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Analysis of Lt Data with ARCS macro

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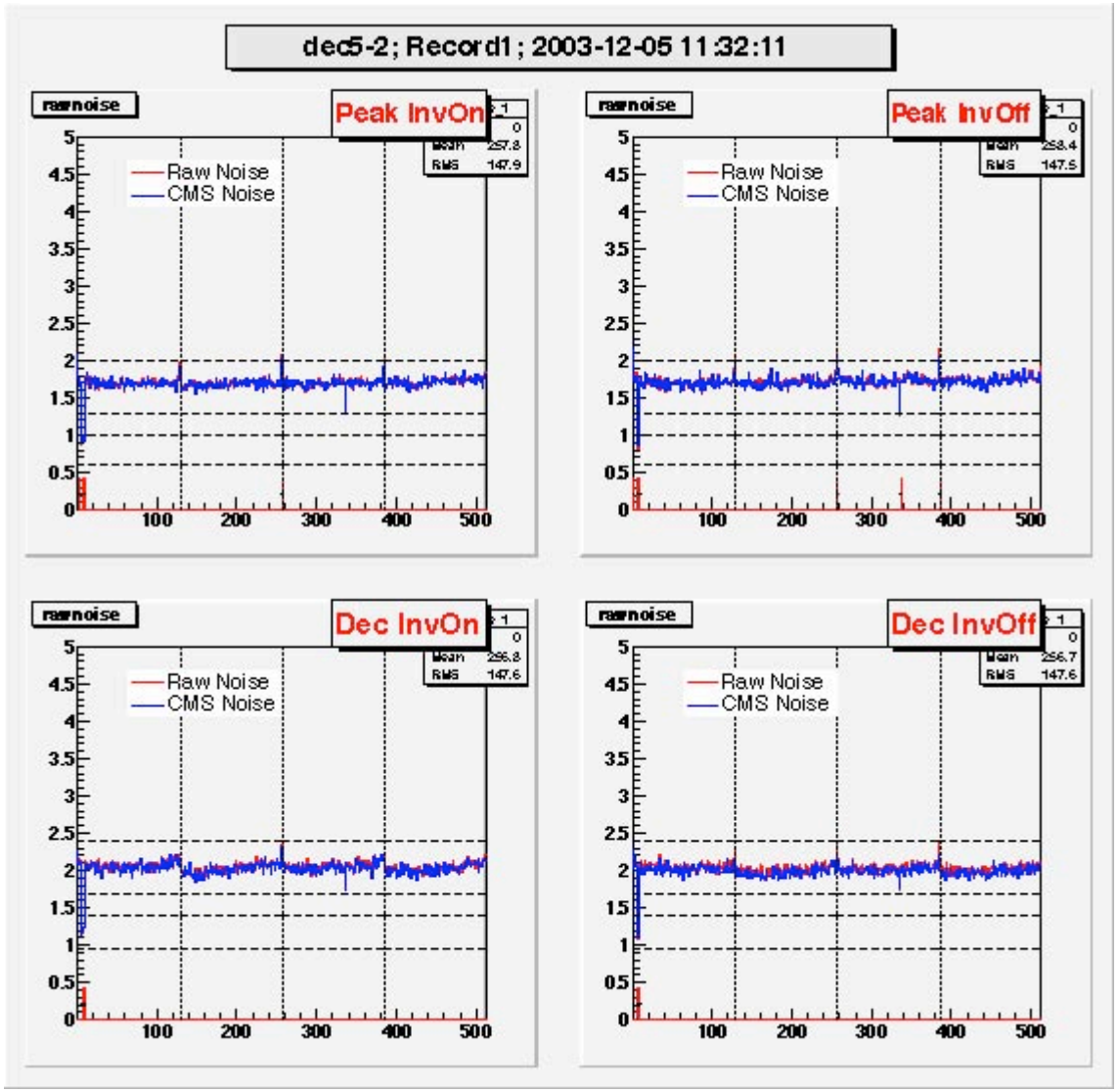
Lt Compatibility

- **Since version 1.15**
  - **Compatible directory structure with one mode per directory**
  - **Histograms renamed to match ARCS**
- **Since version 1.20**
  - **compatible directory structure with all 4 modes in one directory**
- **The ARCS macro can be run with minimal changes**

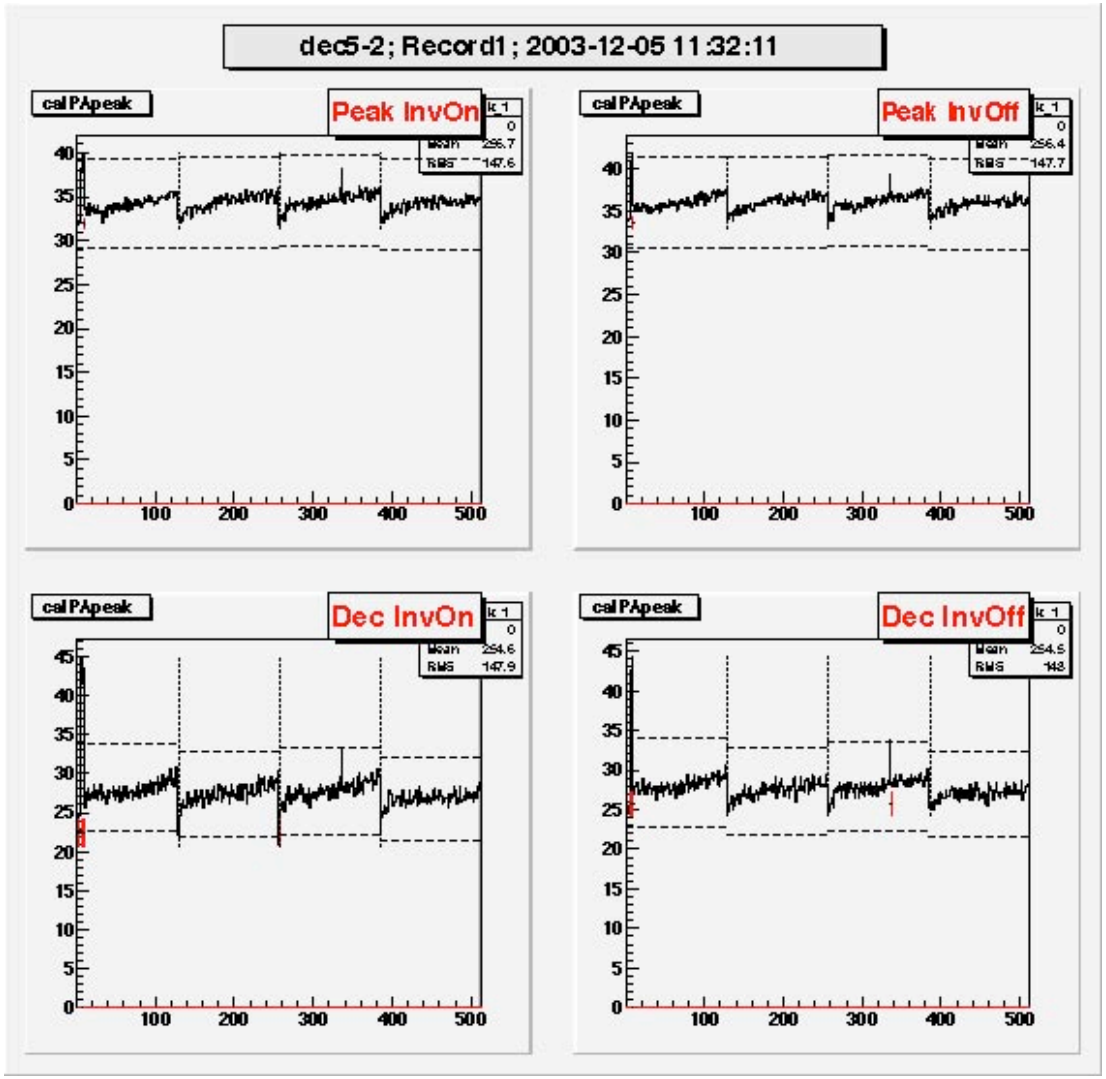
Lt_macro

- Lt_macro : ARCS macro with modifications
- Removed pinhole finding test
  - No LED test for Wien cold box
- Removed unused test and plots
  - Gain scan
- Changes to histogram names
  - Name are compatible but change when opened
    - CMSubtractedNoise -> noise_1
- Changes to header variable names
  - Info about test time, test center, etc.
- http://hep.ucsb.edu/people/gartung/ltdata/plots/lt_macro.cc

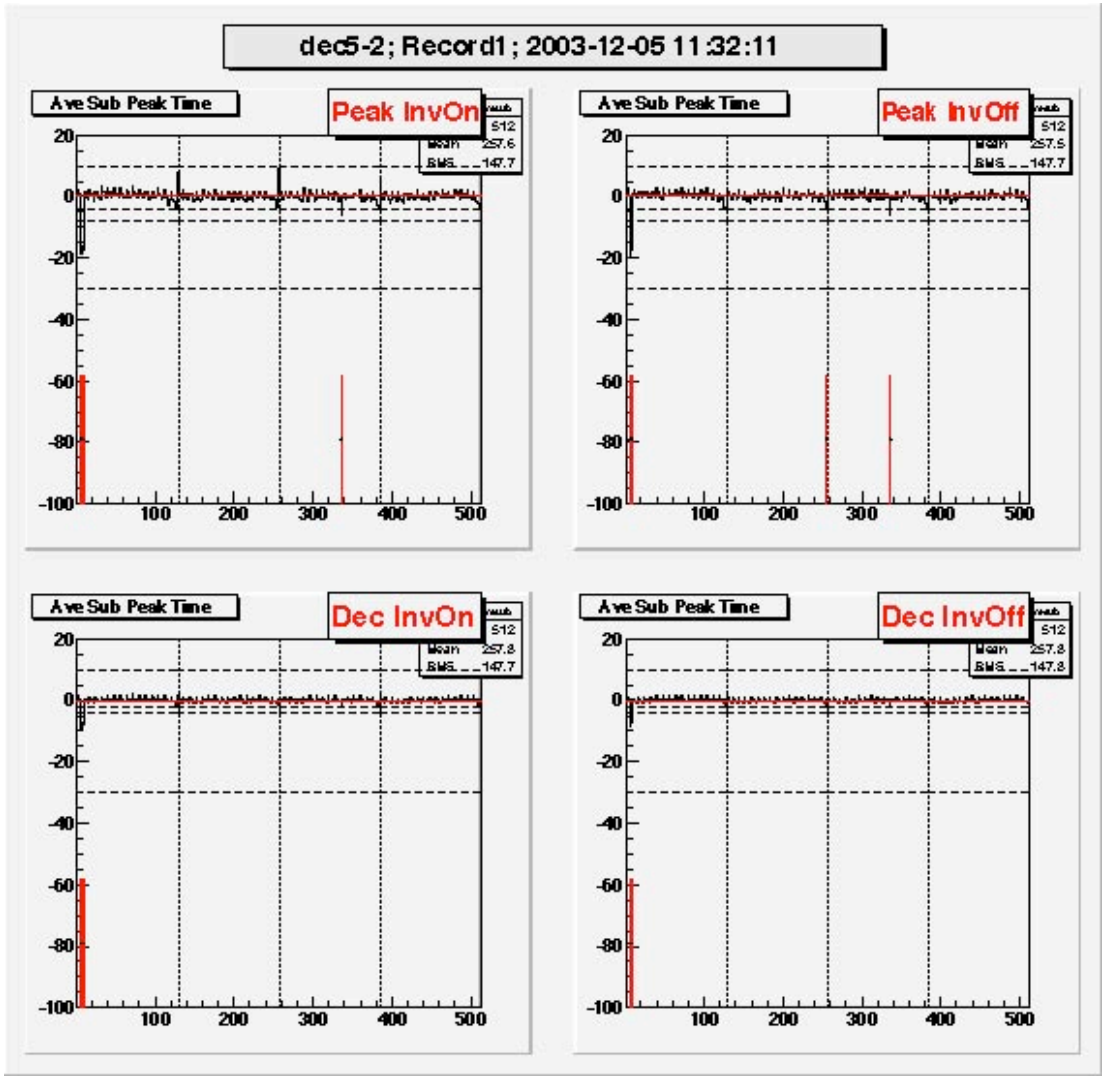
Macro Output : Noise Plots



Macro Output : Pulse Height Plots



Macro Output : Peak Time Plots



Macro Output : Summary

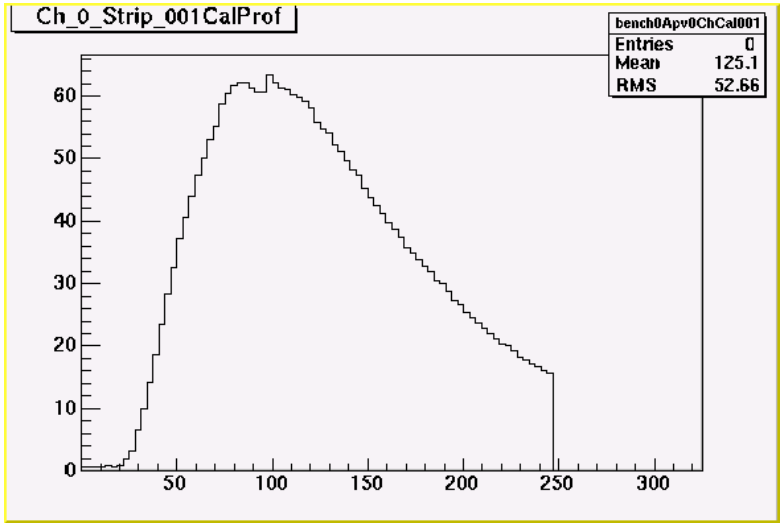

```
------------
-- Chip 0 --
------------

          00000000000000000000000000000000000000000000000000000000000000000000
          00000000011111111112222222222333333333344444444455555555556666 6
          12345678901234567890123456789012345678901234567890123456789012345678901234
Noise Stat   N....TTTT.....................................................
Peaktime Stat.....TTTT.....................................................
PulseH Stat  ........H.....................................................
Ped Stat     .....................................................................
          ------------------------------------------------------------
Summary Stat N    TTTT

          00000000000000000000000000000000001111111111111111111111111111111
          66666777777777788888888889999999999000000000011111111112222222222
          56789012345678901234567890123456789012345678901234567890123456789012345678
Noise Stat   .....................................................................
Peaktime Stat.....................................................................
PulseH Stat  .....................................................................
Ped Stat     .....................................................................
          ------------------------------------------------------------
Summary Stat

Totals:
    Failed pedestal   0
       Failed noise   5
  Failed pulseheight   1
    Failed peaktime   4
```

Macro Output : Bad Channel List

Bad Channel Summary for module dec5-2; Record 1
configFile: TOB.dat
Date: 2003-12-05 11:32:11
TestCenter: Unknown
Version: version_1
Operator: default

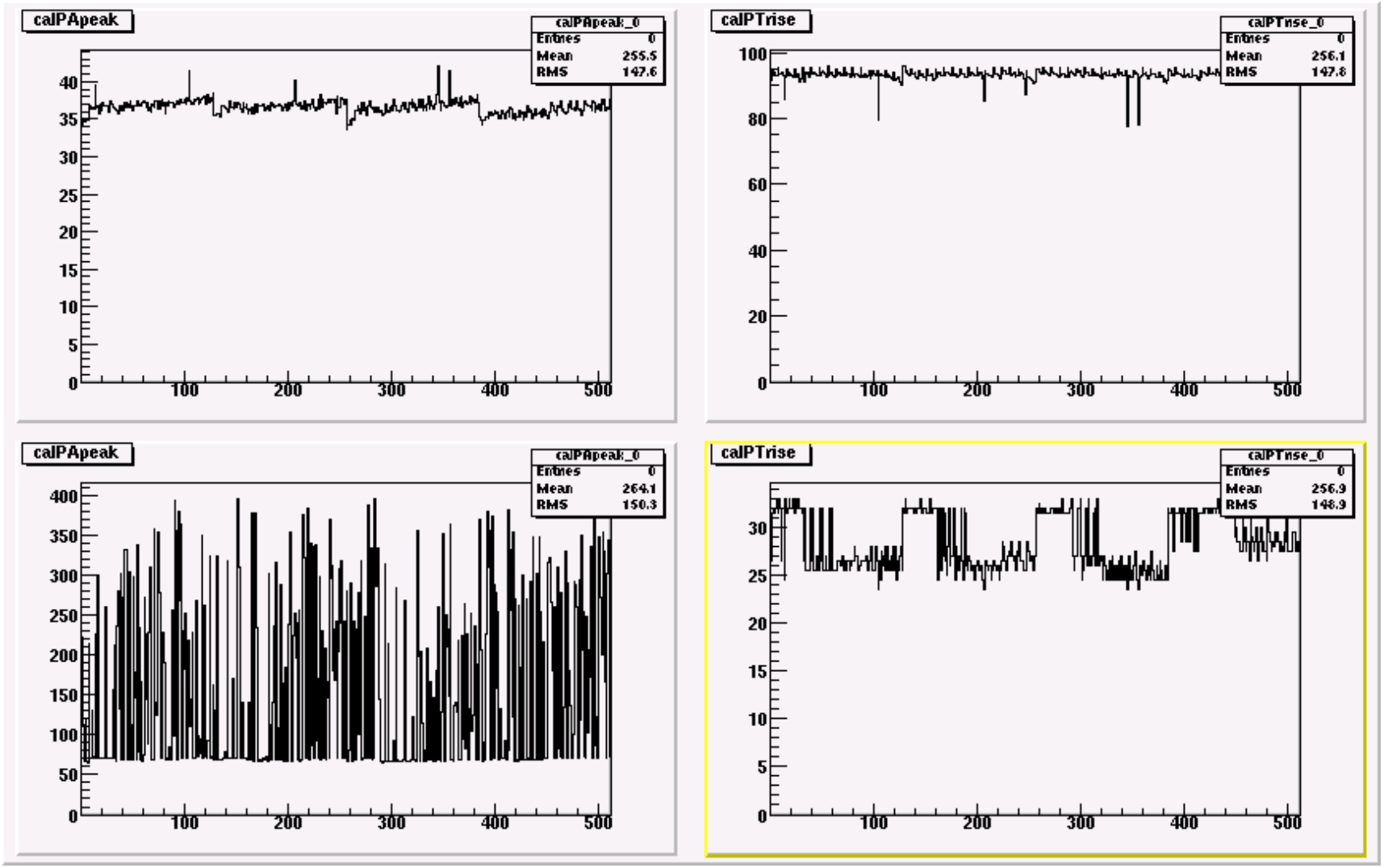
Chan#	Peak Off	Peak On	Dec Off	Dec On
1	NOIS	NOIS	????	
6	TSO+	TSO+	TSO+	TSO+
7	TSO+	TSO+	TSO+	TSO+
8	TSO+	TSO+	TSO+	TSO+
9	TSO+	TSO+	TSO+	TSO+
255	OSO-			
257	NOIS	NOIS	????	
336	OSO+	OSO-	????	
385	NOIS			

Rise Time Calculation

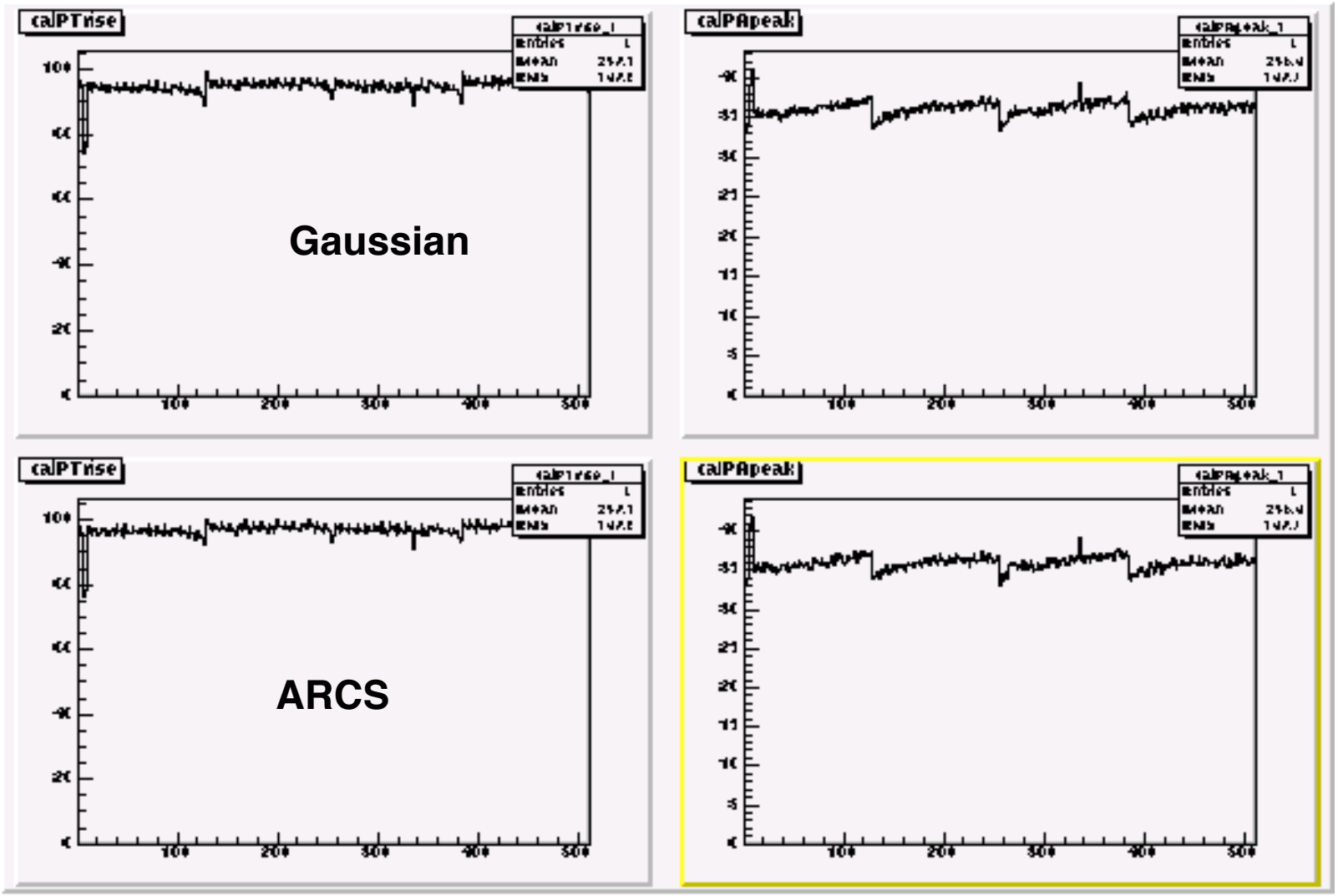


- Center of max bin (v1.20)
  - Max bin not always at peak
- Interpolation of max bin nearest neighbors (v1.21)
- Gaussian fit to max bin and 10 nearest neighbors
- ARCS like fit
  - Deconvolution mode : gaussian
  - Peak mode : c*X*exp(1-X) where X=(t-offset)/tau
    - Peak time = offset + tau

Gaussian Fit vs. Interpolation



Gaussian vs ARCS Fit



Lt XML : Bad Channel List

<result value=" 1 6 7 8 9 126 127 128 129
257 336 383 384 385" name="BadChanList" />

<result value=" 6 -8 7 -8 8 -8 9 -8"
name="chflagpeakinvon" /

<result value=" 6 -8 7 -8 8 -8 9 -8"
name="chflagpeakinvoff" />

<result value=" 6 -8 7 -8 8 -8 9 -8"
name="chflagdecinvon" />

<result value=" 6 -8 7 -8 8 -8 9 -8"
name="chflagdecinvoff" />

<result value=" 1 32 6 20 7 20 8 20 9
20 126 8 127 8 128 8 129 32 257 32 336
24 383 8 384 8 385 32" name="chflag" />

Conclusions

- Lt_macro will identify opens and noisy channels
- Need to understand discontinuous pulse shape (double peak)
- Gaussian fit fast - ARCS fit more precise
- Lt XML bad channel list and ARCS macro agree when same cuts are used