First Weekly Microboone Meeting
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Hardware
Unipolar Shaper Pulse

Since it’s UNIpolar, why are there 2 peaks?

Negative adc values?
- Blame noise, effects from cables and electronics
“Noise” vs. Standard Noise

- Alright, so there will be a change in the pulse shape, so what is it?!
- Answer: Noise is random, so having many pulses will eliminate the random effects and give a better idea of the shaper.
- In few words, average the pulses.
Programming Developments!

- A lot of work has been done on the analyzer code
  - The averaging code has correspondingly changed
    Basic Idea: Create a range for the peak, ignore all others, add each value at each point (bin), divide by the number you took (typical average)
      - Done with an event limit of 1,000
      - From LED data within the first 100 there are ~20 pulses
      - From the cosmic that number drops to ~8 (fewer with higher threshold)

**Important:** Averaging pulses alone will average peaks/noise with baseline values and thin out information throughout 512 microseconds.

  - To avoid this, find the bin with the peak value and work your way backwards to baseline. That will be the first bin of your average!
LED Results:

stitchedavg0

Entries: 612878
Mean: 76.41
RMS: 43.93

stitchedavg1

Entries: 615584
Mean: 75.17
RMS: 44.04

stitchedavg2

Entries: 634812
Mean: 71.77
RMS: 45.64
Cosmic Results

- **stitchedavg0**
  - Entries: 621323
  - Mean: 148.5
  - RMS: 86.79

- **stitchedavg1**
  - Entries: 659607
  - Mean: 144.4
  - RMS: 86.86

- **stitchedavg2**
  - Entries: 624636
  - Mean: 147.2
  - RMS: 87.68
Developments Ahead

• TPC Crate Testing has commenced. Should take about a week (aiming for a crate each day).

• Deconvolution! Want to extract the shaper to find when the PMT was fired to find the difference between fast and late light.
  • Need the shaper pulse to be clean and certain before the convolution has meaning.

My questions:
  • Kazu has the original unipolar shaper?
  • Where do we go from these averages?