fadc Analysis Software Update
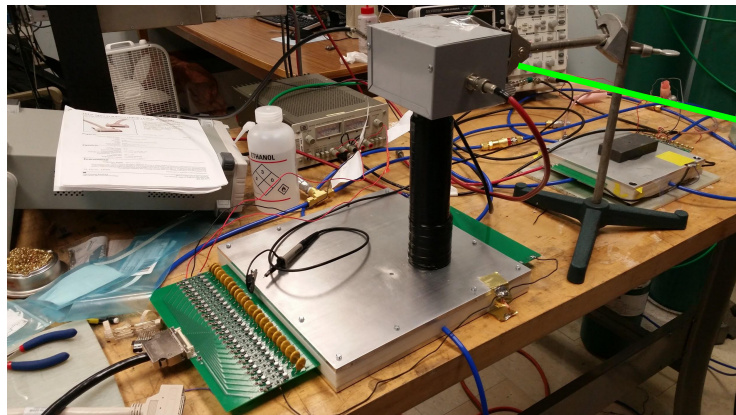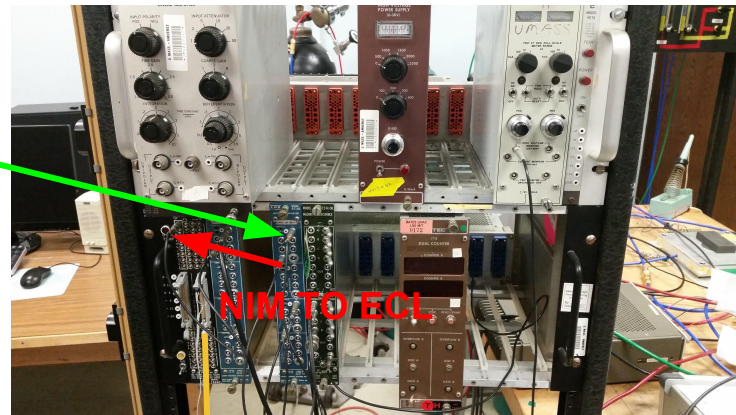
Andrew Schick
7/11/2017

PMT
SIGNAL
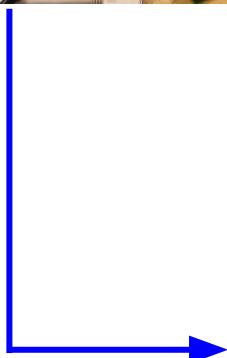TO
DISCR.

NIM TO ECL
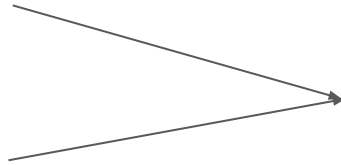
MWPC w/ NaI PMT

NIM Bin Array

ECL TO FADC
TRIGGER

MWPC SIGNAL

fADC

WORLD
EVENTS →→ FADC →→ ROOT file

fadc.exe(ROOT file) —outputs matrix in .csv file→ Matlab analysis

- Constructs waveforms from ROOT data
- Analyzes waveforms
  - Removes empty events
  - Peak start and end times
  - Integrates
- Outputs matrices to csv file
  - Columns are channel number
  - Rows are event number
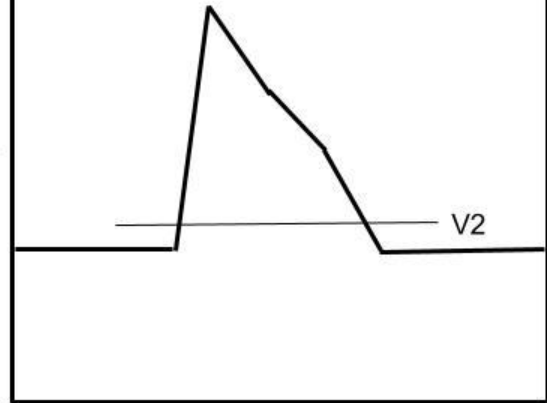 - The elements are wave property of interest (e.g. peak start time)

- Drift time histograms
- Number of elements in matrix as a function of cut voltage
- Waves per trigger
- Integral cuts
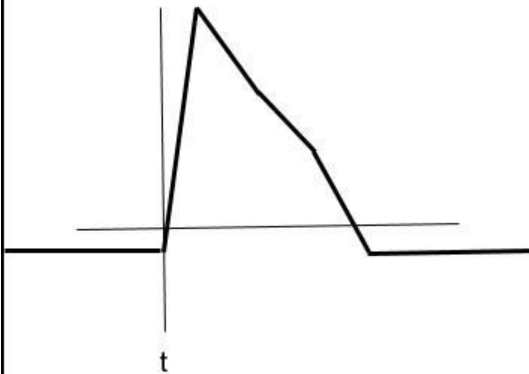
If (max - baseline) < V1
Return peakTimes = (0,0);

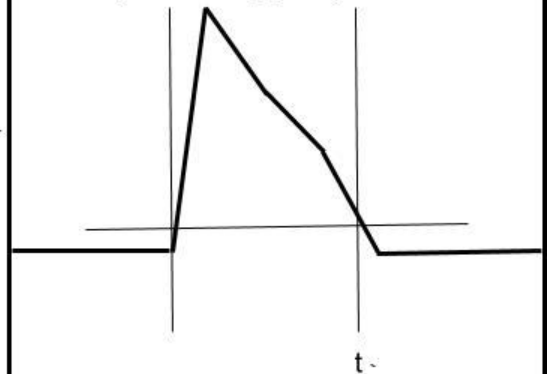V1 = Cut Voltage

V1
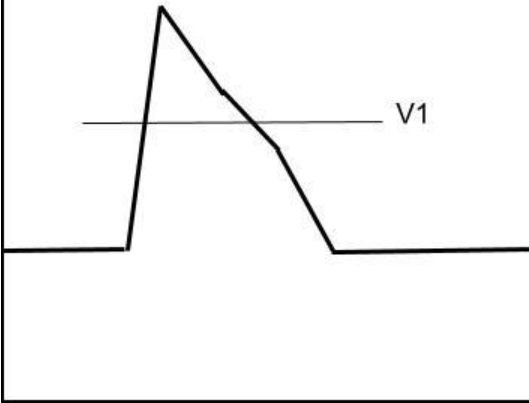
V2 = baseline + (max - baseline) * 0.05

V2

for (t = 0; t < window; t++){
    If V(t) > V2
    peakTimes[0] = t }

t

for (t; t<window; t++){
    If V(t) < V2
    peakTimes[1] = t }

t

Peak Start Time

Event	Channel 1	Channel 2	...	Channel n -1	Channel n
1	387	388	...	0	0
2	0	0	...	0	0
3	0	0	...	476	0
...	...	...	...	...	...

Integrals

Event	Channel 1	Channel 2	...	Channel n -1	Channel n
1	4001	3999	...	0	0
2	0	0	...	0	0
3	0	0	...	1904	0
...	...	...	...	...	...
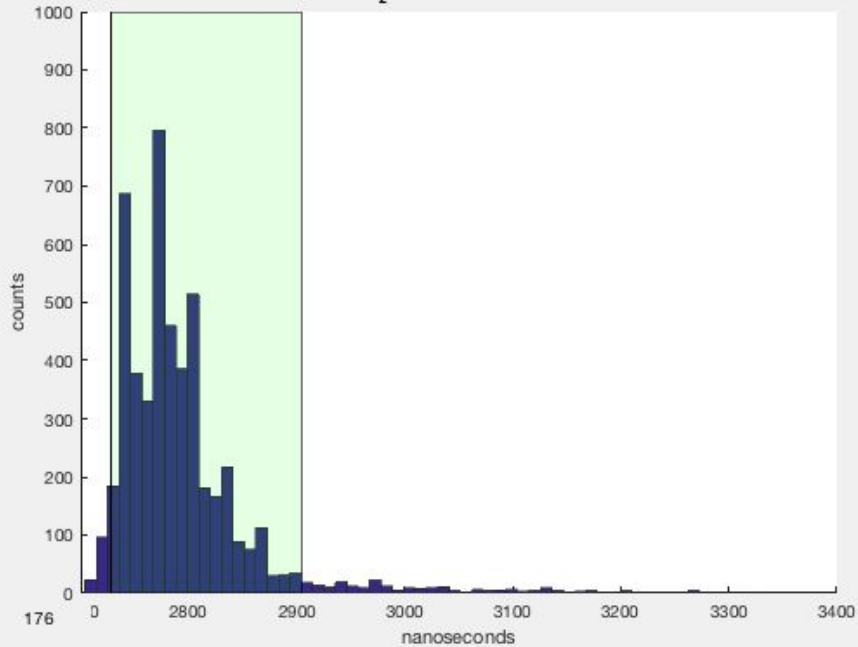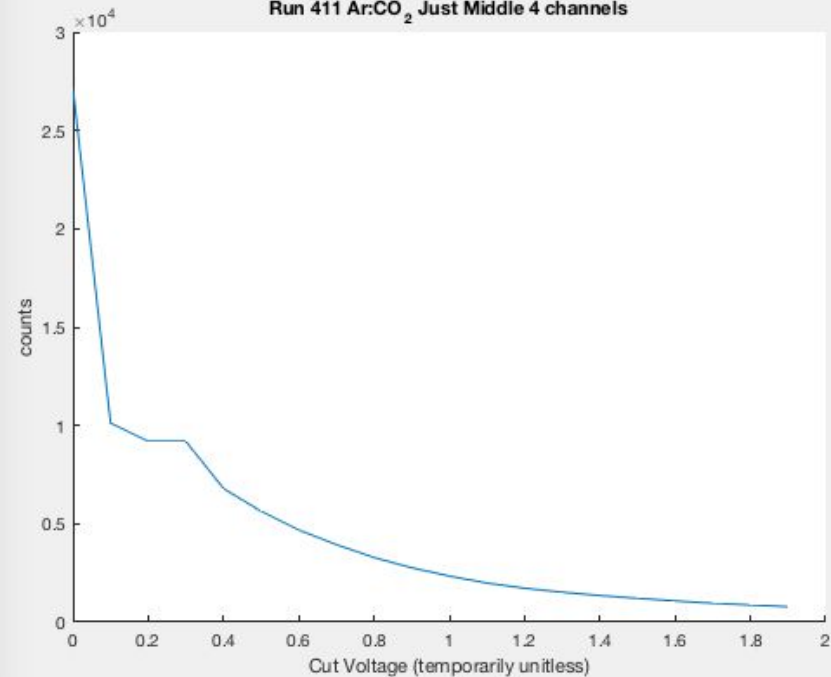
Drift Times calculated at the plateau.

The number of "good" events as a function of our **cut voltage** (**V1**).

Software Additions (added this morning)

PMT integration

- Activated second slot on fa125
- Can now remove noise triggers based on the integral of the PMT signal

Results pending a full run with the PMT. (Medium sized MWPC prototype is currently under repairs)