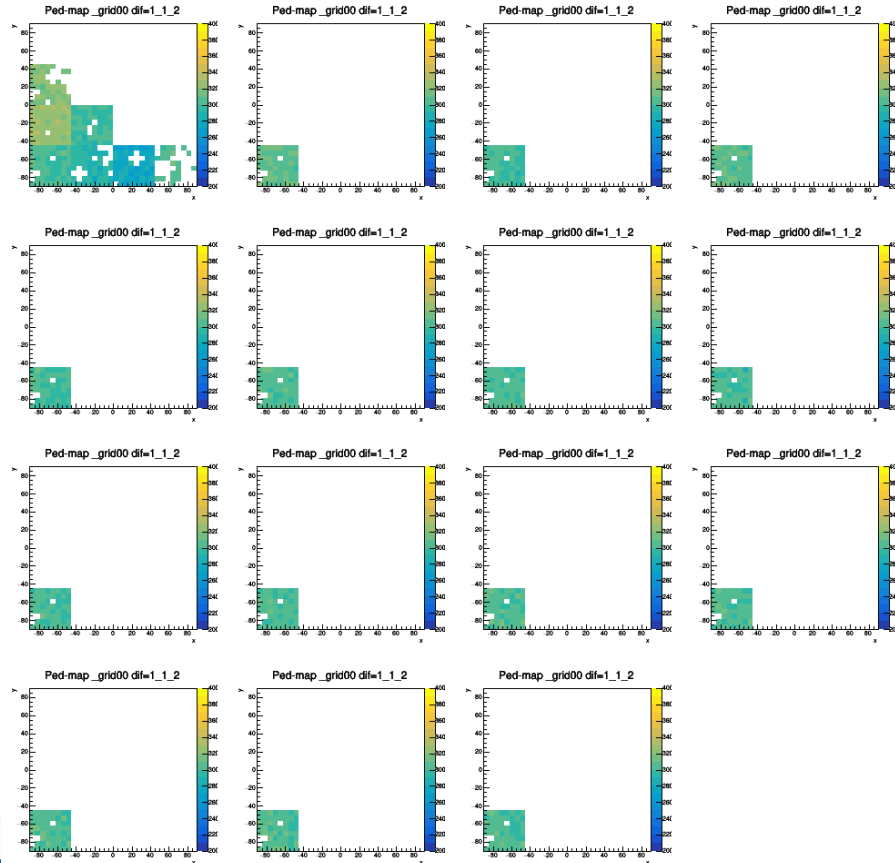
Grid 0, dif_1_1_2



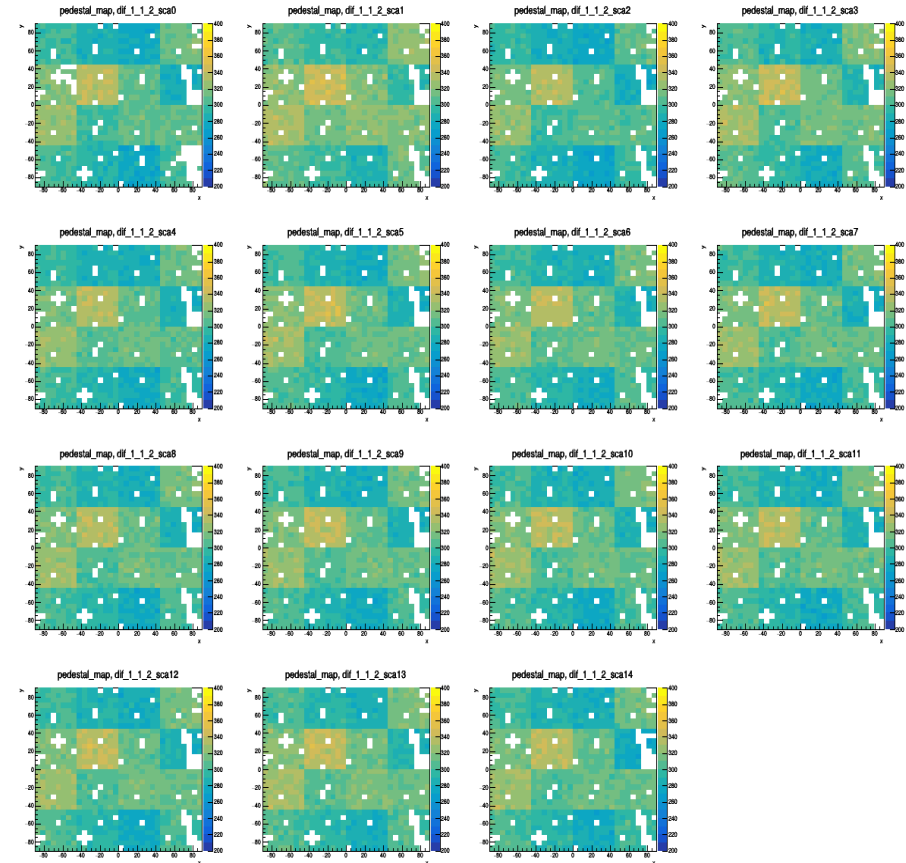
All grid points, dif_1_1_2



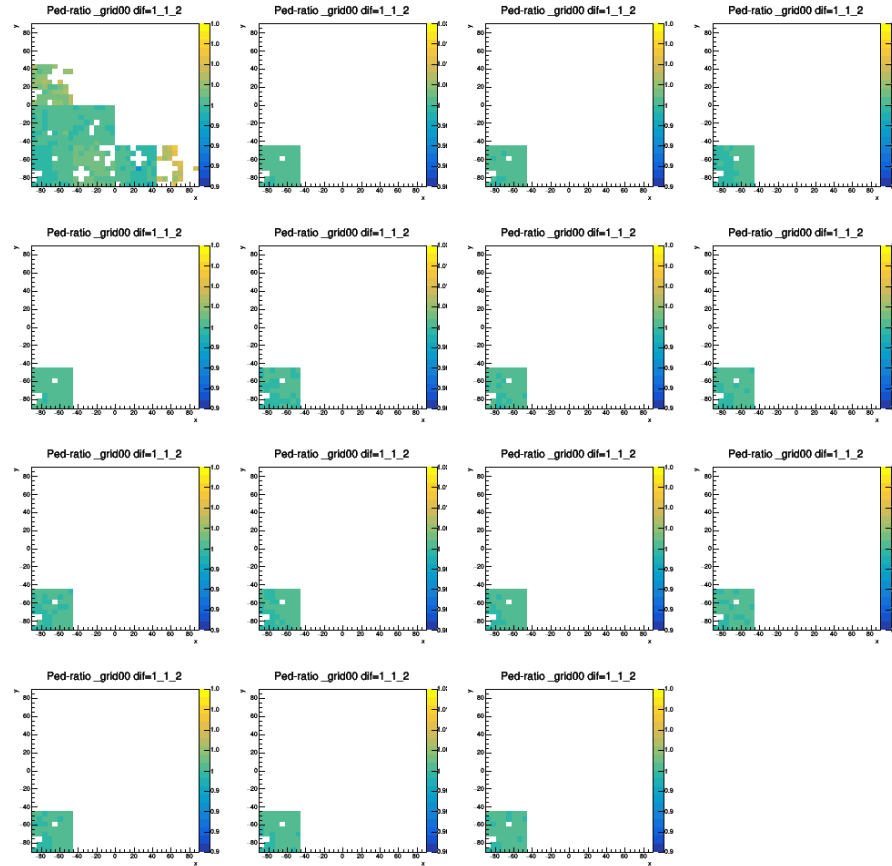
Grid 0, dif_1_1_2



All grid points, dif_1_1_2

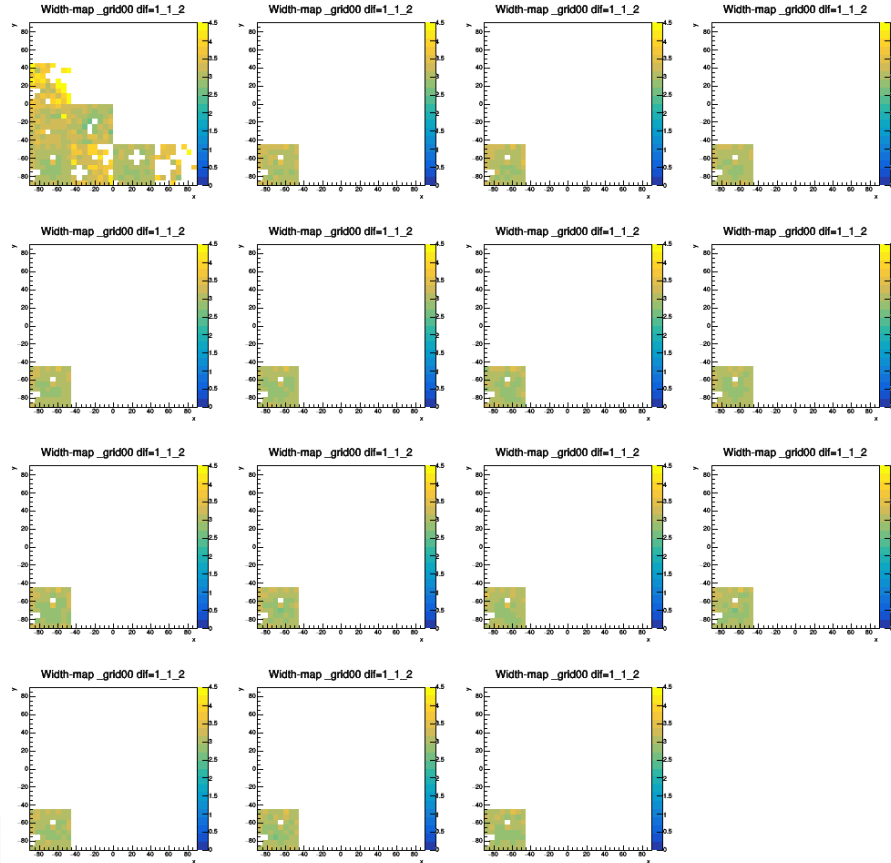


Pedestal map: ratio between single grip points and all runs together

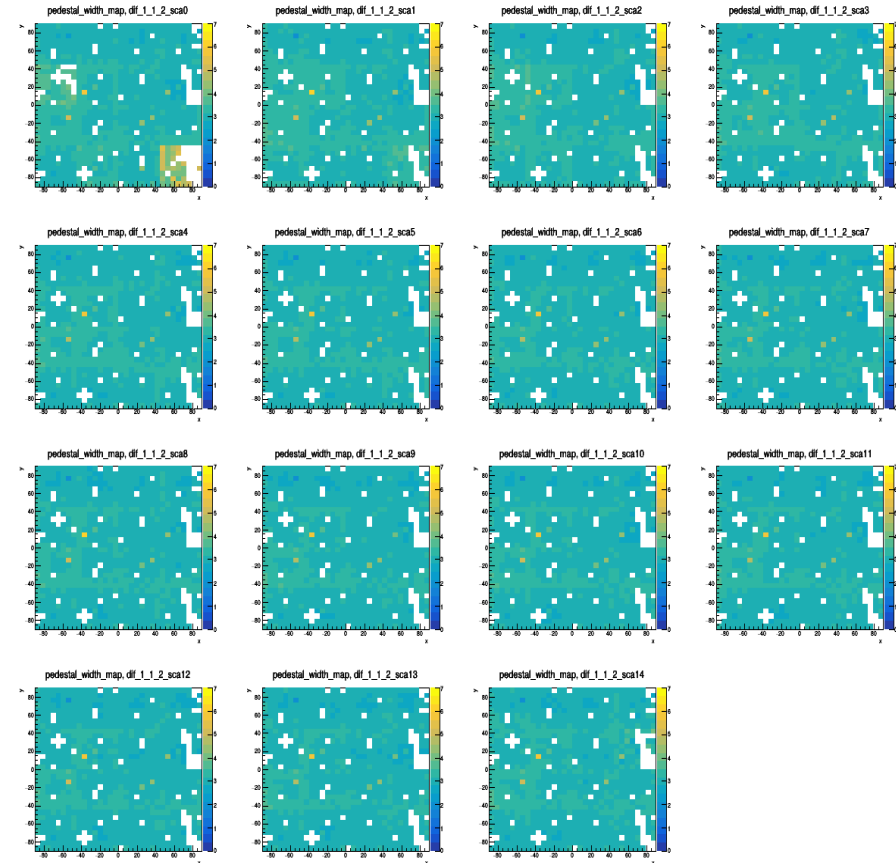


Scale from 0.98,1.02
dif_1_1_2

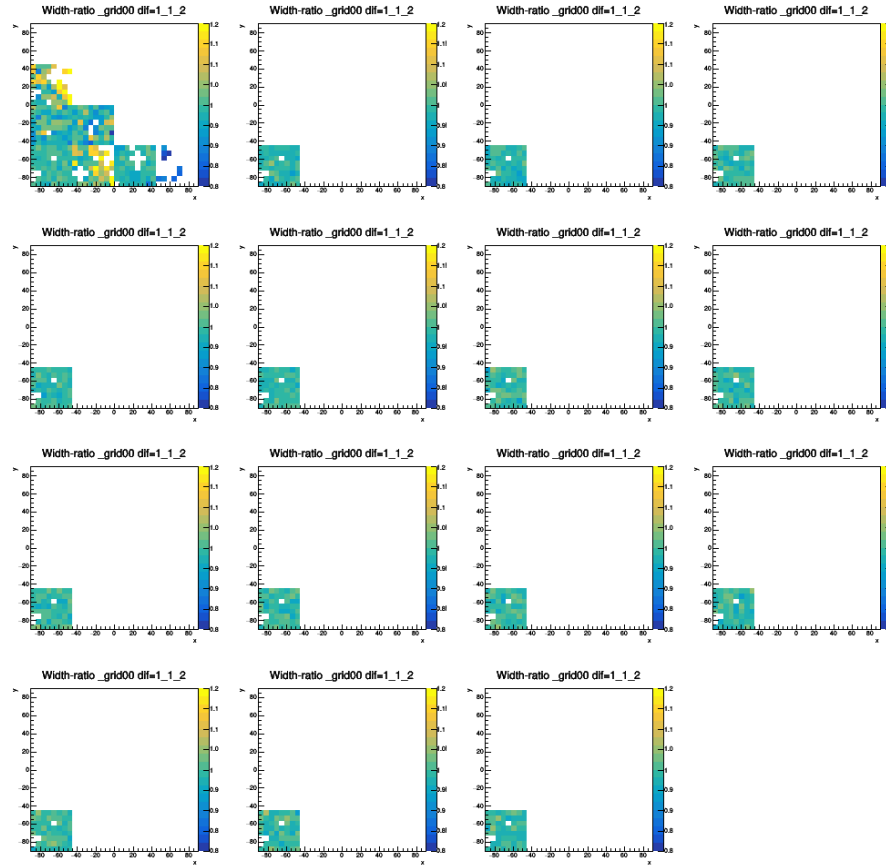
Grid 0, dif_1_1_2



All grid points, dif_1_1_2



Pedestal width map: ratio between single grip points and all runs together



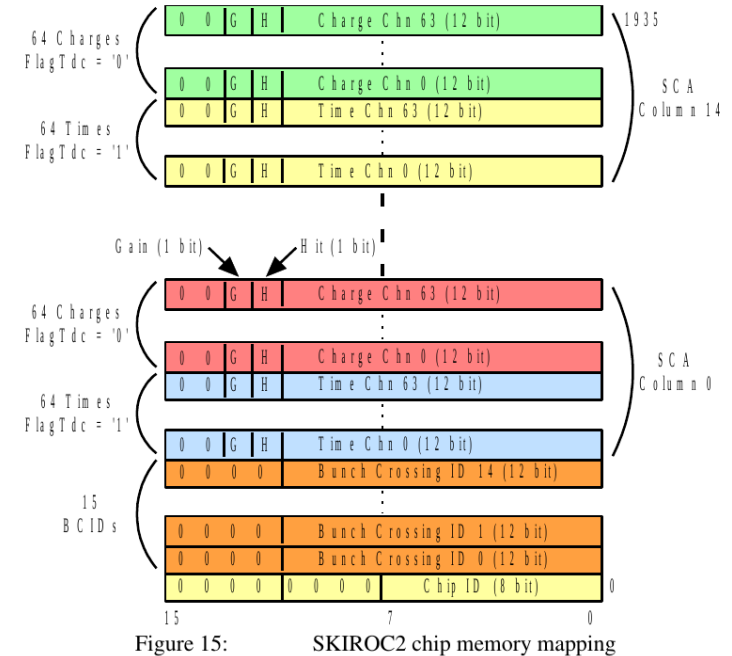
Scale from 0.8,1.2
dif_1_1_2

- New badbcid definition → production of root files for whole MIP scan is done (to be shared)
- New list of masked channels
- New list of pedestals → this list is convoluted with the masked channels
 - If pedestal = 0 → not consider this channel for analysis because was masked or broken, i.e. double peaks)
- Pedestal looks stable, better shape than before.
- Bad events: clear topological pattern in the slabs of double peaks associated to retriggers/plane events. To be investigated.

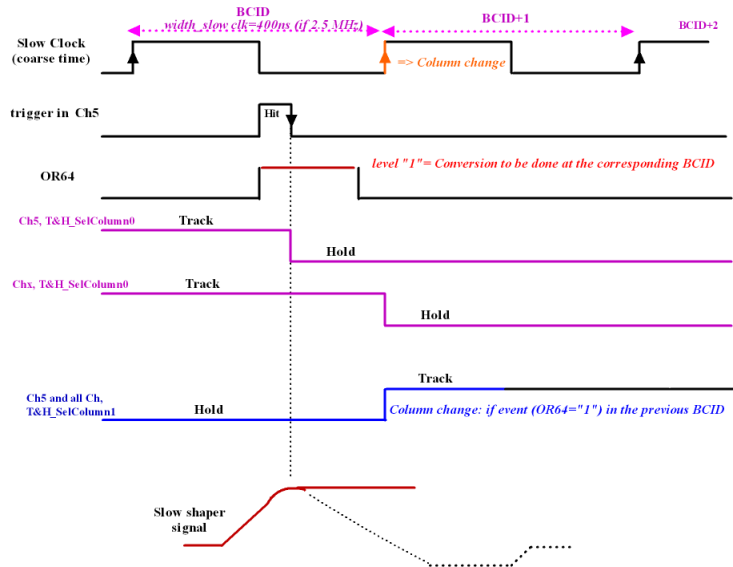
■ The root macro checks the data bytes and headers.

- If additional word is found: warning message and shift of the counter
- If no additional word is found but spill candidate packet has wrong length (in words) → error message and reject spill candidate (count)
- Else: if bad number of columns → error message and reject spill candidate (count)
- Else: if bad chip id → error message and reject spill candidate (count)
- Else: if error in bits → error message and reject spill candidate (count)

In this case, we also save (if possible) the bcid and sca were the error happened

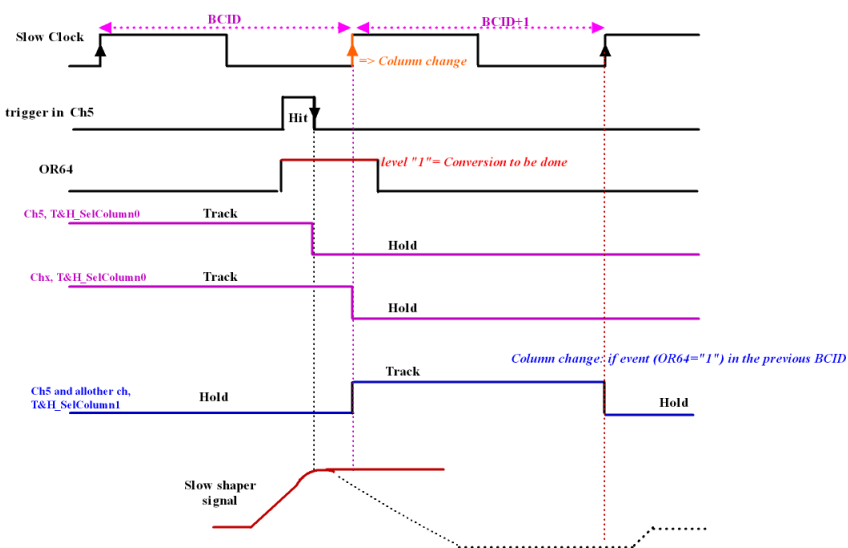


CASE 1: BCID with Hit



Conversion: BCID with one hit, SCA0 ch5: holded value= peak of the signal, other SCA0= holded value=pedestal, other SCAi= ped
BCID+1: No conversion because OR64 level=0 during this BCID+1

CASE 2: BCID+1 without Hit



Conversion: BCID, one hit, SCA0 ch5: holded value= peak of the signal, other SCA0= holded value=pedestal
BCID+1, no hit, SCA1 ch5 holded value=value < pedestal or pedestal, other SCA1 holded value=ped.

- This are not bad events !!
- Next SCA (NSCA+1) is filled with a zero, but SCA=NSCA is usable → not remove from analysis !
- ~ 15% of chances of happening (reduced to ~0 in skiroc2a)