

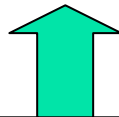
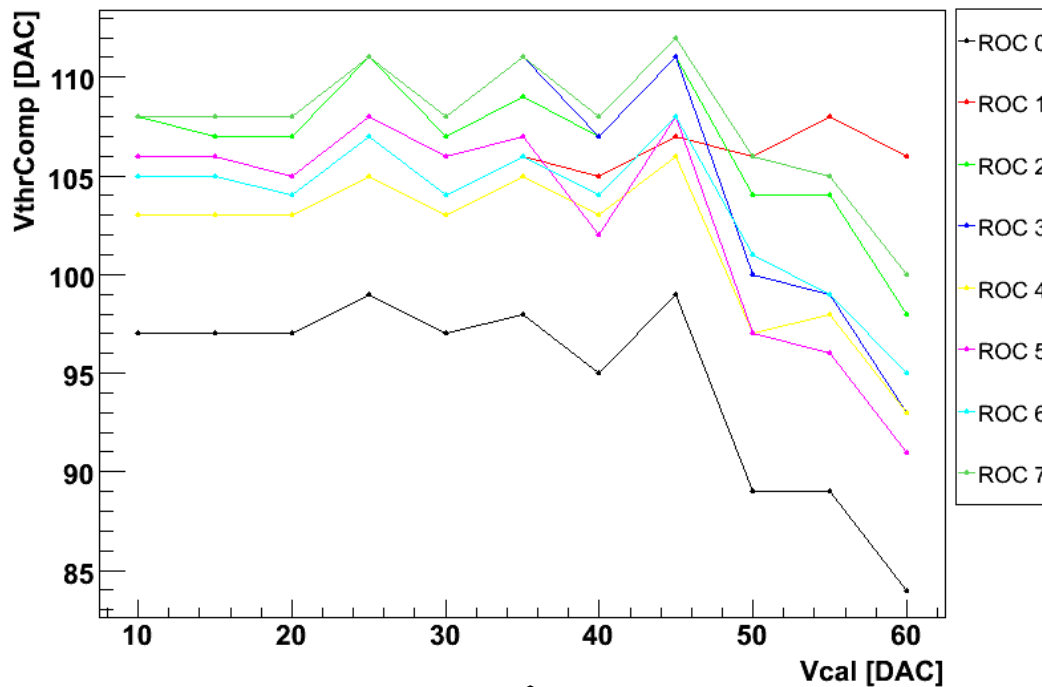
PIRE Conference
9.18.09



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Trimming Results

Step 1: VthrComp vs Vcal

Module 1: VthrComp for different Vcals

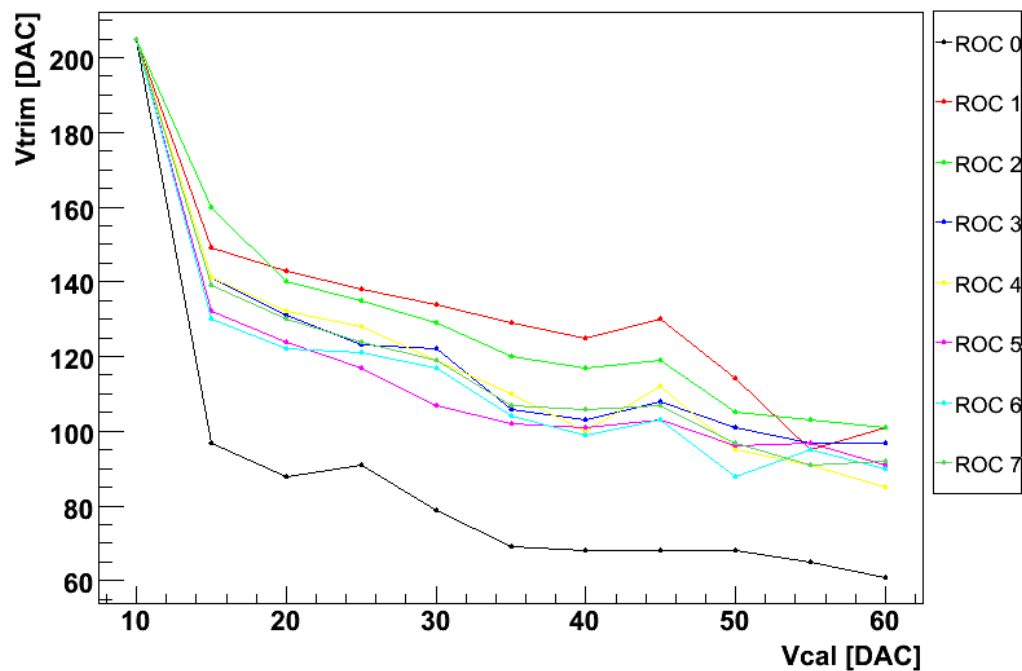


VthrComp changes after trimming at different Vcal values for 8 ROCs in module 1

- Aimed to find global threshold for the ROC
- Varied Vcal
- Changes expected
 - Change in global threshold
- Selected maximum value
 - Saved as global threshold

Step 2: Vtrim vs Vcal

Module 1: Vtrim for different Vcals

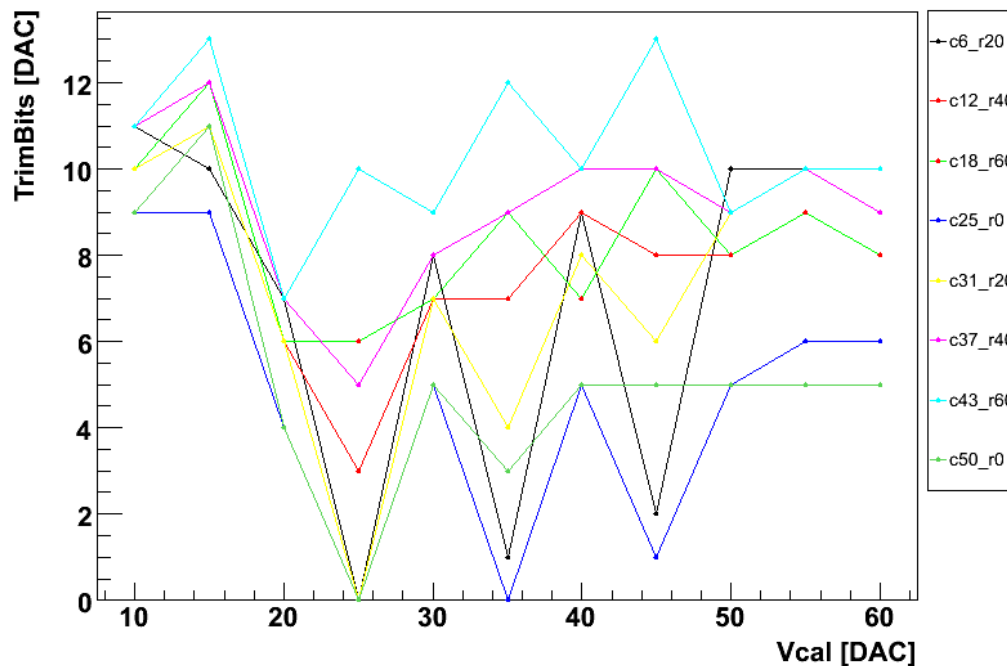


Vtrim changes after trimming at different Vcal values for 8 ROCs in module 1

- Now, using fixed VthrComp value from previous step
- Perform a Vcal scan
- Pixel with highest Vcal is selected to determine Vtrim
- Trim voltage increased until Vcal reaches the value from Vcal scan
- Changes expected
 - Global threshold lowered

Step 3: Trim Bits vs Vcal

ROC 4 TrimBits for various pixels and different Vcals (mod_1)



Trim bits numbers for different pixels after trimming at different Vcal values

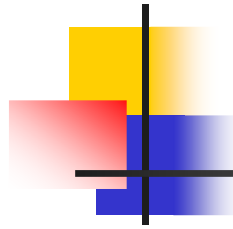
- Next, finding trim state
- Change trim bits until pixel responds to target Vcal value (previous step)
- Assumed global threshold for each ROC should be similar
- Left, shows that the trim bits DO change with changing threshold



SCurve Test

- To test if the changing trim bits were significant
 - Study SCurve behavior at varying VthrComp values
- Procedure:
 - Trim at Vcal 60
 - Trimming procedure sets a fixed VthrComp value for each ROC
 - Change this VthrComp value
 - Run SCurve test

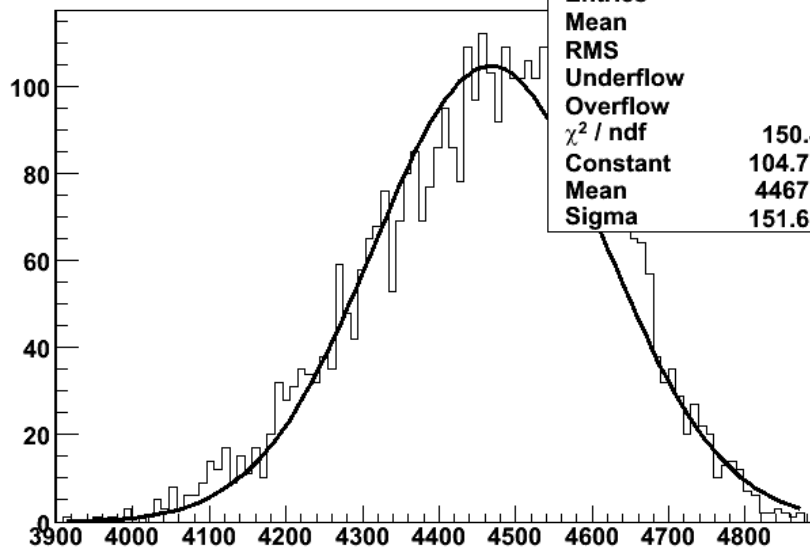
Threshold and Noise for Original VthrComp Value



Threshold sigma graph for original VthrComp value (ROC 4)

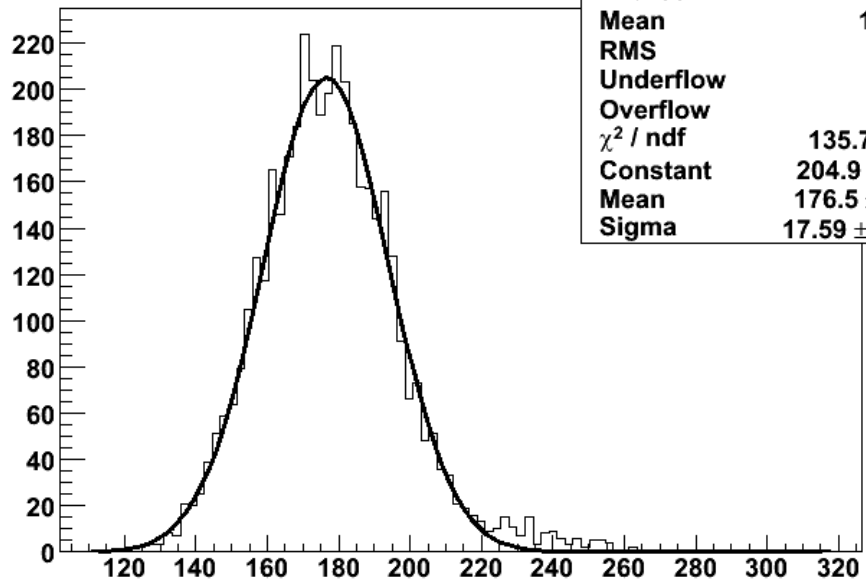


ThresholdPlus0 Mean for roc4



ThrHldMeanPlus0roc4	
Entries	4160
Mean	4466
RMS	155
Underflow	0
Overflow	0
χ^2 / ndf	150.4 / 89
Constant	104.7 ± 2.0
Mean	4467 ± 2.6
Sigma	151.6 ± 1.8

ThresholdPlus0 Sigma for roc4



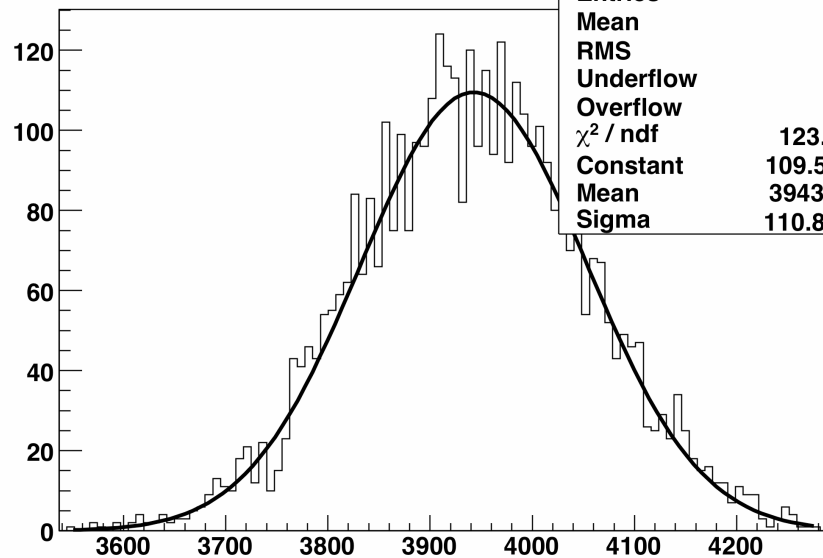
ThrHldSigmaPlus0roc4	
Entries	4160
Mean	177.8
RMS	20
Underflow	0
Overflow	0
χ^2 / ndf	135.7 / 67
Constant	204.9 ± 4.1
Mean	176.5 ± 0.3
Sigma	17.59 ± 0.21

Threshold mean graph for original VthrComp value (ROC 4)



Threshold and Noise for VthrComp+5

ThresholdPlus5 Mean for Roc4



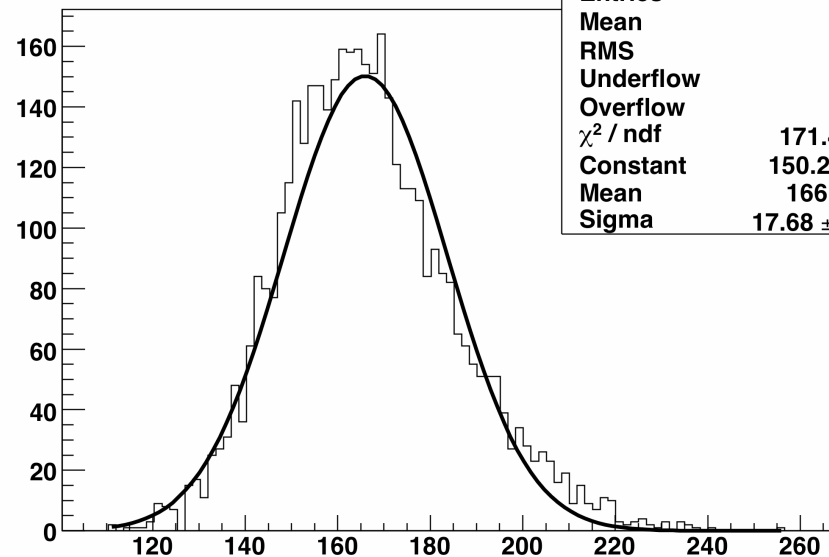
ThrHldMeanPlus5Roc4

Entries	4160
Mean	3942
RMS	112.6
Underflow	0
Overflow	0
χ^2 / ndf	123.8 / 91
Constant	109.5 ± 2.1
Mean	3943 ± 1.8
Sigma	110.8 ± 1.3

Threshold sigma graph after adding 5 DAC units to VthrComp (ROC 4)



ThresholdPlus5 Sigma for Roc4



ThrHldSigmaPlus5Roc4

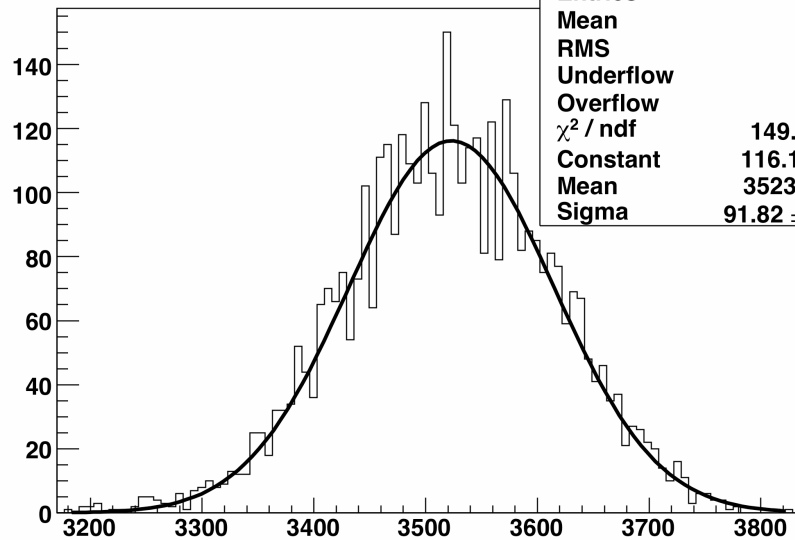
Entries	4160
Mean	166.7
RMS	18.84
Underflow	0
Overflow	0
χ^2 / ndf	171.4 / 73
Constant	150.2 ± 3.1
Mean	166 ± 0.3
Sigma	17.68 ± 0.24

Threshold mean graph after adding 5 DAC units to VthrComp (ROC 4)



Threshold and Noise for VthrComp+8

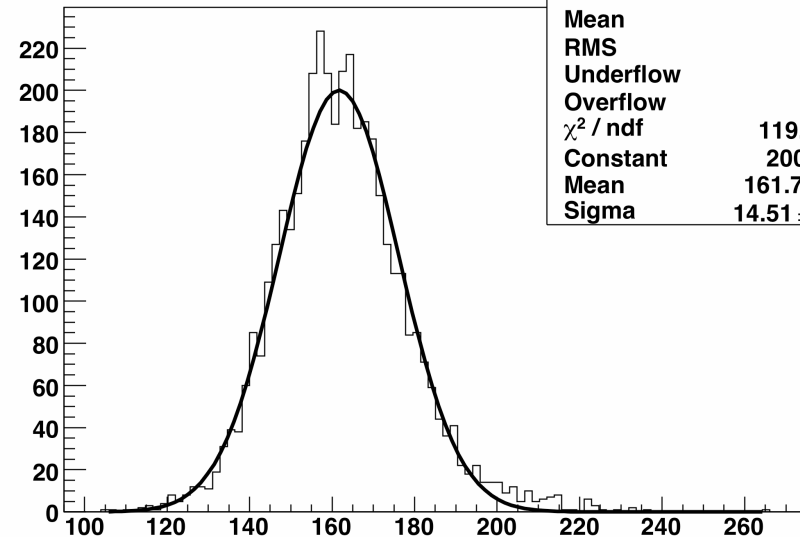
ThresholdPlus8 Mean for Roc4



Threshold sigma graph after adding 8 DAC units to VthrComp (ROC 4)



ThresholdPlus8 Sigma for Roc4

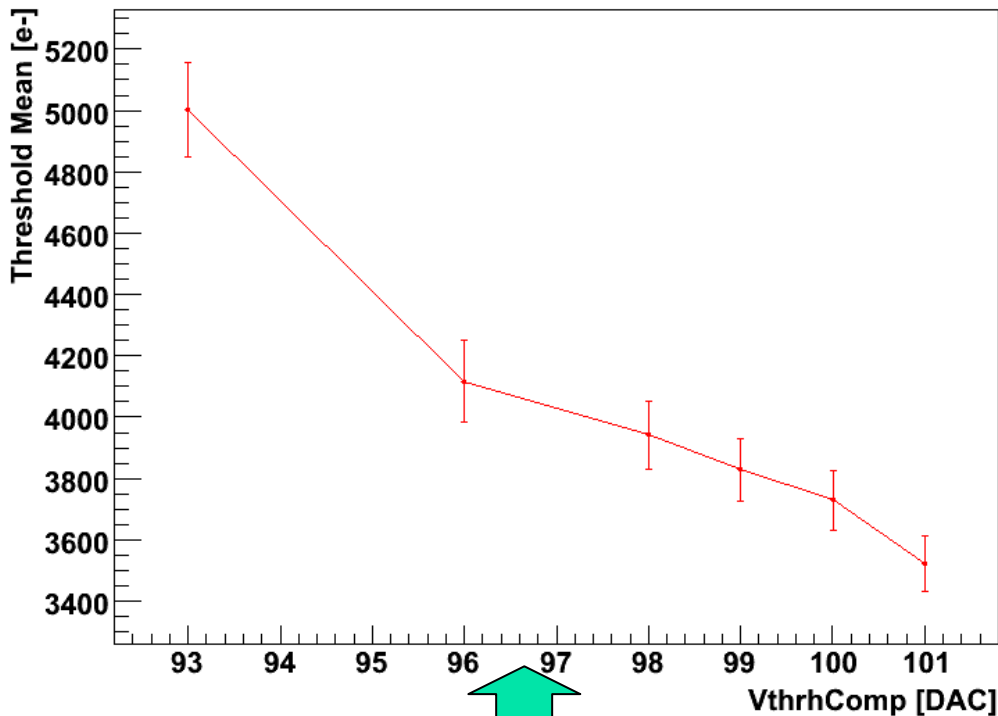


Threshold mean graph after adding 8 DAC units to VthrComp (ROC 4)



Changes in Threshold

ROC 4 Threshold Mean for Different VthrComp (mod_1)

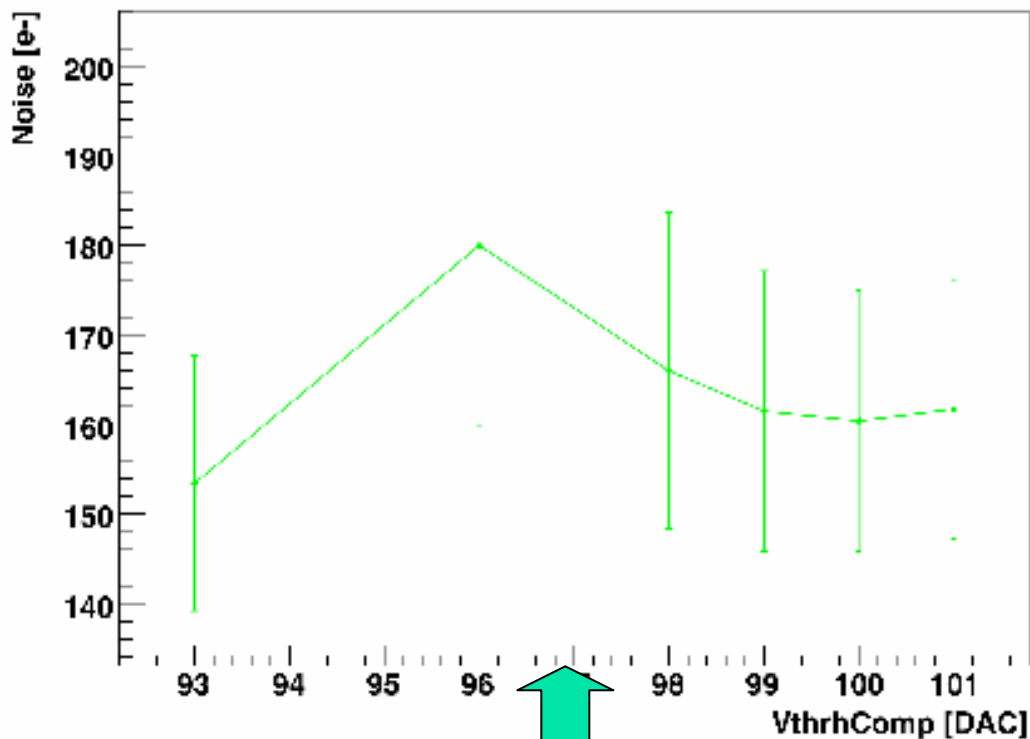


Threshold values (DAC units) for the various VthrComp values (ROC 4)

- Threshold values for the various VthrComp values
- Increasing VthrComp results in decreased threshold mean values
- Expected
- Error bars show the width of the threshold mean Gaussian

Changes in Noise

ROC 4 Noise for Different VthrComp (mod_1)

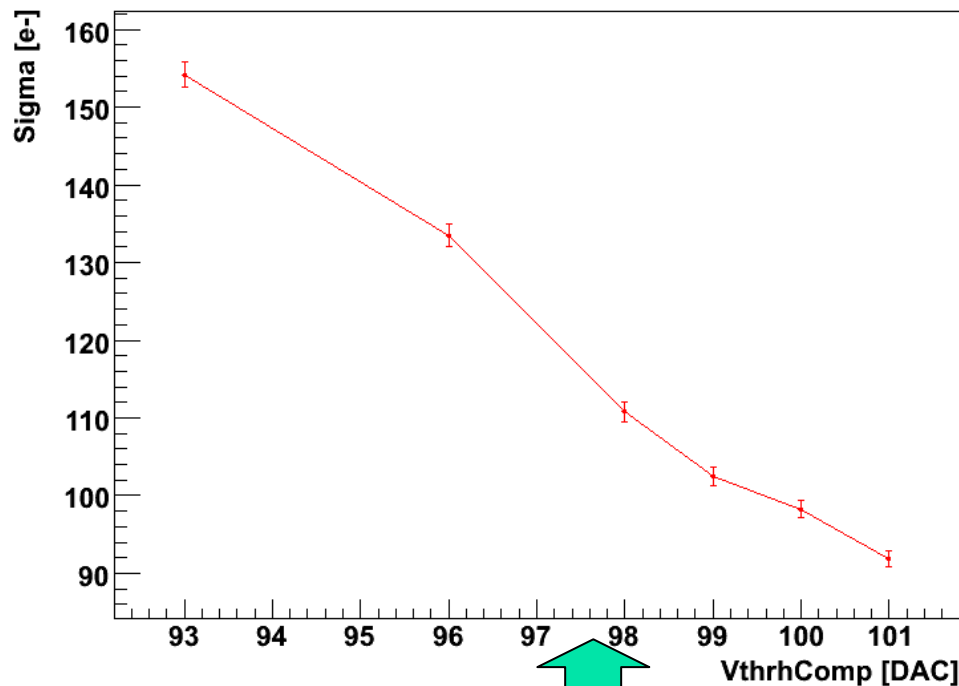


Noise changes as increasing VthrComp value (ROC 4)

- Noise for the various VthrComp values
- Mostly the similar
- Large error bars
 - Width of the threshold sigma Gaussian

Sigma Value for Threshold

ROC 4 Sigma Value of the Threshold (mod_1)



Changes in the width of the threshold mean Gaussian with increasing VthrComp (ROC 4)

- Sigma values for the varying VthrComp values
- Expected, increasing VthrComp would "untrim"
- The width of the threshold Gaussian is narrowing



What's Happening Now...

- Due to strange behavior in threshold sigma:
 - Trim modules at the each $V_{thrComp}$ value
 - Rerun the SCurve test
 - Compare the threshold and sigma values