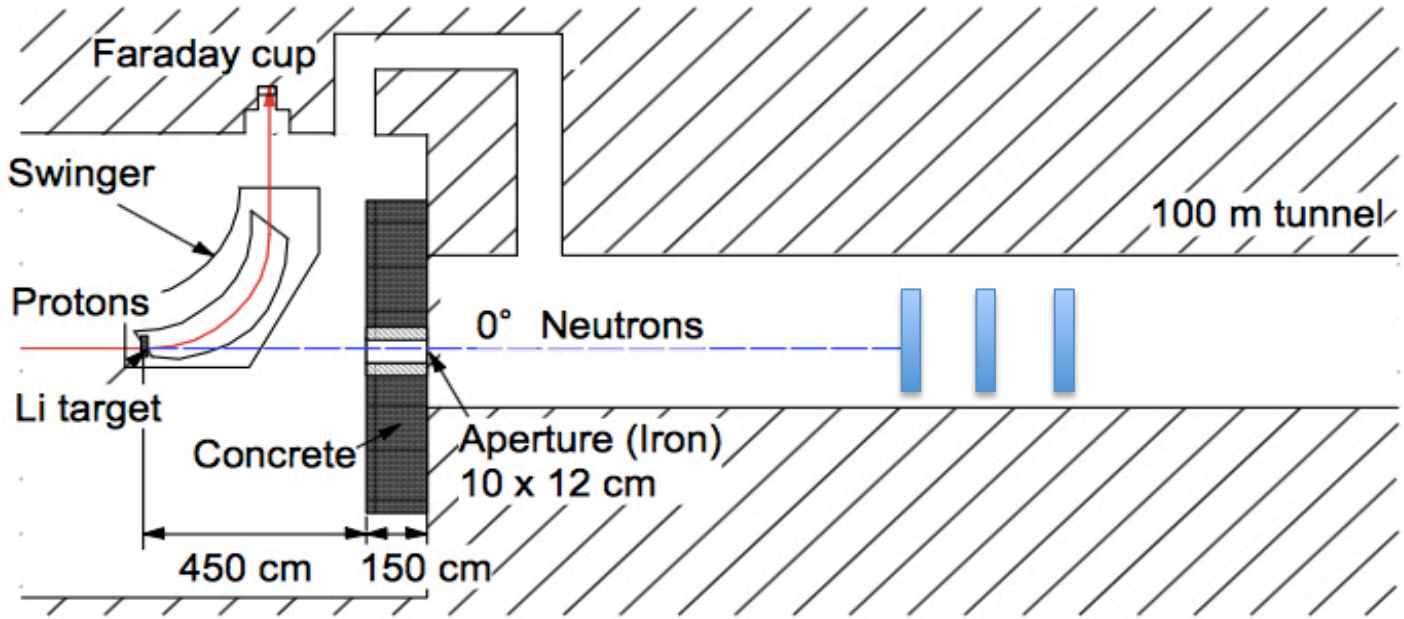
RCNP Experiment environment



$P + {}^{7}Li \rightarrow n + {}^{7}Be$

- Beam

Neutron flux : $4*10^{9}$ n/sr/muC

Beam chopper: 1/9

Beam current : 10 nA

-Target

Li Target : 2cm Diameter ,1cm thick

- Detector

1st ST : 2 (10cm*100cm*10cm)

2nd ST : 4 (200cm*10cm*10cm)

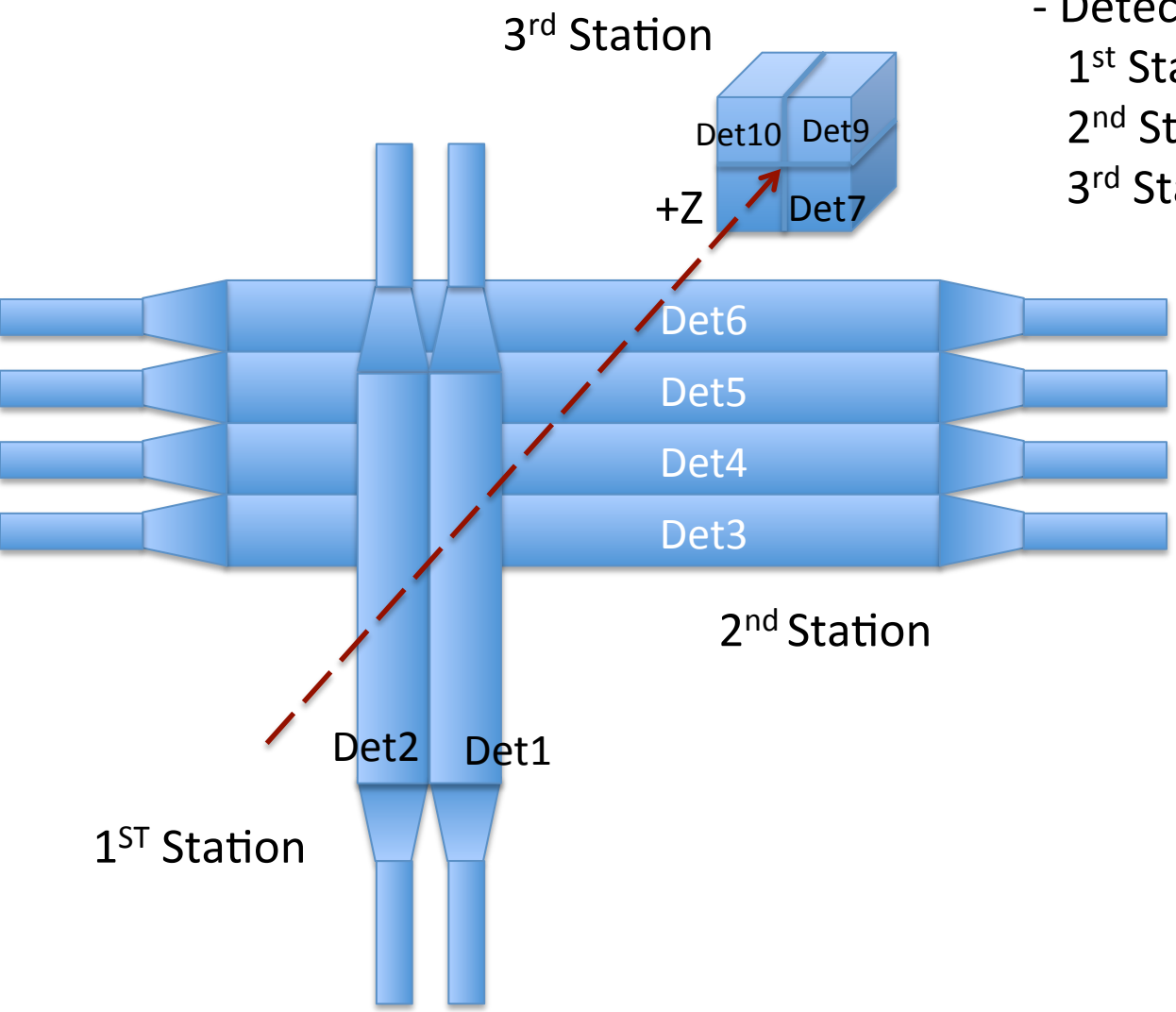
3rd ST : 4 (10cm*10cm*20cm)

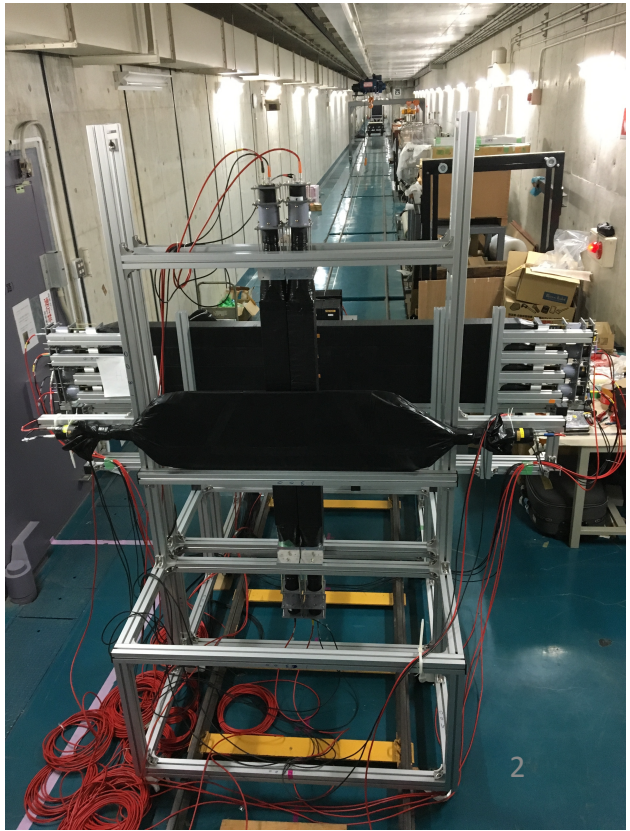
distance between target and detector : 15m

gap between stations : 60 cm

Detector setting structure

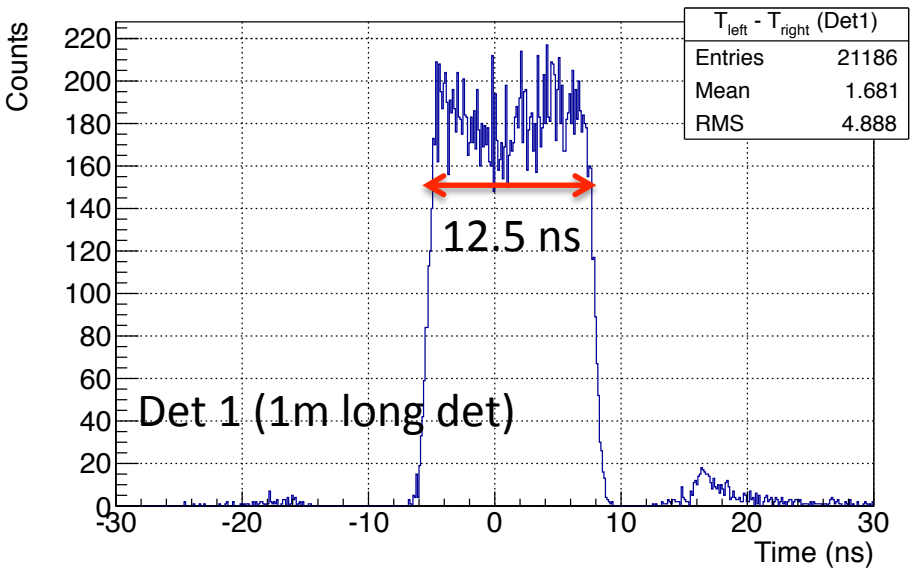
Scintillator : 11 개
PMT : 18 개
- Detector Size
  1st Station : 2 (10cm*100cm*10cm)
  2nd Station : 4 (200cm*10cm*10cm)
  3rd Station : 4 (10cm*10cm*20cm)

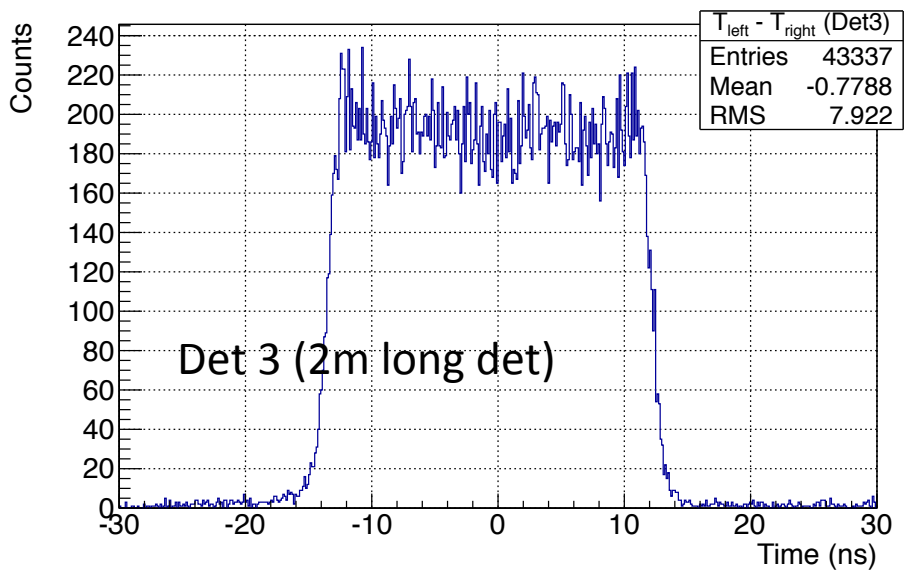




Data : CosmicSetting45

Time difference distribution of two PMTs





Hit position = $(T_{left} - T_{right})\, v_s/2$

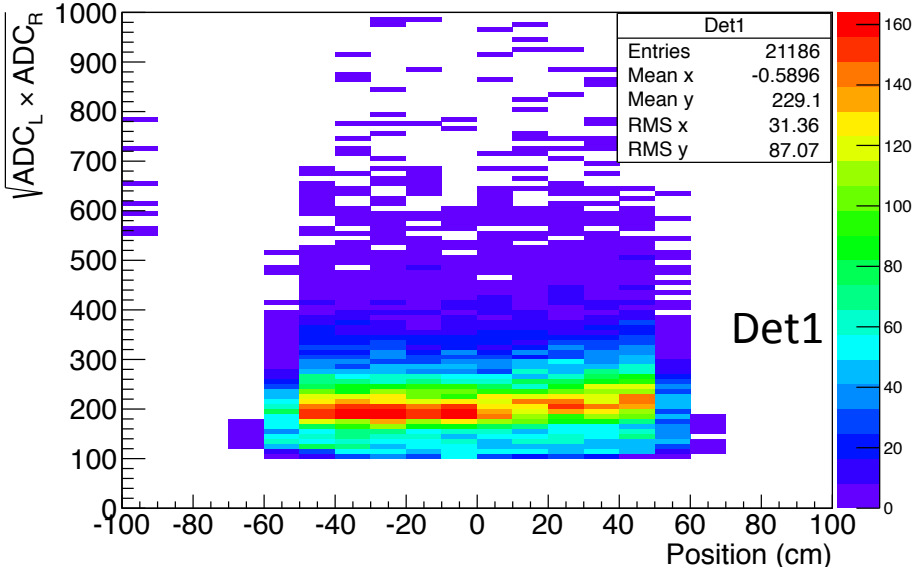
Hit time = $((T_{left} + T_{right}) - L_{det}/v_s)/2$

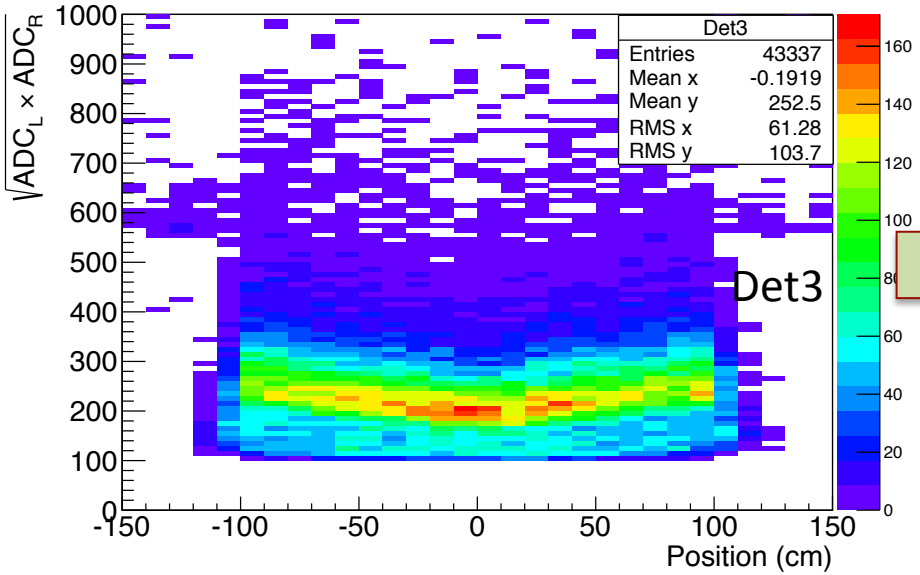
X axis : $T_{diff} = T_{left} - T_{right}$

Data : CosmicSetting45

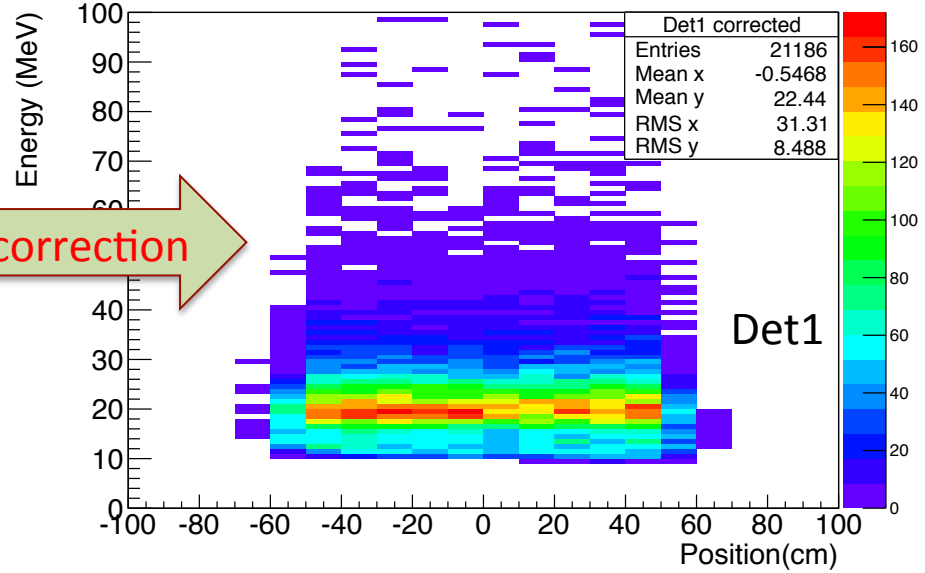
Energy calibration

Before calibration

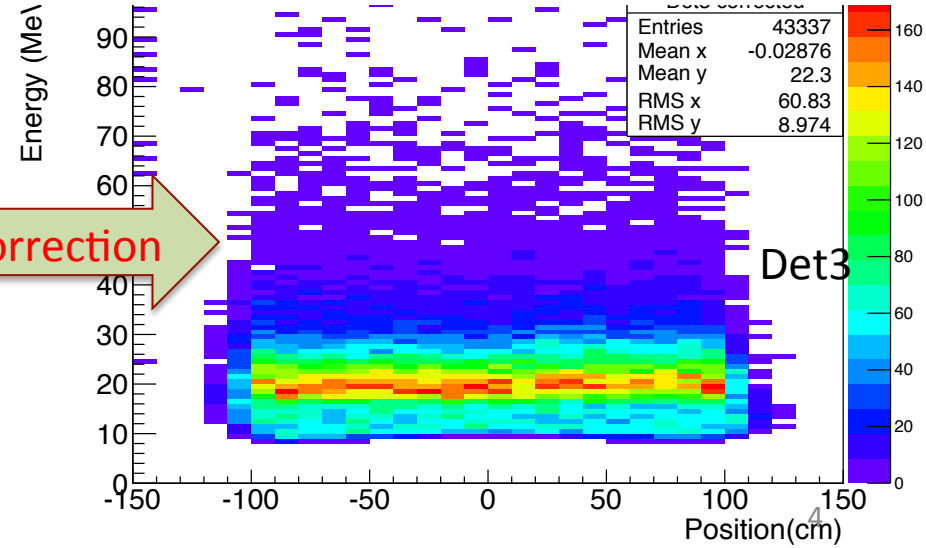




After calibration



correction

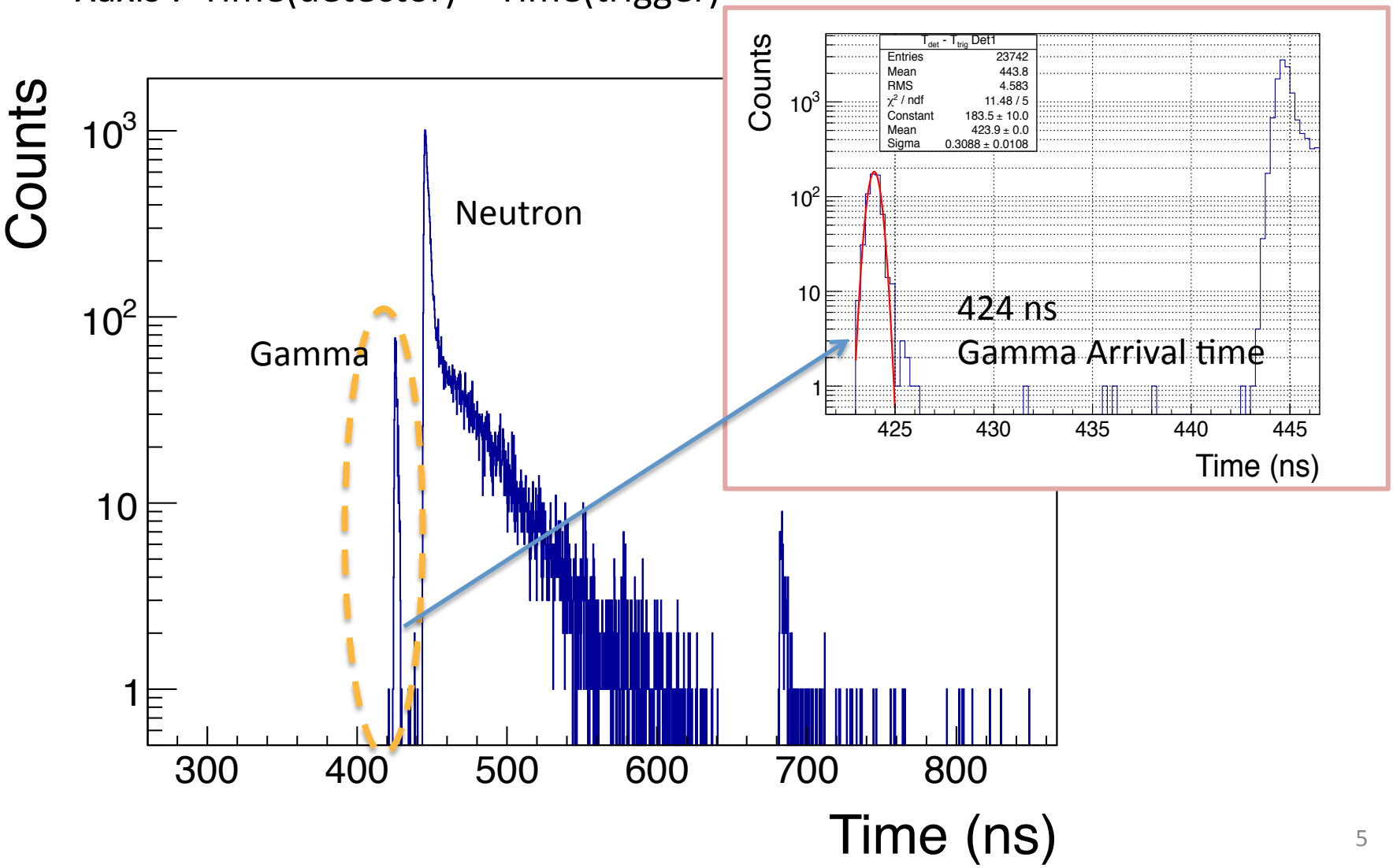


correction

Data : beamNew30

Arrival time distribution on Det1

Xaxis : Time(detector) – Time(trigger)



Data : beamNew30

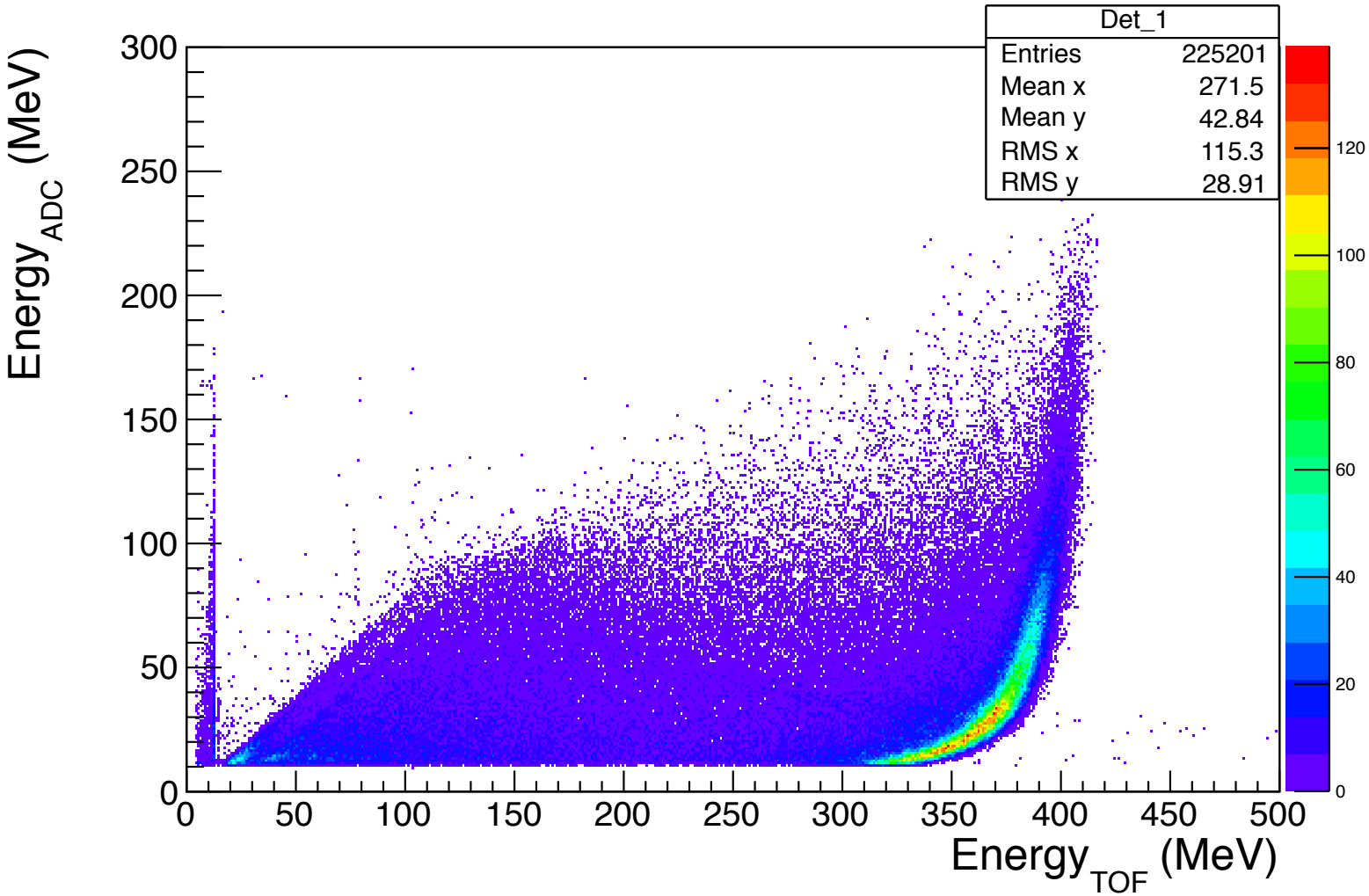
E_{adc} vs E_{tof}

Xaxis : electron-equivalent energy

Yaxis : $E_{tof} = 939.6*t*c/sqrt(t^2c^2-L^2) -939.6$

Detector threshold : 100 cnt (10MeV)

Time Offset : 374 ns (424 ns – 50 ns)



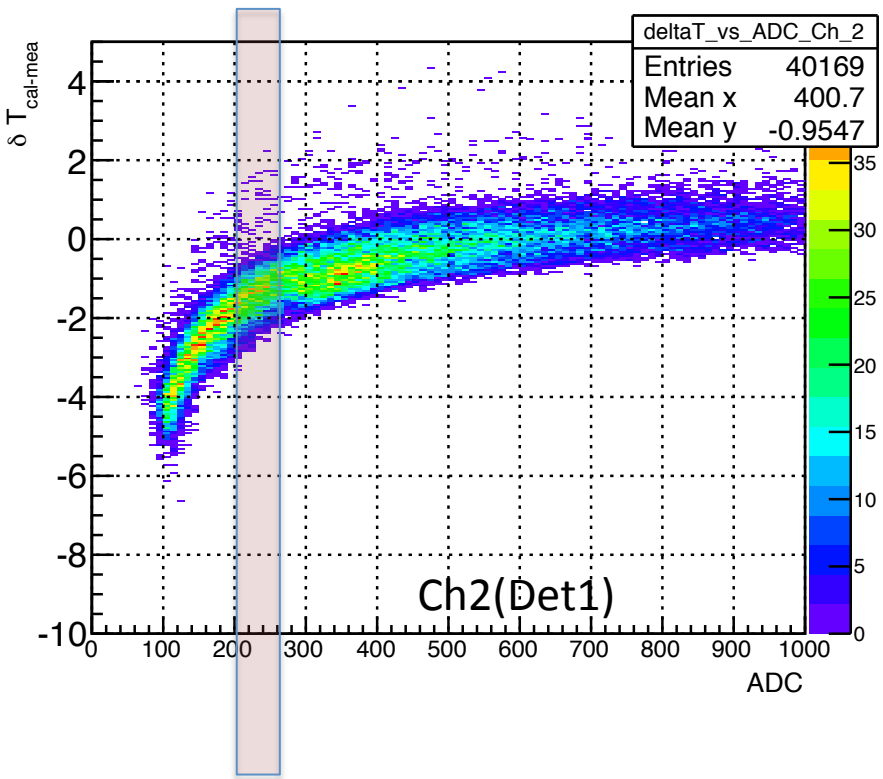
Data : beamNew30

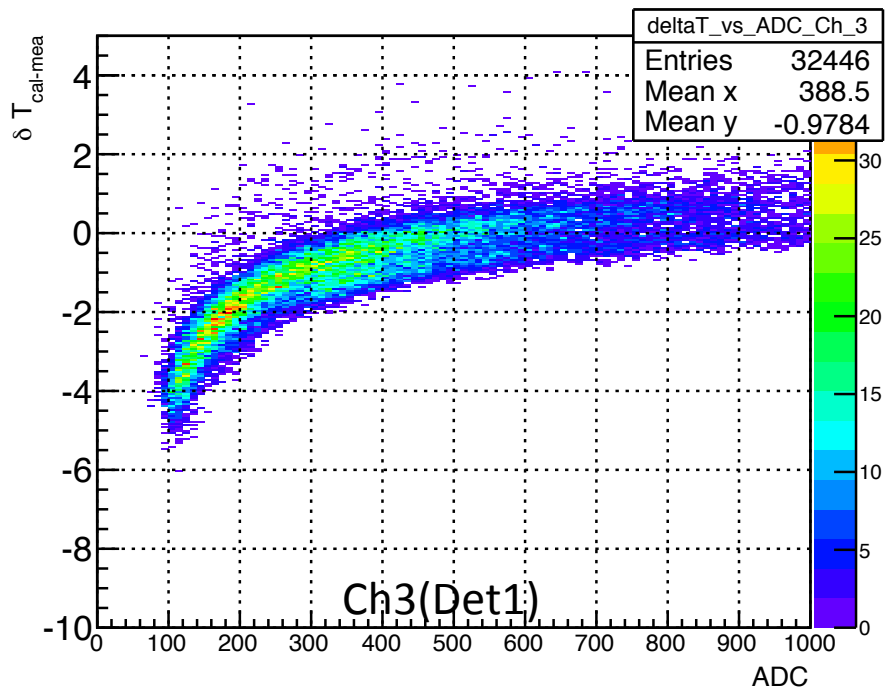
Time difference vs ADC signal height(ADC peak)

Show significant deltaT variation in the region of < 500 counts

X axis : ADC peak

Y axis : $T_{60\%adc\ peak}$ - T_{th}

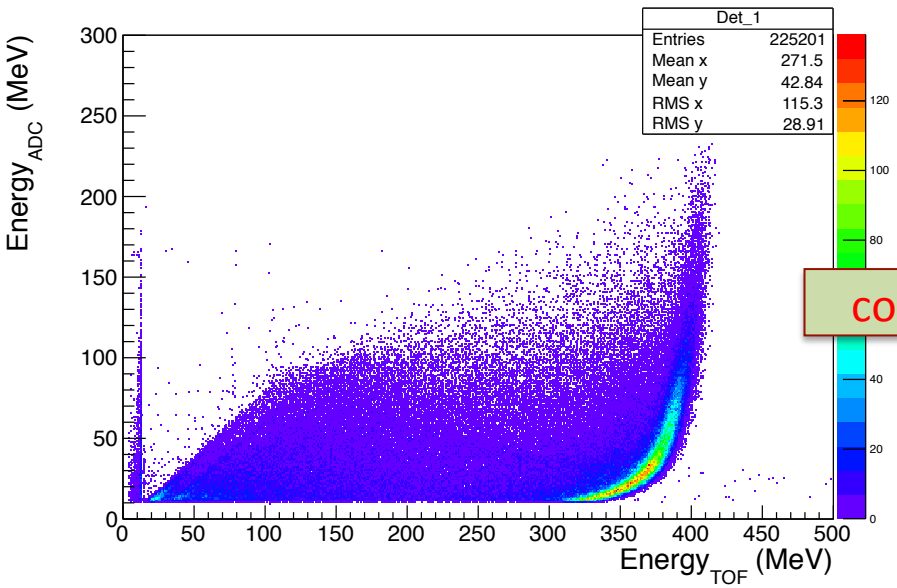




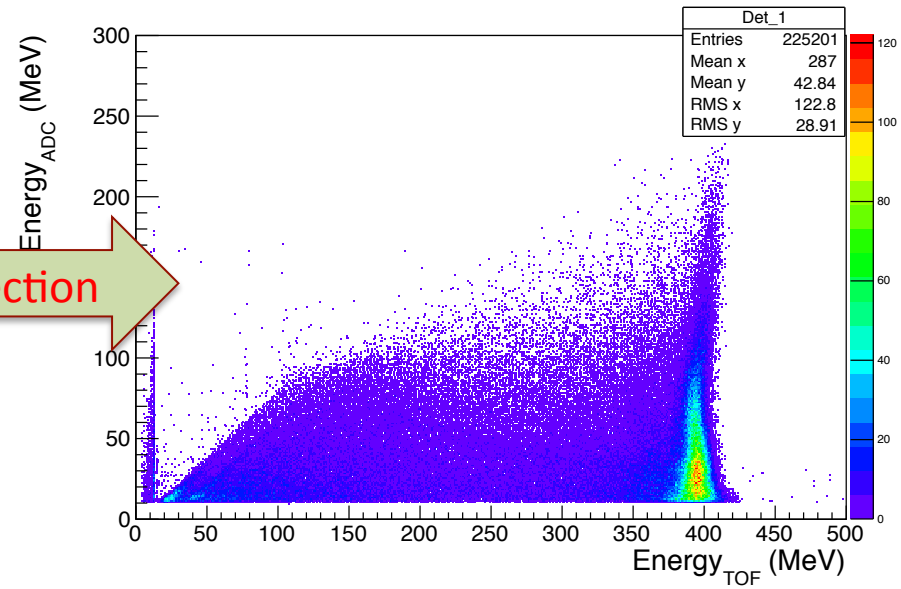
Y-projection -> Get fitting-function(for time-walk correction)

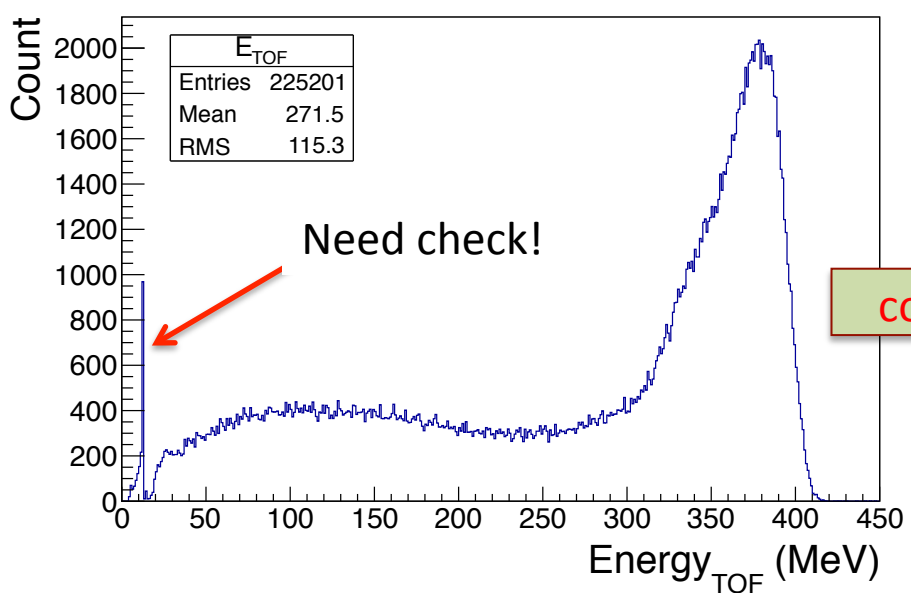
Data : beamNew30

E_{adc} vs E_{tof} after time-walk Calibration

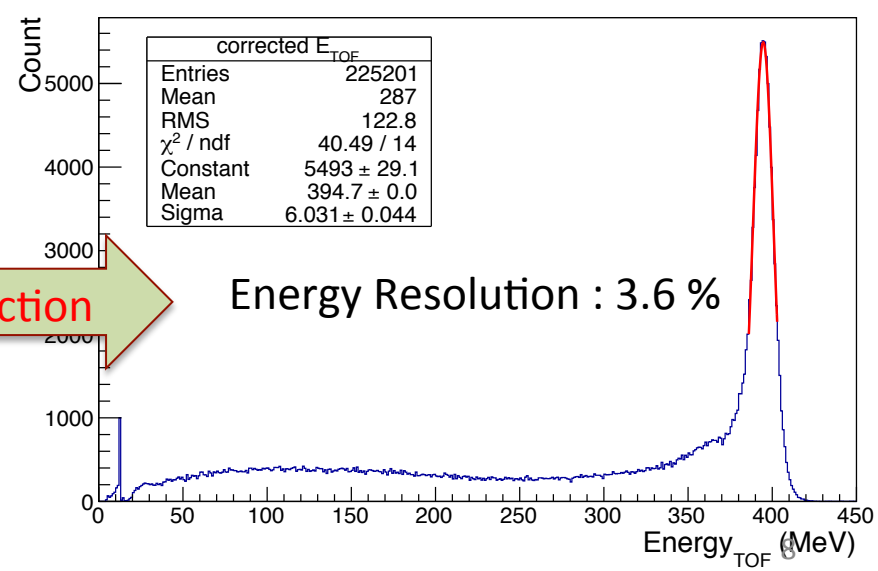


correction



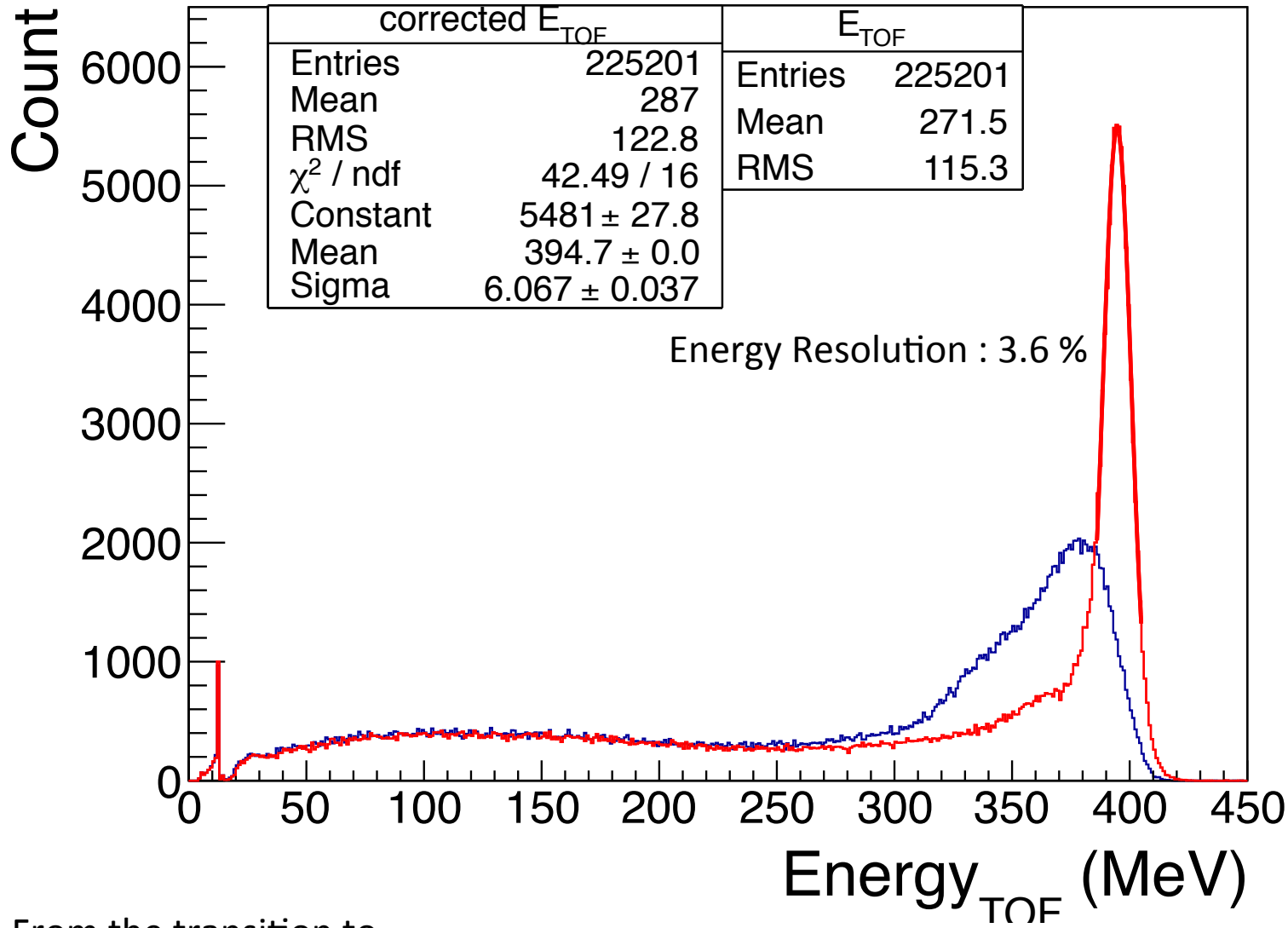


correction



Data : beamNew30

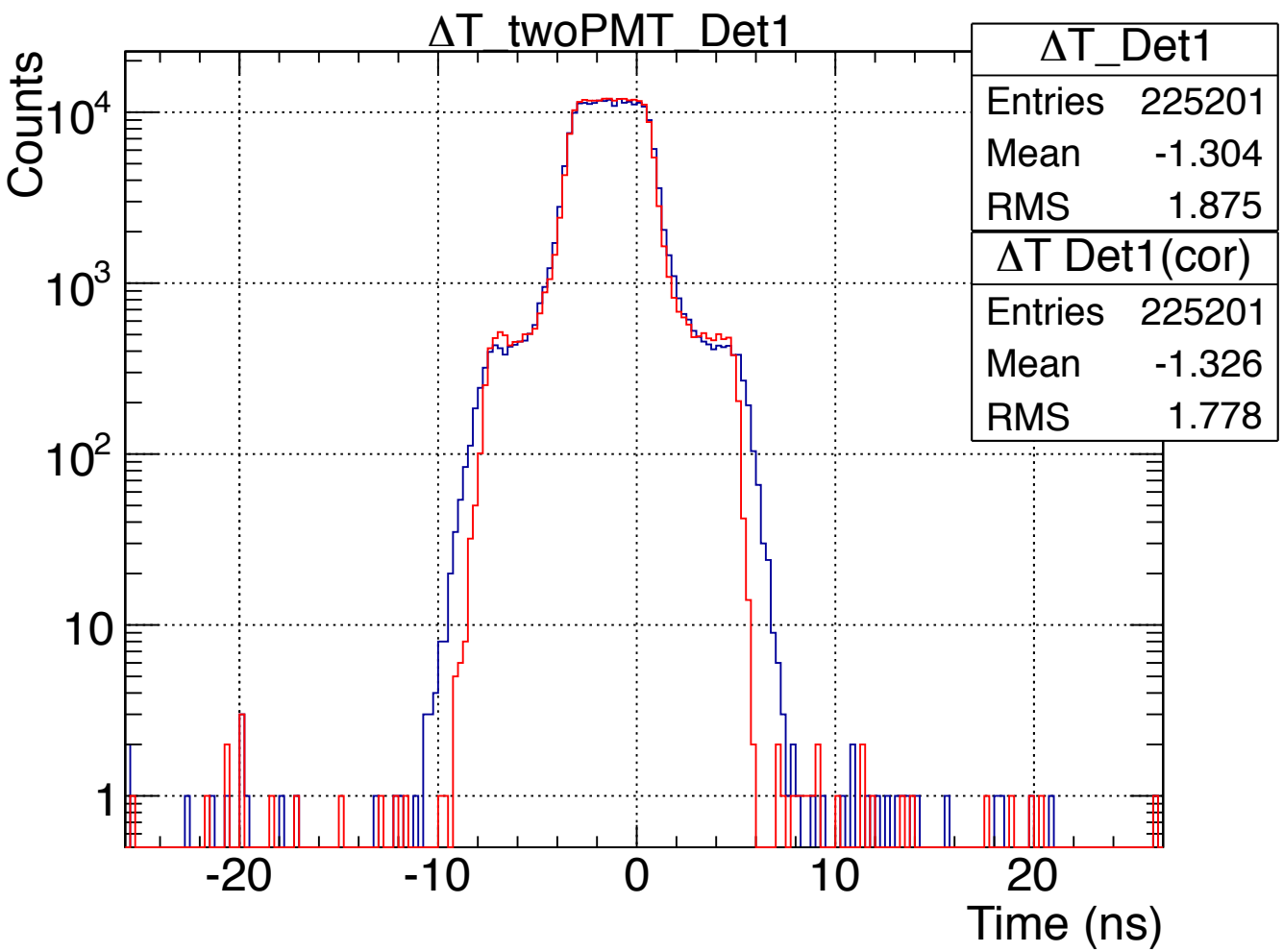
TOF energy spectrum



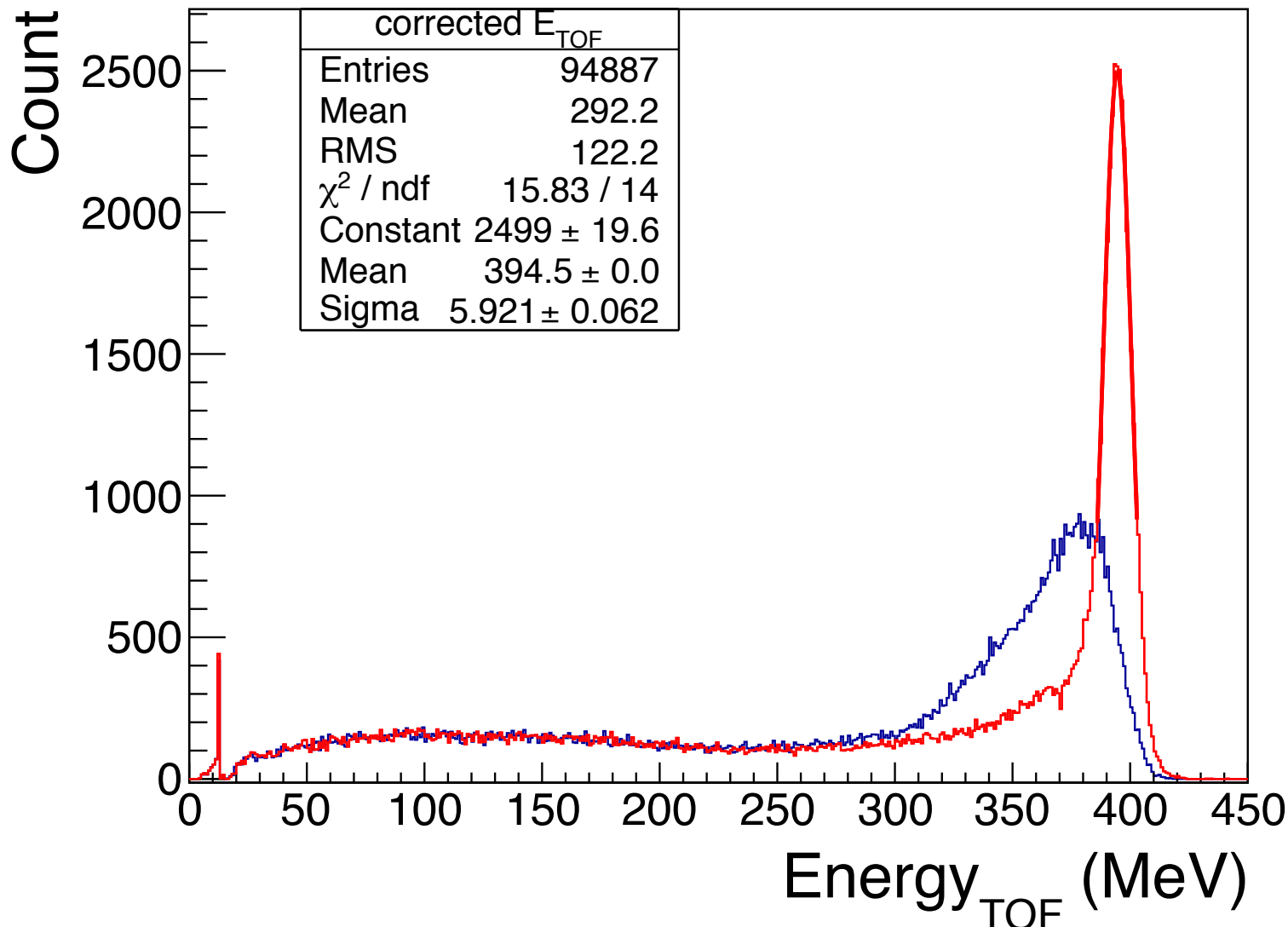
From the transition to

Back up

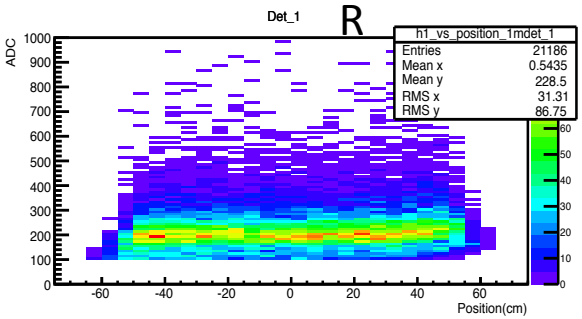
Time difference between two PMT

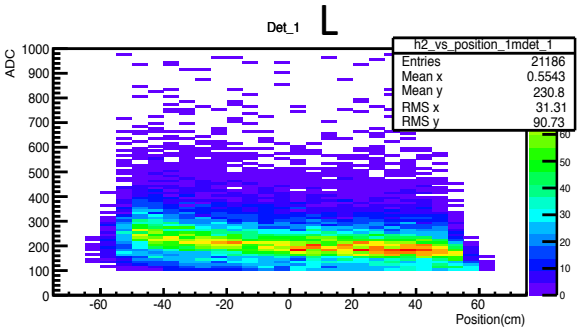


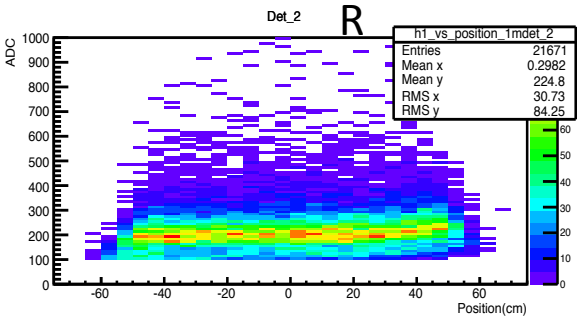
TOF energy spectrum

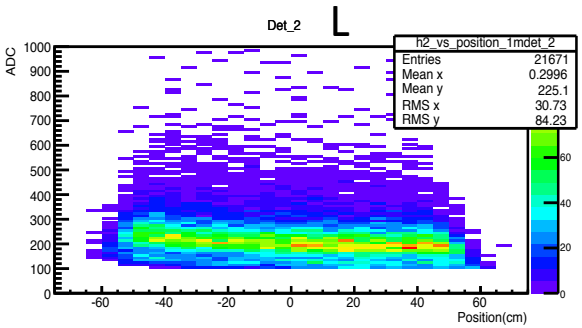


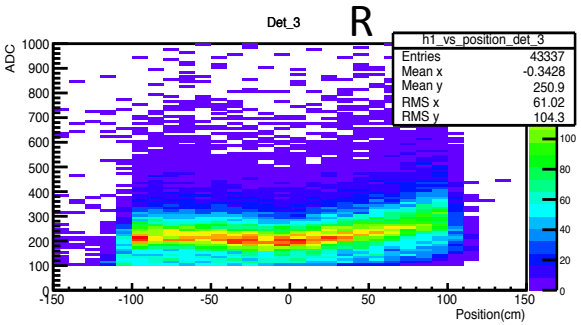
cosmicSetting_45

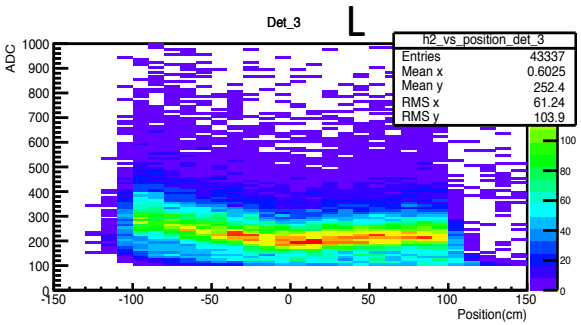


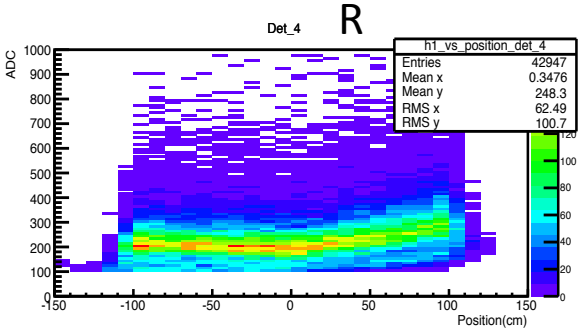


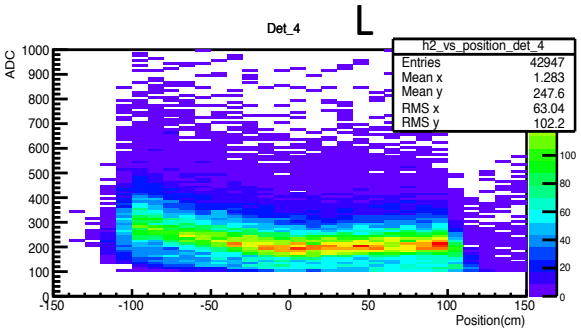


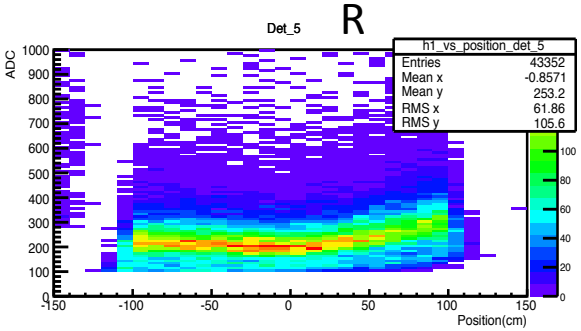


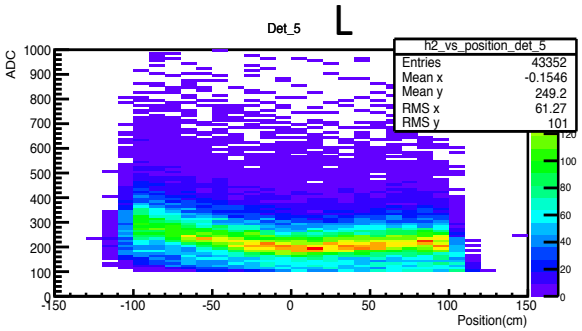


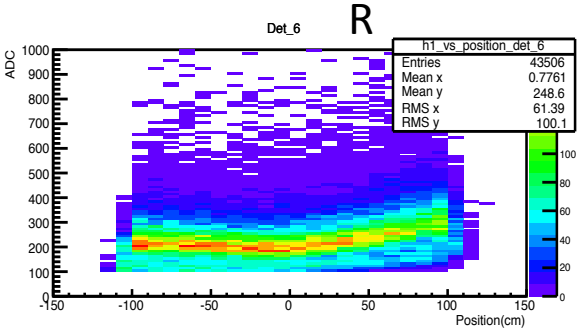


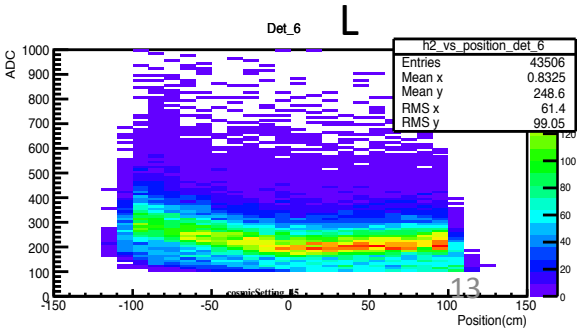






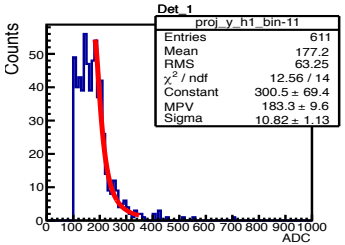


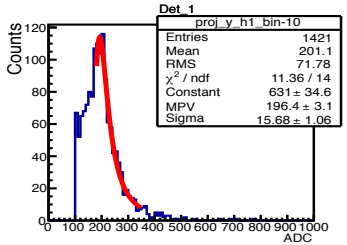


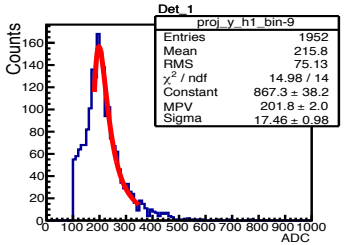


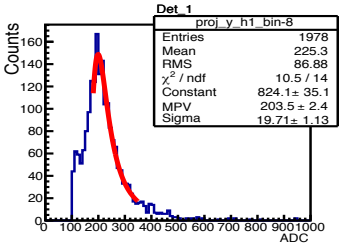
cosmicSetting_45

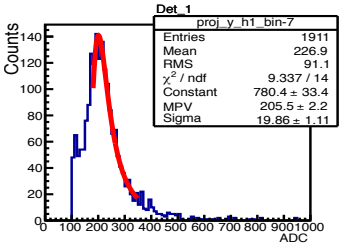
Det 1 ch2

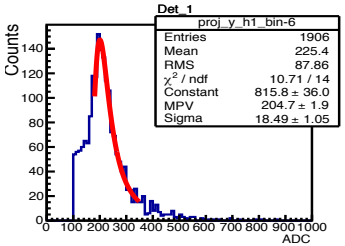


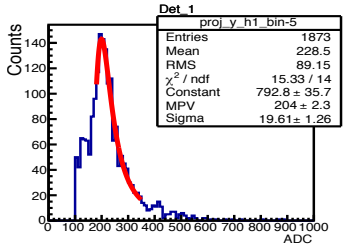


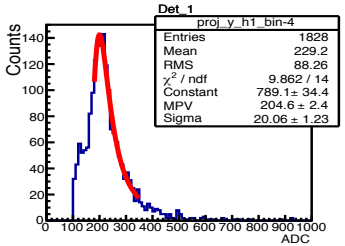


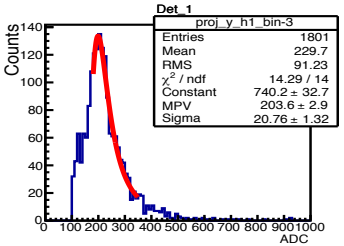


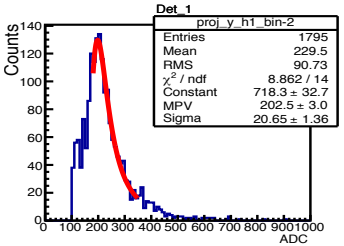


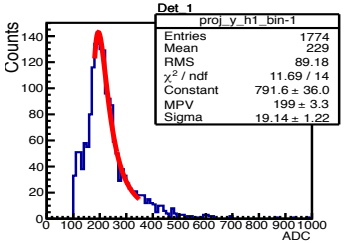


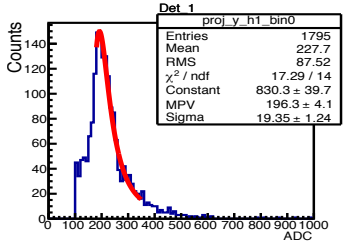


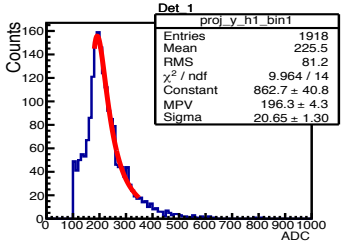


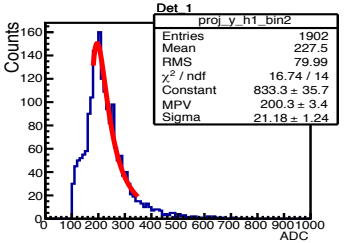


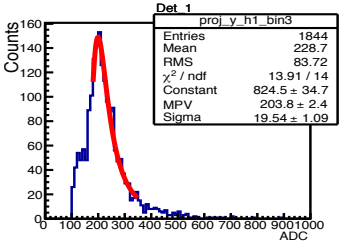


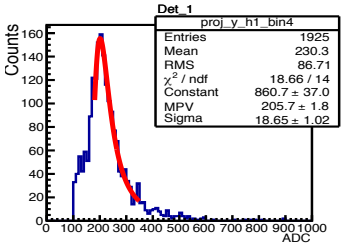


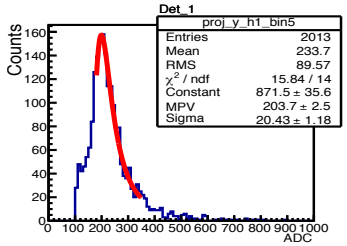


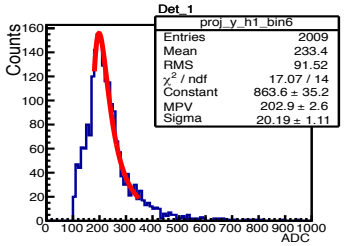


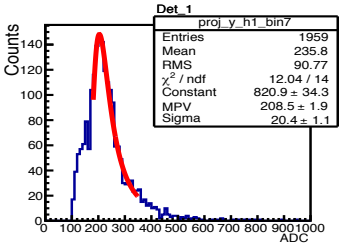


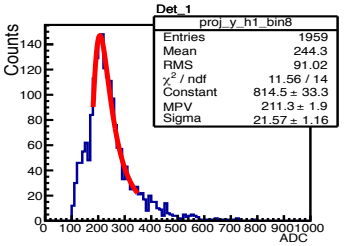


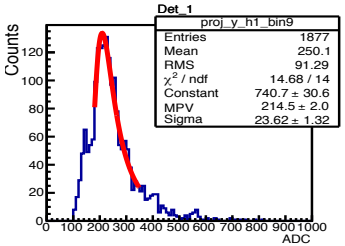


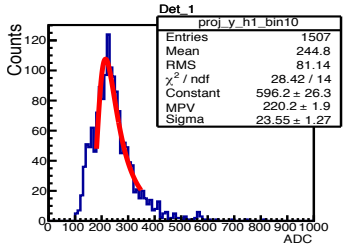




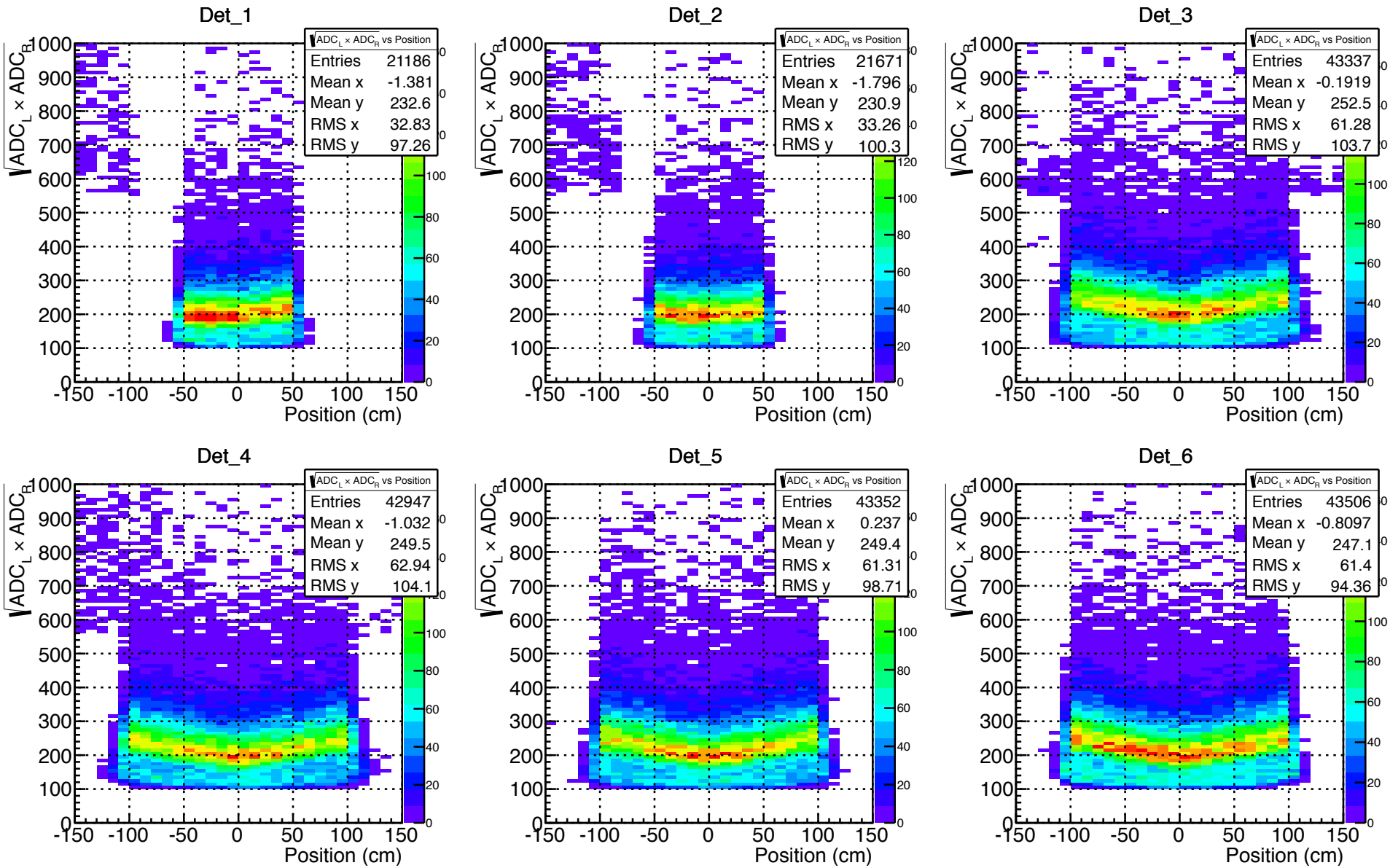








CosmicSetting45



Finding_EnergyCalibration_Cosmic_inRCNP_2016_07_11_R_L_shifted.C

CosmicSetting45