Run 10-14

Analysis in CgemBoss

2020-02-03

before new calibrations

Study on charge and cl.size

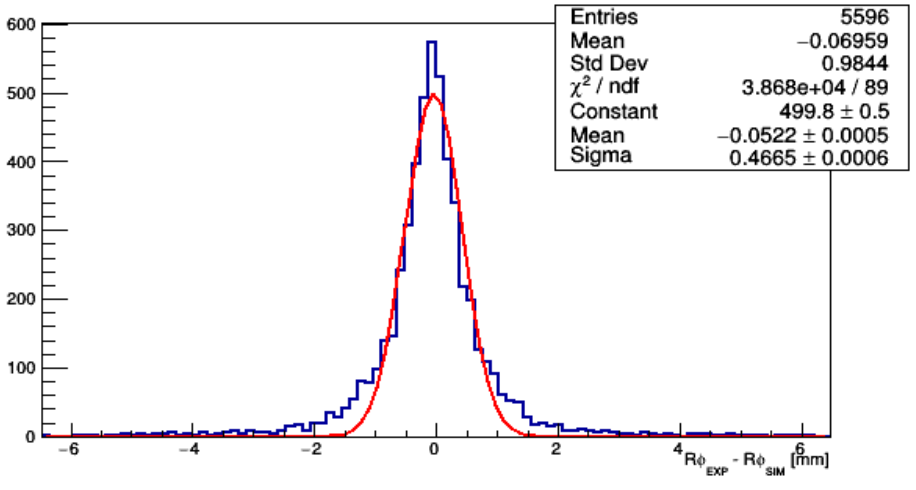
With a cut on nof sigma

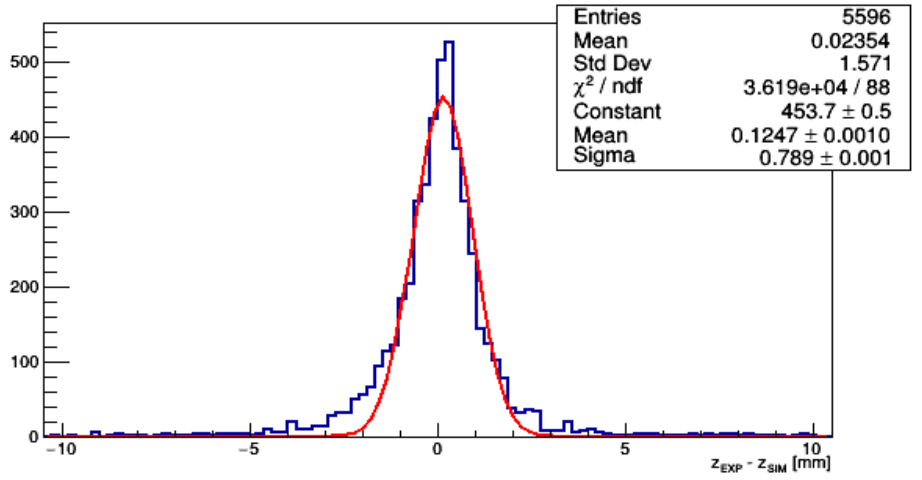
both on Rϕ and z residuals

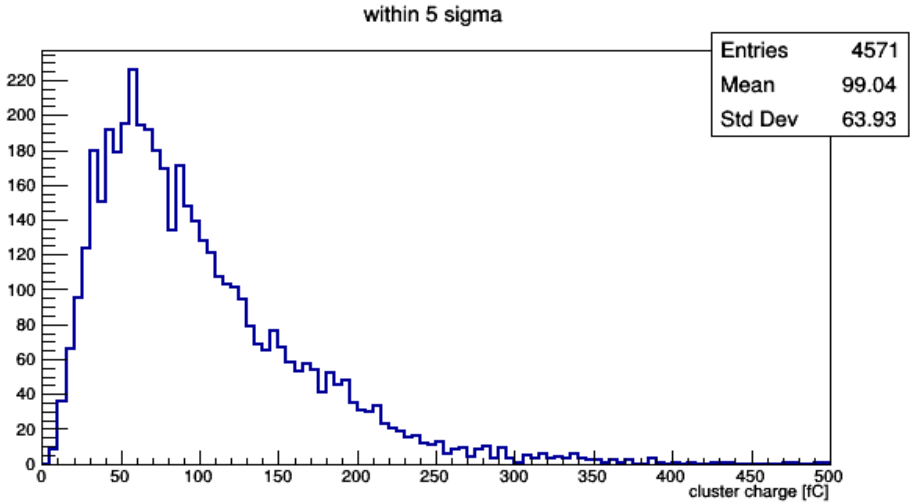
charge – L1 bottom

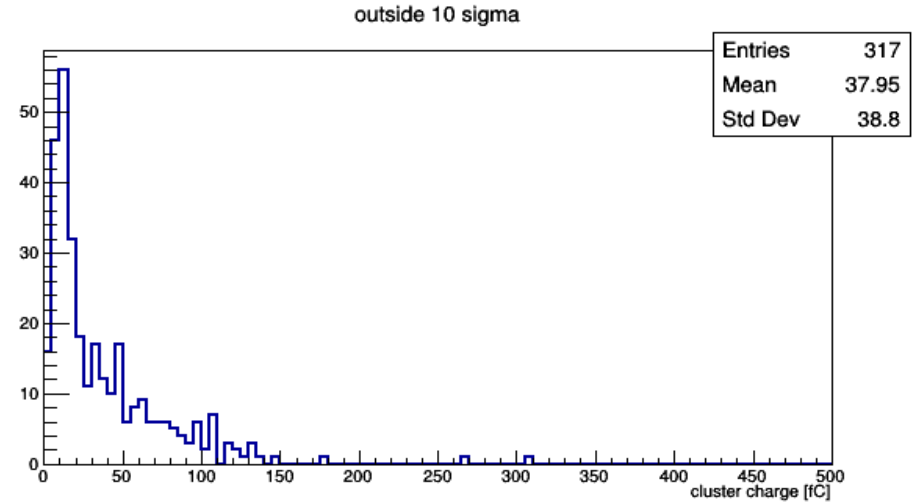
CUT:

- test chamber Q > 2 fC && **chi2xy < 0.01 && chi2rz < 1:**
  - **Signal is within 5 sigma**
  - **Noise is outside 10 sigma**
  - **The cut on the #sigmas is applied both in Rphi and in z residuals!**









charge – L1 bottom

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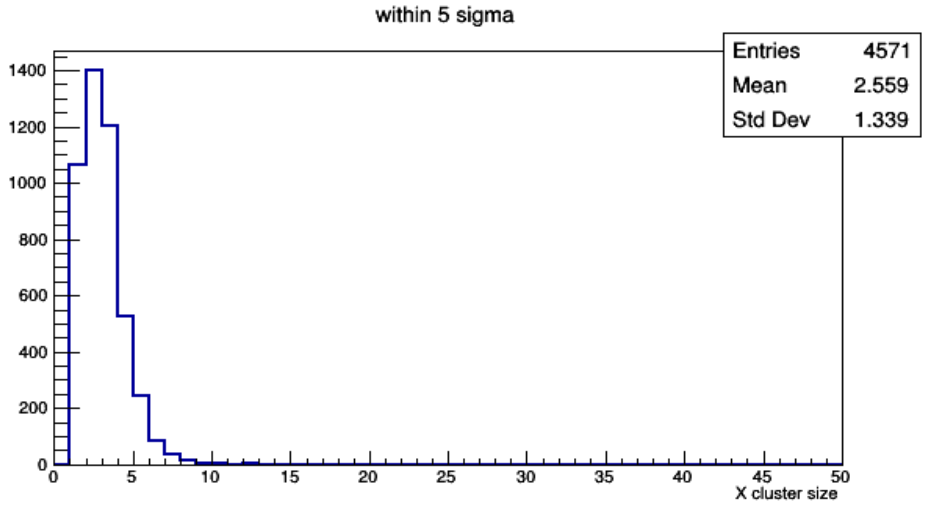
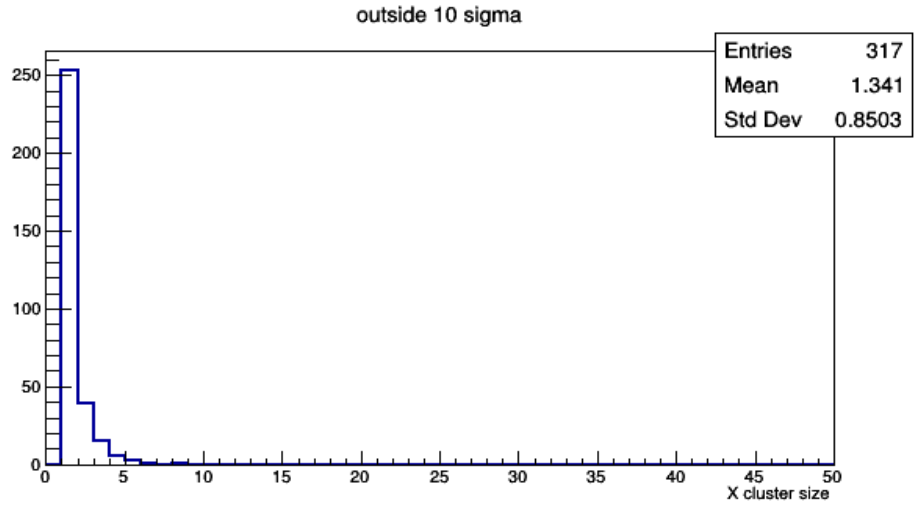
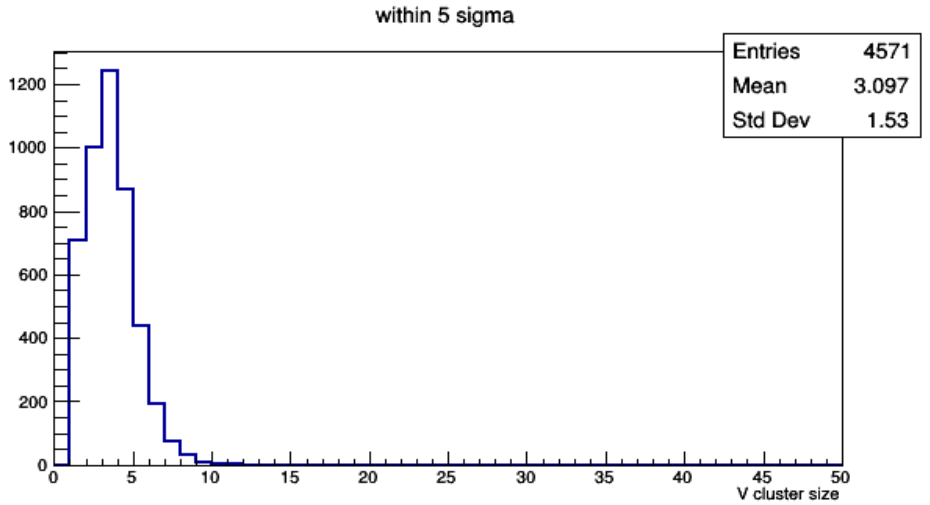
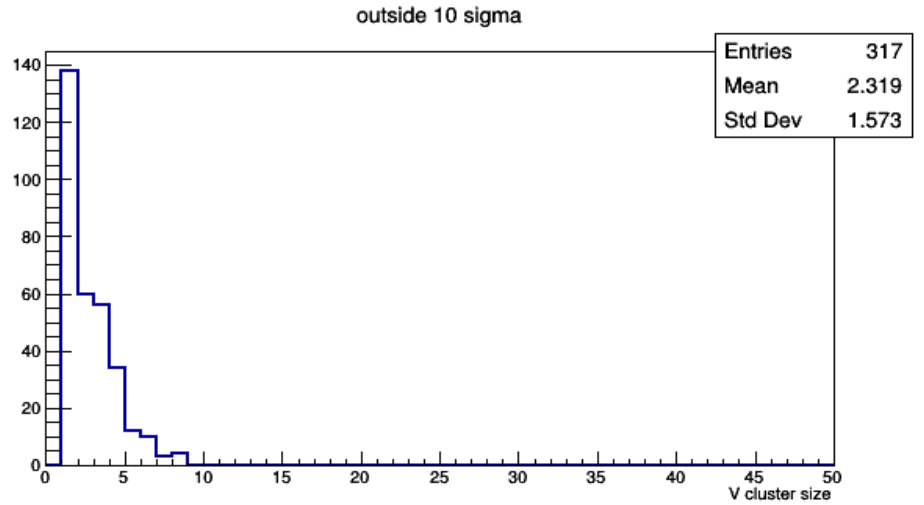








cl.size & charge: comparison

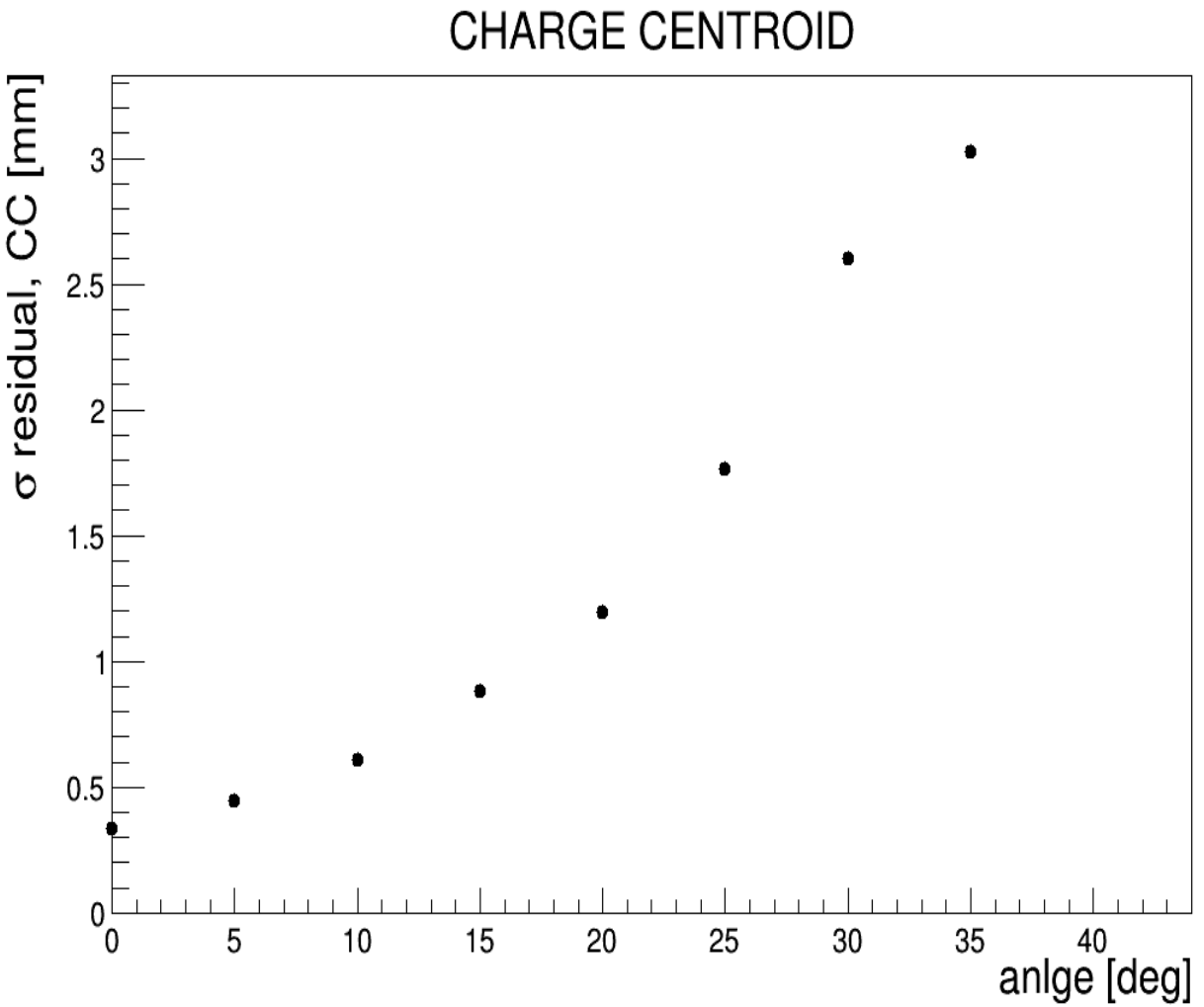
All the planes have similar histograms → here is the summary:

	L1 bottom		L1 top		L2 bottom		L2 top	
	signal	***noise***	***signal***	***noise***	***signal***	***noise***	***signal***	***noise***
charge [fC]	99.04	37.9	104.1	44.3	118.6	53.1	101.0	30.5
cl. size x	2.55	1.34	2.55	1.38	3.31	1.51	3.10	1.40
cl. size v	3.10	2.32	3.21	2.48	2.77	2.14	2.53	1.87
eff	75%	-	75%	-	84%	-	84%	-

$$\text{eff} = \frac{N(\ Q_{TEST} > 2 + \chi^2_{XY} < 0.01 + \chi^2_{rz} < 1 + \text{within\_5}\sigma\text{\_phi} + \text{within\_5}\sigma\text{\_z}\ )}{N(\ \chi^2_{XY} < 0.01 + \chi^2_{rz} < 1\ )}$$

Resolution *vs* incident angle

Charge centroid

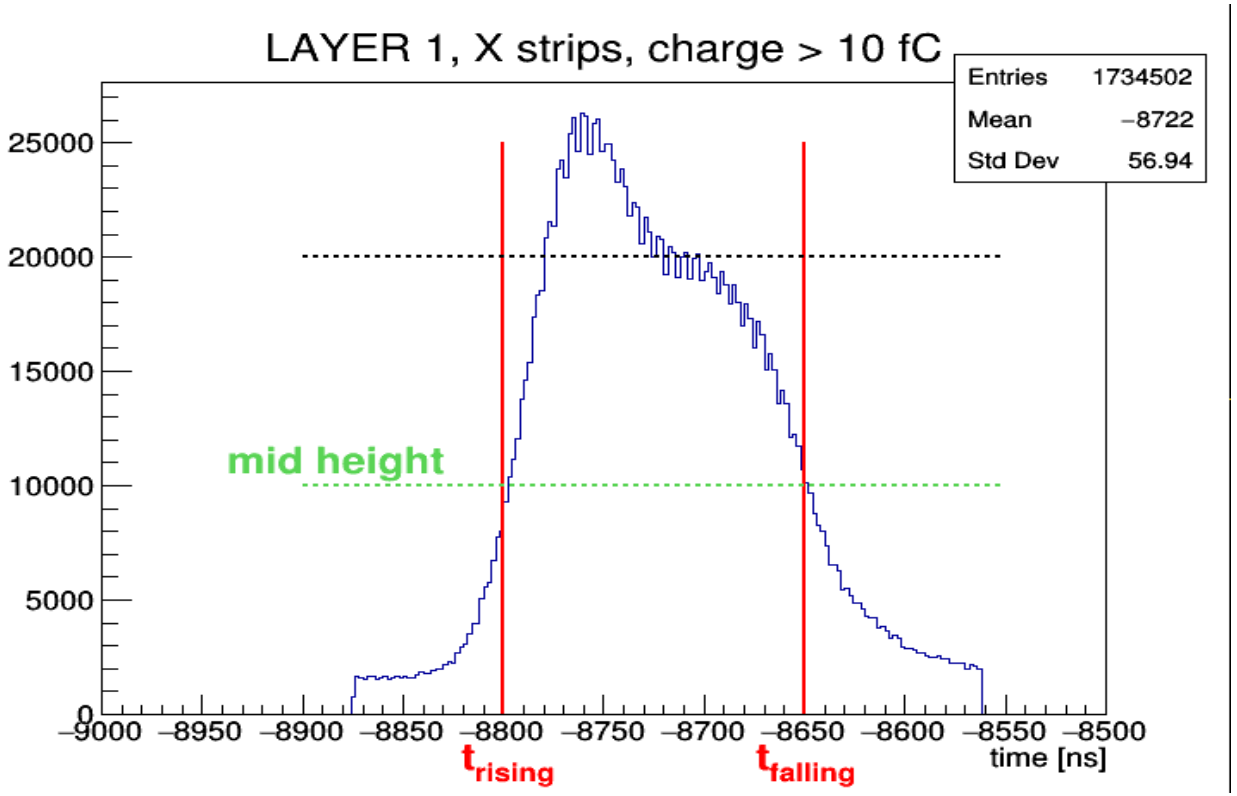


uTPC reconstruction

Added to CgemClusterCreate
declareProperty("selectTPC",m_selectTPC=2);
To choose among the two implementations
1 - TGraphError fit
2 - analytical fit

Calibration *by eye* for the uTPC

- time window -8875 < time < -8562
- method2 = flag 3
- all the runs: 10-11-12-13-14
- Use analytical fit



- Created the file:

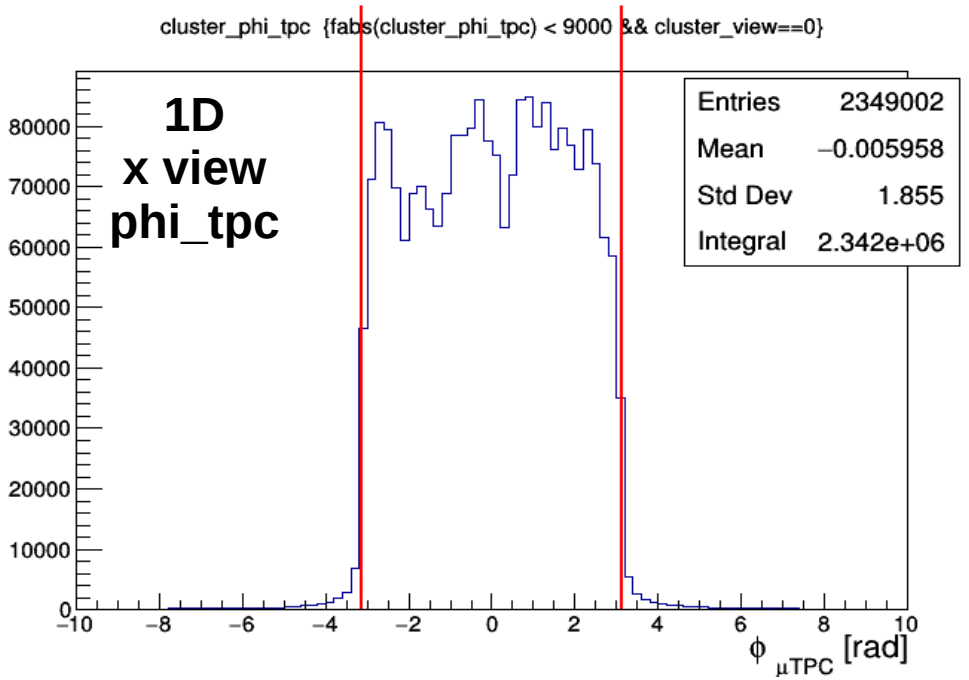
Cgem/CgemCalibFunSvc/CgemCalibFunSvc-00-00-03/dat/timeFit_Run10.txt

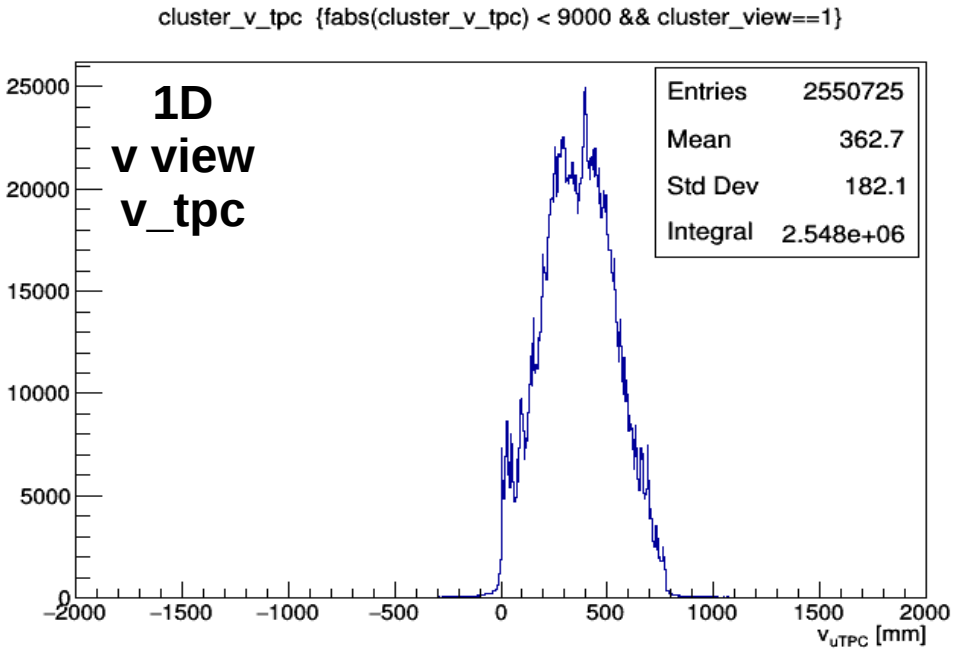
XV_type	tRising_sheet0	tFalling_sheet0
X	-8800	-8650
V	-8825	-8686

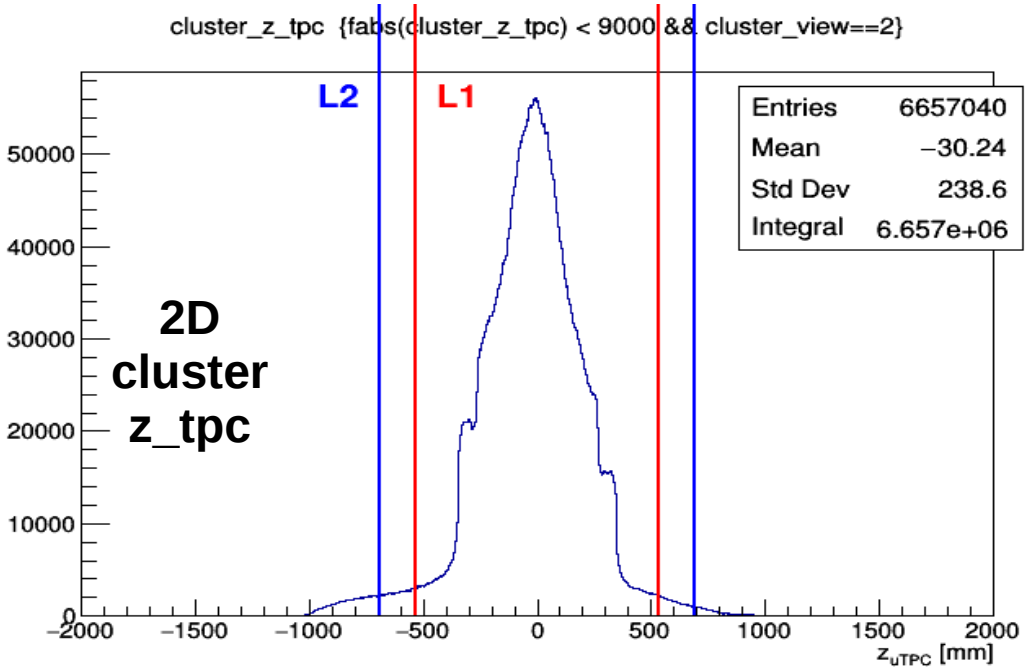
Layer 1

XV_type	tRising_sheet0	tFalling_sheet0	tRising_sheet1	tFalling_sheet1
X	-8824	-8675	-8824	-8675
V	-8828	-8686	-8828	-8686

All layers together – analytic fit







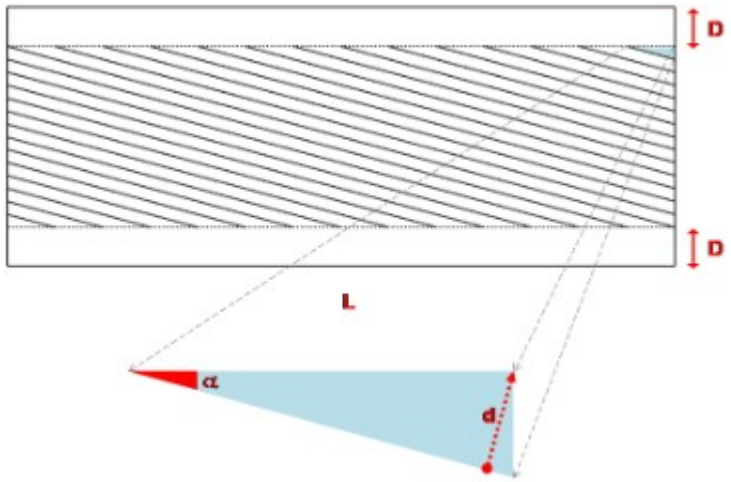
LAYER 1 – analytic fit

X VIEW -

- number of clusters with phi reconstructed by CC = 1741925
- number of clusters with cluster size_x > 1 = 633204
- number of clusters with phi reconstructed by uTPC = 633203 = almost 100%
- number of clusters with phi_tpc < 3.1415 = 615077 = 97% of reconstructed utpc

V VIEW -

- number of clusters with v reconstructed by CC = 3511661
- number of clusters with cluster size_v > 1 = 936792 = almost 100%
- number of clusters with v reconstructed by uTPC = 936632 = 27%
- number of clusters with v_tpc < 776 && > 0 = 921116 = 98% of reconstructed utpc

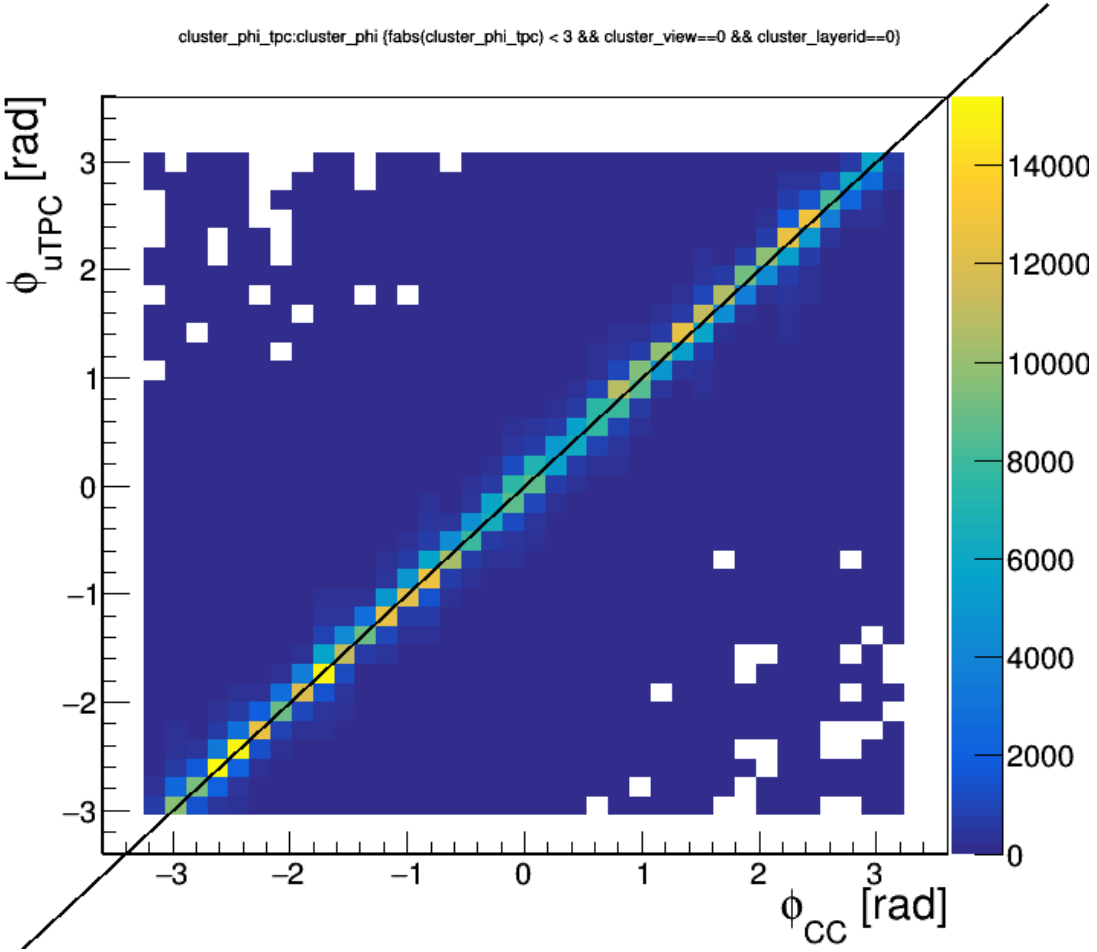


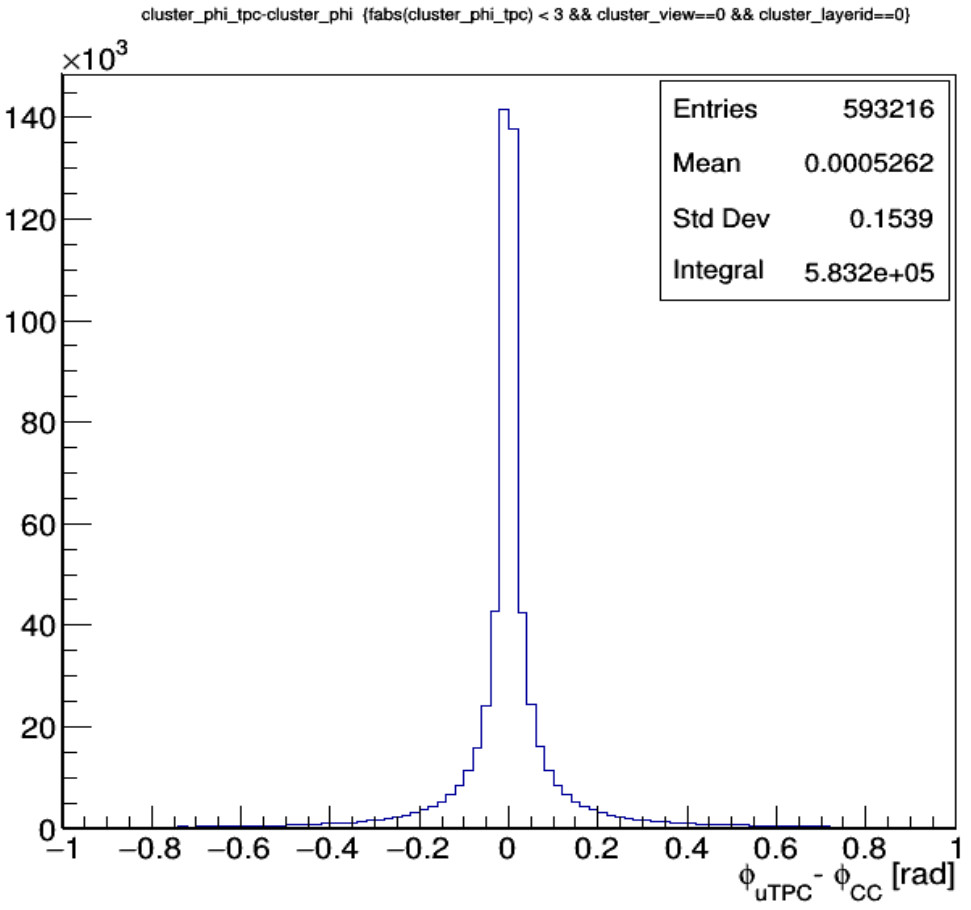
L = 532 // length mm
alpha = 46.6877 // stereo angle deg

→ d = L/sin(pi/2 - alpha)
→ **d = 775.53895 mm**

LAYER 1 – analytic fit

1D cluster, x view – comparison between CC and uTPC



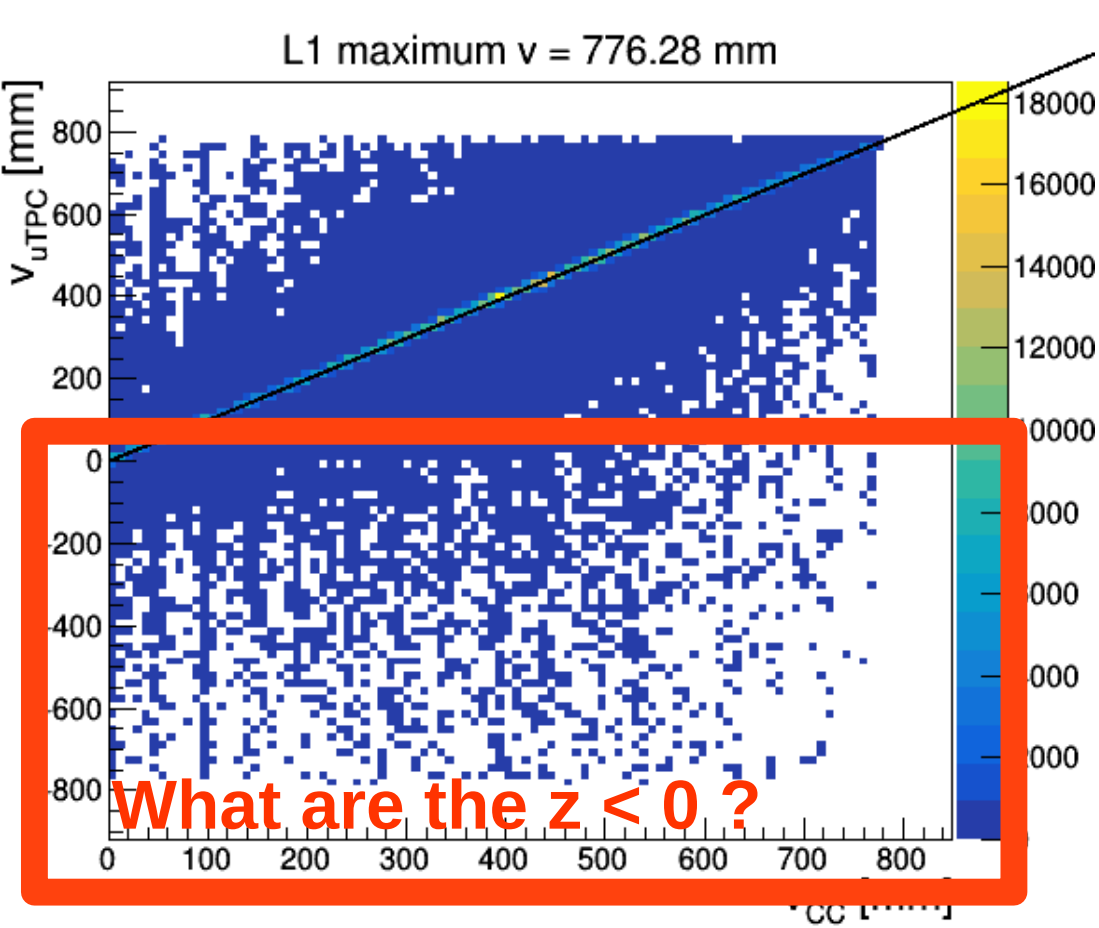


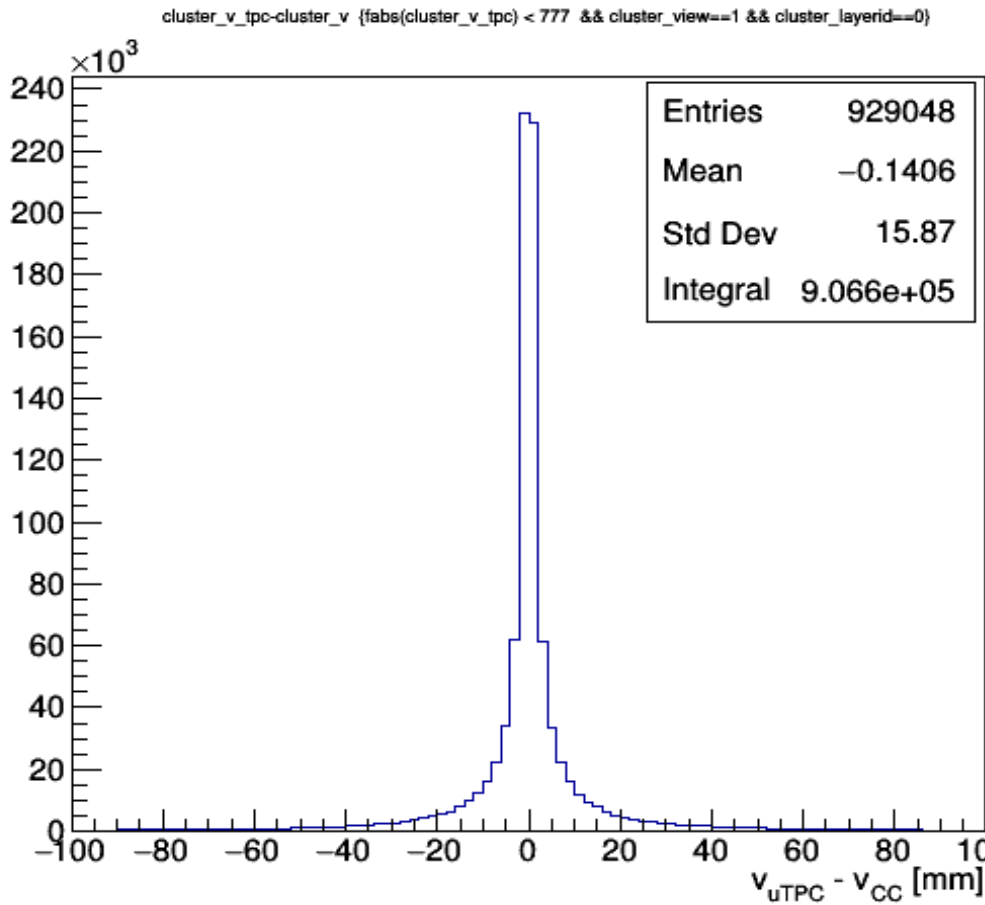
Selection for histograms:

- phi_tpc < 3 (i.e. reasonable phi from uTPC reco)

LAYER 1 – analytic fit

1D cluster, v view – comparison between CC and uTPC





Selection for histograms:

- v_tpc < 777 (i.e. reasonable v from uTPC reco)

Results are similar for layer 2

LAYER 2 bottom – analytic fit