

GEM test in Hall A

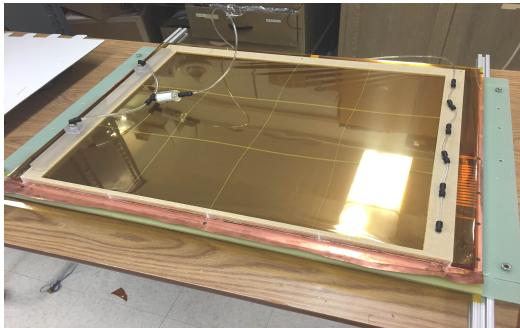
Danning Di, N.Liyanage
University of Virginia

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SoLid GEM and SBS GEM

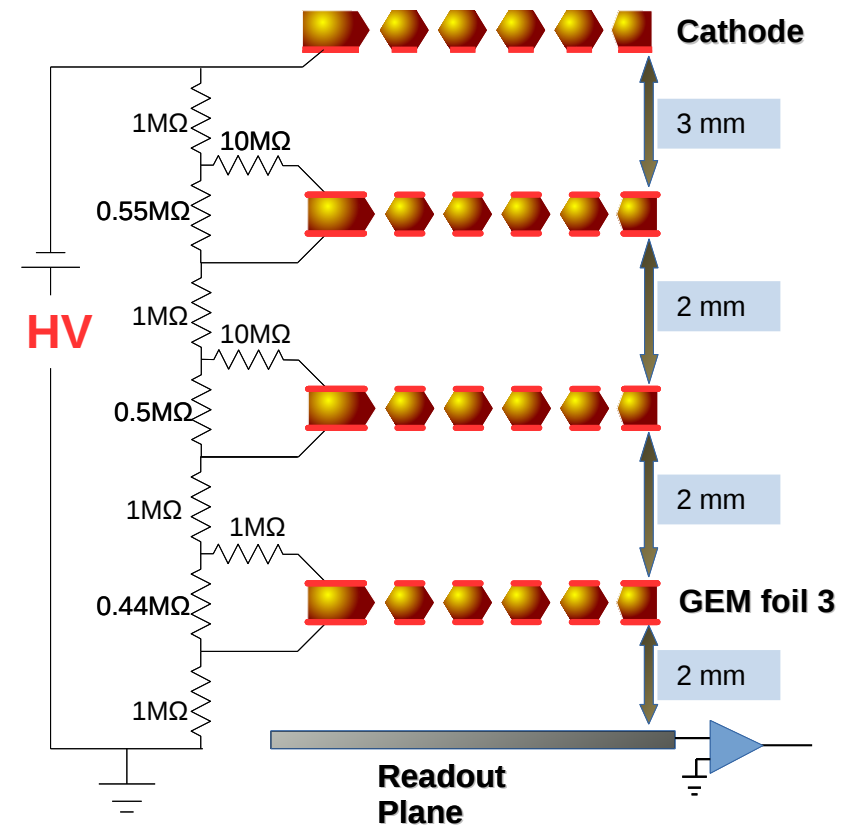


SoLid GEM(prototype)

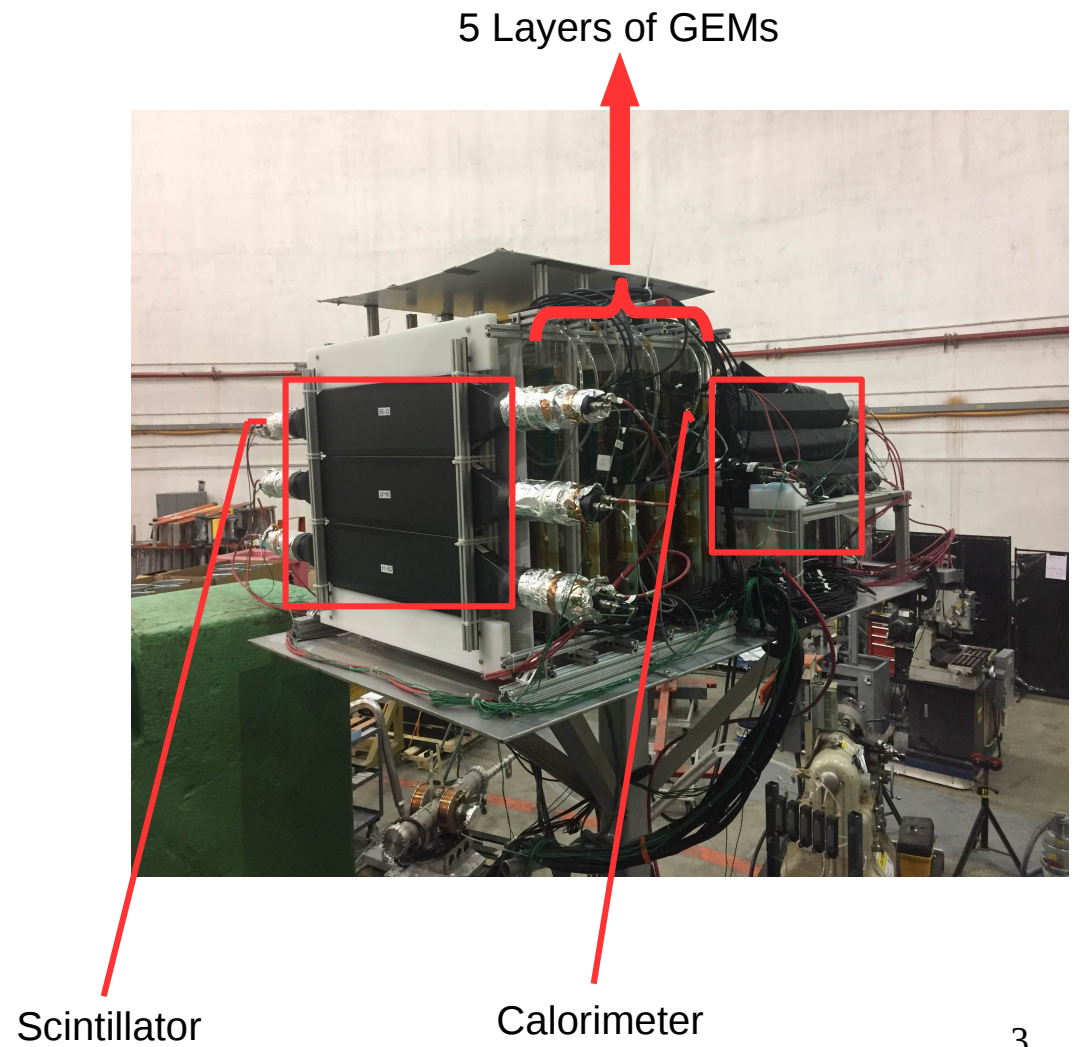
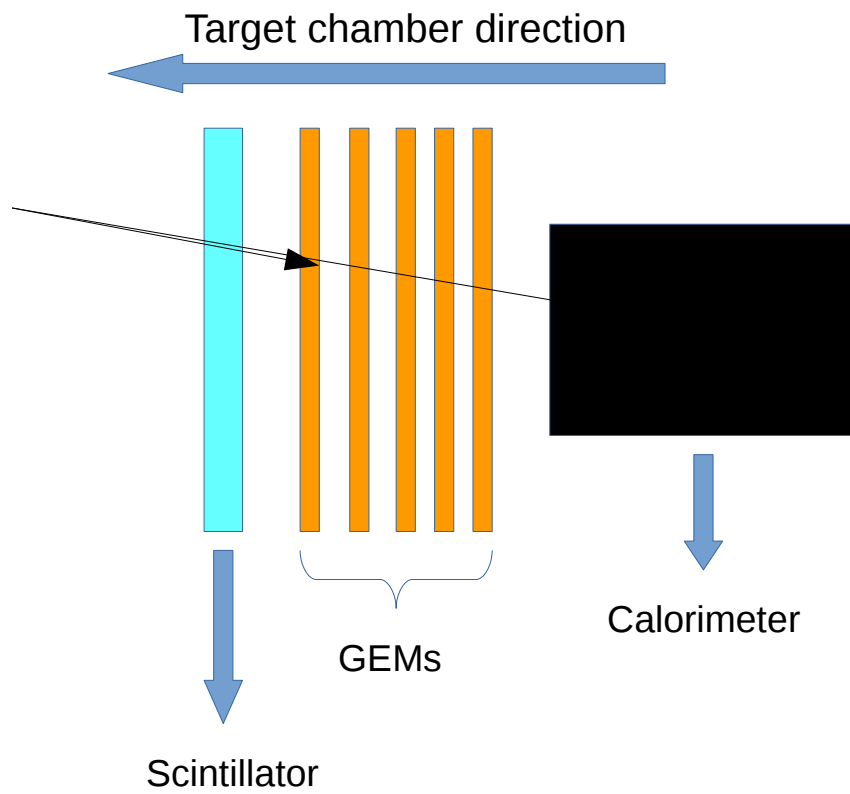


SBS GEM(60x50 cm)

- Different in size and style of readout plane
- Share same structure
- High occupancy

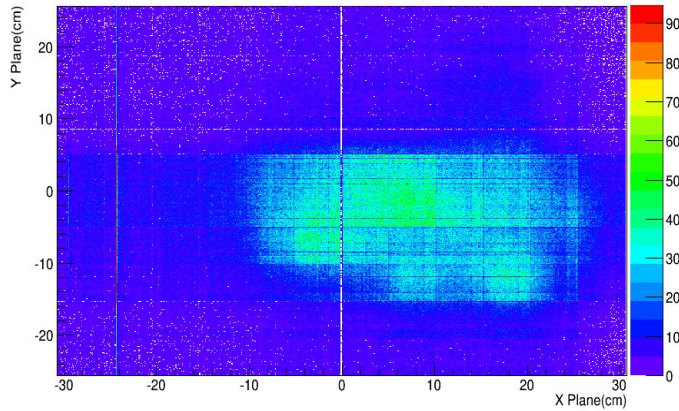


Setup



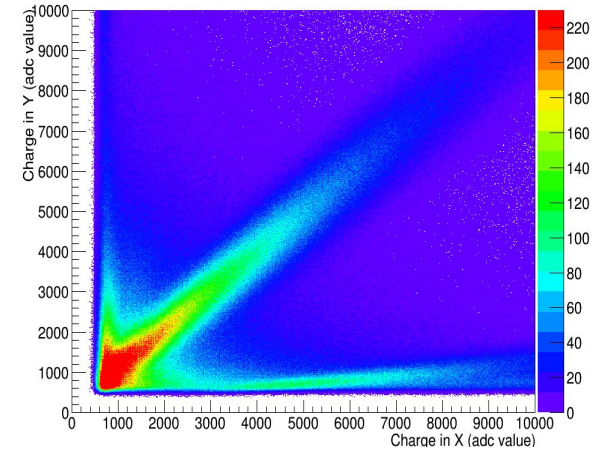
Hit Reconstruction

2D Hit Map of all clusters

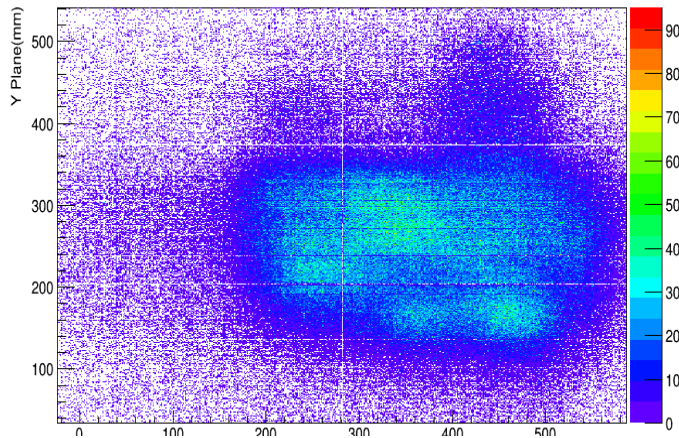


All possible cluster combination

Charge Correlation

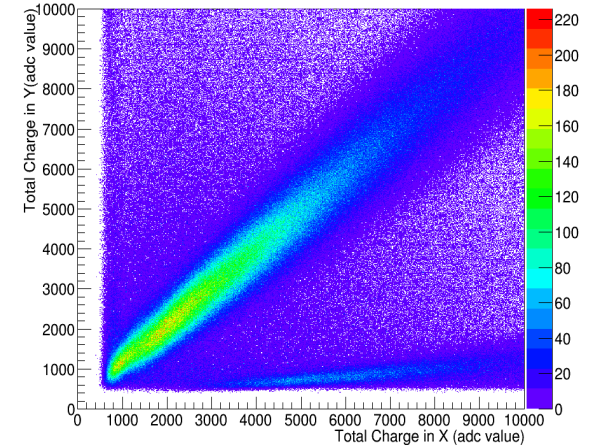


2D Hit Map of clusters on tracks

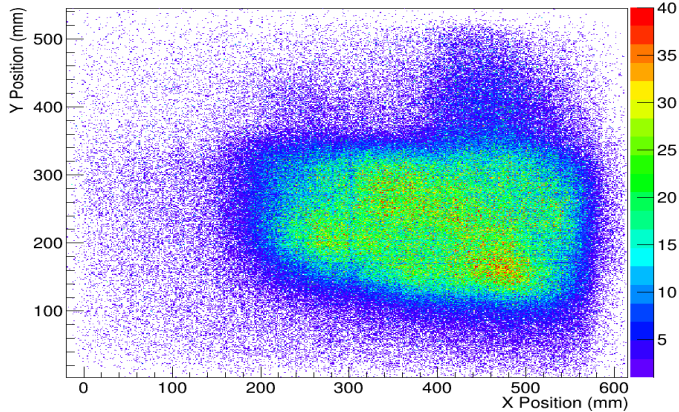


Clusters recognized by tracking

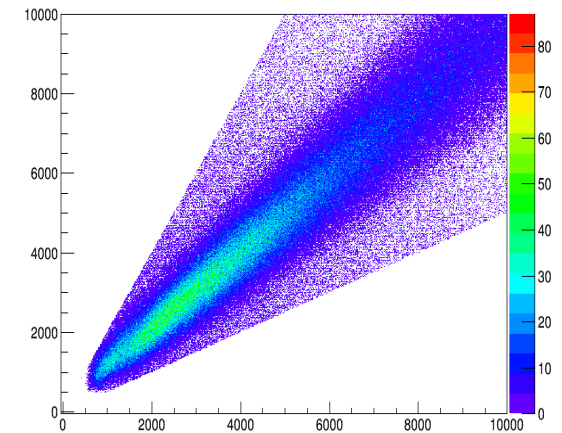
Charge Correlation



2D hit Map

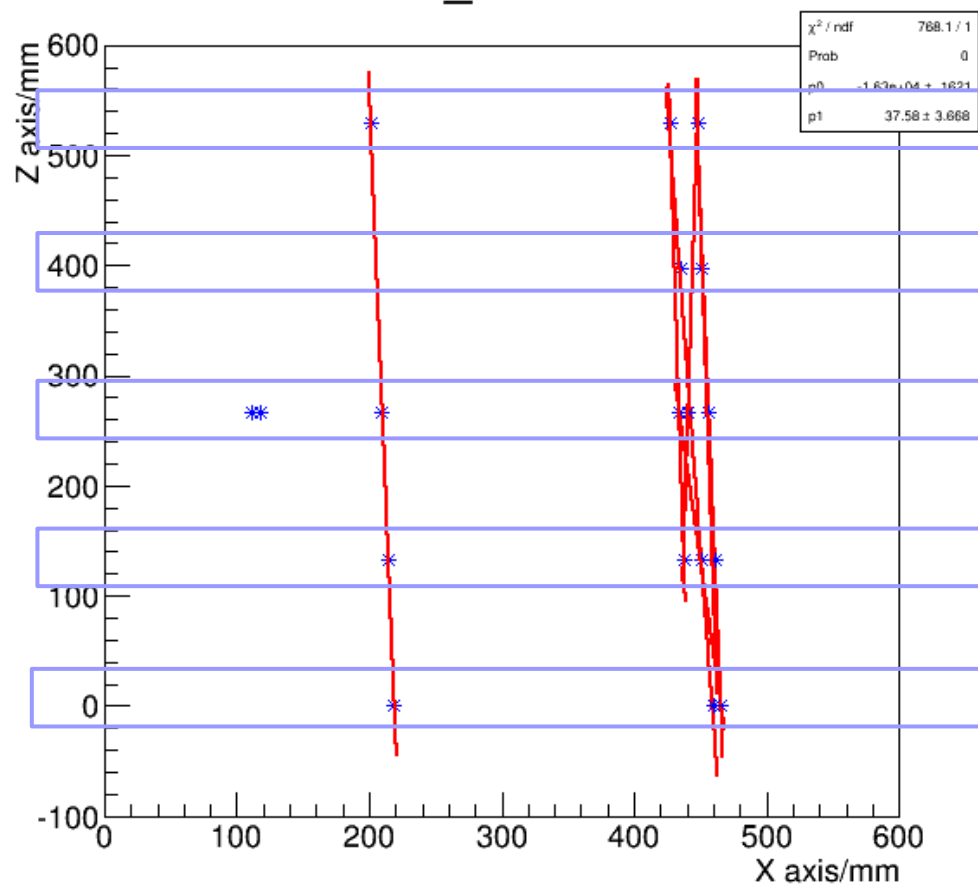


After **tracking**, add a rough cut in **charge correlation** and **timing correlation**

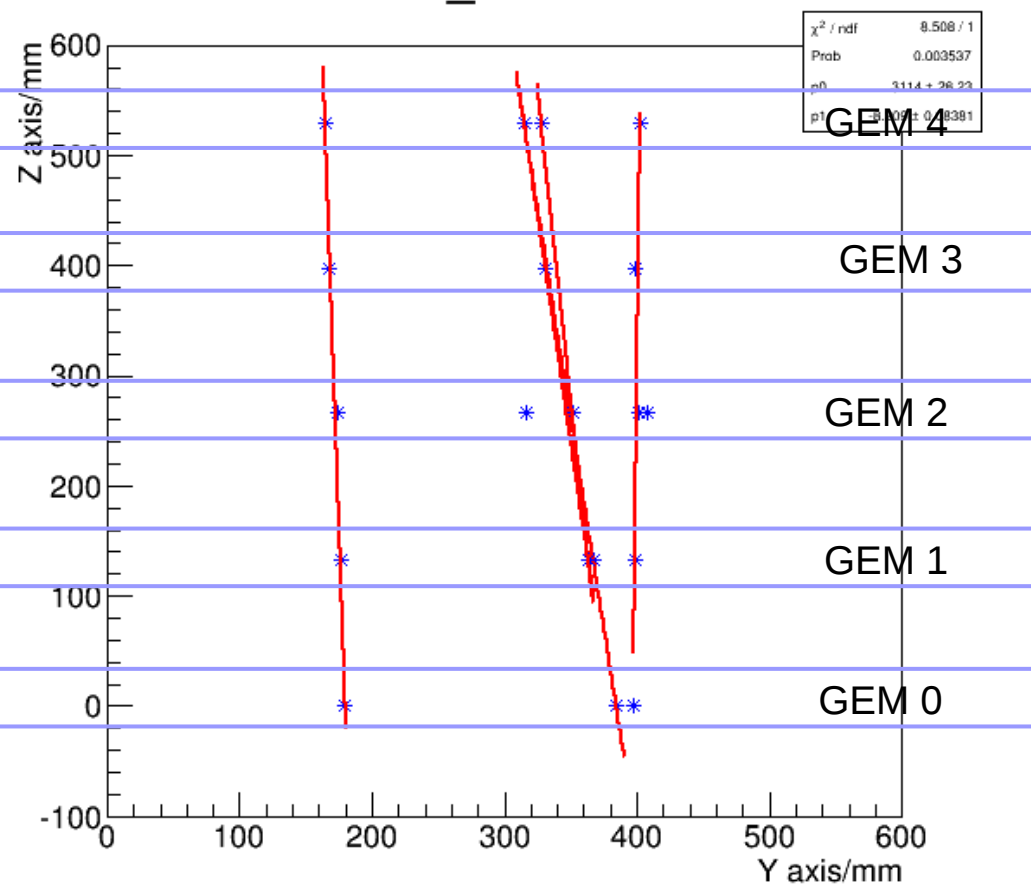


Tracking Snapshots

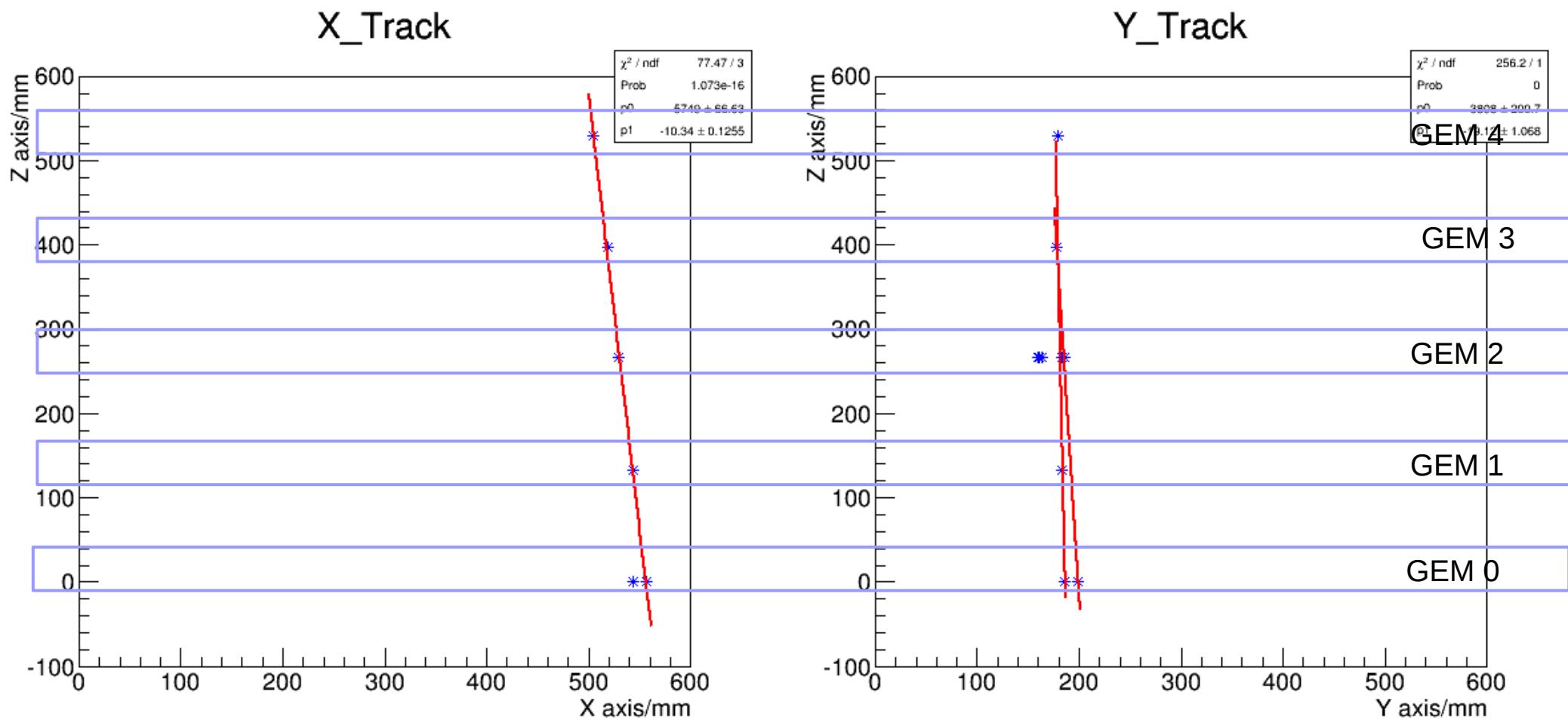
X_Track



Y_Track

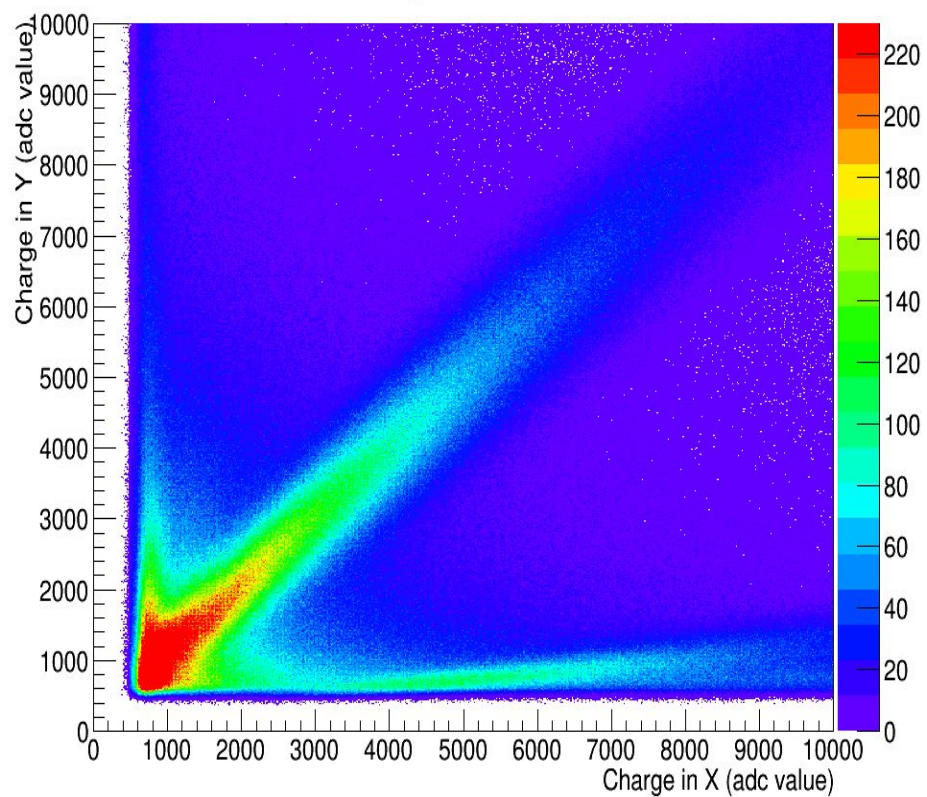


Tracking Snapshots

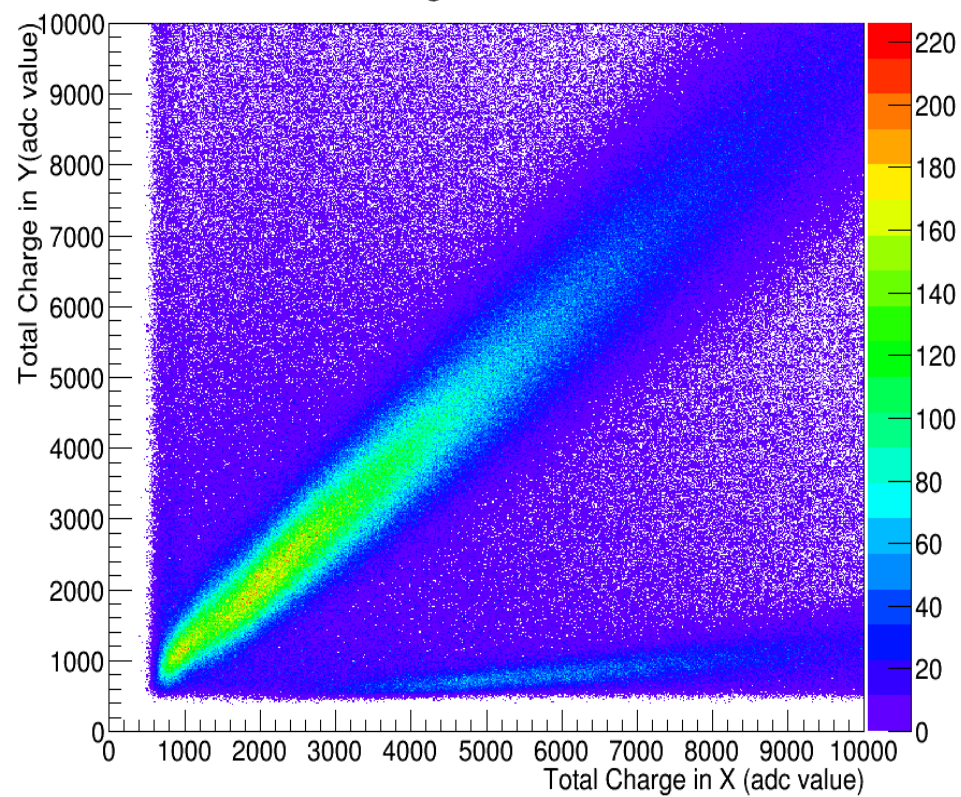


Charge Correlation

Charge Correlation

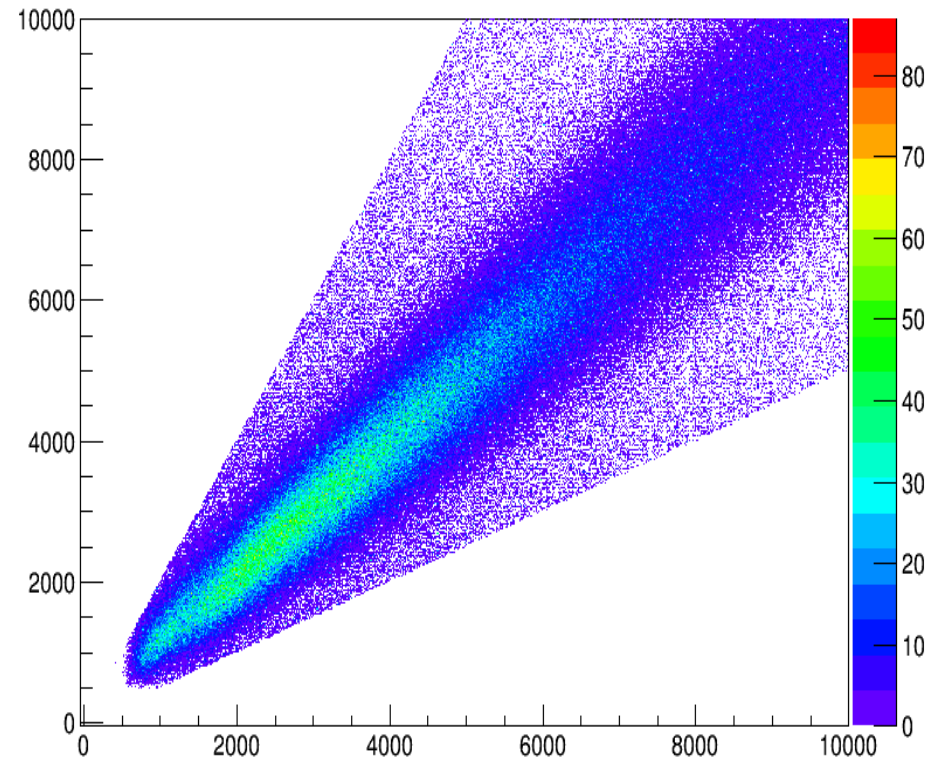
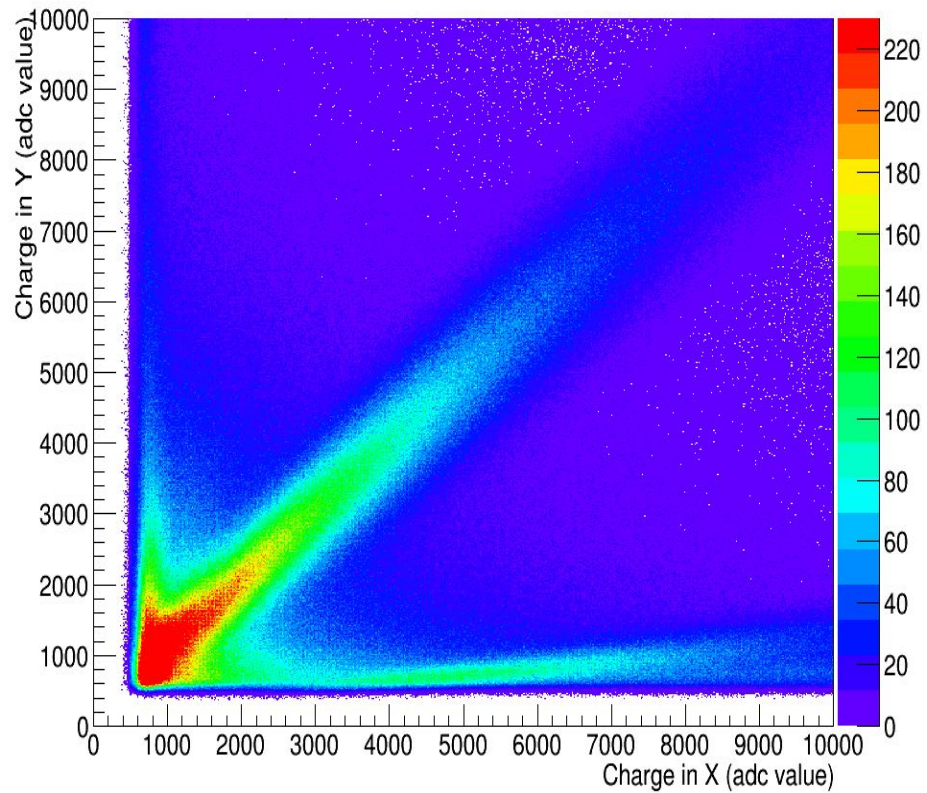


Charge Correlation



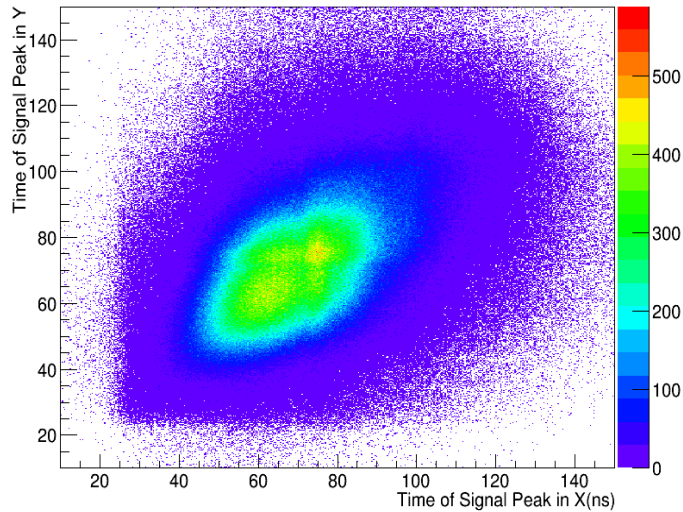
Charge Correlation

Charge Correlation



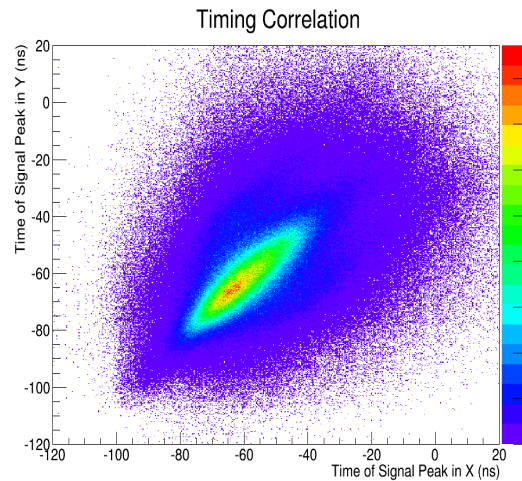
Timing Correlation

Timing Correlation (fitting method)

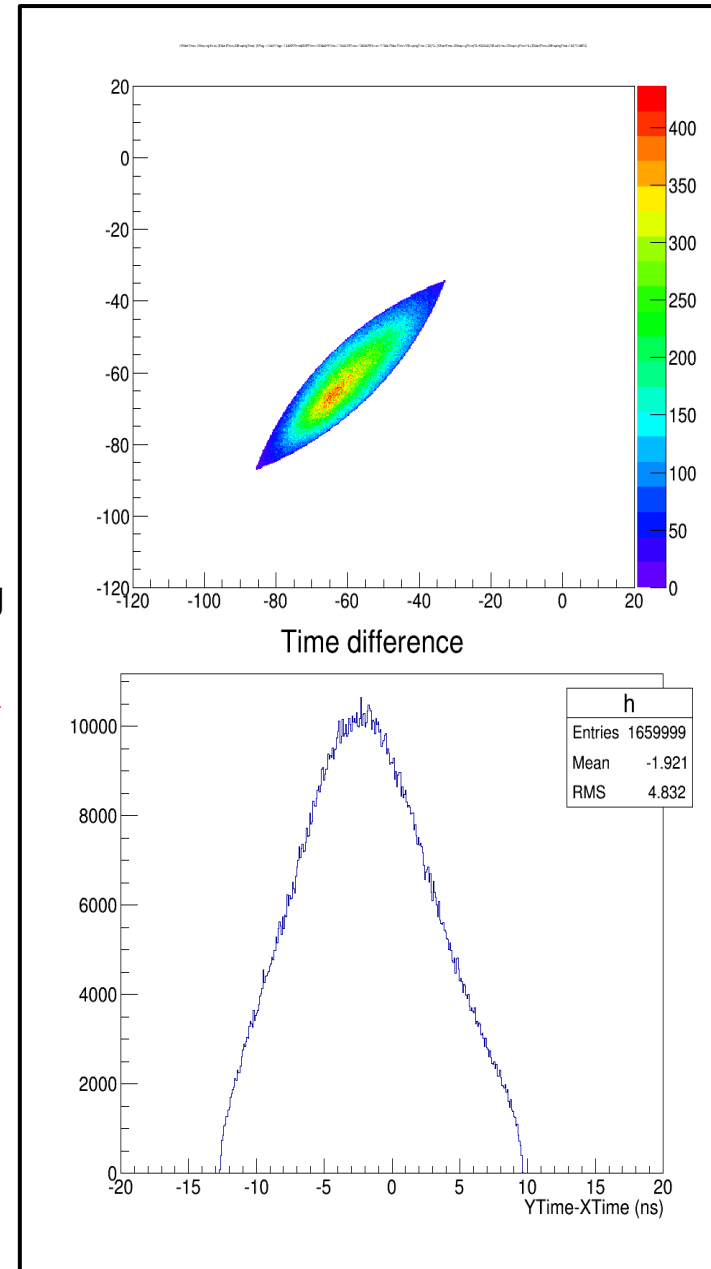
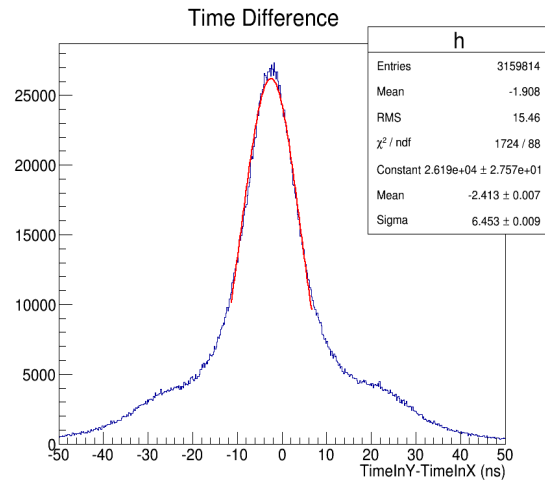


From fit of 6 time sample

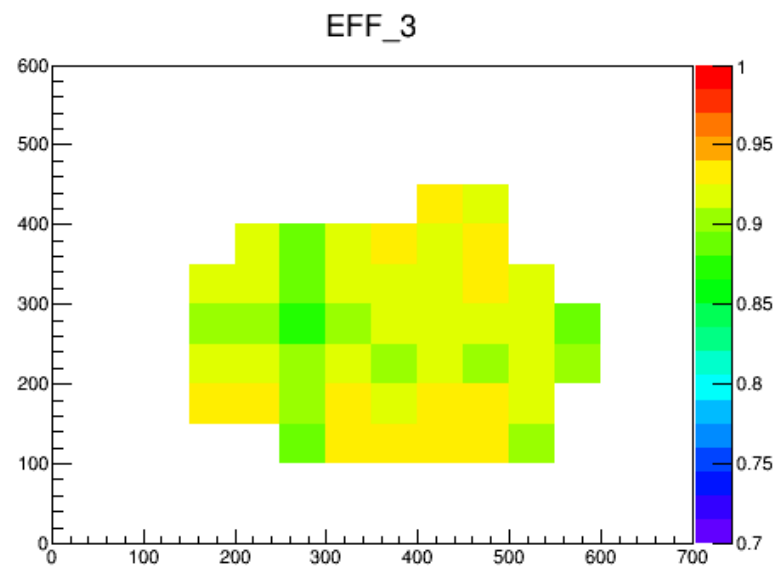
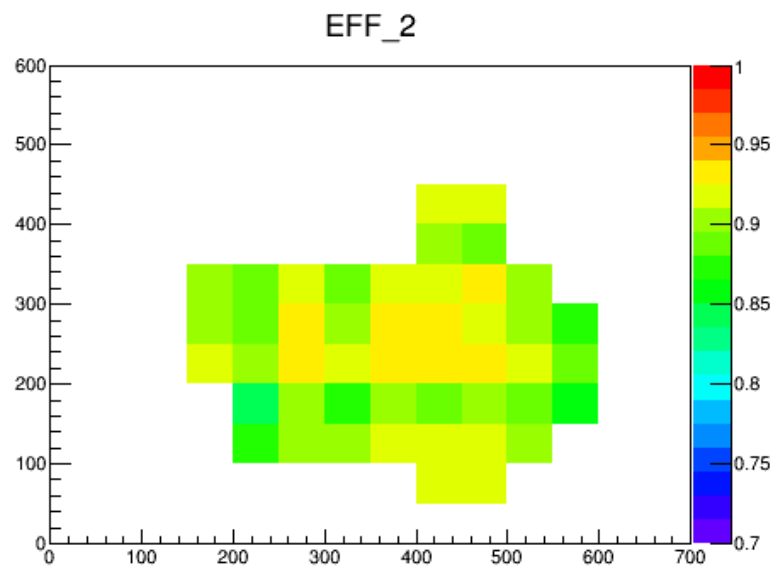
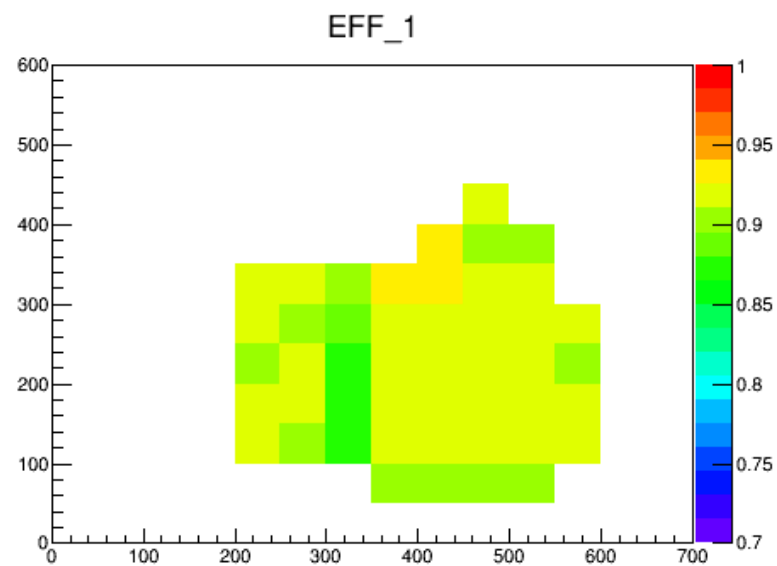
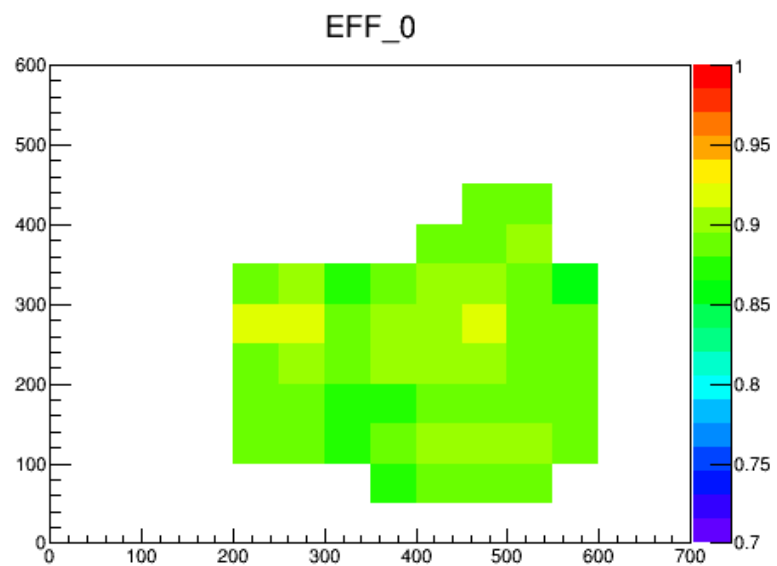
Correcting the phase of trigger in APV clock



Cut off weakly timing correlated clusters



Local Efficiency at 4100V



Experience and Suggestion to SoLid GEMs

- Experience of Hall A GEM test and previous X-ray test:
 - at low occupancy, tracking can remove most of accidentals and cross-talk signals
 - at high occupancy, charge correlation and timing cut will play a much more important role

Suggestion:

- Better design of HV divider, for efficient HV supply to GEM at high occupancy.
- Avoid using 1 time sample in case SoLid GEMs adopt APV25 chip.