

Preliminary Data From pRad GEM Chamber after noise cancellation

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Contents

- U.Va Test Setup
- Raw Signal
- Noise Cancellation
- Cosmic Test
- Sr-90 Source Test
- Summary



U.Va Test Setup

Setup

- APV cards distributed on 3 FEC cards for this Test. In reality, two pRad chambers needs 5 FEC cards in total.
- Two big Scintilators serve trigger for Cosmic Test.
- A very small Scintalitor receives radiation from Sr-90 Source, serves as trigger for radioactive source Test.
- Trigger Sent to SRS-SRU and then Distributed to each FEC.



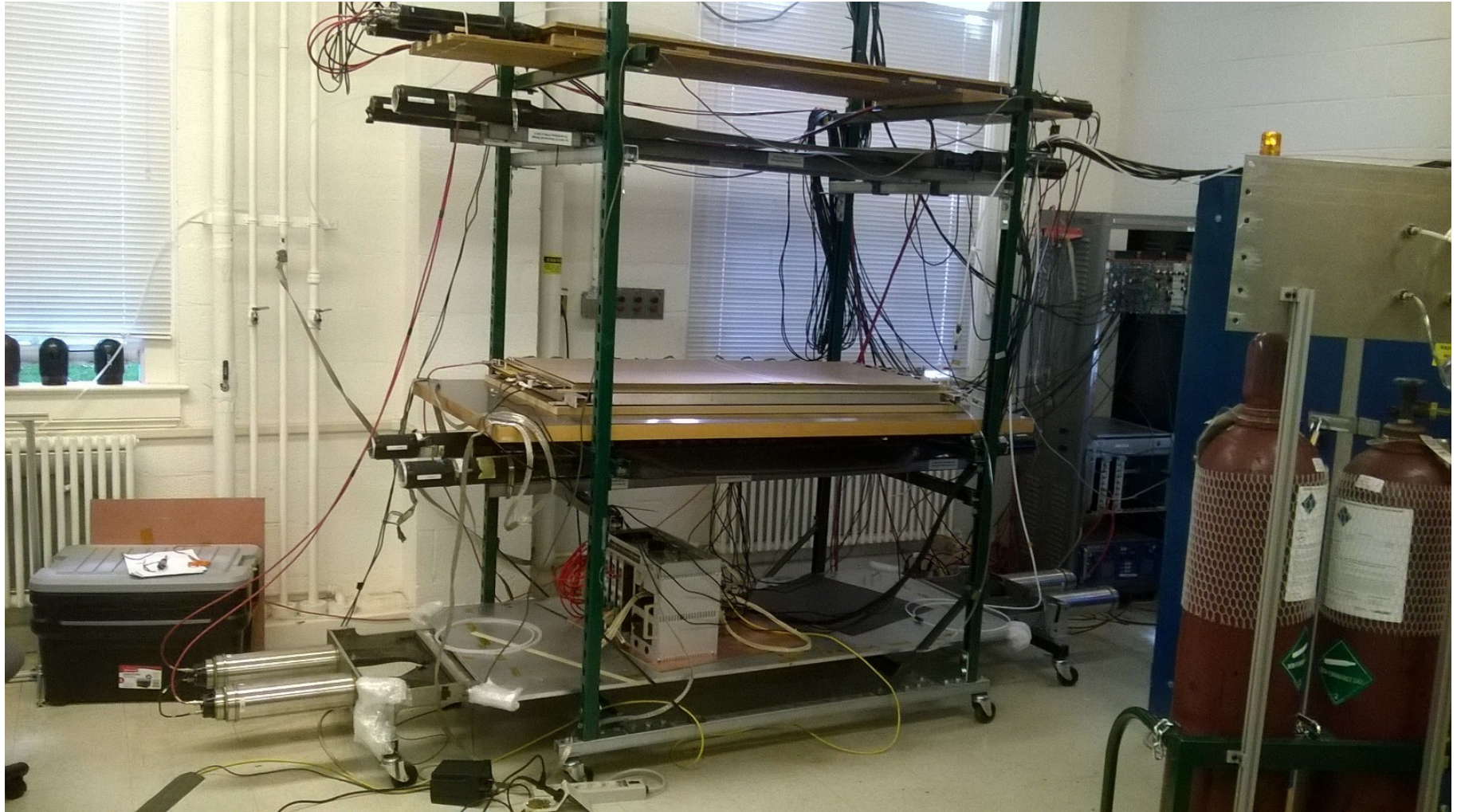
U.Va Test Setup

SRS System



U.Va Test Setup

Cosmic Stand



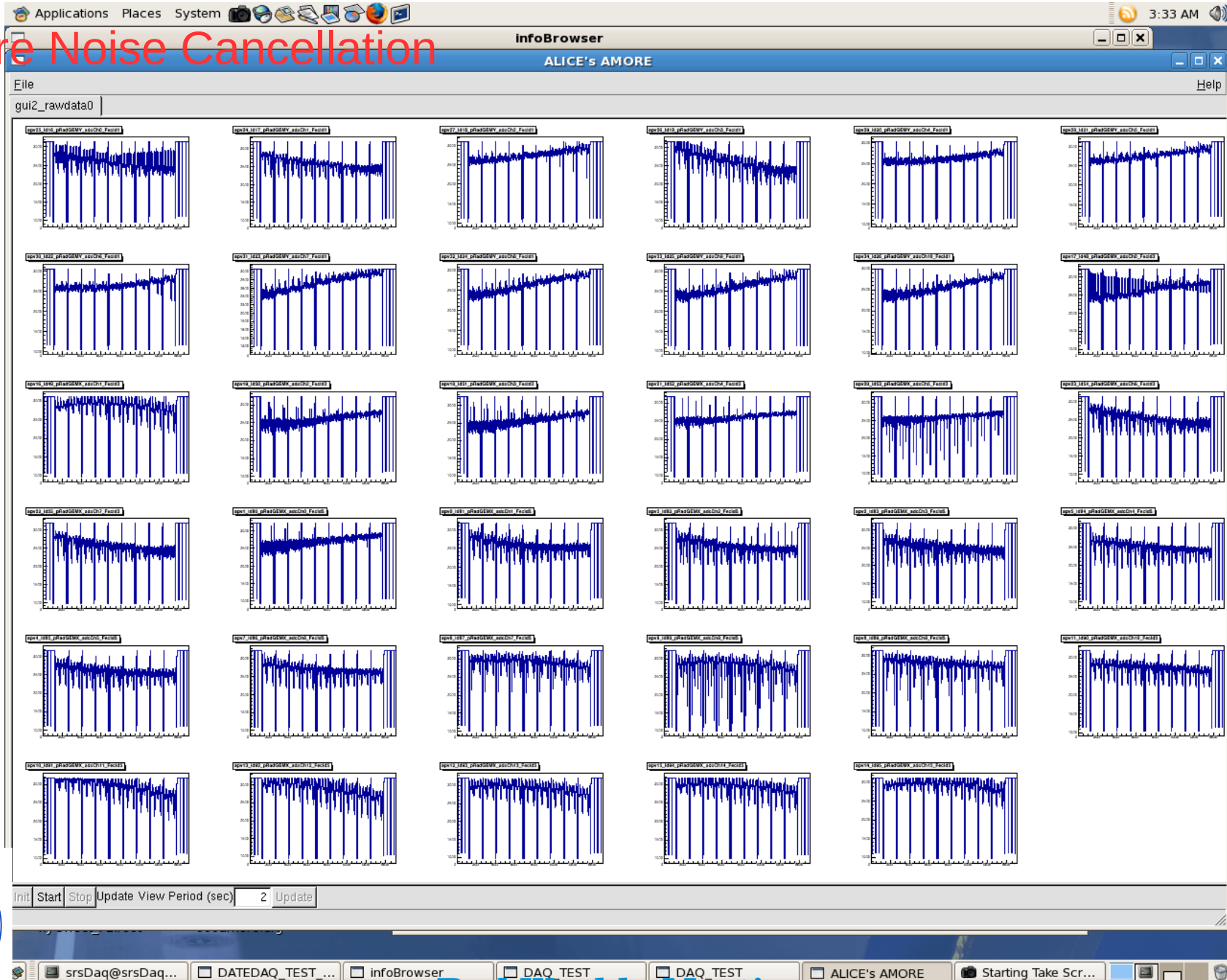
U.Va Test Setup

X-ray Box



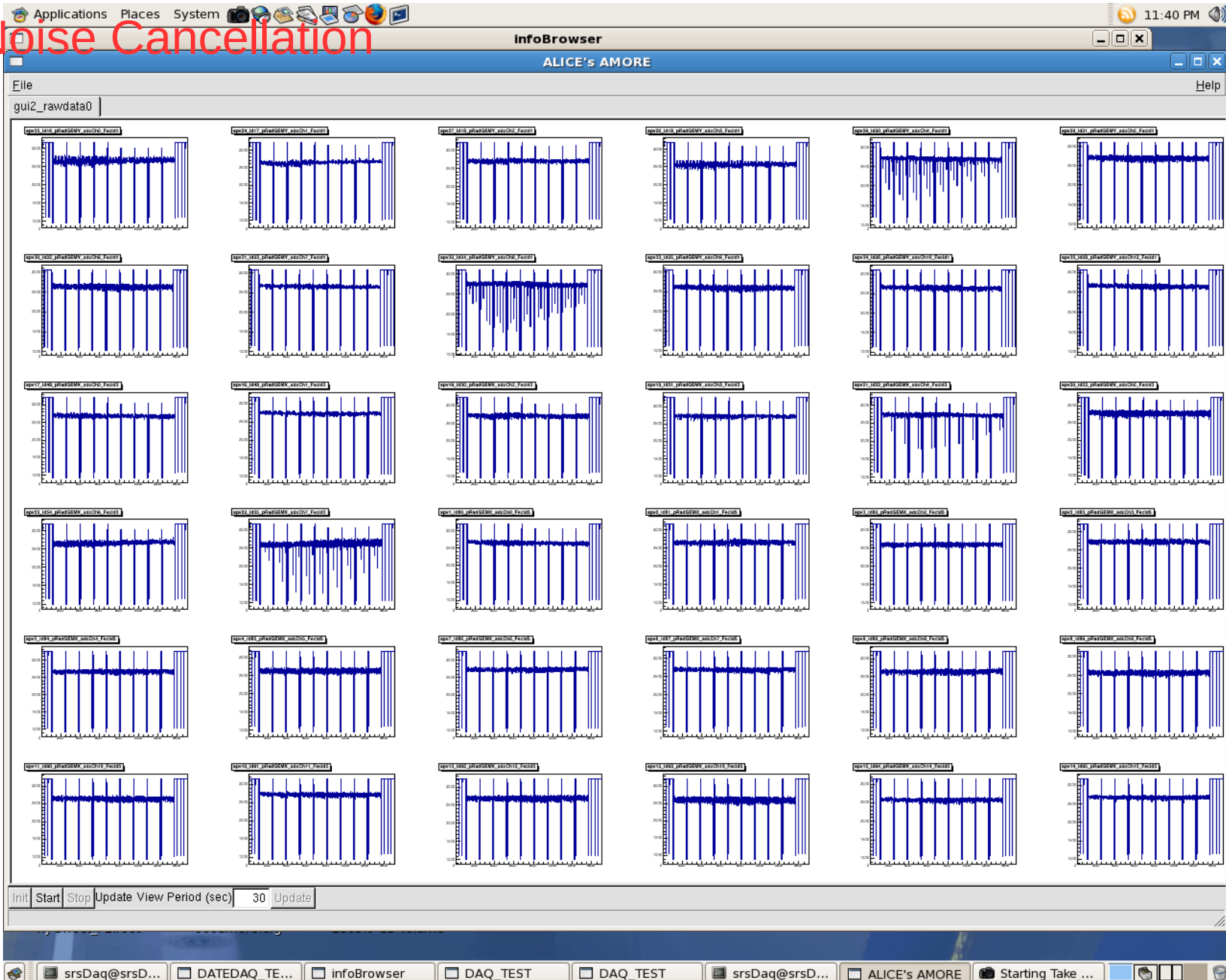
Raw Signal

Before Noise Cancellation

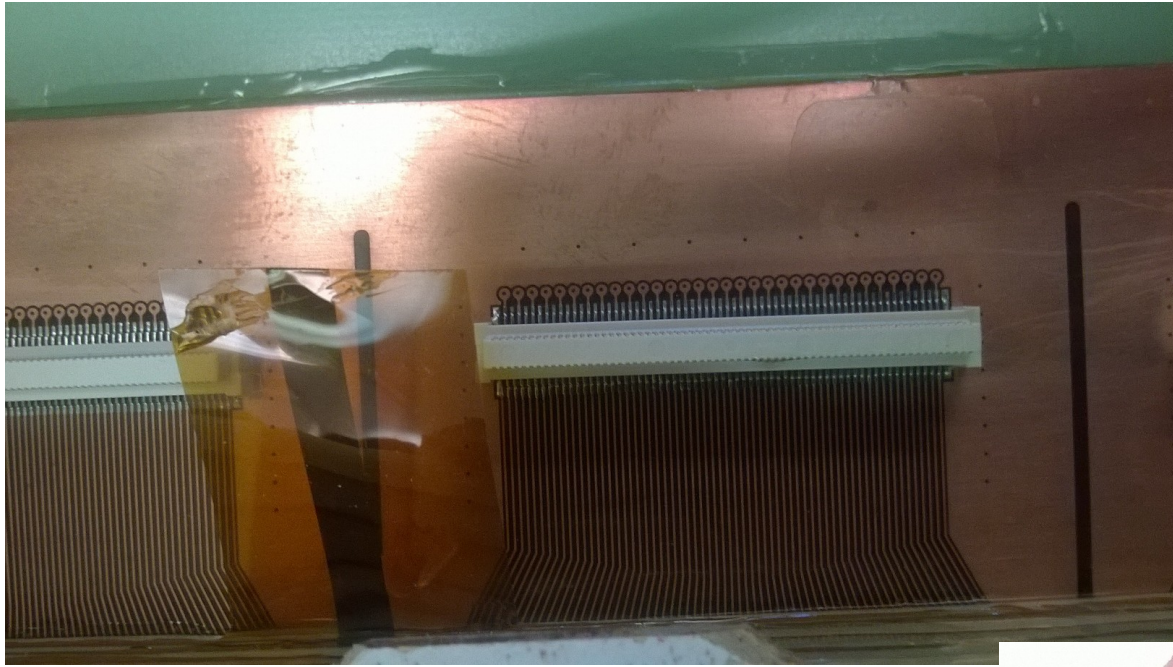


Raw Signal

After Noise Cancellation



Noise Cancellation



SBS Panasonic Connector

- 130 pins on panasonic connectors.
- 128 pins serve as signal lines to APV chip
- 2 extra pins provide ground level to APV front end card.

Capacitance Between Strips:

pRad:

Top Long Strip: $\sim 55\text{pF}$

Top Short Strip: $\sim 25\text{pF}$

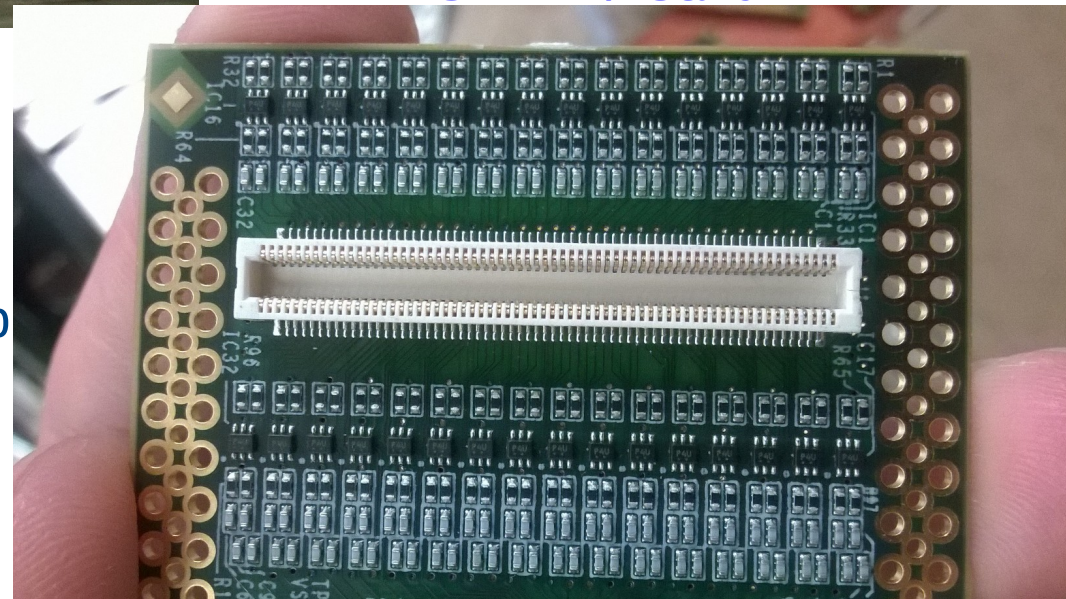
Bottom Strip: $\sim 55\text{pF}$

SBS:

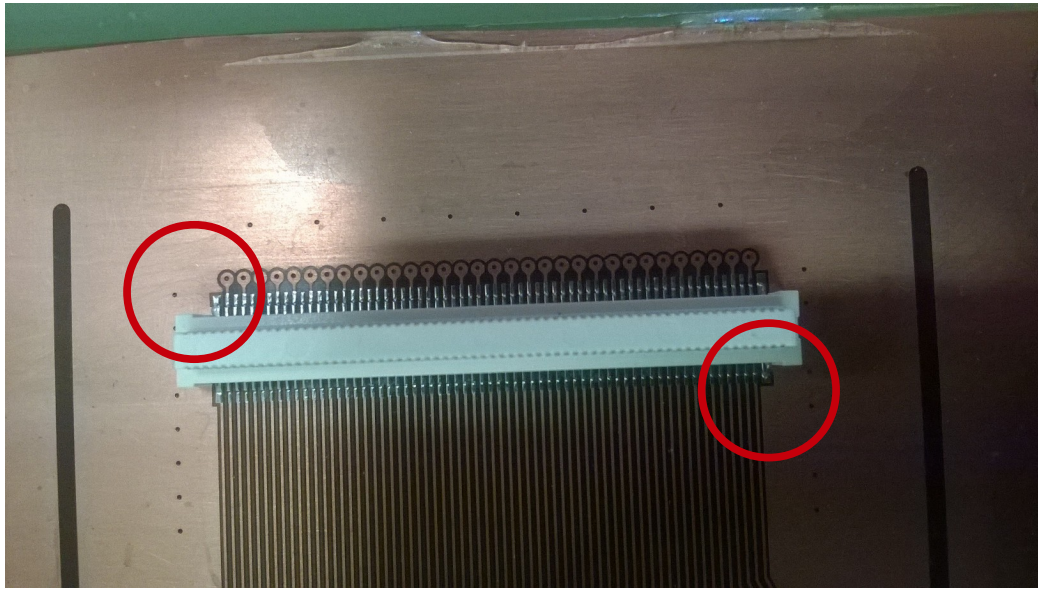
Top Strips: $\sim 25\text{pF}$

Bottom Strips: $\sim 55\text{pF}$

**Panasonic Connector
On APV Card**

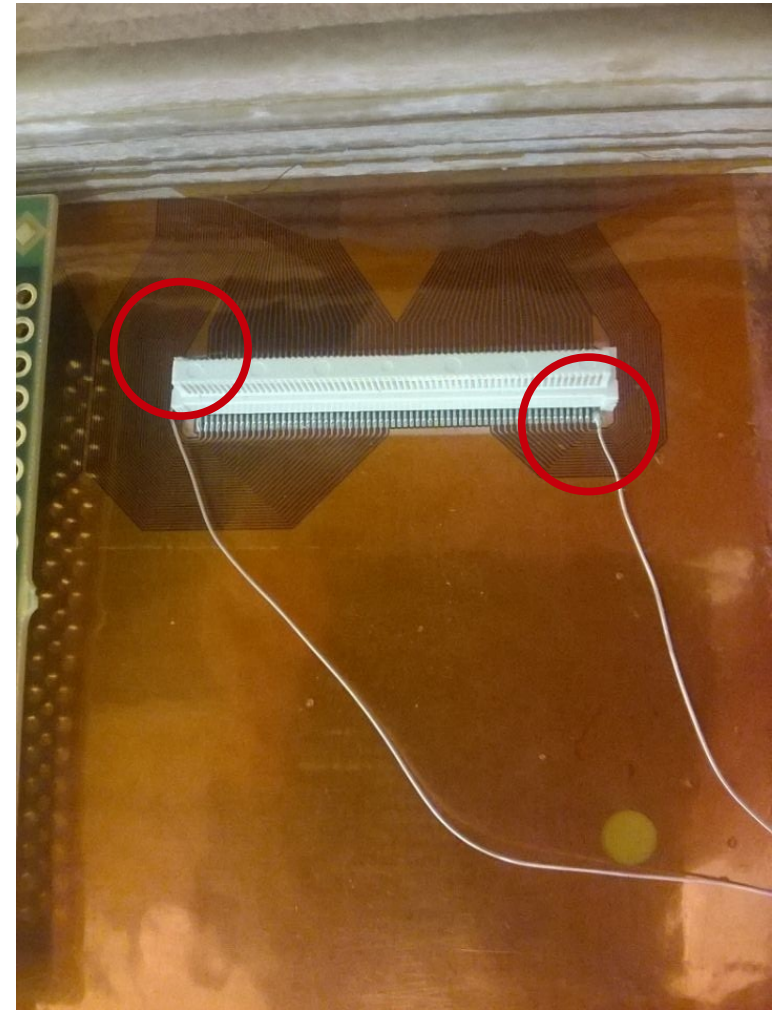


Noise Cancellation



SBS Panasonic Connector

- 1), Through these Two pins serve A ground level to front-end APV Cards.
- 2), Do same thing for all 36 APV cards.



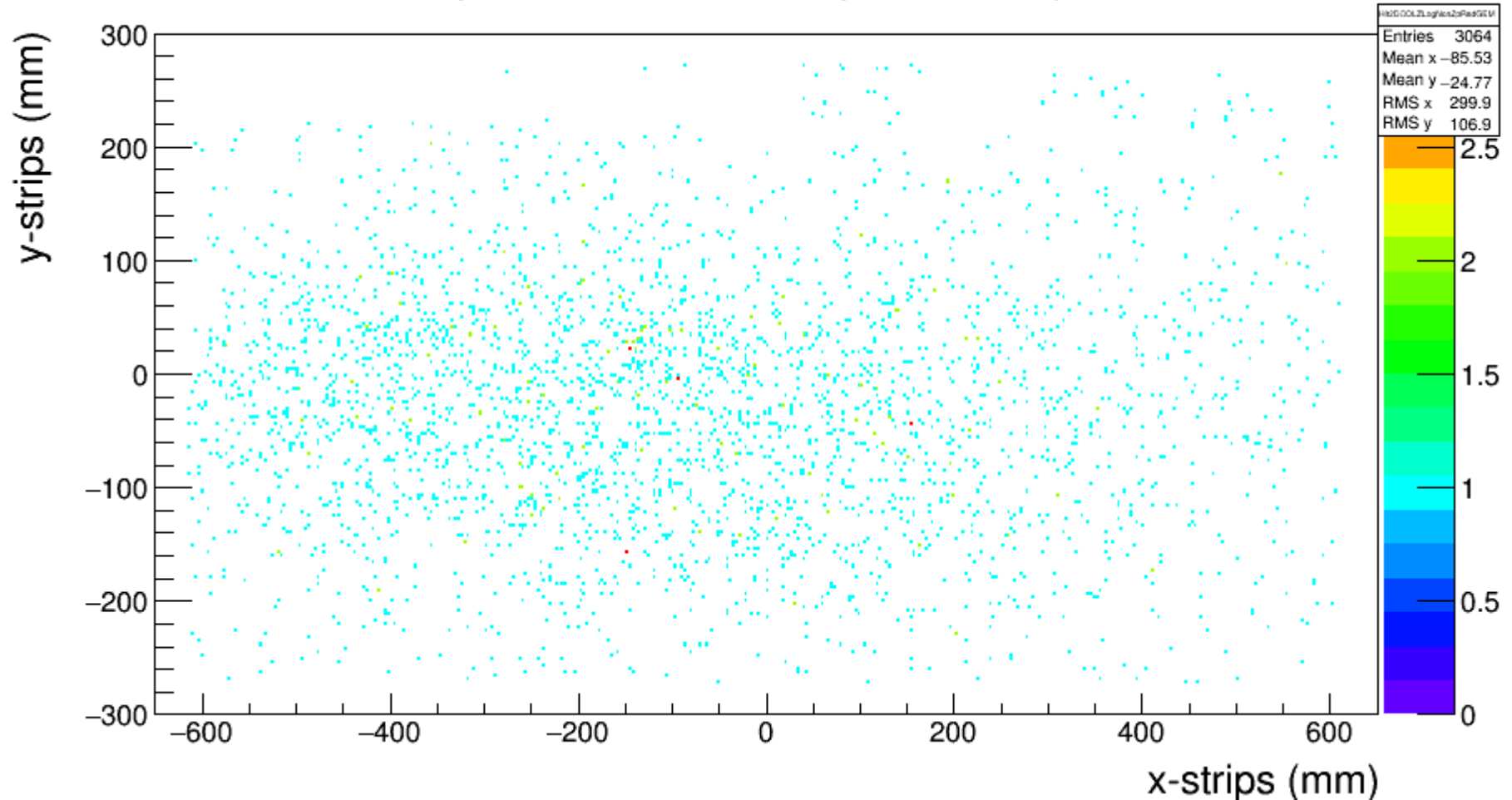
pRad Panasonic Connector



Cosmic Test

Not enough statistics, Trigger Rate: $\sim 1\text{Hz}$

pRadGEM1: cluster' position Map



2D cosmic plots.

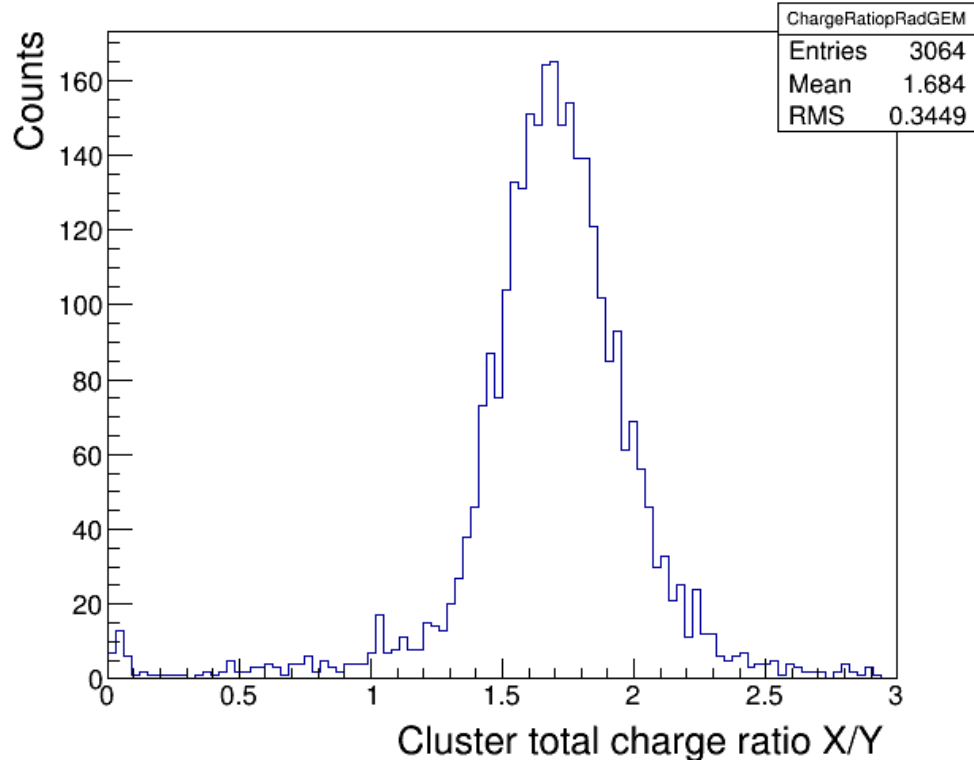
5000 Events, 3064 real hits.



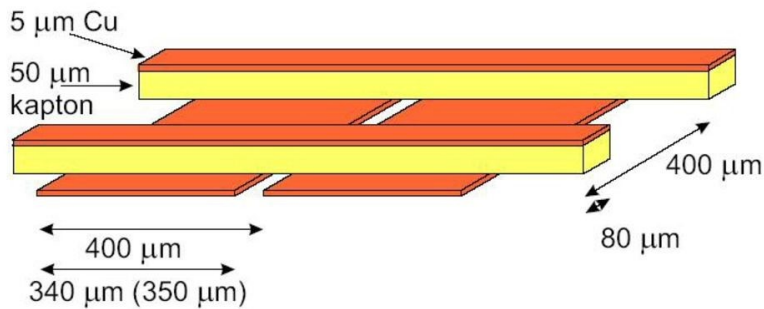
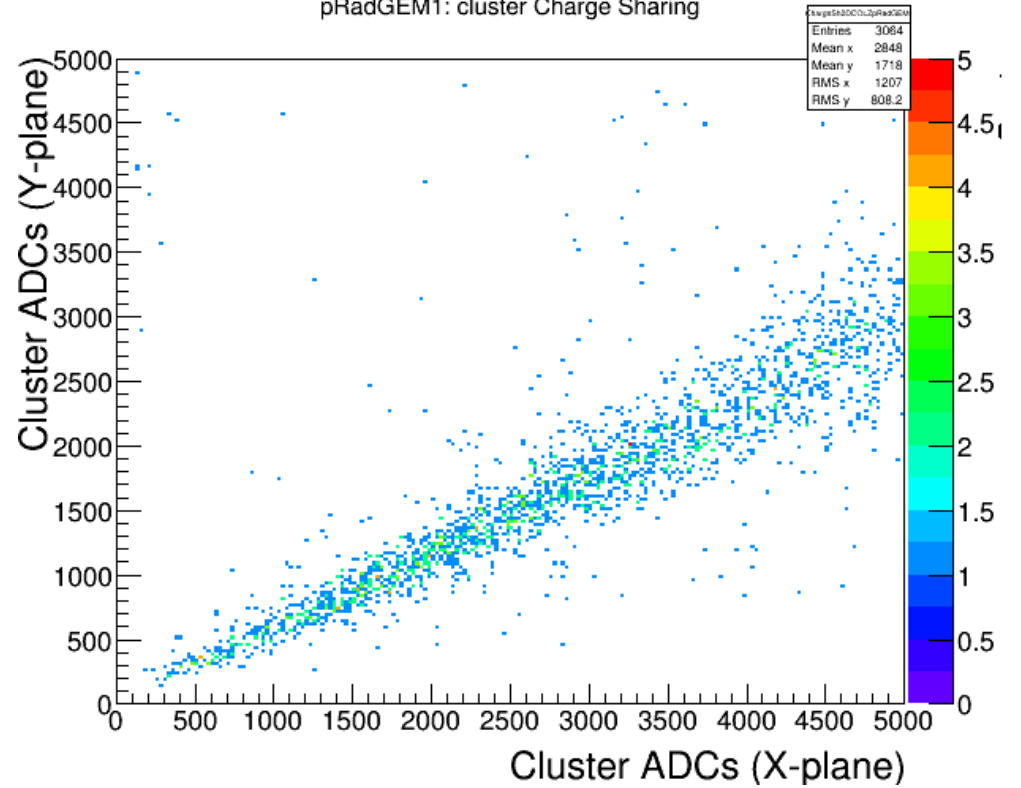
Cosmic Test

Charge Ratio

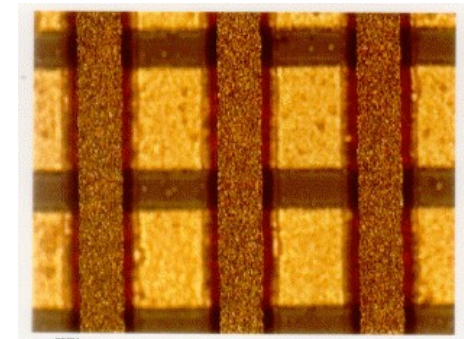
pRadGEM1: cluster Charge Ratio



pRadGEM1: cluster Charge Sharing

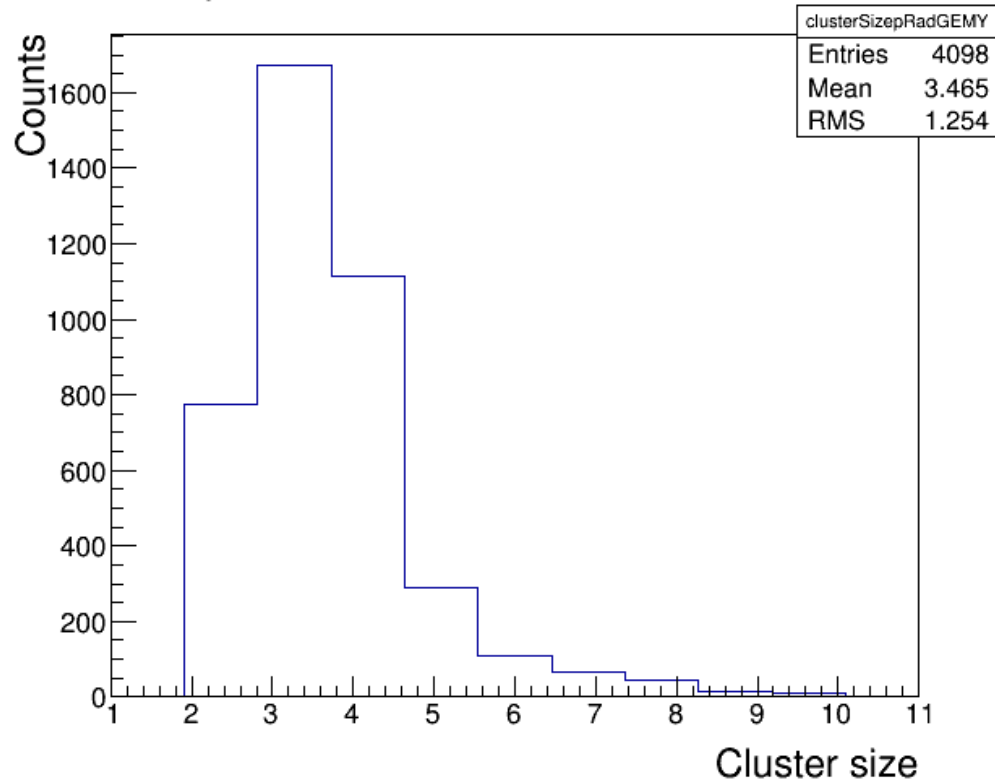


2D Readout Strips



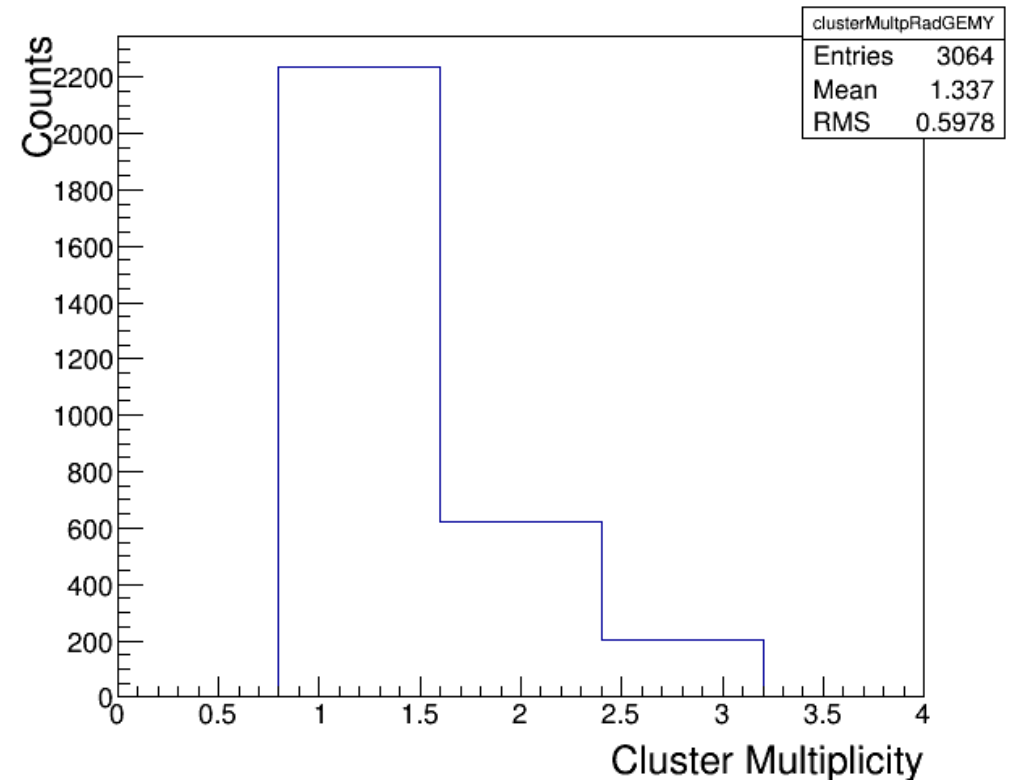
Cosmic Test

pRadGEM1: cluster Size Distr in Y



of Strips in a Cluster

pRadGEM1: average number of clusters per event in Y

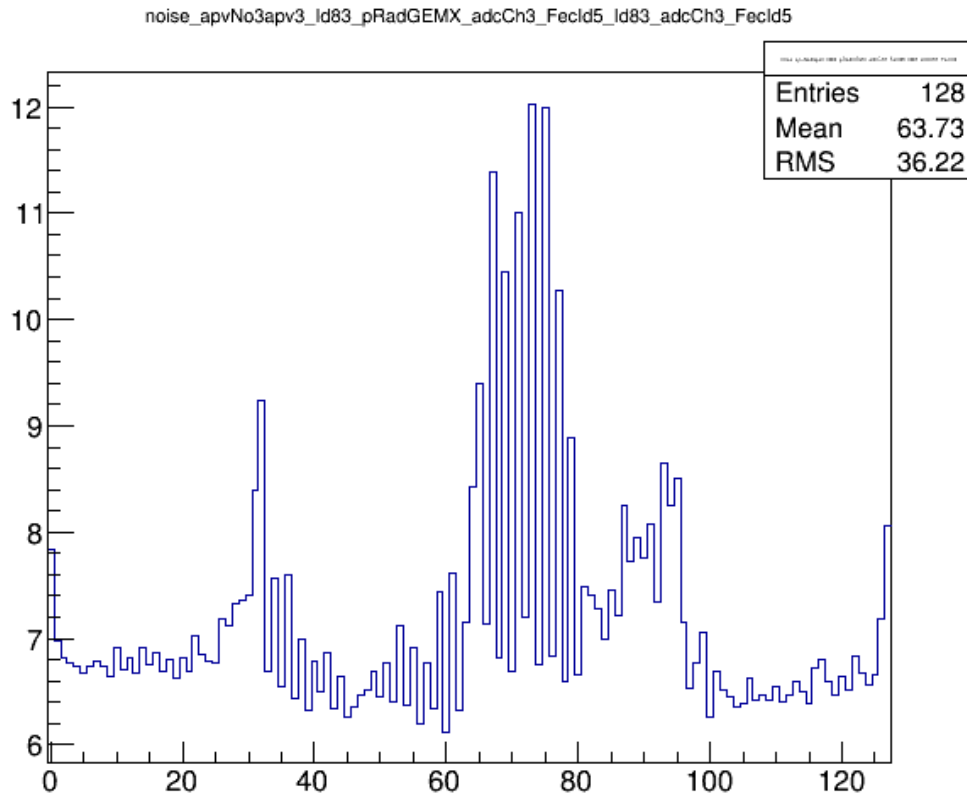


Multiple hits and Single hits

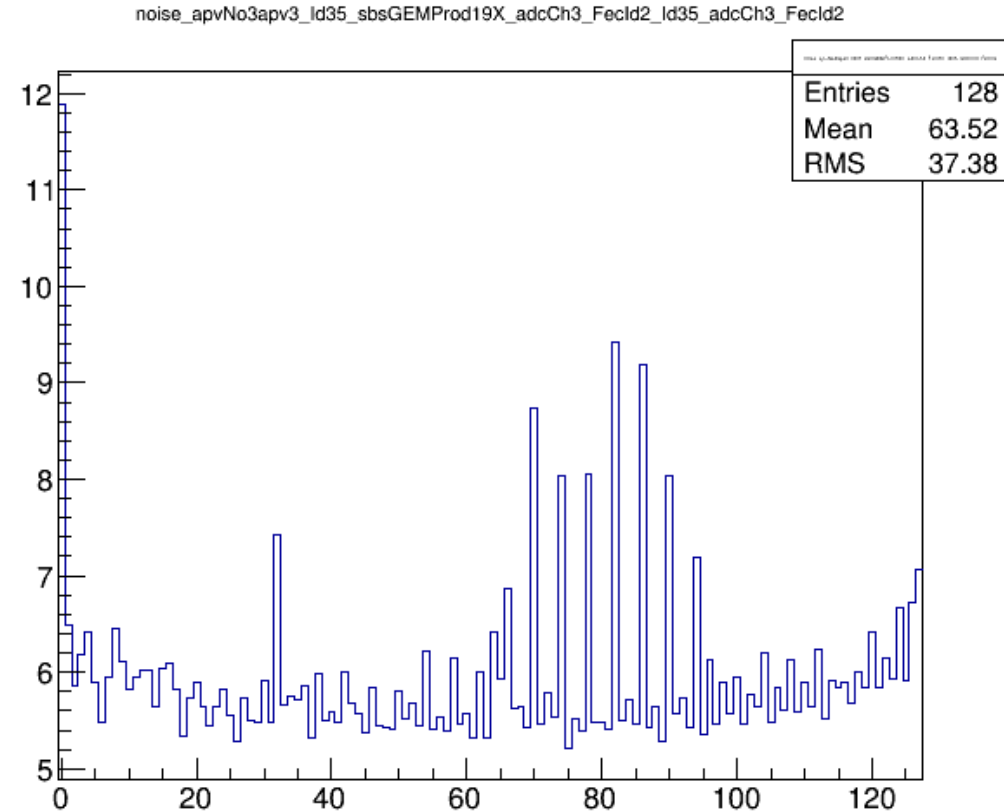


Cosmic Test

Noise Level



Noise Level pRad
One APV

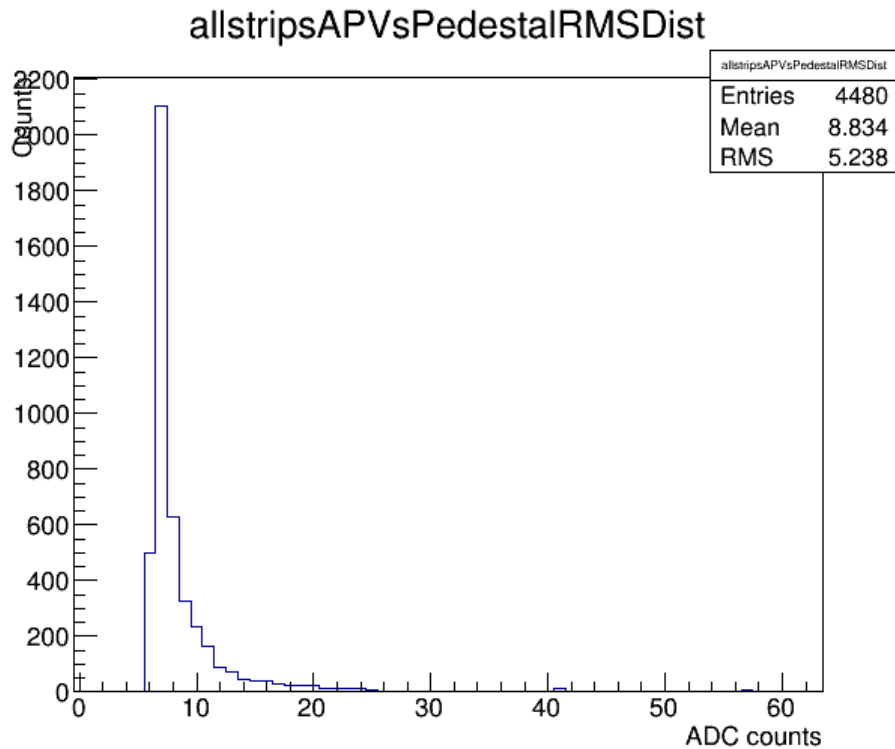


Noise Level SBS
One APV

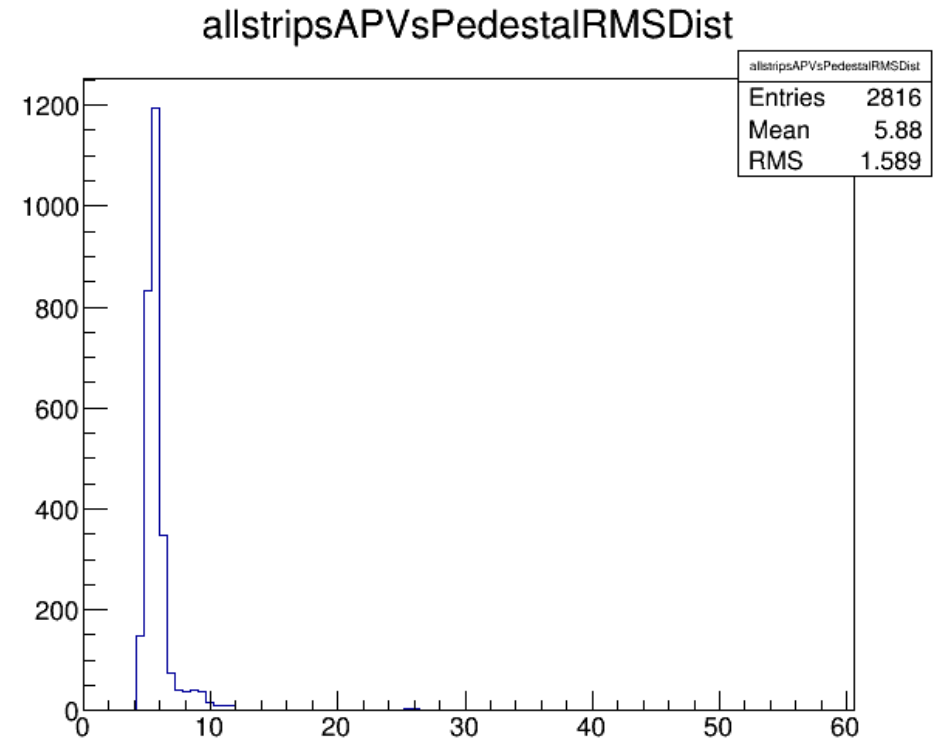


Cosmic Test

Noise Level



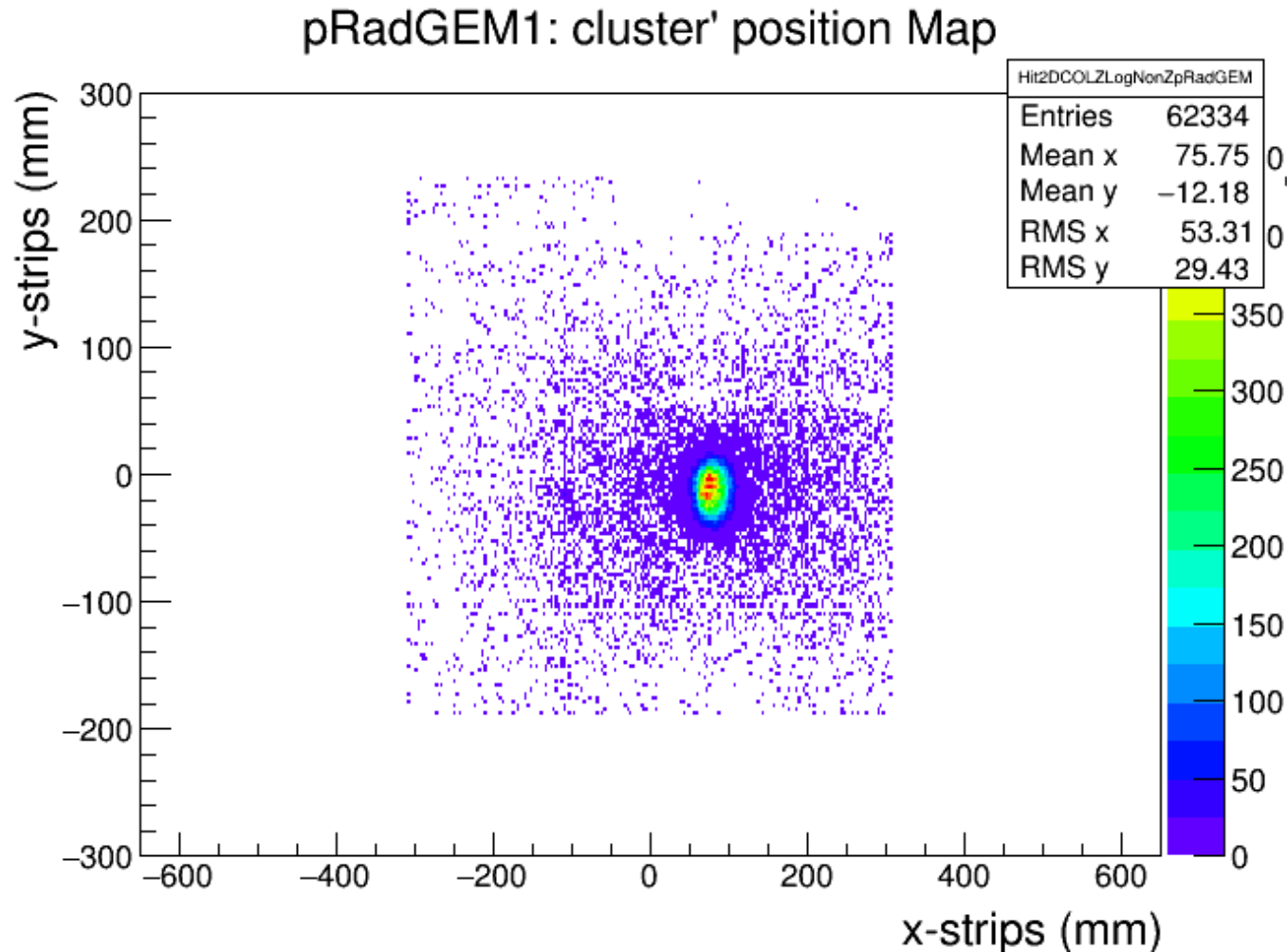
Noise Level pRad
All Strips



Noise Level SBS
All Strips



Sr-90 Source Test



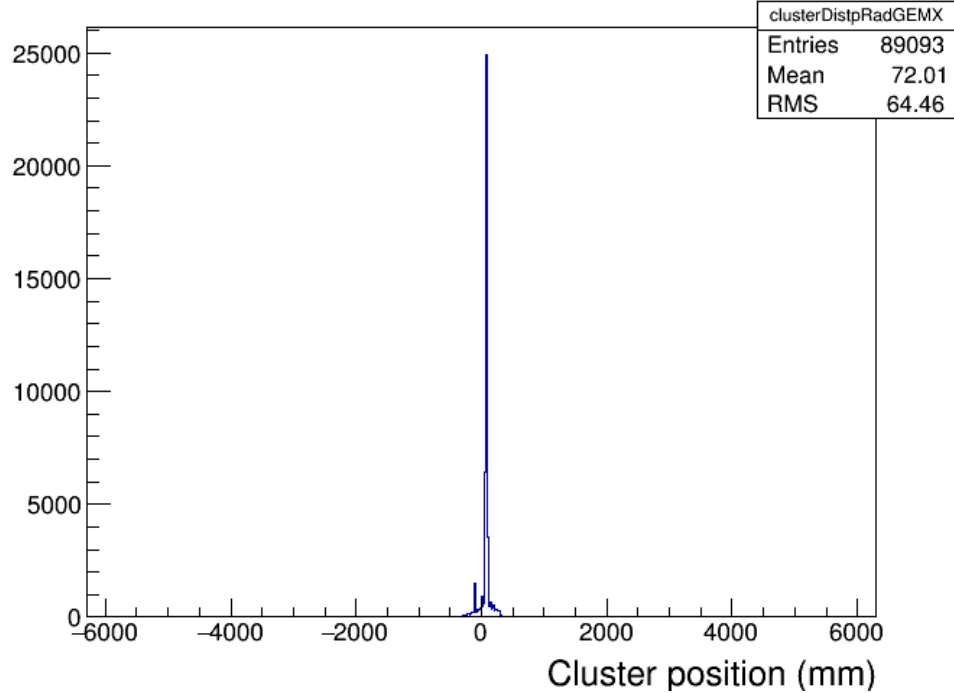
Only ~22 APV cards connected.



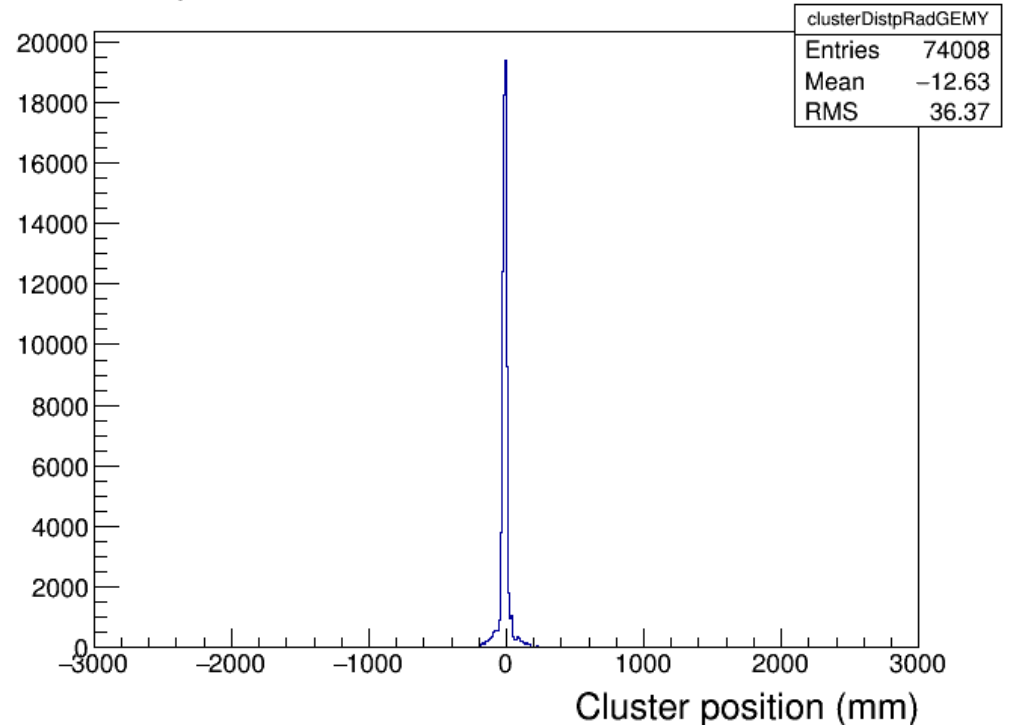
Sr-90 Source Test

1D hit distribution

pRadGEM1: Cluster Position Distr. in X



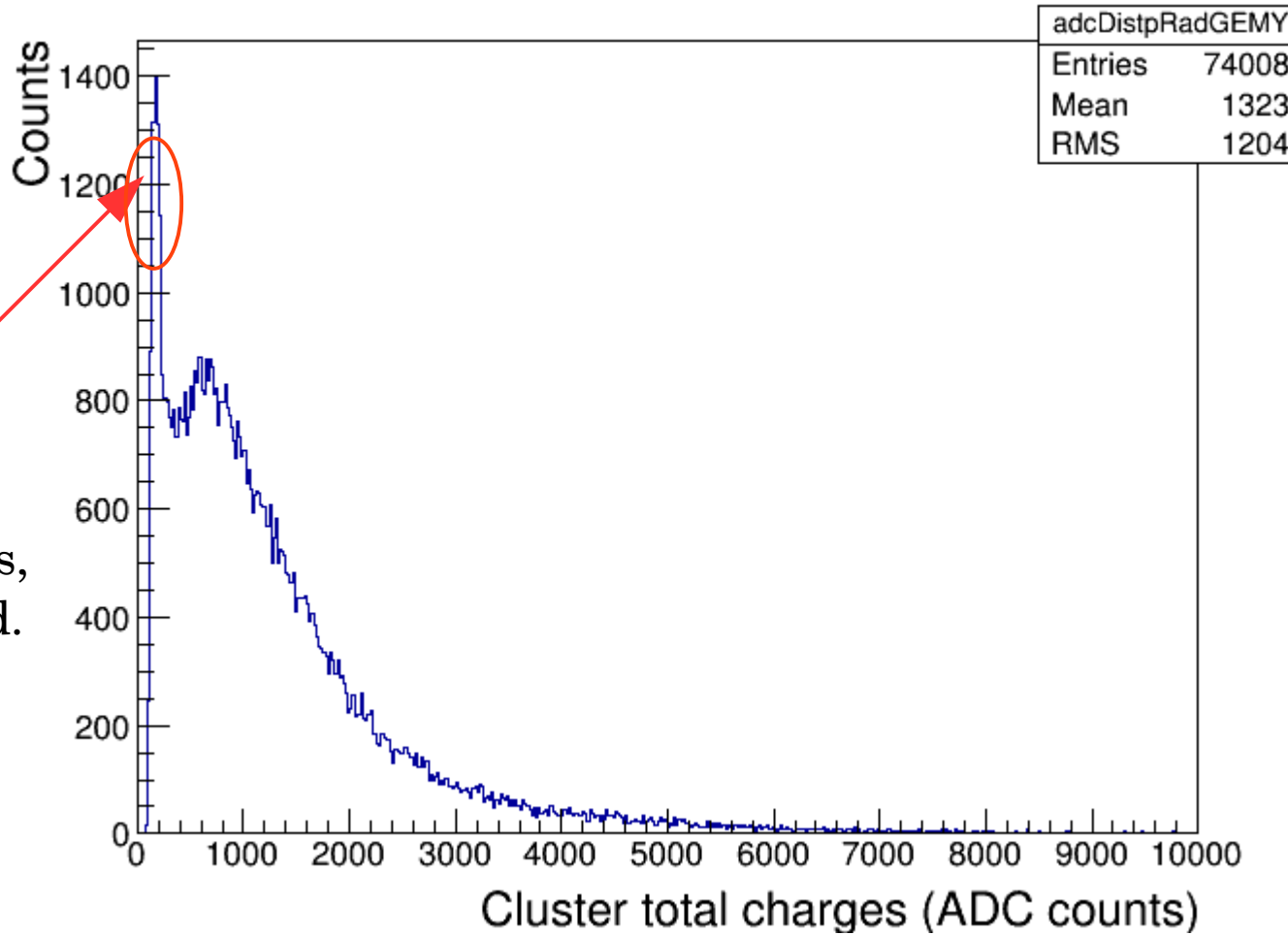
pRadGEM1: Cluster Position Distr. in Y



Sr-90 Source Test

ADC distribution

pRadGEM1: cluster Charge Distr in Y-strips



Coincident Hits,
Can be rejected.



Summary

- For now, this is a preliminary results.
- Already can see that characteristics of pRad chamber is comparable to SBS chamber.
- Gain, Uniformity, etc, need more Cosmic data.
- Resolution study needs another setup. three more other chambers needed.

