

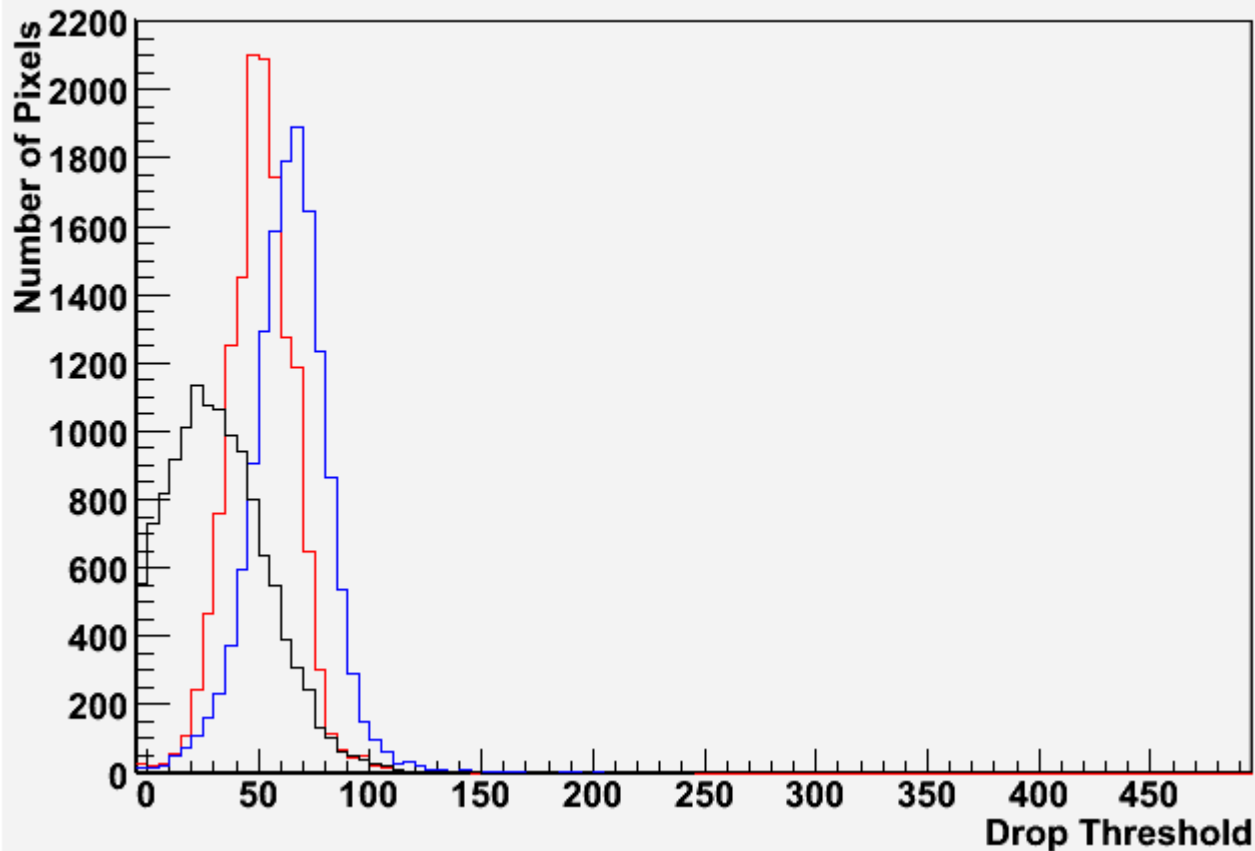
# Status Report For Threshold Scans

# Shaper/Sampler Drop Trims

- As promised new and improved trimming techniques have been developed.
- As suggested, we will focus on trims calculated according to drop-off point, calculated separately for shapers and samplers.
- Here, drop-off is defined as the highest threshold where the bin content is greater than half the maximum bin content recorded.

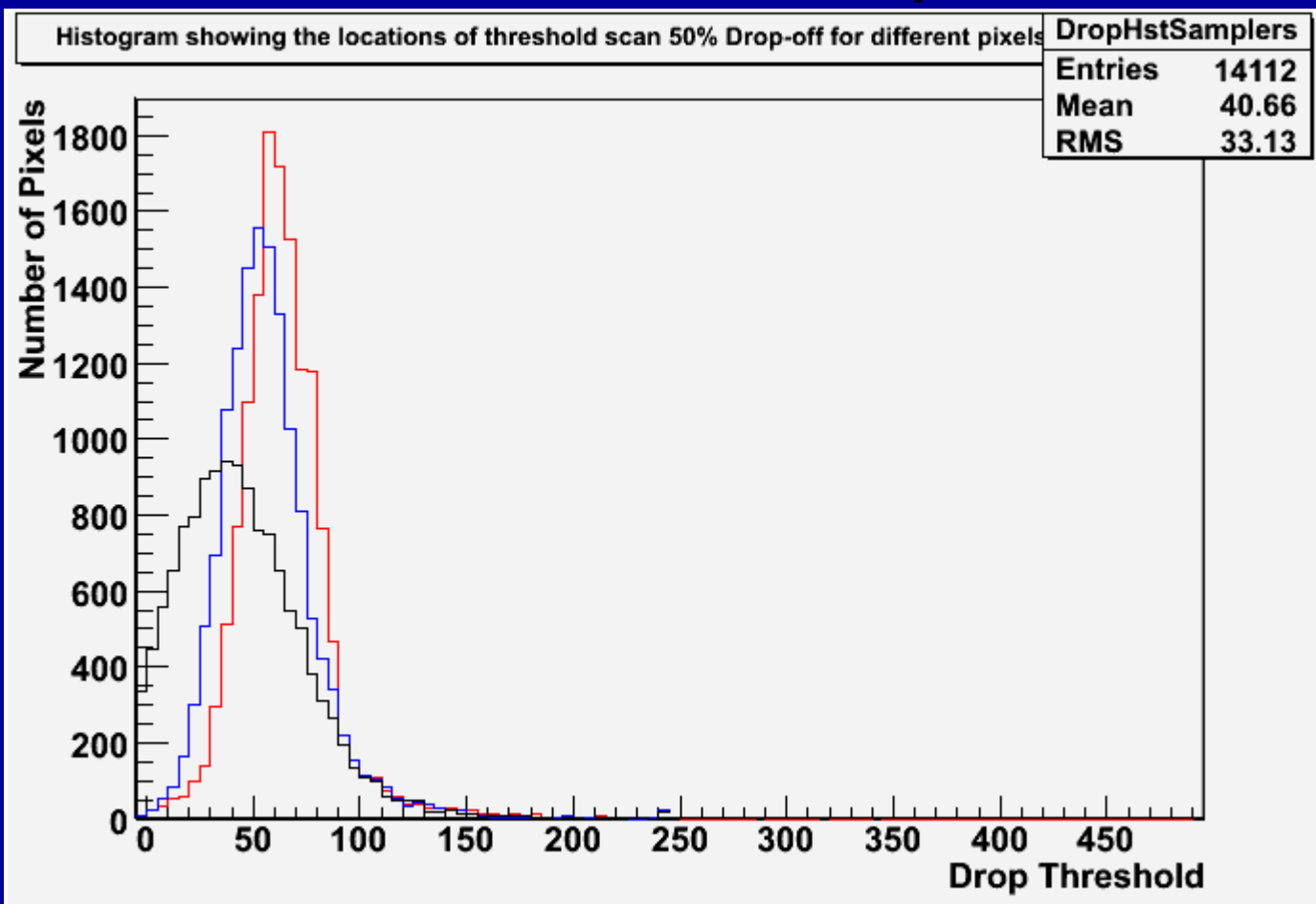
# Performance of different trims in the Shapers

Histogram showing the locations of threshold scan 50% Drop-off for different pixels in the Shapers



- Untrimmed
- Basic Mean Trim
- Separate Shaper and Sampler Drop-off trim

# Performance of different trims in the Samplers



- Untrimmed
- Basic Mean Trim
- Separate Shaper and Sampler Drop-off trim

# Correlation Between Pixel Stats

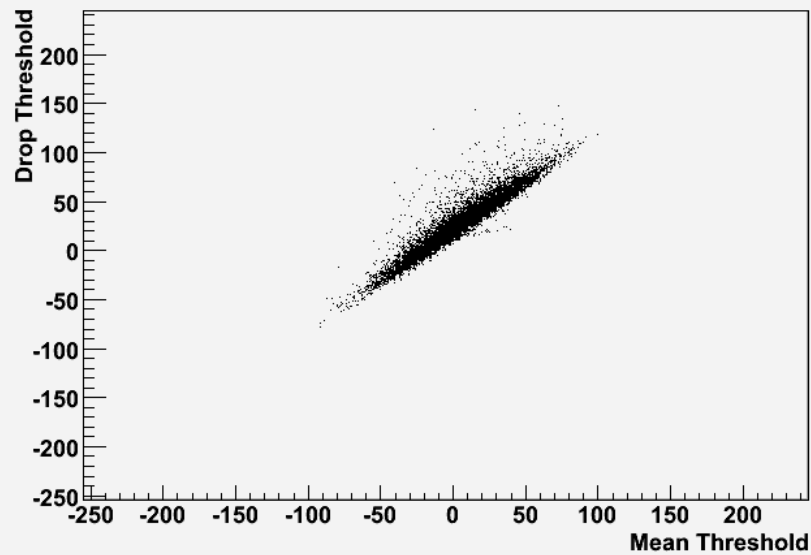
- This is essentially an attempt to find out whether or not individual pixel statistics from their threshold scans are consistently related.
- Specifically the statistics studied are: Mean threshold, peak threshold and 50% drop-off.

# Mean Vs Drop-off

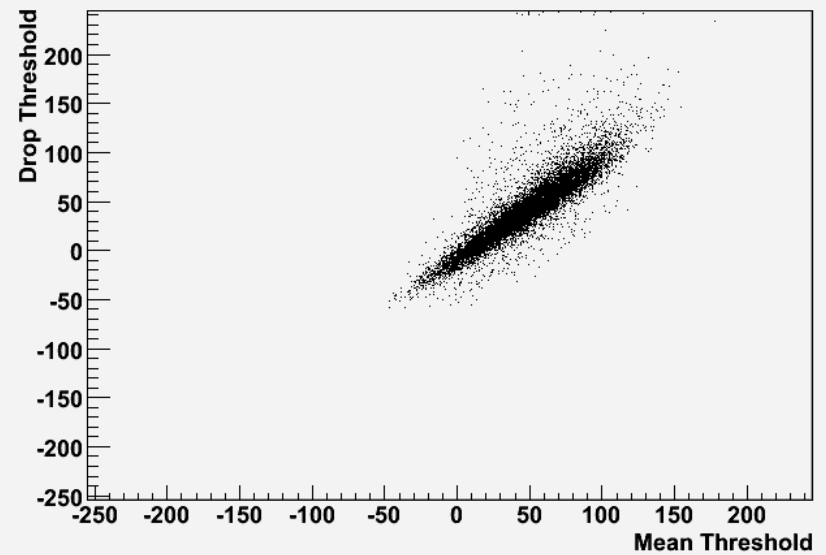
Shapers

Samplers

Relation between mean and 50% Drop-off in the shapers



Relation between mean and 50% Drop-off in the samplers



Owen Miller

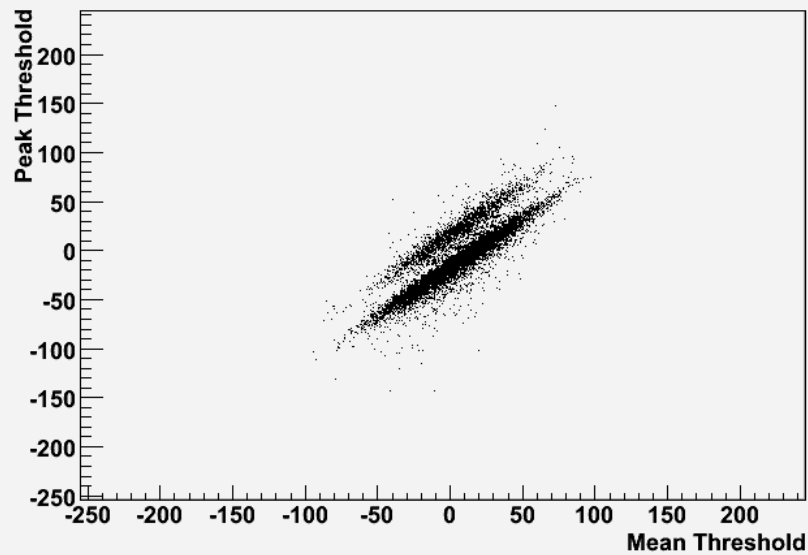
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# Mean Vs Peak

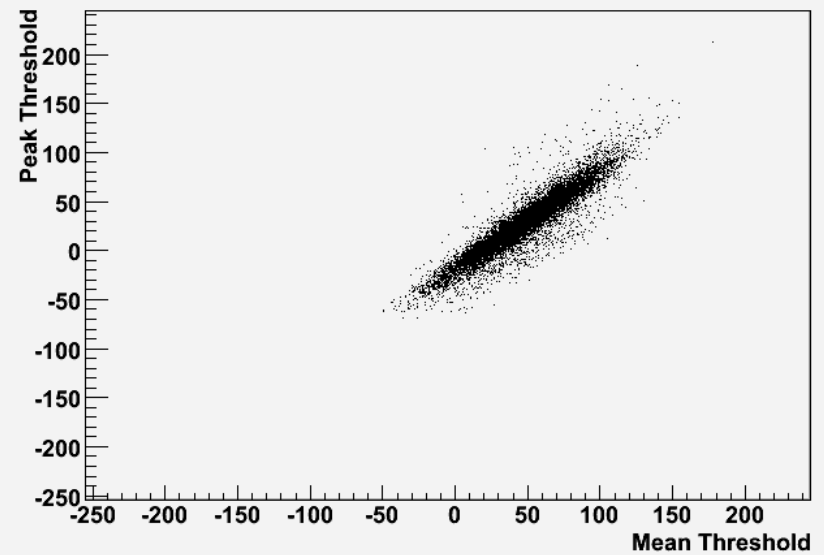
Shapers

Samplers

Relation between mean and peak in the shapers



Relation between mean and peak in the samplers



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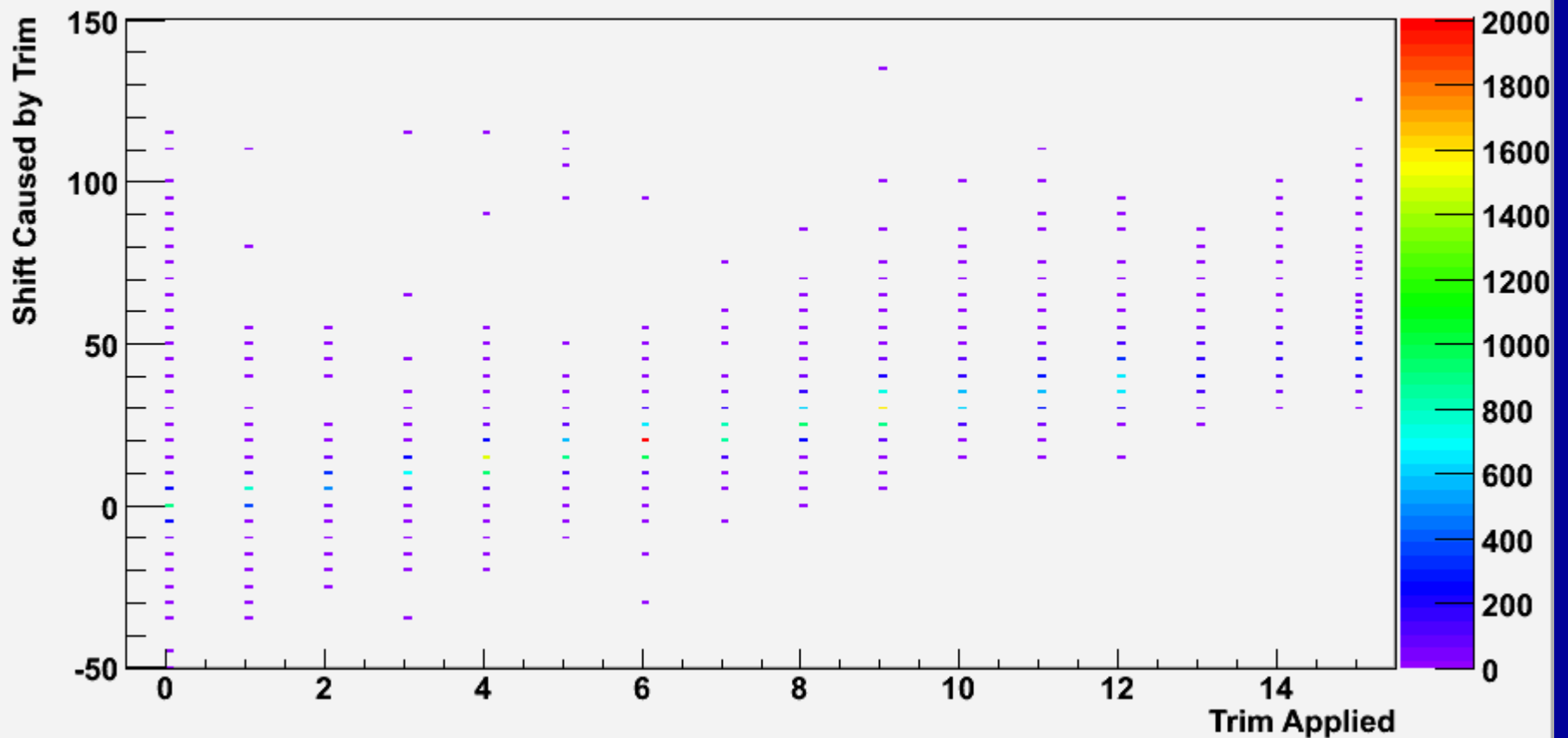
# Trim Vs Shift

- This study is (hopefully) primarily a sanity check, ensuring that the alterations in pixel behaviour caused by applying a trim are both consistent and predictable.
- The following graphs are based on a comparison between trimmed and untrimmed runs, showing how much the position of the drop-off changes with the trim applied to the pixel.



# Histogram Showing the effects of Applying a Trim

Histogram Showing how the Trim applied affects the 50% Drop off Point



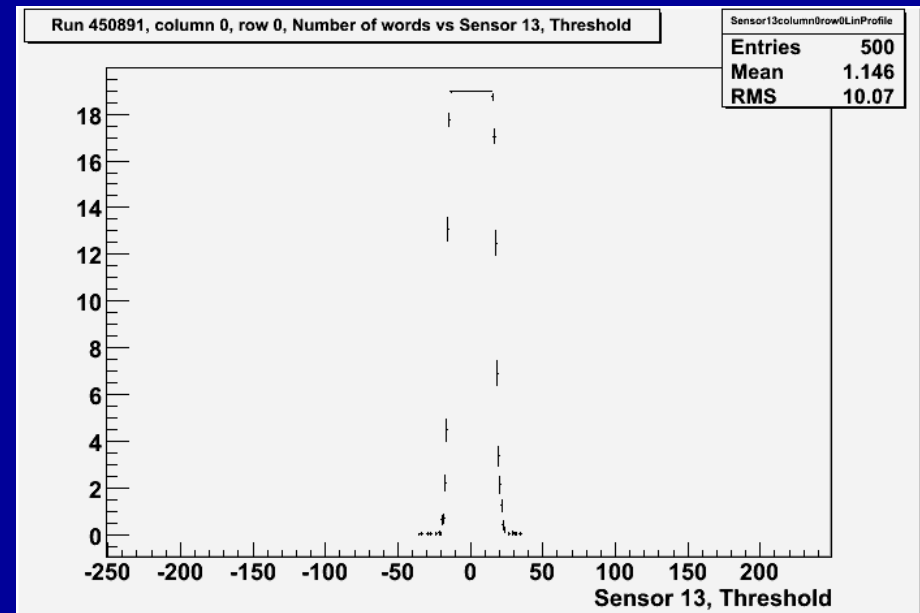
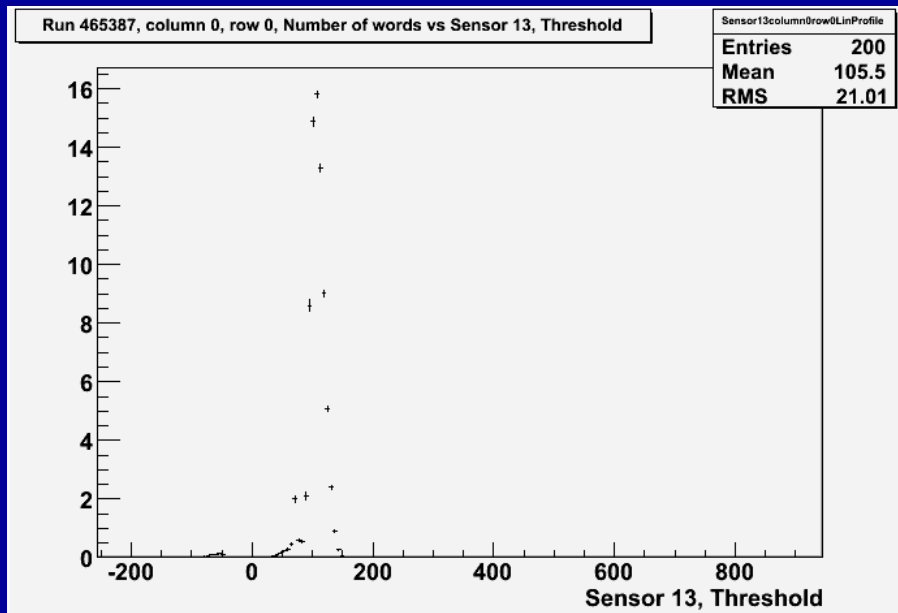
# Fe55 runs

- Several sets of per-pixel threshold scan runs were performed with an Fe55 source next to the sensor.
- The following slides show the threshold scans of several pixels with and without the Fe55 source.

# Sensor 13, Column 0, Row 0

Fe55

No Source



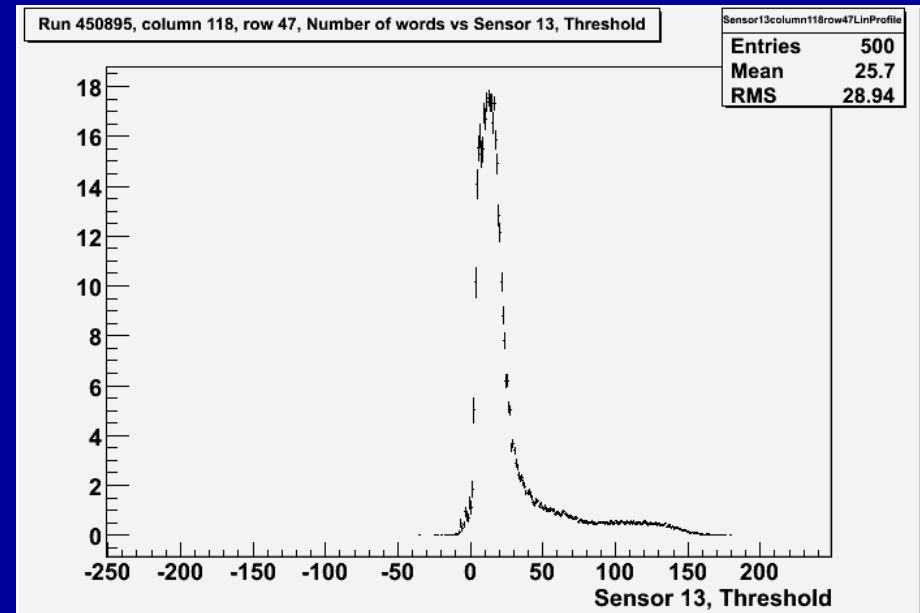
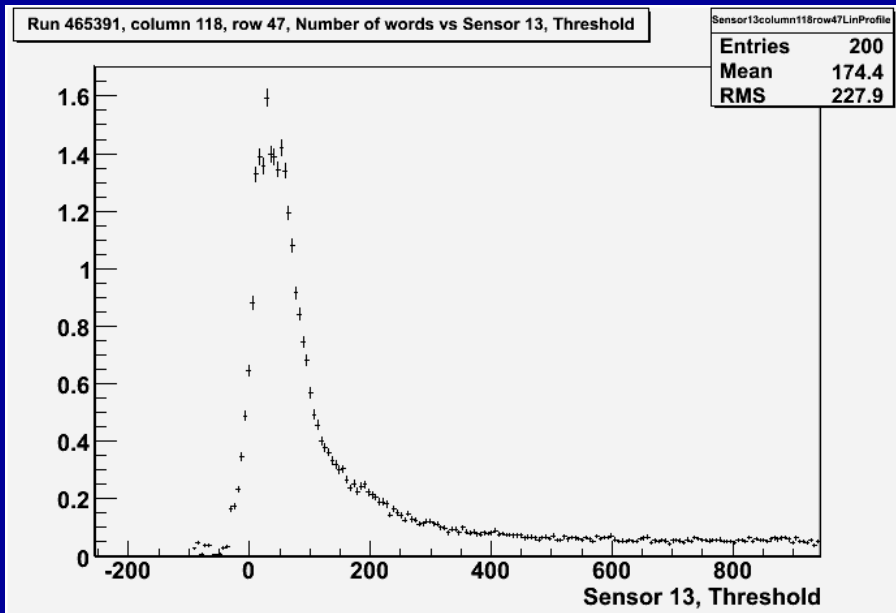
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# Sensor 13, column 118, row 47

Fe55

No Source



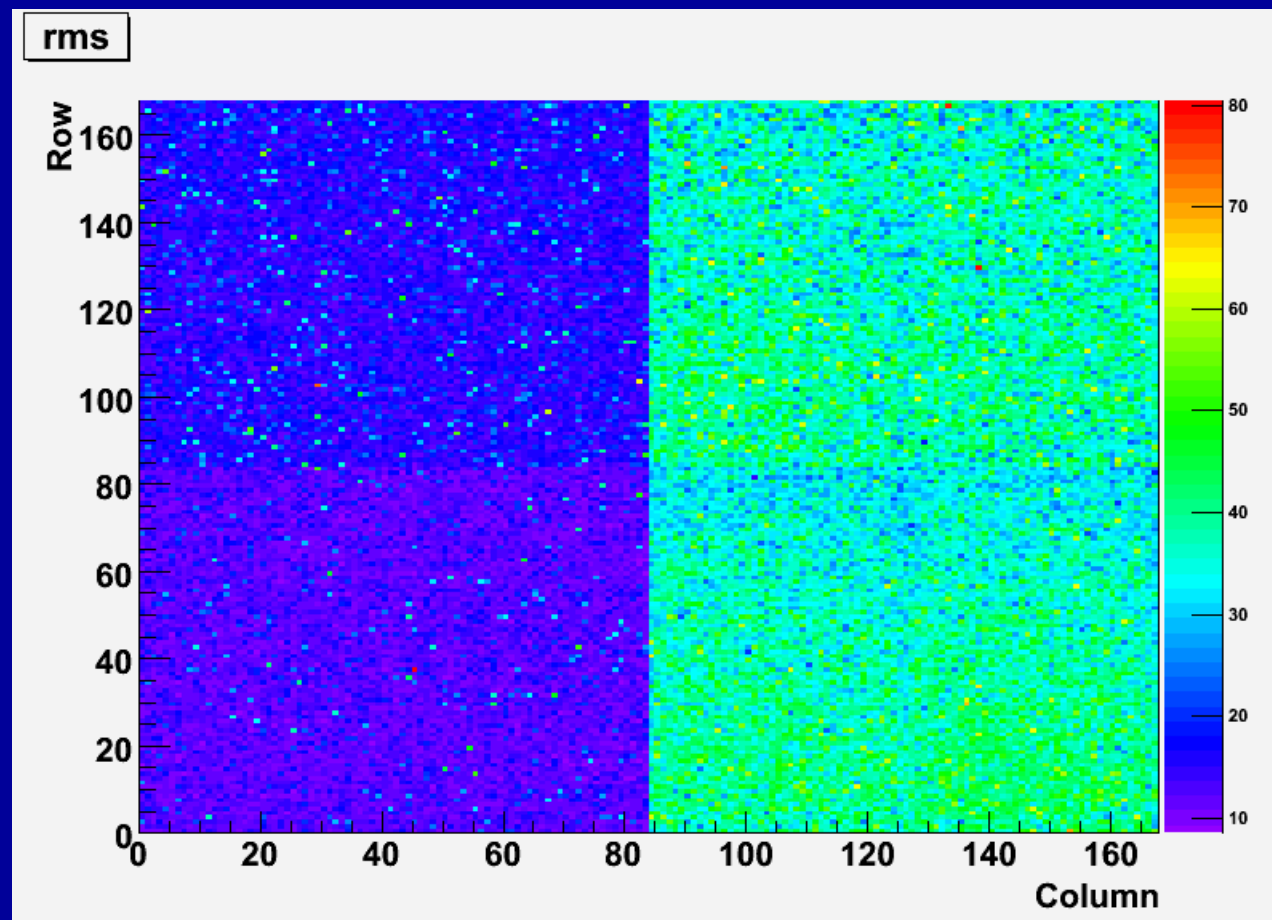
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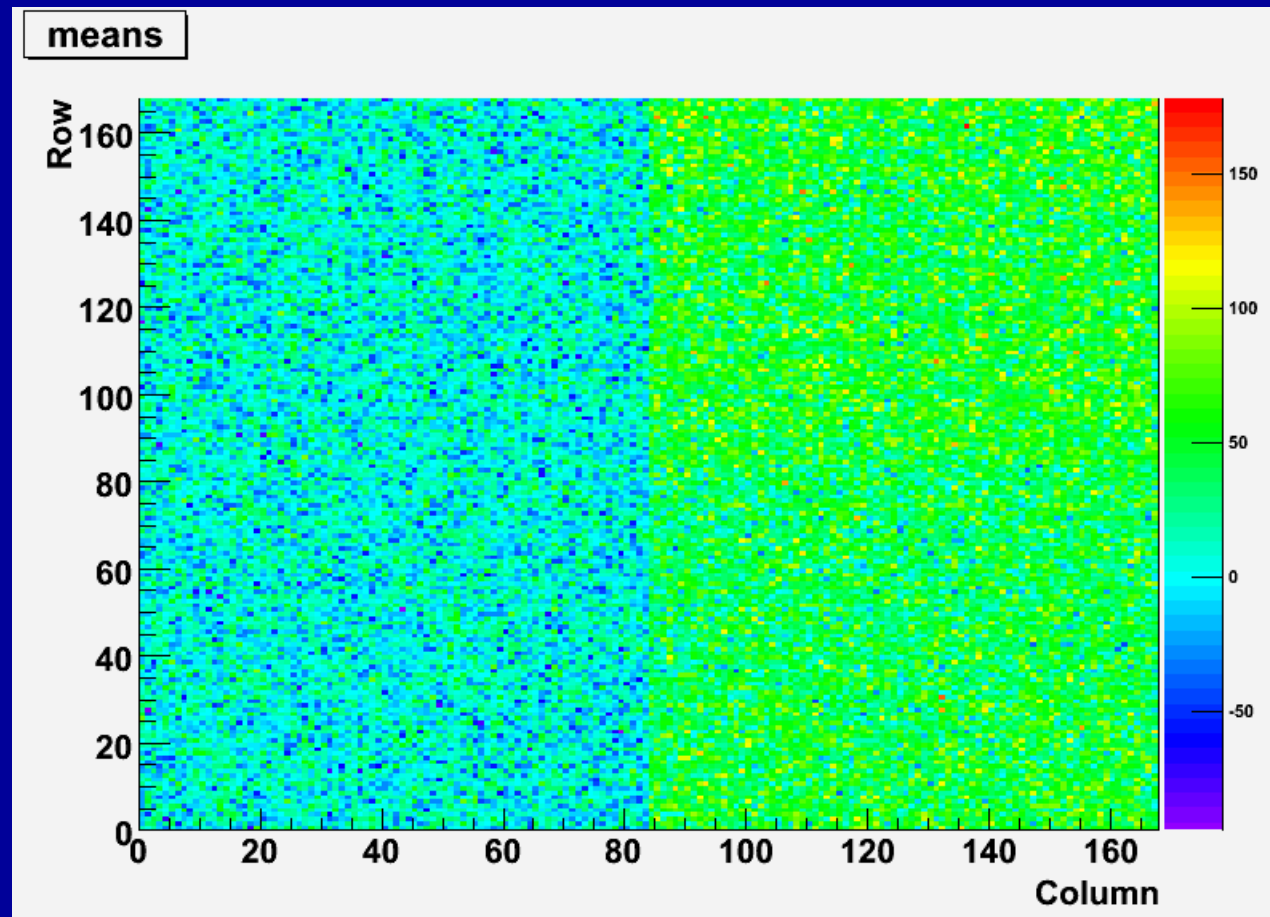
# Pedestals & Noise

- The pedestal of a pixel is related to its mean threshold (on a threshold scan).
- The noise of a pixel is related to the sigma of its threshold scan.

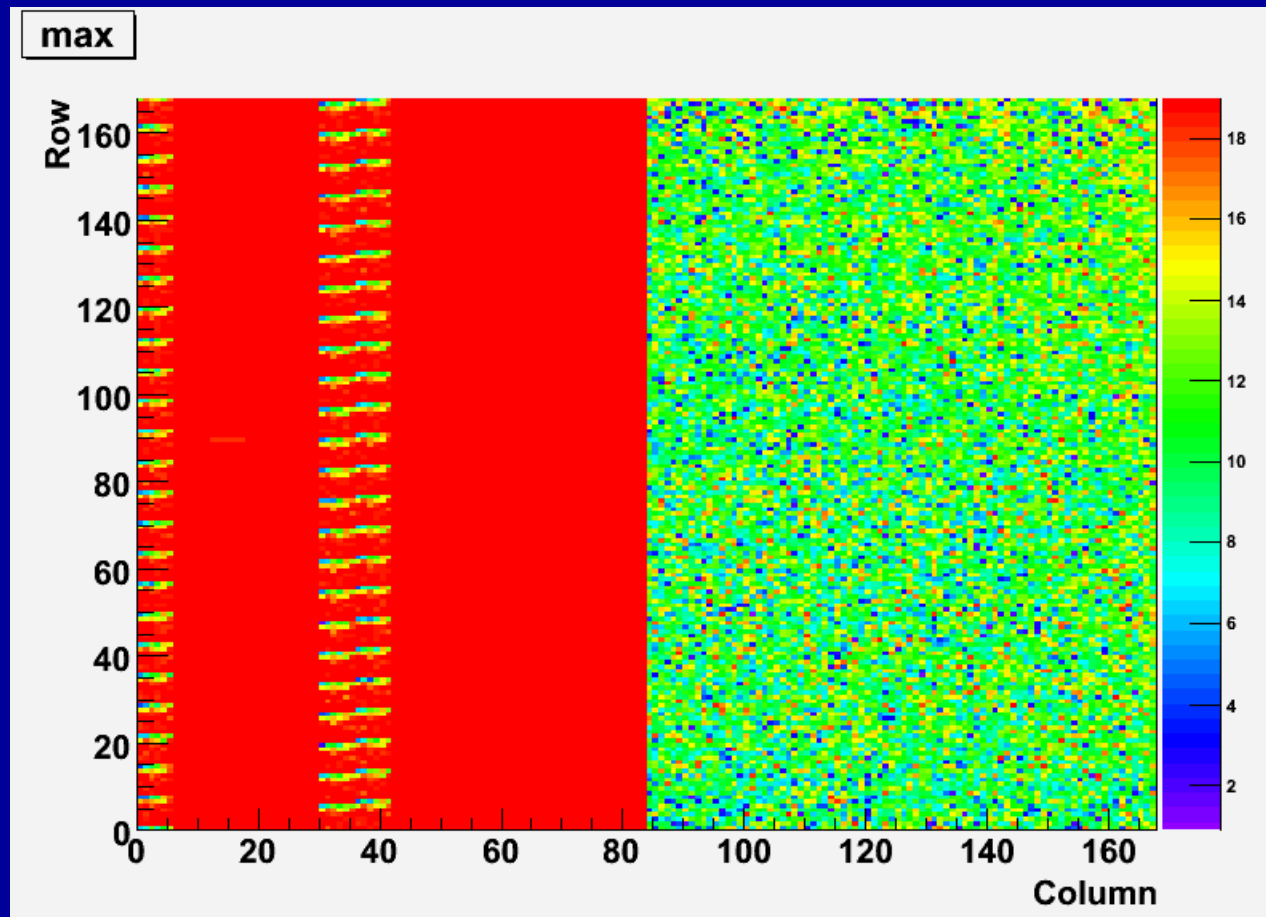
# RMS of Pixels in the Sensor



# Means of Pixels in the Sensor

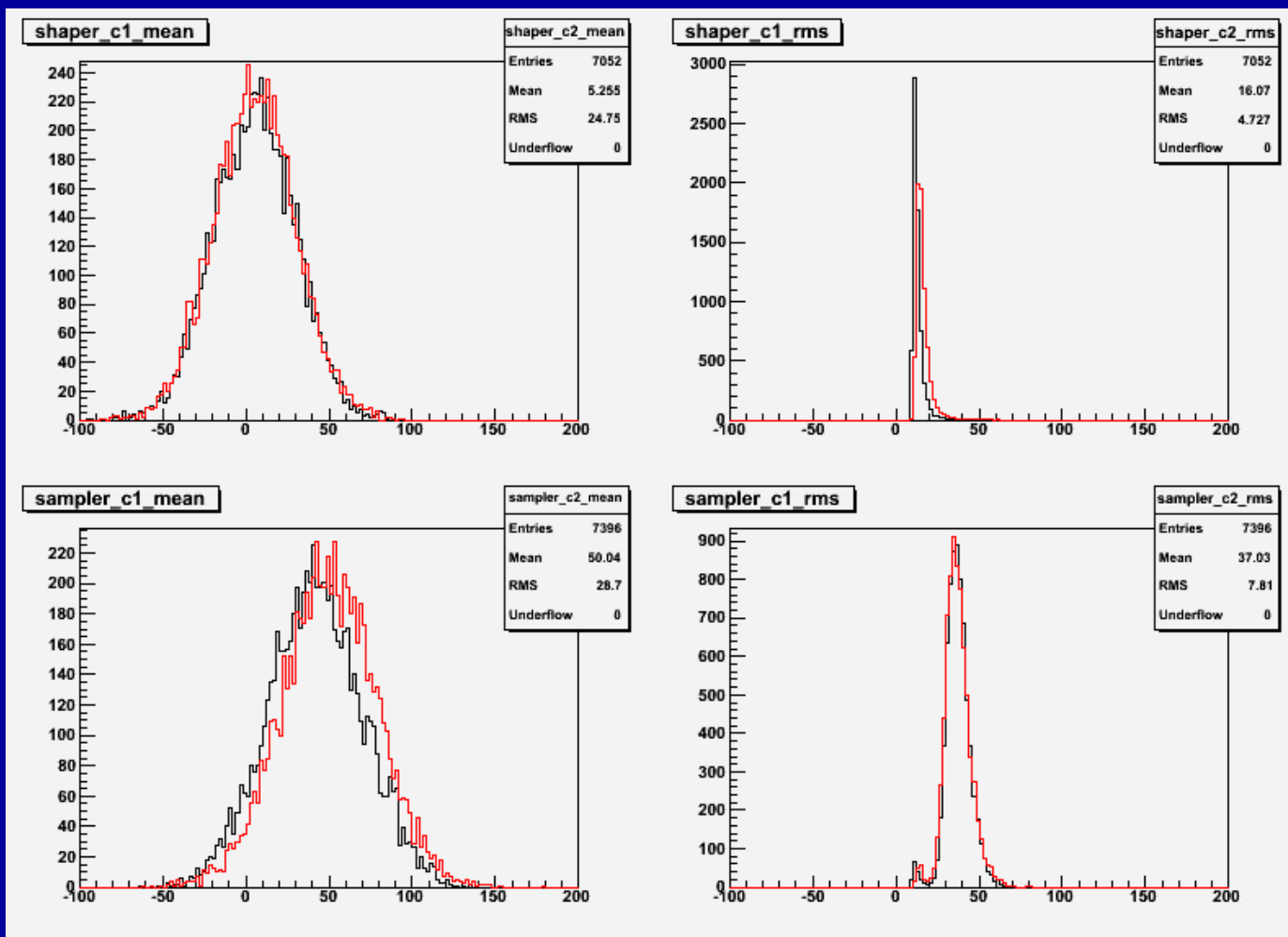


# Maximums of Pixels in the Sensor





# Variation in Pixel Behaviour for Different Quadrants



- c1  
- c2

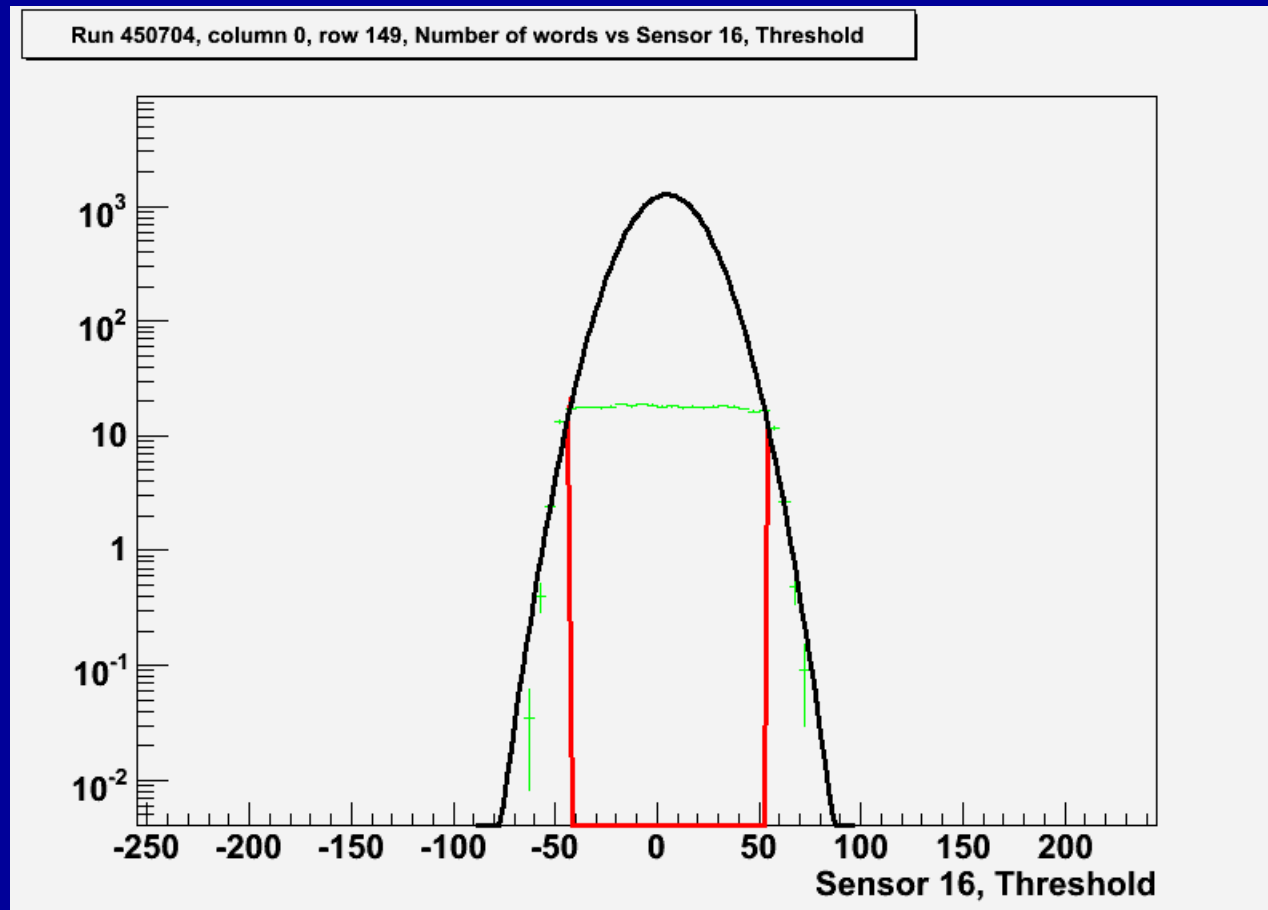
# Fit Results for Sensor 16

- From the graphs on the previous slide we can get the following statistics:
  - Shaper Capacitor Region 1:
    - Mean= $5.2 \pm 24.0$
    - Sigma= $12 \pm 1.95$
  - Shaper Capacitor Region 2:
    - Mean= $5.5 \pm 24.35$
    - Sigma= $14.74 \pm 2.1$

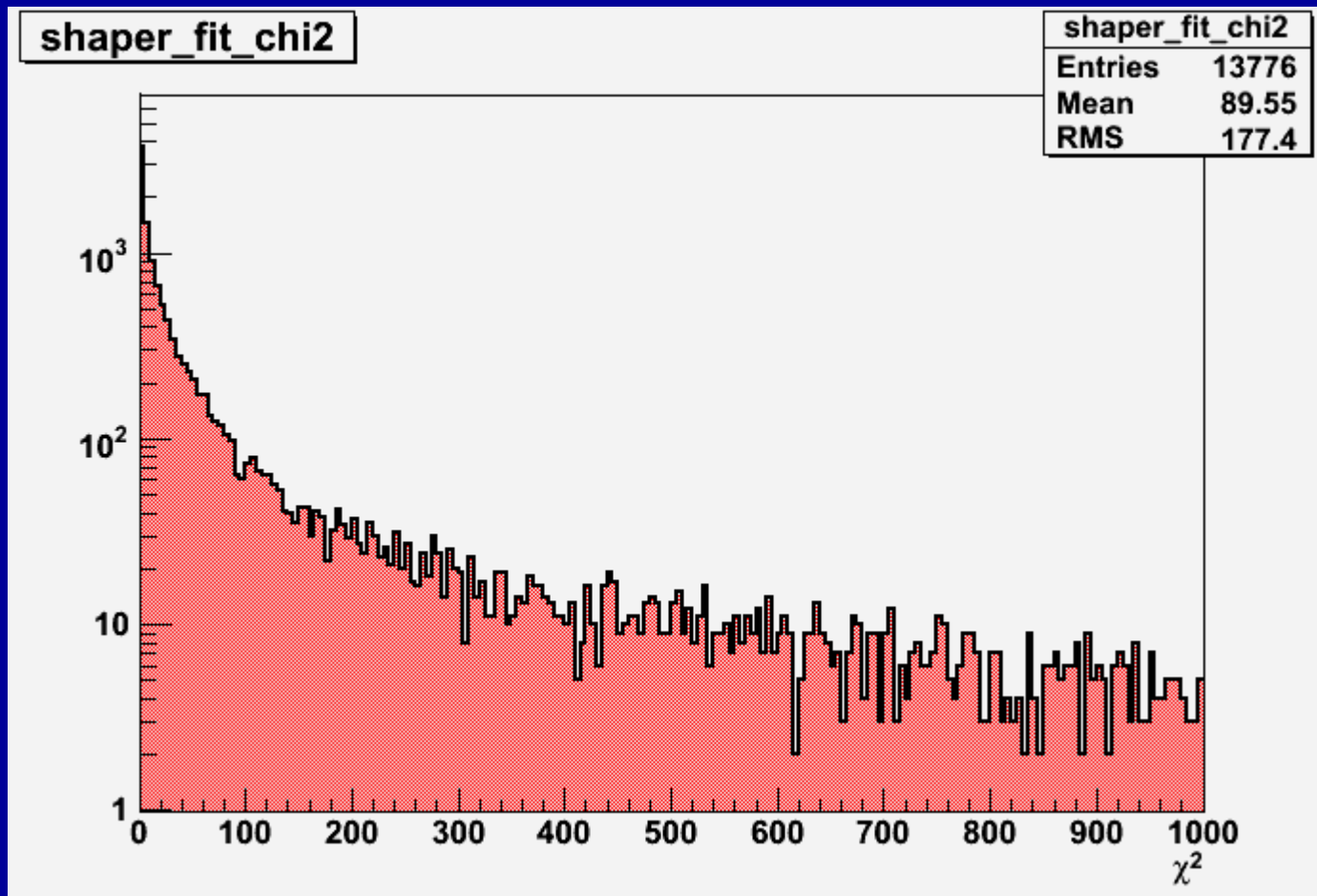
# Fitting Program

- Marcel has been working on fitting program to deal with the 'flat-top' threshold scan distributions seen in the shapers.
- The program attempts to fit a Gaussian distribution to an individual pixel threshold scan.
- So far the program produces reasonable results in 90% of cases.

# Pixel Threshold Scan, data and fitted Gaussian



# Reliability of fitting



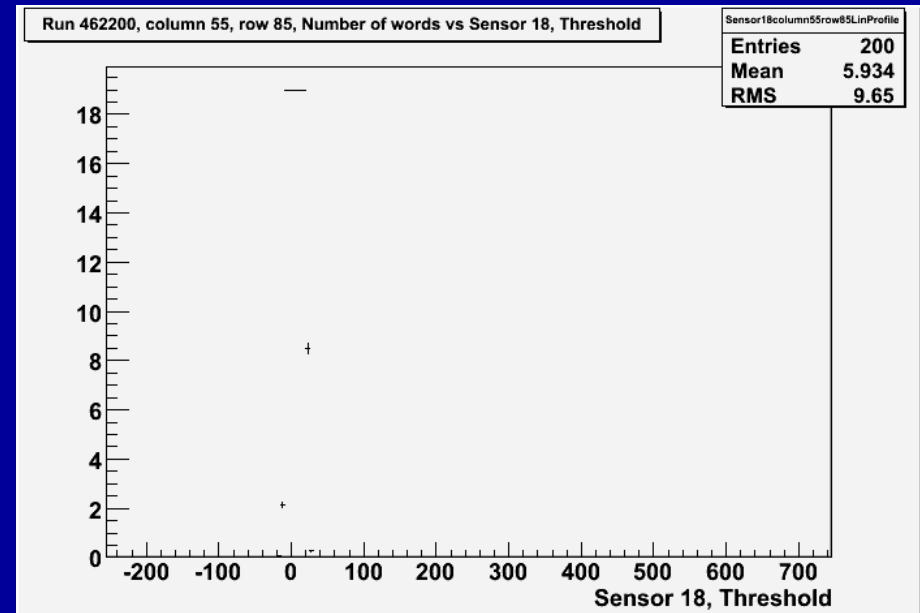
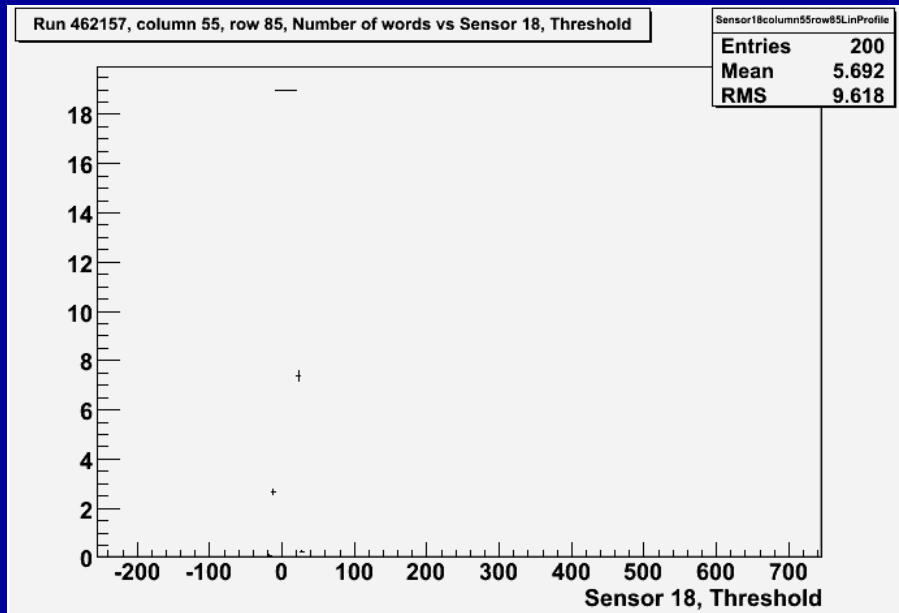
# Laser Runs

- We are in the process of starting a study of the sensor using the laser.
- The laser will cover an area approximately 10 pixels by 10 pixels, this beam size is achieved purely by shutter control (no defocusing).

# Sensor 18, Column 55, Row 85

Laser

No Laser



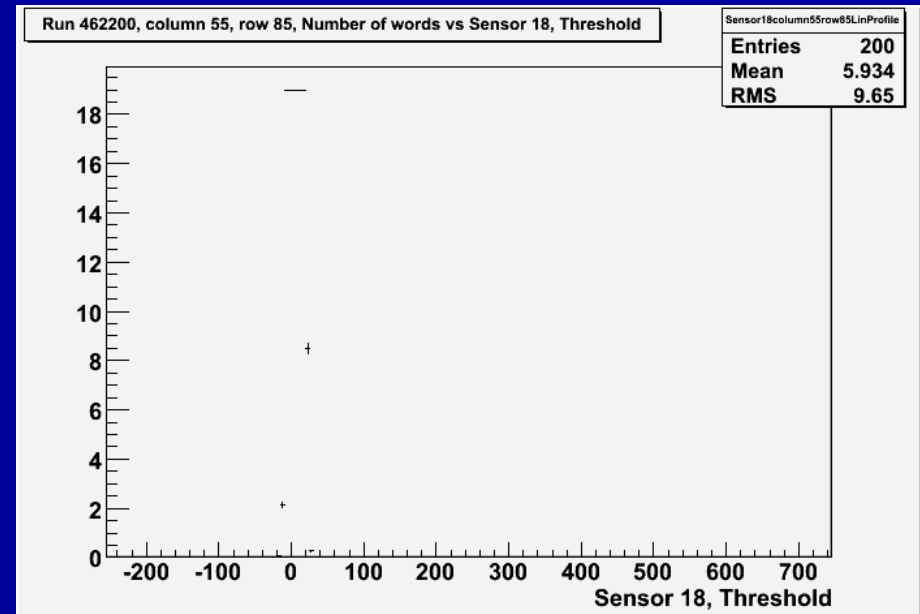
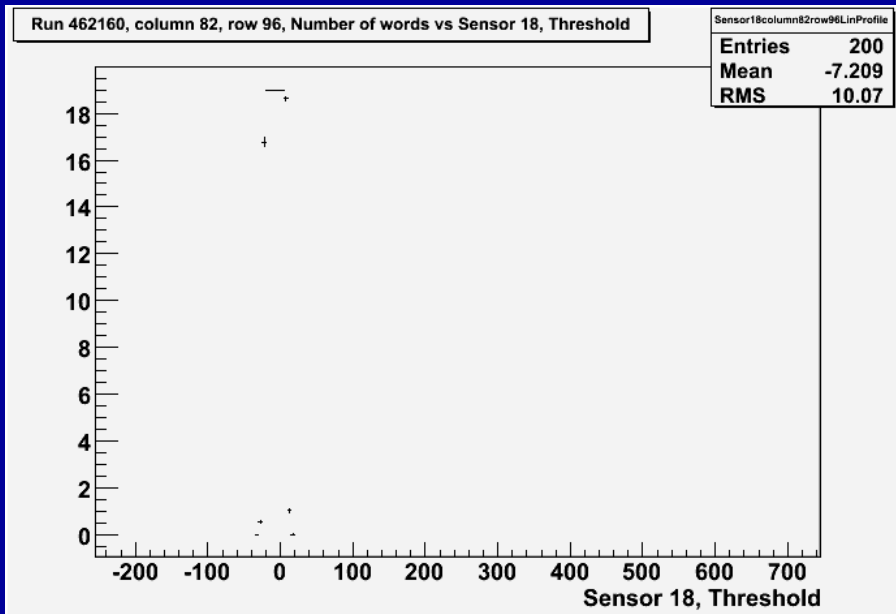
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# Sensor 18, Column 82, Row 96

Laser

No Laser

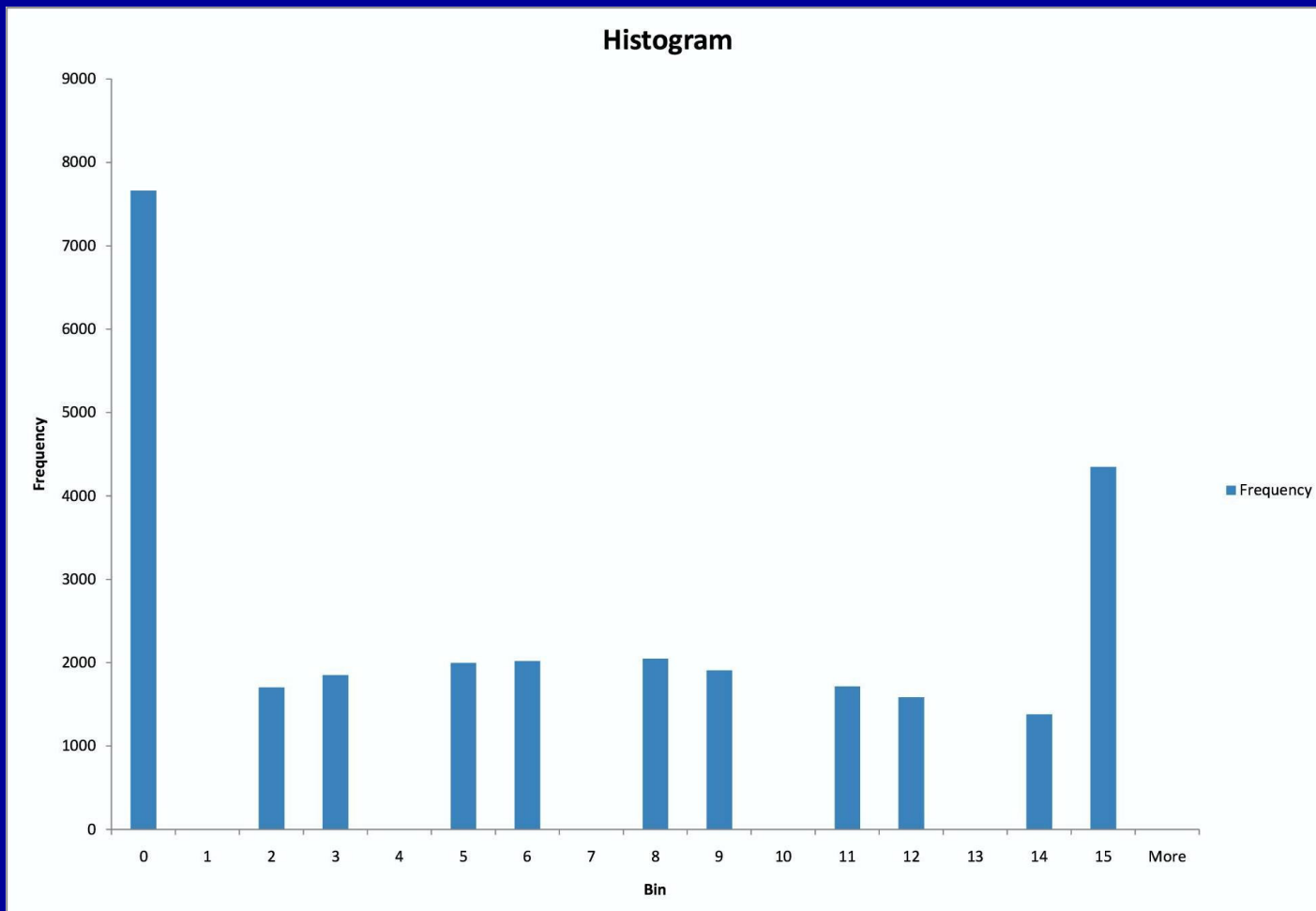


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# Variation in Trim Values Applied



# Variation In Drop-offs

