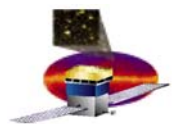


# Muons from Flight SoftWare (= “FSW”)

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- See my WorkShopSix presentation to understand the plots here.
- The point of these slides: FSW does indeed give the same TKR-to-CAL muon results as we had before with LATTE.
- Which means that both FSW (“online”) and the pipeline are picking up the right settings, calibration constants, et cetera.
- However, a small issue on two channels persists (but that’s not FSW’s fault). It is that the online hardware LAC settings got corrected but not the offline value used in  
\$LATCalibRoot/CAL/LAT/tholdci\_16twr\_01\_25\_2006.xml



# The data sample

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For the “muon PSF” page:

9 runs,

six LAT 711 runs (077002497 to 2502)

three LAT 701 runs (077002503 to 2505)

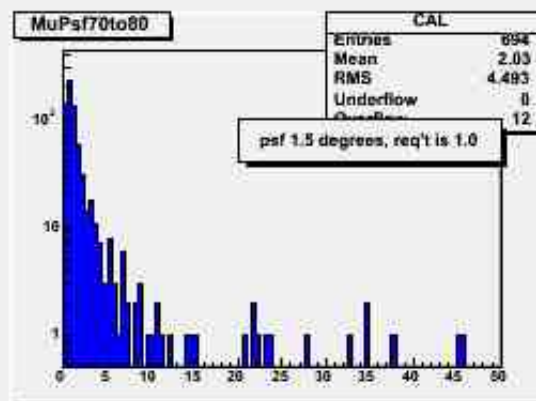
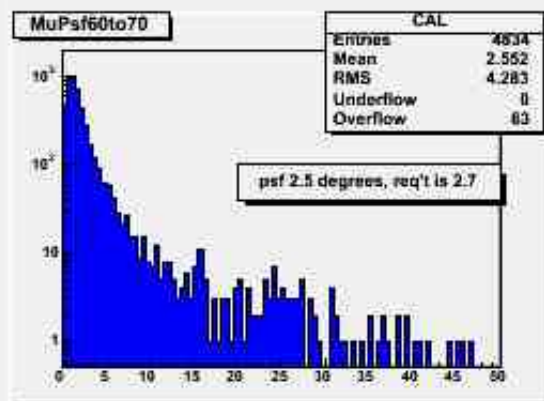
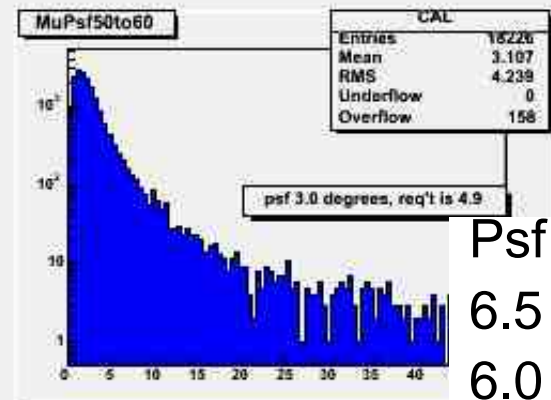
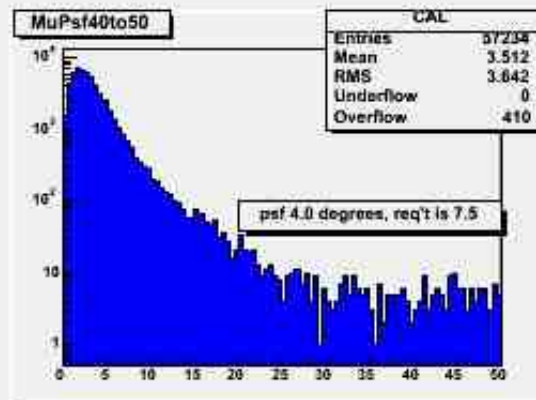
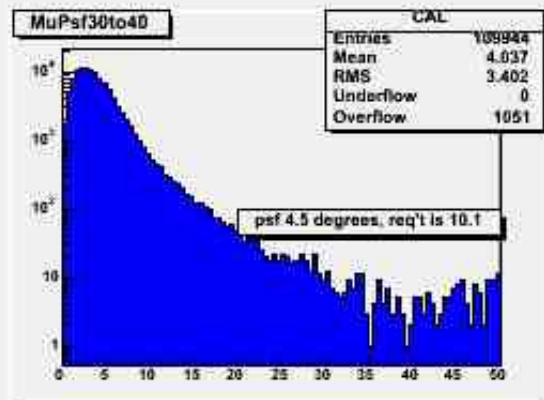
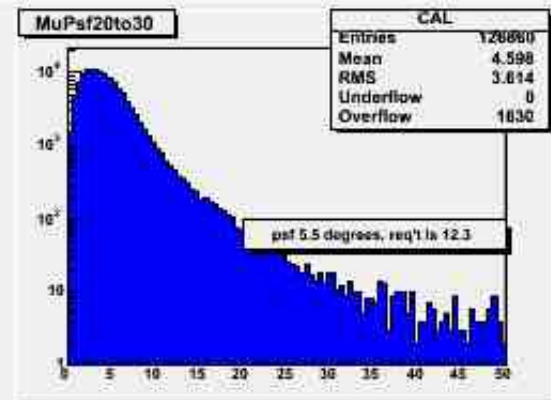
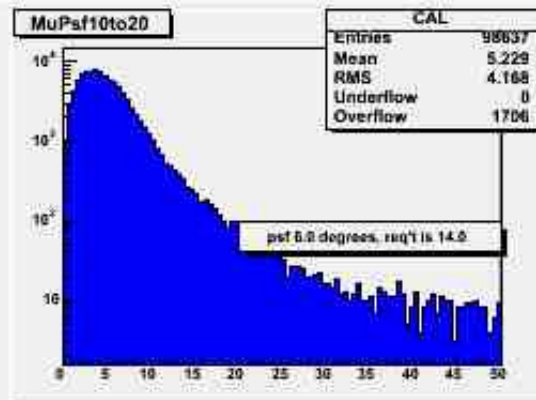
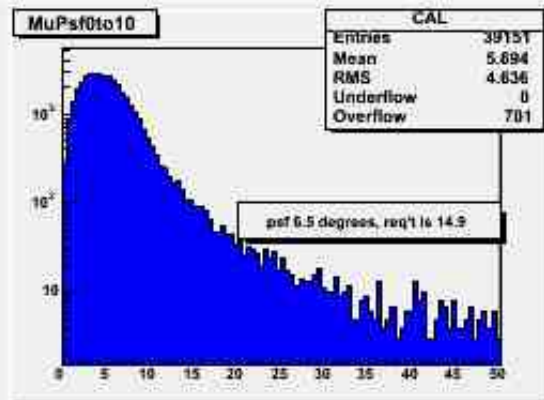
(I realized that I mixed 711 and 701 when I was writing this up. Shouldn't change anything.)

For the “energy per crystal” pages:

seven LAT 701 runs (077002485 to 2491)

(the idea was just to try some different files for the two jobs)

# Nine 10° zenith angle intervals



**req't met:**

Gets marginal  
beyond 70  
degrees off axis.

Psf req

6.5 14.9

6.0 14.0

5.5 12.3

4.5 10.1

4.0 7.5

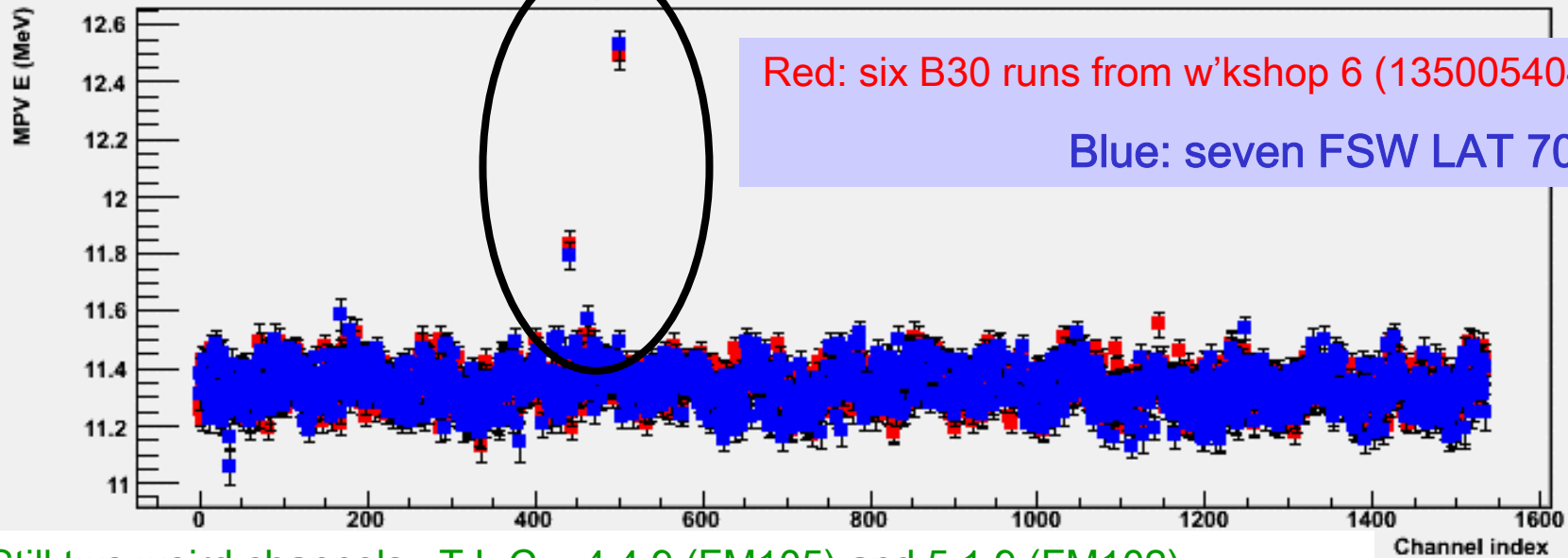
3.0 4.9

2.5 2.7

1.5 1.0

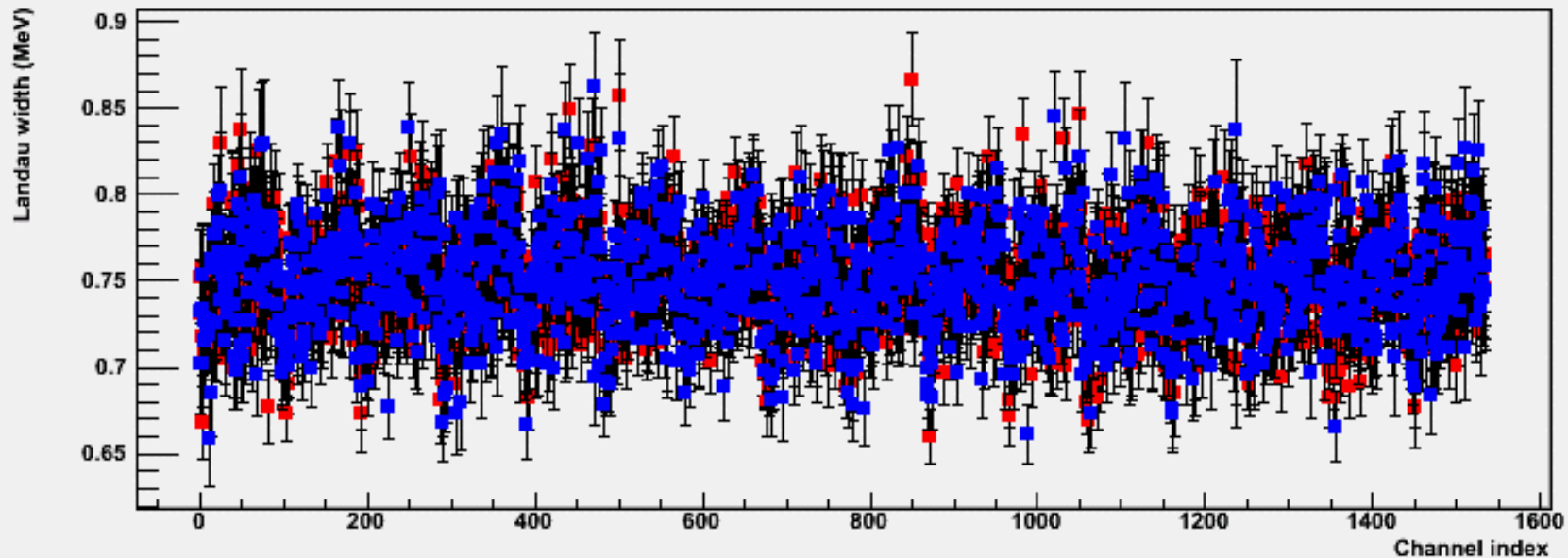
# Energy deposit vs crystal

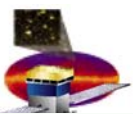
mean energy deposition



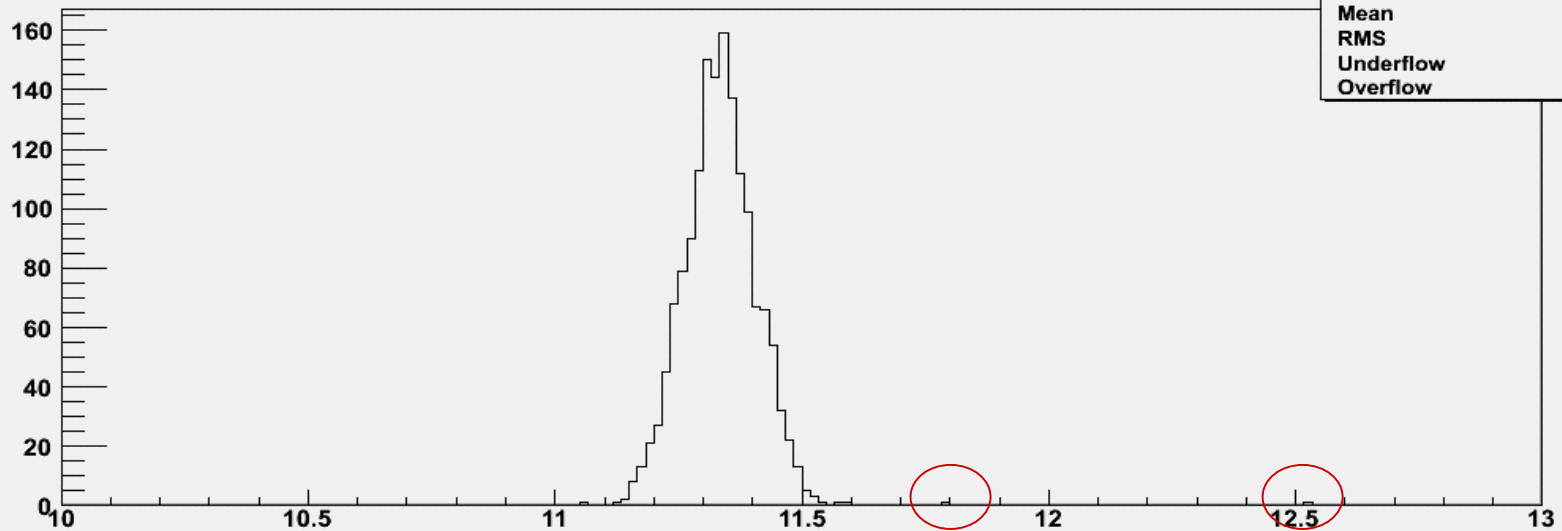
Still two weird channels, T L C = 4 4 9 (FM105) and 5 1 9 (FM102)

Width of Landau

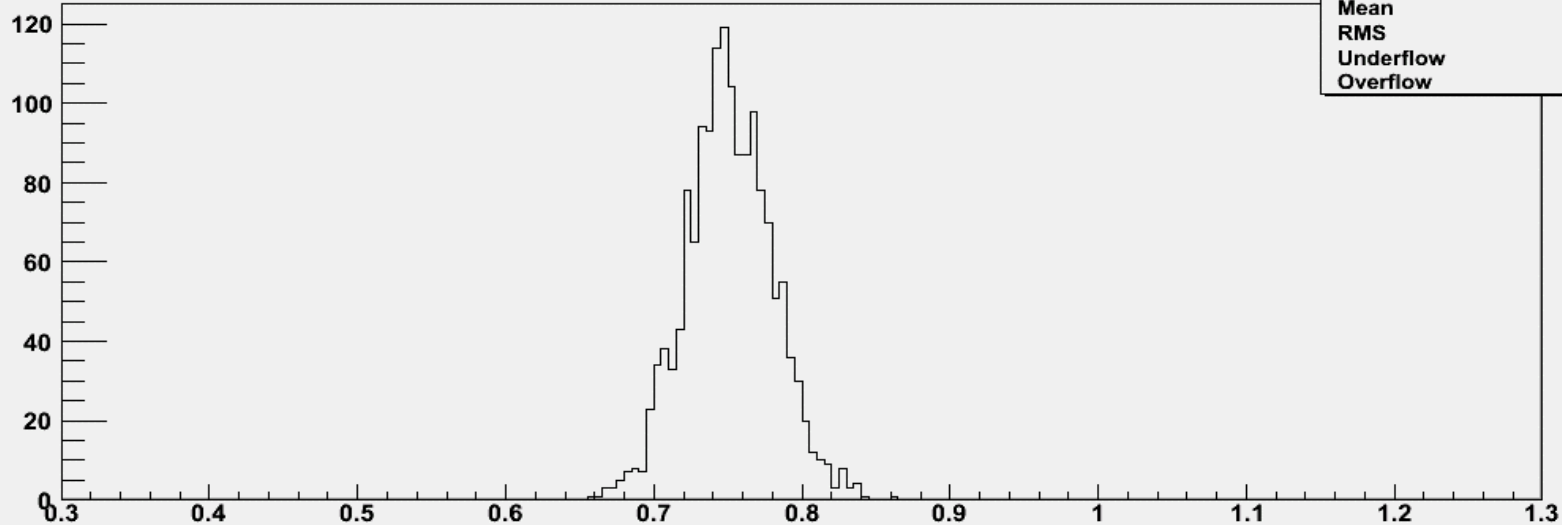


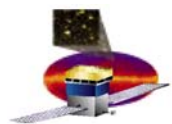


# Energy deposit histograms

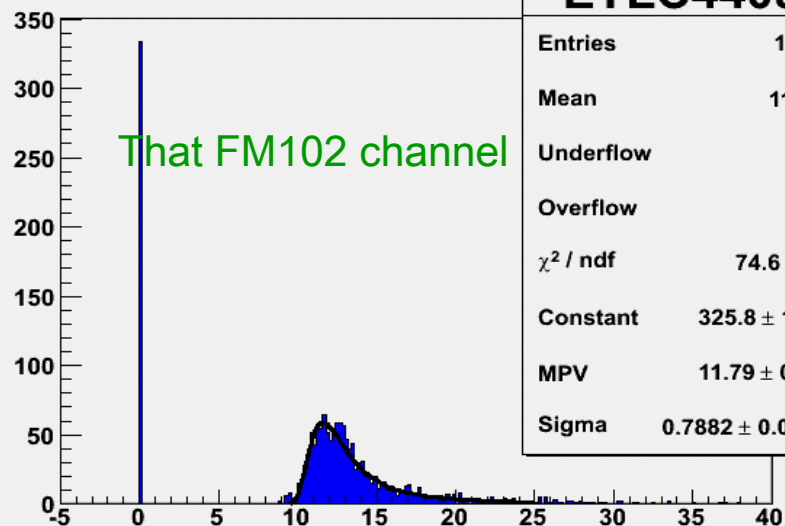
**Energy Landau MPV**

FSW gives same result as January Latte

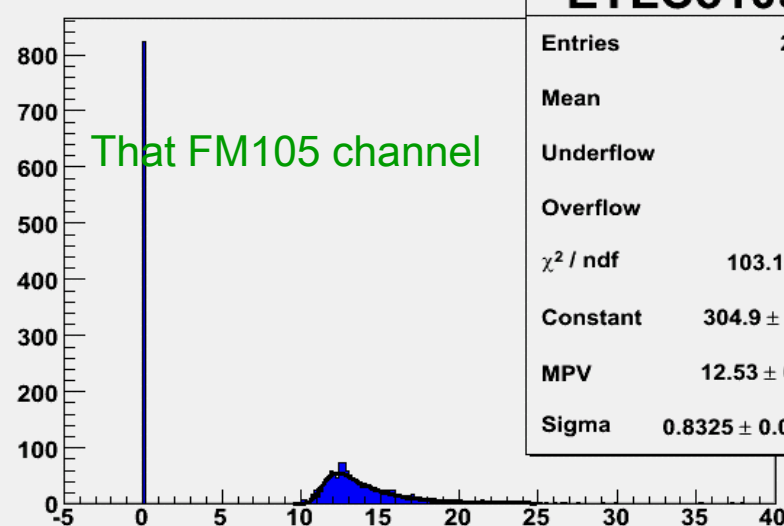
**Energy Landau width**



# Those 2 renegade channels (here, FSW)

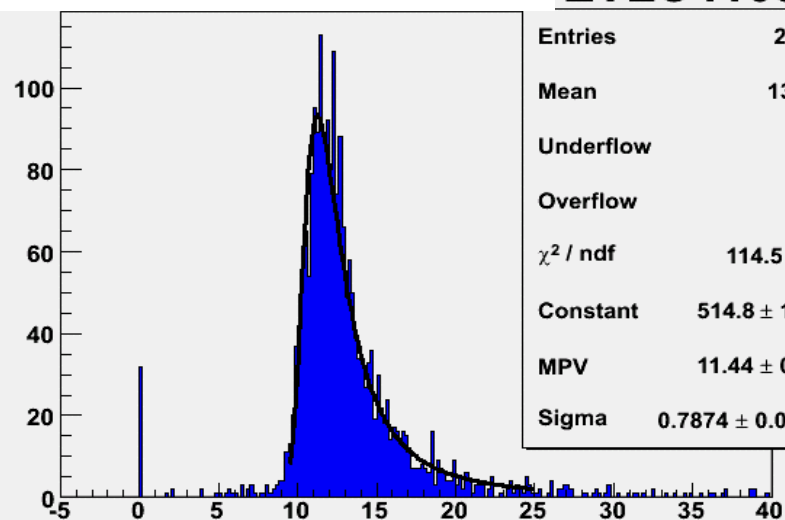
**ETLC4409****ETLC4409**

Entries	1650
Mean	11.17
Underflow	0
Overflow	4
$\chi^2 / \text{ndf}$	74.6 / 69
Constant	$325.8 \pm 13.9$
MPV	$11.79 \pm 0.05$
Sigma	$0.7882 \pm 0.0271$

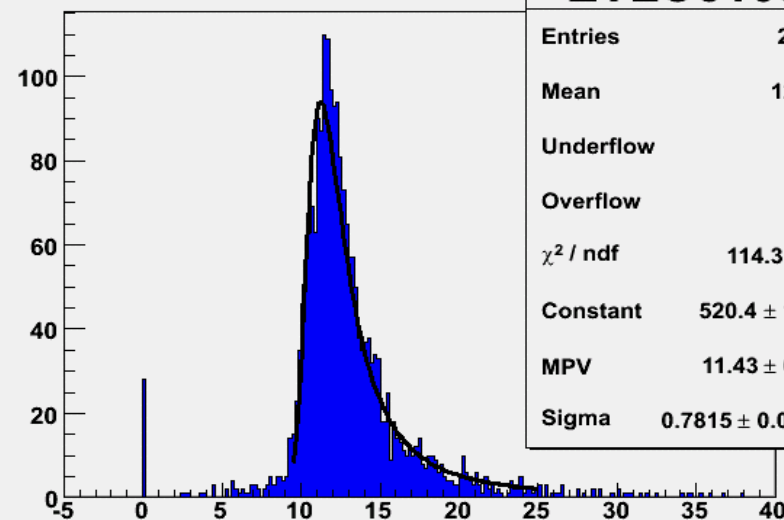
**ETLC5109****ETLC5109**

Entries	2151
Mean	8.98
Underflow	0
Overflow	14
$\chi^2 / \text{ndf}$	103.1 / 72
Constant	$304.9 \pm 15.1$
MPV	$12.53 \pm 0.05$
Sigma	$0.8325 \pm 0.0372$

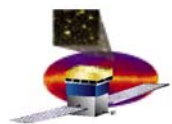
2 normal channels, SVAC tuple

**ETLC4109**

Entries	2132
Mean	13.17
Underflow	0
Overflow	5
$\chi^2 / \text{ndf}$	114.5 / 71
Constant	$514.8 \pm 17.5$
MPV	$11.44 \pm 0.04$
Sigma	$0.7874 \pm 0.0218$

**ETLC6109****ETLC6109**

Entries	2159
Mean	12.97
Underflow	0
Overflow	12
$\chi^2 / \text{ndf}$	114.3 / 74
Constant	$520.4 \pm 17.5$
MPV	$11.43 \pm 0.04$
Sigma	$0.7815 \pm 0.0214$

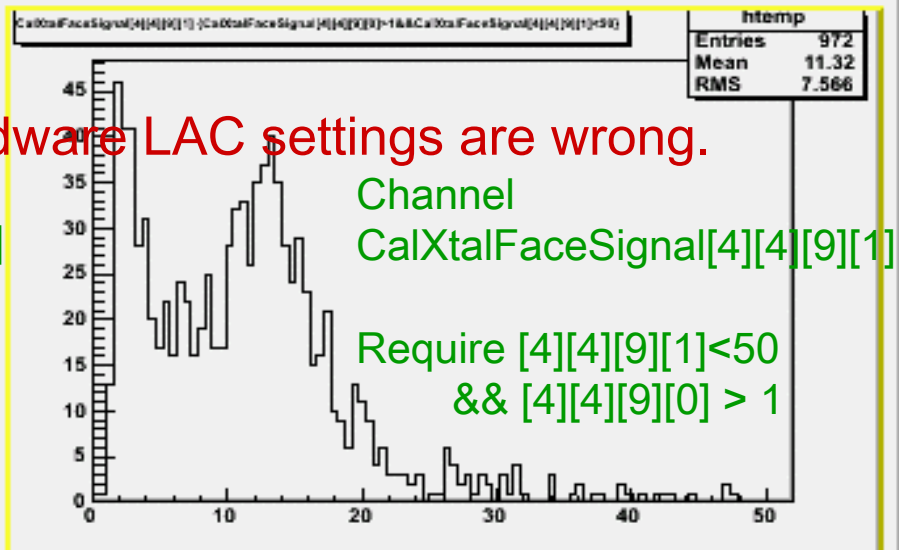
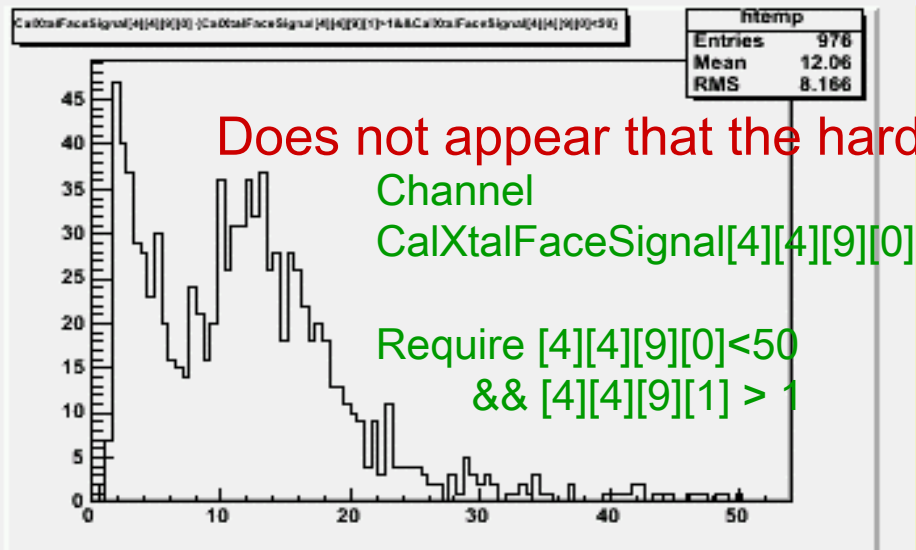
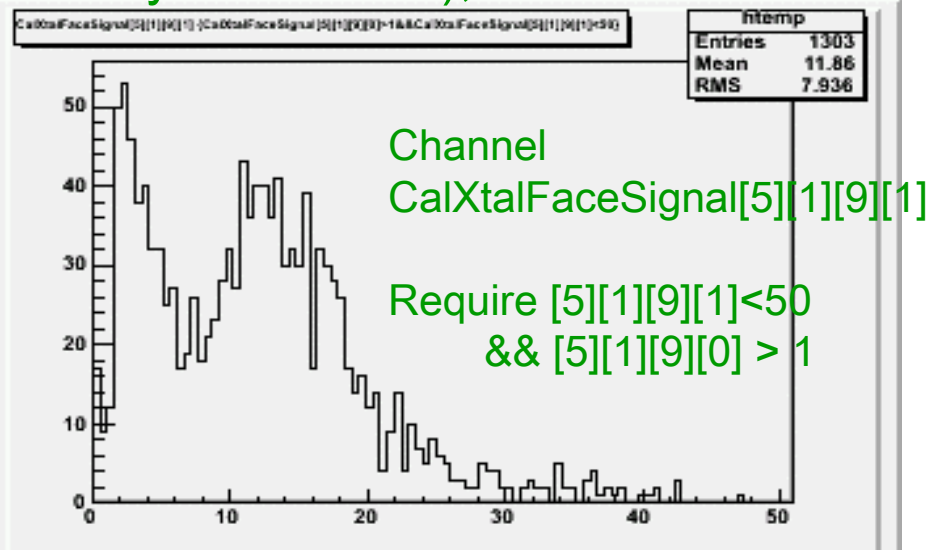
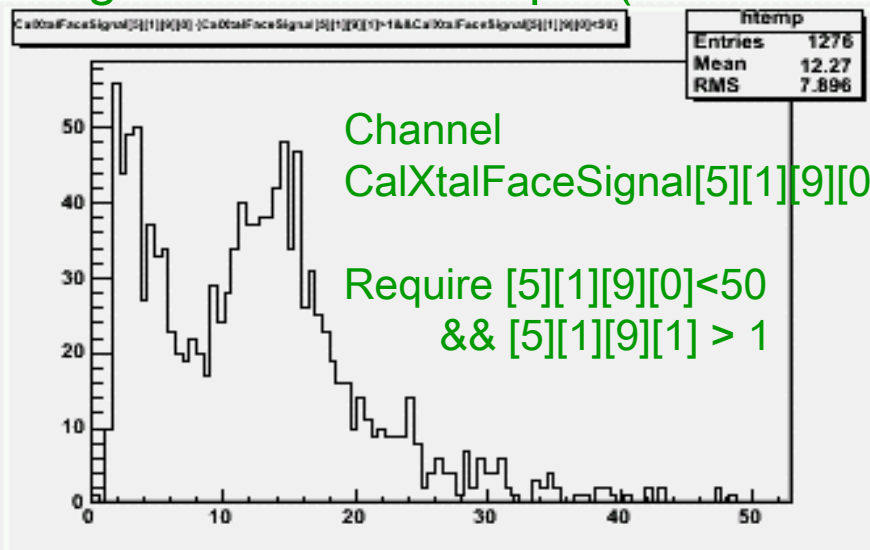


# But Anders said LAC's fixed, and

## Anders is right (as usual)

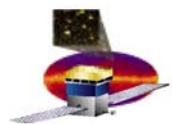
Run 077002486

Straight from the CalTuple (uncontaminated by Dave code), for LAT 701 run.



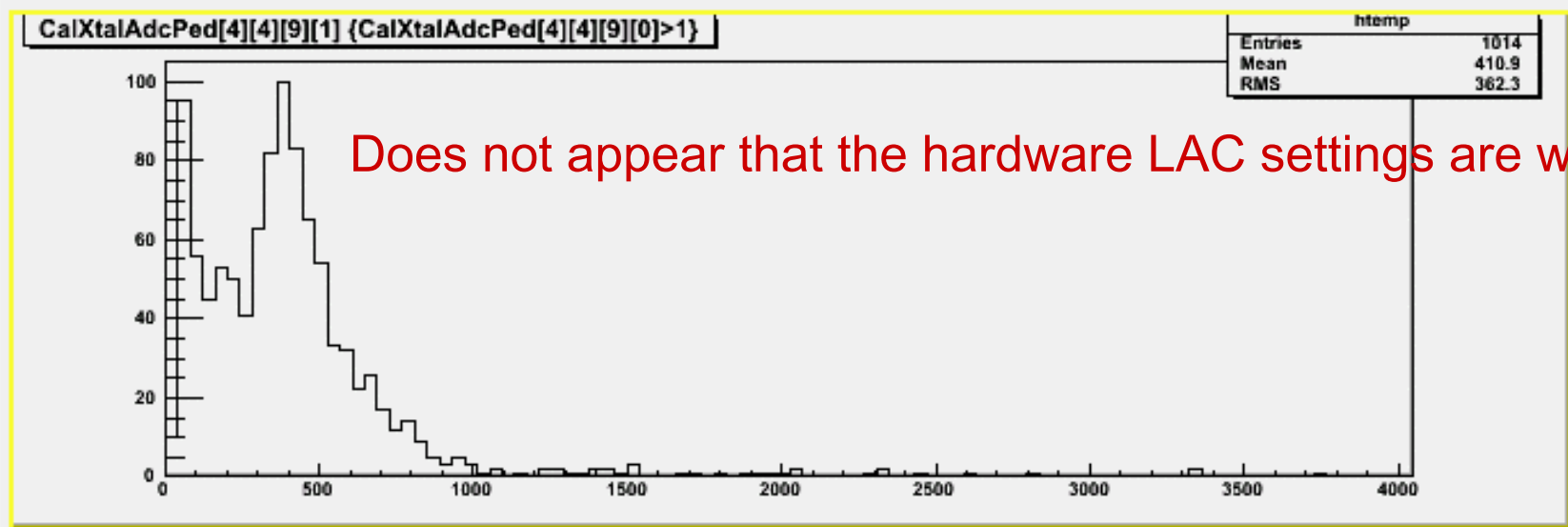
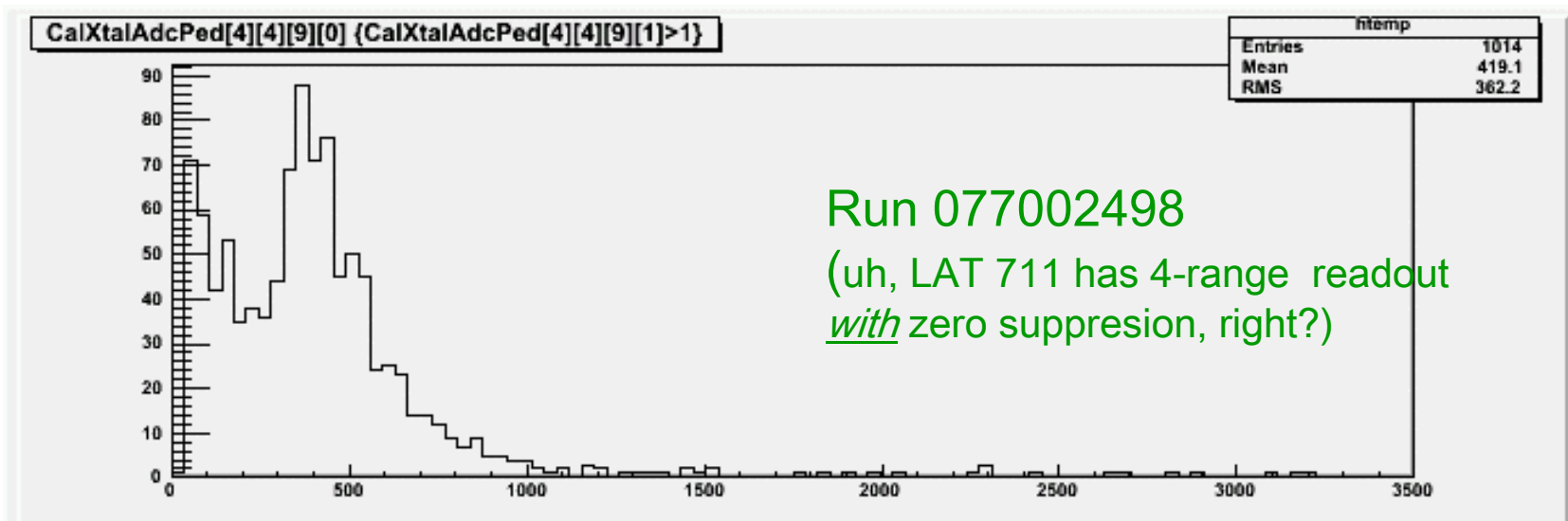
Does not appear that the hardware LAC settings are wrong.



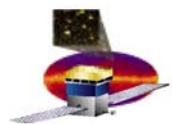


# LAT 711 used to be B30

Straight from the CalTuple (uncontaminated by Dave code), for LAT 711 run.

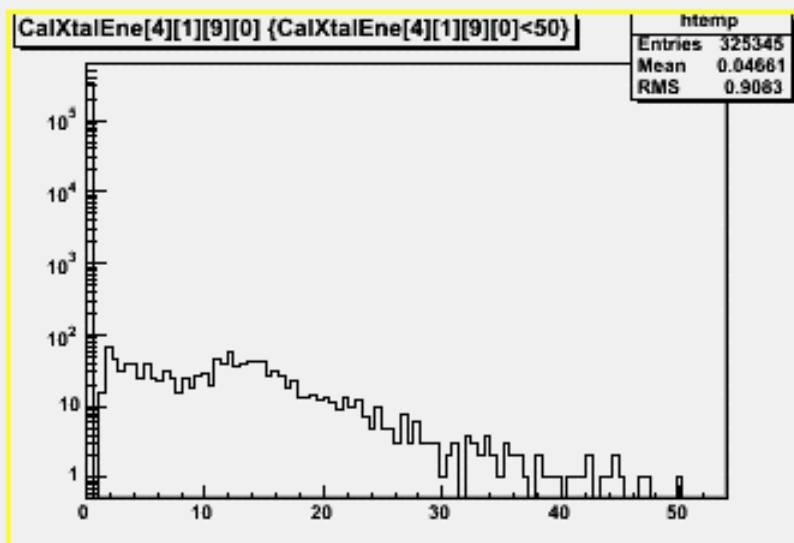
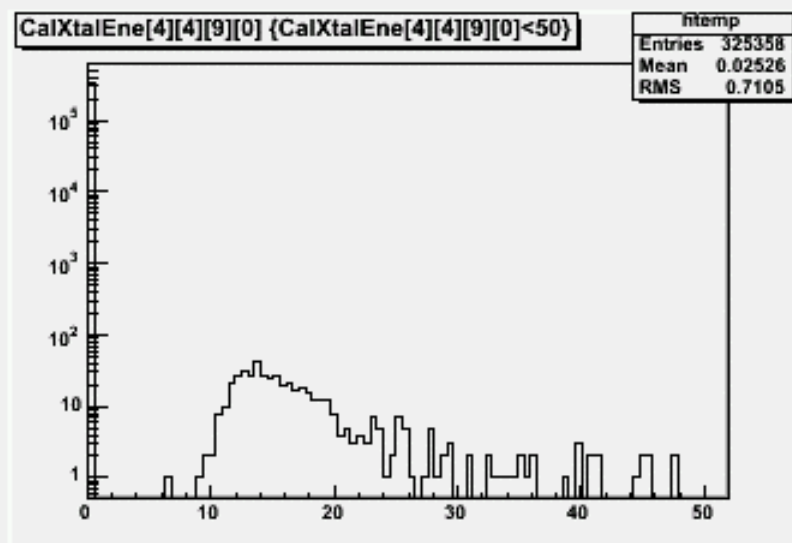
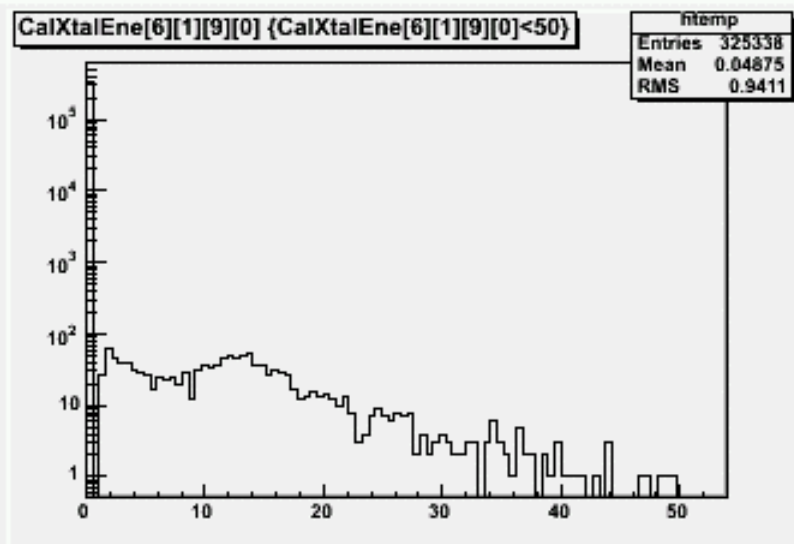
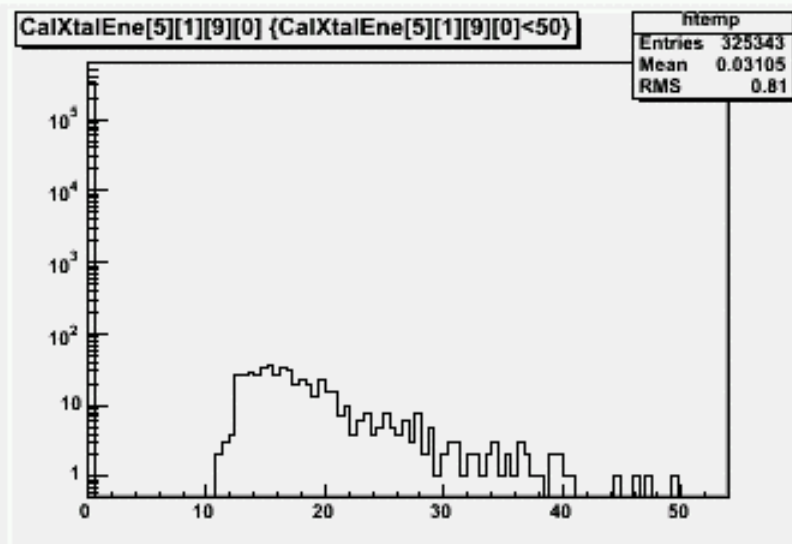


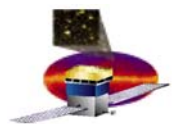




# LAC looks okay in CalTuple, so how about in SVAC Tuple?

YIKES! Looks like CalXtalResponse applies a cut to these two channels.

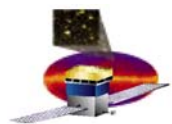




## And the answer is...

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- The online LAC setting for these two channels did indeed get fixed – XtalRecTool.cxx shows that the single face values stored in the CalTuple get calculated first.
- But to calculate the crystal energy using both faces, a cut on the offline LAC value is applied a little farther on in the code, and the result is stored in the SVAC tuple.
- You can look at \$LATCalibRoot/CAL/LAT/tholdci\_16twr\_01\_25\_2006.xml where LACDAC is still 127 for the POS end of crystals 4 4 9 and 5 1 9.
- The solution is to re-generate tholdci\_16twr using the current online LAC settings.



# Conclusions

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- January LATTE muons look the same as April FSW muons.

# 2 renegade channels (January, looser cuts)

ETLC4109

ETLC4109

Entries	15186
Mean	11.28
Underflow	0
Overflow	84
$\chi^2 / \text{ndf}$	286.9 / 75
Constant	$2860 \pm 40.2$
MPV	$11.38 \pm 0.02$
Sigma	$0.8247 \pm 0.0096$

normal "LAC"

ETLC4409

ETLC4409

Entries	12799
Mean	8.671
Underflow	0
Overflow	62
$\chi^2 / \text{ndf}$	184.1 / 75
Constant	$1802 \pm 31.8$
MPV	$11.8 \pm 0.0$
Sigma	$0.8748 \pm 0.0128$

"LAC" too high  
(FM105)

ETLC5109

ETLC5109

Entries	16434
Mean	7.442
Underflow	0
Overflow	91
$\chi^2 / \text{ndf}$	322.8 / 75
Constant	$1750 \pm 31.4$
MPV	$12.27 \pm 0.02$
Sigma	$0.9536 \pm 0.0148$

"LAC" too high  
(FM102)

ETLC6109

ETLC6109

Entries	16201
Mean	11.28
Underflow	0
Overflow	91
$\chi^2 / \text{ndf}$	295.1 / 75
Constant	$3050 \pm 42.0$
MPV	$11.39 \pm 0.02$
Sigma	$0.8193 \pm 0.0093$

normal "LAC"