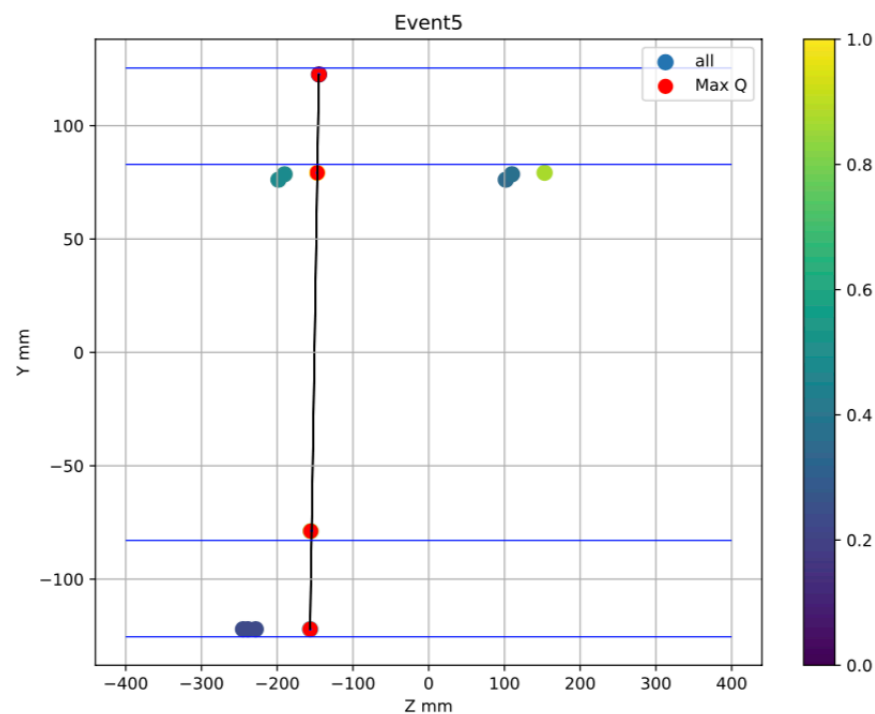
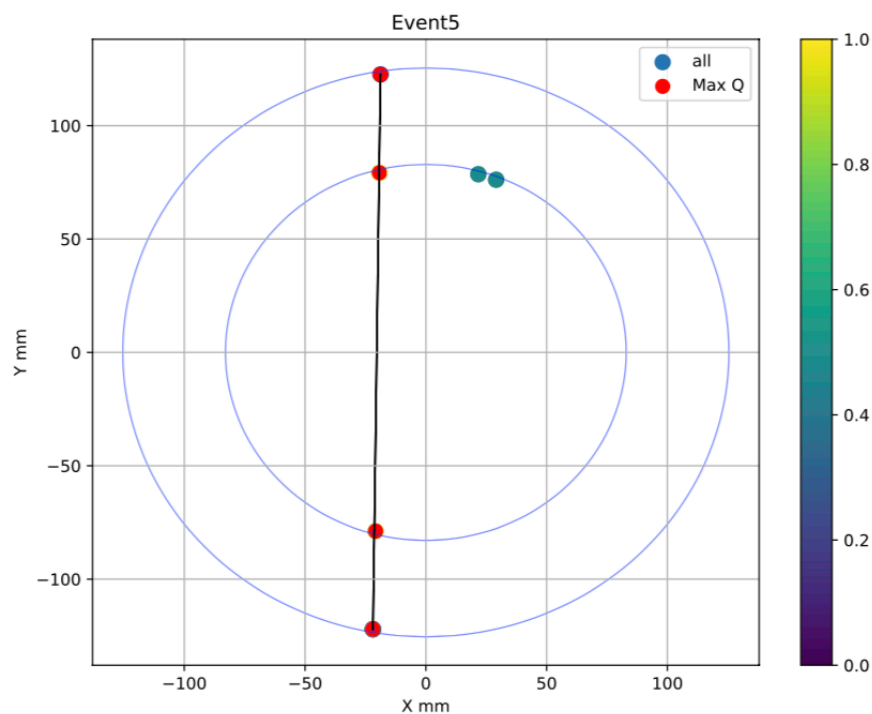


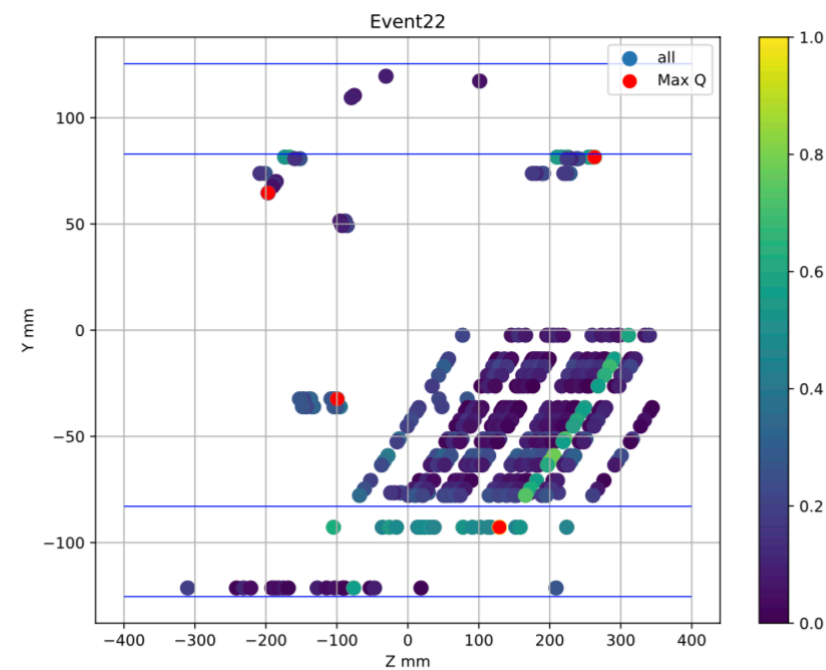
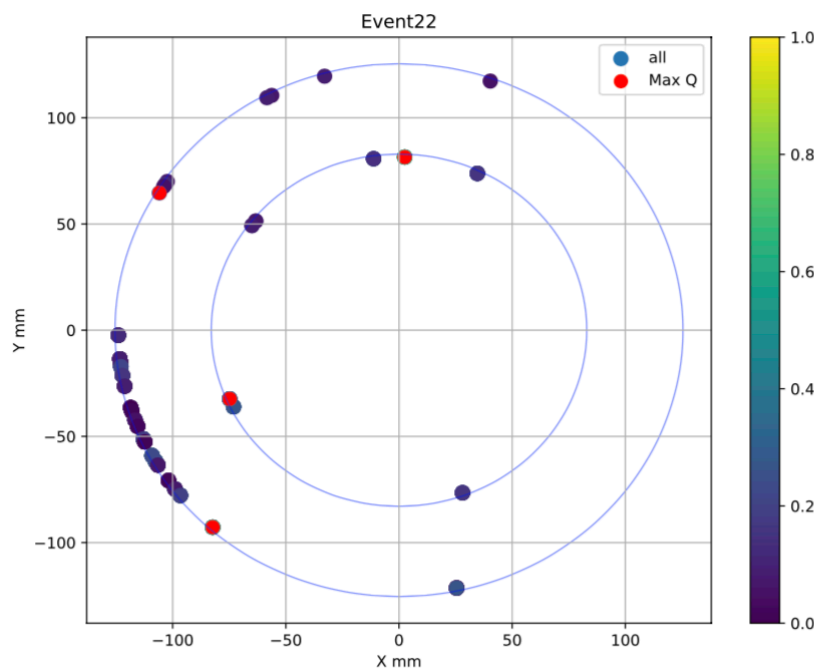
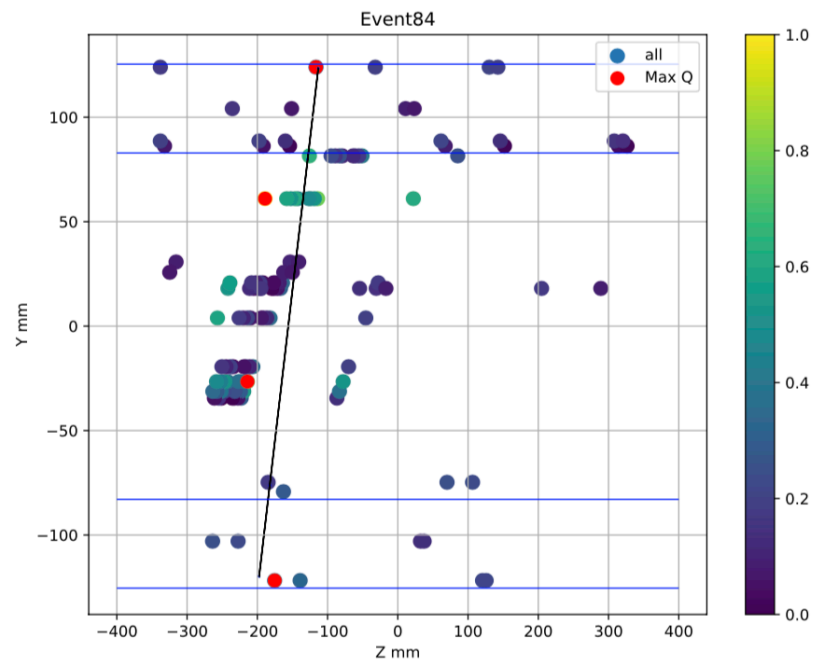
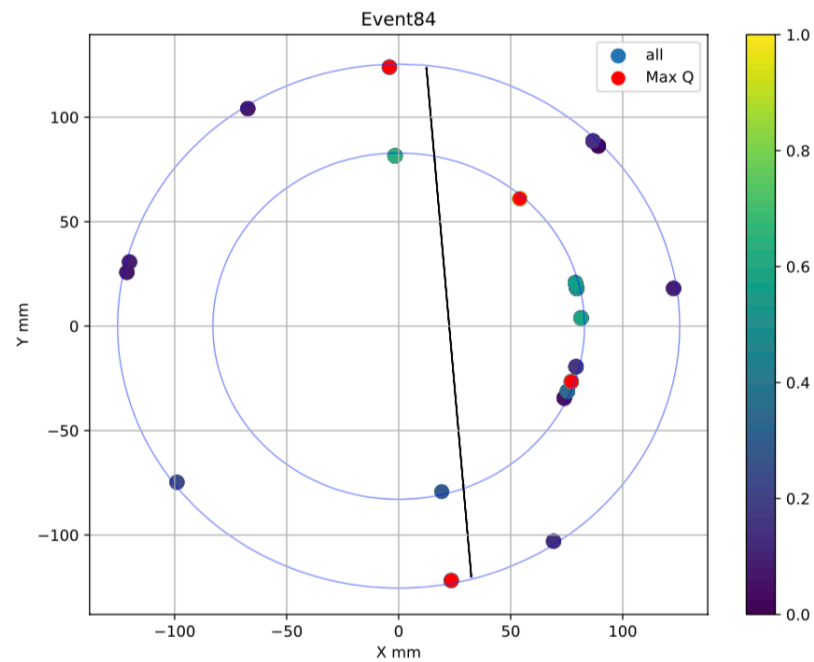
Investigation of comic-ray data

A. Guo, R. Mitchell, L. Wu, L. Wang,
H. Wang, J. Zhao, L. Lavezzi

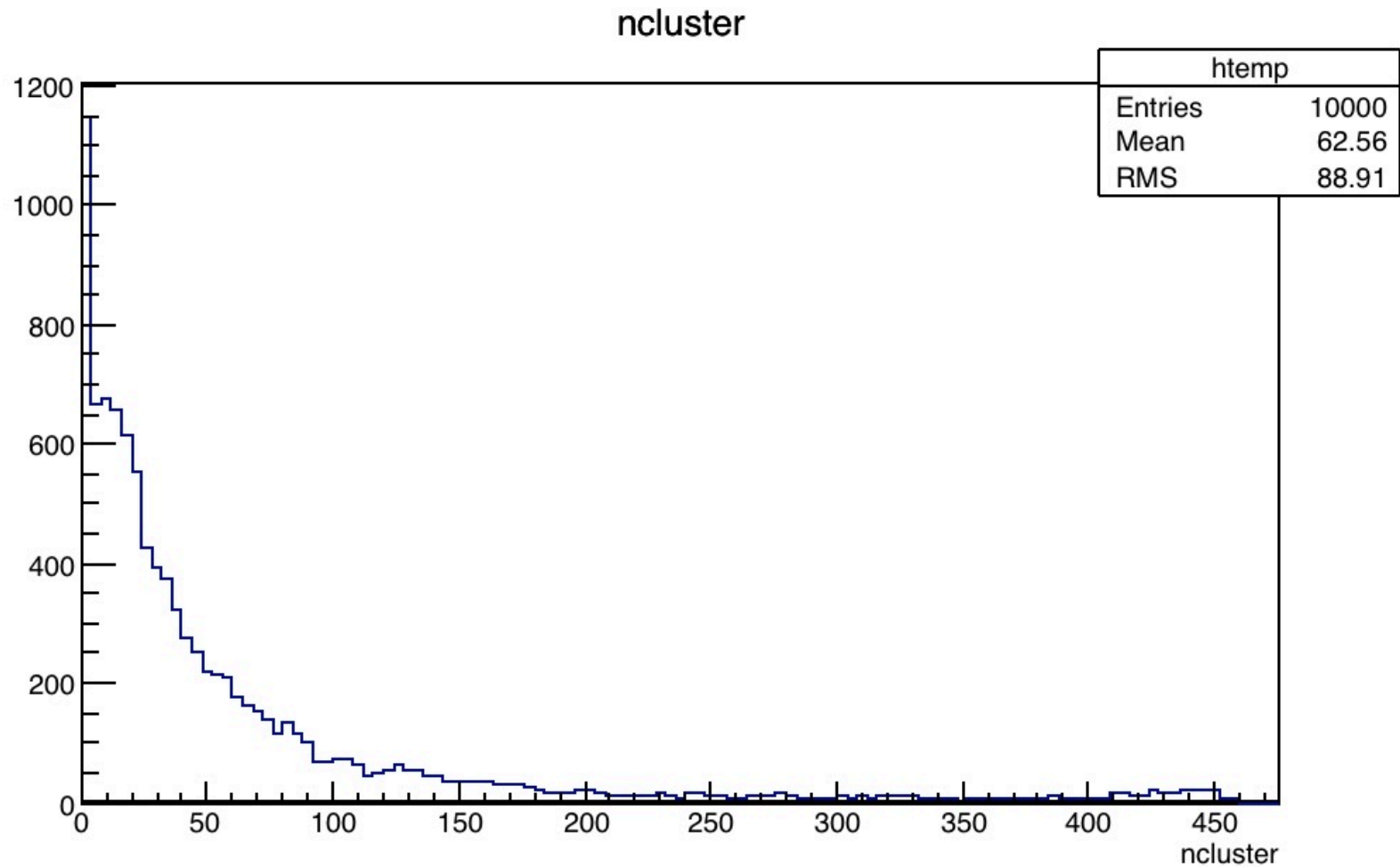
A quick glance of data (Run 17)

- Using Charge centroid method to reconstruct cluster
- Select >3 clusters with largest deposit energy for track fitting
- Based on CgemClusterCreate-00-00-27, CgemLineFit-00-00-06

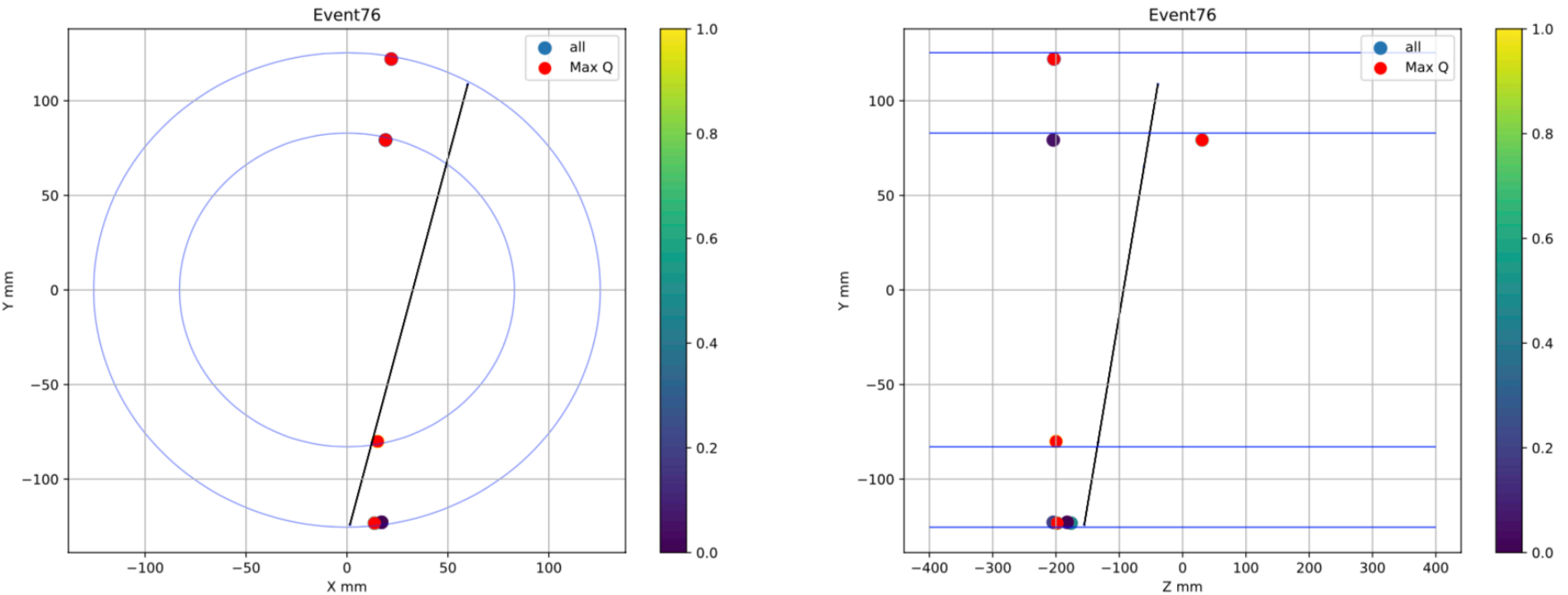




Cluster numbers



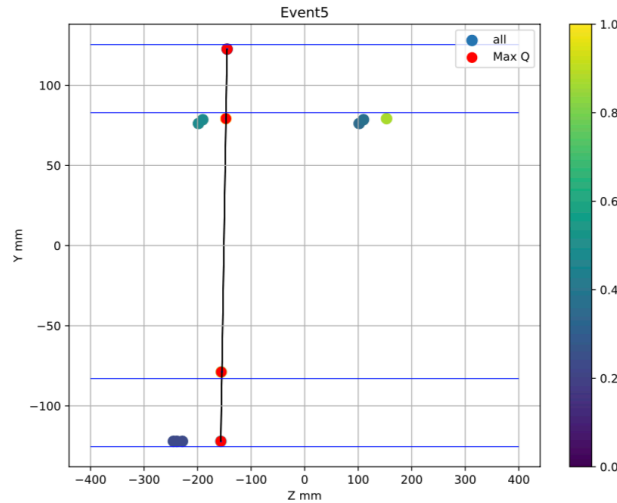
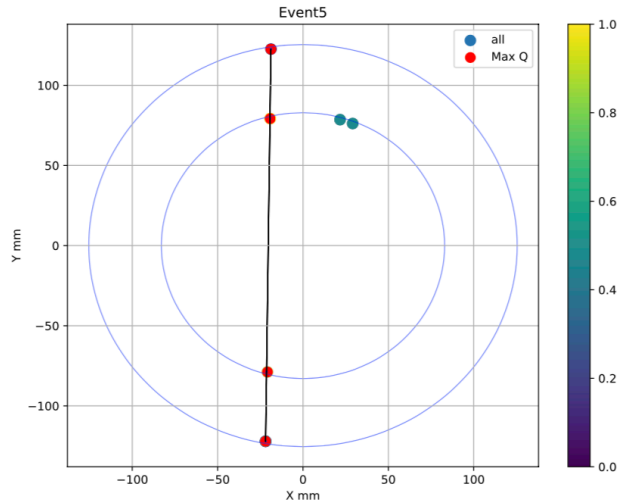
Problem of MaxQ method



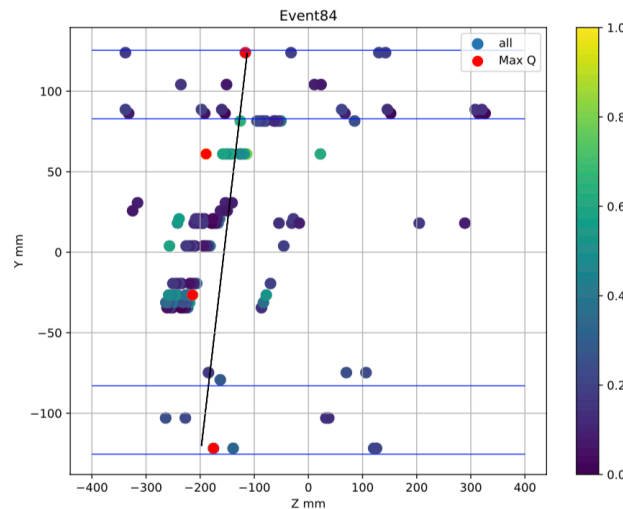
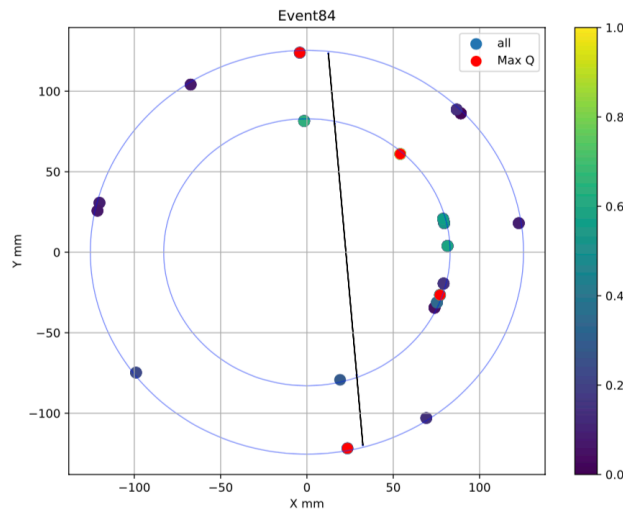
The goal of this study

- Understand the source of noise
 - Electronic noise: Cross talk ?
 - Combinatorial clusters of X and V
- Improve the cluster reconstruction algorithm
 - Comparing the signal and noise cluster
 - Tighten criteria: Q, size
- Improve the pattern recognition if possible, and therefore increase the track finding efficiency
- How to separate signal and noise?

Signal and noise



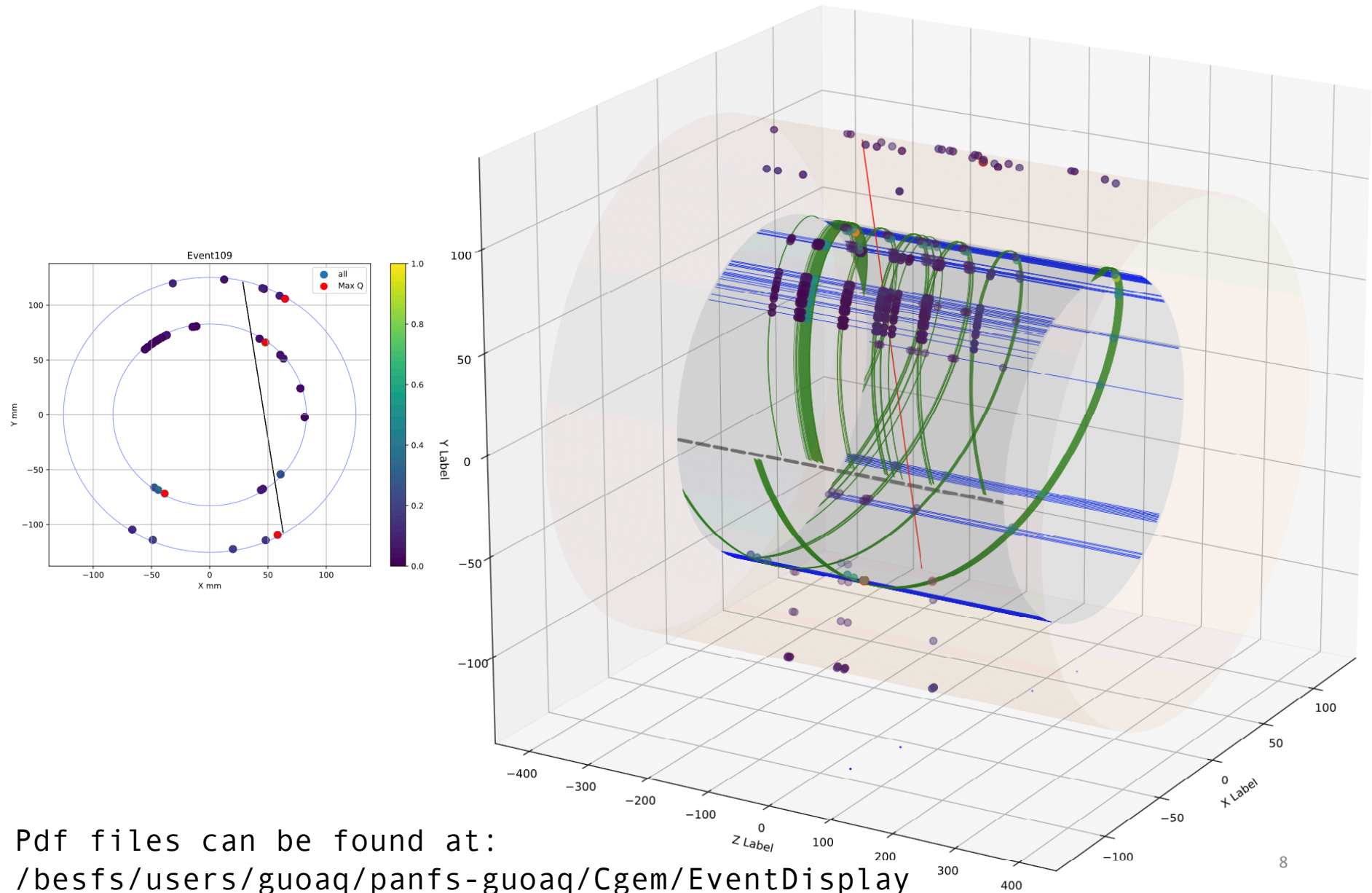
- **Signal**
- **Chisq < 100**
- 4 clusters with maximum deposit energy



- **Noise**
- No. of cluster > 15
- All the clusters excepts the 4 with largest energy

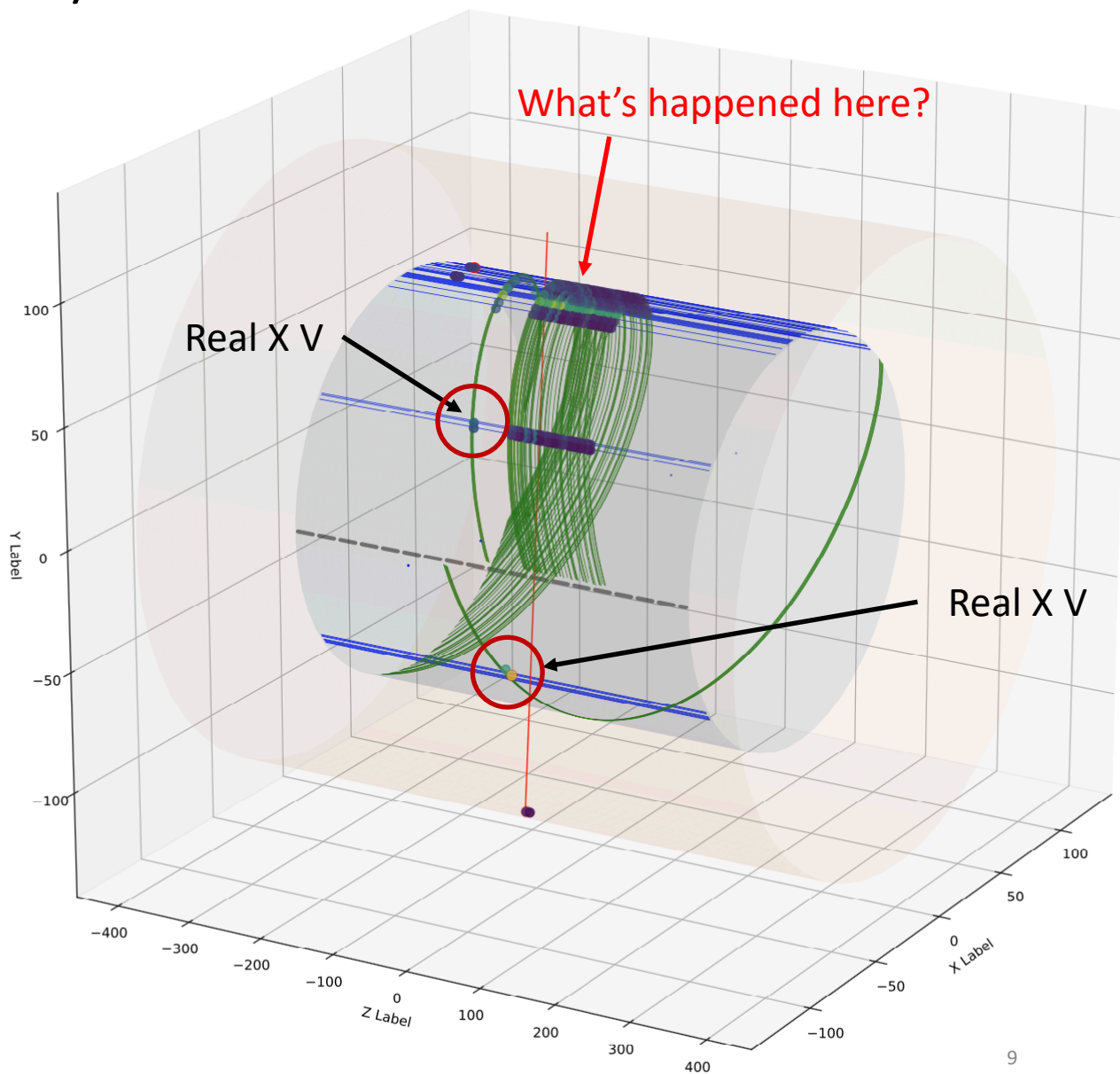
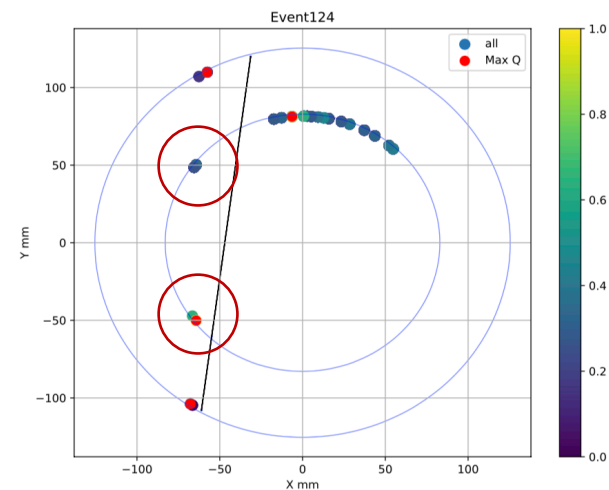
3D event display

Event109



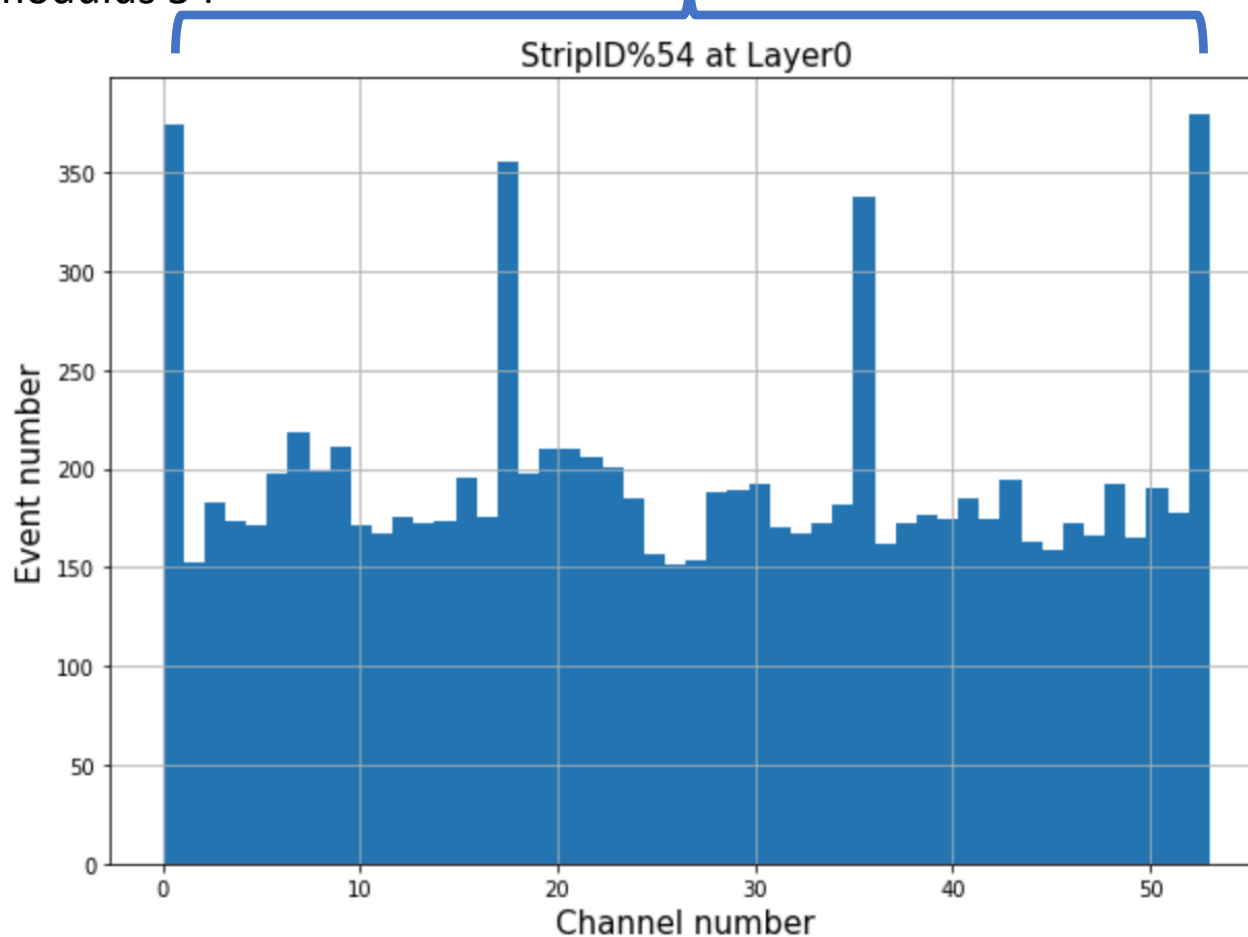
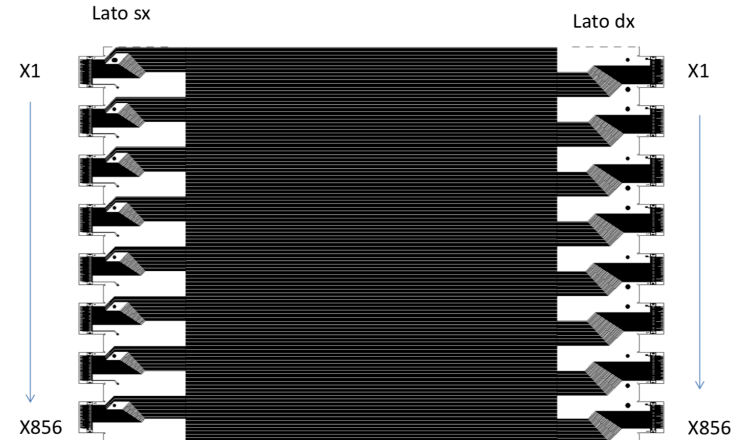
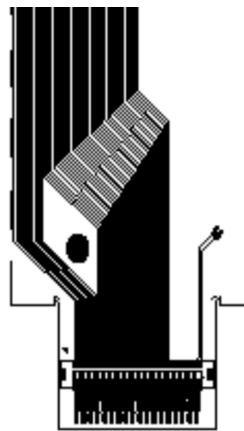
3D event display

Event124

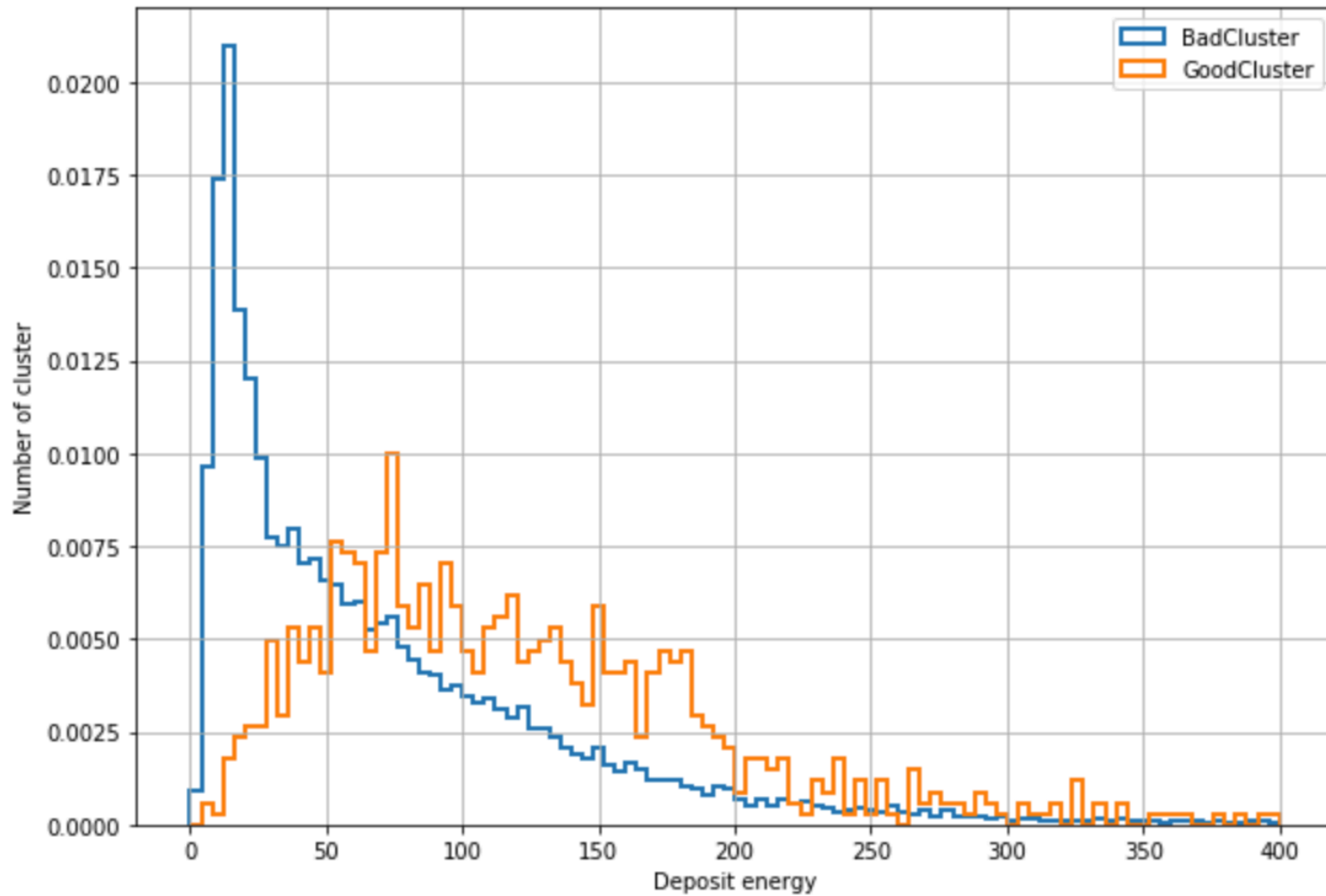


Electronic cross talk?

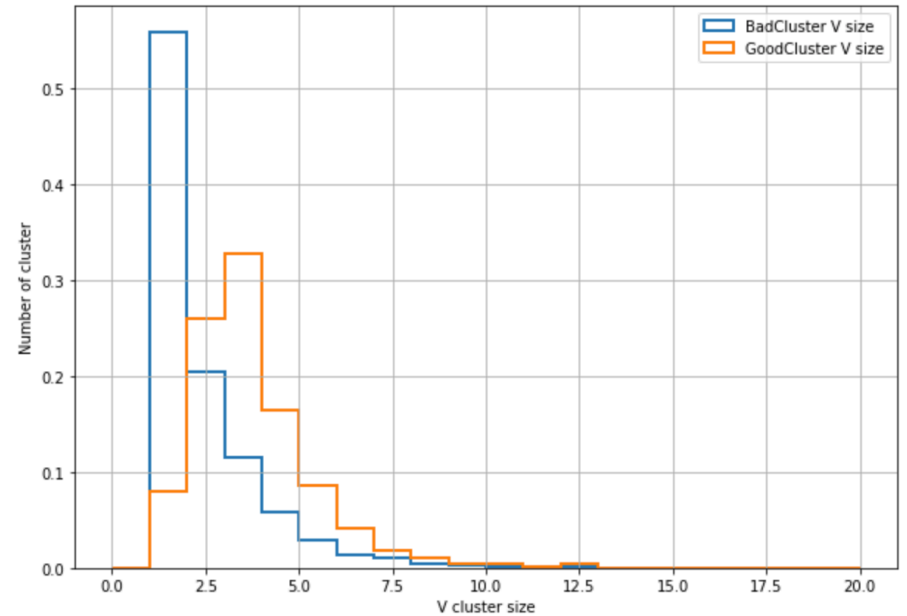
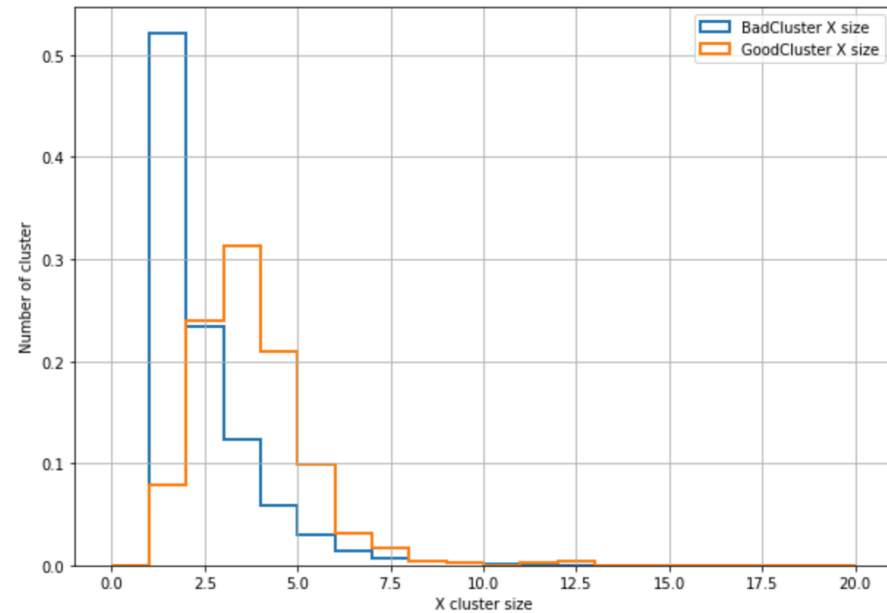
If we assume the cross talk is constrained inside one connector, event number will enhance at the edge channel
Check the remainder of strip ID by modulo operation with modulus 54



How to reduce noise? Deposit energy



How to reduce noise? Cluster size



Requiring the cluster size >1 can reduce noise

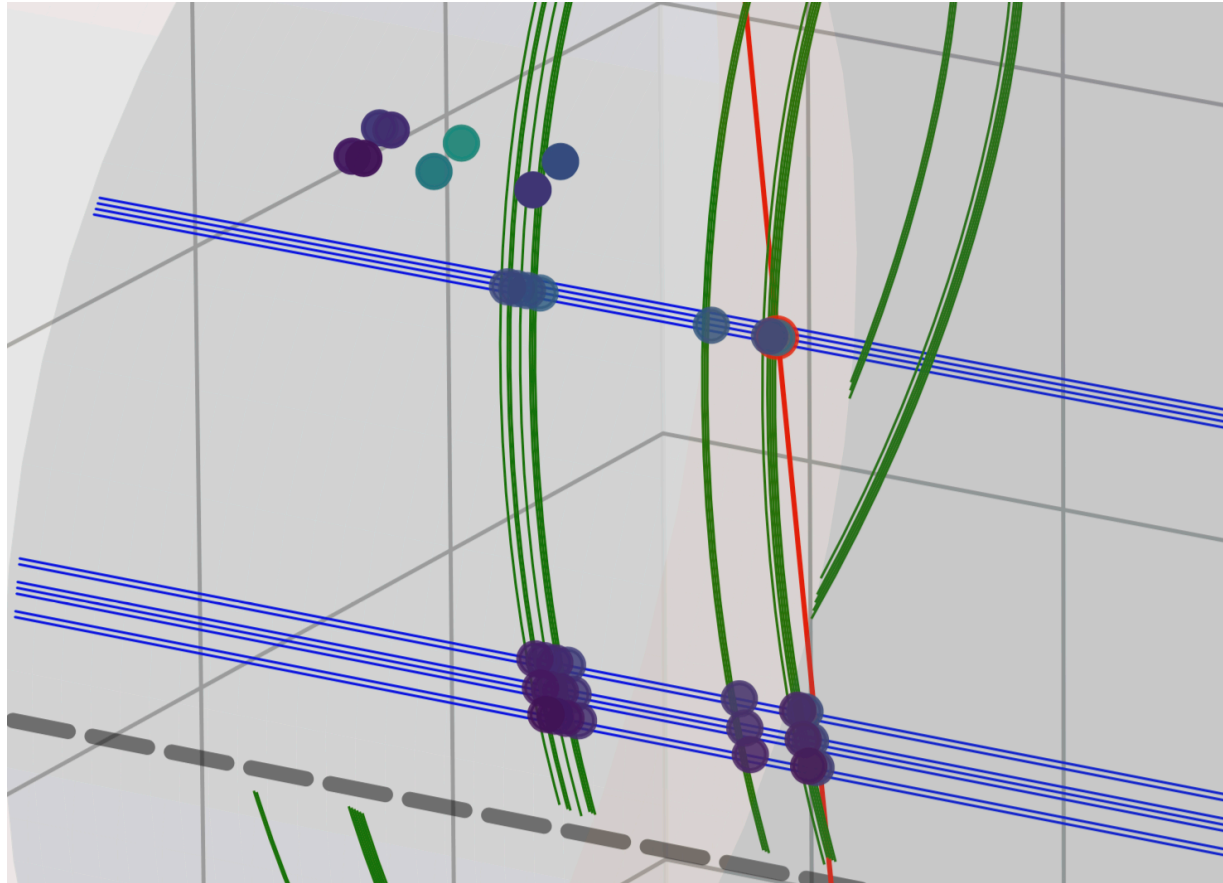
Should we allow missing strip in one cluster?

- **Benefit:**

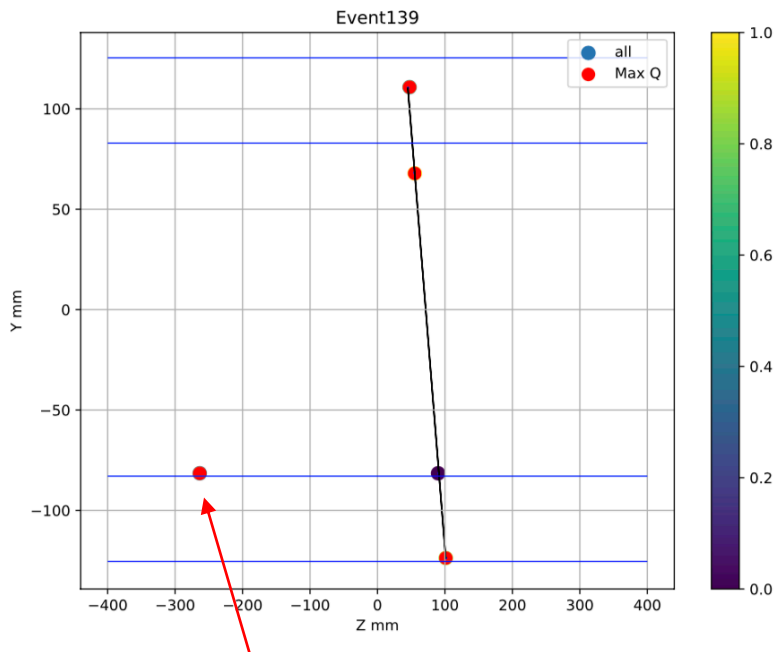
Reduce Combinatorial cluster number

- **Down side:**

probably combine all the noise to form a fake cluster with high deposit energy

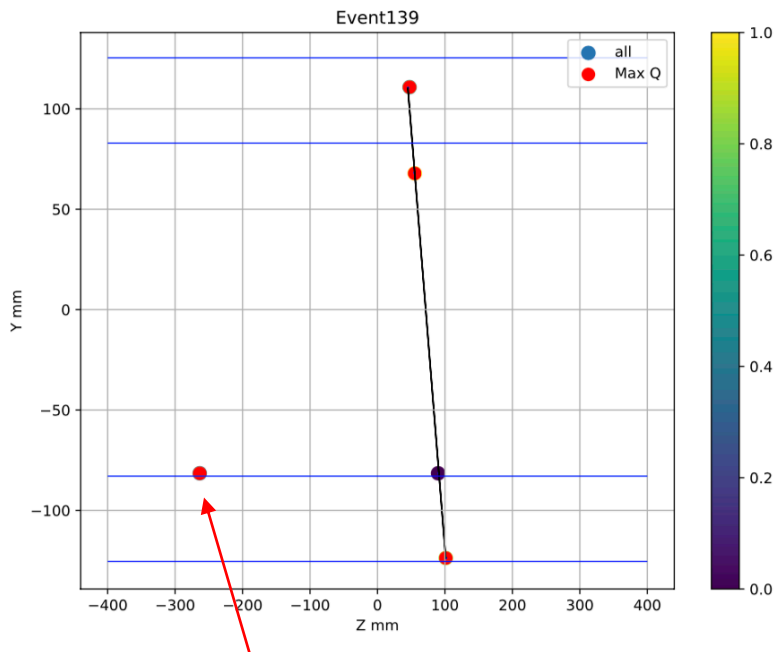


Issue of maxQ method

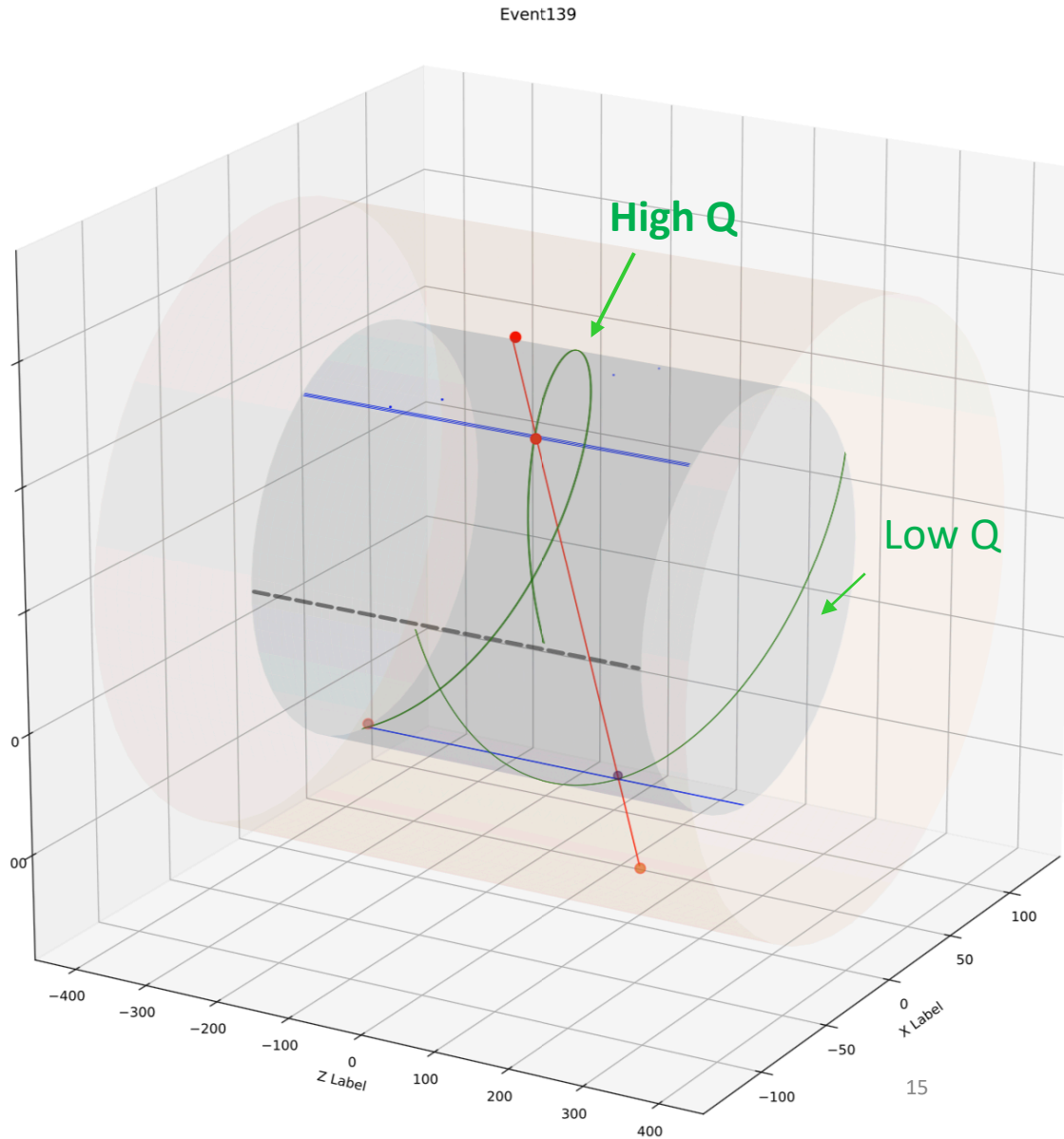


MaxQ method prefers to pick the wrong cluster

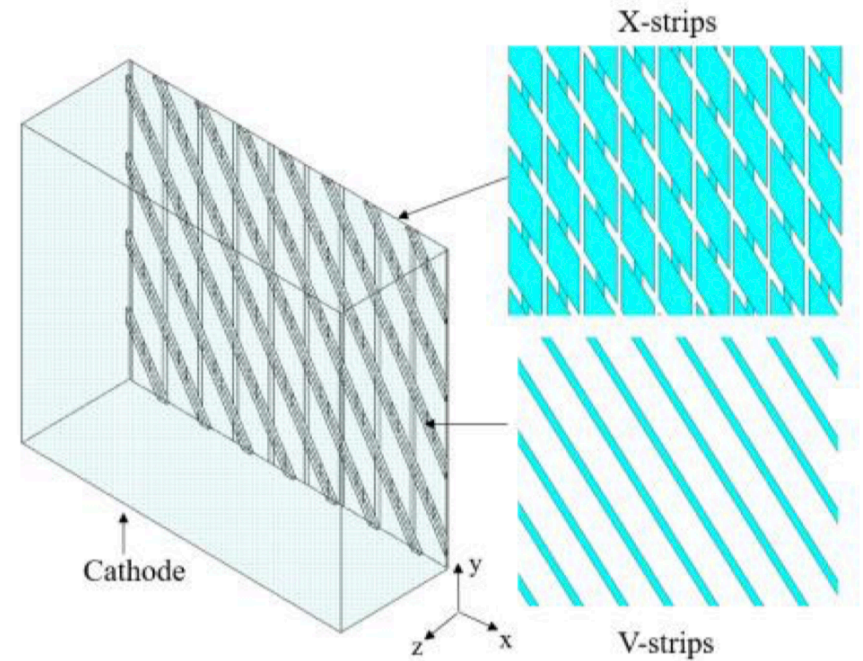
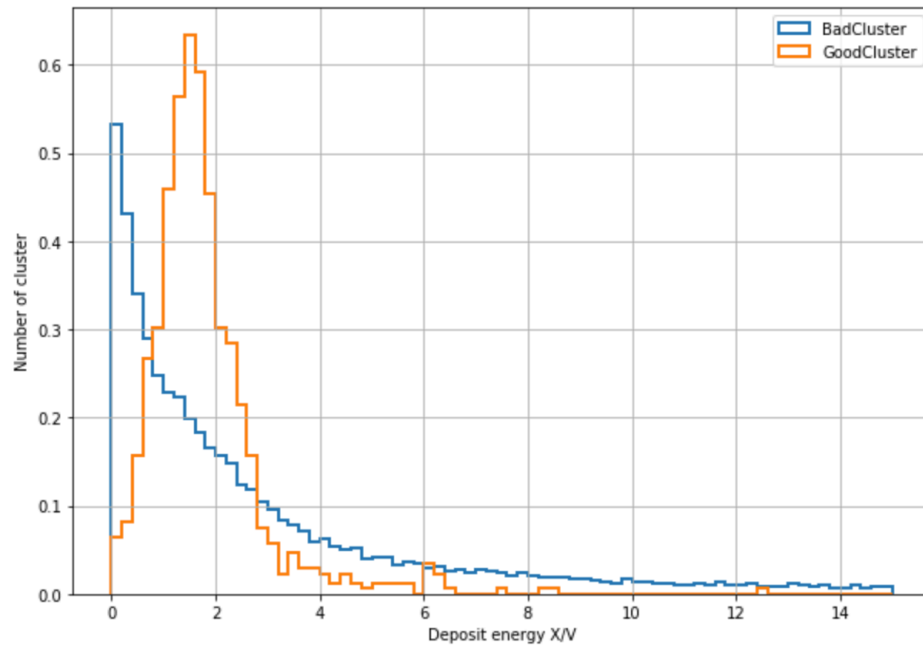
Issue of maxQ method



MaxQ method prefers to pick the wrong cluster due to the higher Q than the right cluster

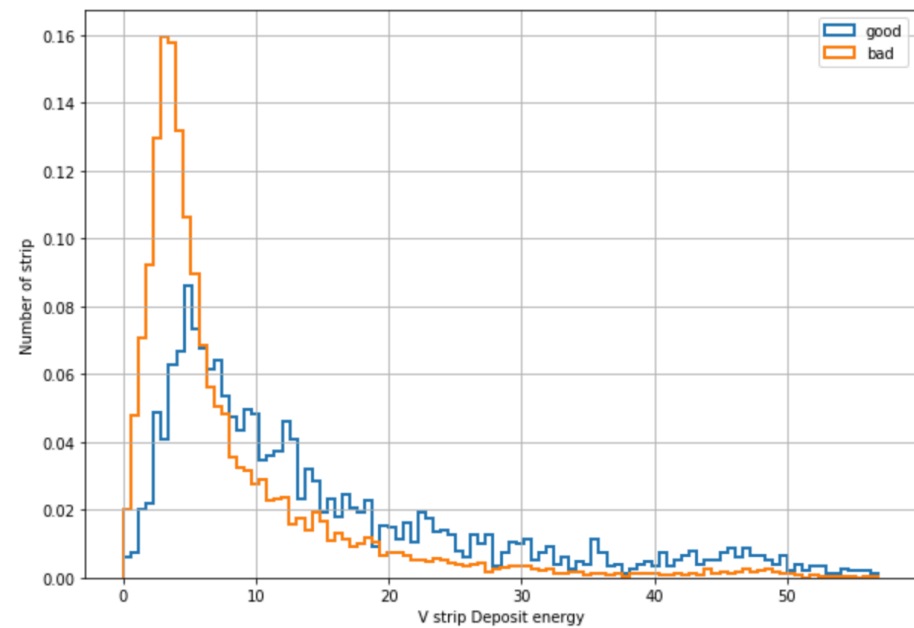
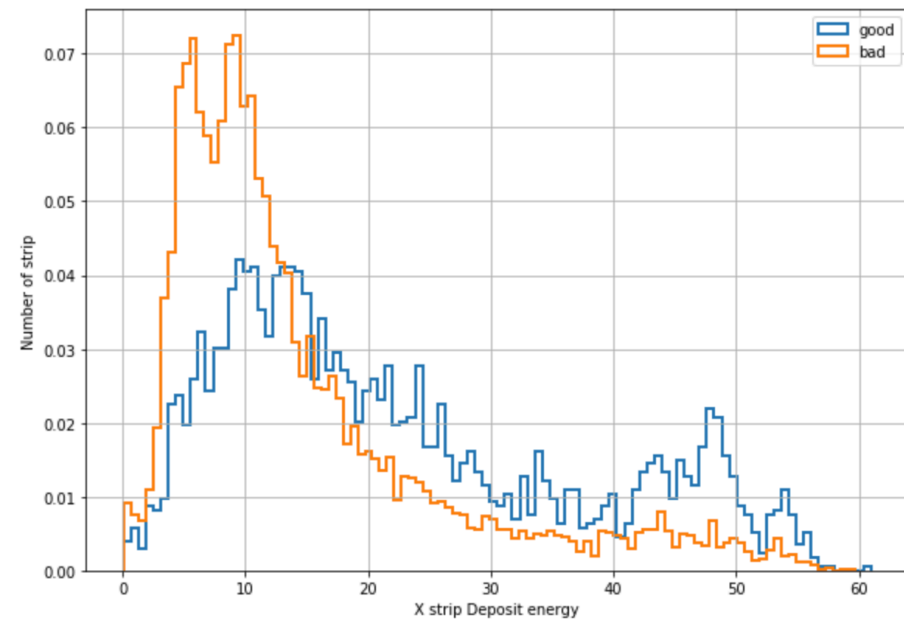


Issue of maxQ method

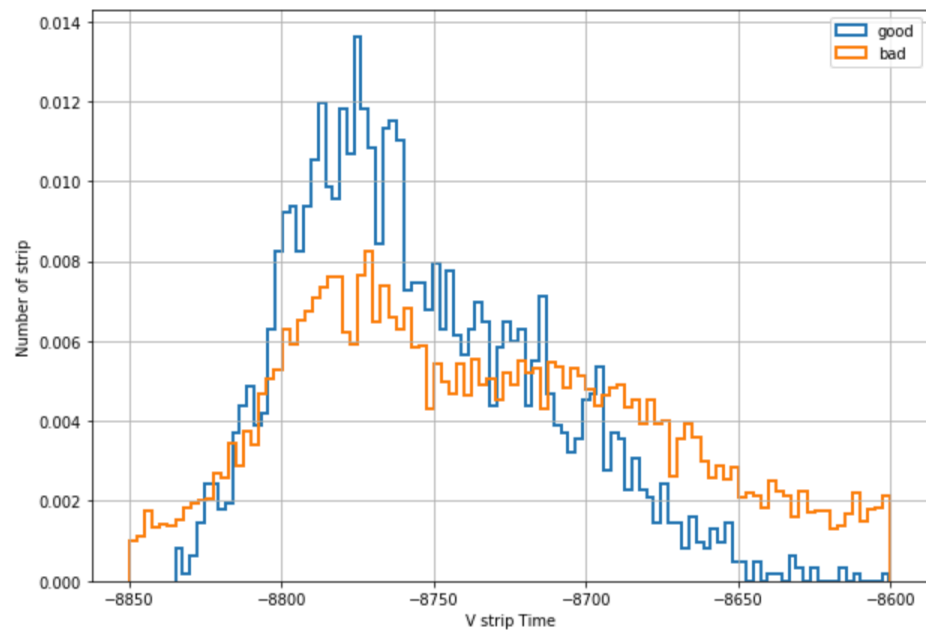
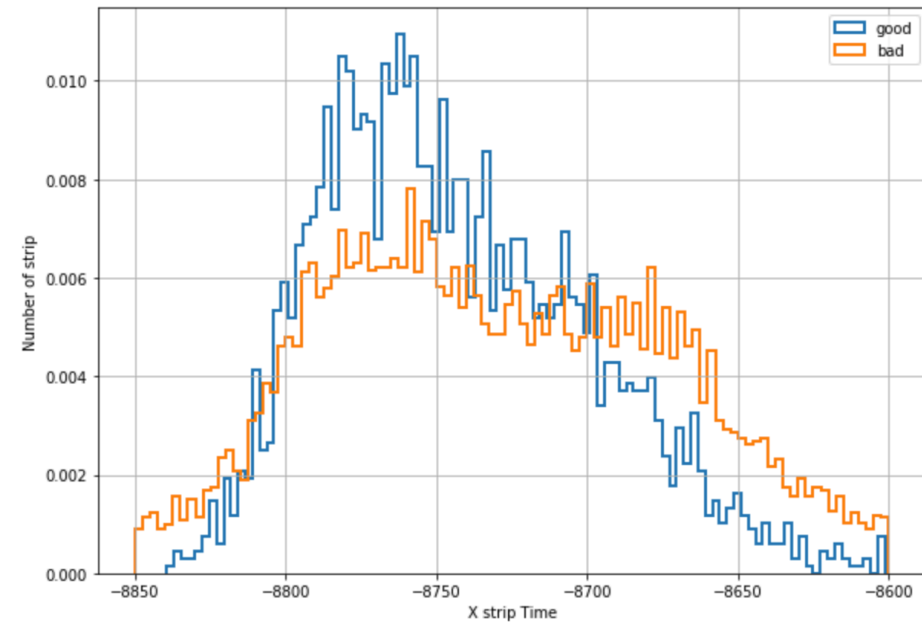


The QX/QV is expected larger than 1 for the real fired strips with right combination

Comparison of strip information: charge



Comparison of strip information: Time



Summary

- The latest cosmic-ray data is investigated to understand the source of noise
- What we have learnt:
 - Electronic cross talk?
 - Multiple combination of X and V 1D cluster (real and noise)
 - Multiple combination of real fired X and V 1D cluster
 - The last one also produce problem of pattern recognition
- How to reduce the noise and improve tracking efficiency
 - Tighten deposit energy or cluster size will reduce noise
 - QX/QV could be helpful to distinguish right combination
 - Constraints on Q or T of strip seems not helpful

Thank you!