TPOL Hardware Update

Data to be shown in this presentation

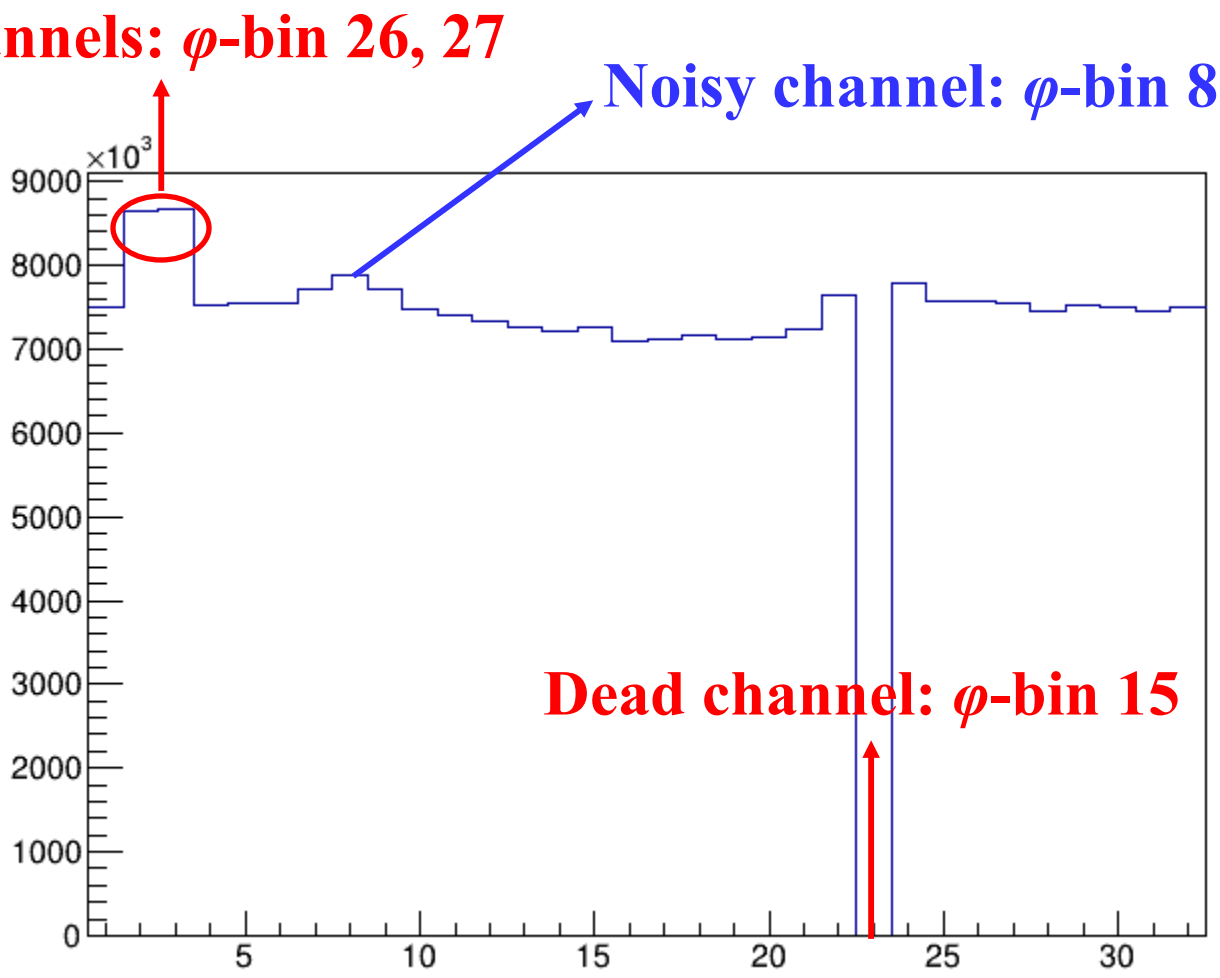
- Hot checkout 2022
- Batch 5-8 2020

Numbering schemes

- TPOL-cable number
- Sector number (from Manufacturer)
- φ-bin number (32 bins from 0^o to 360^o)
- fADC slot, channel

Will include φ-bin number for all channels of interest

Channels of interest



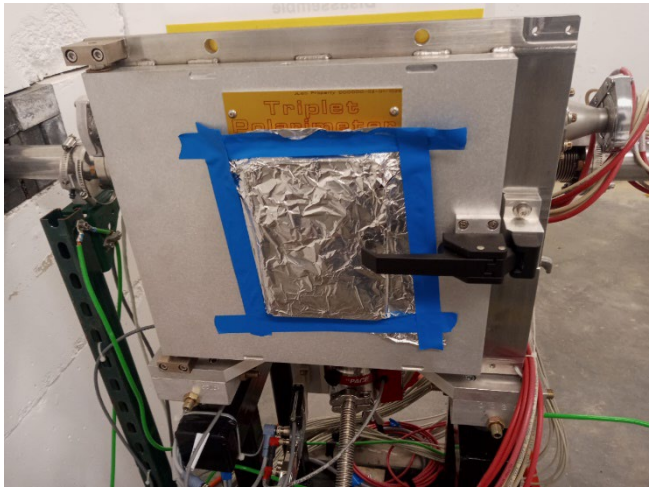
NOTE: In prior analysis of 2020 data,
φ –bins 14-16, and 26-27 were removed

Presentation

- Noisy channel and window repair
- Dead channels
- Hot channel
- Noisy channel
- Other issues

TPOL window cover

Front view



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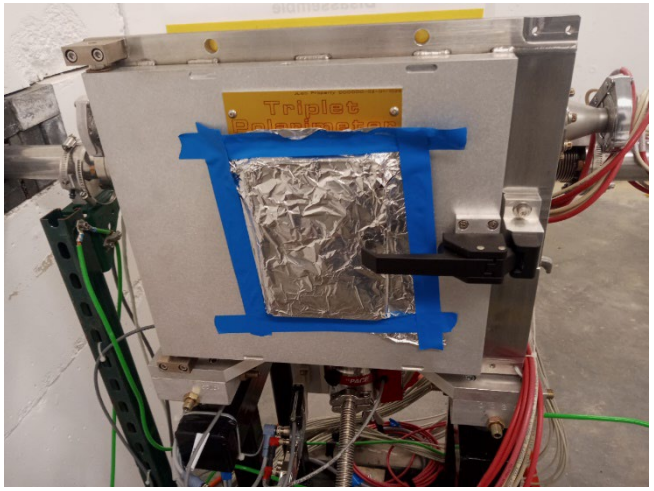
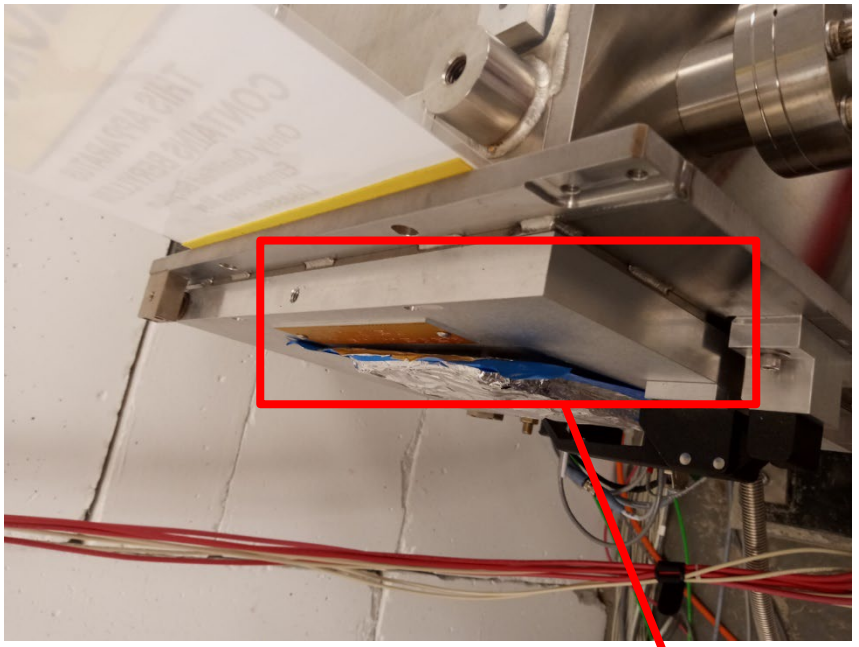


Side view



Tape lifted off surface of vacuum chamber

TPOL window cover

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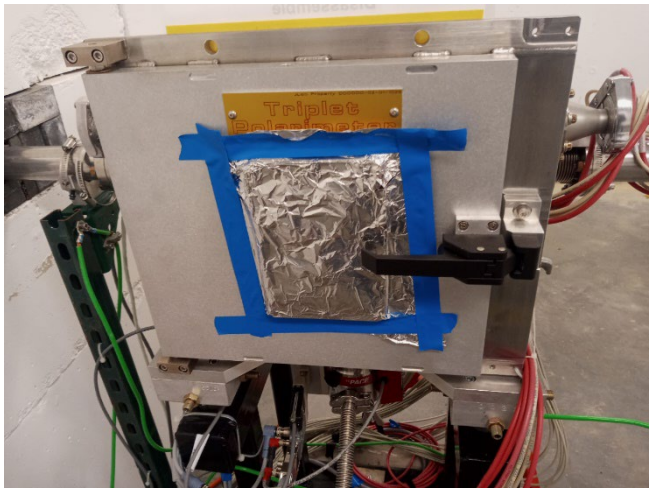

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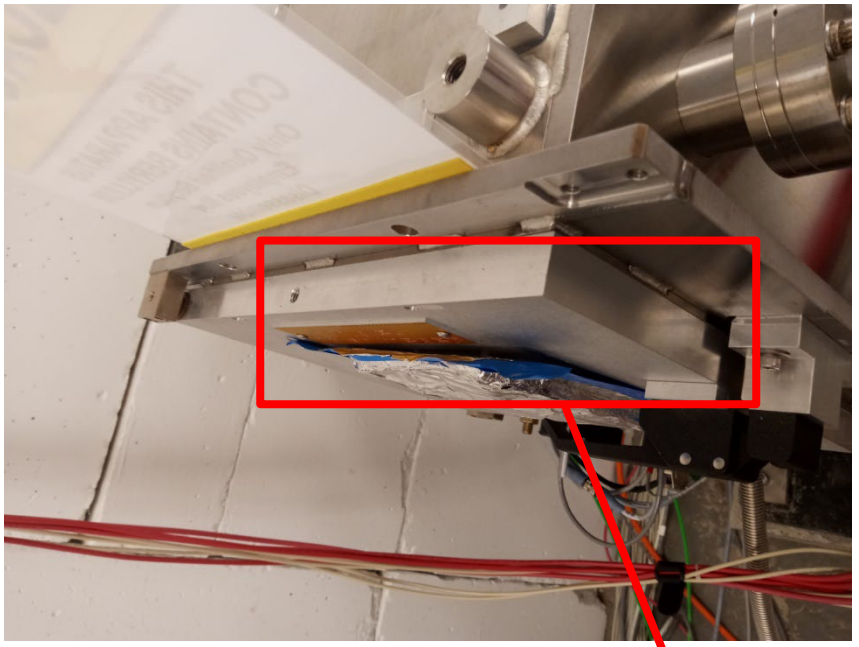


Tape lifted off surface of vacuum chamber

Tear in aluminium

TPOL window cover repaired

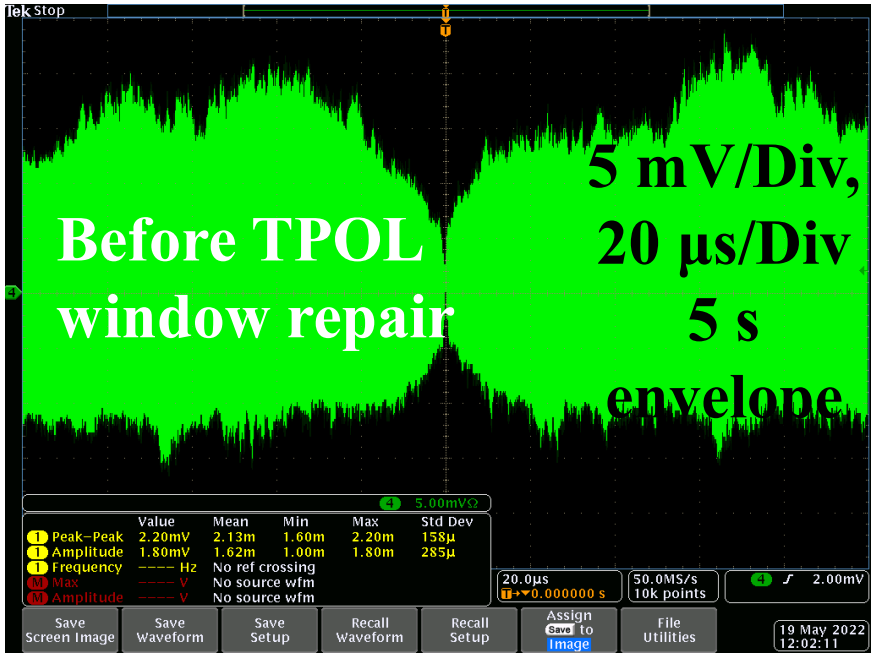
Layer 1

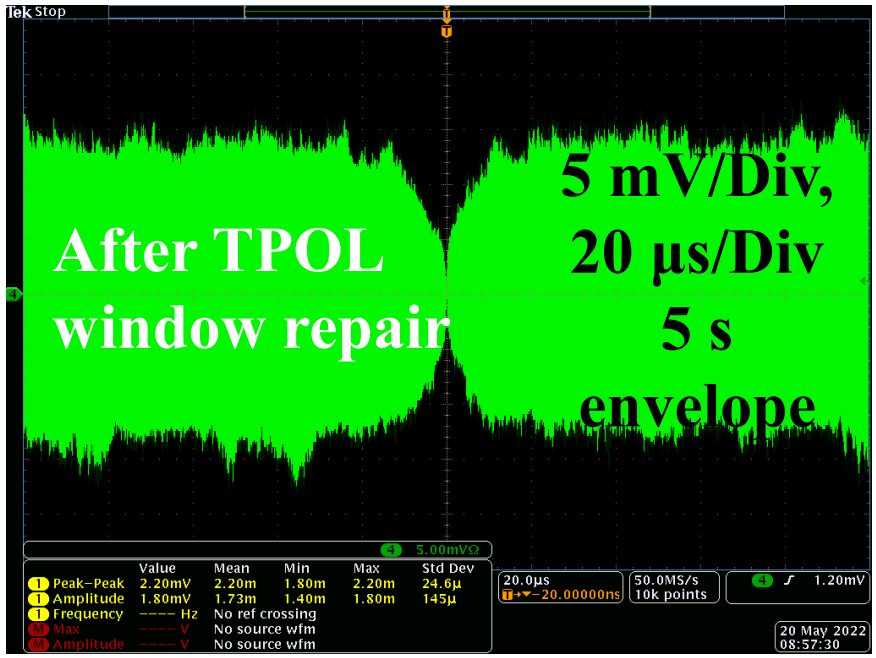
TPOL window cover repaired

Layer 1

Layer 2

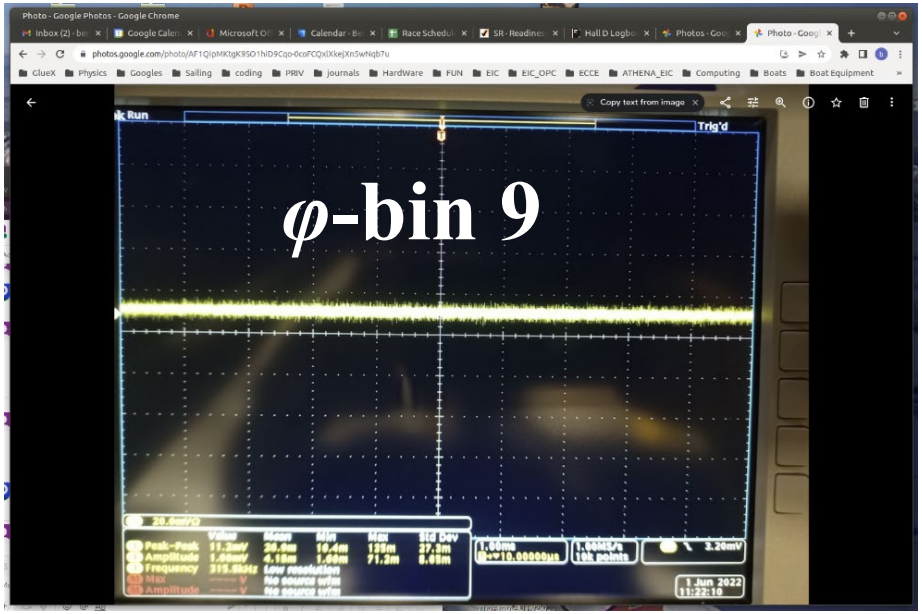
Noisy channel (φ-bin 8)

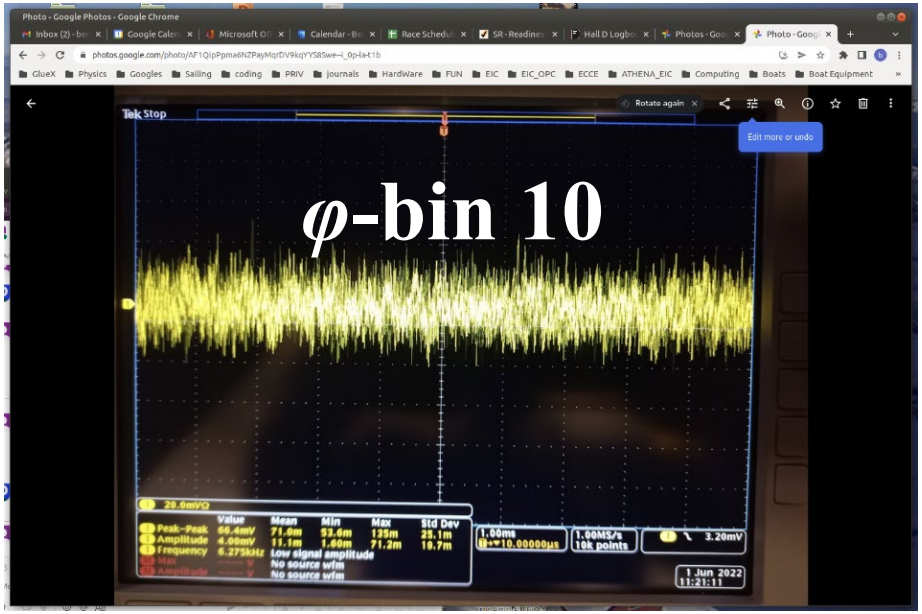




- Window repair fixed some of the noise in the channel, but channel still too noisy ☹

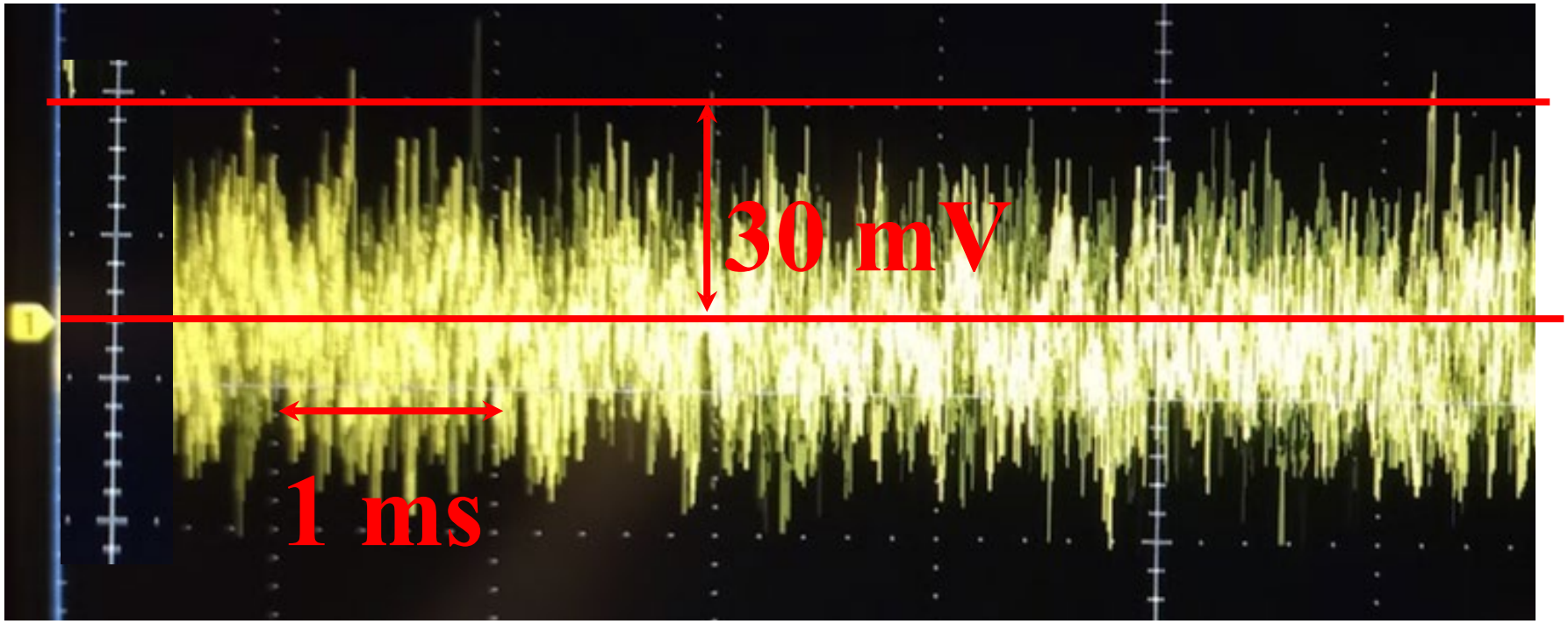
Comparison





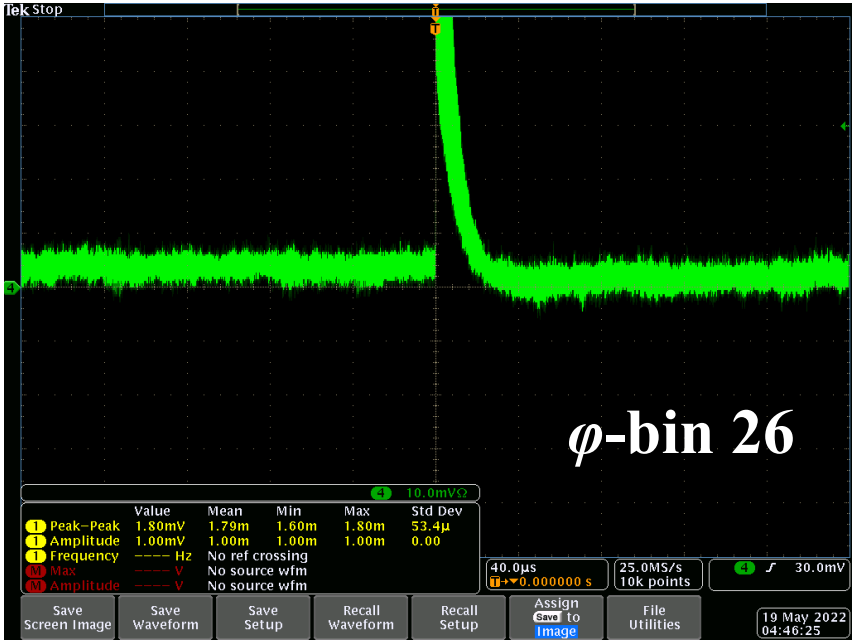
- Several days after I took the o-scope pictures shown on previous slide, Beni took some screen shots
- φ-bin 9 looks normal
- φ-bin 10 looks super noisy ☹

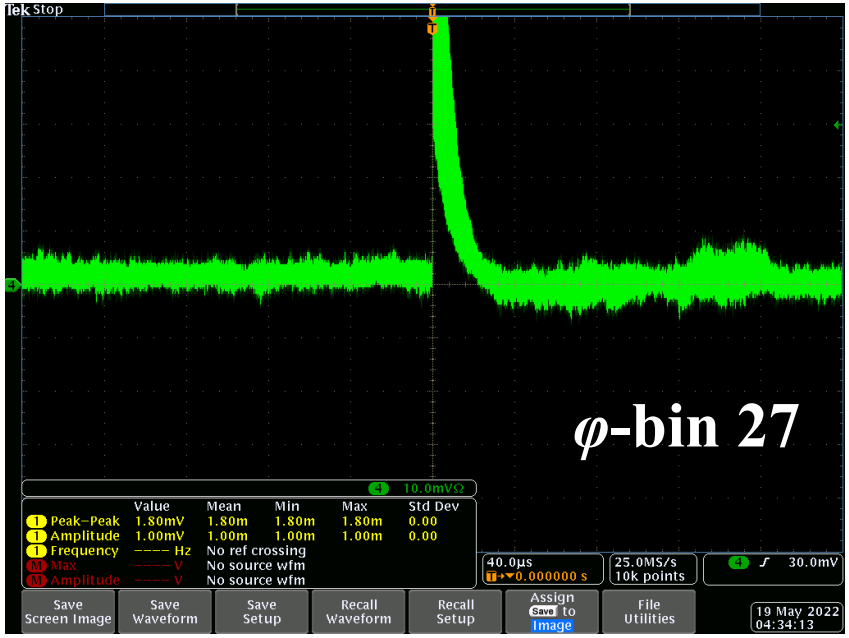
φ-bin 8 close up



- fADC threshold set to 60 channels above baseline
- 60 channels is about 30 mV
- Spikes above threshold at about kHz rate.

Hot channels (o-scope)





- 30 mV trigger
- 10 mV/Div
- 40 µs/Div
- 10 minute envelope

Looks normal

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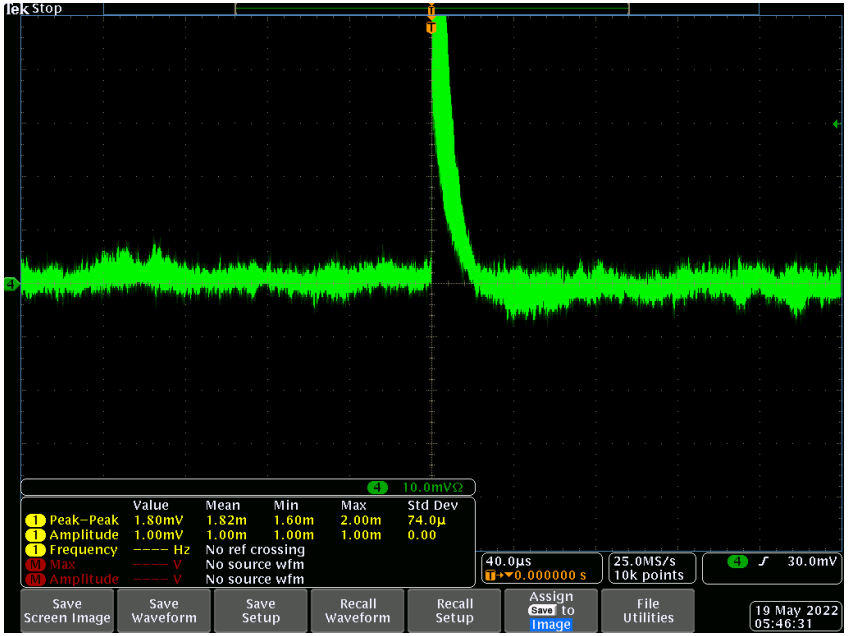

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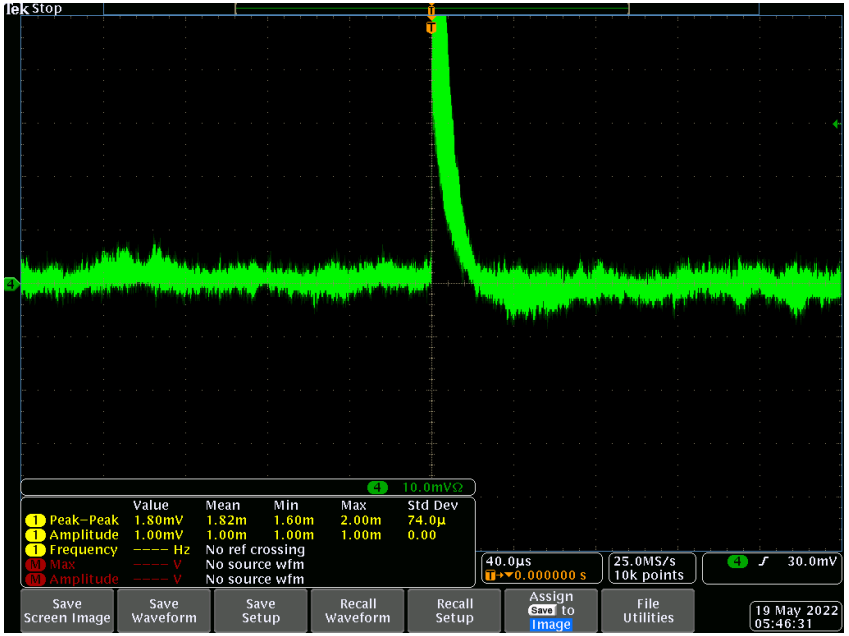

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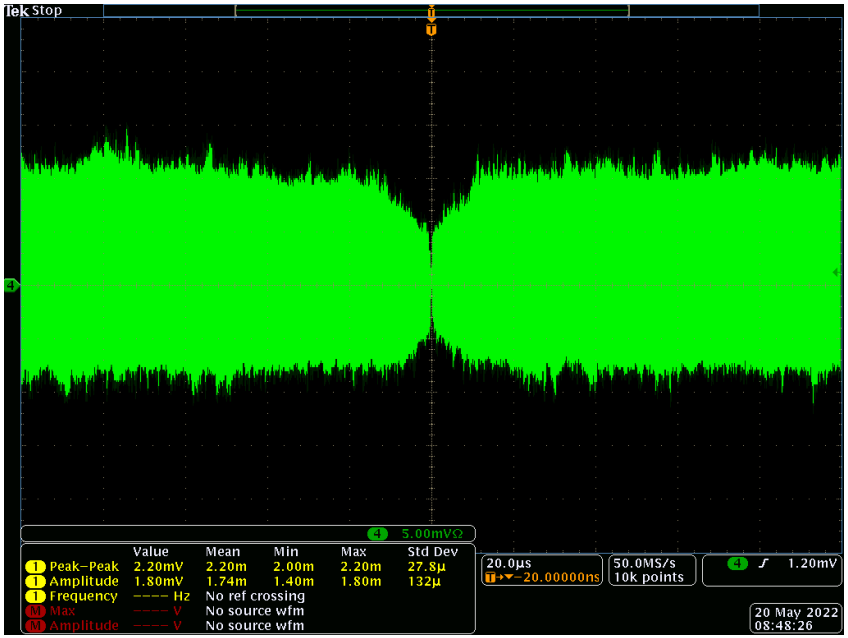

- Low trigger
- 5 mV/Div
- 20 µs/Div
- 5 second envelope

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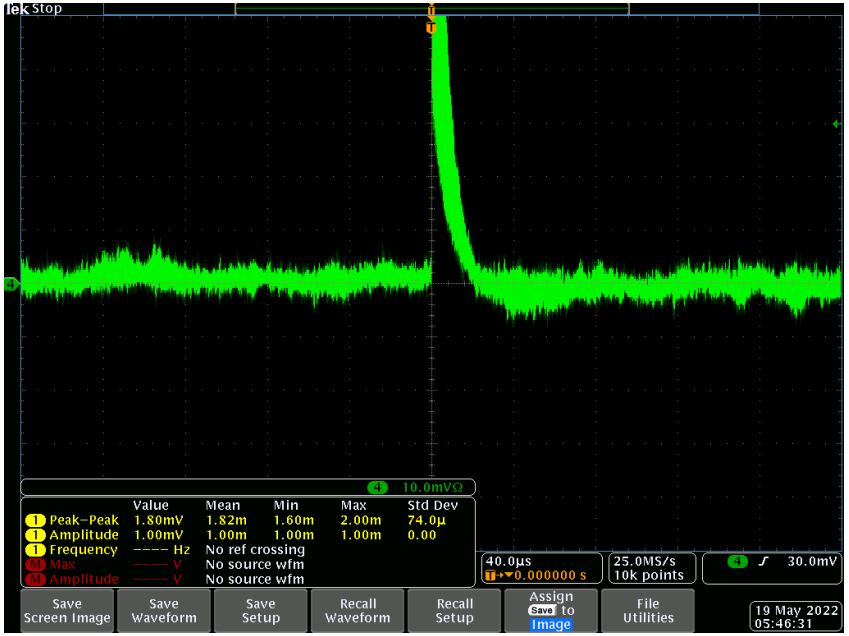

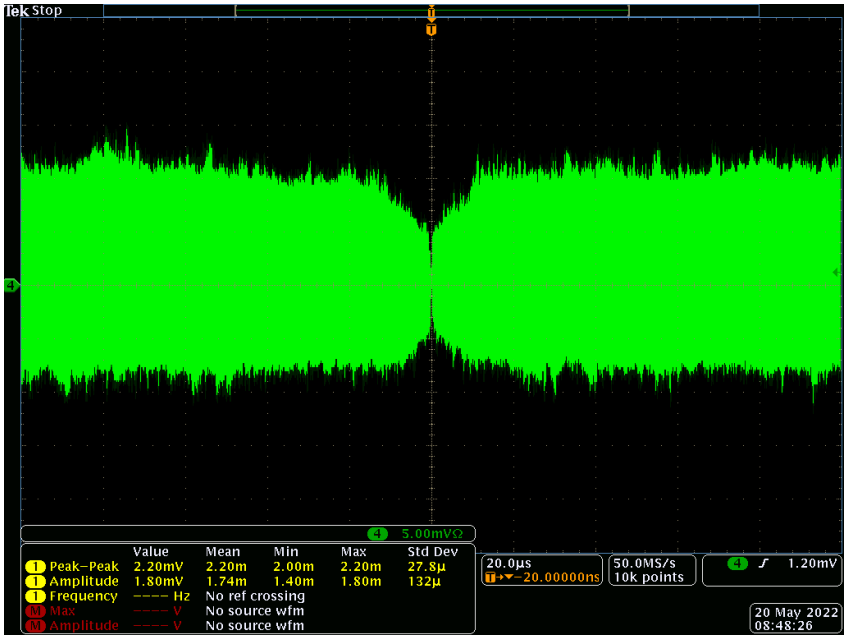

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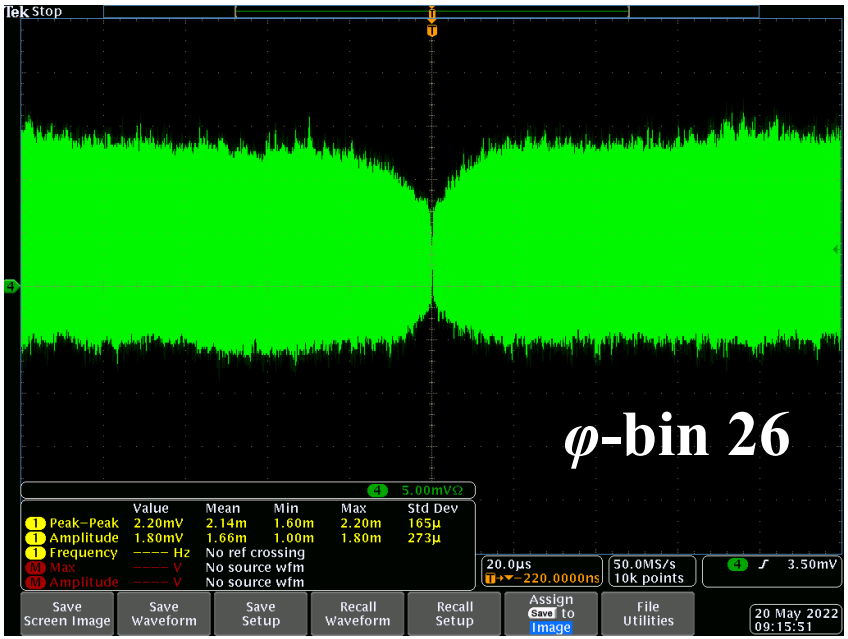
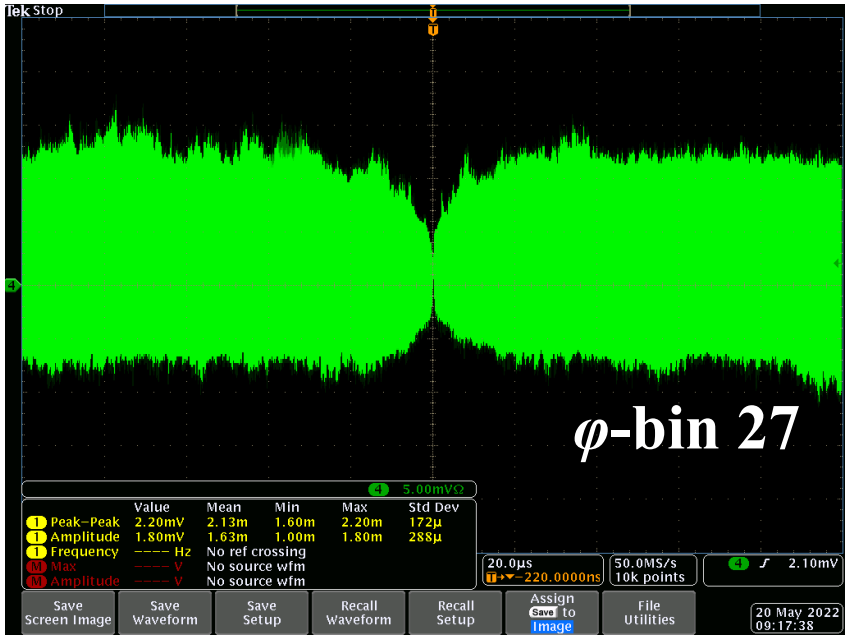
picture from Beni

Hot channels (o-scope)





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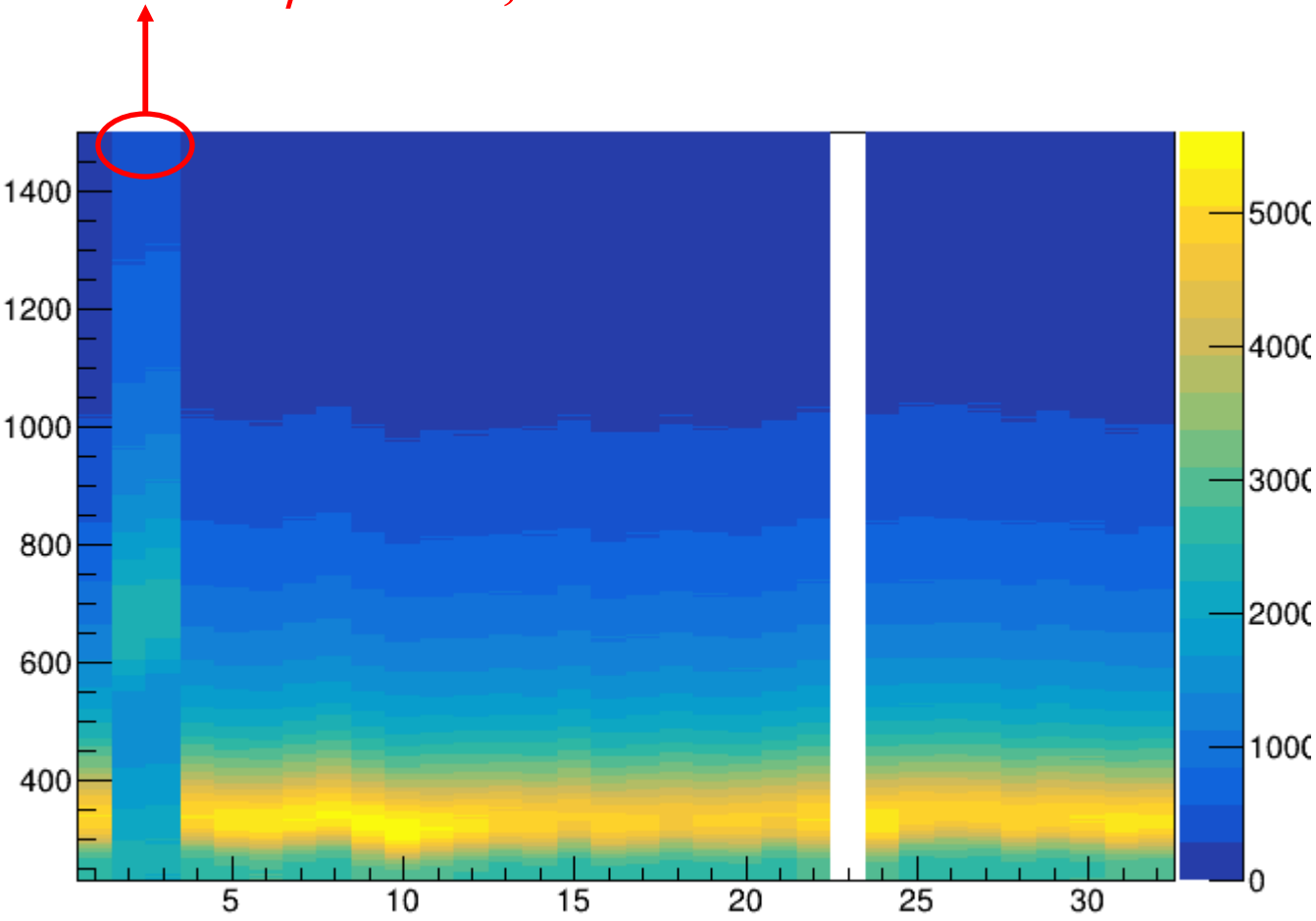
Looks normal

Hot channels

- o-scope shots looked OK
- Looked back at the data

Hot channels

Hot channels: φ-bin 26, 27



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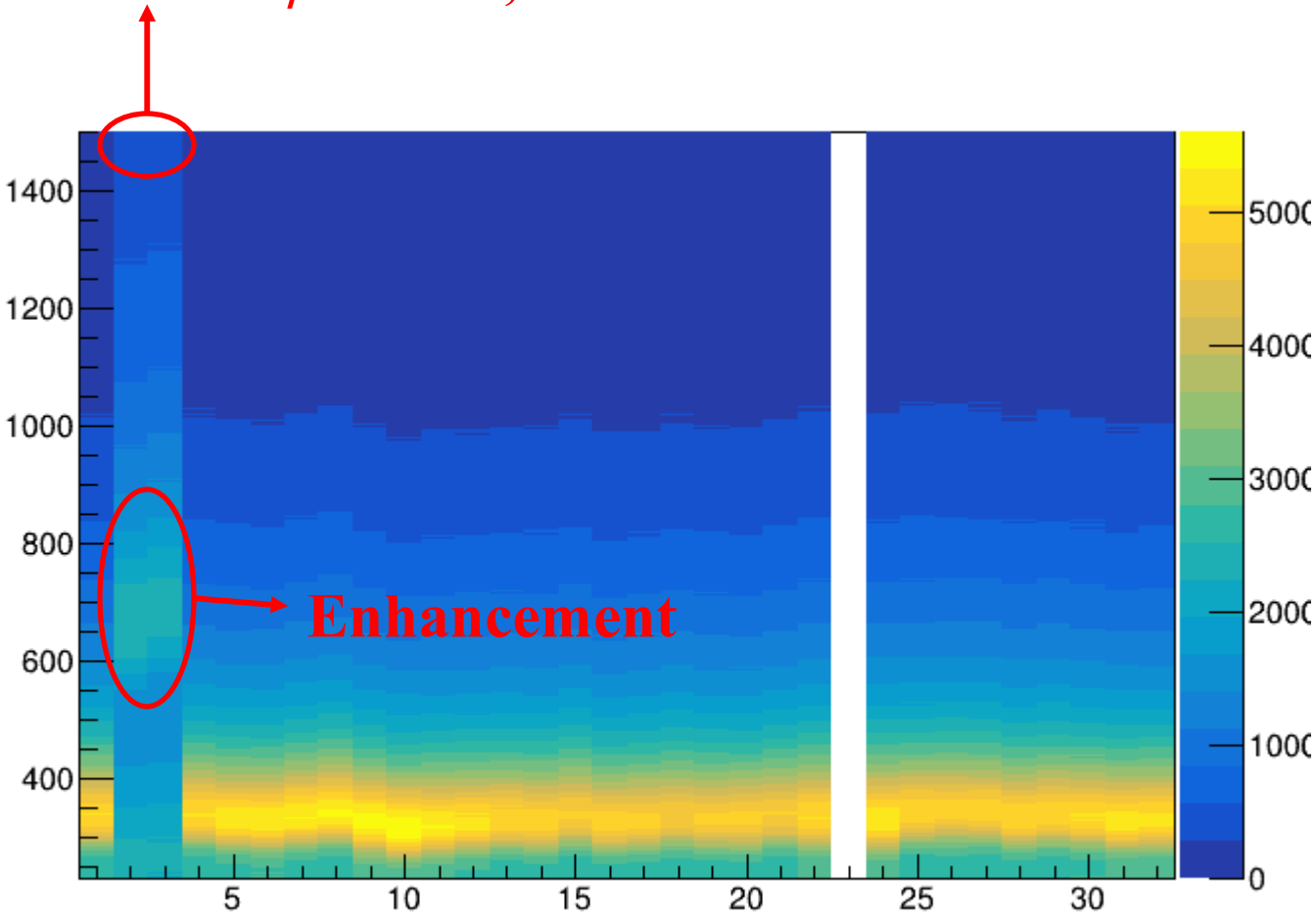

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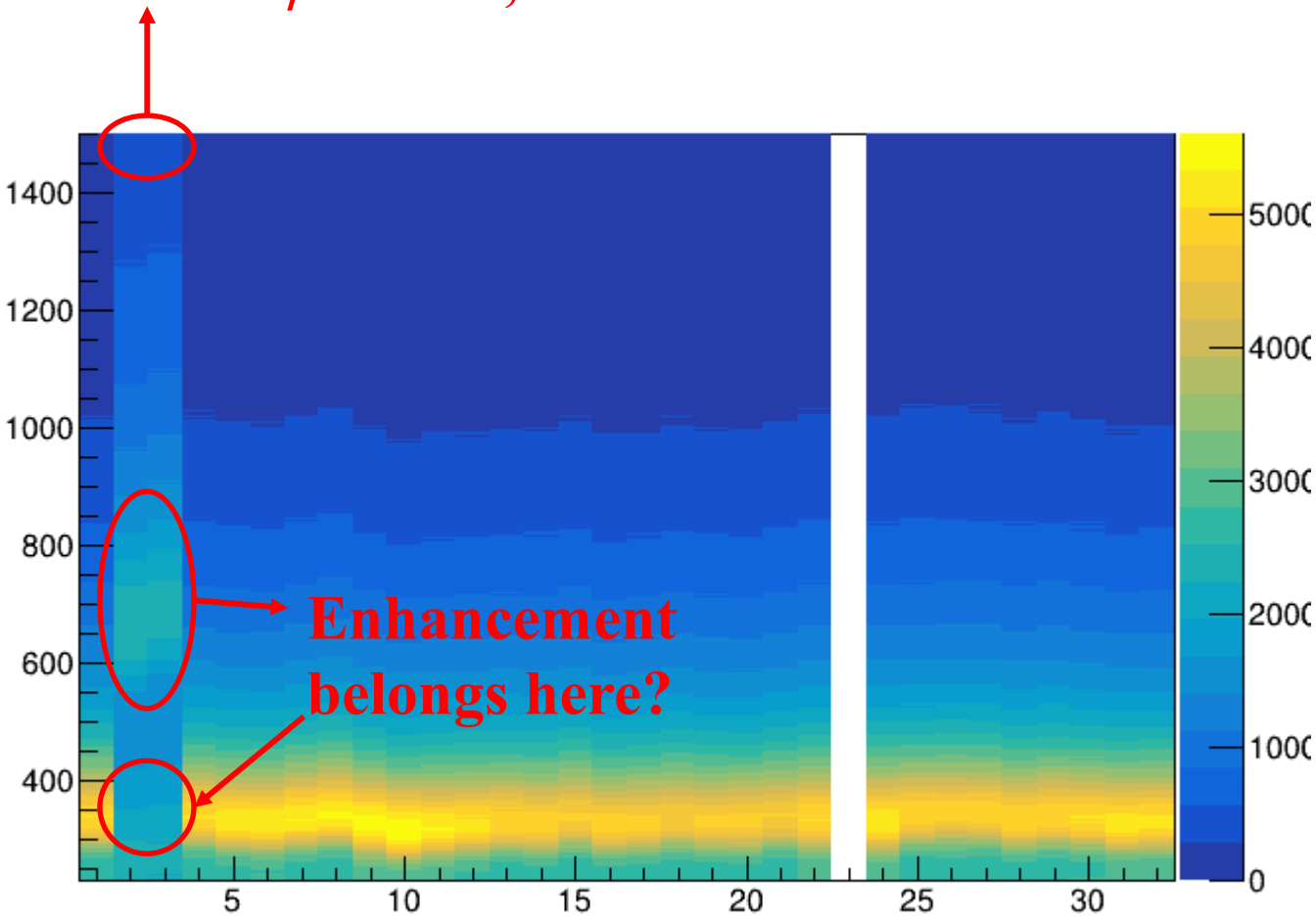

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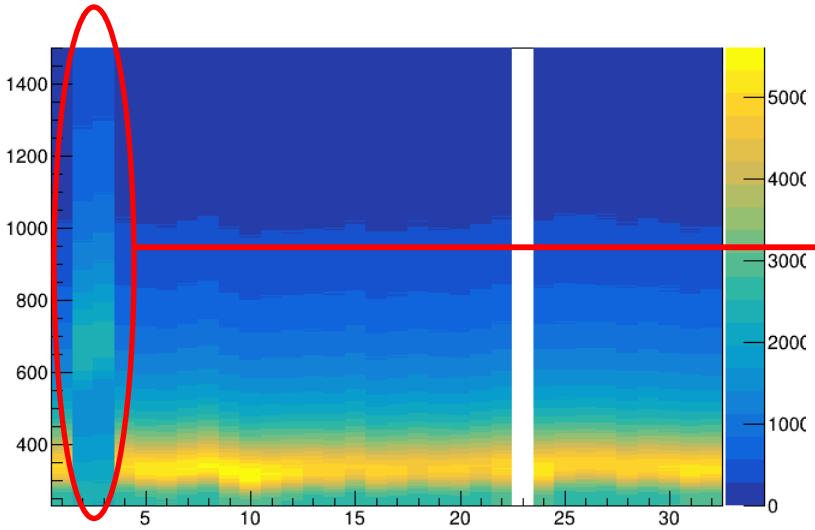
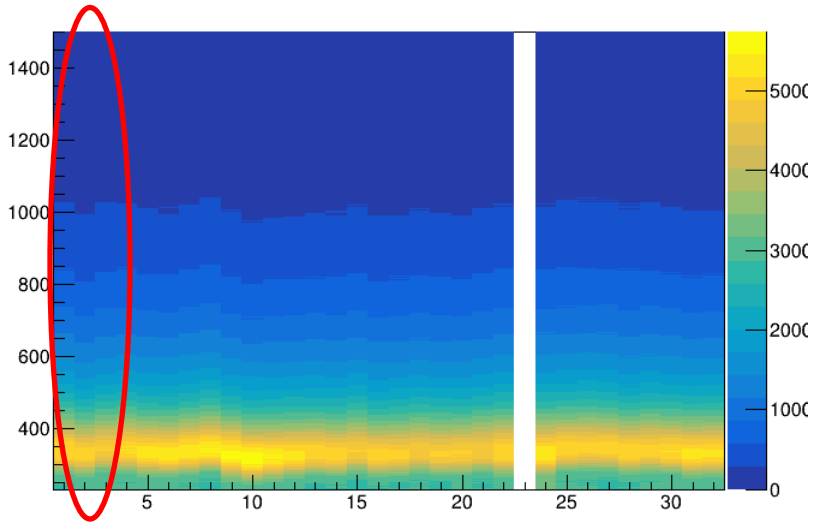


Divide fADC channels by 2



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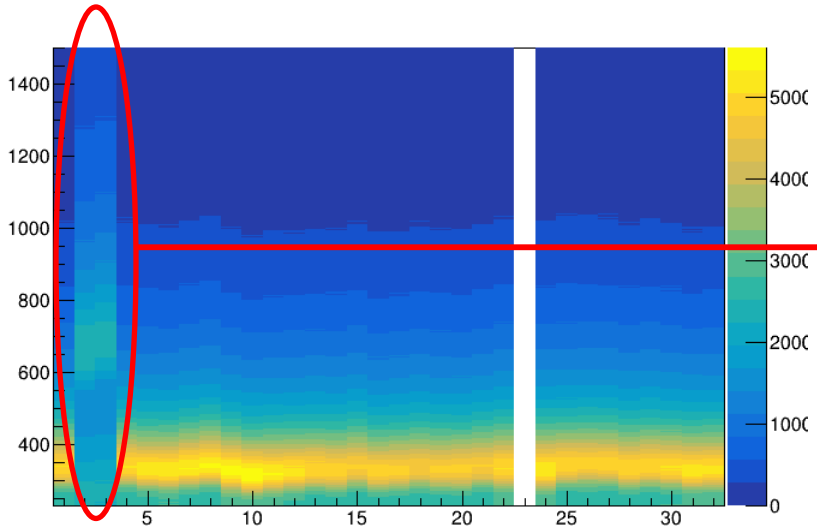

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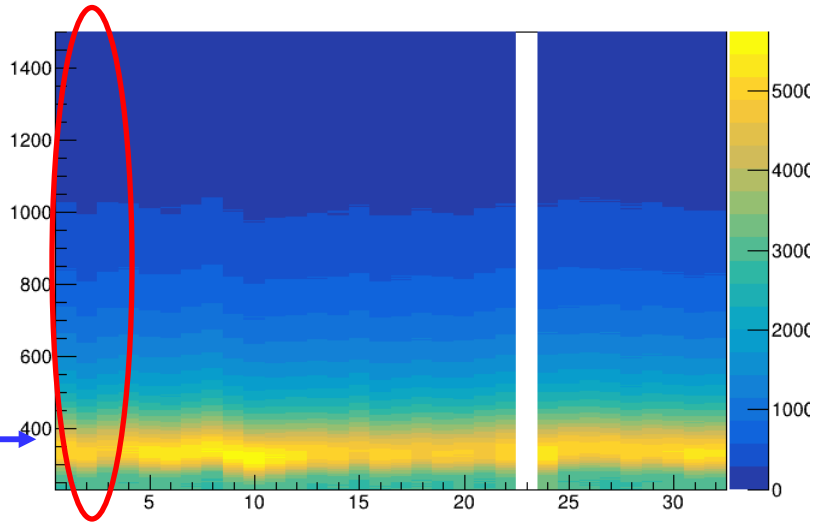
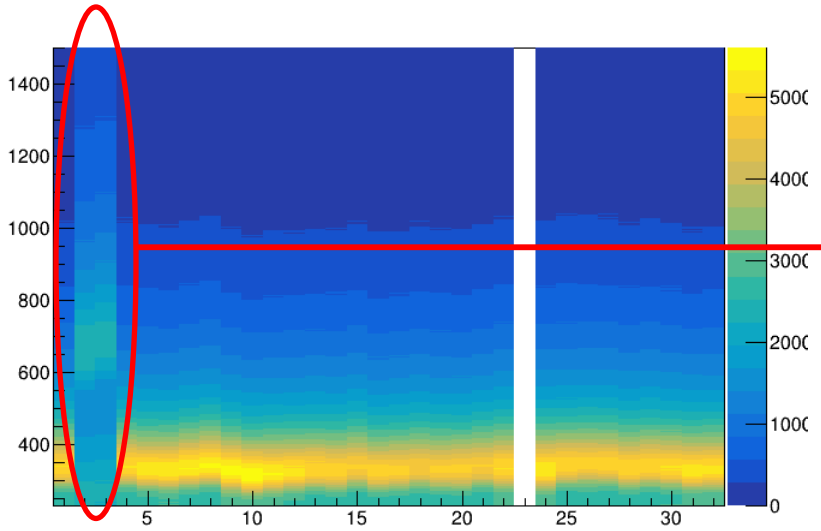


- Calibration: Should realign energy deposition

Hot channels



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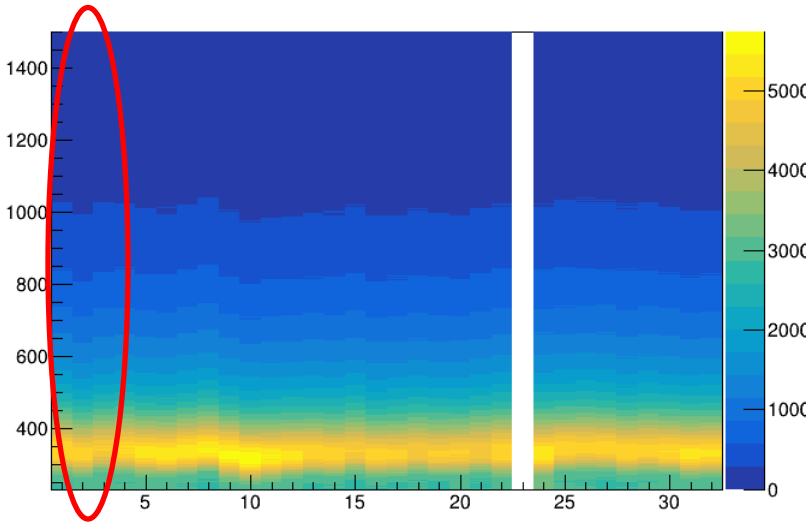
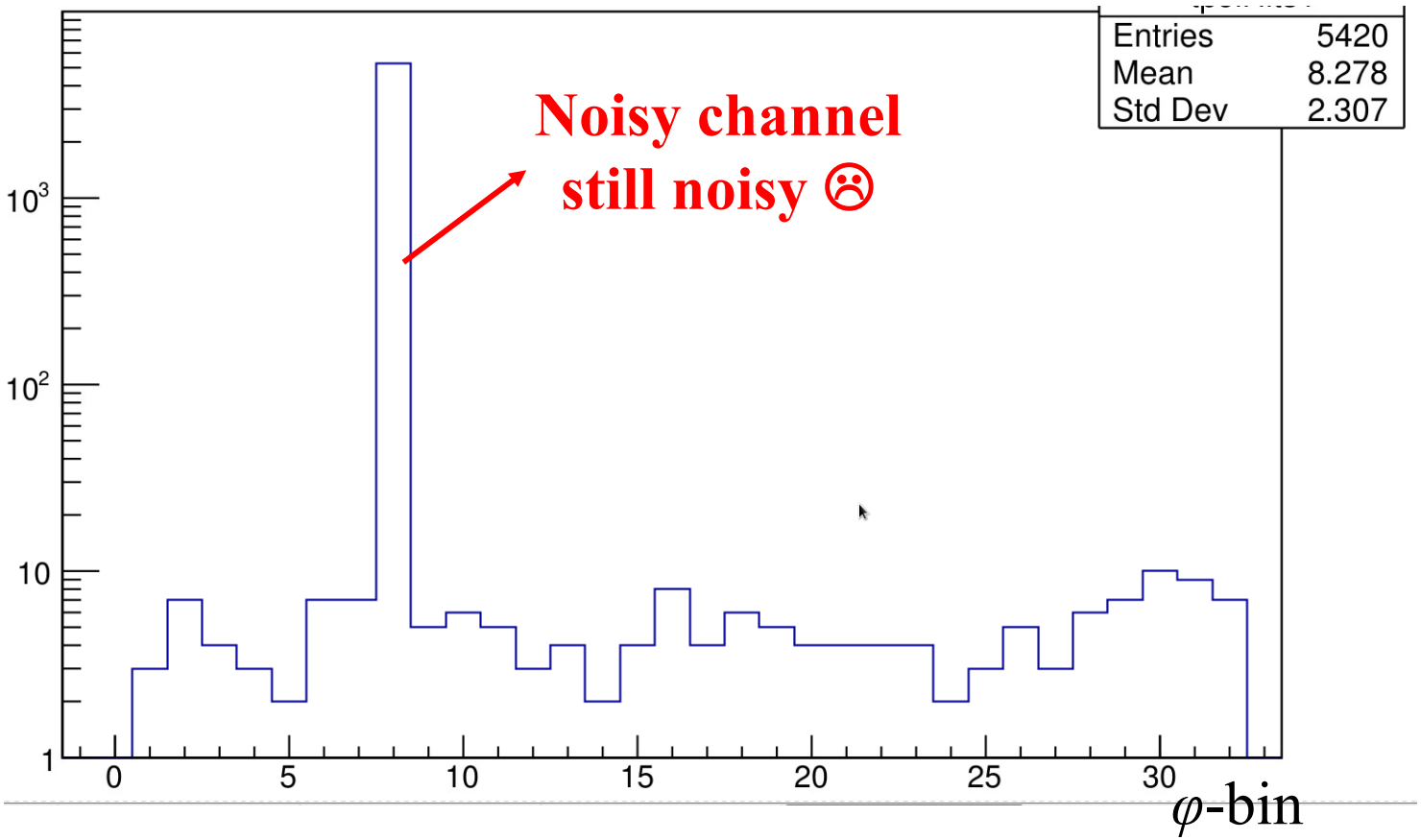


Told Beni about strange behavior and he figured out what was wrong (next slides)

Cosmics



- Beni analyzed cosmic data
- Required 90 fADC counts above baseline (~ 240 keV energy deposit)

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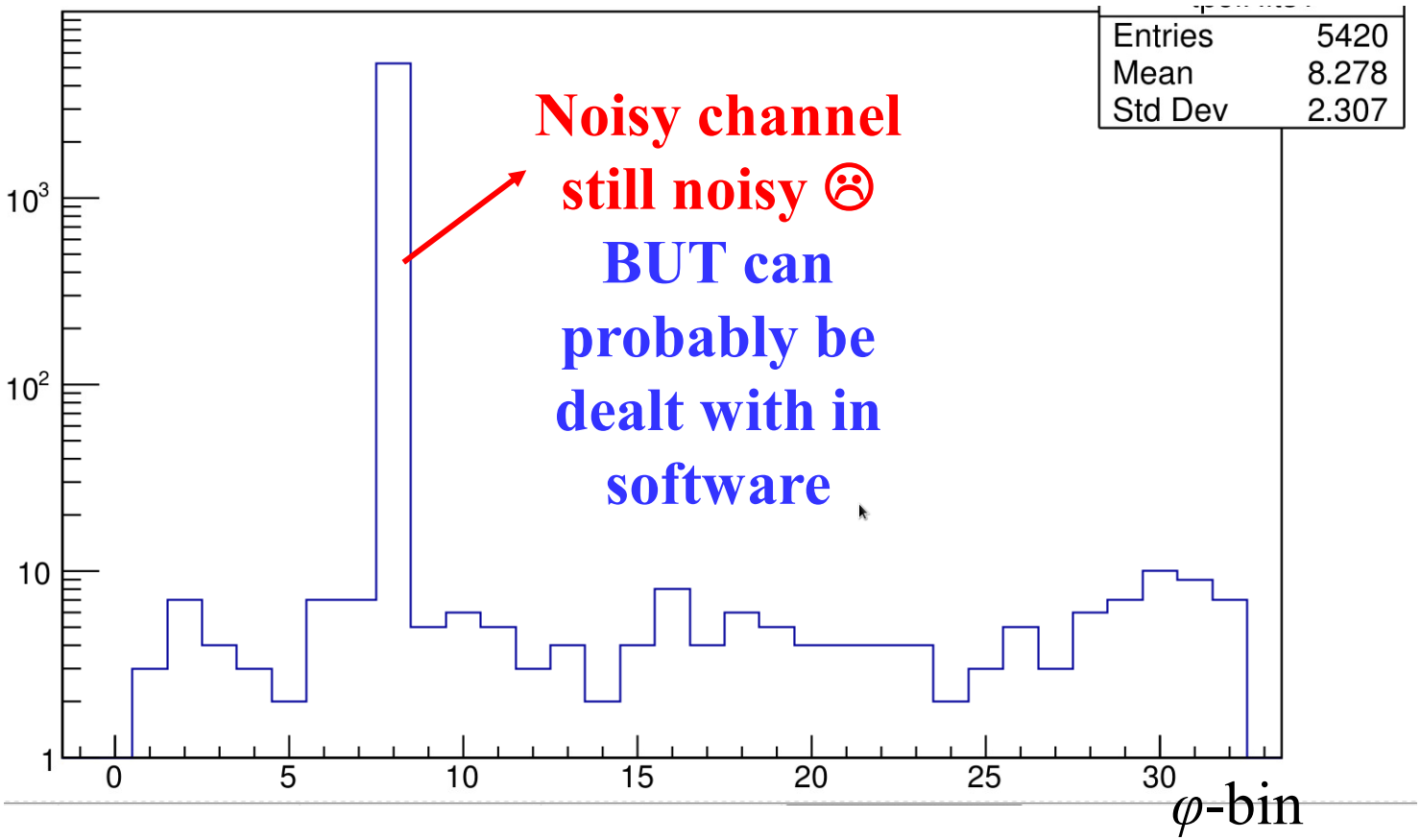

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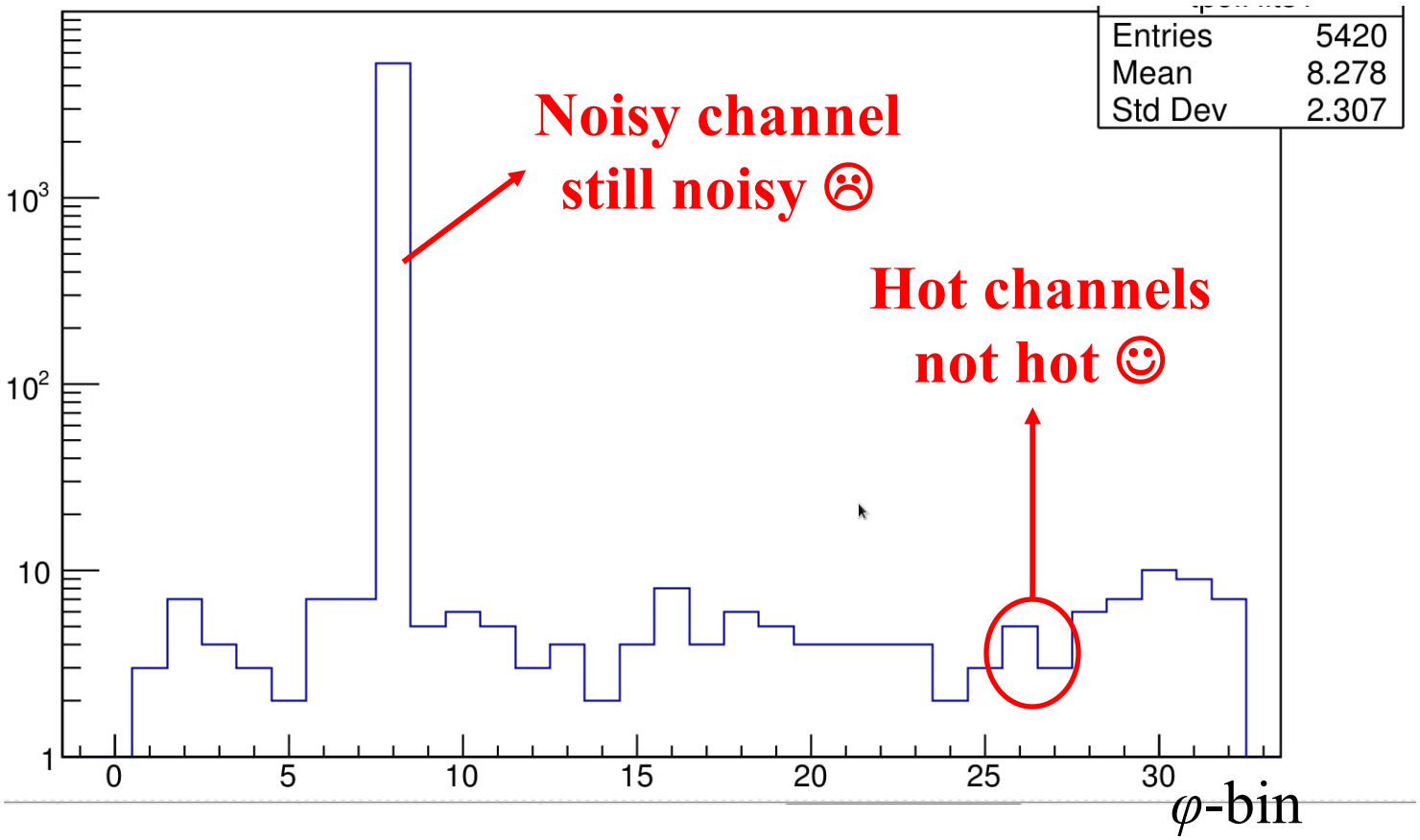

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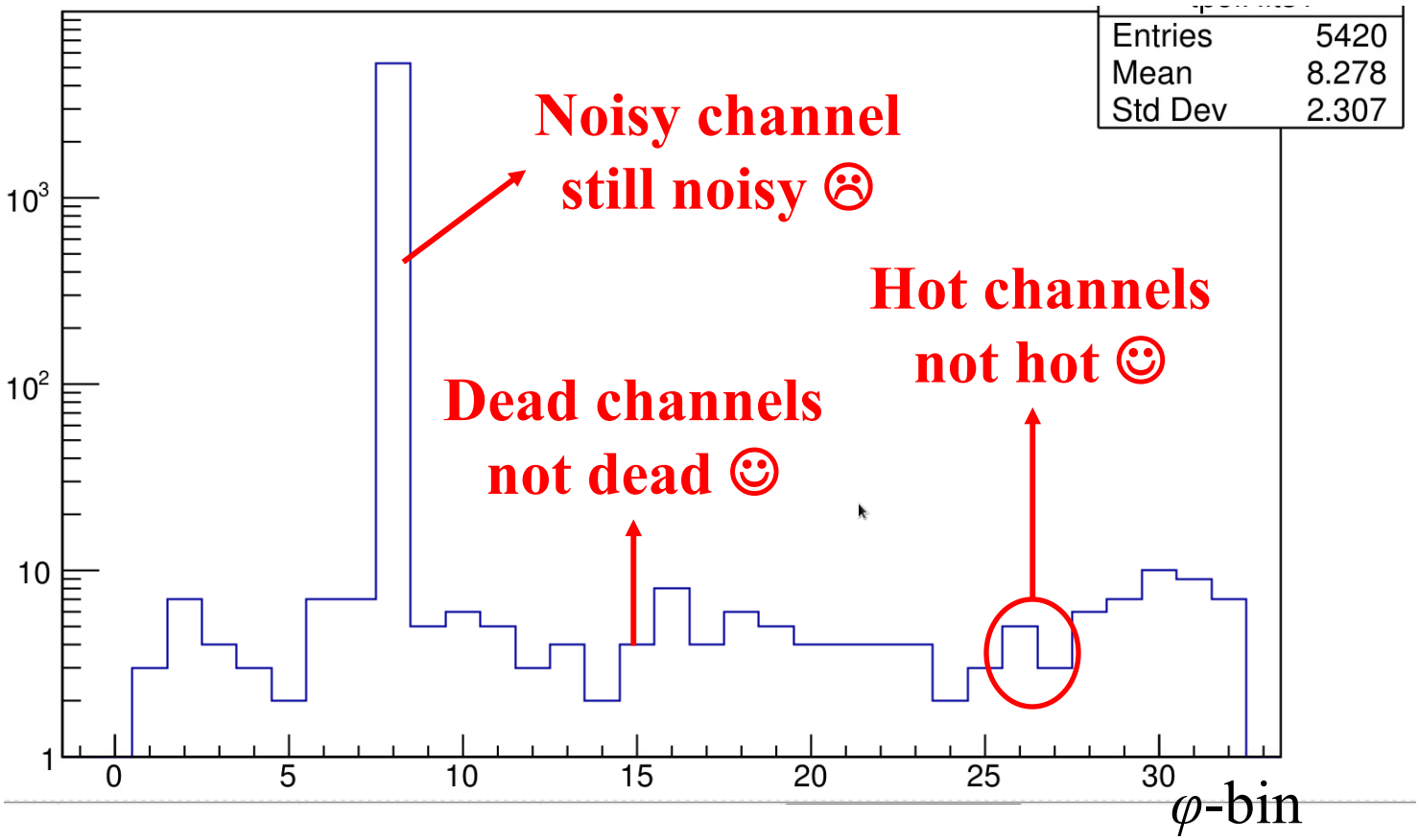

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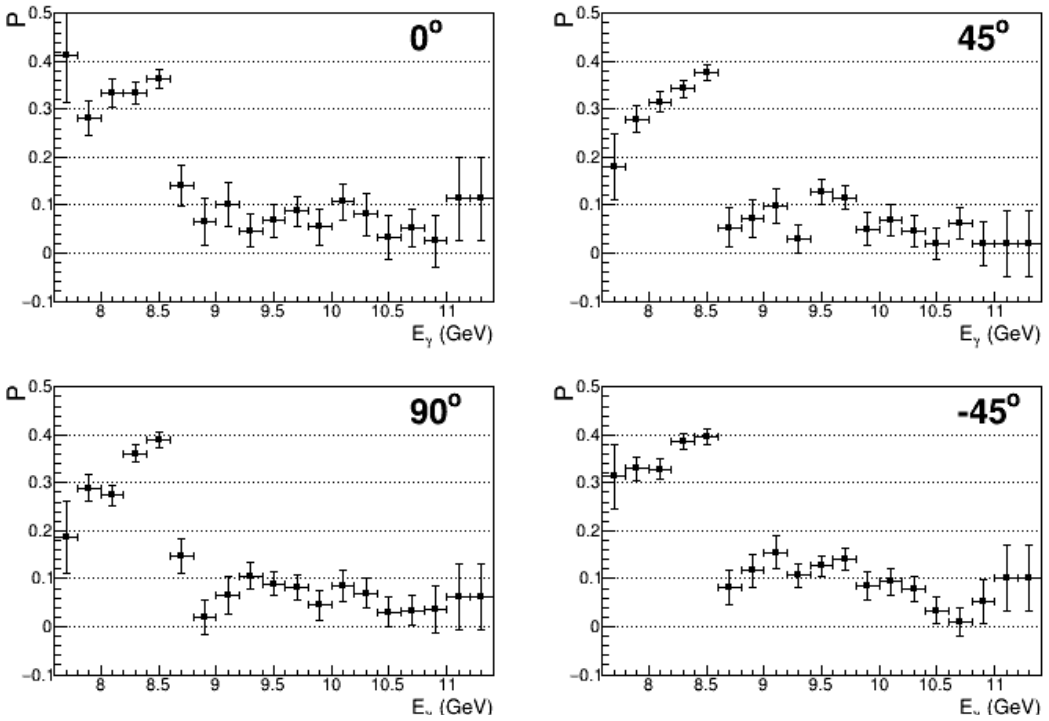
Preliminary polarization for batch 5-8 using recovered channels



Polarization values for E_gamma between 8.0 and 8.6 GeV

Beam orientation	Polarization
0 degrees:	0.3460 +/- 0.0137
45 degrees:	0.3476 +/- 0.0108
90 degrees:	-0.3498 +/- 0.0106
135 degrees:	-0.3746 +/- 0.0100

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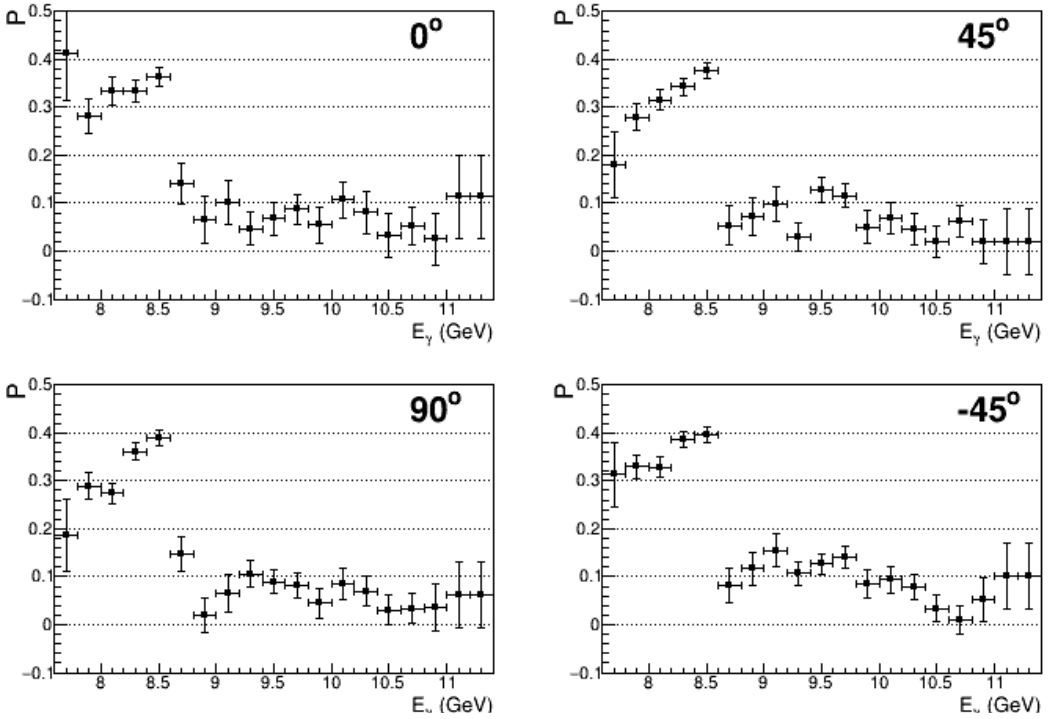

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- 0,45 and 90 degree orientations are fairly consistent

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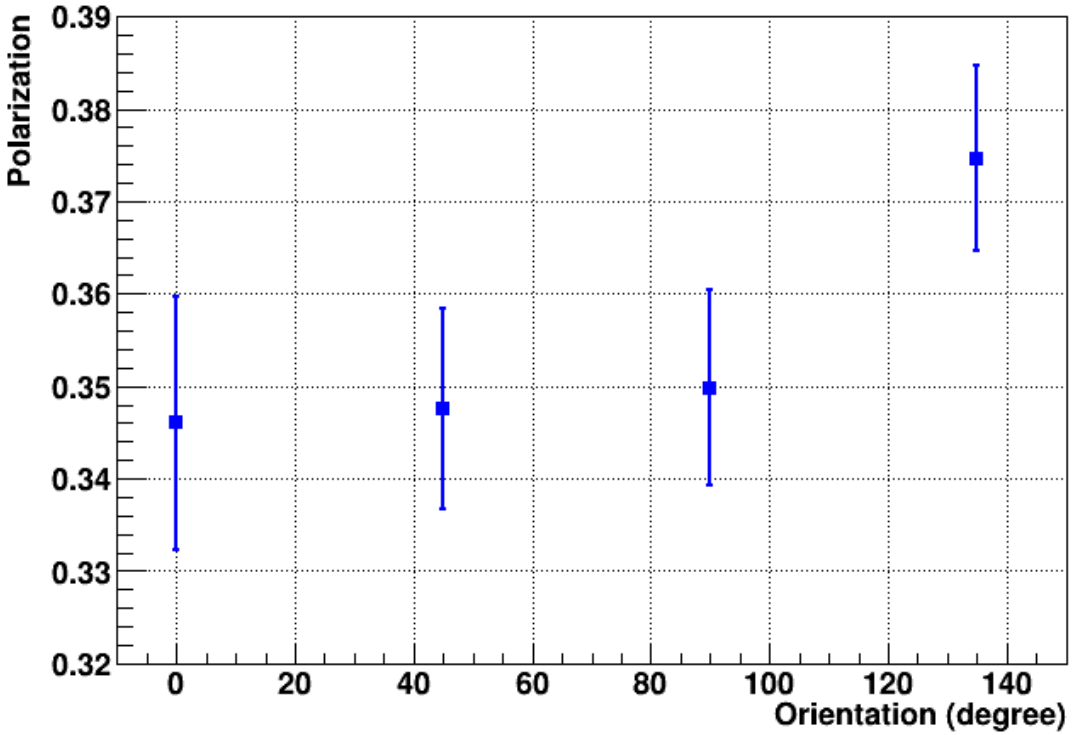

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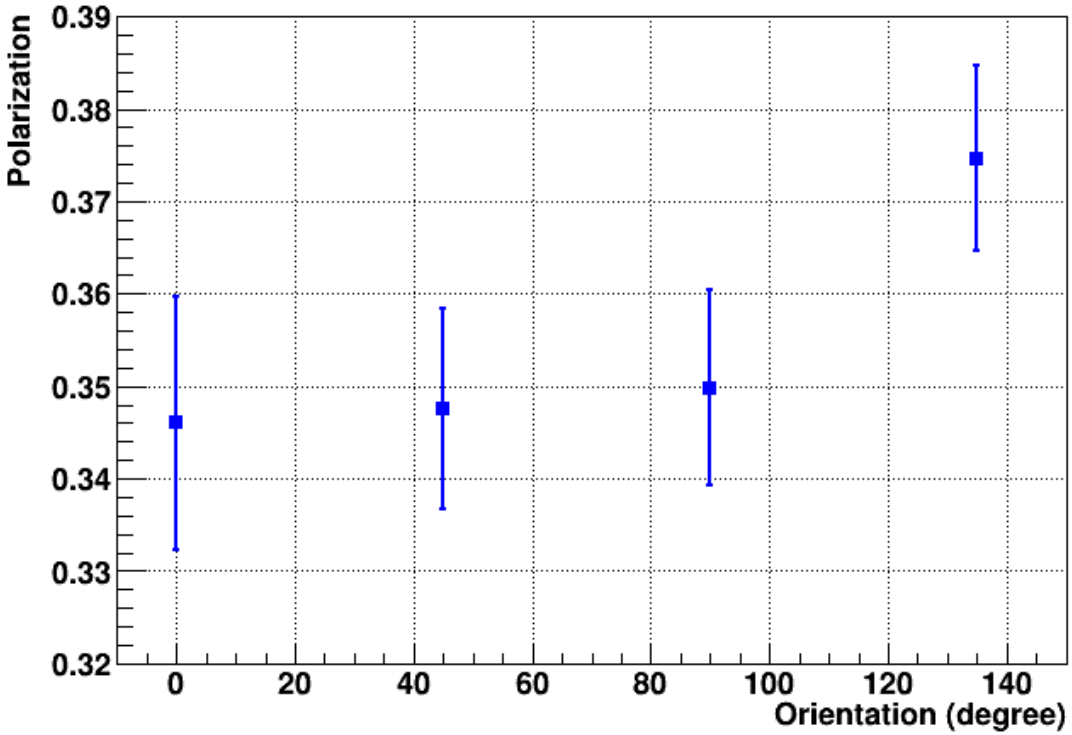

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- Will recalibrate energy deposition

Title