

MVTX chip test upgrade

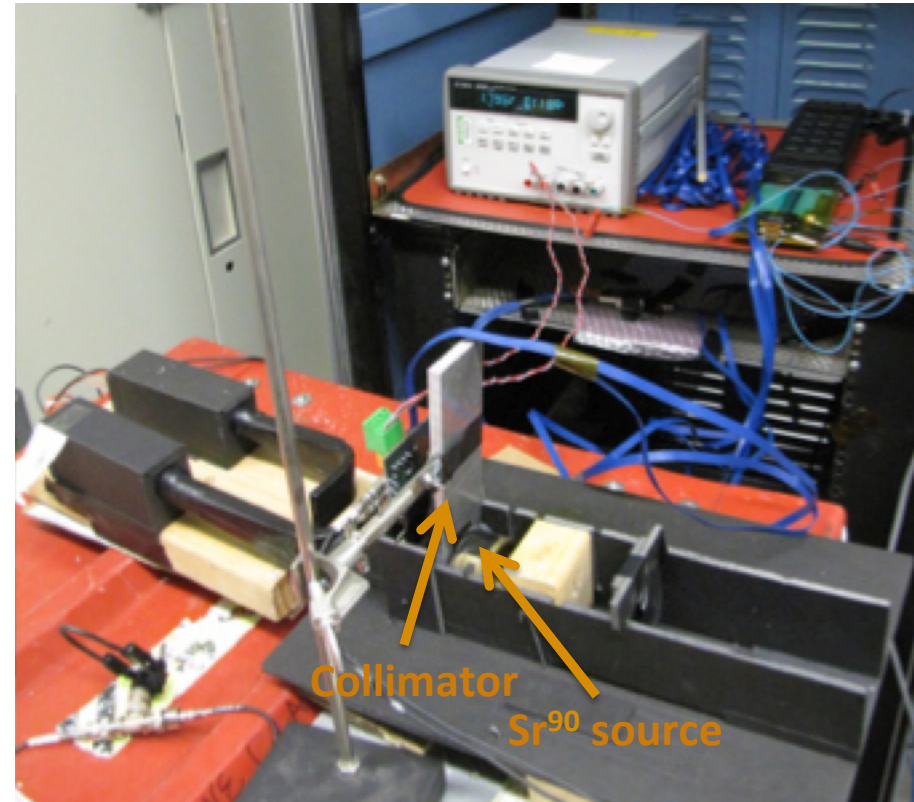
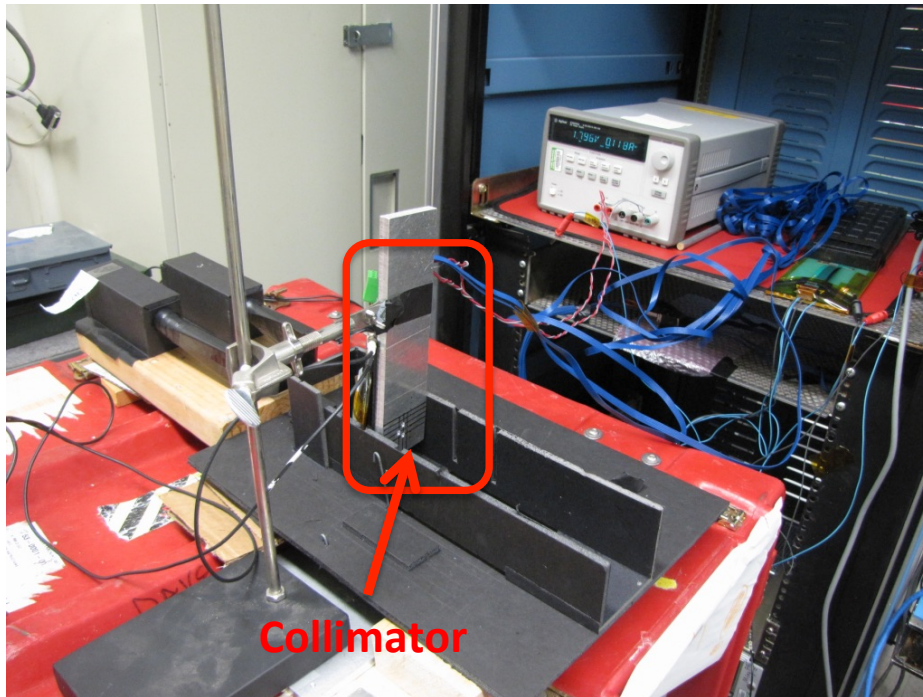
Xuan Li (LANL)

Outline

- Sr^{90} source test trigger update:
 - Tune the scintillator coincidence trigger width at 150 ns to meet the MOSAIC 100 ns trigger bandwidth limitation.
 - Read out the hit and cluster information event by event.

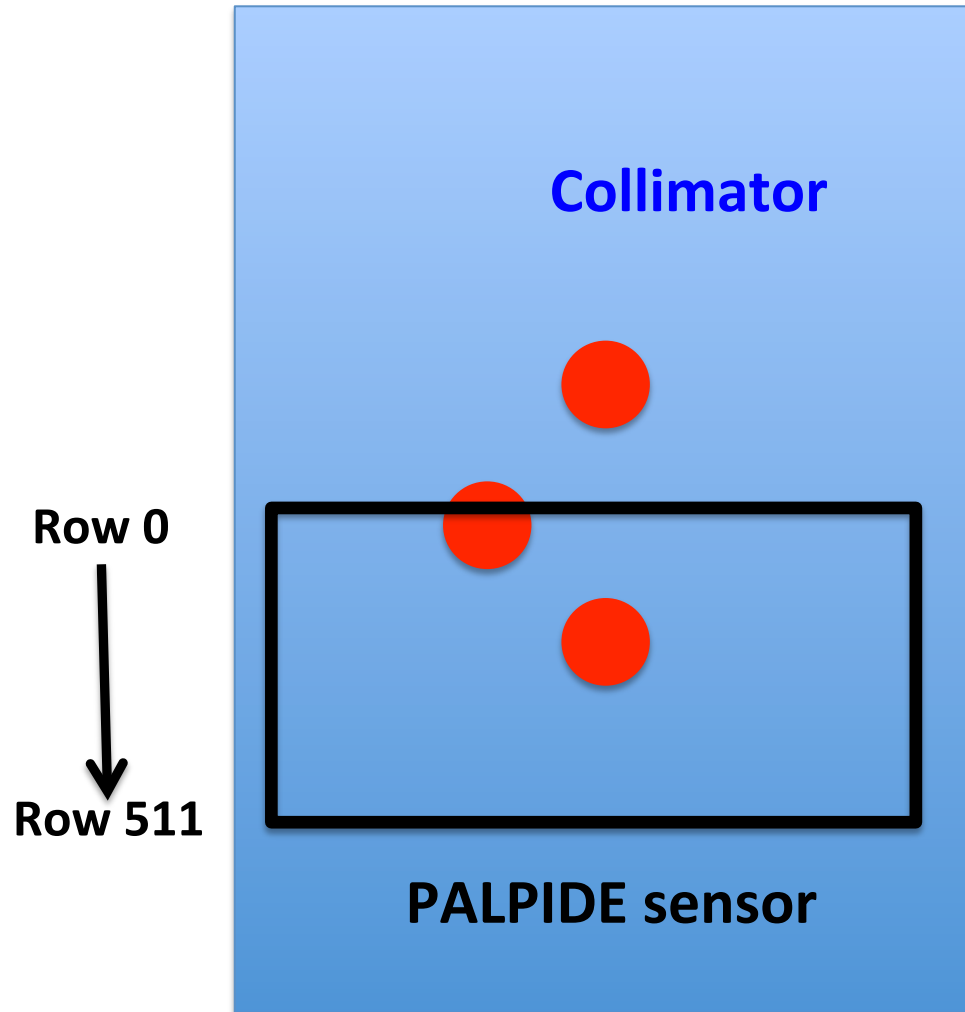
Use the collimator with three hole structure

- New configuration of the setup.



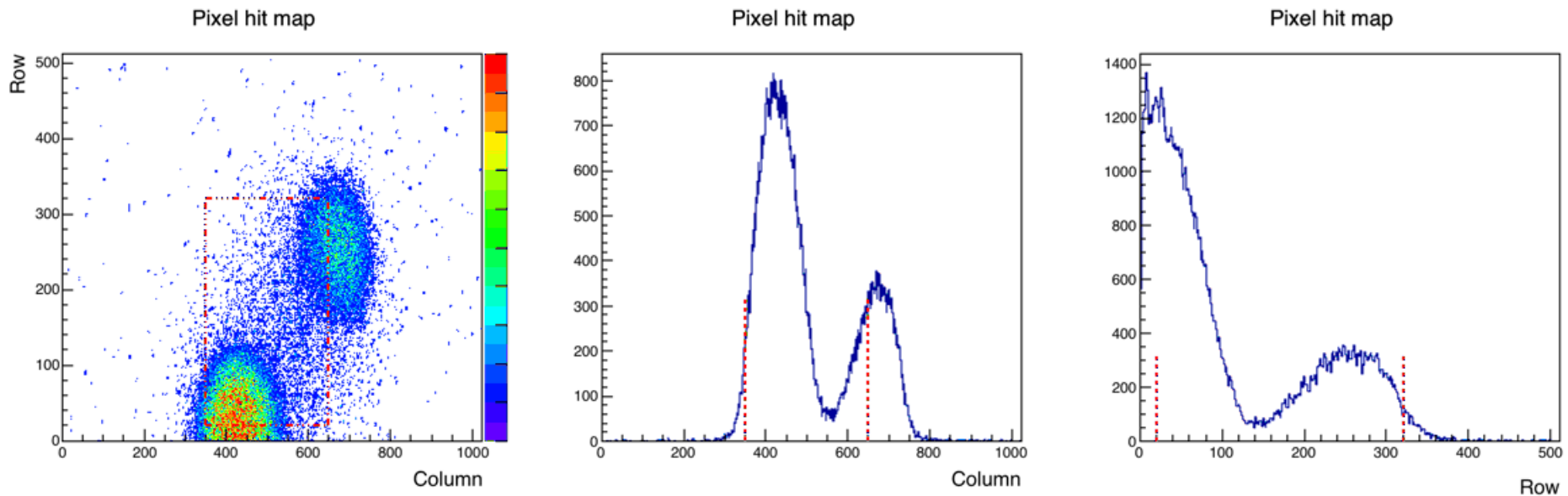
Sr⁹⁰ beta decay electrons with collimator

Trigger delay time: 2 μ s



Hit and cluster 2D distribution with the new collimator (Sr^{90})

- Pixel map (left), Column profile (middle) and row profile (right).
- Removed noise pixels.

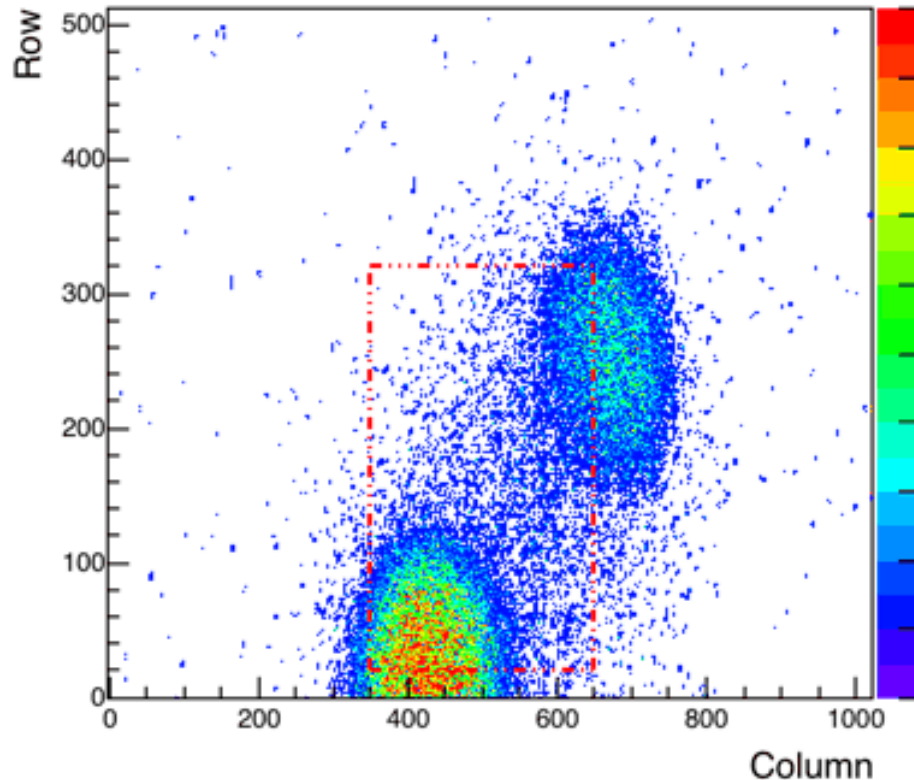


- Clear hole structure from the collimator.

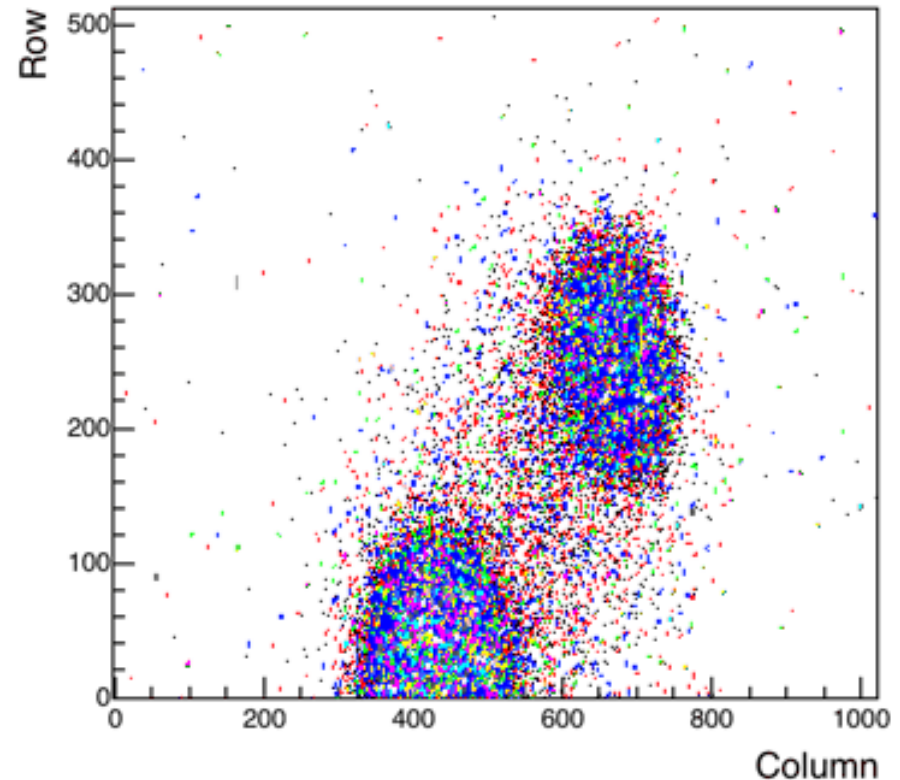
Hit and cluster 2D distribution with the new collimator (Sr^{90})

- Pixel map (left), cluster map (right).
- For cluster finder, exclude big size cluster (no. of pixels > 16).

Pixel hit map

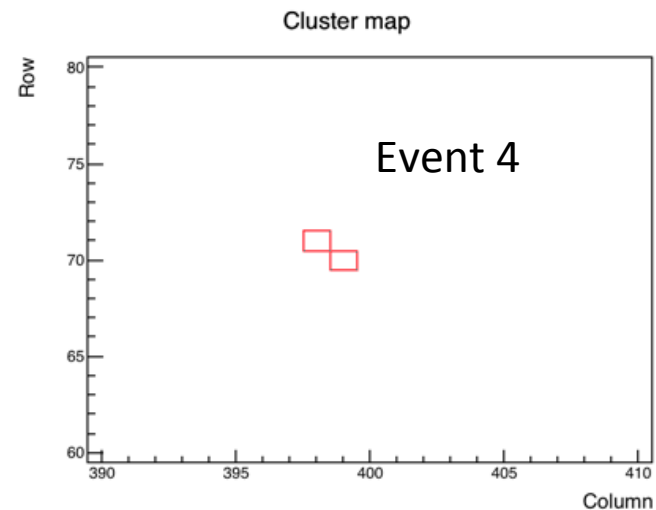
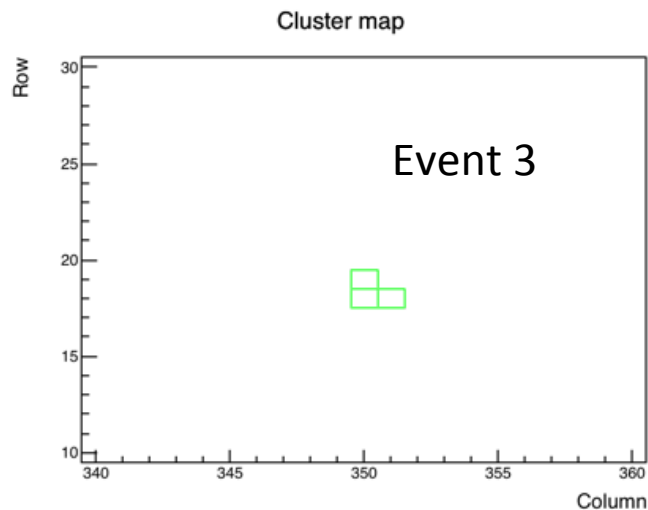
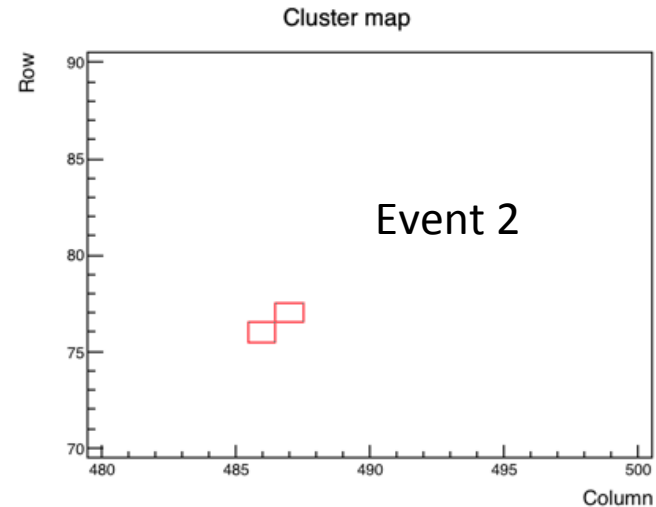
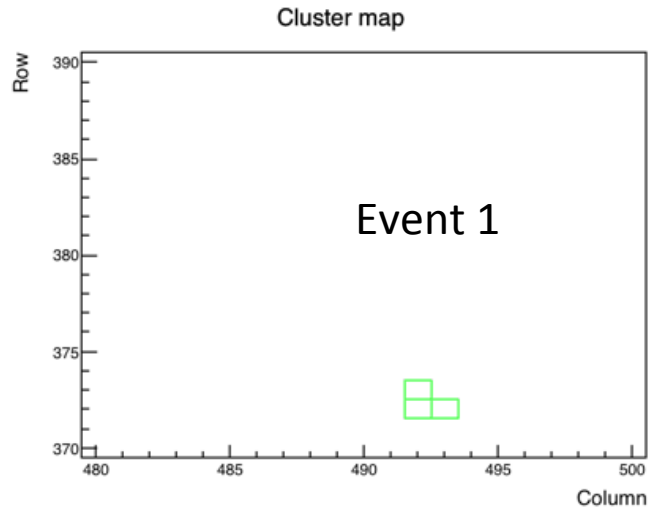


Cluster map



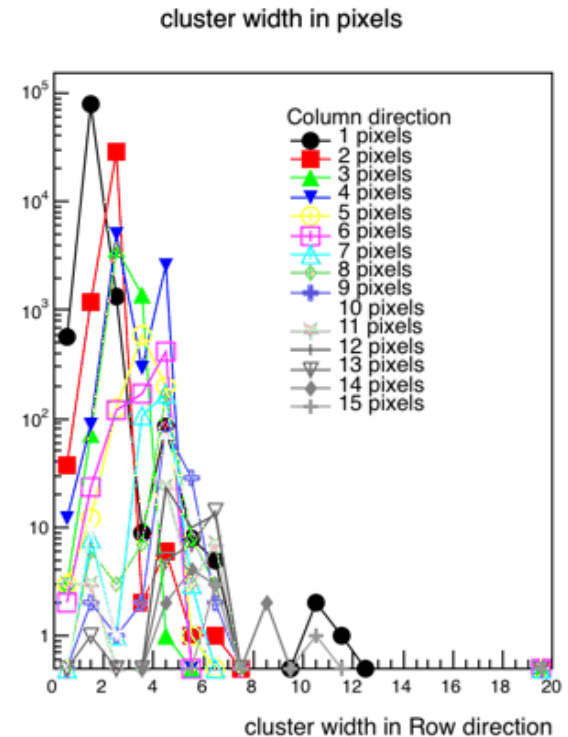
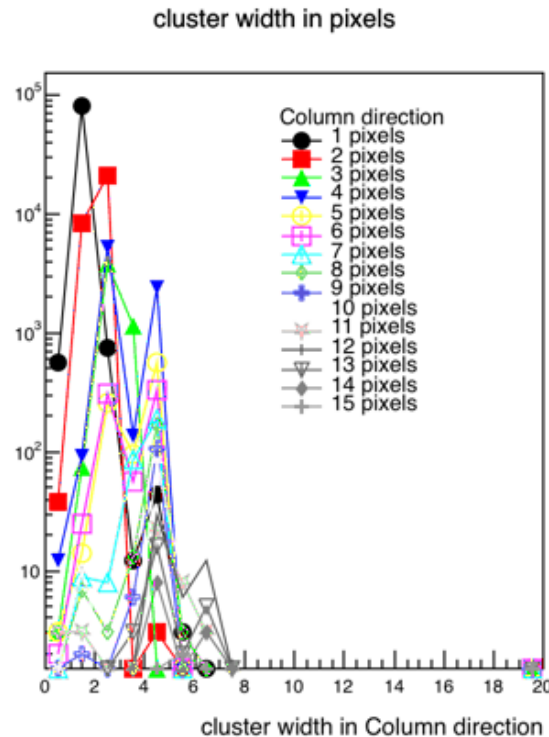
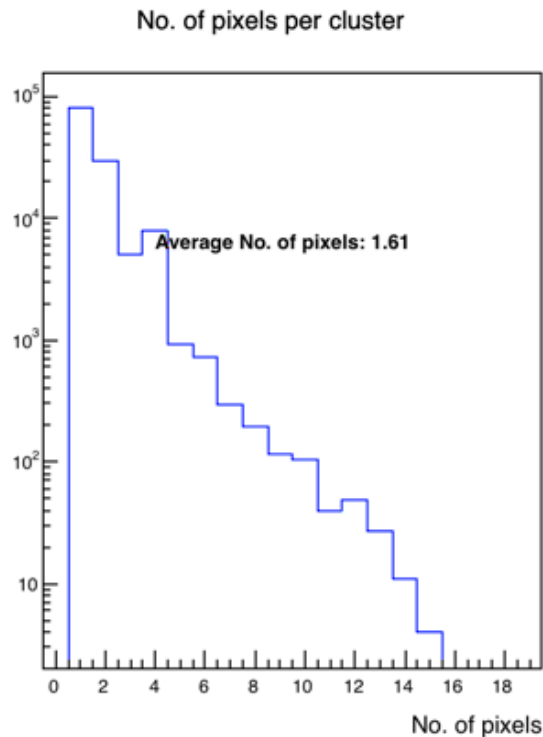
Event by Event information

- Random select four events with zoom in view.



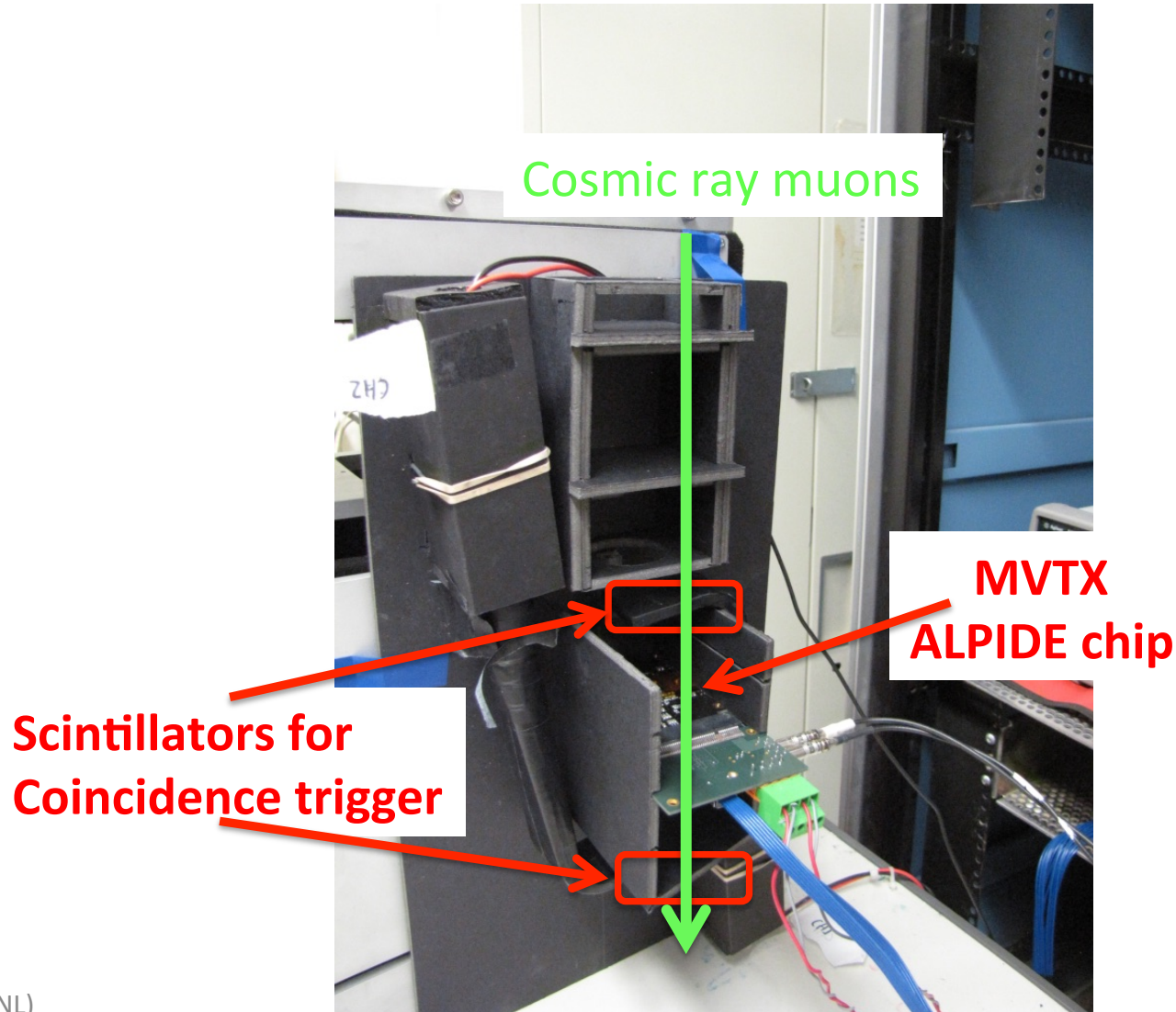
Number of pixels distribution per cluster (Sr^{90})

- Trigger delay time: 2 μs .
- In linear scale.



Set up cosmic ray stands

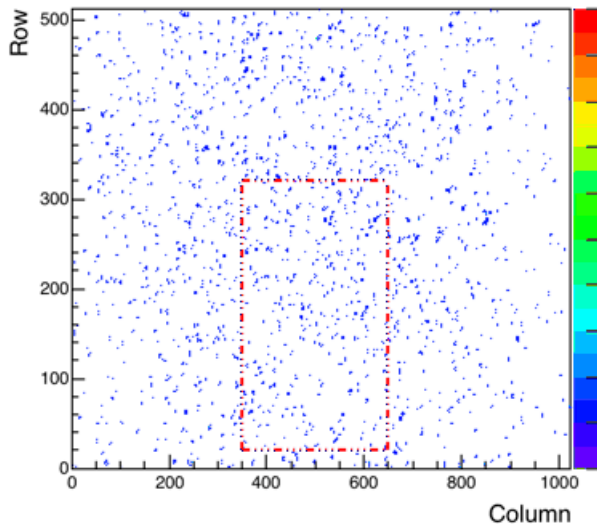
- Trigger delay time 2 μ s.



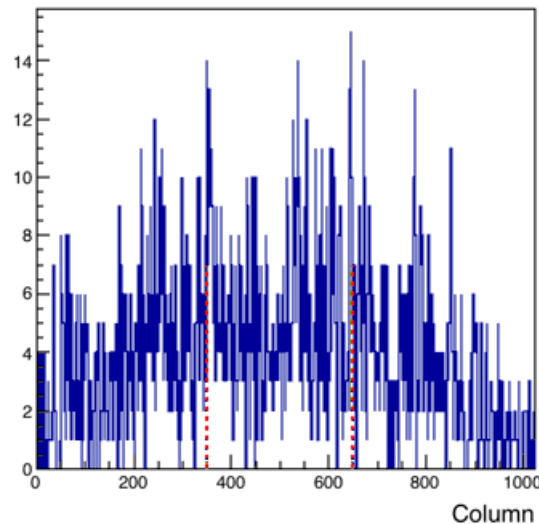
Hit and cluster 2D distribution with cosmic ray

- Pixel map (left), Column profile (middle) and row profile (right).
- Removed noise pixels.

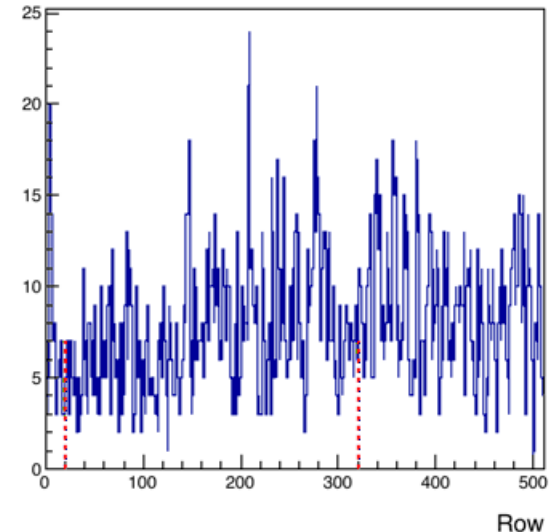
Pixel hit map



Pixel hit map



Pixel hit map

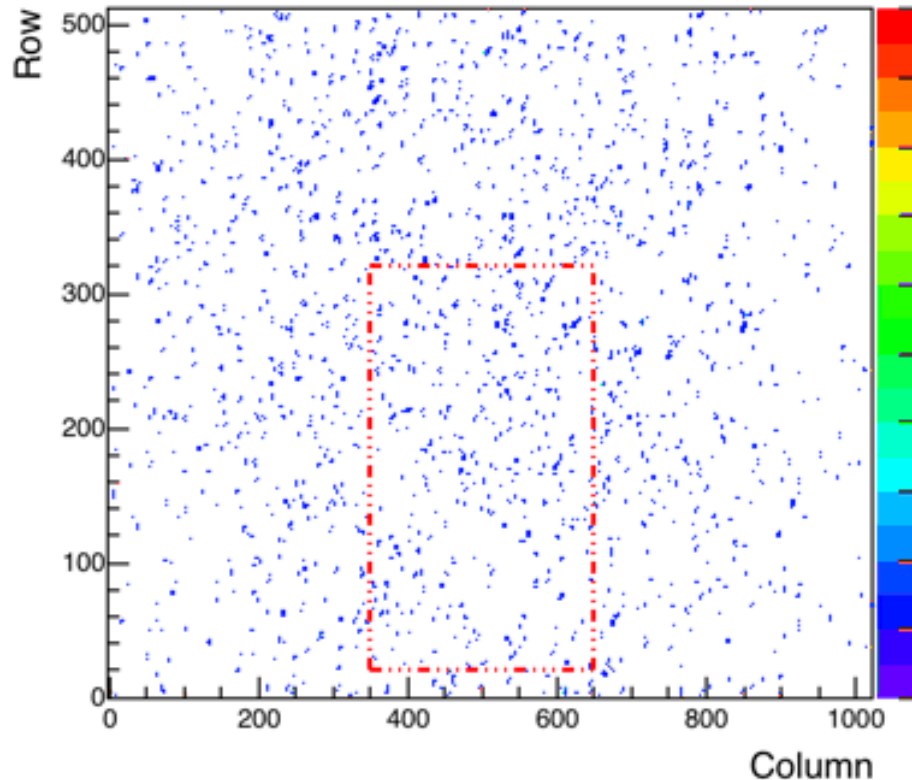


- Random uniform distribution consistent with expectation.

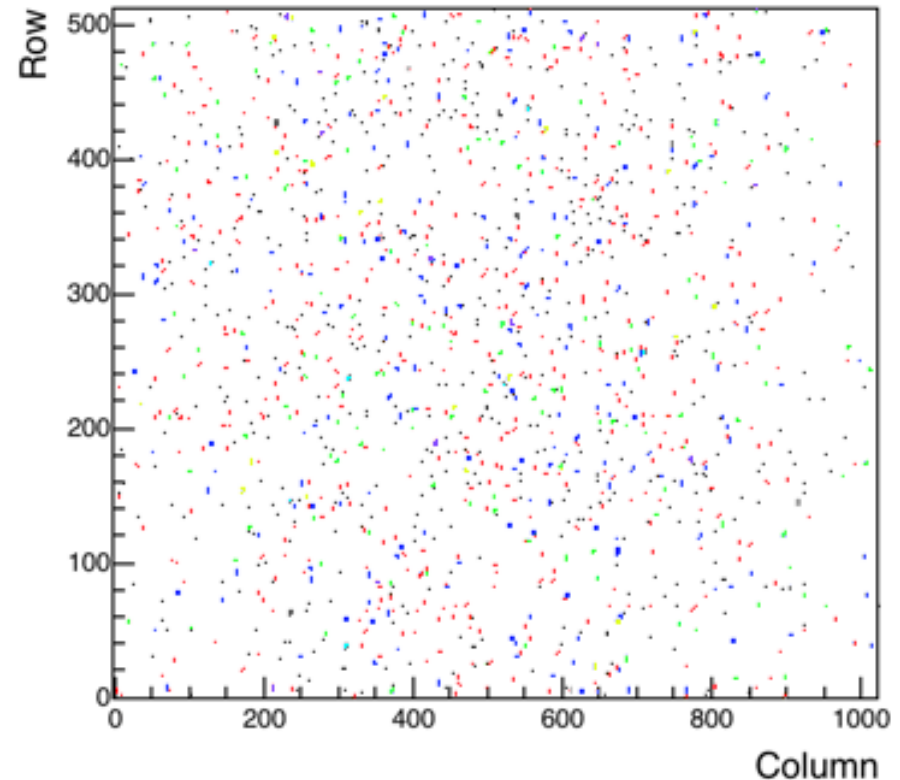
Hit and cluster 2D distribution with cosmic ray

- Pixel map (left), cluster map (right).
- For cluster finder, exclude big size cluster (no. of pixels > 16).

Pixel hit map

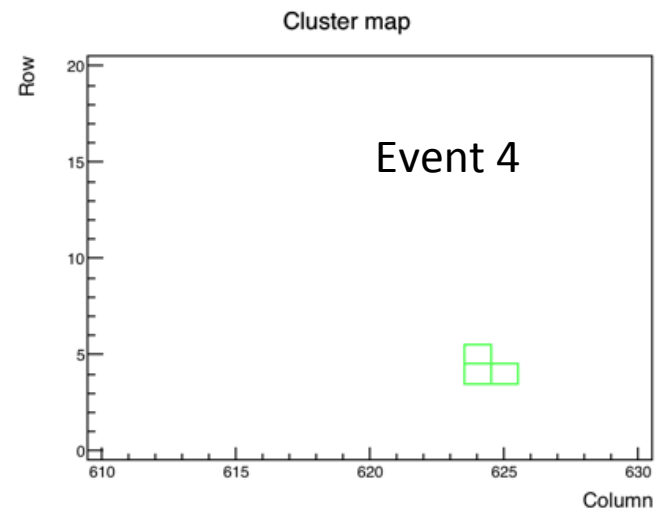
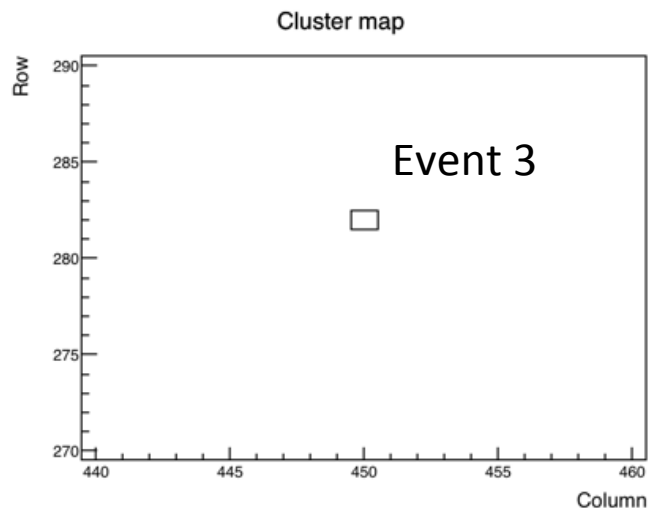
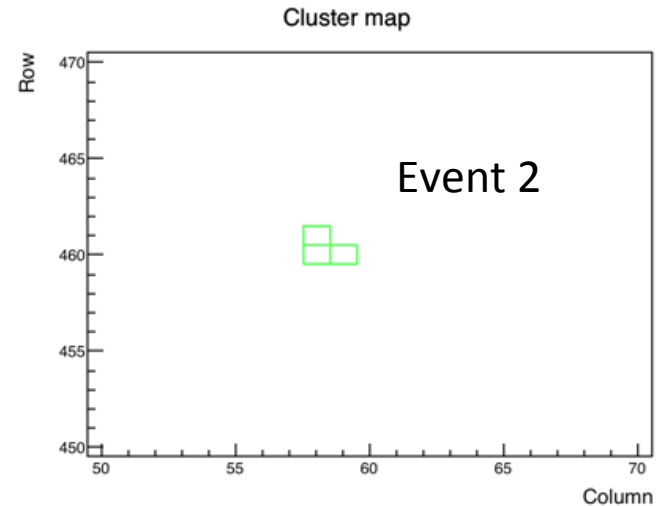
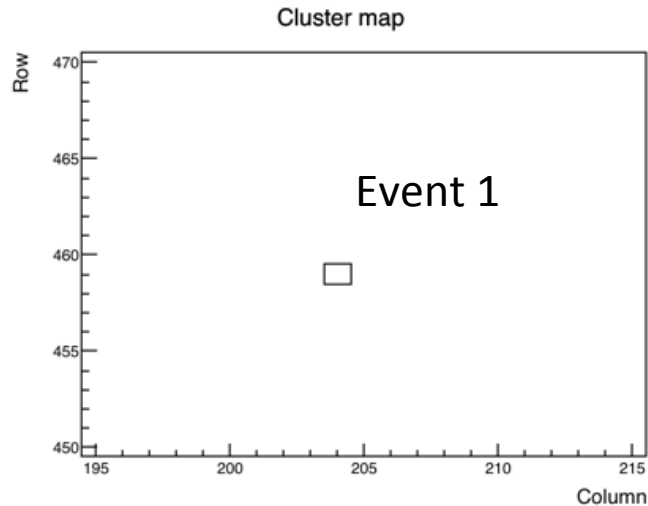


Cluster map



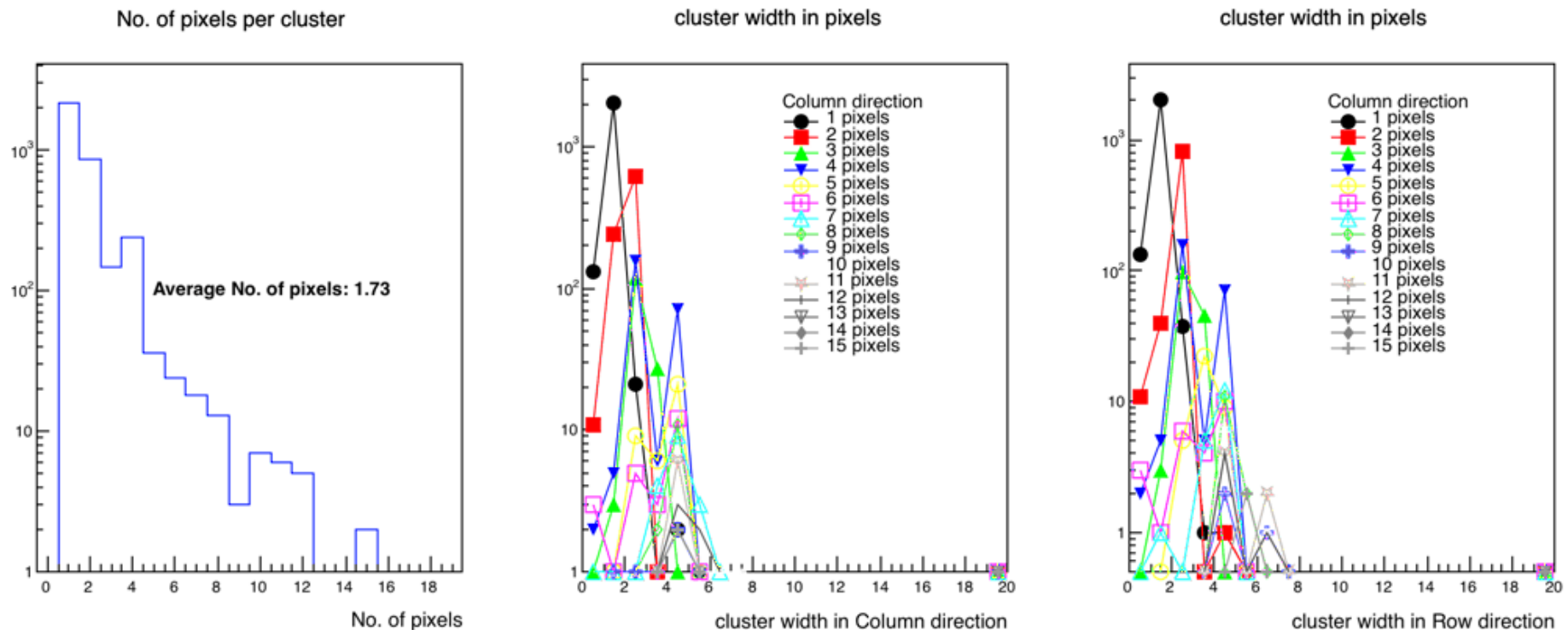
Event by Event information

- Random select four events with zoom in view.



Number of pixels distribution per cluster (Sr^{90})

- Trigger delay time: 2 μs .
- In log scale.



Conclusions

- Cleaner structure from the collimator has been seen from the Sr^{90} test from the trigger events.

To do

- Take long cosmic ray run with the Hubert vertical cosmic ray stands.
- Continue the trigger delay time scan and tune the DAC parameters to modify the pulse shaping time.
- Study the efficiency to check the threshold setting.
- Optimize the parameters to tune the pixel performance.

Backup

Number of pixels distribution per cluster from CERN beam test

- 450 MeV e- beam.

