

PRad Data Decoding Status
EPICS and Sync Info Display
and
HyCal Calibration

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PRad Data Decoding Status

- Chao has finished the data decoding (zero-suppression) for ~27 runs
 - Decoded data files are in /work/hallb/prad/replay/, in DST file format
 - 24 of them are 1.1GeV, including carbon foil run (1345)
 - The rest will be done by myself
 - Should be able to finish in two weeks, from now

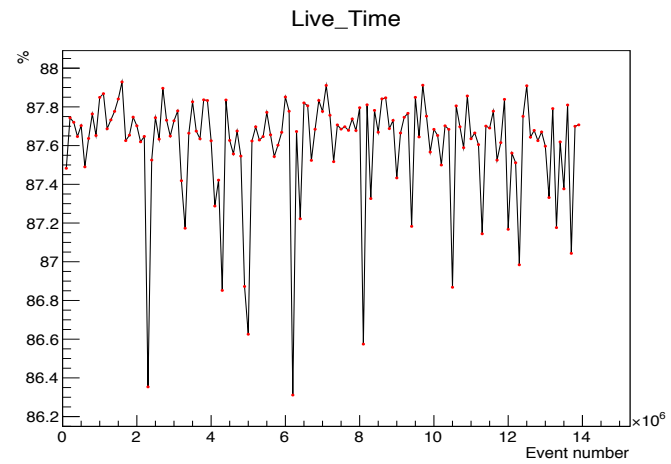
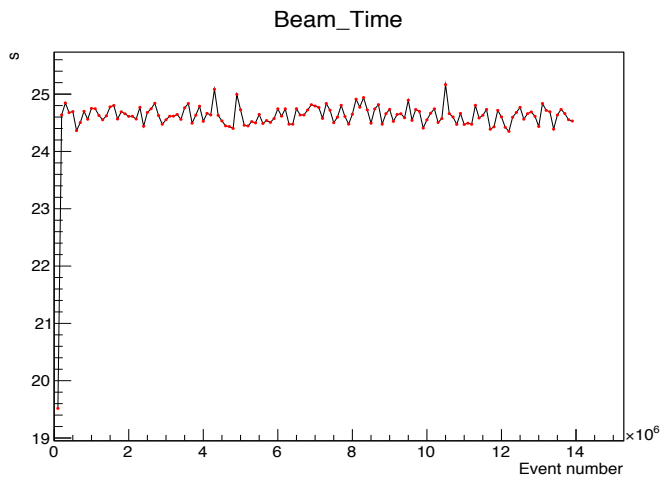
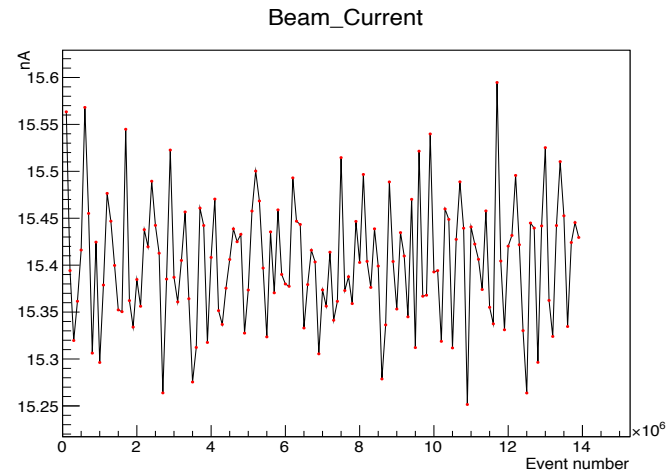
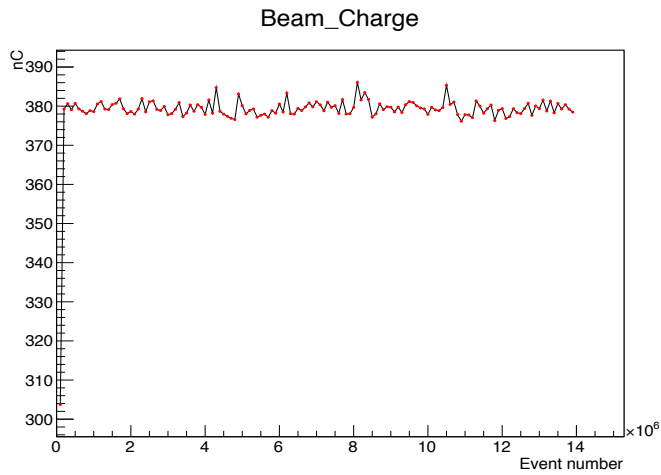
EPICS and Sync Event Info Display

- Every 2 sec there is a EPICS event
 - Cell pressure, temperature, beam position, energy...
- Every 100k there is a Sync event
 - Contains information that can be used to calculate beam charge, current, live time and beam time
- For each run, there is a root file put in /work/hallb/prad/replay_EnS. It contains graphs for:

EPICS	Sync
Cell Pressure (mTorr)	Beam Charge (nC)
Cell Gas Temperature (K)	Beam Current (nC)
Beam Energy (MeV)	Beam Time (S)
Target Thickness (N/cm ²)	Live Time (%)

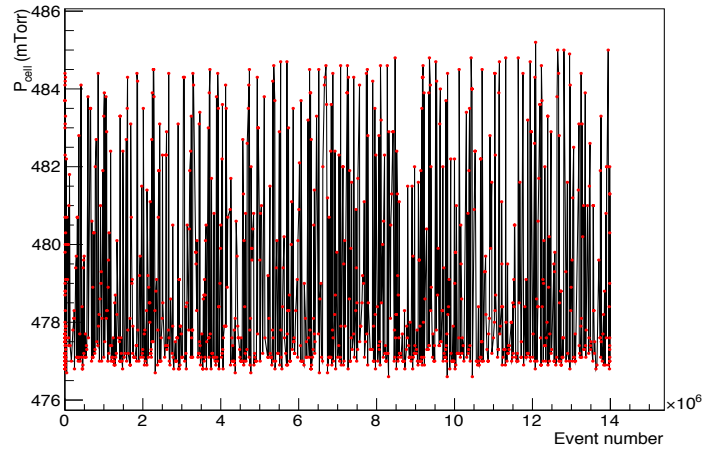
Anything else that we need?

Example: Sync event for a good run (1291)

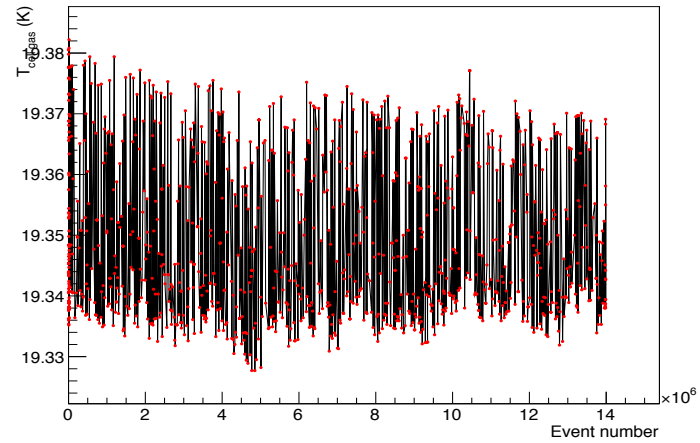


Example: EPICS event for a good run (1291)

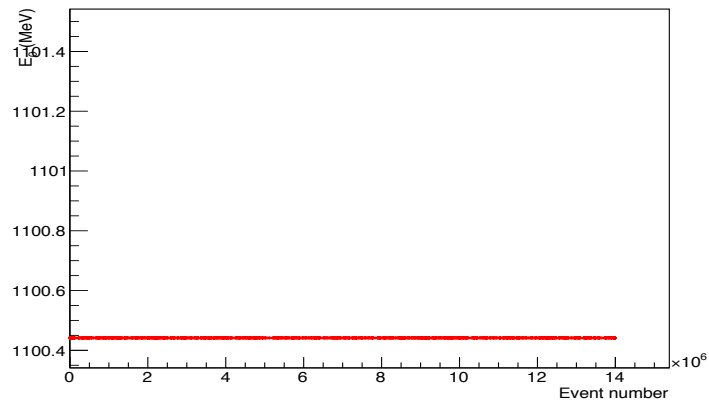
Cell_Pressure



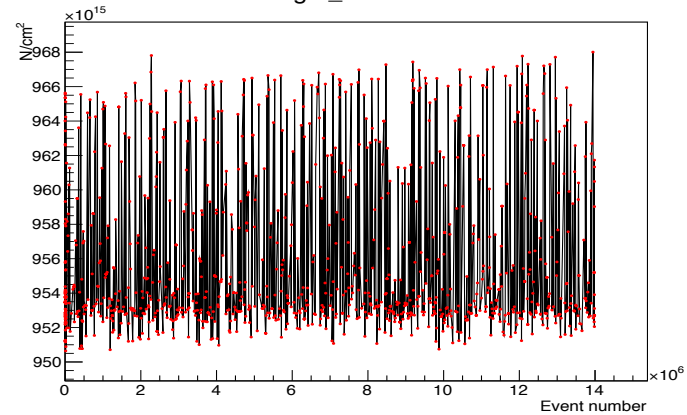
Cell_Gas_Temperature



Beam_Energy

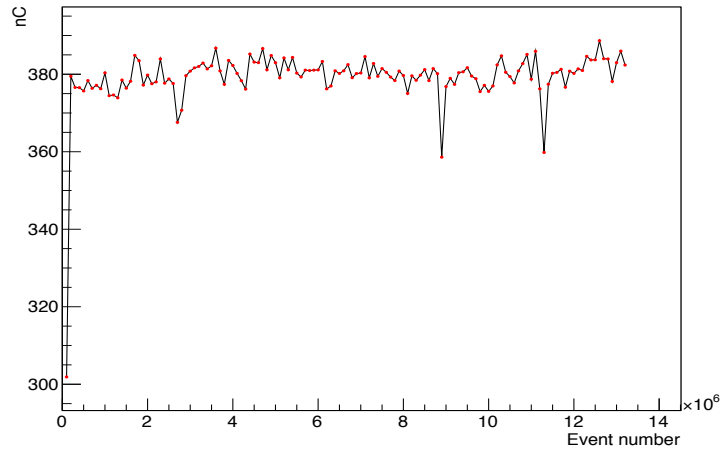


Target_Thickness

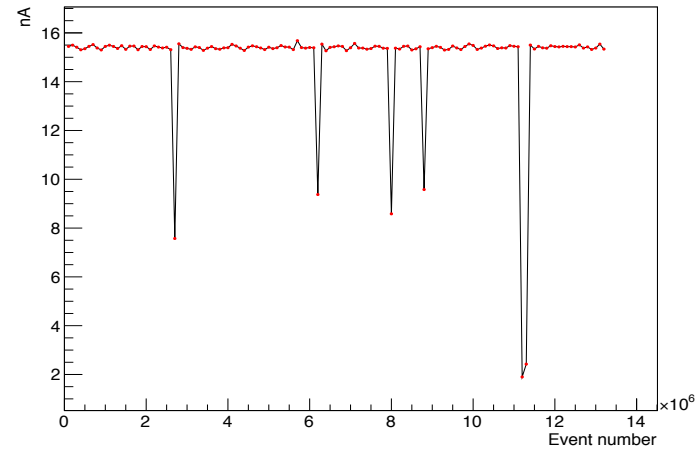


Example: Sync event for a not-so-good run (1307)

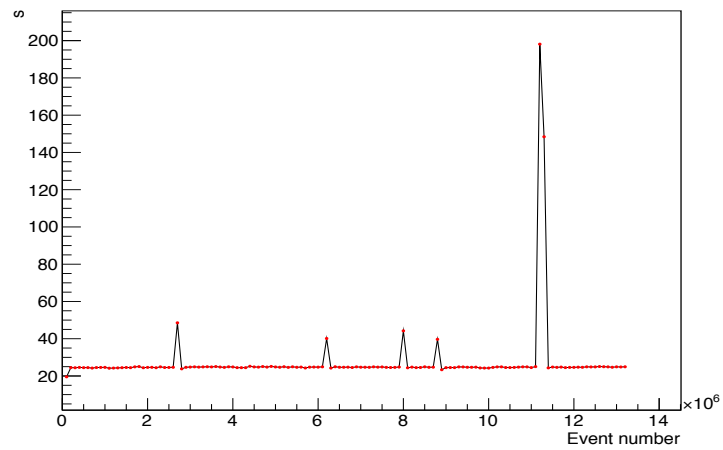
Beam_Charge



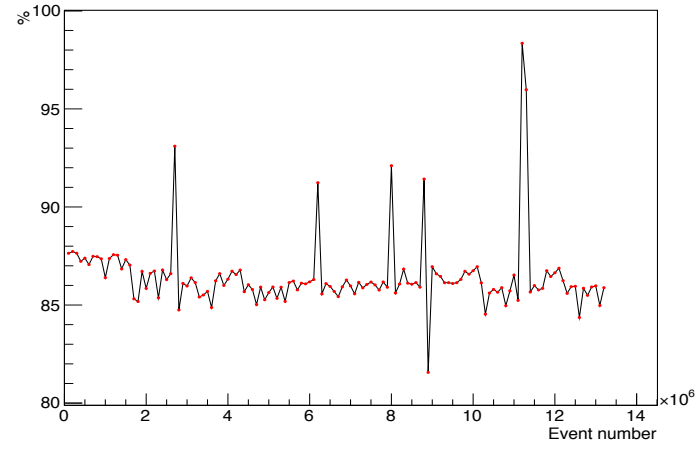
Beam_Current



Beam_Time

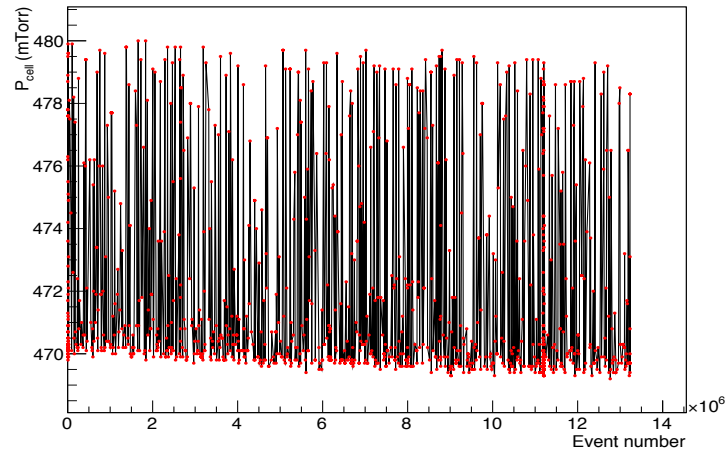


Live_Time

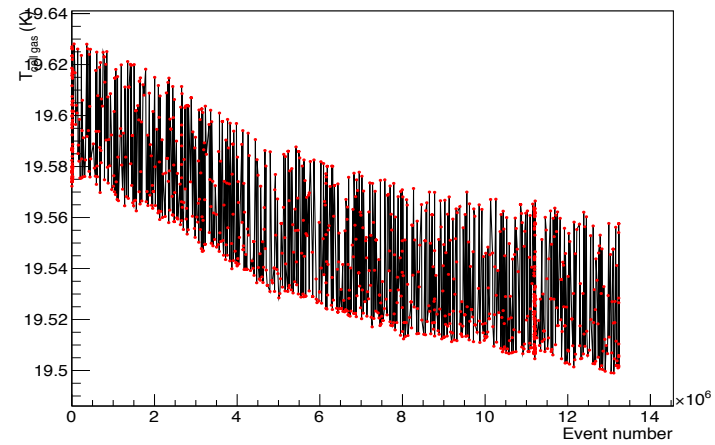


Example: EPICS event for a good run (1307)

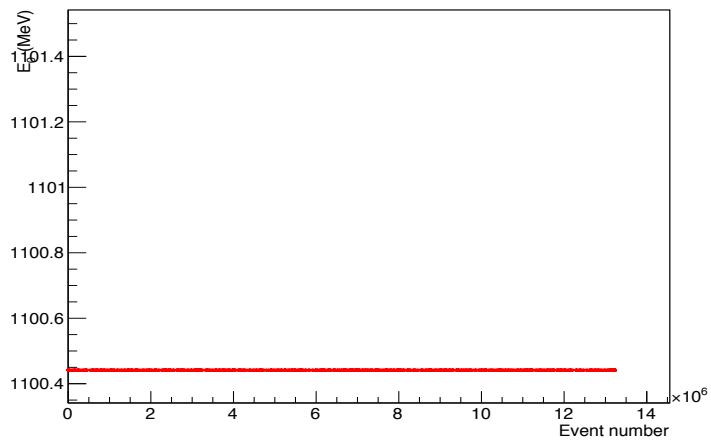
Cell_Pressure



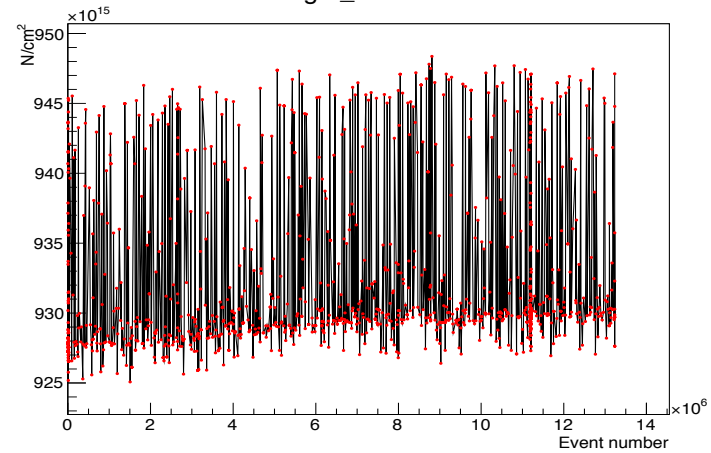
Cell_Gas_Temperature



Beam_Energy

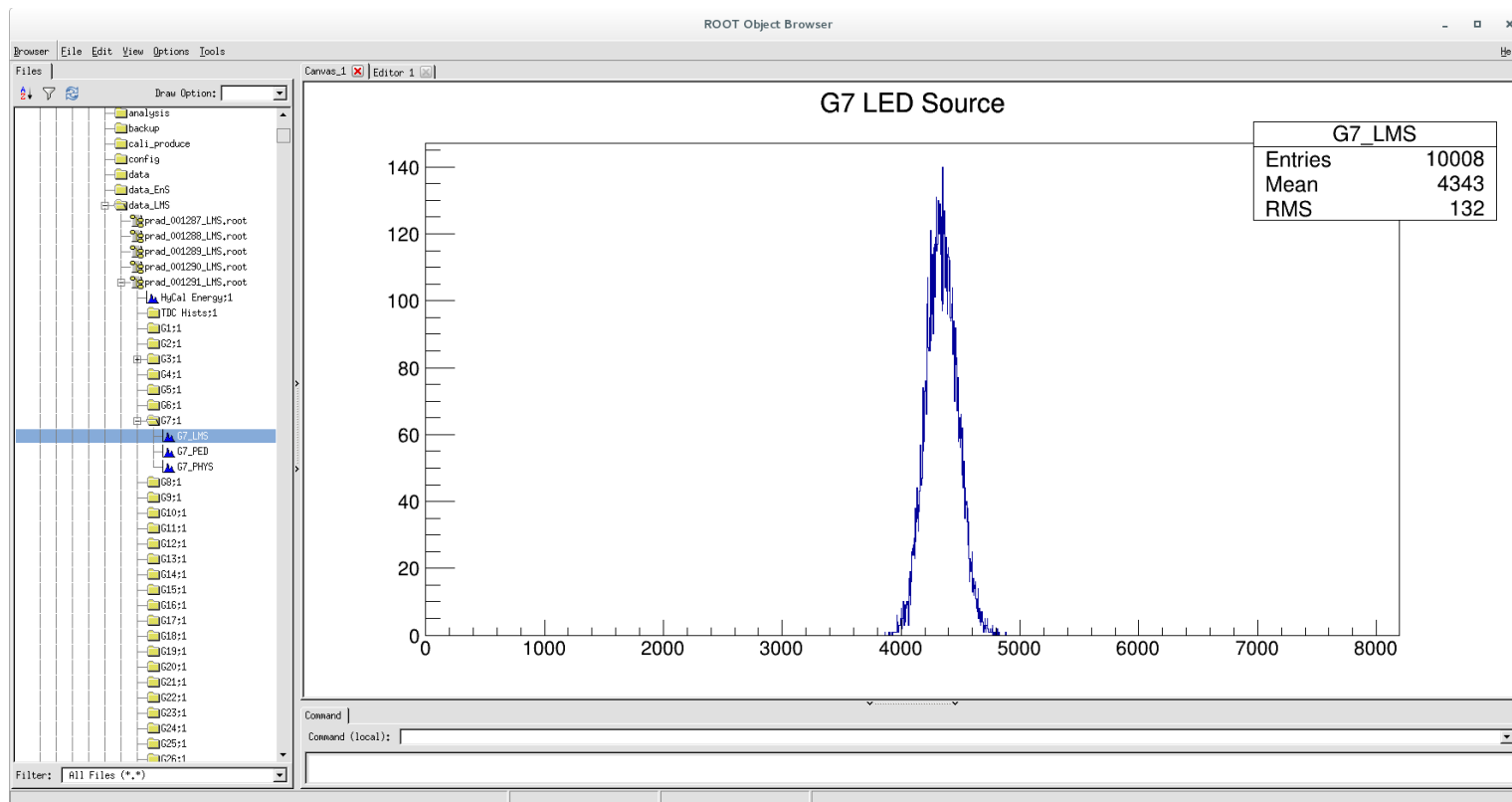


Target_Thickness



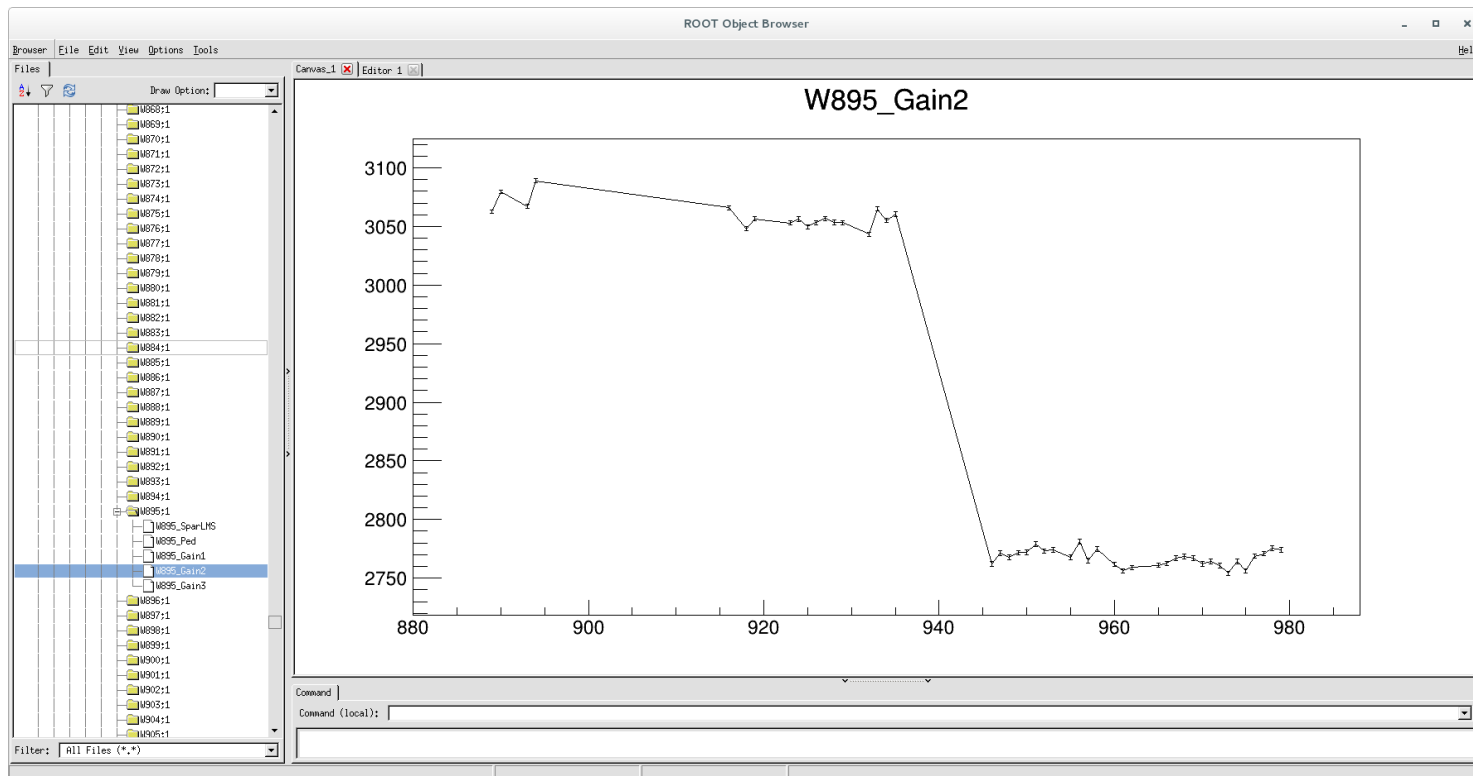
LMS and Gain Monitoring Files

- For each run, a root file containing the LMS and pedestal distribution of each channel can be found in /work/hallb/prad/replay_LMS.

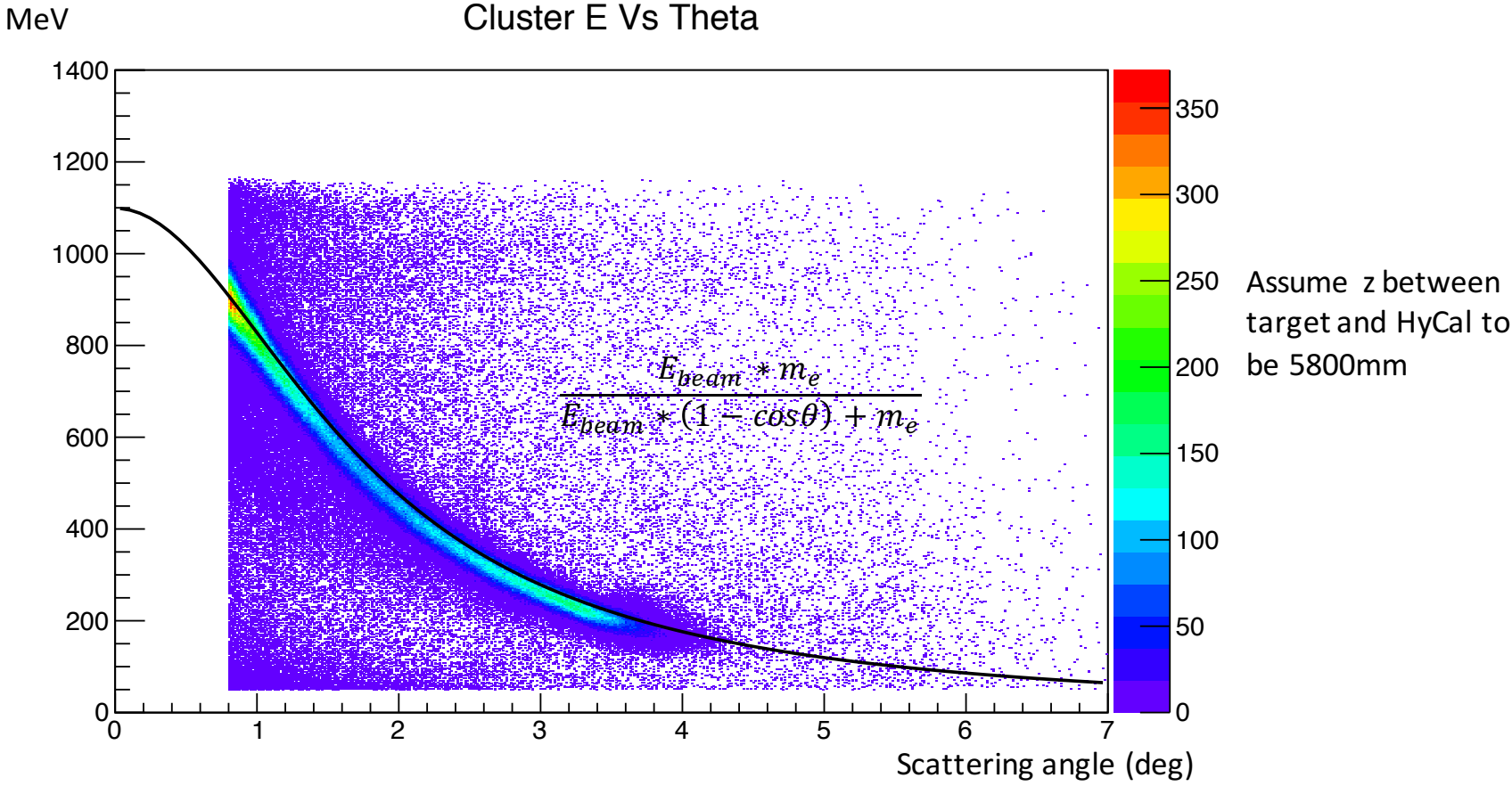


LMS and Gain Monitoring Files

- Will also have 3 root files containing the mean value of LMS and gains of each channel, as a function of run number. (one for calibration, one for 1.1GeV and 1 for 2.2GeV)



Attempt for HyCal Z-position calibration



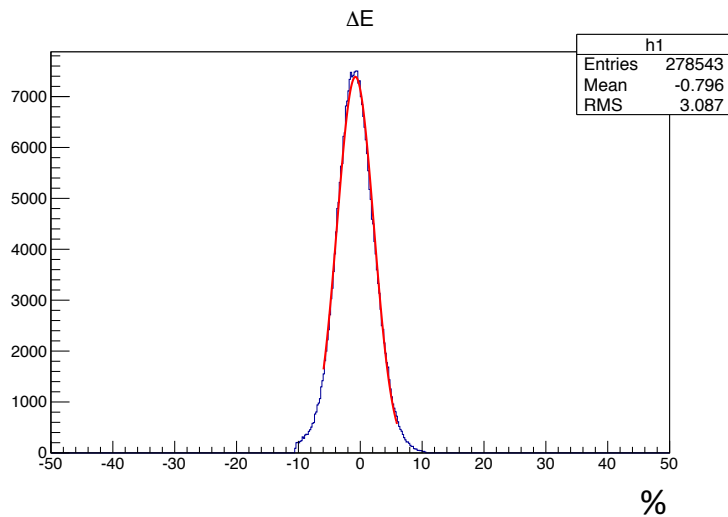
Attempt for HyCal Z-position calibration

- First make sure the energy is calibrated and x and y shifts are corrected using double-arm Moller events
- Select double-arm Mollers, assuming reconstructed energy is unbiased, and use that to calculate expected polar angle
- Plot the distribution of $\Delta\theta$, and find the z-shift that is needed to set the distribution centered at 0.

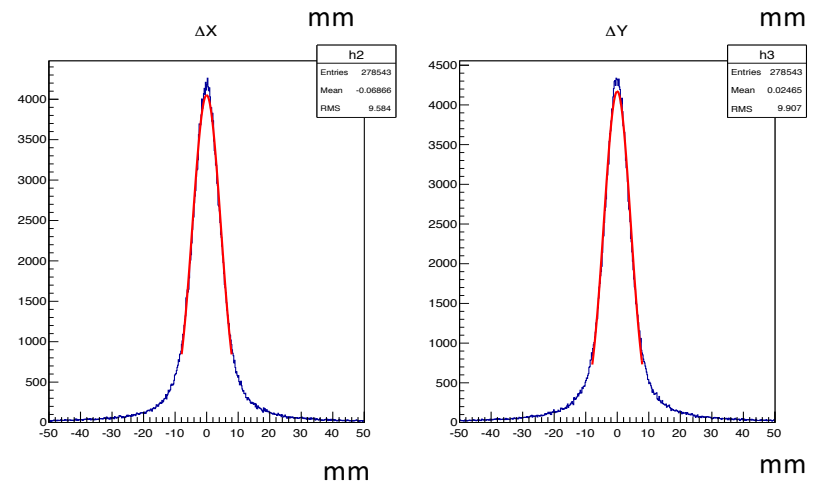
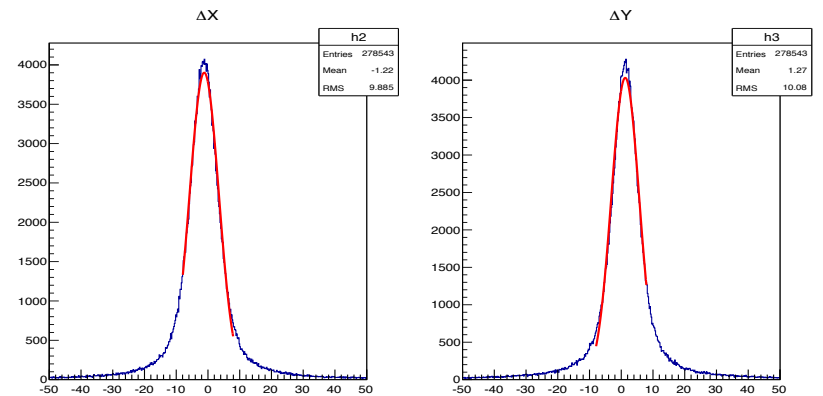
Attempt for HyCal Z-position calibration

Cuts:

1. requiring two-cluster events
2. Total energy = 1100 +/- 120 MeV
3. Cut +/- 240MeV around the Moller dist
4. Theta > 0.8 and < 3.5 deg

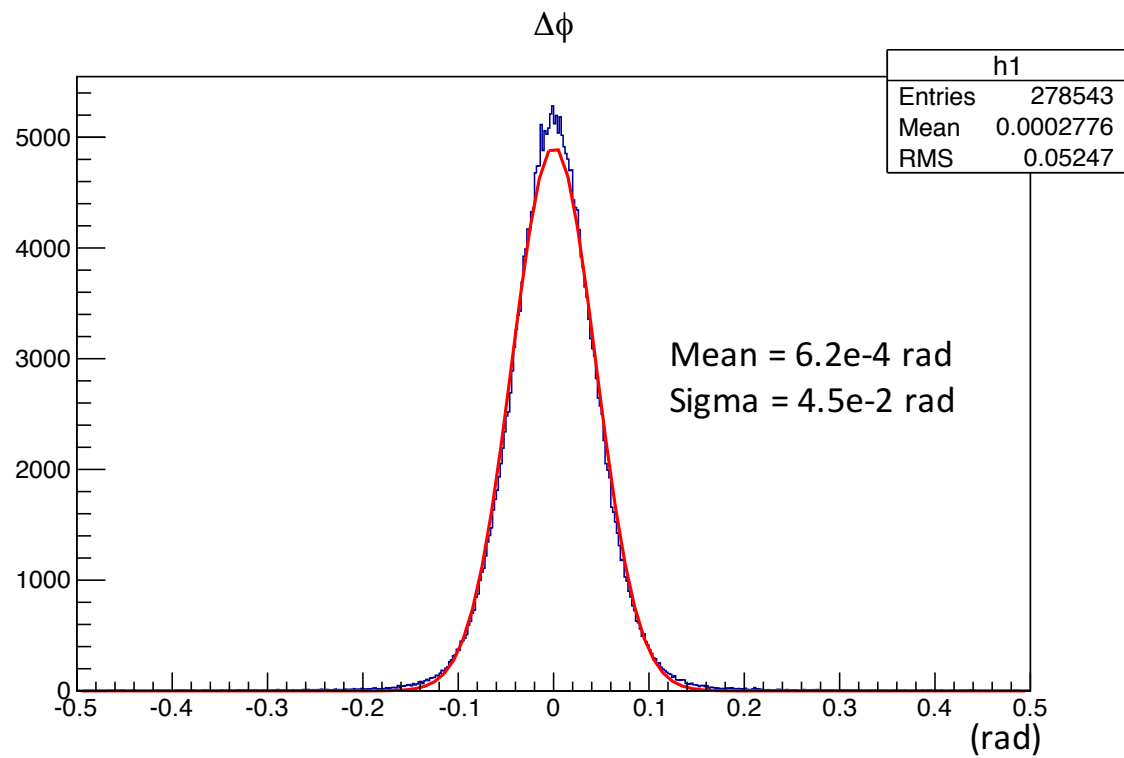


Around 0.75% shift to the negative side, so E total < Ebeam.



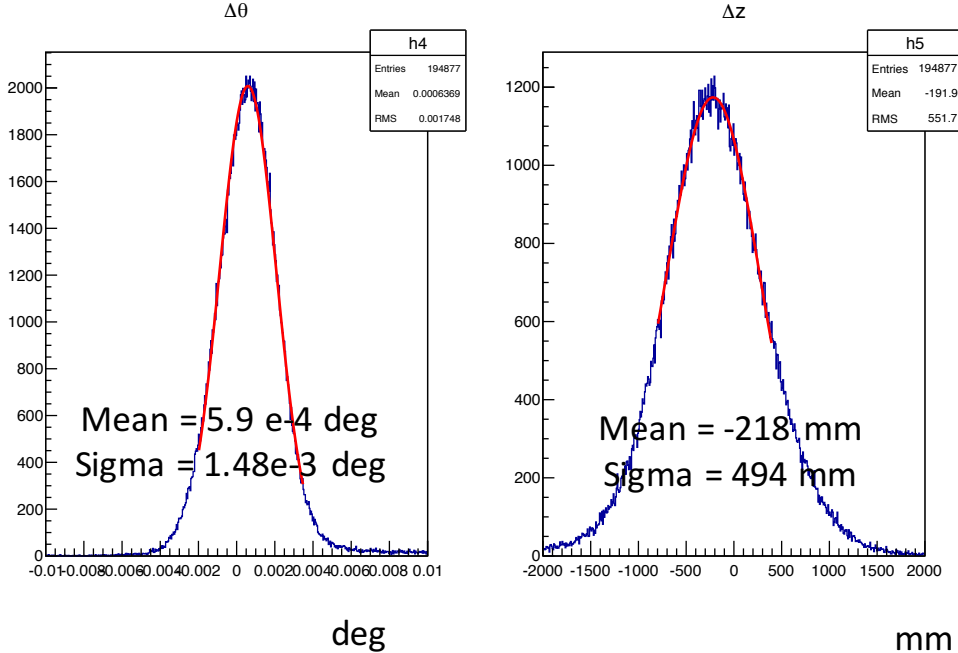
X needs to be shift by 1.18 mm and y by -1.26 mm

Attempt for HyCal Z-position calibration

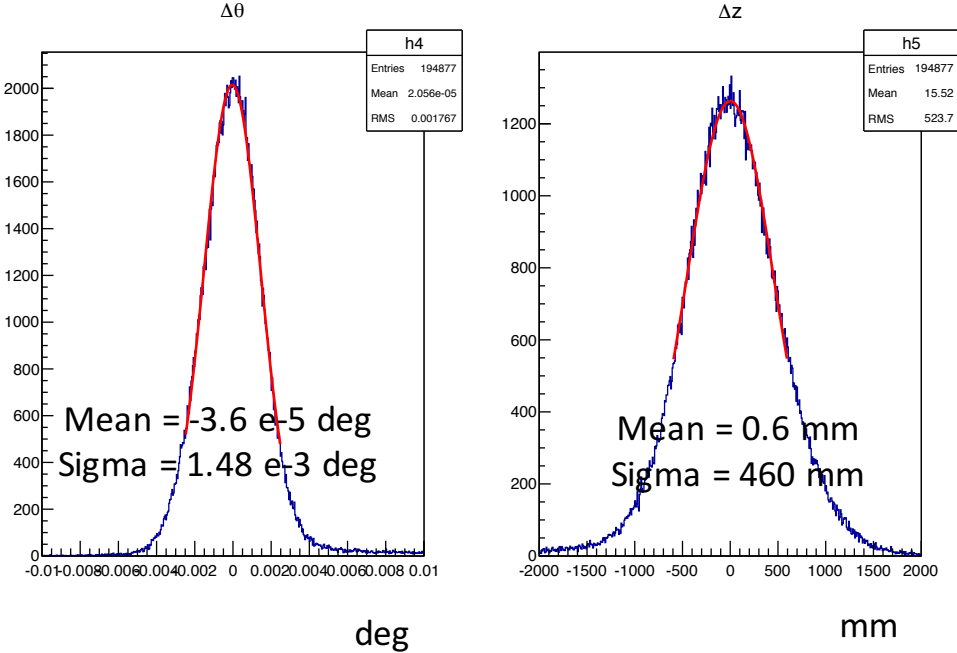


Attempt for HyCal Z-position calibration

Assume z = 5800 mm



Assume z = 5591 mm



Attempt for HyCal Z-position calibration

