A quick look at the TKR Digit and crosstalk hits
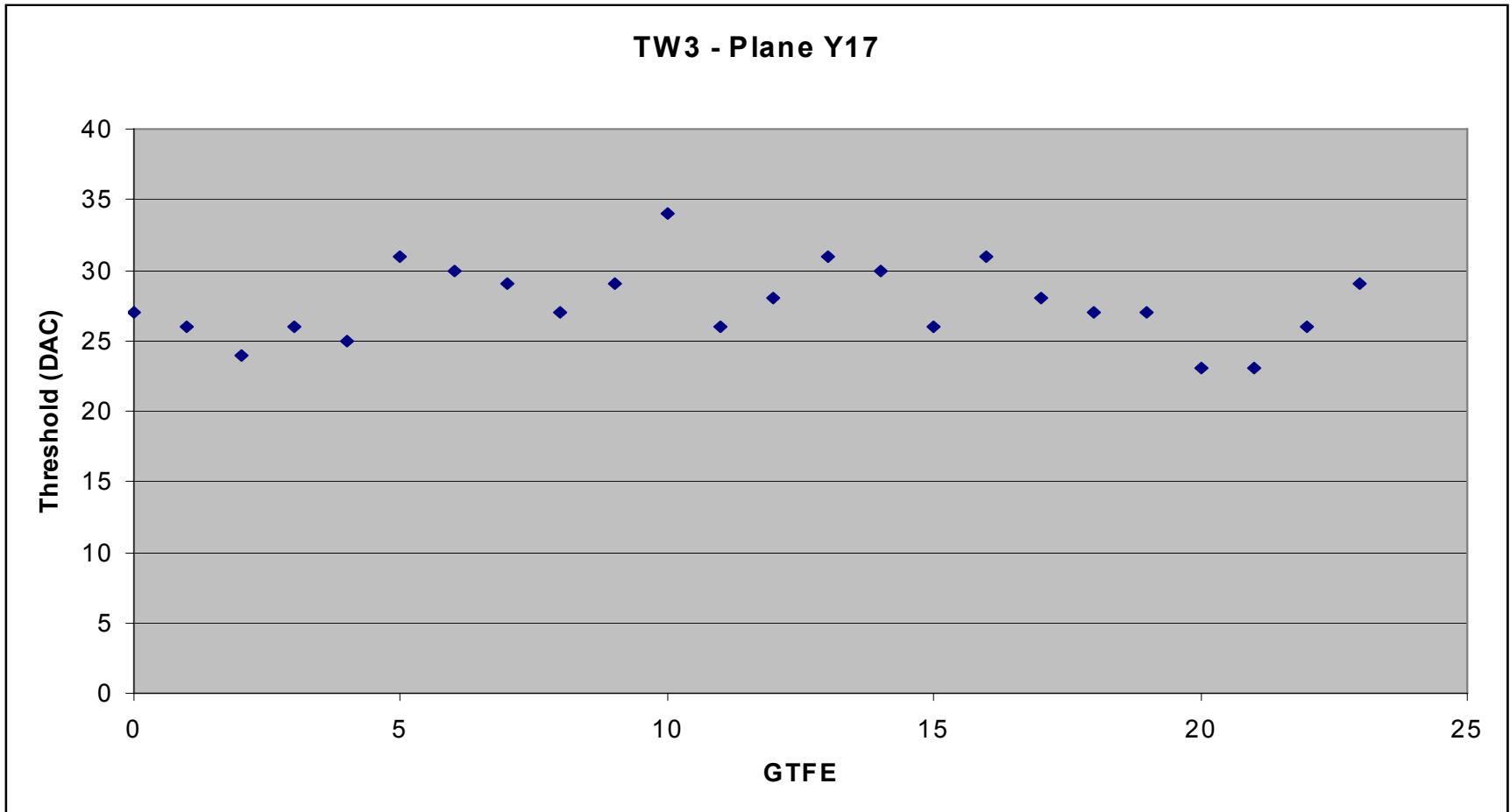
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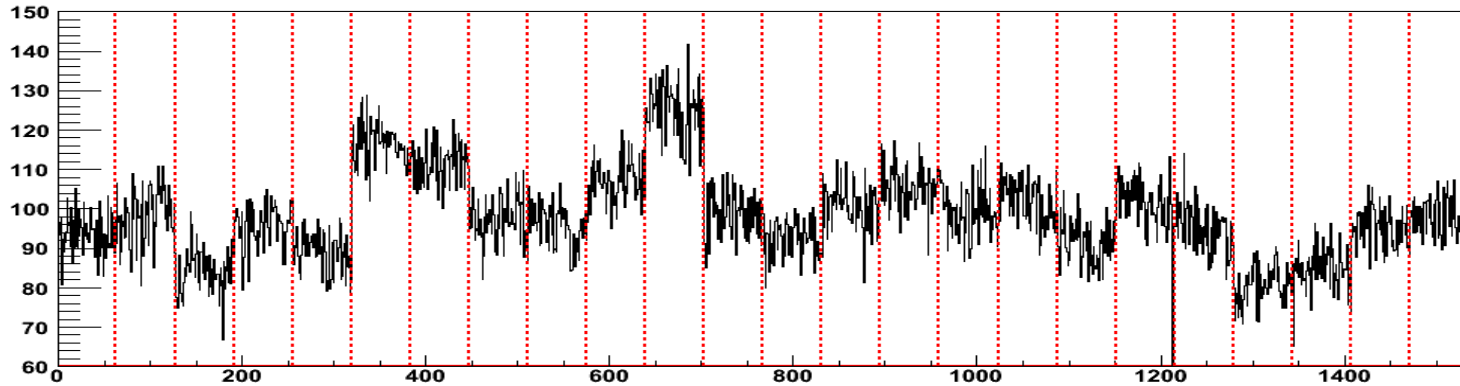
TKR Calibration

- The Trigger Threshold is set for each GTFE such that it is ¼ of MIP
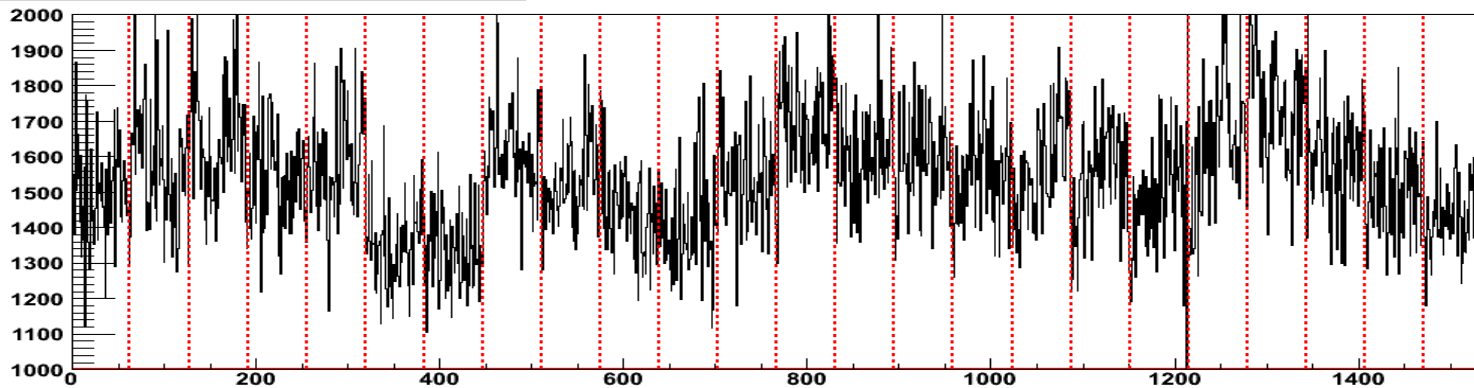
TW3 - Plane Y17

Gain and Noise Profile

Gain(mV/fC) Vs Strip ID - TW3 Plane Y17

Noise (ENC) Vs Strip ID - TW3 Plane Y17

- **Average overall Gain is about 100 mV/fC (σ = 10 mV/fC)**
  - For each GTFE the RMS is about 6%
- **Average Noise is about 1550 ENC**

MC (Simple)Digit simulation suggestion

- convert the energy deposition Edep in a strip channel to number of pairs Np=Edep/3.6eV

- add a fluctuation on Np by using a gaussian random number with mean=0 and σ = sqtr(F*Np), where F=0.1 is the Fano factor for Silicon

- add a fluctuation due to electronic noise of 1550 ENC by using a gaussian random number with mean=0 and σ =1550

- convert the Np in charge Q unit (fC), if Np>0, otherwise set Q=0

- convert Q in voltage, by using the electronic gain and taking the saturation into account, i.e. V(mV) = min(Q(fC)*G, 1100), where G=100 mV/fC

  - Gain fluctuation of 6% should be included at this level

- compare the voltage V with the threshold Vth of 125 mV, assuming that a most probable value of MIP is 500 mV (about 5 fC), then fire the channel strip if V>Vth

- convert Q in ToT

- capture the strip by taking into account the TACK

Crosstalk hit studies

- The TKR hit cluster size, by requiring at least size=2, has been studied in the GTFE and across two GTFEs
  - GTFE cluster: FirstStrip and LastStrip in the same GTFE
  - Inter GTFE cluster: FirstStrip and LastStrip in the different GTFEs
- The TKR hit cluster size, by requiring at least size=2, has been studied in the wafer and across two wafers
  - GTFE cluster: FirstStrip and LastStrip in the same wafer
  - Inter GTFE cluster: FirstStrip and LastStrip in the different wafers
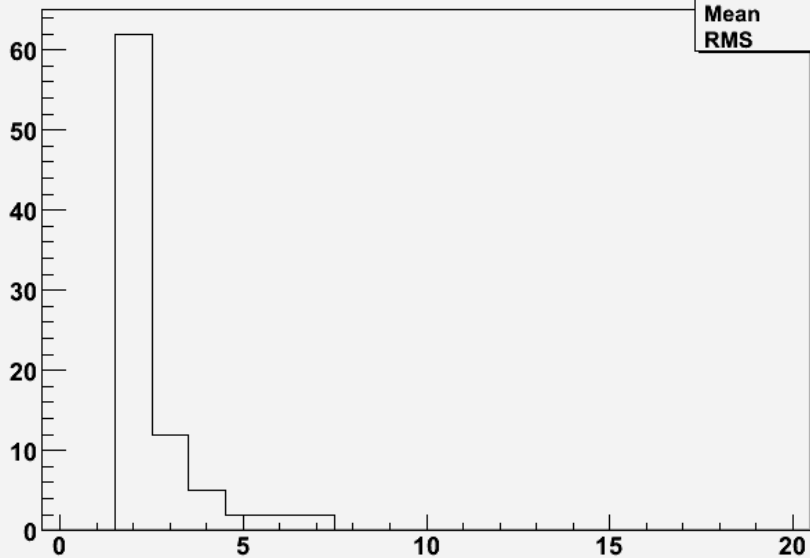
GTFE cluster (e⁻ 5GeV 0deg)
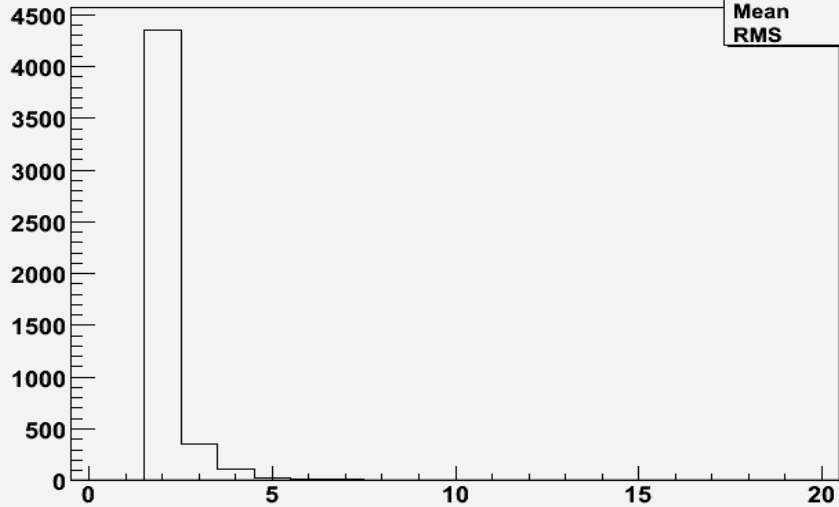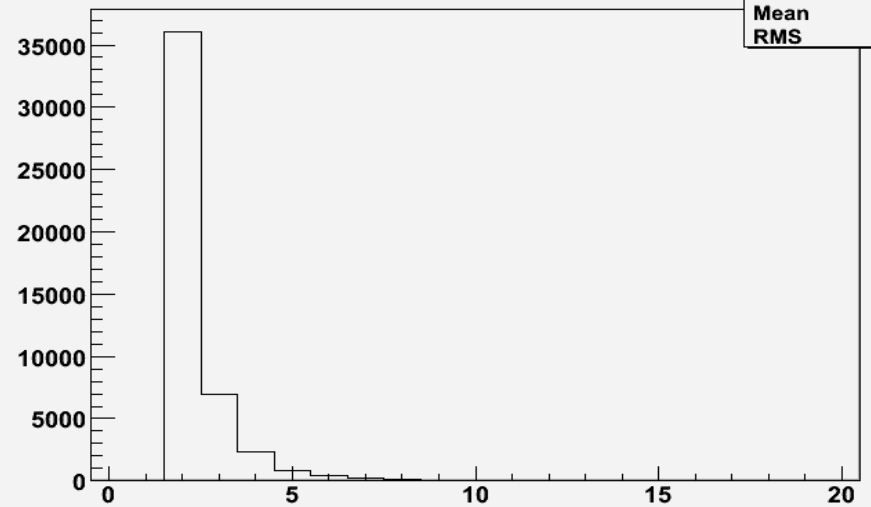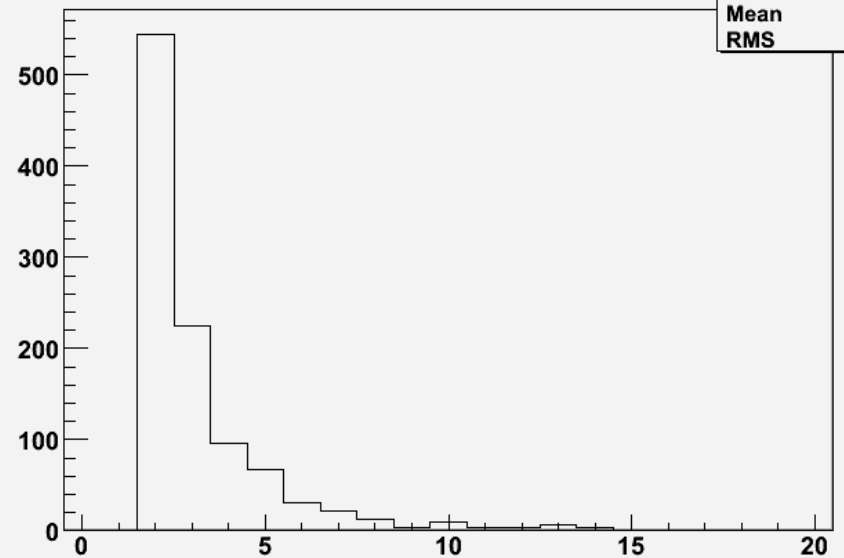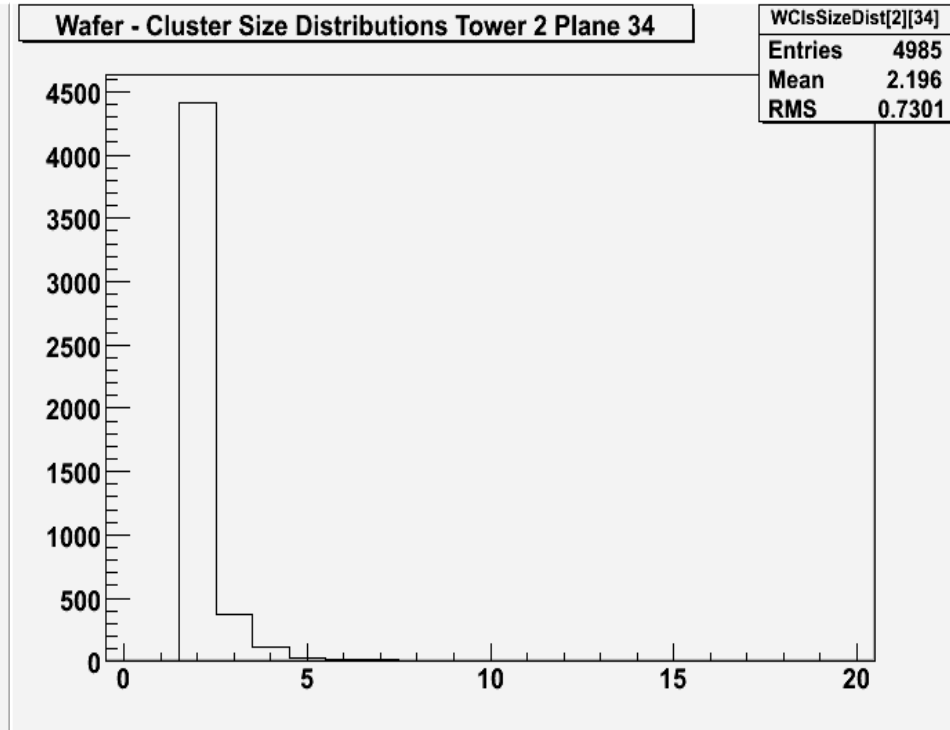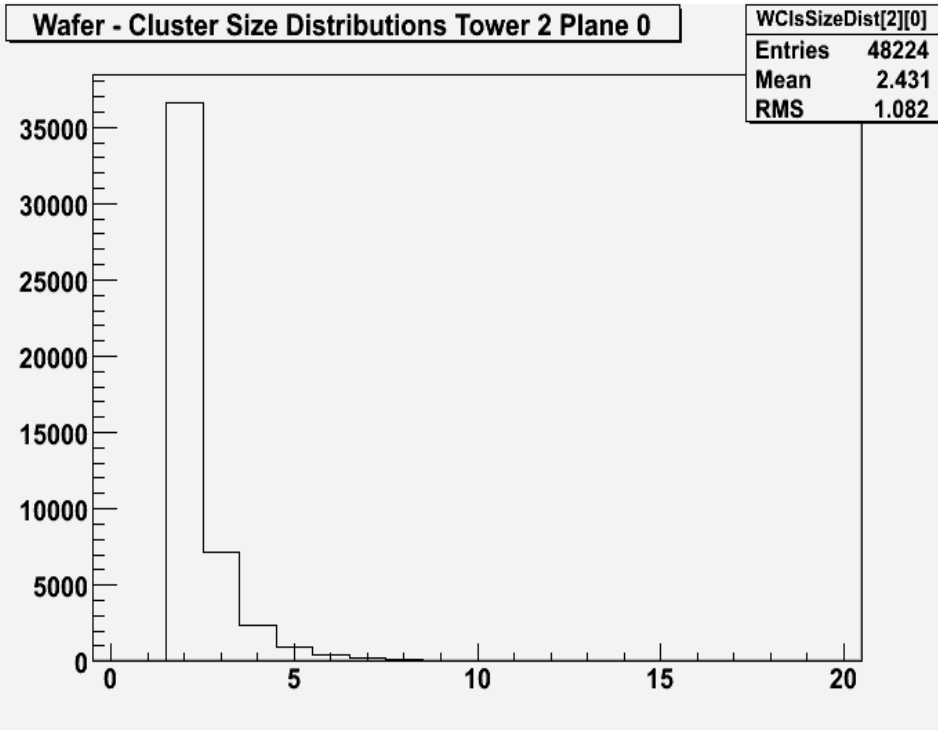
Wafer cluster

No clusters with size at least 2 across the wafers have been found, why?