SiWECAL
Test Beam @DESY 2017

Re-triggering analysis

- ✤ Double pedestal
- ✤ Re-triggering region
- ✤ About ASC 0
- ✤ Summary and Feature plan

Yu Miura (Kyushu University)
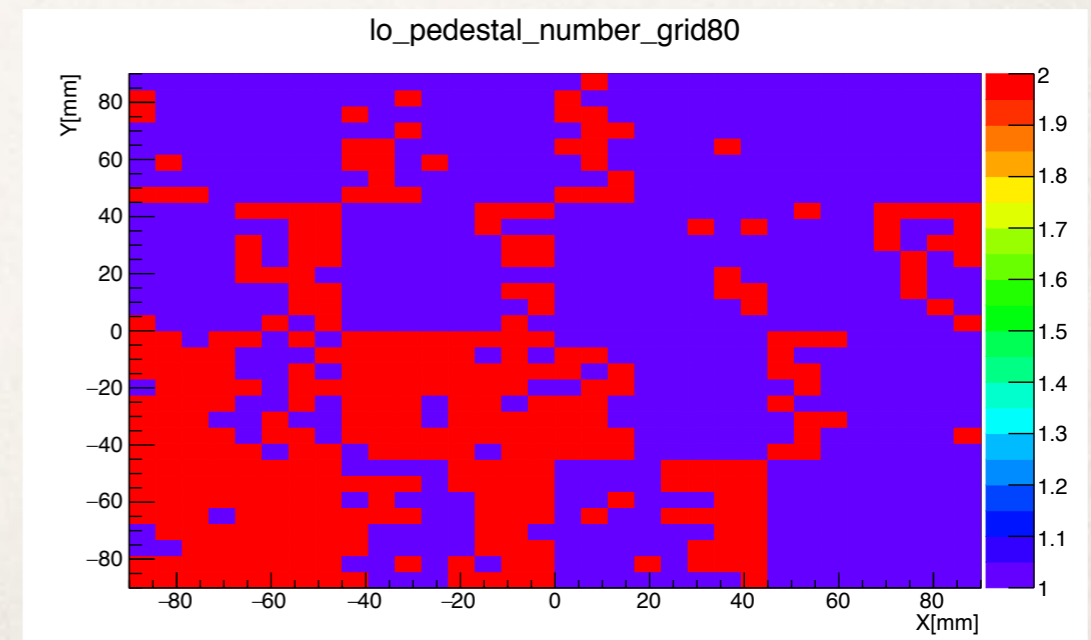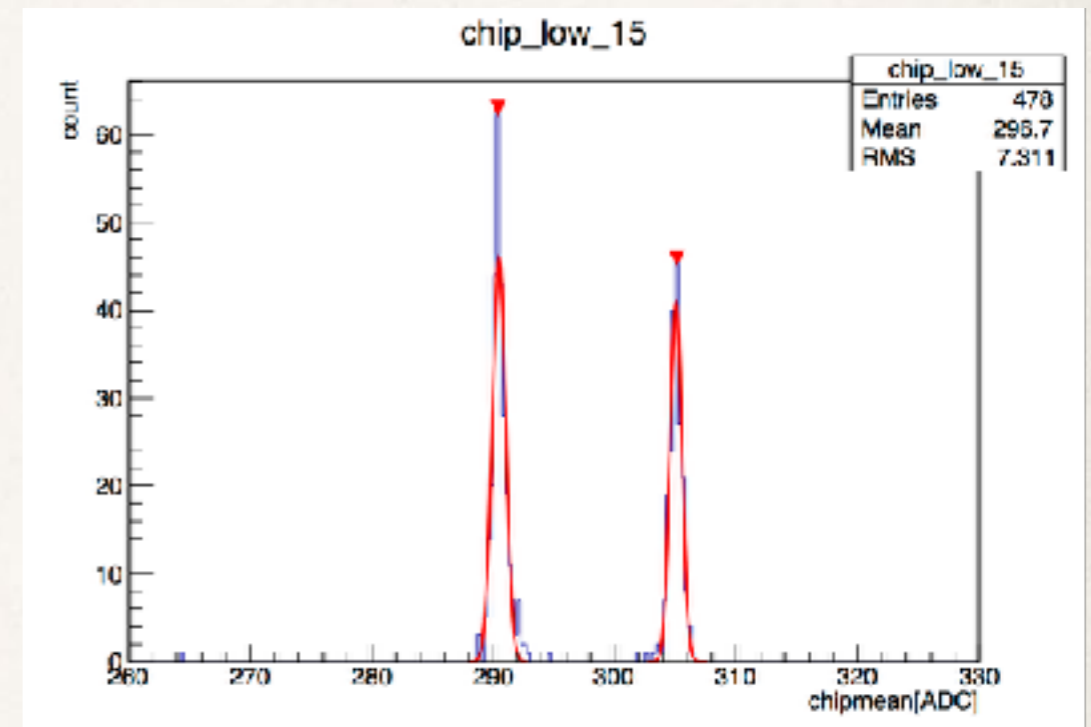
Double pedestal

Double pedestal

- When we produced histogram, double pedestal was seen !

- Double pedestal was seen at **RED region**

- Data
run number : 20170616_175712
MIP scan : 1800 seconds
Beam shout point : grid 80
Beam energy : 3 GeV
DIF : 1_1_4
Memory cell : 0 only
Charge : low gain
Tungsten (W) : none

Double pedestal data

✤ Left pedestal : 57 %
Mean : 290.463
Sigma : 0.473
Entries : 274

✤ Right pedestal : 43 %
Mean : 305.044
Sigma : 0.474
Entries : 204

chip_low_15

chip_low_15	
Entries	478
Mean	296.7
RMS	7.311
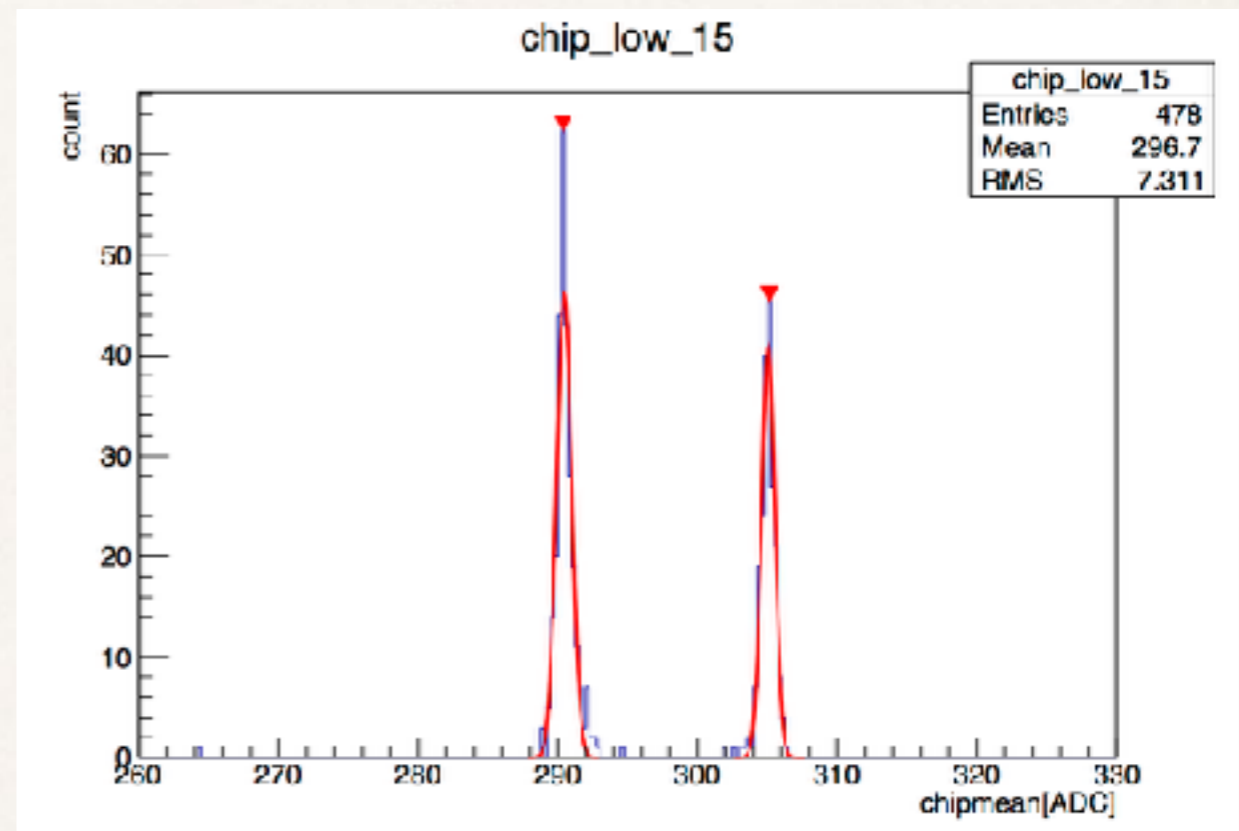
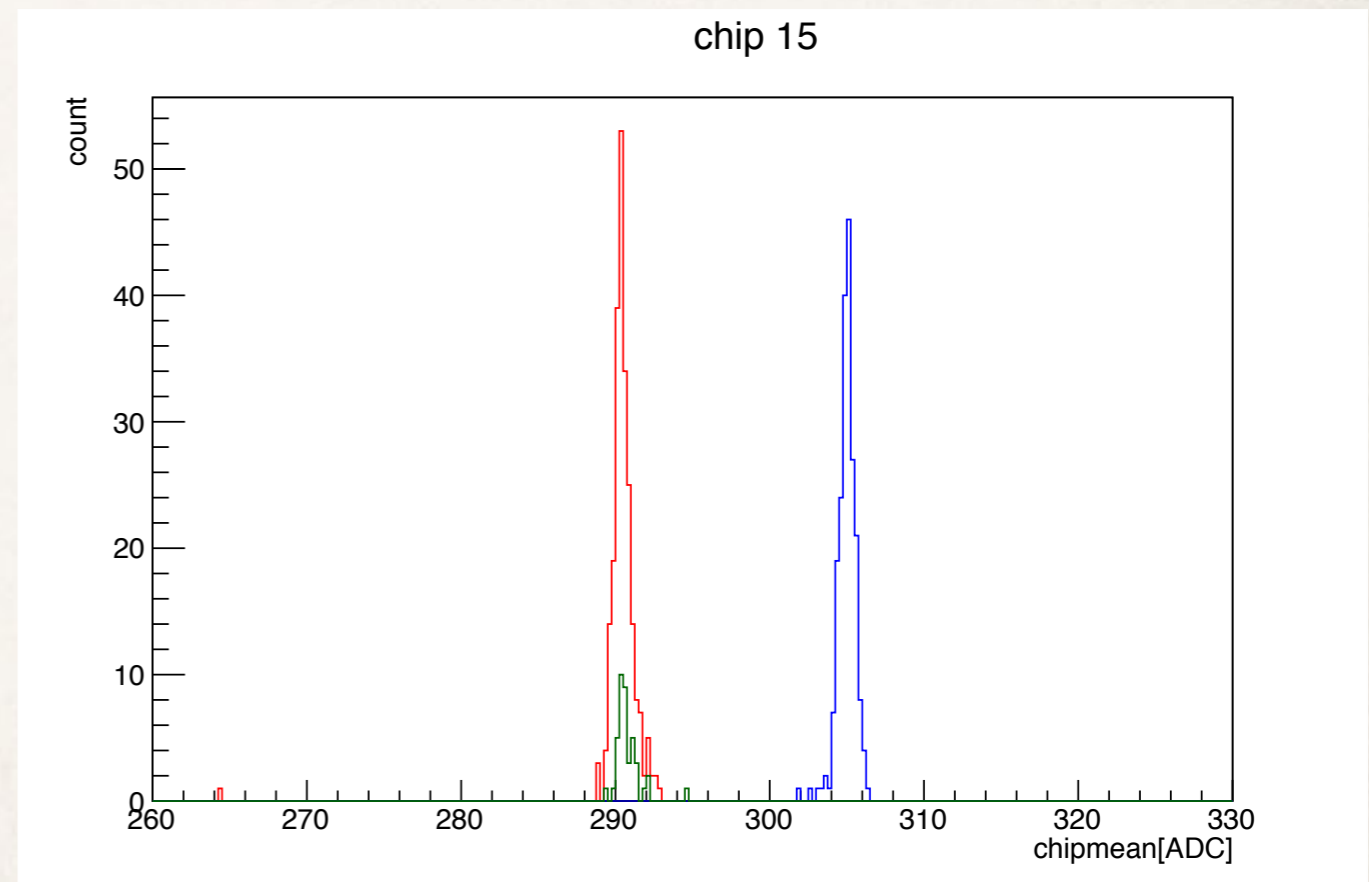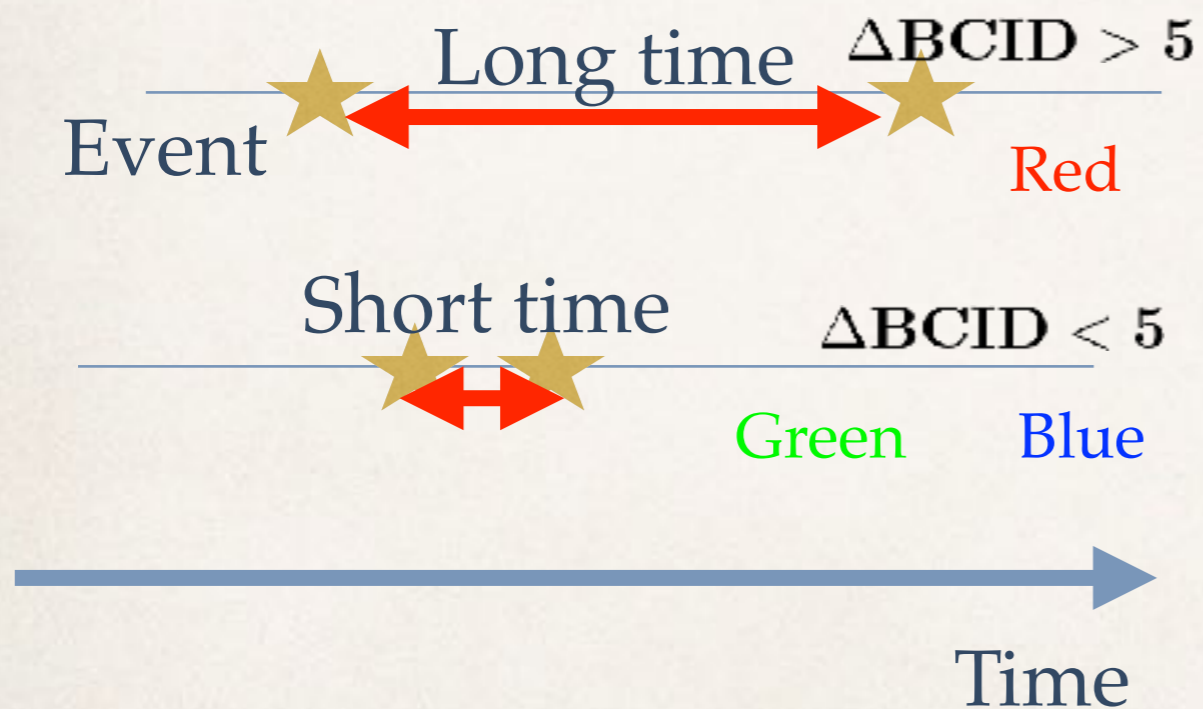✤ ADC of many channels appeared in either one side (left or right pedestal)

4

Re-triggering region

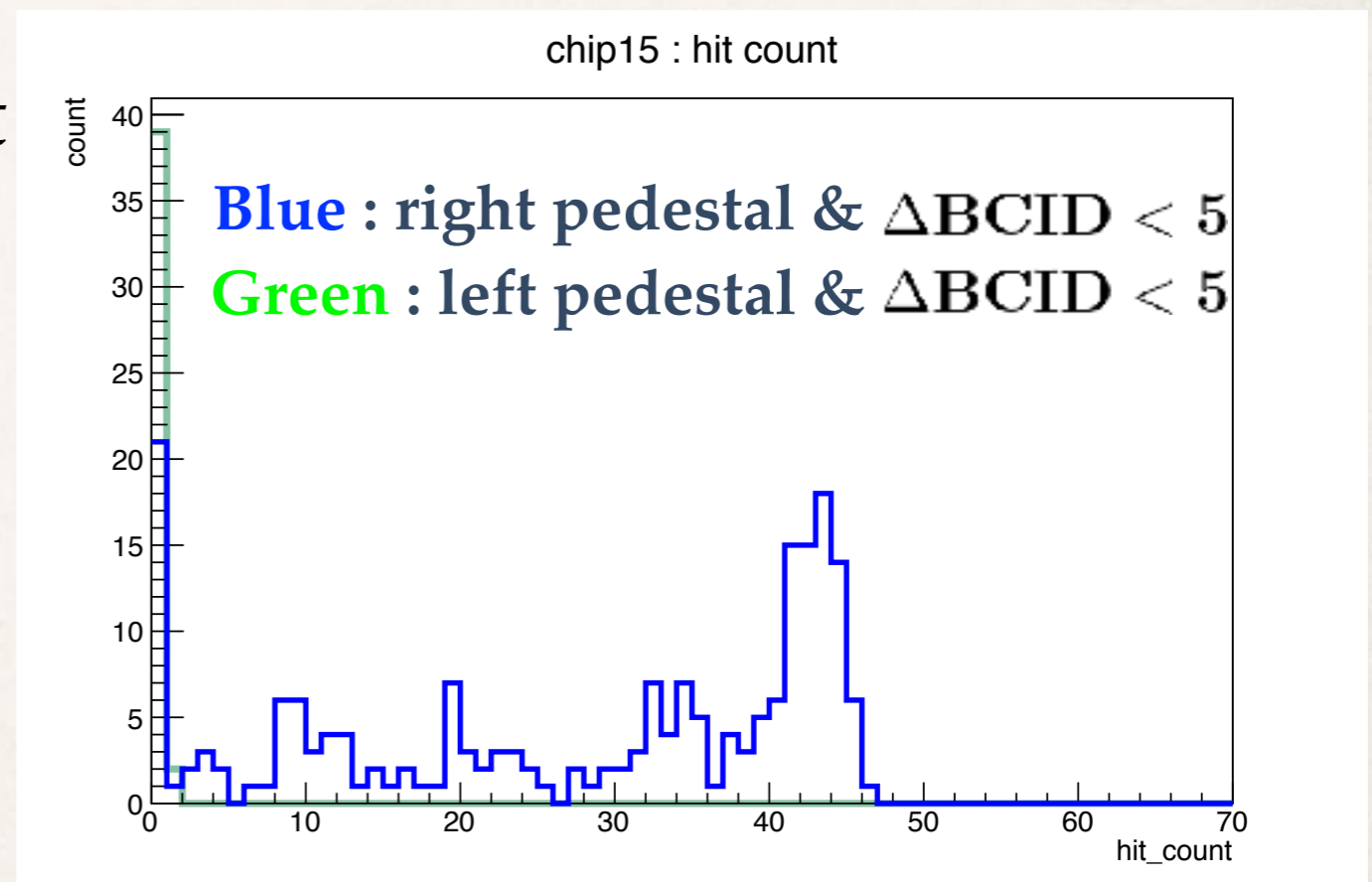# Time difference to next event

✤ <u>Next event is recorded immediately in Neighbor SCA</u>

$$\mathbf{BCID}[\,][1] - \mathbf{BCID}[\,][0] = \mathbf{\Delta BCID}$$

The number of hits in SCA 1

✤ To see the feature of these cases(i.e. Green and Blue), event components in SCA 1 were checked.

✤ Blue
re-triggering : dominant
zero event : 12.5 %
→Mainly re-triggering

✤ Green
re-triggering : very few
zero event : dominant
→ Mainly zero event

chip15 : hit count

Blue : right pedestal & $\Delta\text{BCID} < 5$
Green : left pedestal & $\Delta\text{BCID} < 5$

count

hit_count

About SCA 0

ADC of hit channel

✤ To see correlation between mean of left pedestal and ADC of hit channel in these cases, these differences are checked
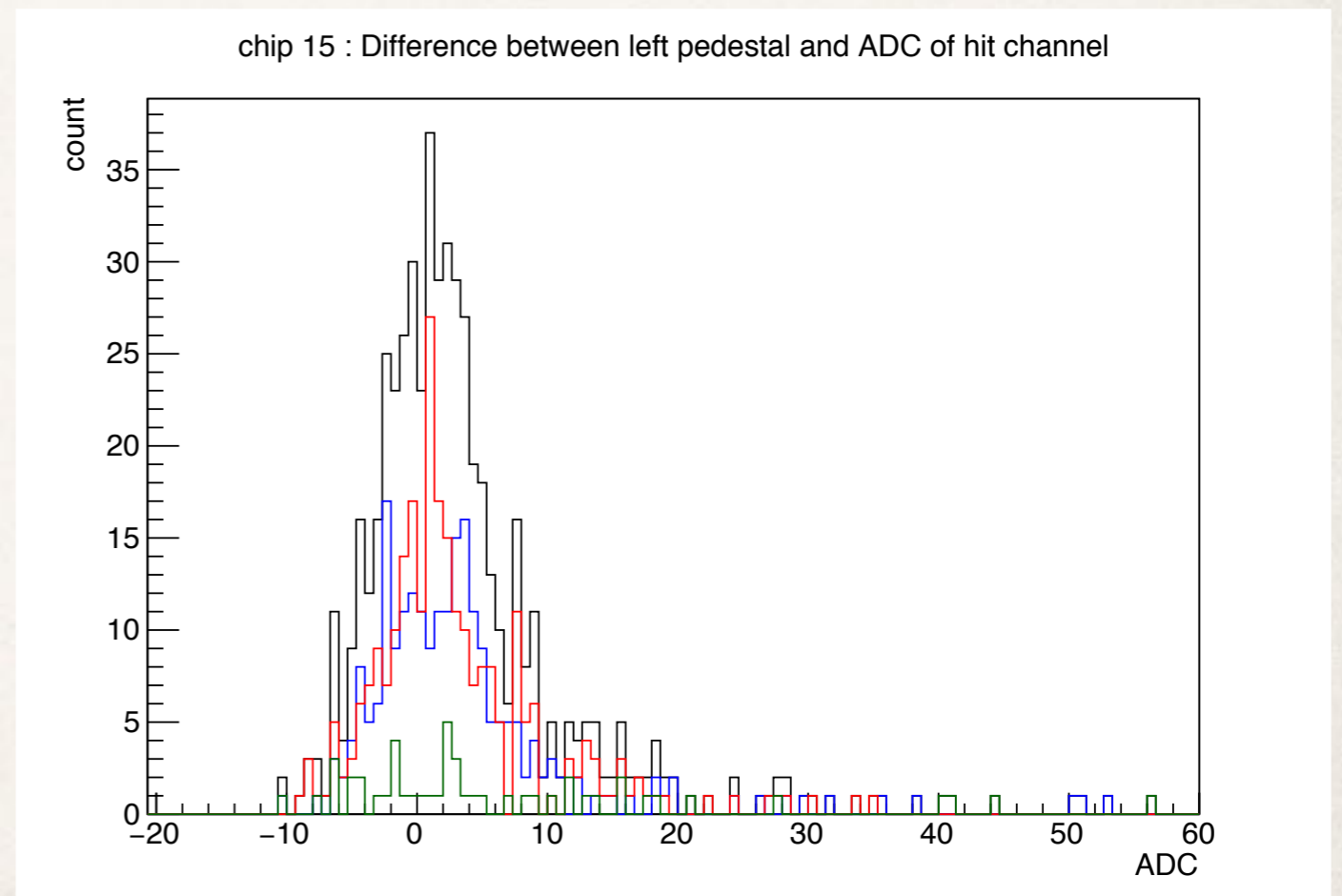
Black : Total
Red : Left pedestal & $\Delta\mathbf{BCID} > 5$
Blue : Right pedestal & $\Delta\mathbf{BCID} < 5$
Green : Left pedestal & $\Delta\mathbf{BCID} < 5$

✤ <u>ADC of hit channel don't depend on pedestal positions(left and right)</u>

chip 15 : Difference between left pedestal and ADC of hit channel

Number of hits in SCA 0

✤ To see number of hits in SCA 0, event components are checked

✤ <u>Event component in these case don't depend on number of hits</u>

chip 15 : memory cell 0

Black : Total
Red : Left pedestal & $\Delta \mathbf{BCID} > 5$
Blue : Right pedestal & $\Delta \mathbf{BCID} < 5$
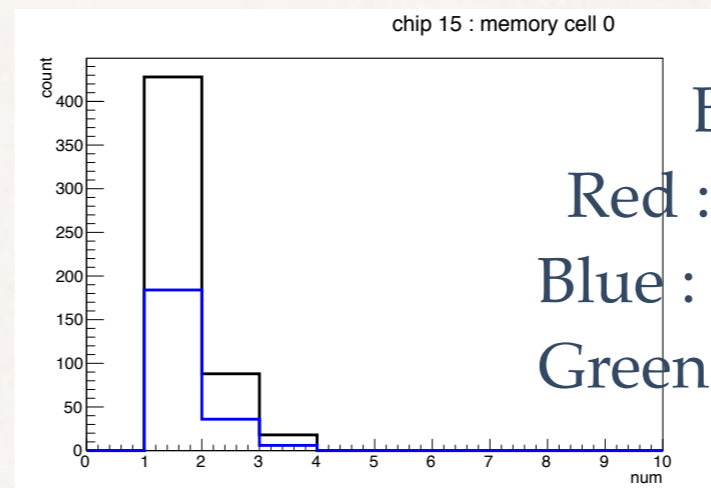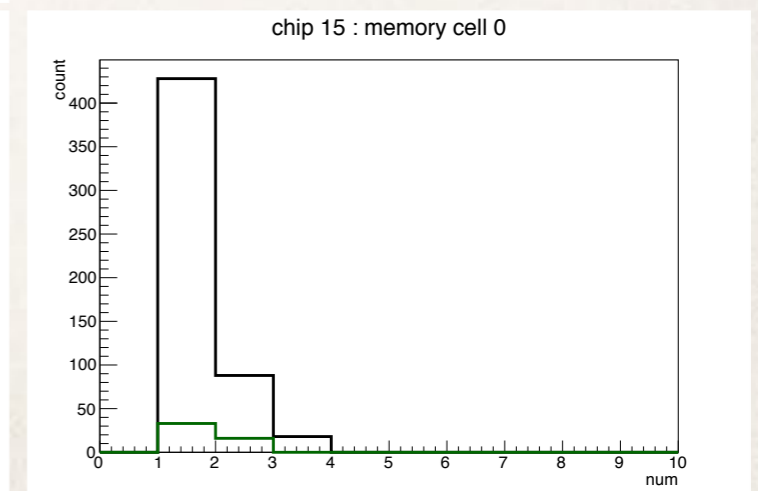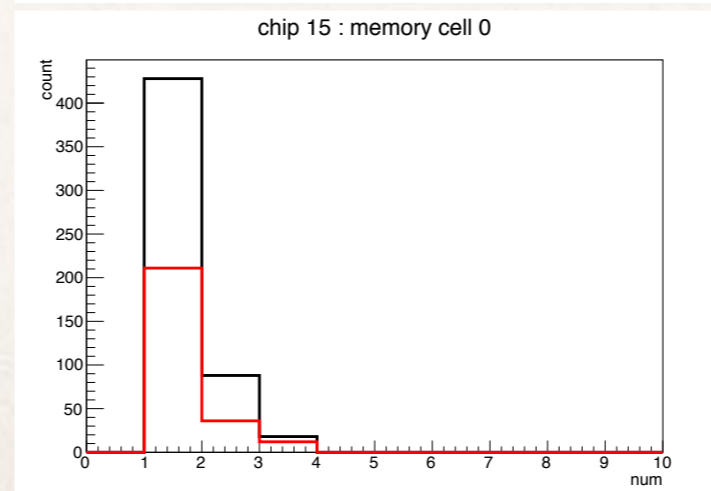Green : Left pedestal & $\Delta \mathbf{BCID} < 5$

chip 15 : memory cell 0

chip 15 : memory cell 0

Summary and Feature plan

✤ Double pedestal are seen in many region and ADC of all channel appear in either one side (left or right pedestal)

✤ In case that many channels appeared right pedestal, re-triggering or zero event are caused in the next SCA.

✤ In case that many channels appeared left pedestal, the event occurs zero event about 15%

✤ The number of hits and their ADC in SCA 0 don't depend on pedestal position

✤ In order to clarify the reason of the double pedestal problem, I plan to check events in the same wafer, slab, and BCID