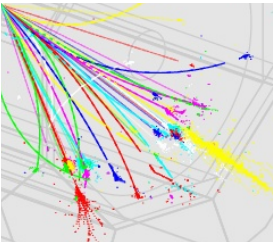
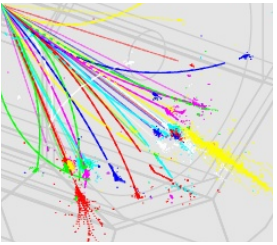


# More TPAC 1.1 Items

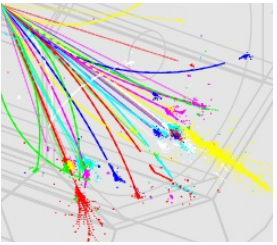
Marcel Stanitzki

RAL 16.01.2009



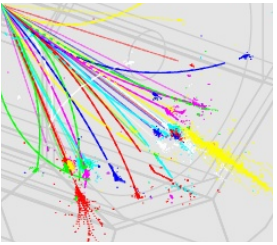
# News

- Some note from last meeting
  - 335 MHz peak is from elsewhere
  - Mike has acucmulated lots of numbers
- **All values have not been adjusted for the 0.9x0.9 gain reduction**

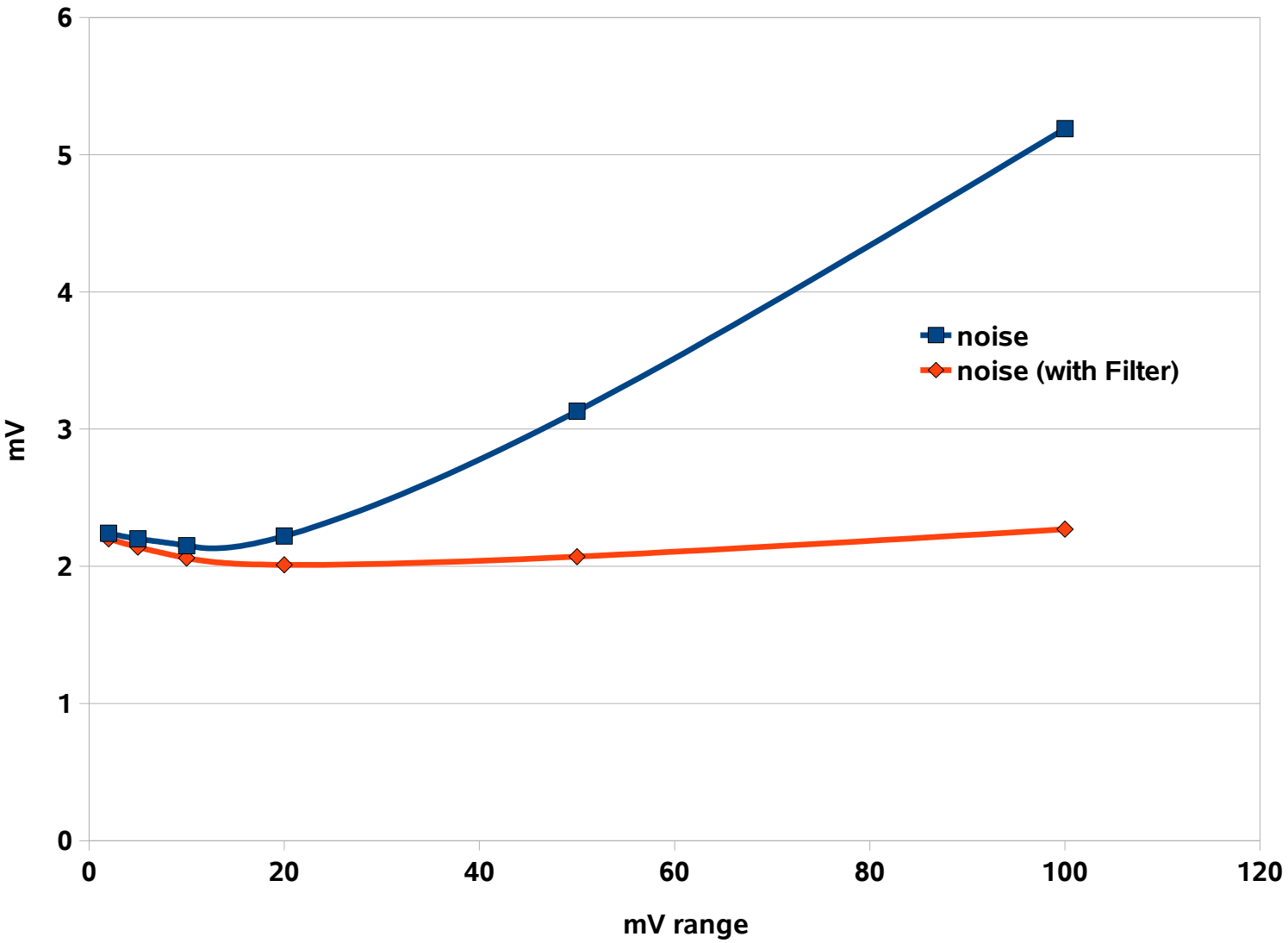


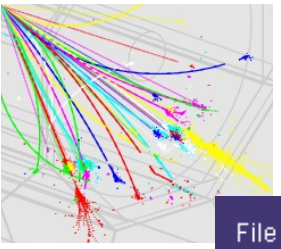
# Measuring Noise

- Some funny effects noted
  - Noise measurement dependent on Voltage range
- We always measured with the same setting
  - the noise (few mv)
  - the signal 50 mV or more



# This is what you get ...





# More checks

File Vertical Timebase Trigger Display Cursors Measure Math Analysis Utilities Help Zoom Undo

C3

C2

mean +- 1 sdev

| Measure | P1:sdev(C2) | P2:sdev(C2) | P3:rise(C2) | P4:width(C2) | P5:widn(C3) | P6:dt@lv(C1,C2) |
|---|---|---|---|---|---|---|
| value | 2.4 mV | 2.6 mV | 89.823 ns | 304.590 ns | 222.603 ns | |
| mean | 2.413 mV | 2.434 mV | 8[illegible]28218 ns | 318.12214 ns | 205.17722 ns | |
| min | 1.6 mV | 1.8 mV | [illegible]6.405 ns | 223.902 ns | 31.794 ns | |
| max | 11.7 mV | 16.6 mV | [illegible]48.577 ns | 643.178 ns | 270.036 ns | |
| sdev | 256 µV | 216 µV | [illegible].10920 ns | 15.69315 ns | 15.26454 ns | |
| num | 80.242e+3 | 80.242e+3 | 80.240e+3 | 80.228e+3 | 80.242e+3 | |
| status | ✔ | ✔ | ⇑ | ⚠ | ✔ | |
| histo | | | | | | |

C2 AC1M 50.0 mV/div 0.0 mV ofst

C3 AC1M 200 mV/div 220.0 mV

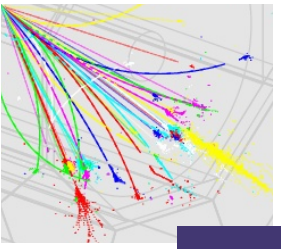
Tbase 10.20 µs 2.00 µs/div 200 kS 10 GS/s

Trigger C3 Stop -100 mV Edge Positive

LeCroy

04/02/2009 14:27:50

Noise does not differ by a large amount



# Different scale

File Vertical Timebase Trigger Display Cursors Measure Math Analysis Utilities Help Zoom Undo

C3

C2

mean +- 1 sdev

| Measure | P1:sdev(C2) | P2:sdev(C2) | P3:rise(C2) | P4:width(C2) | P5:widn(C3) | P6:dt@lv(C1,C2) |
|---|---|---|---|---|---|---|
| value | 2.15 mV | 2.44 mV | 33.833 ns | 494.571 ns | 187.851 ns | |
| mean | 2.1714 mV | 2.2010 mV | 30.16987 ns | 504.34484 ns | 211.30641 ns | |
| min | 1.33 mV | 1.51 mV | 21.179 ns | 387.166 ns | 167.830 ns | |
| max | 3.41 mV | 3.12 mV | 40.991 ns | 586.724 ns | 258.583 ns | |
| sdev | 318.8 µV | 252.3 µV | 4.18613 ns | 15.94136 ns | 14.09348 ns | |
| num | 1.247e+3 | 1.247e+3 | 1.197e+3 | 1.247e+3 | 1.247e+3 | |
| status | ✔ | ✔ | | | ✔ | |

histo

C2 AC1M 10.0 mV/div 0.00 mV ofst

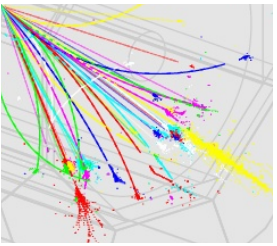
C3 AC1M 200 mV/div 220.0 mV

Tbase 10.20 µs 2.00 µs/div 200 kS 10 GS/s

Trigger C3 Stop -100 mV Edge Positive

LeCroy

04/02/2009 14:31:38



# Trying to check noise

File Vertical Timebase Trigger Display Cursors Measure Math Analysis Utilities Help Zoom Undo

mean +- 1 sdev

C2

C3

| Measure | P1:sdev(C2) | P2:sdev(C2) | P3:rise(C2) | P4:width(C2) | P5:widn(C3) | P6:min(C2) |
|---|---|---|---|---|---|---|
| value | 2.6 mV | 2.5 mV | 53.775 ns | 401.353 ns | 199.451 ns | -286 mV |
| mean | 2.524 mV | 2.540 mV | 44.63037 ns | 418.08257 ns | 208.60504 ns | -291.68 mV |
| min | 1.8 mV | 1.9 mV | 37.517 ns | 229.316 ns | 74.328 ns | -321 mV |
| max | 7.5 mV | 9.2 mV | 851.989 ns | 541.765 ns | 270.638 ns | -144 mV |
| sdev | 255 µV | 206 µV | 6.86248 ns | 15.28557 ns | 14.67115 ns | 7.89 mV |
| num | 31.228e+3 | 31.228e+3 | 31.206e+3 | 31.221e+3 | 41.306e+3 | 31.221e+3 |
| status | ✔ | ✔ | | | ✔ | ✔ |
| histo | | | | | | |

C2 AC1M 50.0 mV/div 155.0 mV

C3 AC1M 200 mV/div 220.0 mV

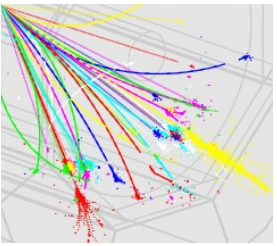
Tbase 10.20 µs 2.00 µs/div 200 kS 10 GS/s

Trigger C3 Stop -100 mV Edge Positive

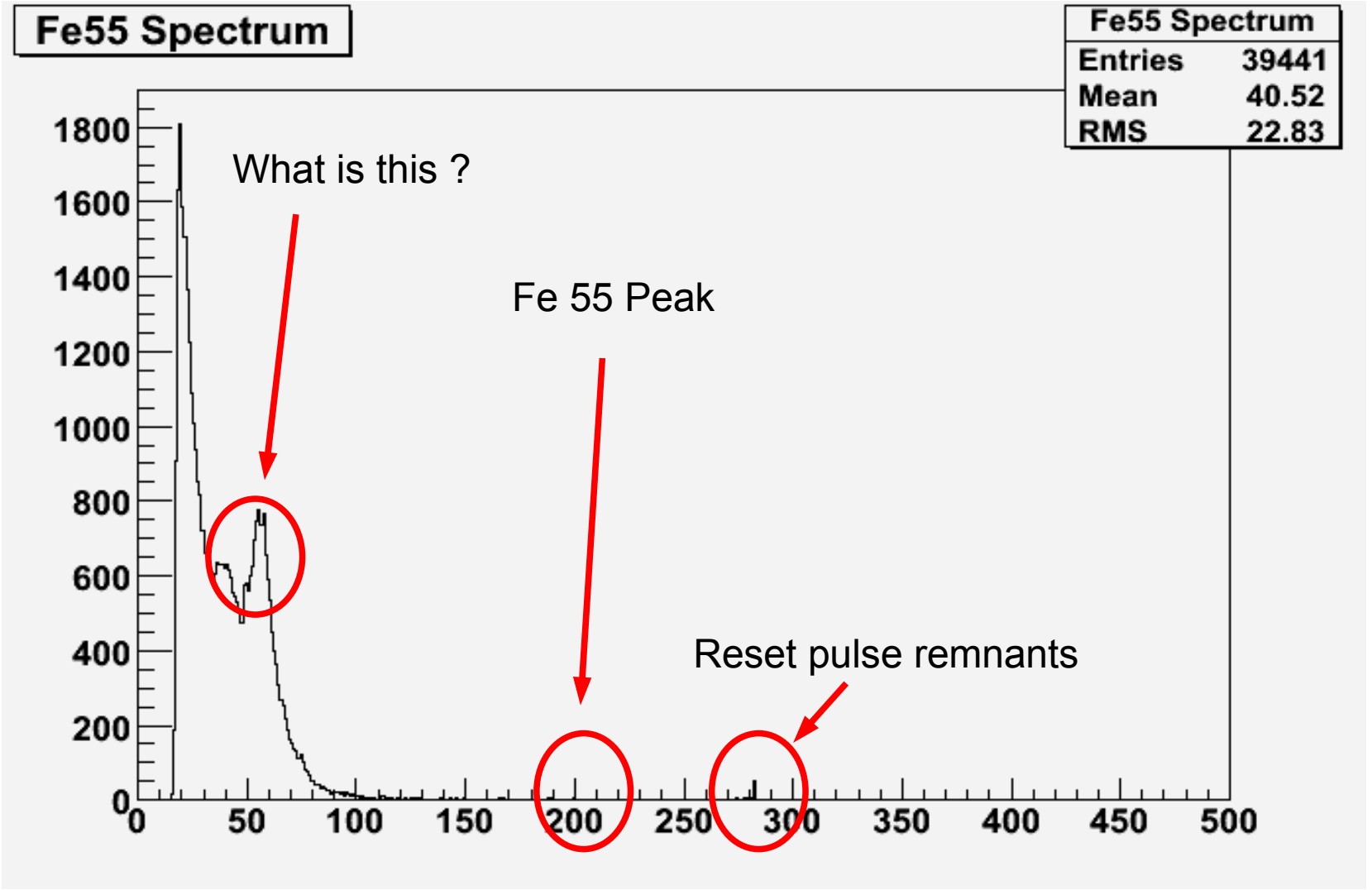
LeCroy

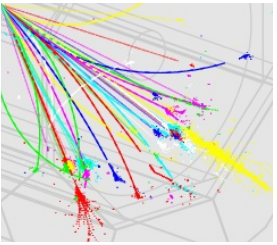
04/02/2009 16:44:07

Reset pulse should have fixed height
Deviation could give you feel for the noise
We get 291.68 +/- 7.89 mV

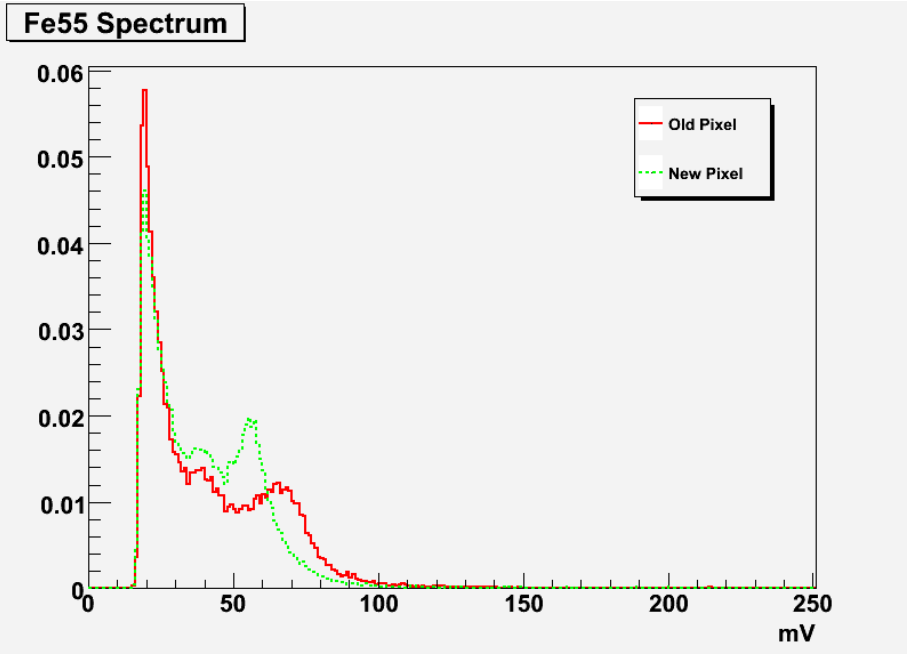


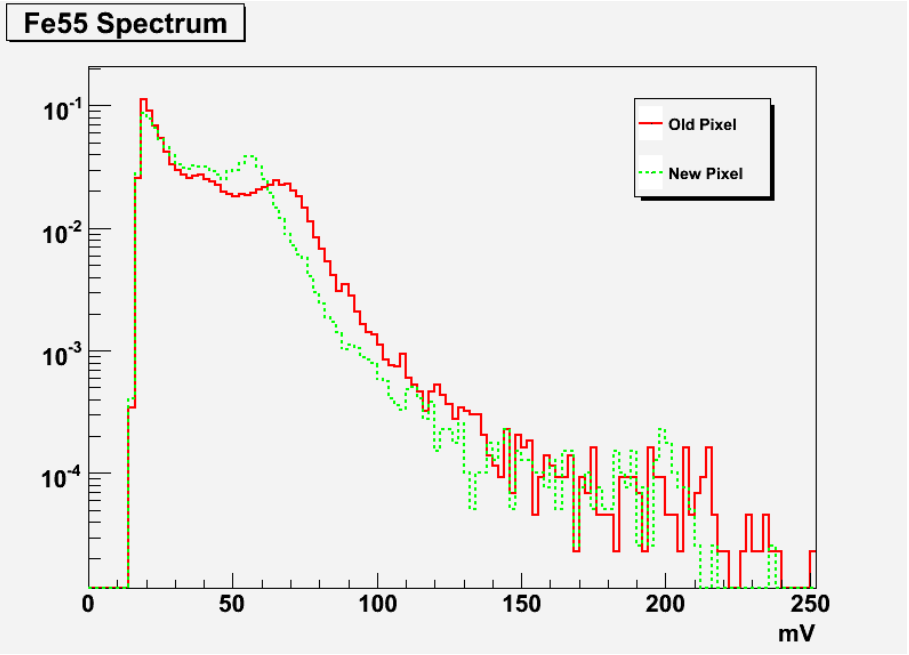
# $^{55}$Fe Spectra

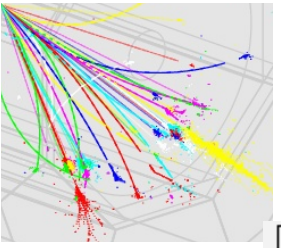




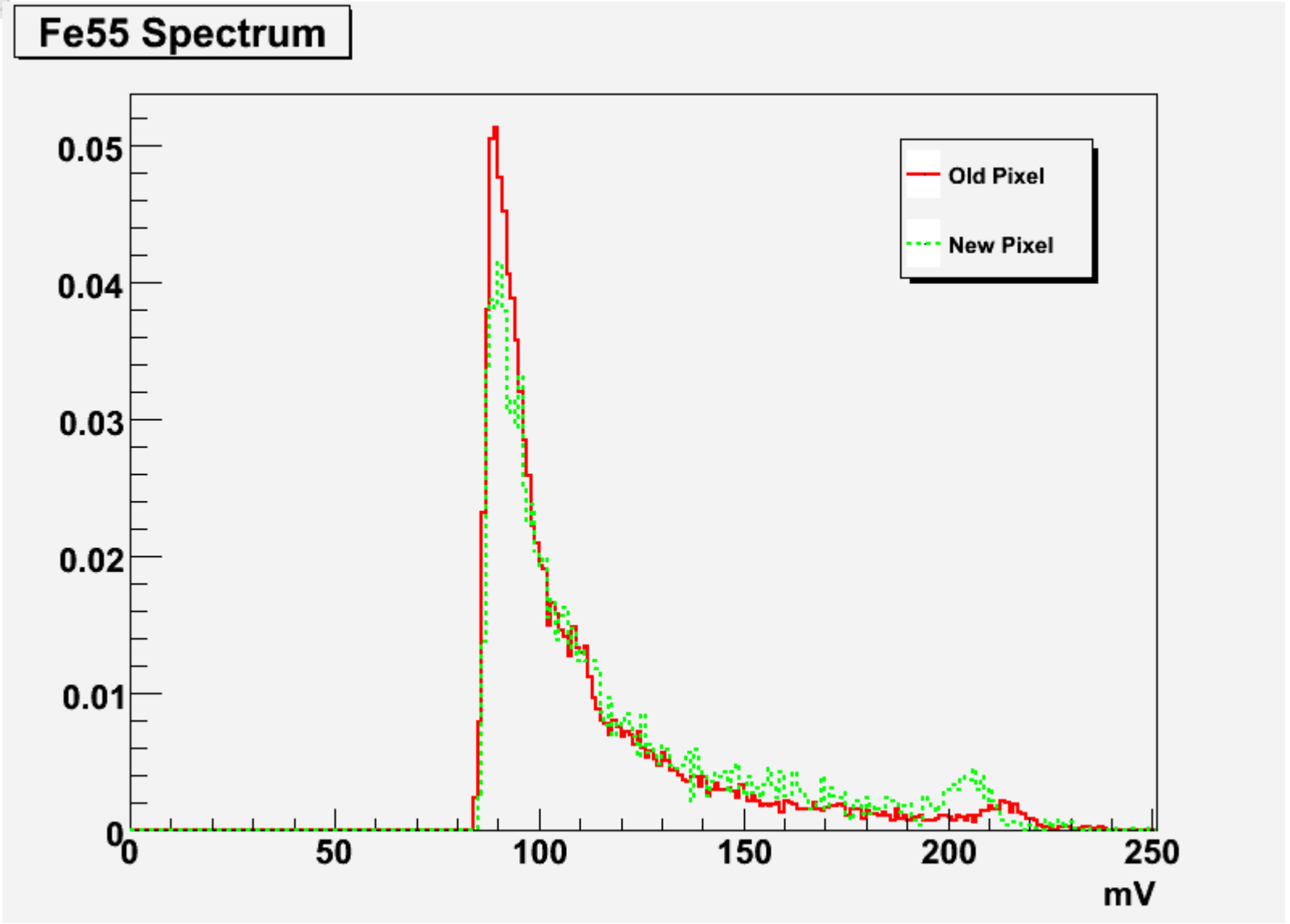
# Old Pixel vs. new Pixel

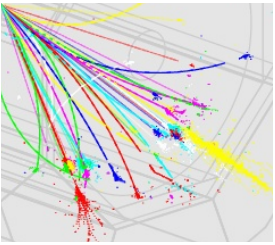


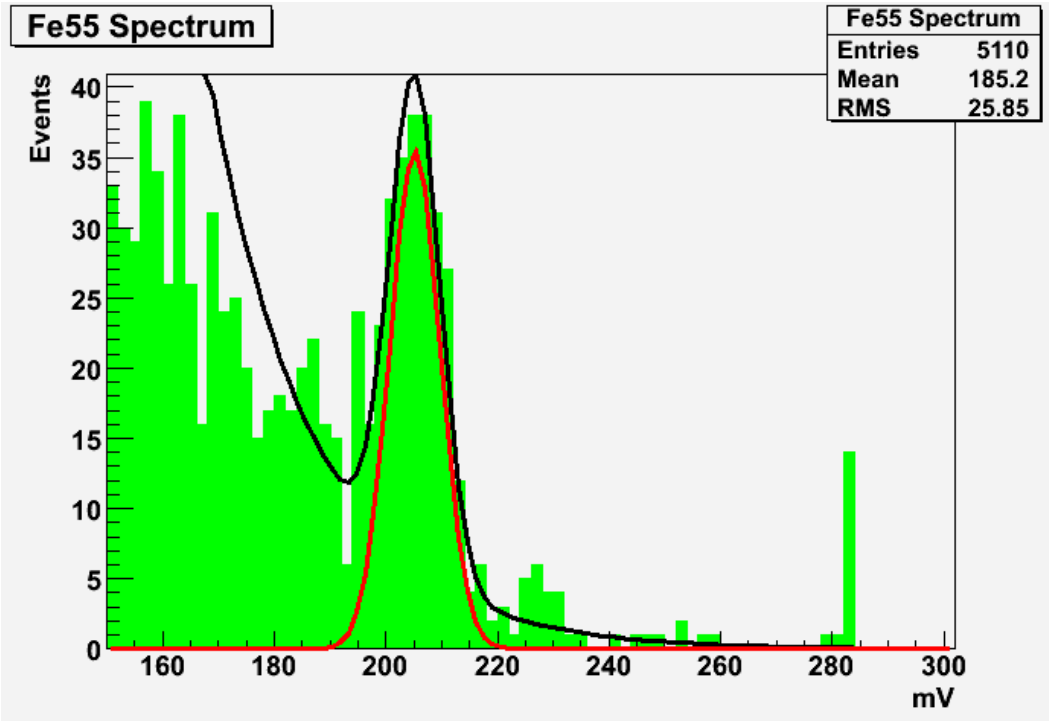


# Closer look

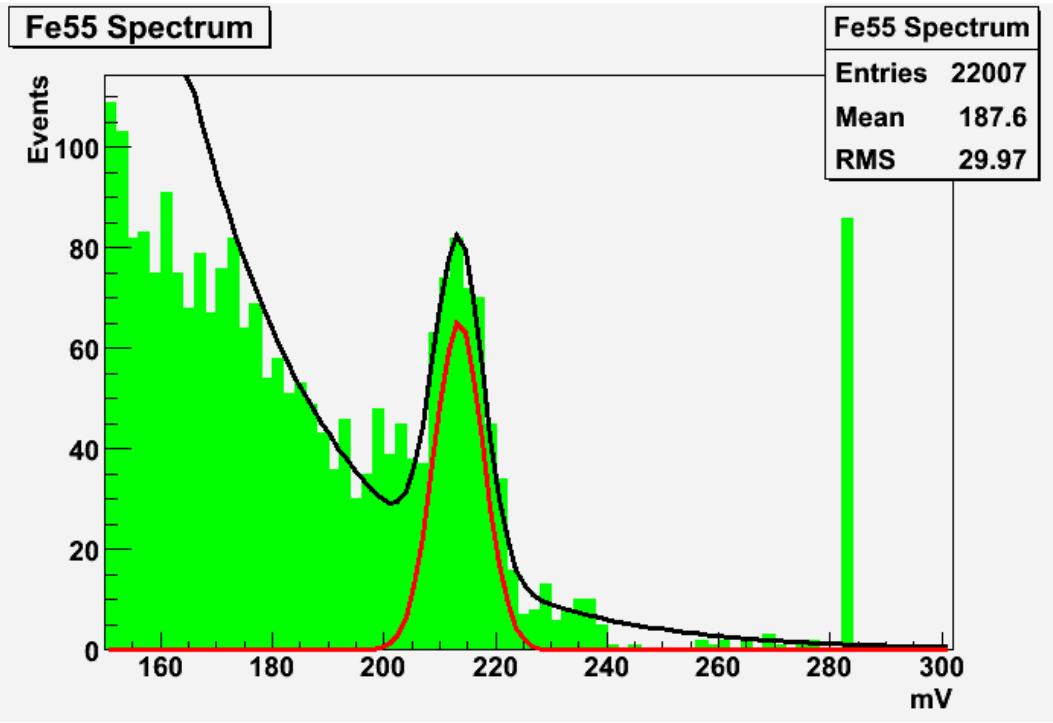

Fe55 Spectrum
Old Pixel
New Pixel
0.05
0.04
0.03
0.02
0.01
0
0
50
100
150
200
250
mV



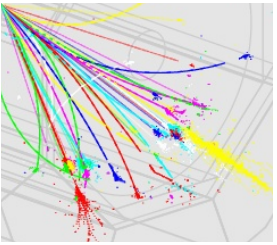
# Fitting the peaks



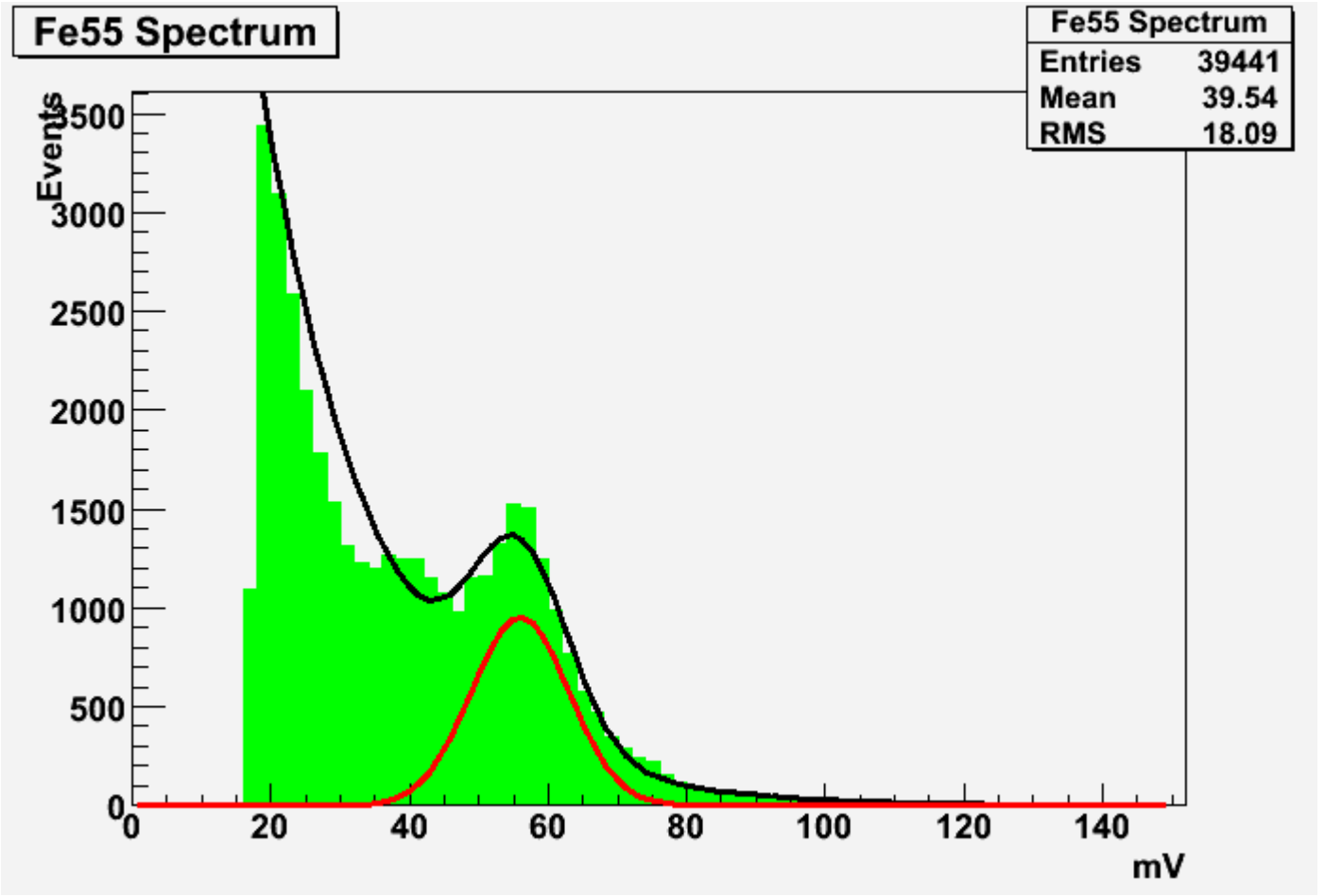

205.2 (mean) ±4.5 (width) mV
New Pixel



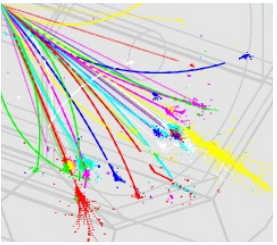

213.5 (mean) ±4.4 (width) mV
Old Pixel



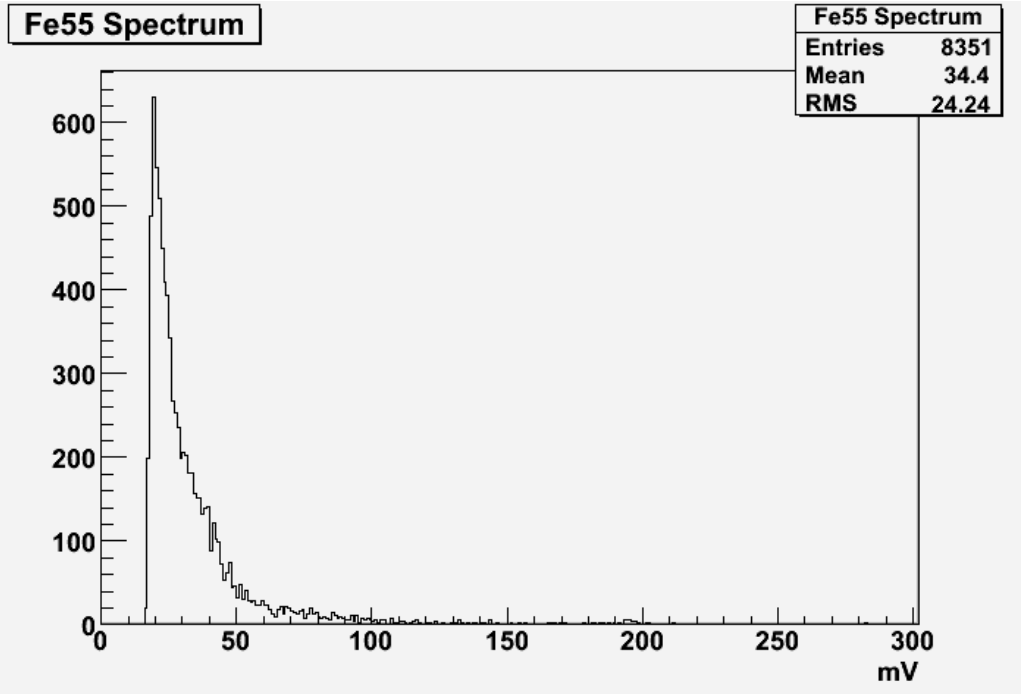
# Fitting the Fake peak

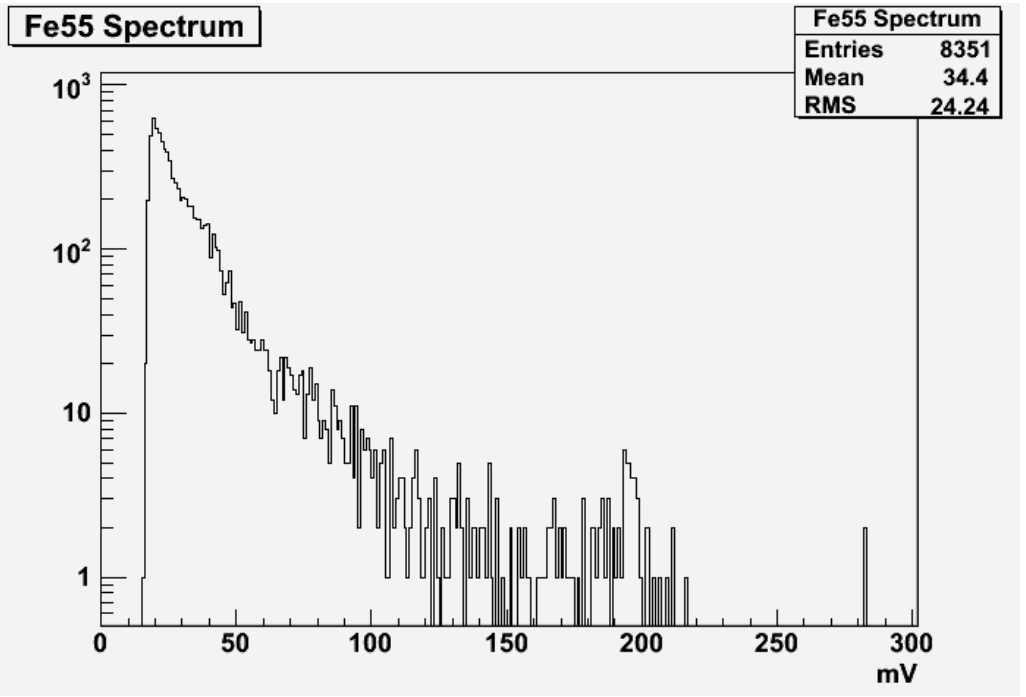


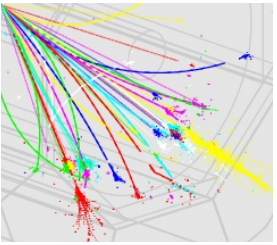

55.9 (mean) ±7.0 (width) mV
New Pixel



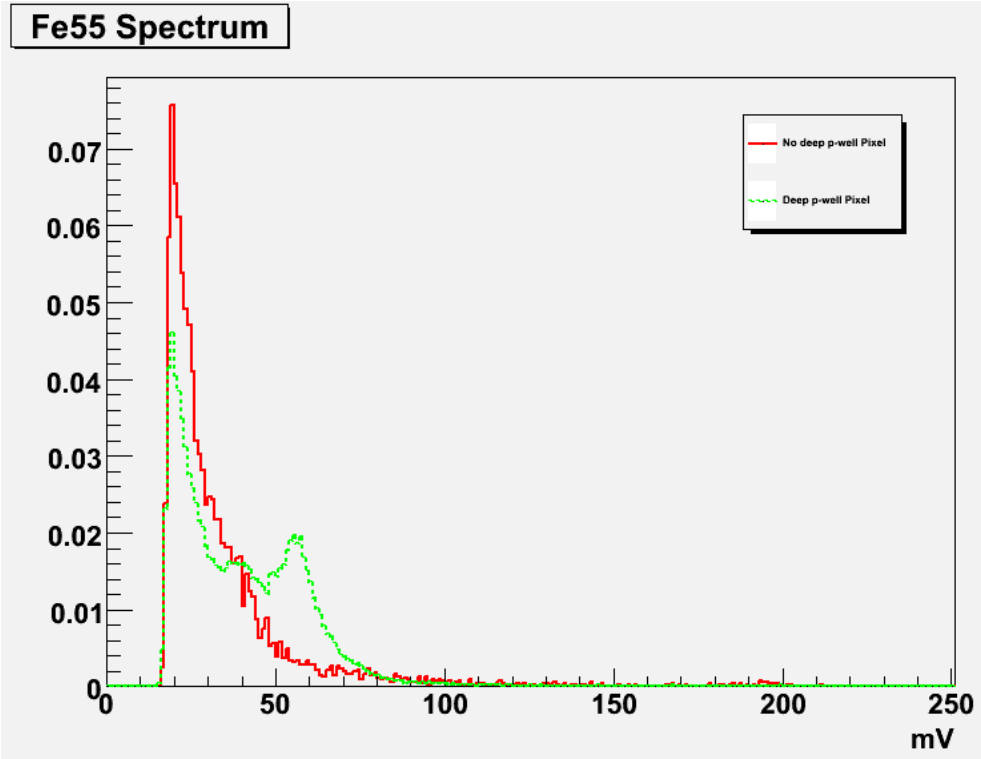
# Testing with no-deep p-well

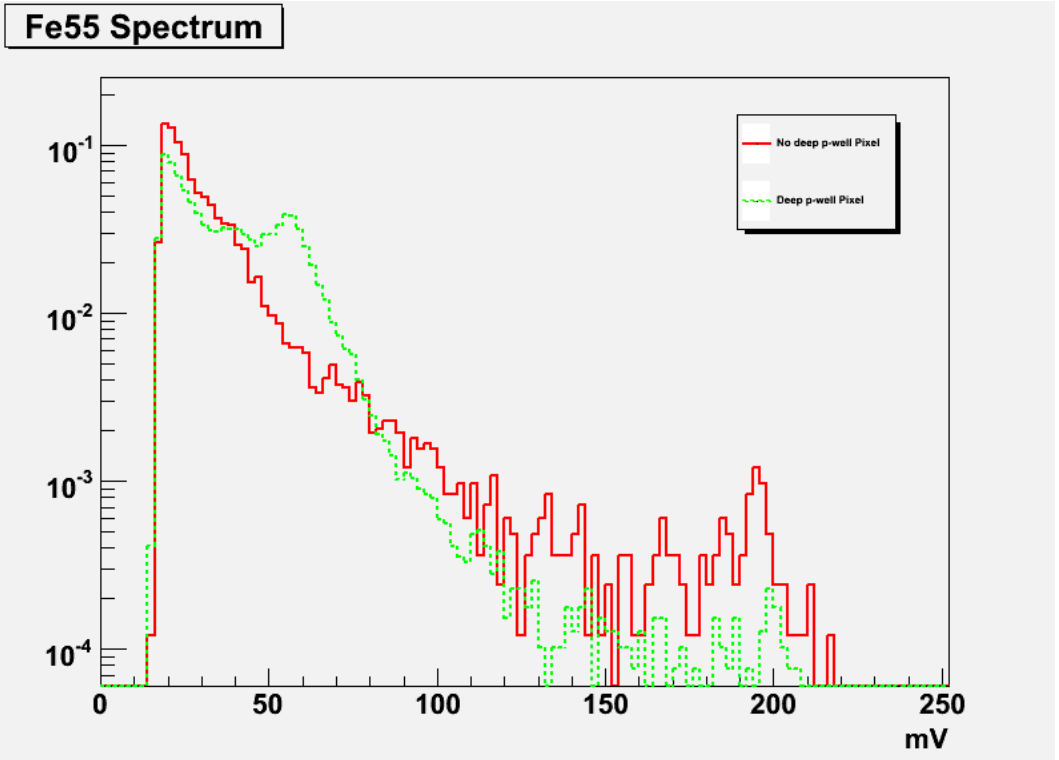


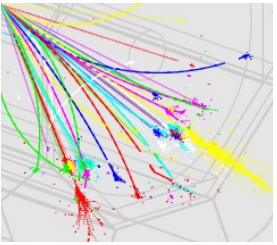





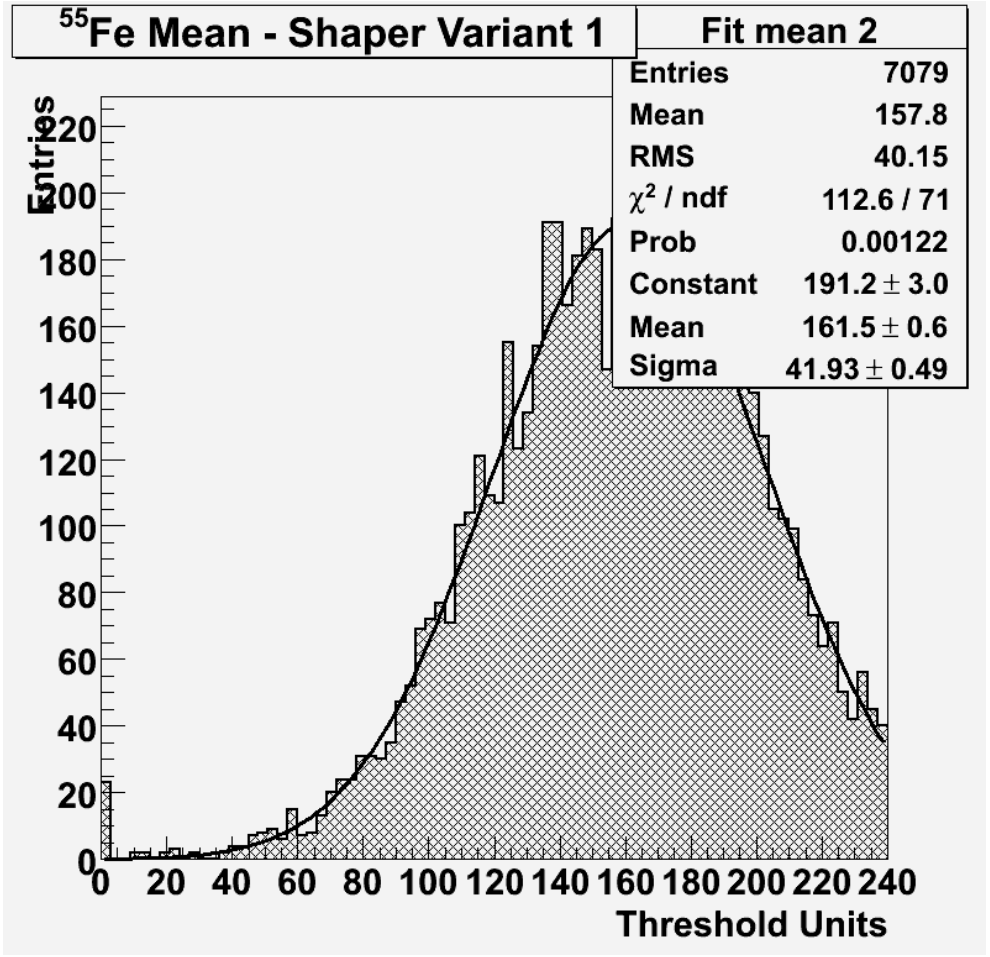
# Compare the two

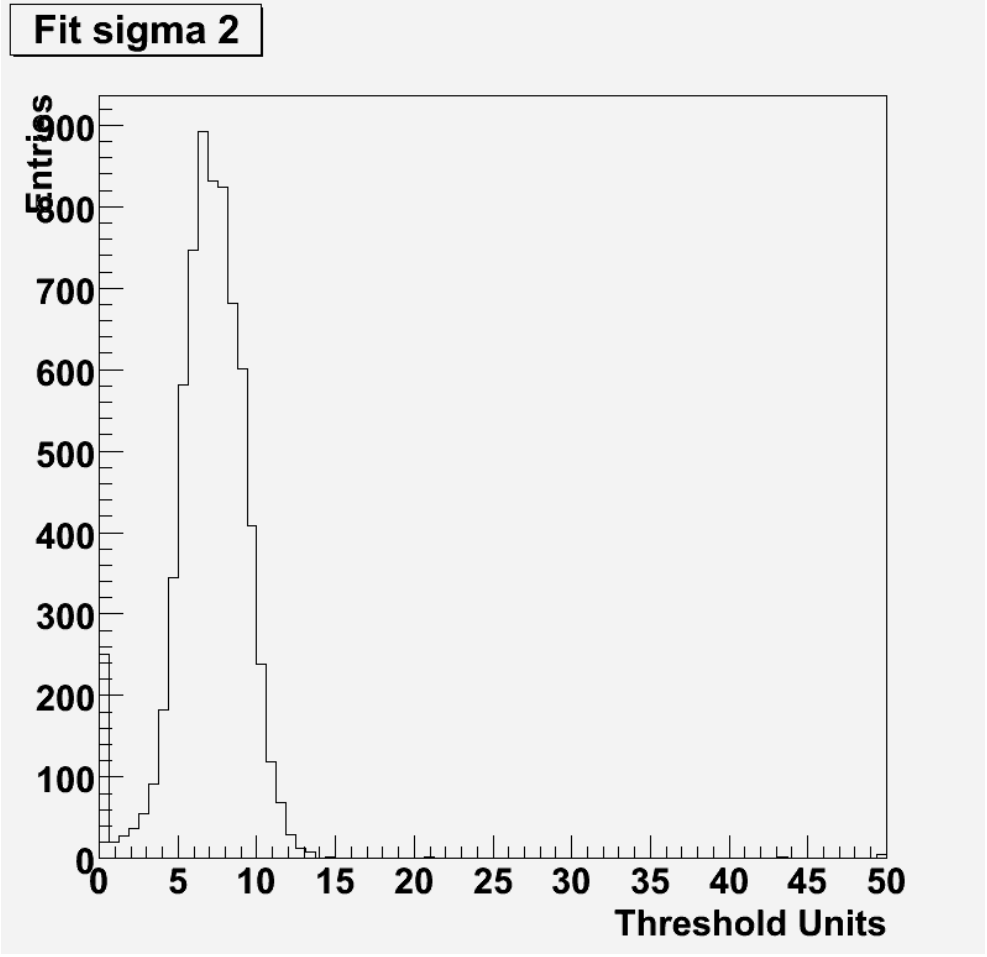


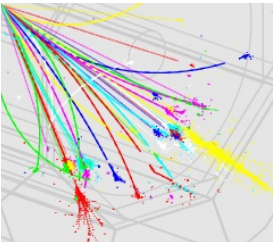


# TPAC 1.0 Bulk

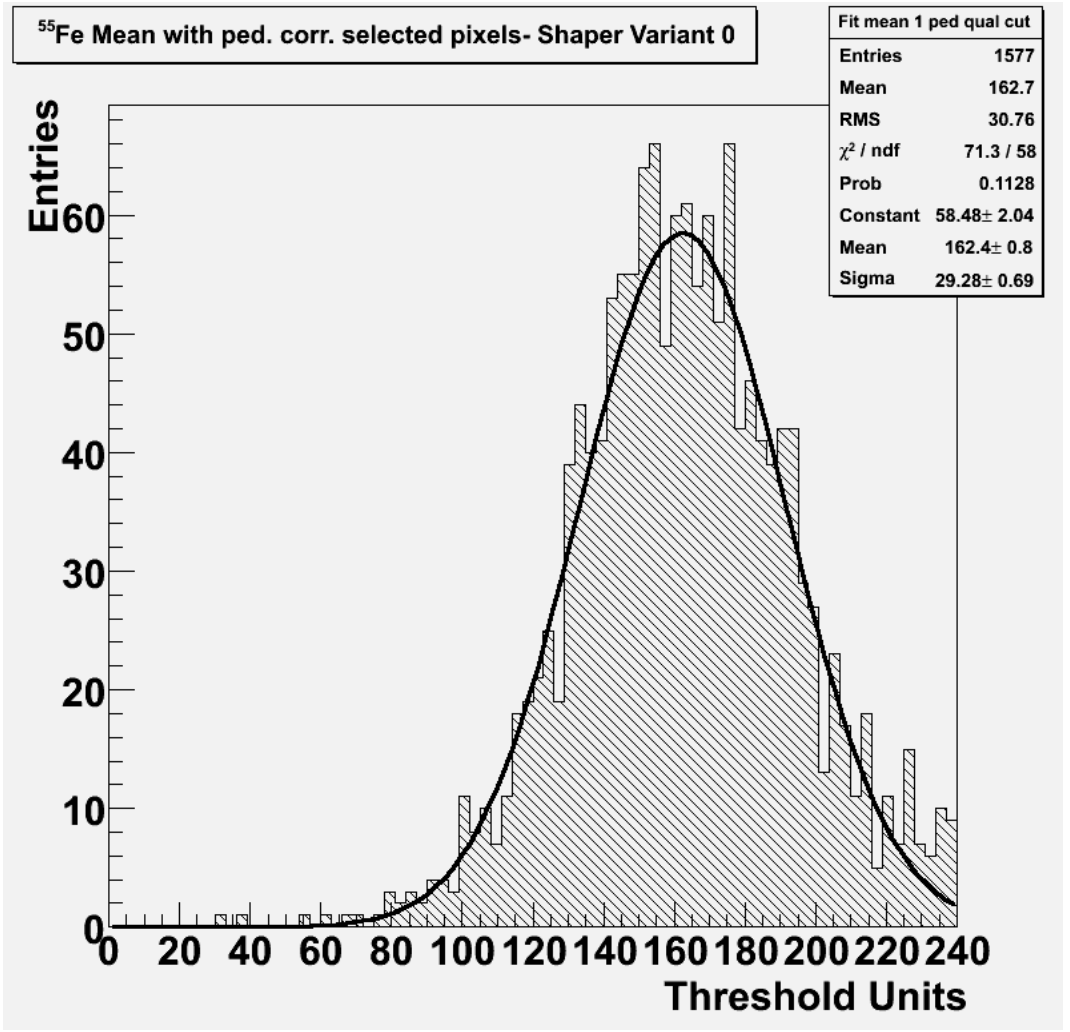


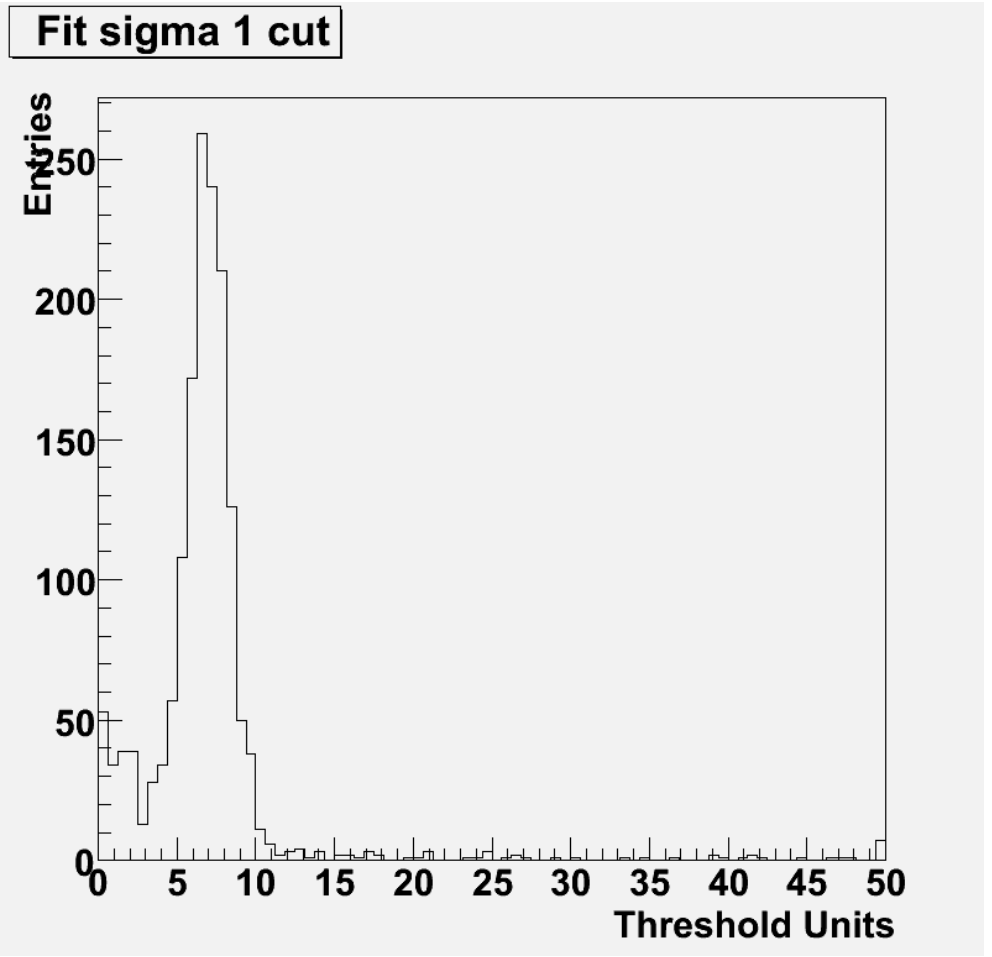




7.25 ± 1.89 TU

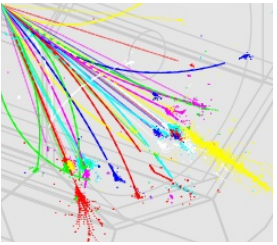


# TPAC 1.1 Bulk




6.88 ± 1.44 TU



# Notes

- The fits are less stable than for TPAC1.0, probalby needs a bit of tuning
- Can run with 168 pixels at once, much faster
- Overall results are comparable
- The big question is, what are we fitting
  - Mike and Jamie have all the numbers