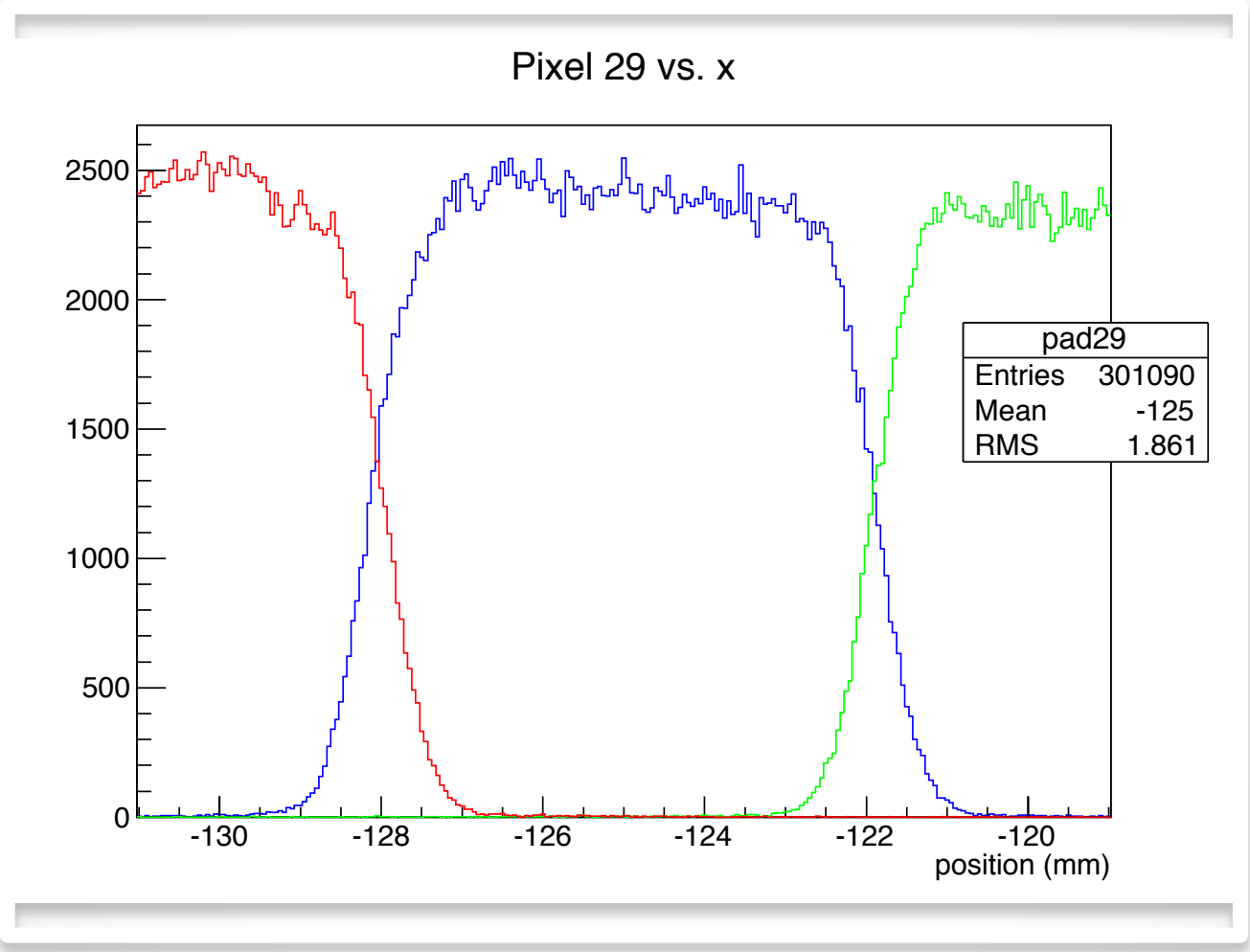
H8500 Cross Talk Studies

Doug Roberts
Ellie Twedt
University of Maryland

Overview

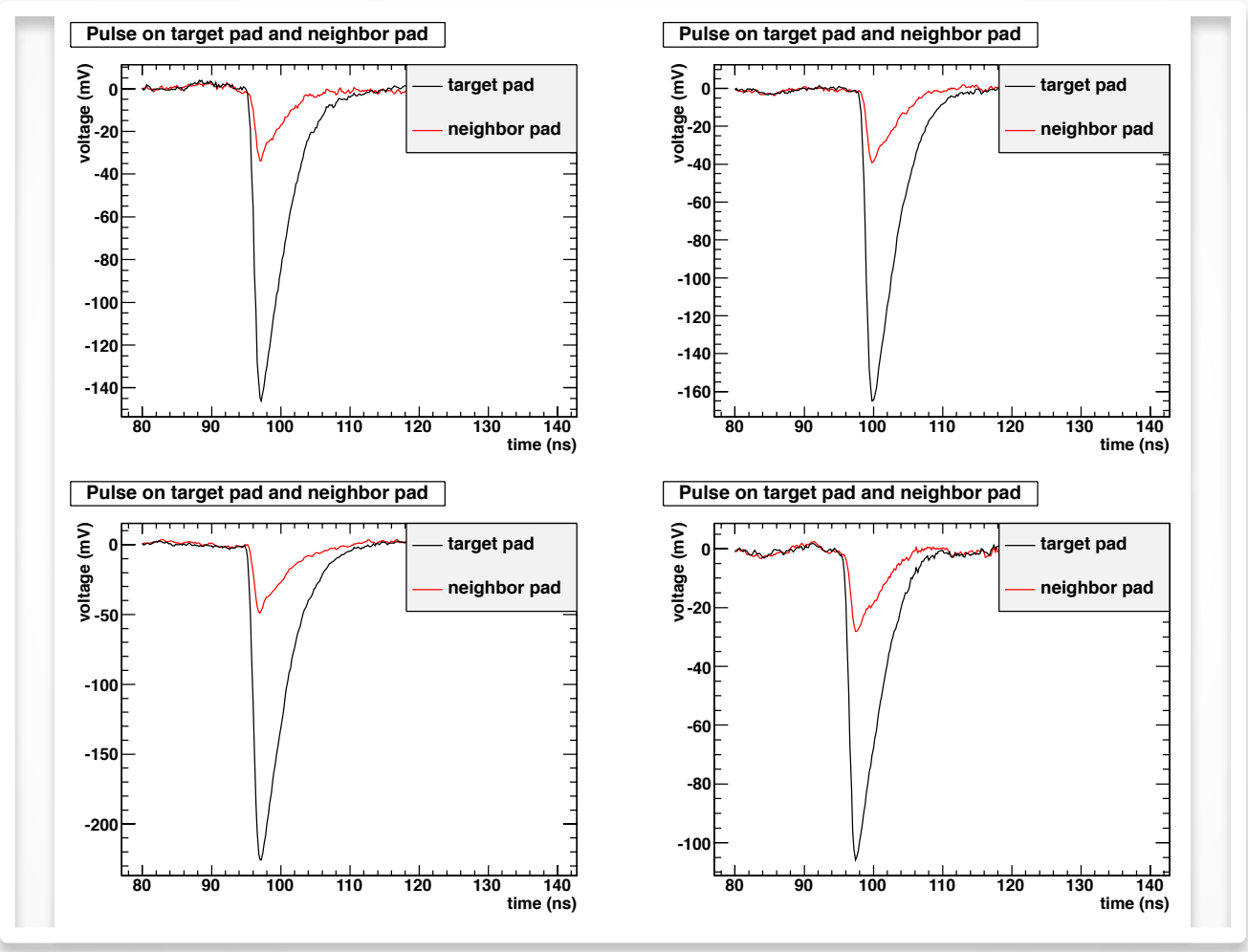
- We have continued our studies of cross-talk in the H8500.
- Want to try to understand the nature of cross-talk:
  - Charge sharing?
  - Position dependence?
  - Overall size?
- Can it be used to improve position resolution or is it just bad?
- Need to get some handle on this effect and put into simulation for CRT prototype

Scan Output



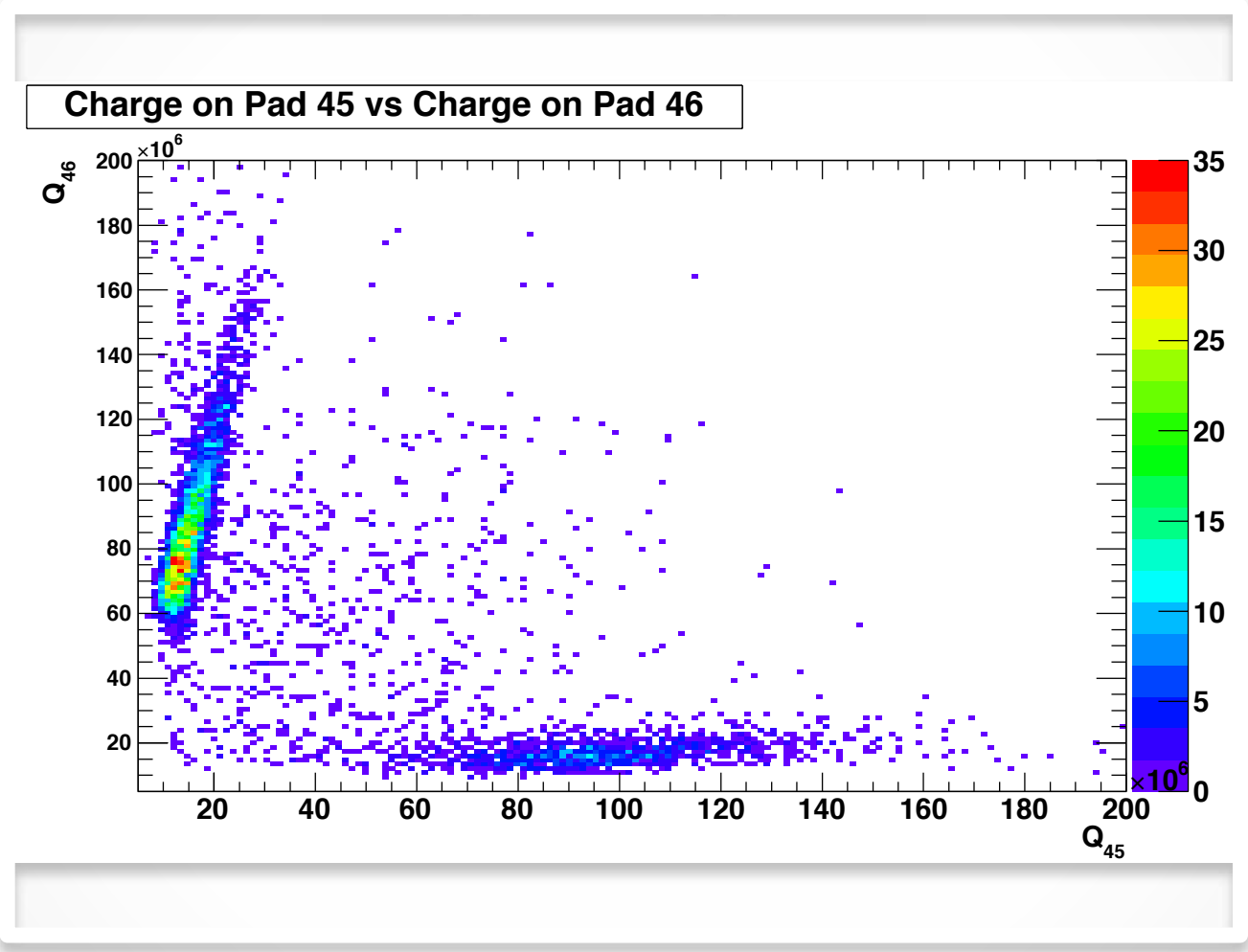
Older scan showing response on pads vs. X-position.

Cross-Talk Pulses



Waveform images of pulses when we see cross-talk near the boundary between two pads

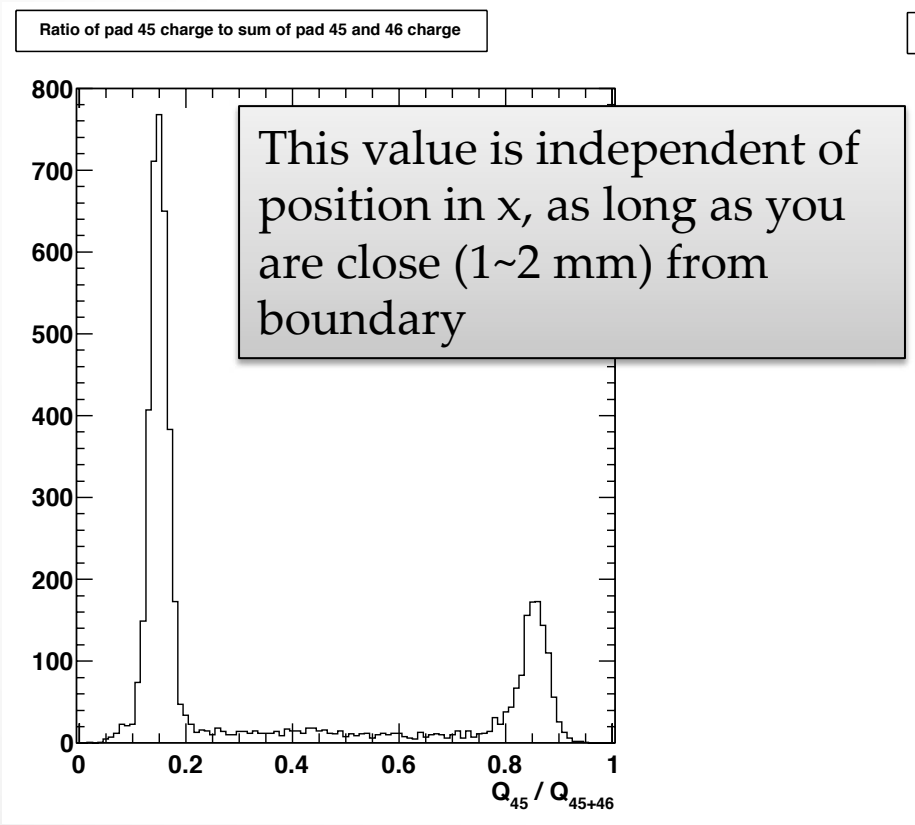
Correlation of Charge on Two Neighboring Pads



Scan in X near pad boundary

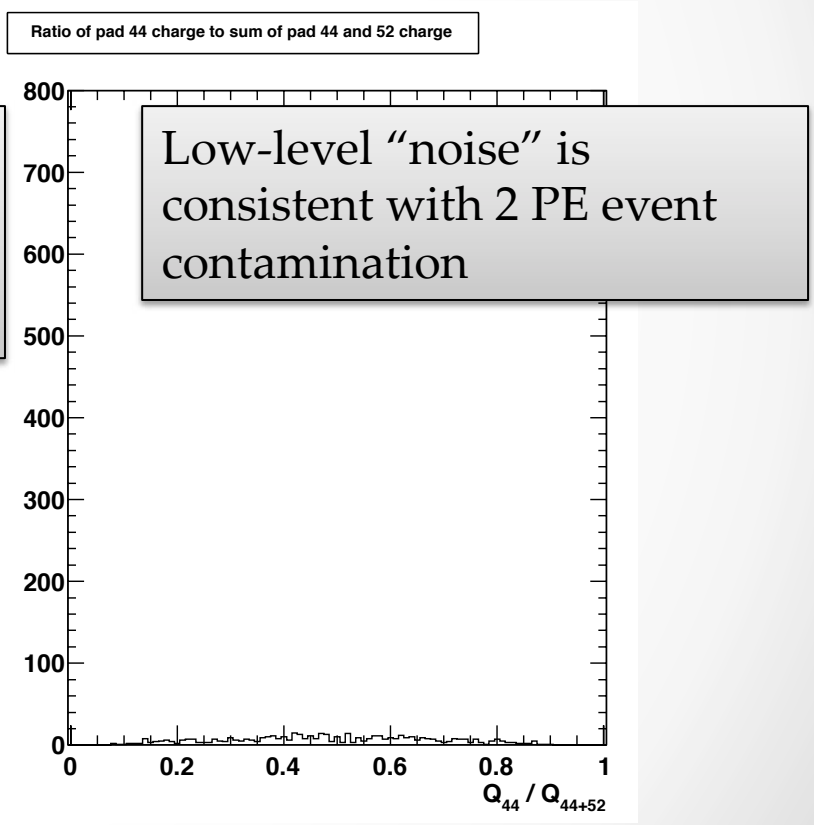
Ratio of Single Charge to Sum of Charge on Two Pads

Scan in X-Direction



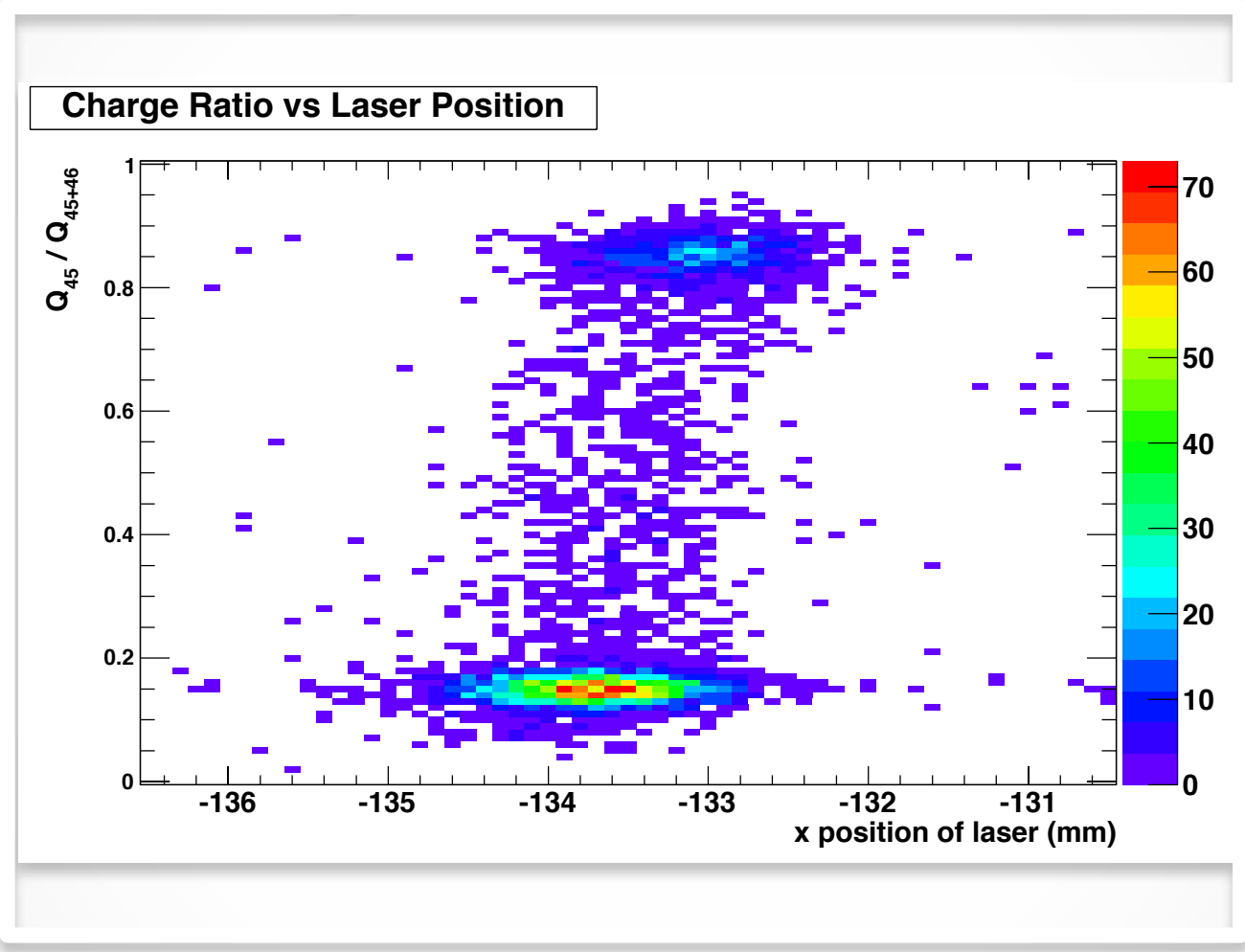
This value is independent of position in x, as long as you are close (1~2 mm) from boundary

Scan in Y-Direction



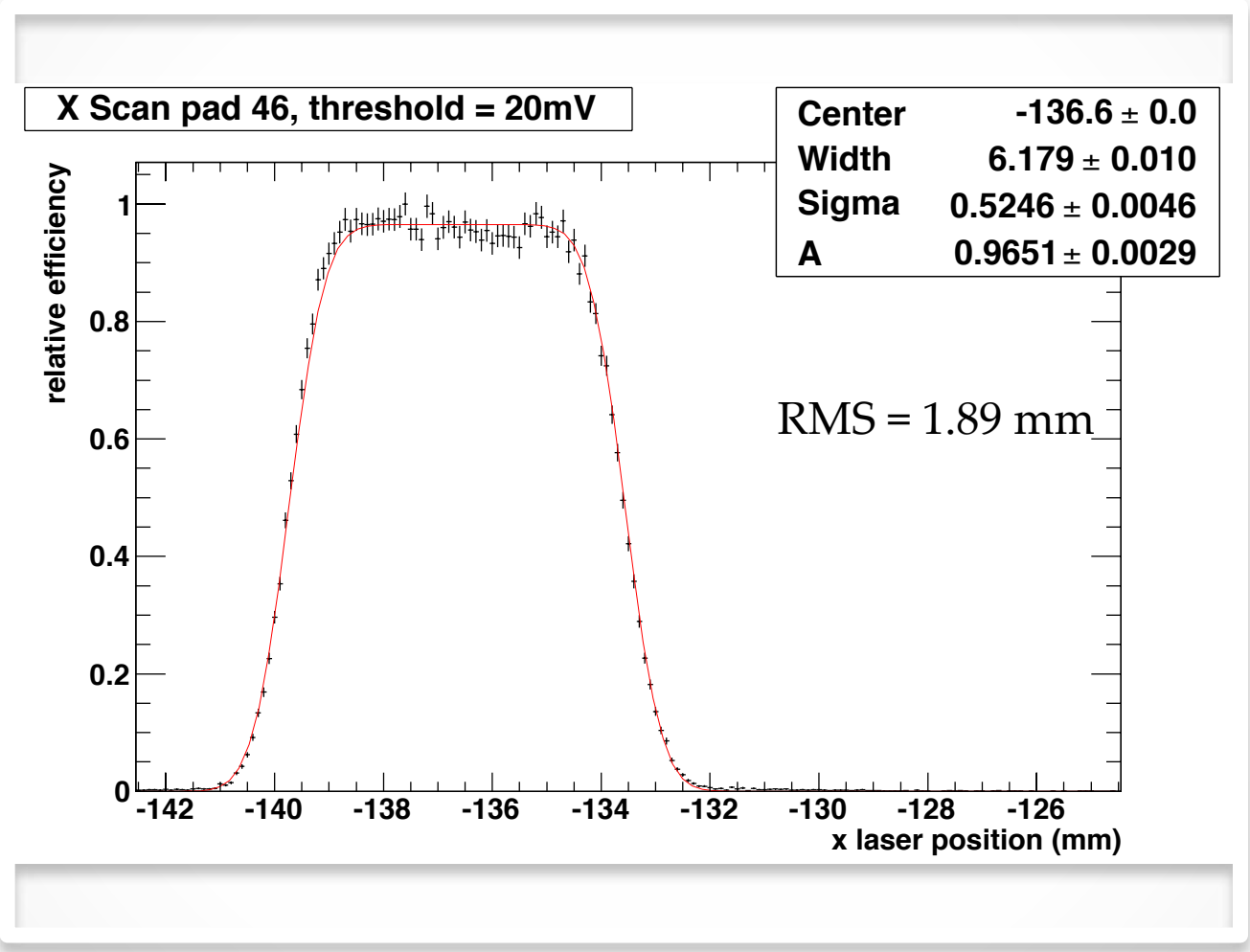
Low-level “noise” is consistent with 2 PE event contamination

Charge Ration vs. X Position



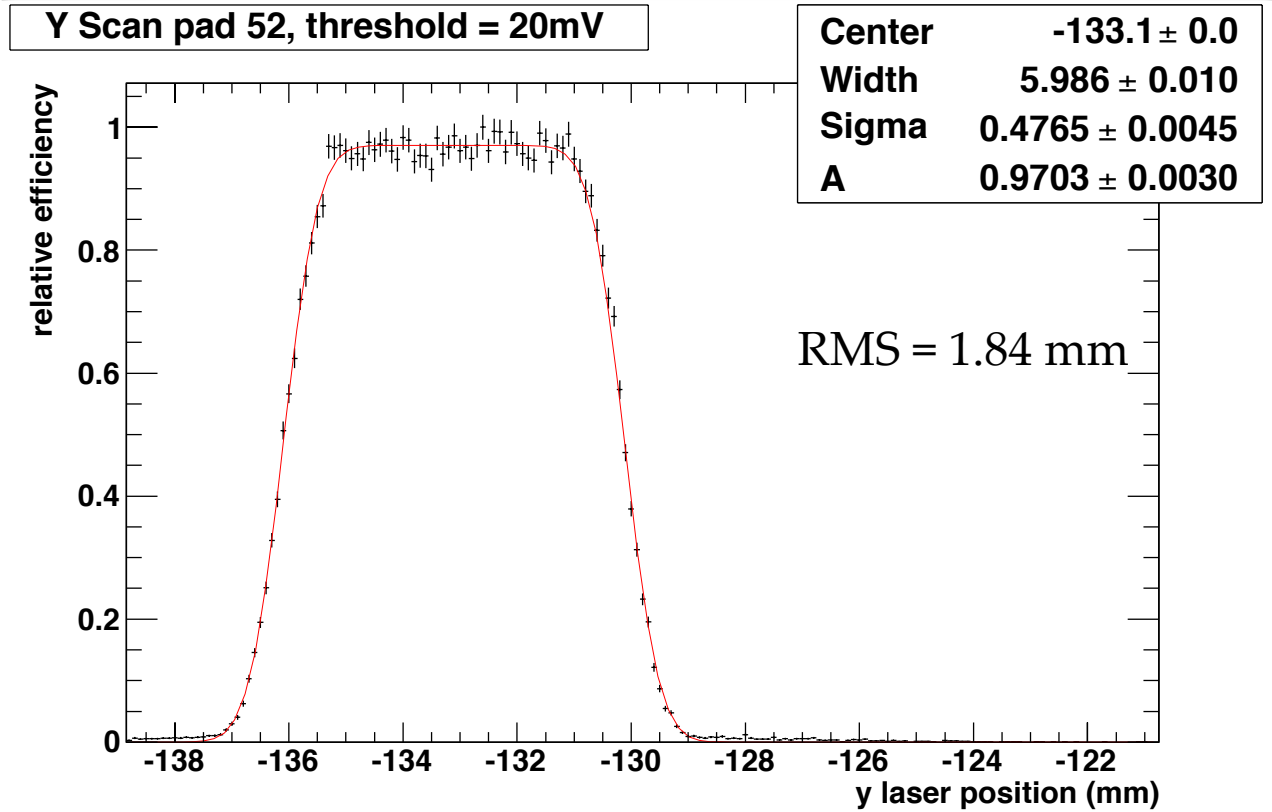
Effect turns on ~1 mm from boundary or pixels. Only see this in x-direction

Position Resolution in X



Pad spacing in 6.08mm

Position Resolution in Y



Slightly better than in X. All other things being equal, would be better to have tube oriented with better Y resolution (oriented with connectors vertical).

Summary

- Cross-talk does not appear to be very useful for position resolution improvement.
- Size of effect is basically independent of location once you are close to the boundary
- Cross-talk is at the >20% level near the boundary
  - Pulses are probably too small to be useful? Depends on electronics.
- There may be a slight preference for tube orientation since we would prefer to have better position resolution in Y, but this is a small effect.