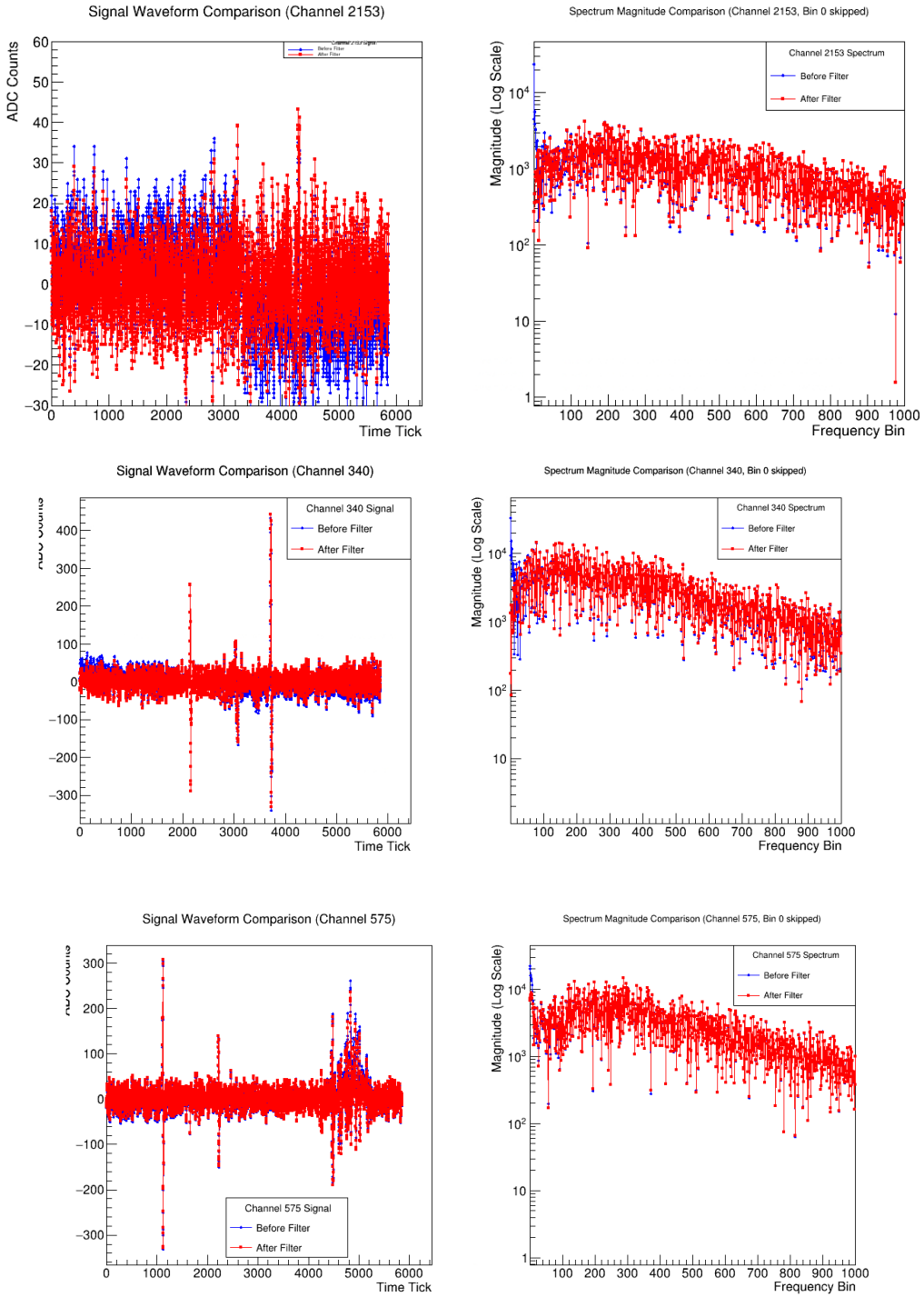
Lf_noisy

- **Input:** A frequency spectrum
- **It is lf_noisy if (either is true):**
  - **Dominance:** The magnitude of the first frequency component (spec[1]) must be *strictly greater* than the magnitudes of the next nfreqs components.
  - **Average Power:** The average magnitude (power) of these first nfreqs + 1 components must exceed a predefined **maxpower threshold**.

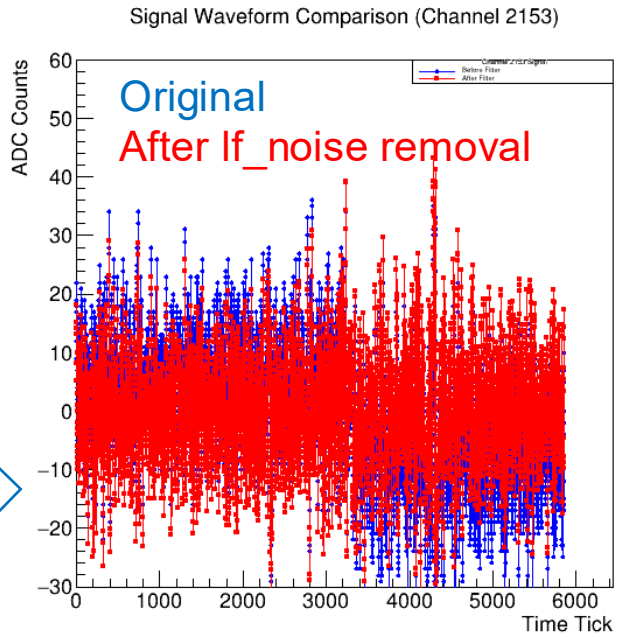
- To fix lf_noisy:
- Protect signal region
- **Adaptive Baseline Subtraction**
  - Calculates baseline using a **512-sample sliding window average**.
  - **Adaptive Features:**
    - **Excludes Signal:**
    - **Fills Gaps:** If a window lacks sufficient valid samples (< 256), the baseline for that region is **interpolated or extrapolated** from nearby reliable baseline points.
- **Output:** The input signal sig is modified **in-place** with the baseline subtracted.

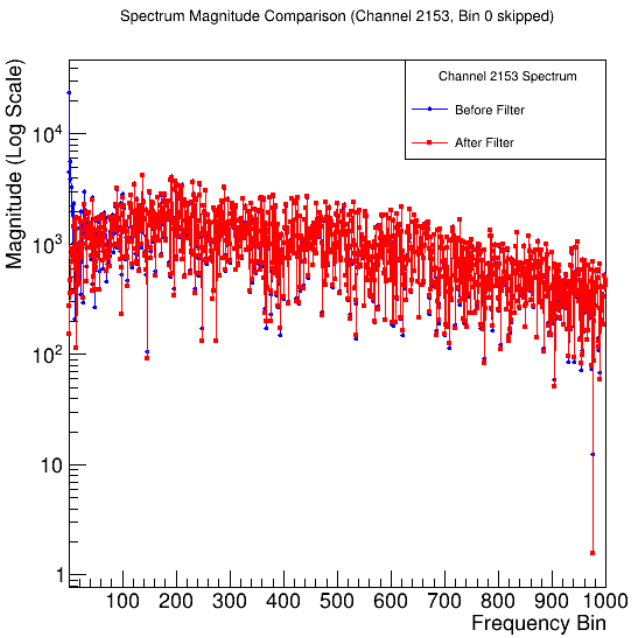


Lf_noisy examples

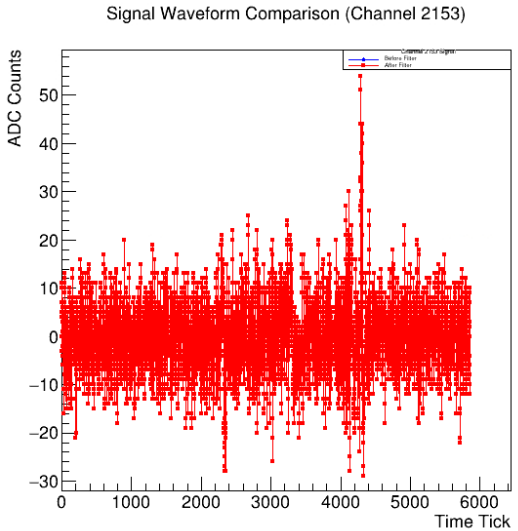
Run 28548
Gain:7.8
maxpower threshold = 6000

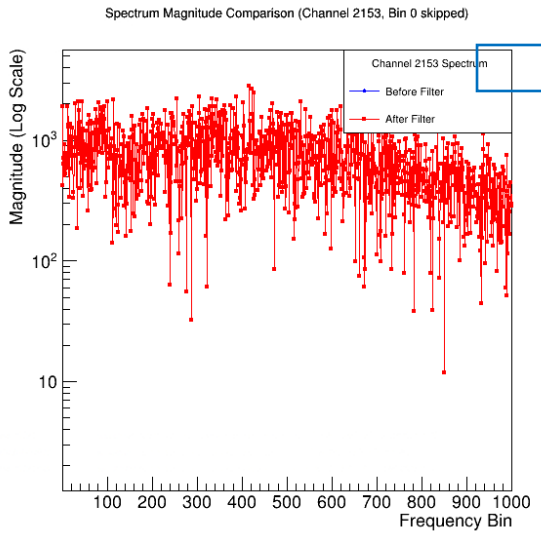
Rate: around 1 or 2 channels per event.



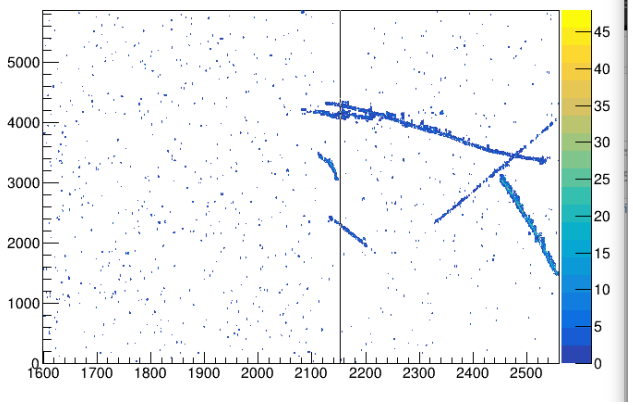


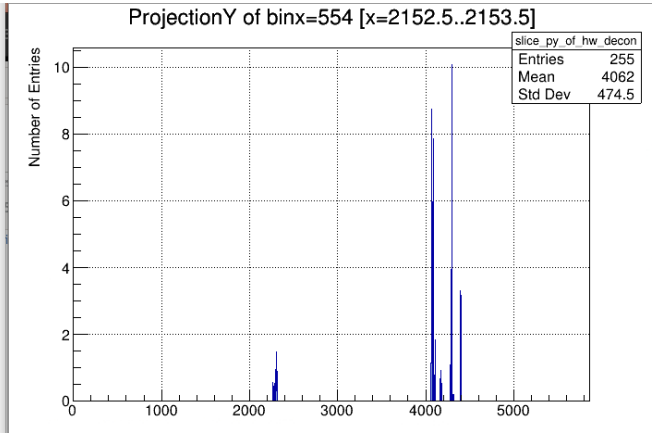
After coherent noise removal





After signal processing

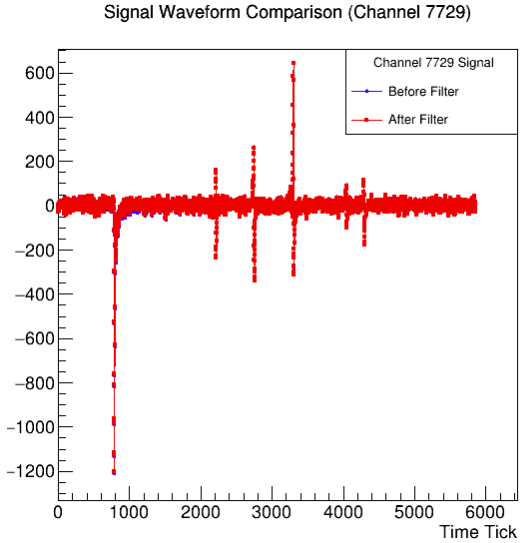


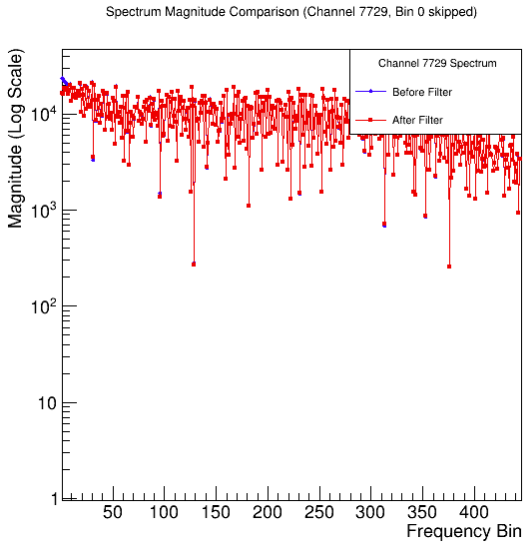


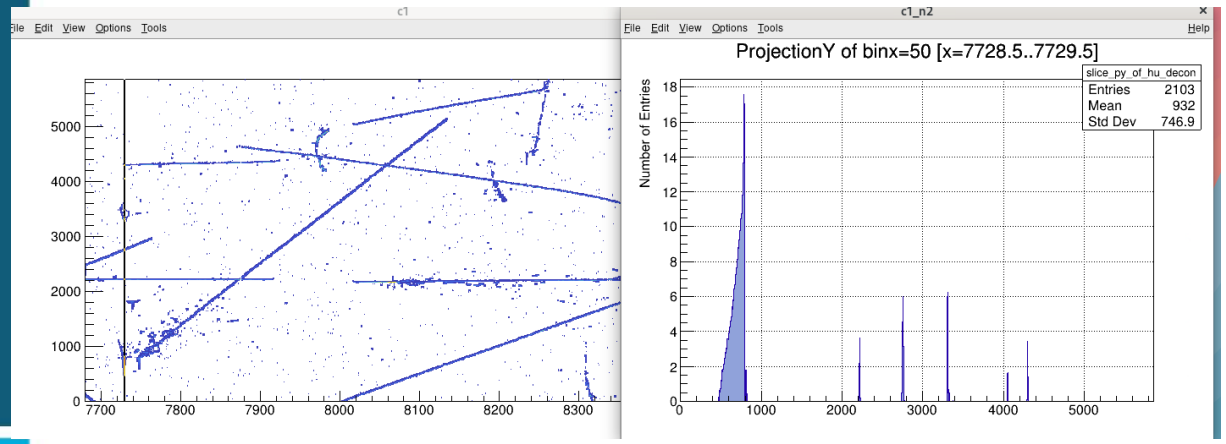
Lf_noisy examples

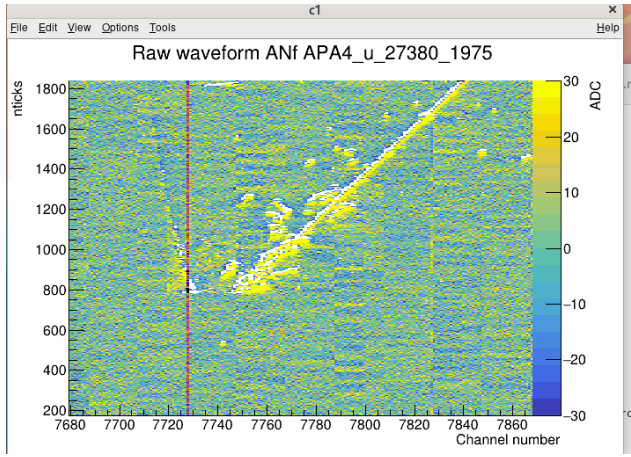
Run 27380
Gain:14
maxpower threshold = 15000

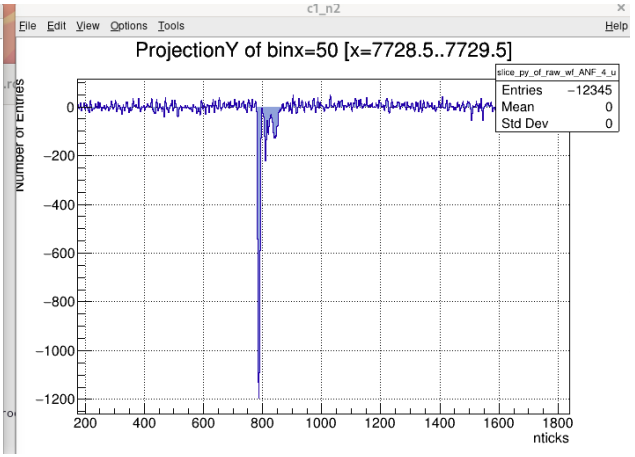
Rate: around 1 or 2 channels per event.
Lots of events have this pure kind of negative peak.



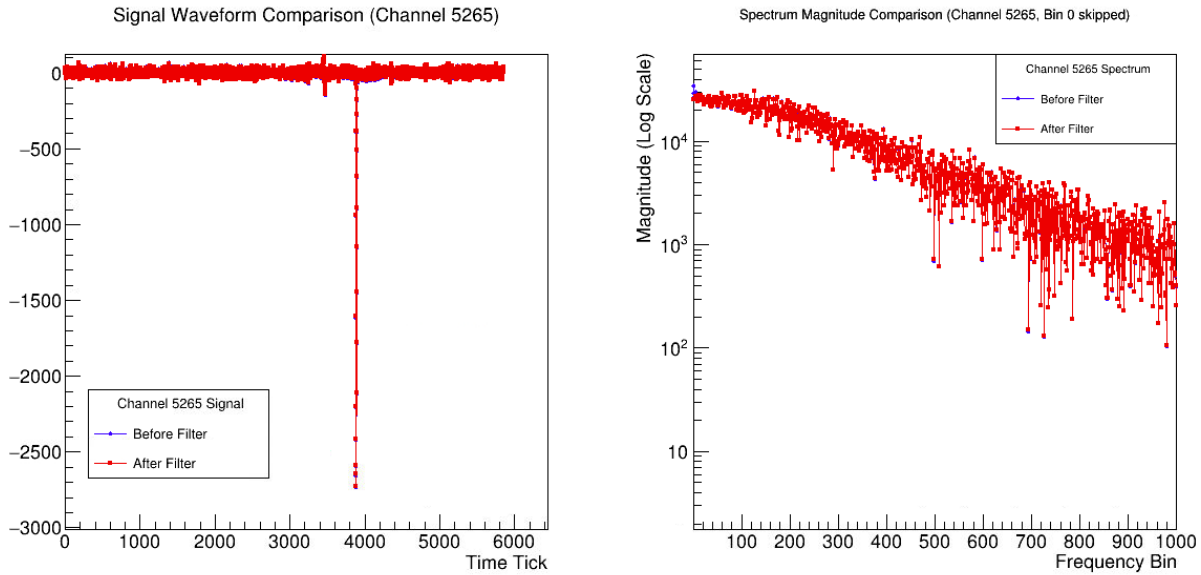


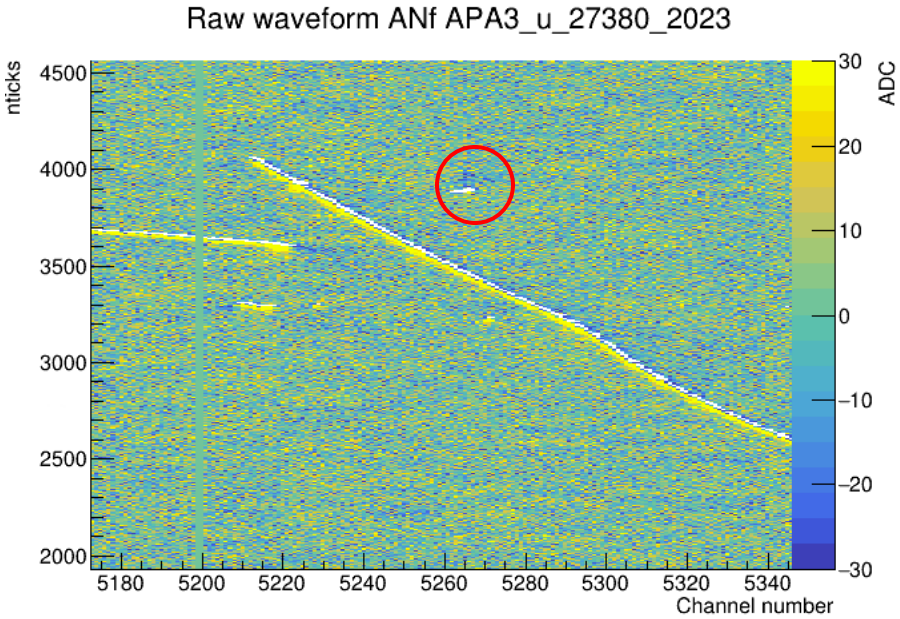


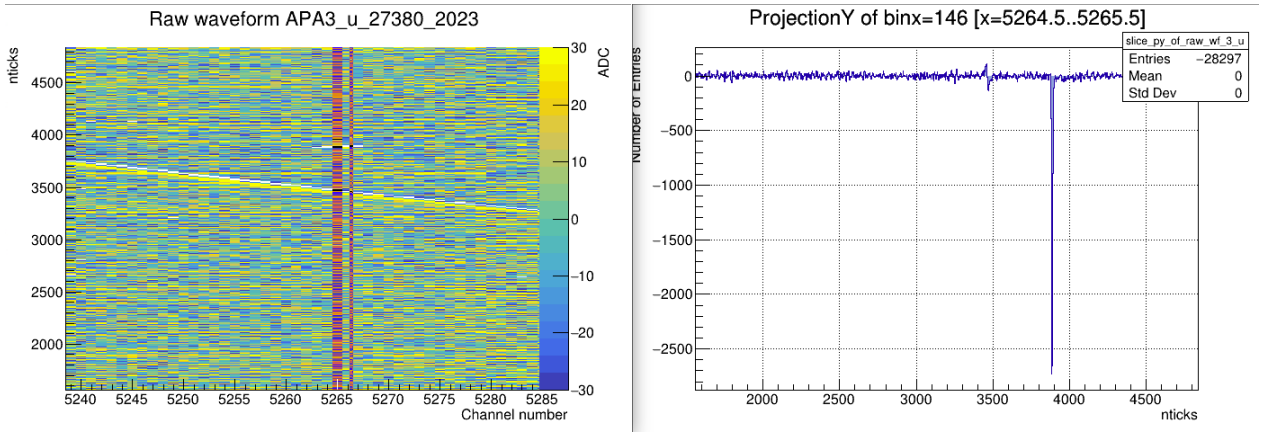


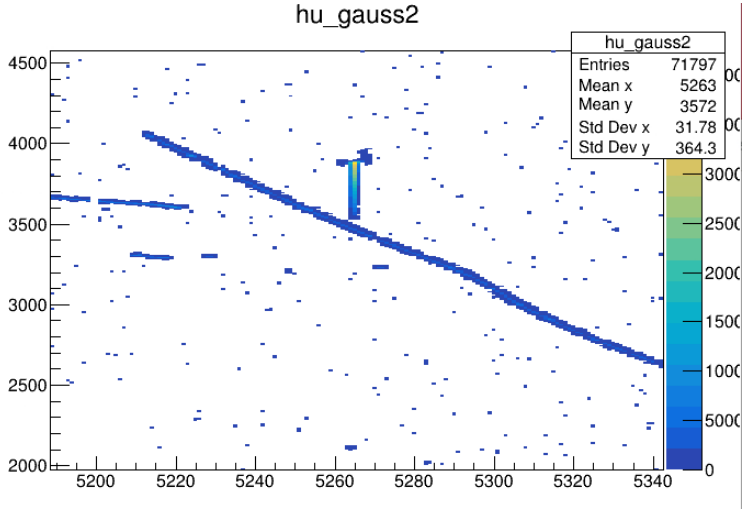


Lf_noisy examples



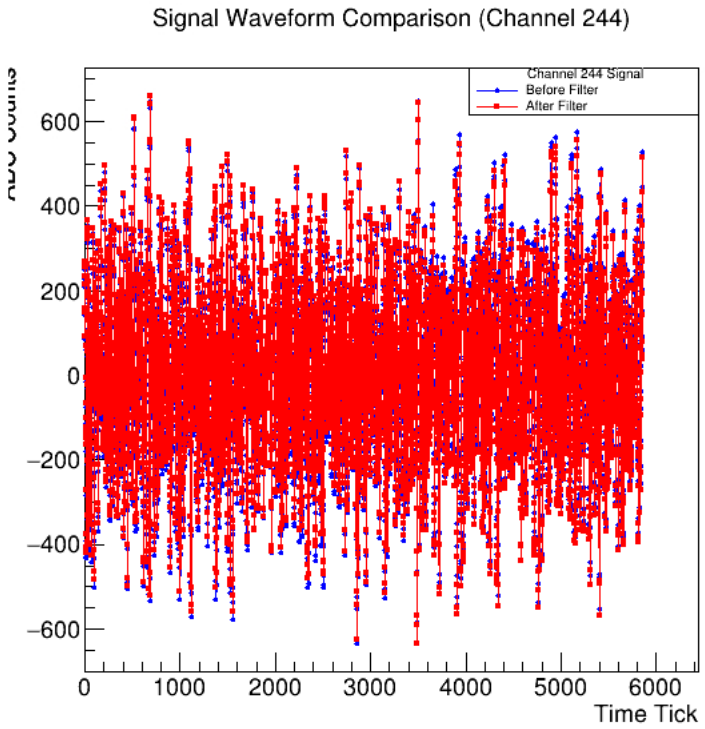


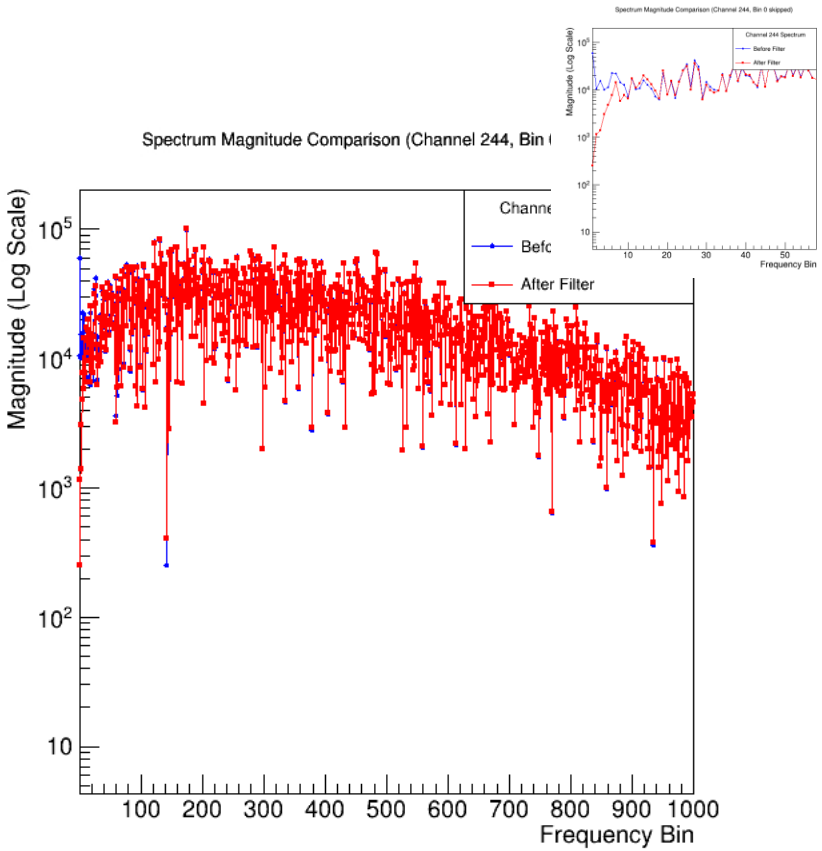




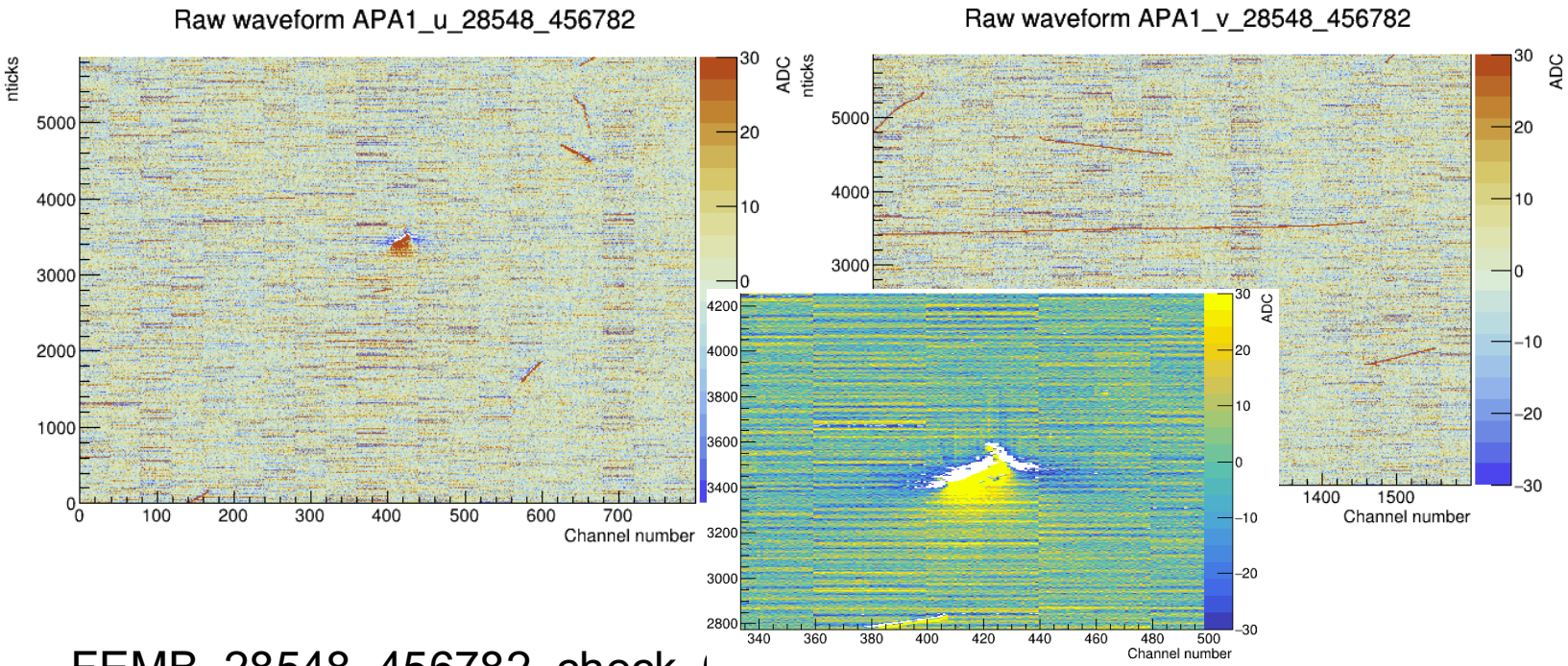
Lf_noisy examples

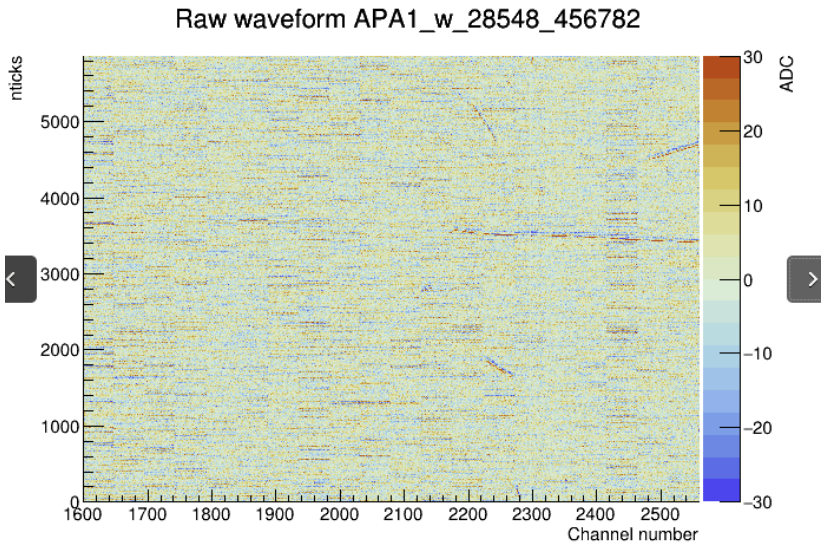
8 times occur for channel 244



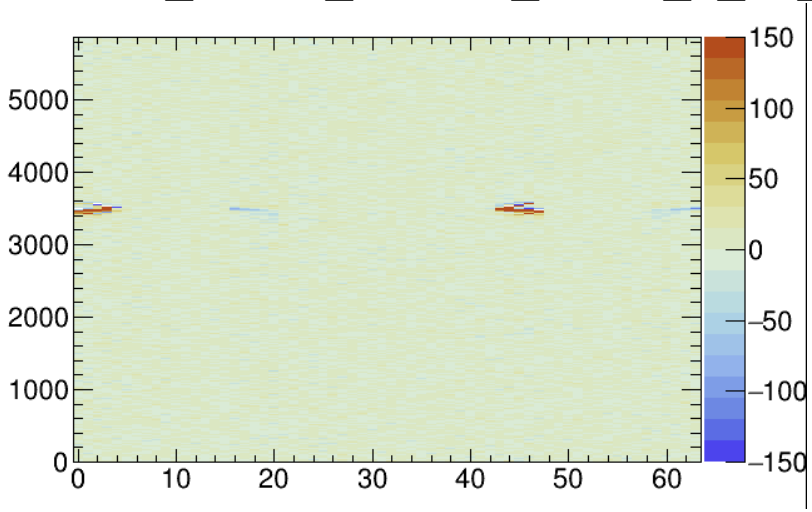


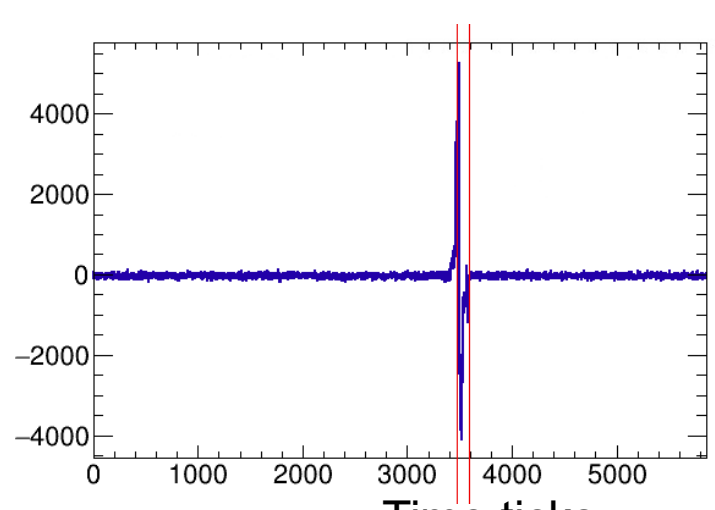
Problem found for FEMB noise filter

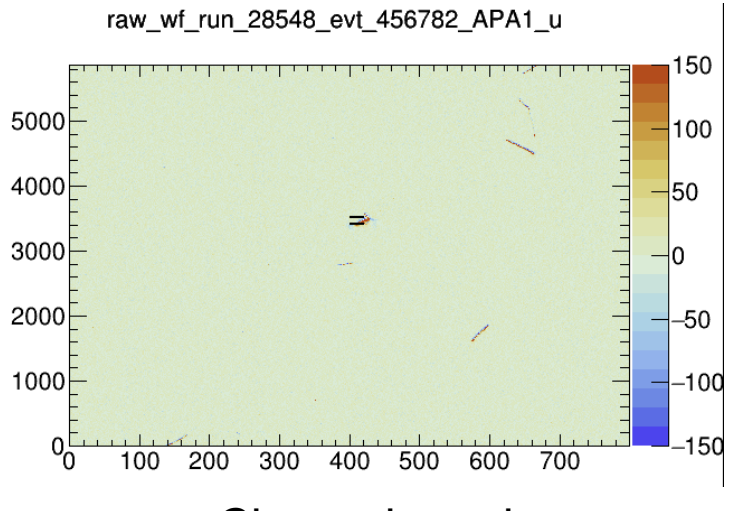




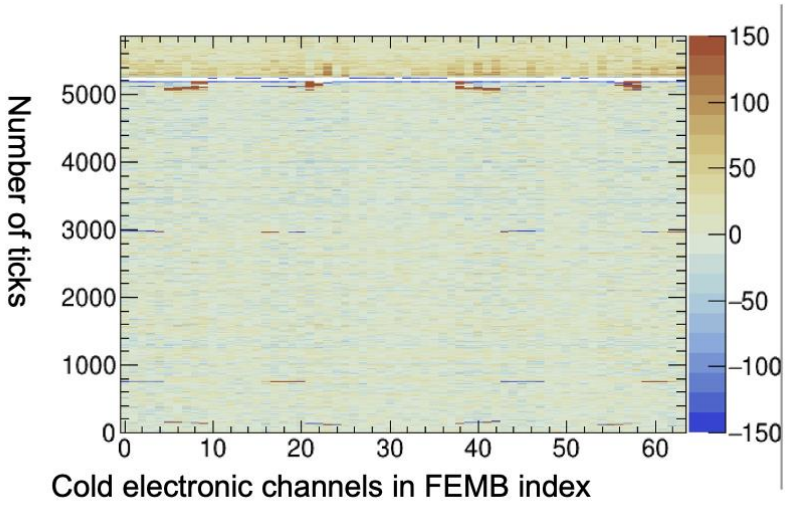
FEMB_28548_456782_check_0_19_1

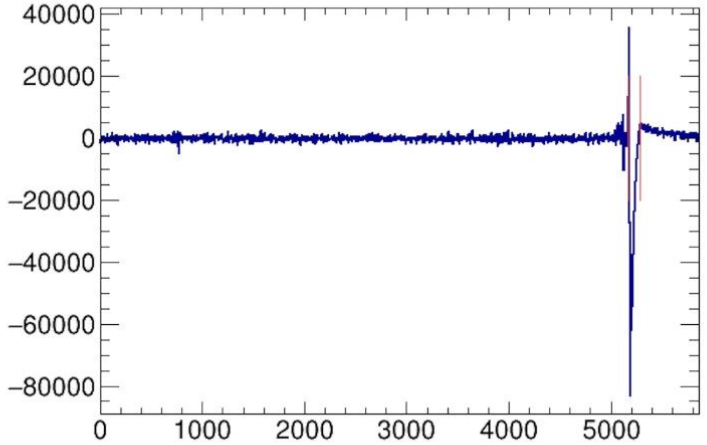






Previous FEMB noise selection





○Find all “- signal ROIs” in this integral histogram:

■ (if ADC-baseline < -3.5 r.m.s)

=> vector<int> roi

If there is a width of the “signal” larger than 50, then it is an FEMB noise. (regular event won’t more than 20)

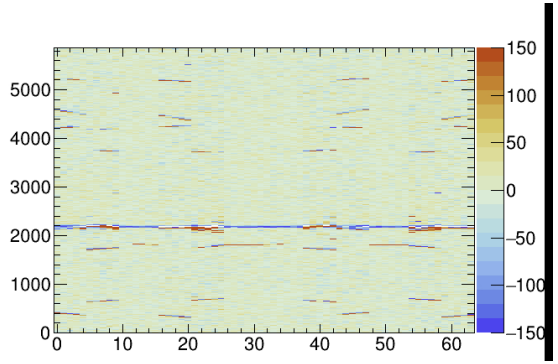
- Blind region is defined as:

  start_ticks = roi[0]-20;

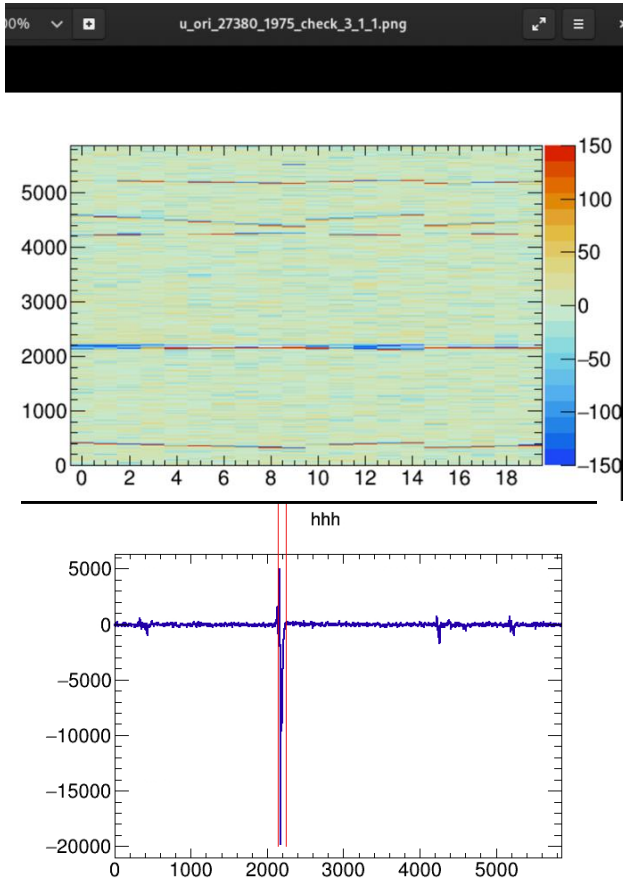
  end_ticks = roi.back()+20;
- Channel number can be found according to the map

Add additional check

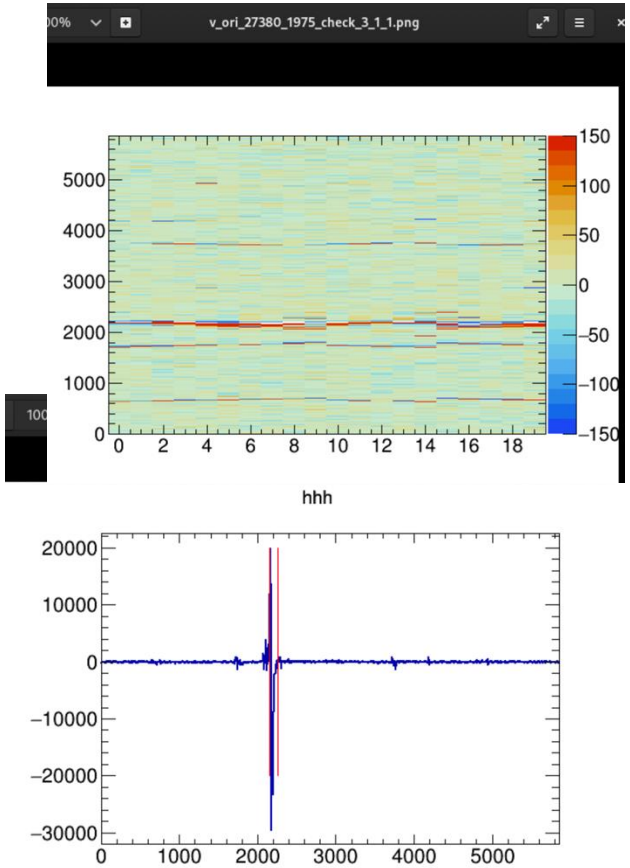
If the overall FEMB noise is found, perform a secondary check, on separate u,v w in this half FEMB.



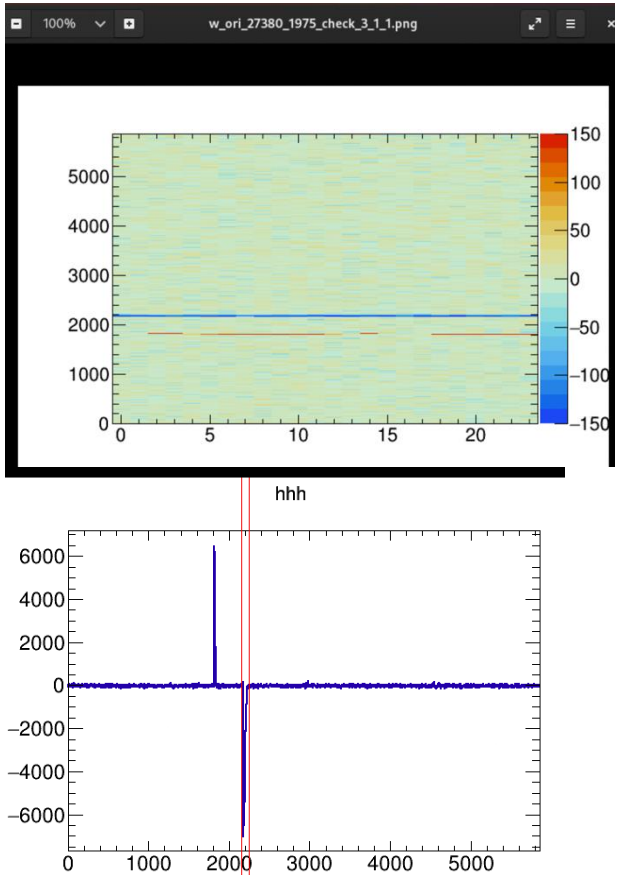
u



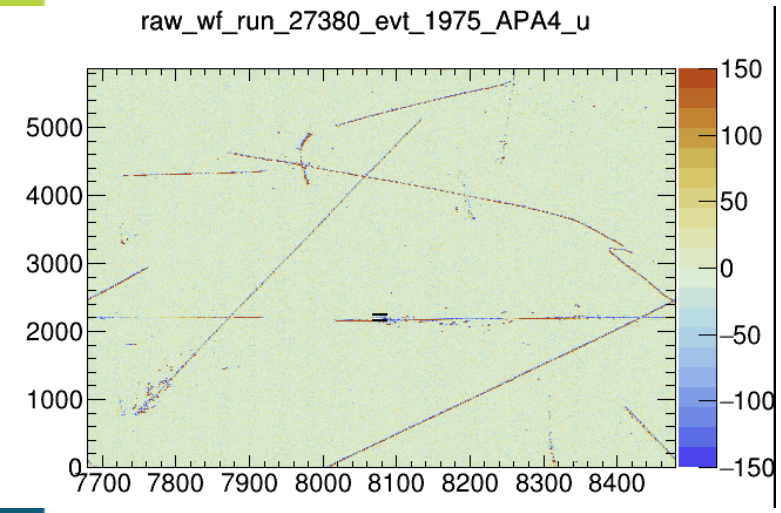
v

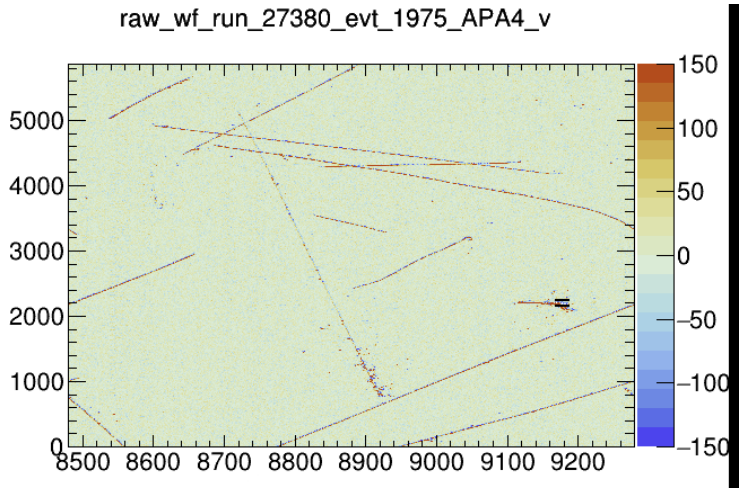


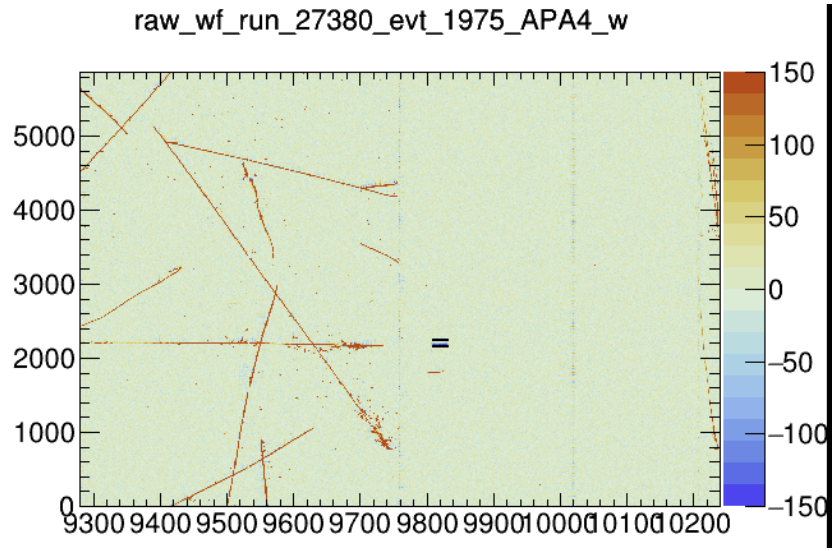
w

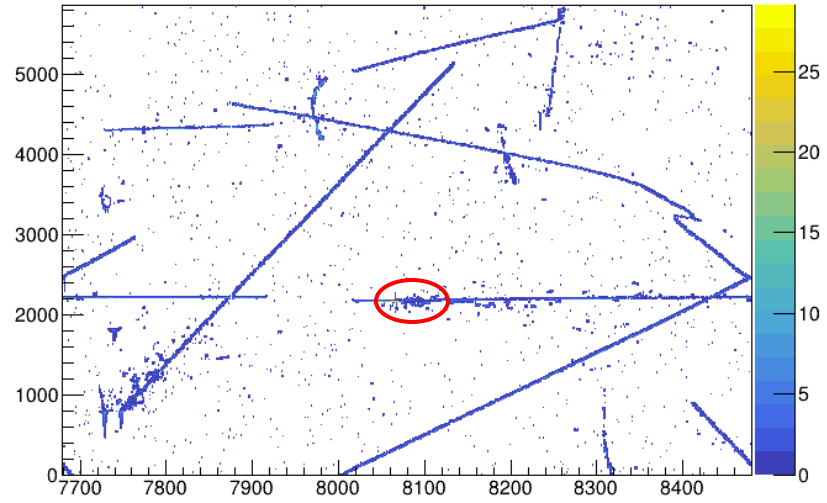


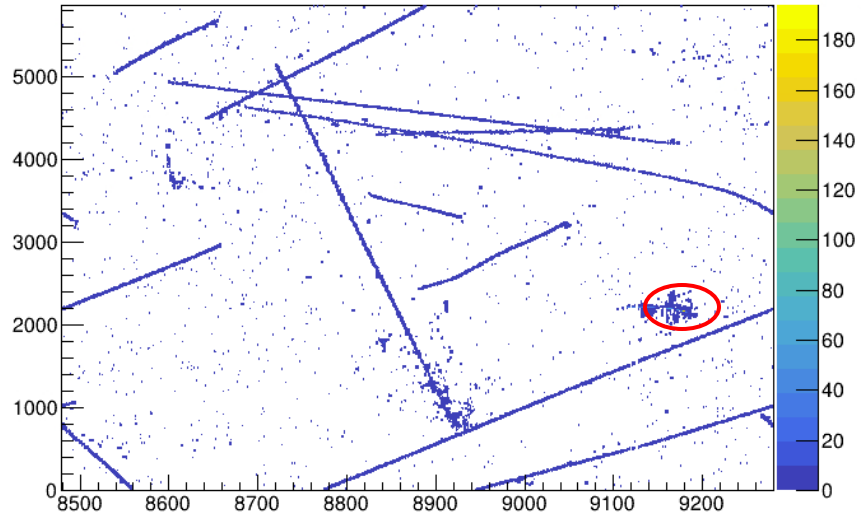
Check signal processing

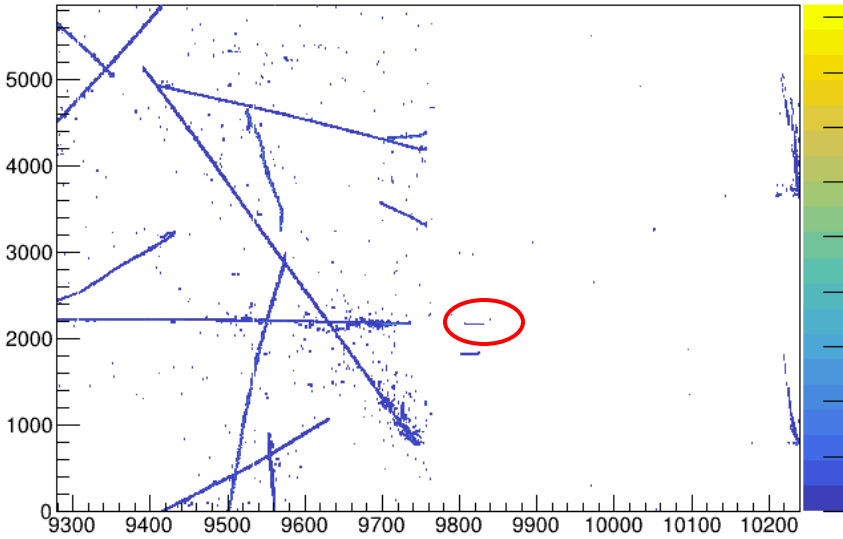






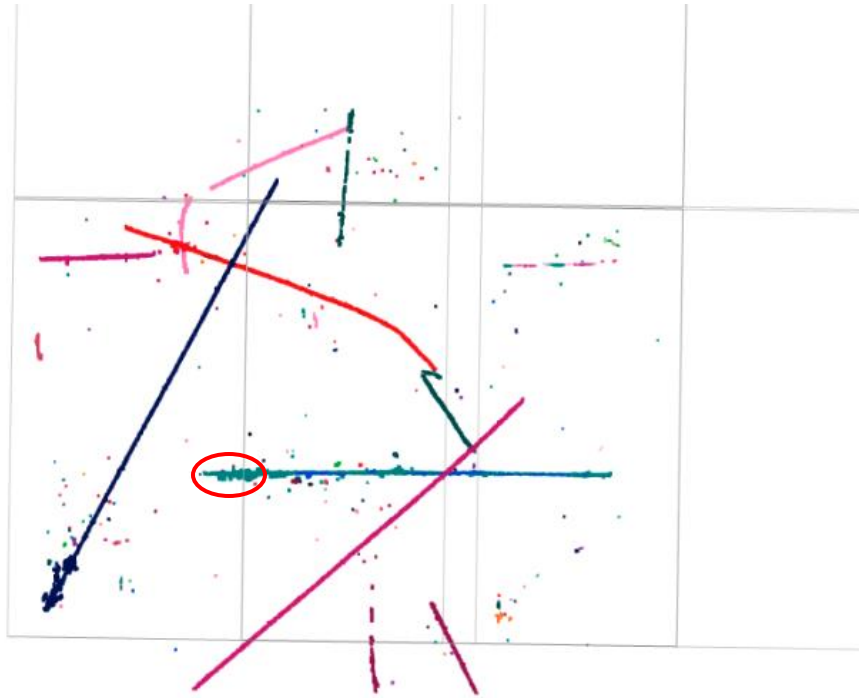


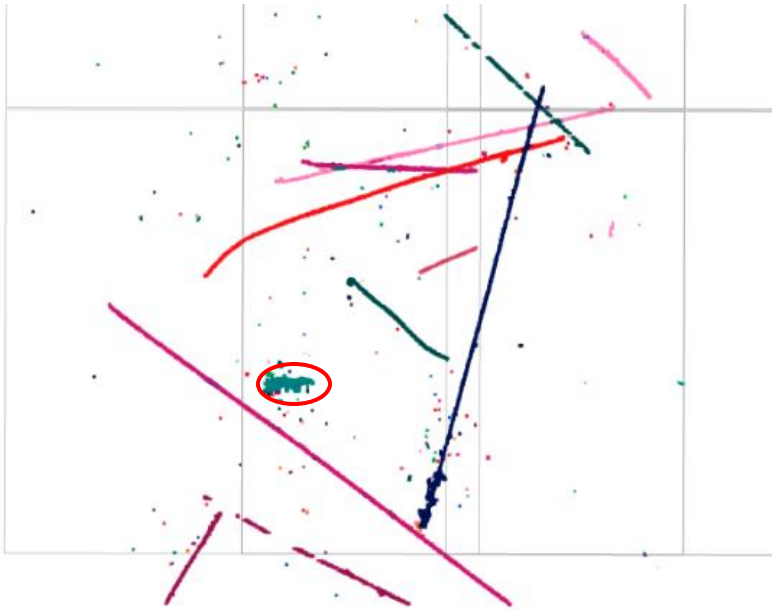




Check imaging

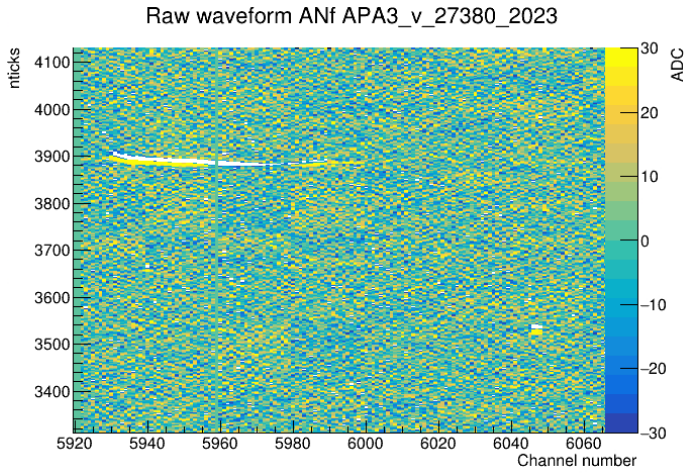
https://www.phy.bnl.gov/twister/bee/set/3ecc292e-5cac-49db-85fc-24bce5851e4d/event/0/

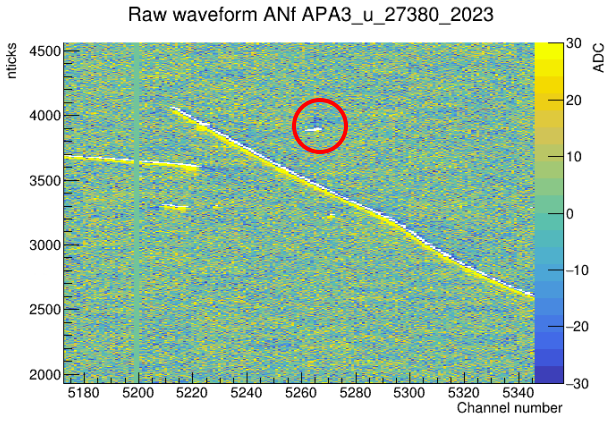


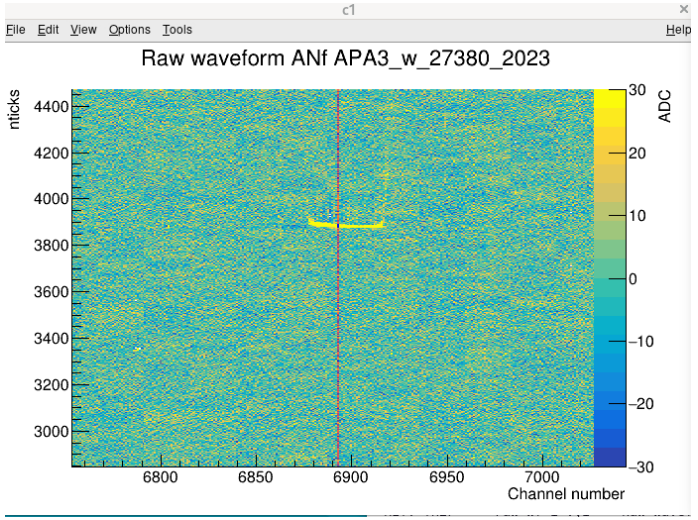


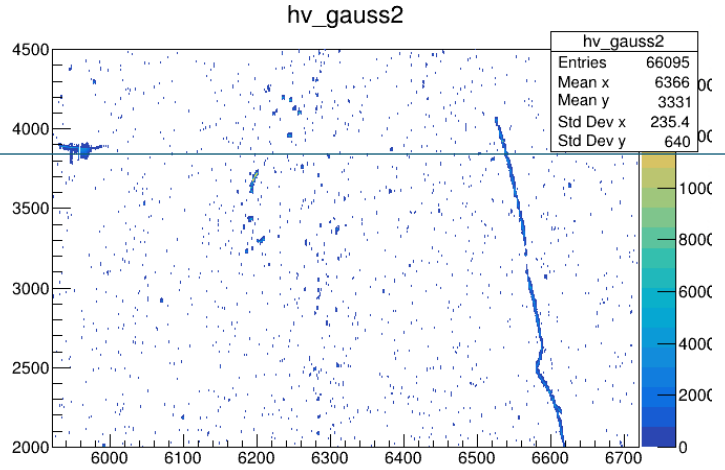
Backup

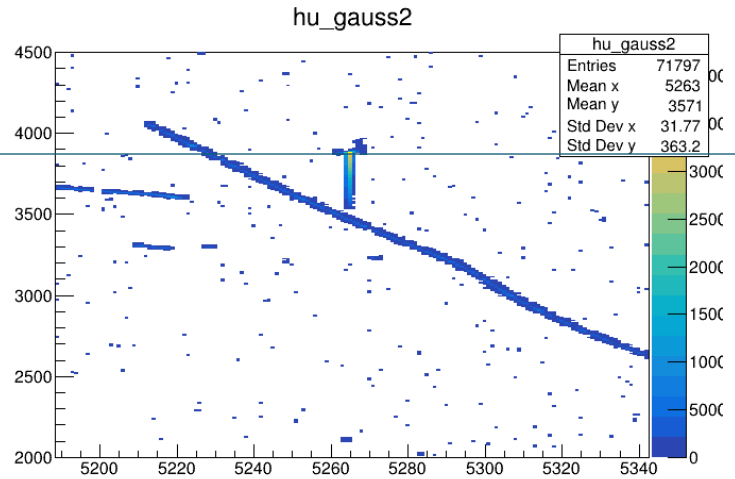
Run 27380-2023

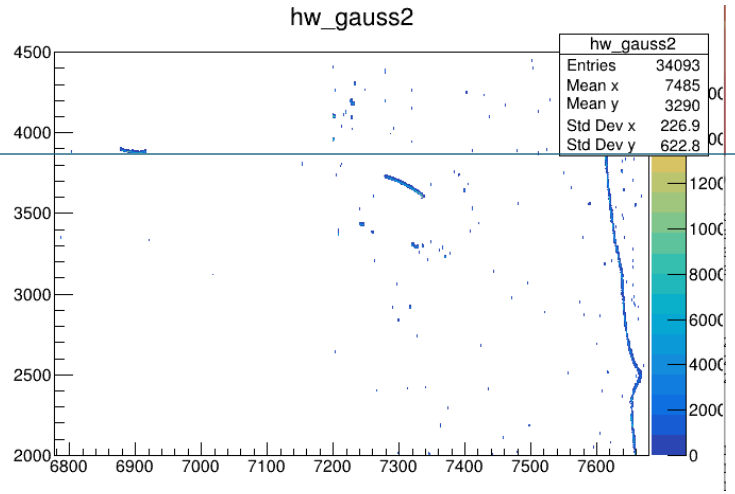


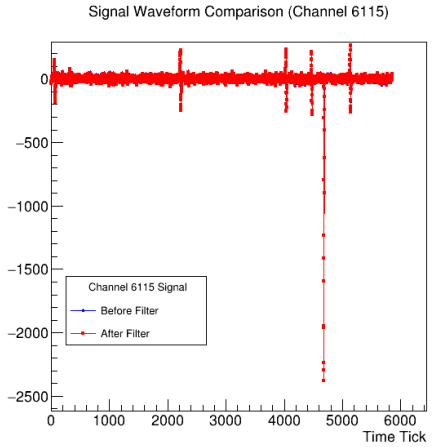


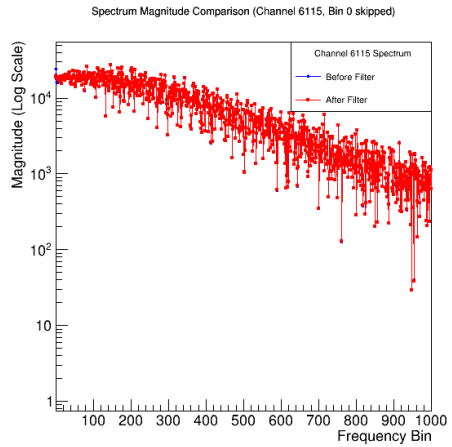


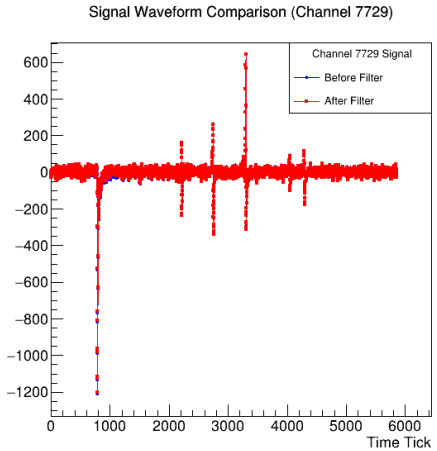


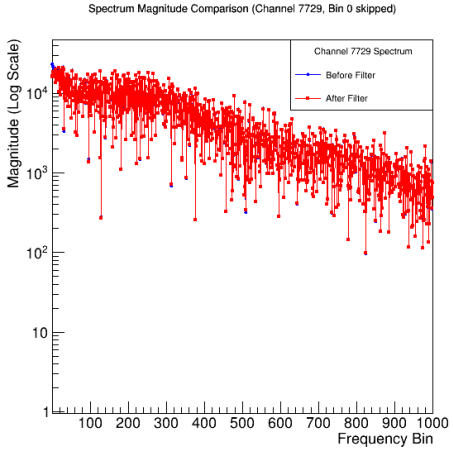


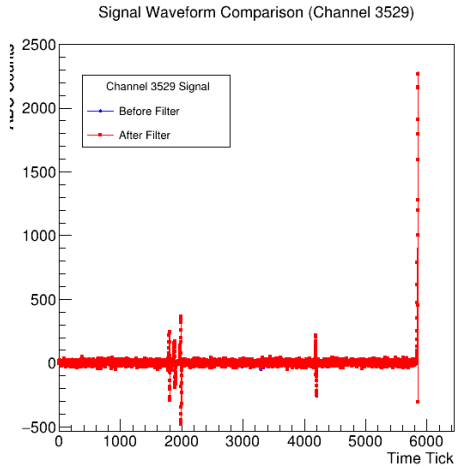


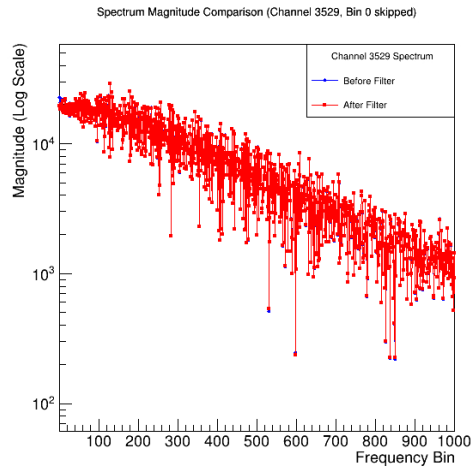

Signal Waveform Comparison (Channel 6115)
Channel 6115 Signal
Before Filter
After Filter
Time Tick

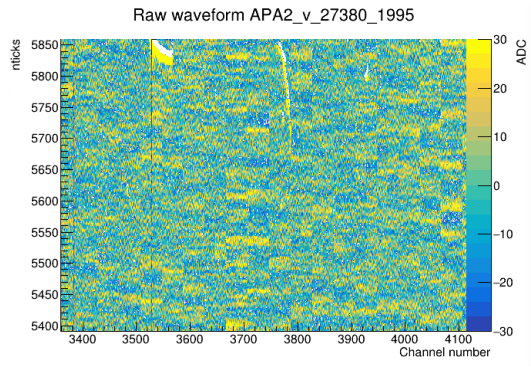

Spectrum Magnitude Comparison (Channel 6115, Bin 0 skipped)
Channel 6115 Spectrum
Before Filter
After Filter
Magnitude (Log Scale)
Frequency Bin

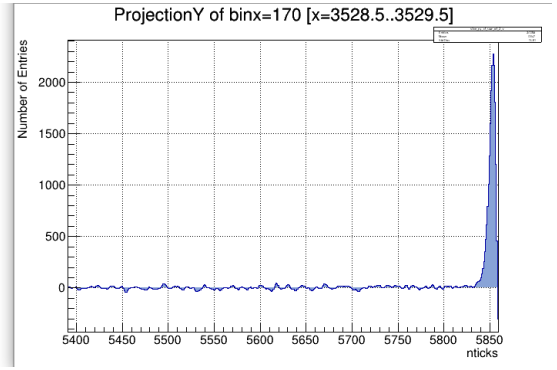

Signal Waveform Comparison (Channel 7729)
Channel 7729 Signal
Before Filter
After Filter
Time Tick


Spectrum Magnitude Comparison (Channel 7729, Bin 0 skipped)
Channel 7729 Spectrum
Before Filter
After Filter
Magnitude (Log Scale)
Frequency Bin


Signal Waveform Comparison (Channel 3529)
Channel 3529 Signal
Before Filter
After Filter
Time Tick


Spectrum Magnitude Comparison (Channel 3529, Bin 0 skipped)
Channel 3529 Spectrum
Before Filter
After Filter
Magnitude (Log Scale)
Frequency Bin


Raw waveform APA2_v_27380_1995
nticks
ADC
Channel number


ProjectionY of binx=170 [x=3528.5..3529.5]
Number of Entries
nticks