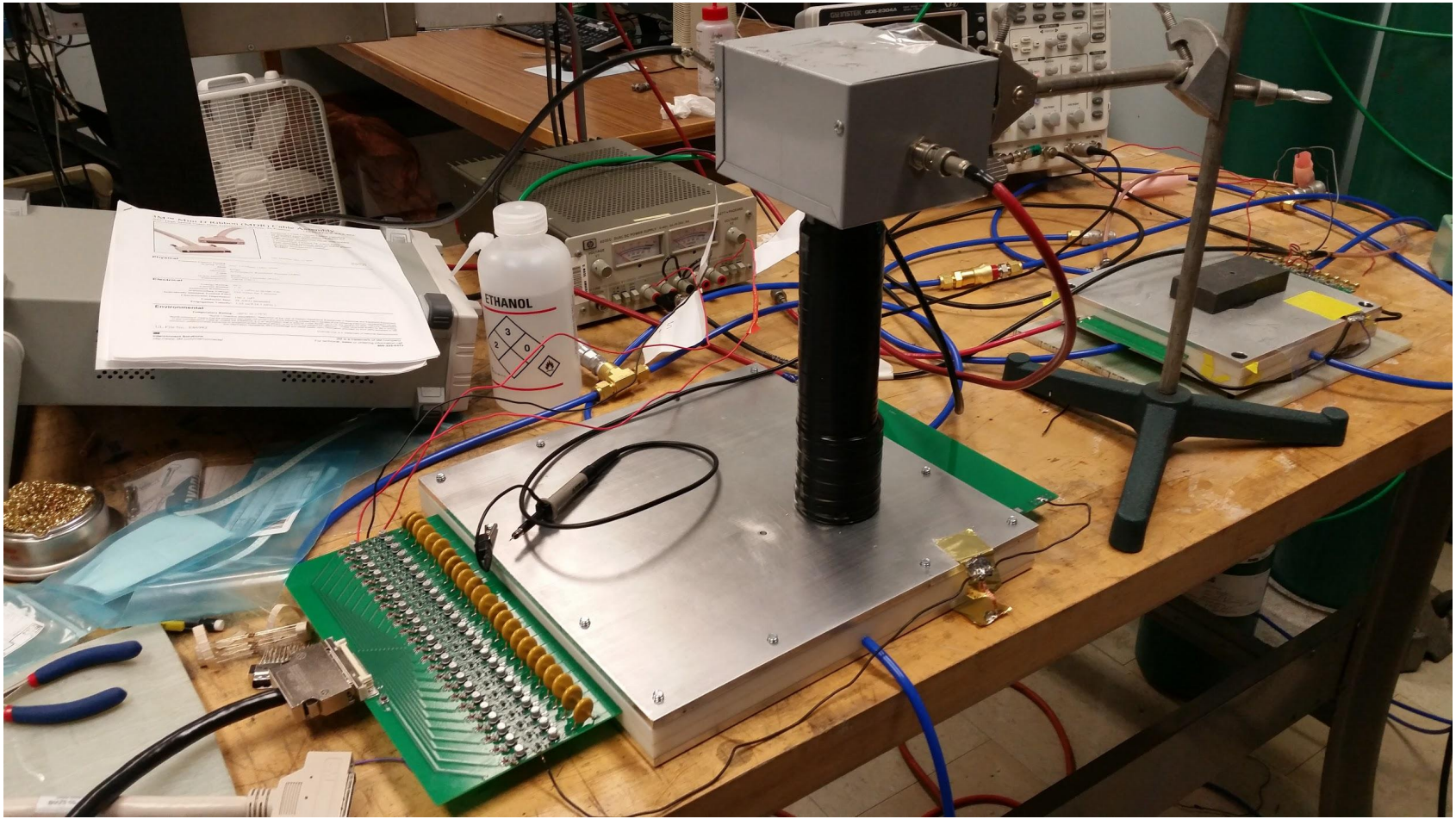
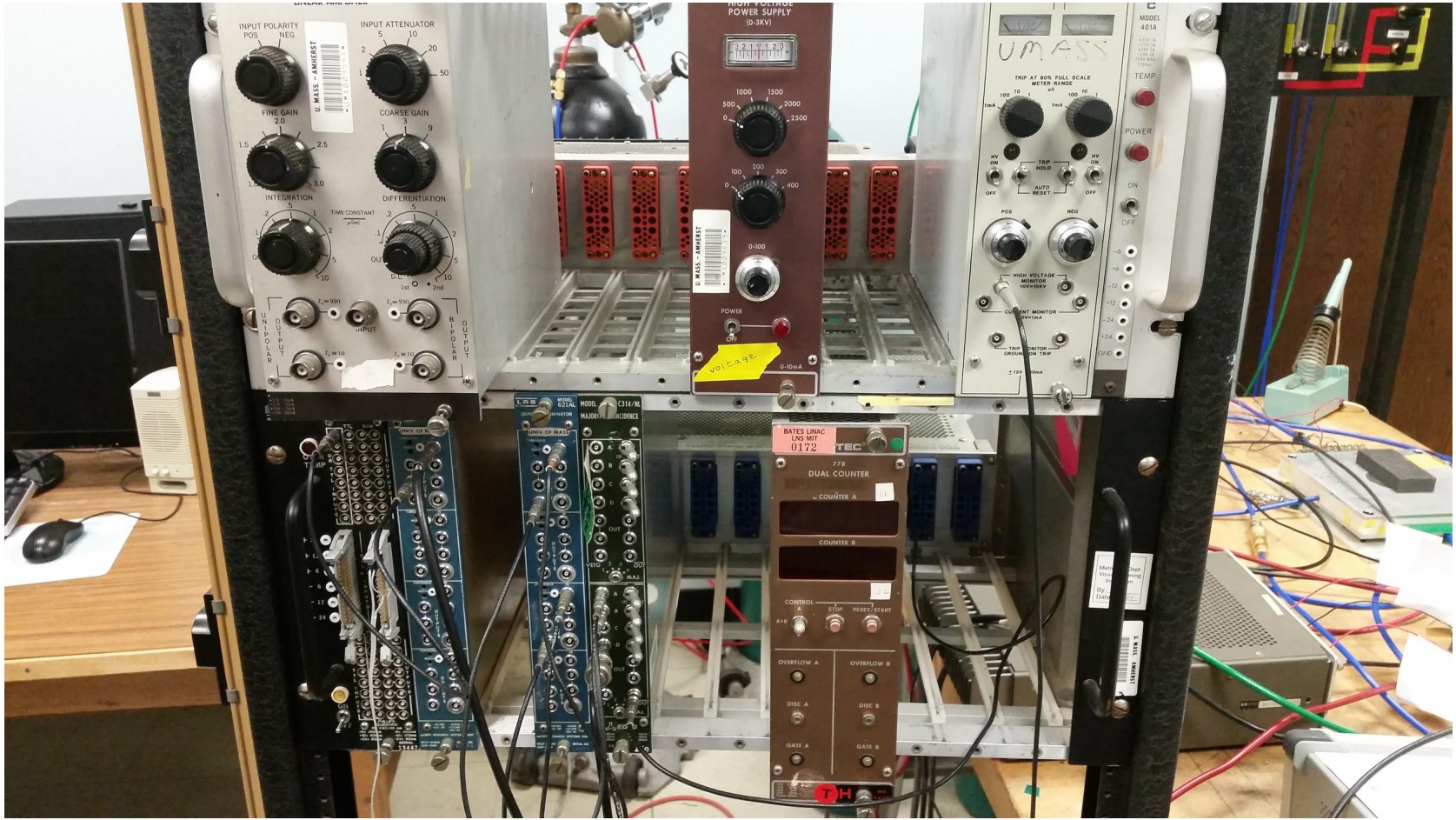
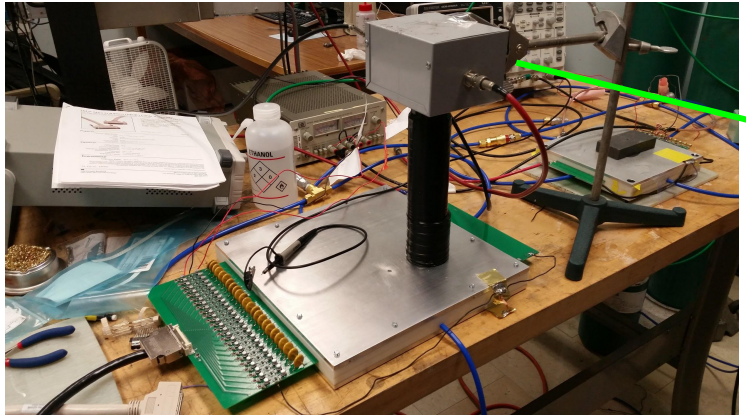

ETHANOL
3
2
0

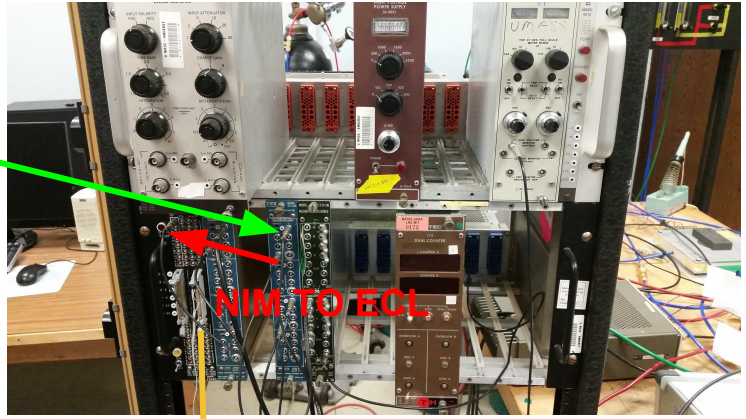

LINEAR AMPLIFIER
INPUT POLARITY
POS
NEG
INPUT ATTENUATOR
FINE GAIN
COARSE GAIN
INTEGRATION
DIFFERENTIATION
TIME CONSTANT
INPUT
UNIPOLAR OUTPUT
BIPOLAR OUTPUT
U MASS - AMHERST
HIGH VOLTAGE POWER SUPPLY
(0-3KV)
0-100
POWER
0-10mA
Voltage
UMASS
MODEL 401A
TRIP AT 80% FULL SCALE METER RANGE
HV ON
OFF
TRIP HOLD
AUTO RESET
POS
NEG
HIGH VOLTAGE MONITOR 10V=10KV
CURRENT MONITOR 10V=1mA
TRIP MONITOR GROUND ON TRIP
TEMP
POWER
ON
OFF
LRS
MODEL 621AL
UNIV. OF MASS
MODEL C314/NL
MAJORITY COINCIDENCE
BATES LINAC
LNS MIT
0172
778
DUAL COUNTER
COUNTER A
COUNTER B
CONTROL A
STOP
RESET/START
OVERFLOW A
OVERFLOW B
DISC A
DISC B
GATE A
GATE B

HALL D
JLAB
fADC-125
VXS
WIENER
REMOTE CONTROL



MWPC w/ NaI PMT

PMT SIGNAL TO DISCR.



NIM Bin Array

MWPC SIGNAL

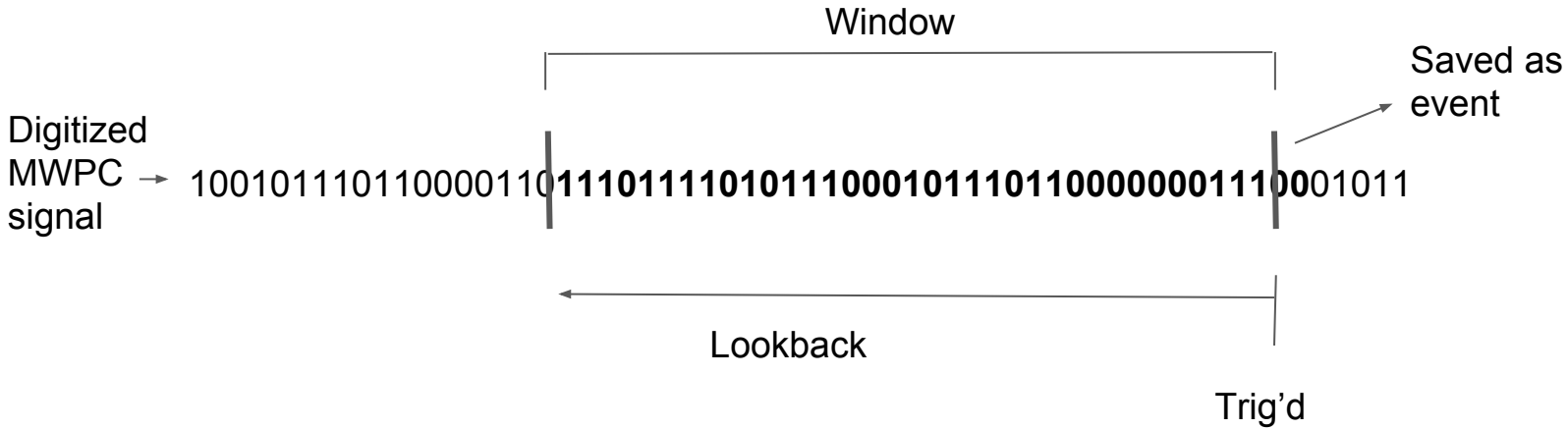
fADC

ECL TO FADC TRIGGER

DAQ

The fADC has a constant pipeline of data entering it from the MWPC, broken down into 8 ns frames.

When it receives a trigger from the PMT, it consults a CONFIG file that instructs it on where to start taking data, and for how many 8 ns frames.



Control Sessions Configurations Options Expert User Help

Start Time: /25/16 20:01:56

End Time: 26/16 18:19:28

Run Parameters

Expid: hdops

Session: hdops

Configuration: DC125_single

Output File: /home/daq/Disk2/data/fmwpc_proto_000315_000.evio

User RTV %(config): unset

User RTV %(dir): unset

Run Status

Run N...: 315

Run State: ended

Event Limit: 0

Watch Component: PEB0

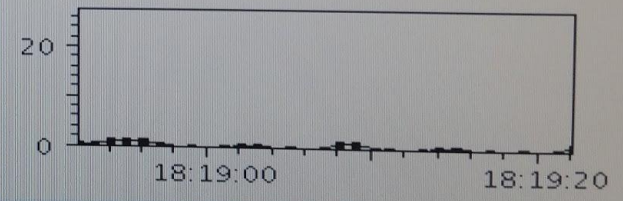
Data Limit: 0

Total Events: 33059

Time Limit (min.): 0

Name	State	EvtRate	DataR...	IntEvt...	IntDat...
PEB0	download...	0.0	0.0	0.4	0.1
ROC0	download...	0.0	0.0	0.4	0.1

Event Rate | Data Rate | Client Data | Live Time



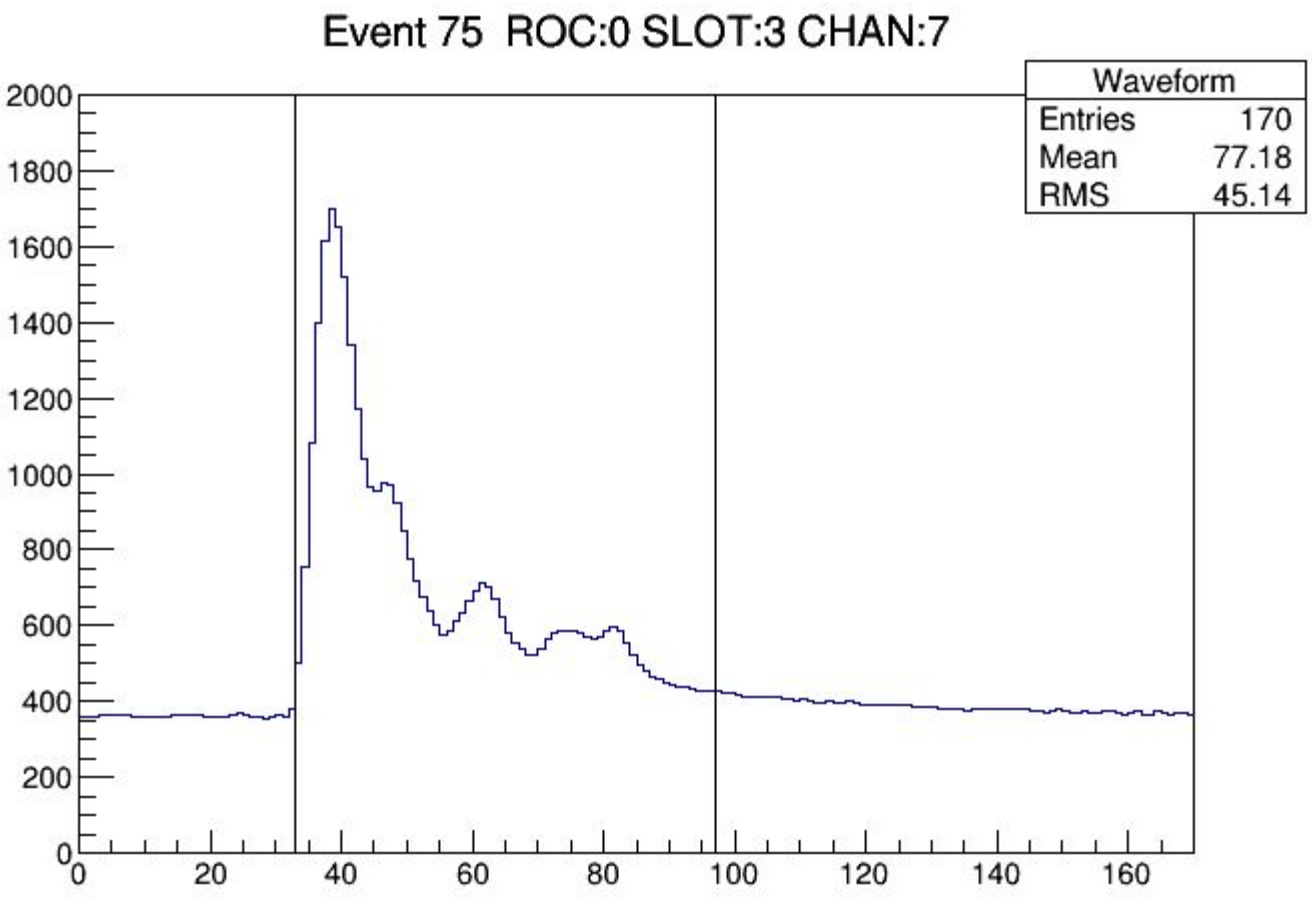
Name	Message	Time	Severity
sms_fADC125_single	waiting for...	18:19:27 ...	WARN
sms_fADC125_single	End succeeded.	18:19:28 ...	INFO

XTerm (3) Terminal_d Run Control

ROOT files

The DAQ system creates a ROOT file of the data.

Using software that wraps some of ROOT’s functionality, we create a waveform that can be analyzed.


Event 75 ROC:0 SLOT:3 CHAN:7
Waveform
Entries 170
Mean 77.18
RMS 45.14
2000
1800
1600
1400
1200
1000
800
600
400
200
0
0
20
40
60
80
100
120
140
160

Using the ROOT files in drift time studies

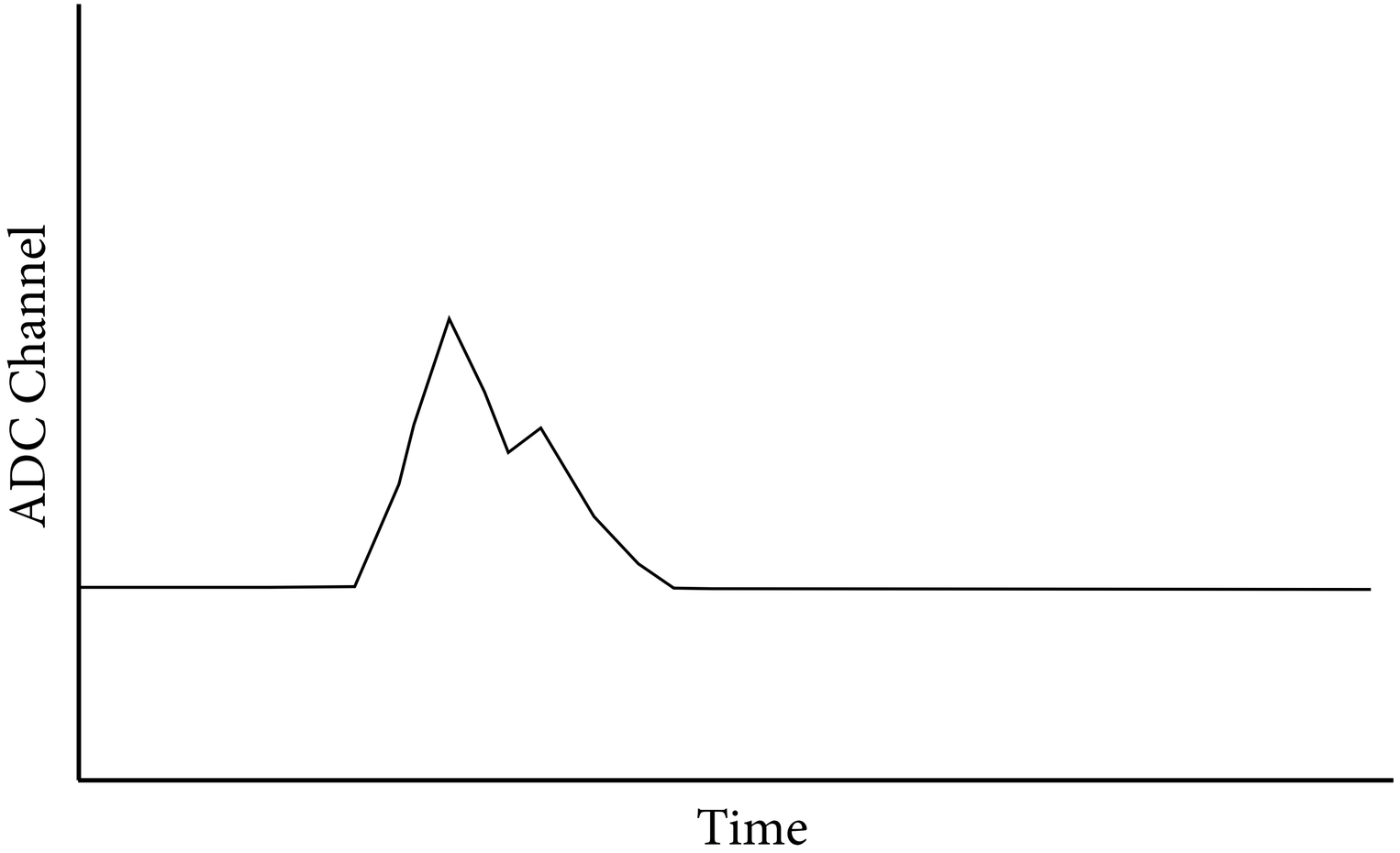
PEAK DETECTION ALGORITHM:

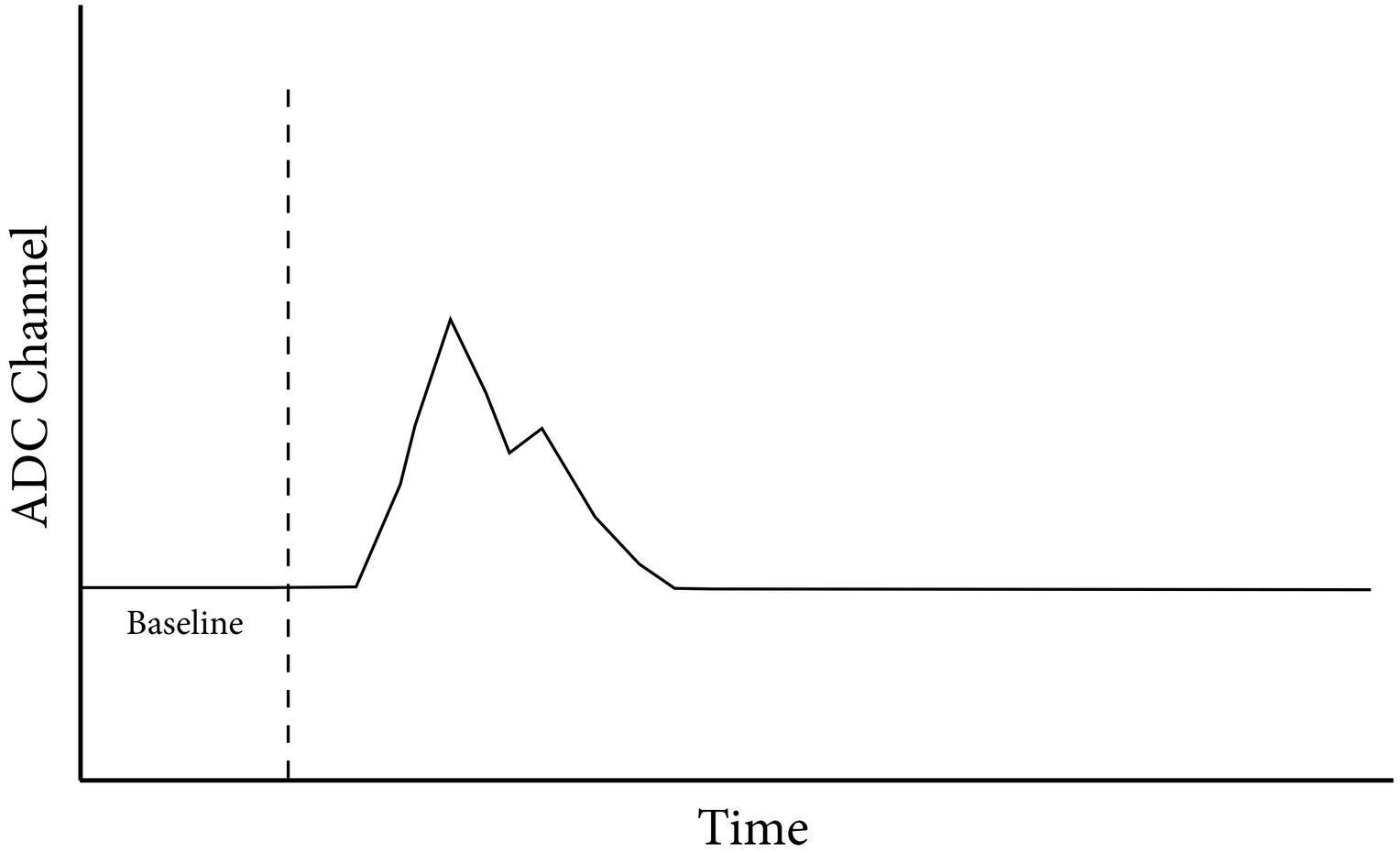
Constant Fraction Method with some modifications

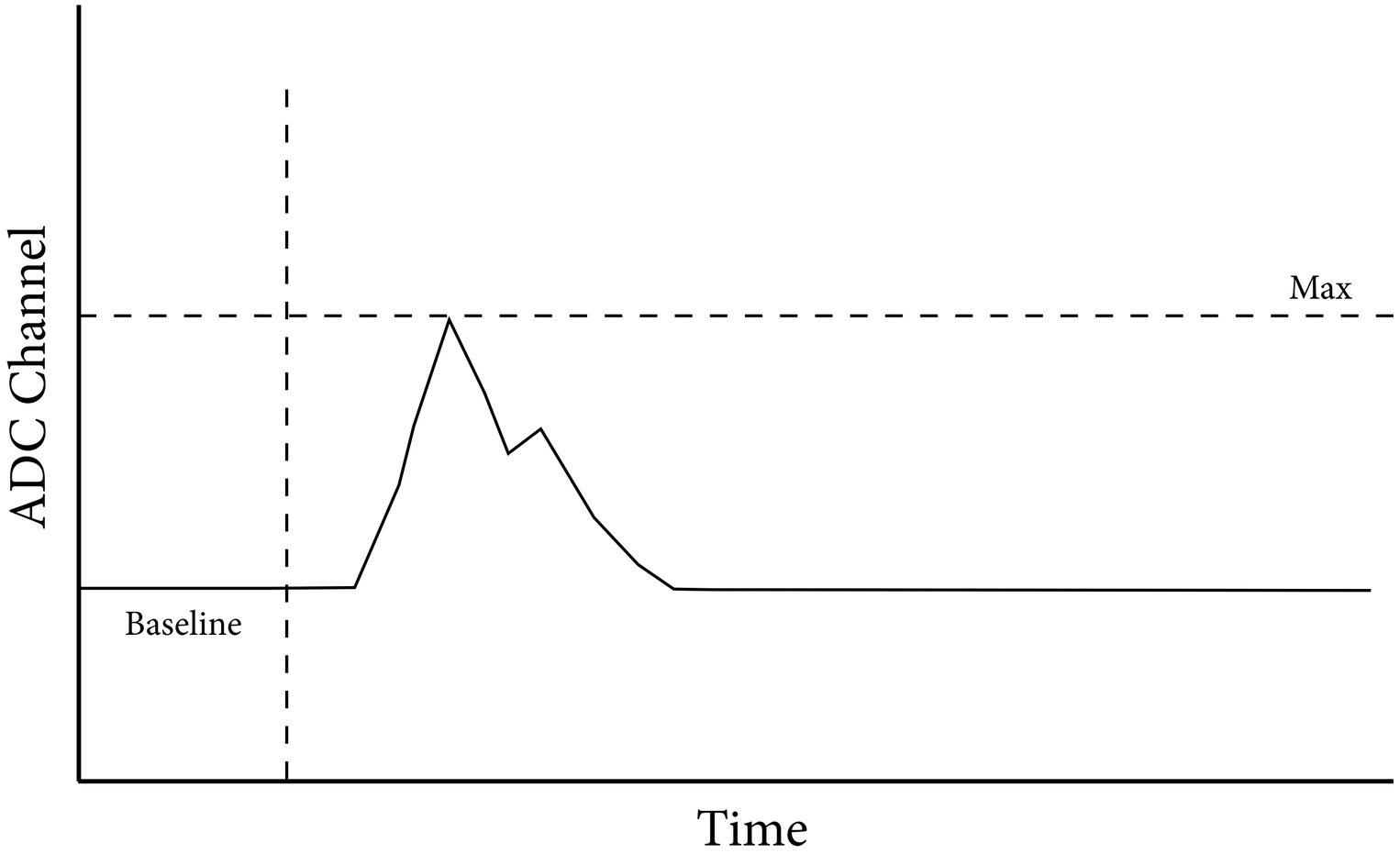
Voltages for 10^5 gain on MWPC power supply

Ar:CO_2 80:20	2020 Volts
Ar:CO_2 90:10	1820 Volts
Freon	2125 Volts

Voltage for NaI PMT power supply	1400 V
Discriminator threshold for PMT signal	390 mV


ADC Channel
Time

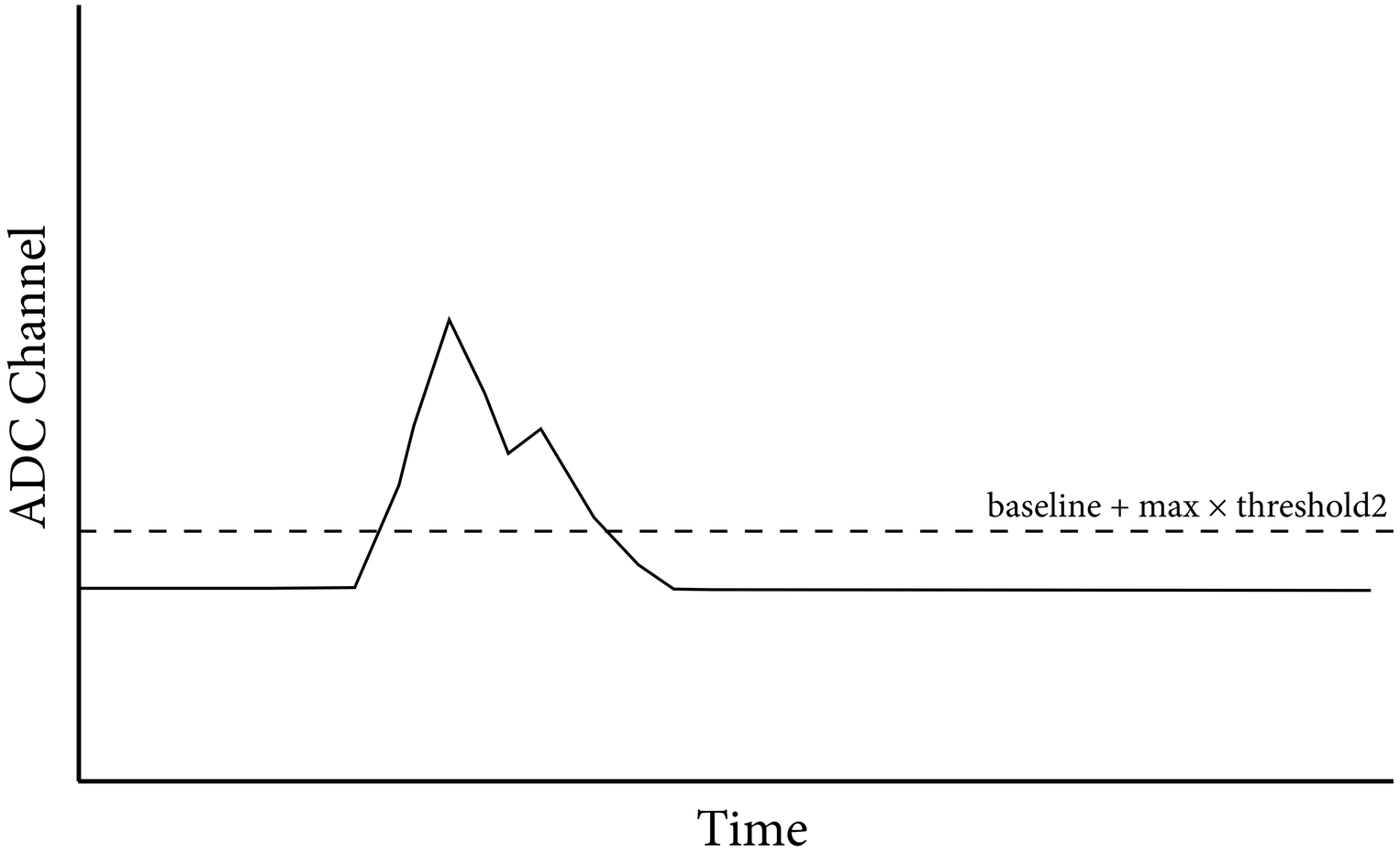

ADC Channel
Baseline
Time

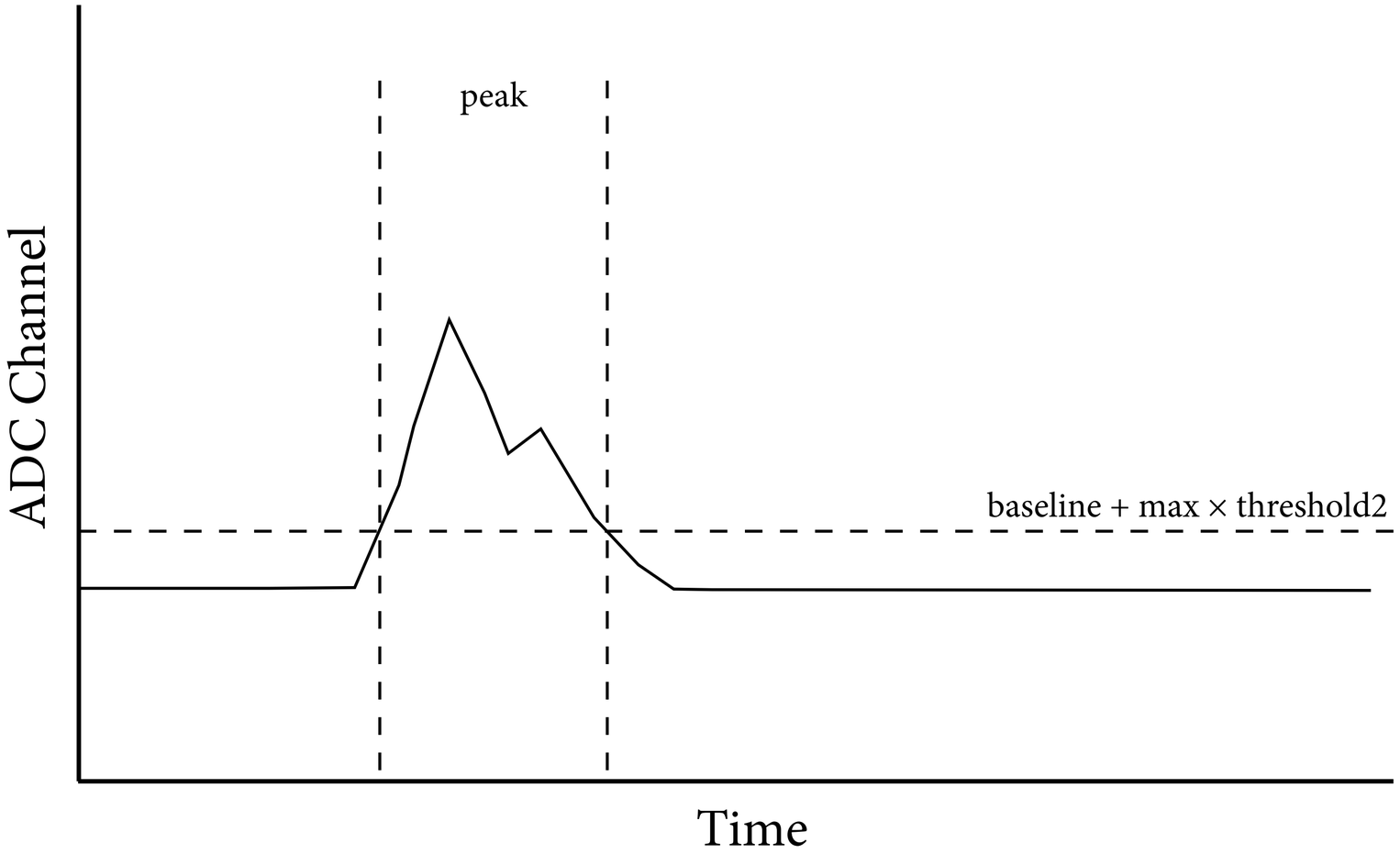

ADC Channel
Max
Baseline
Time

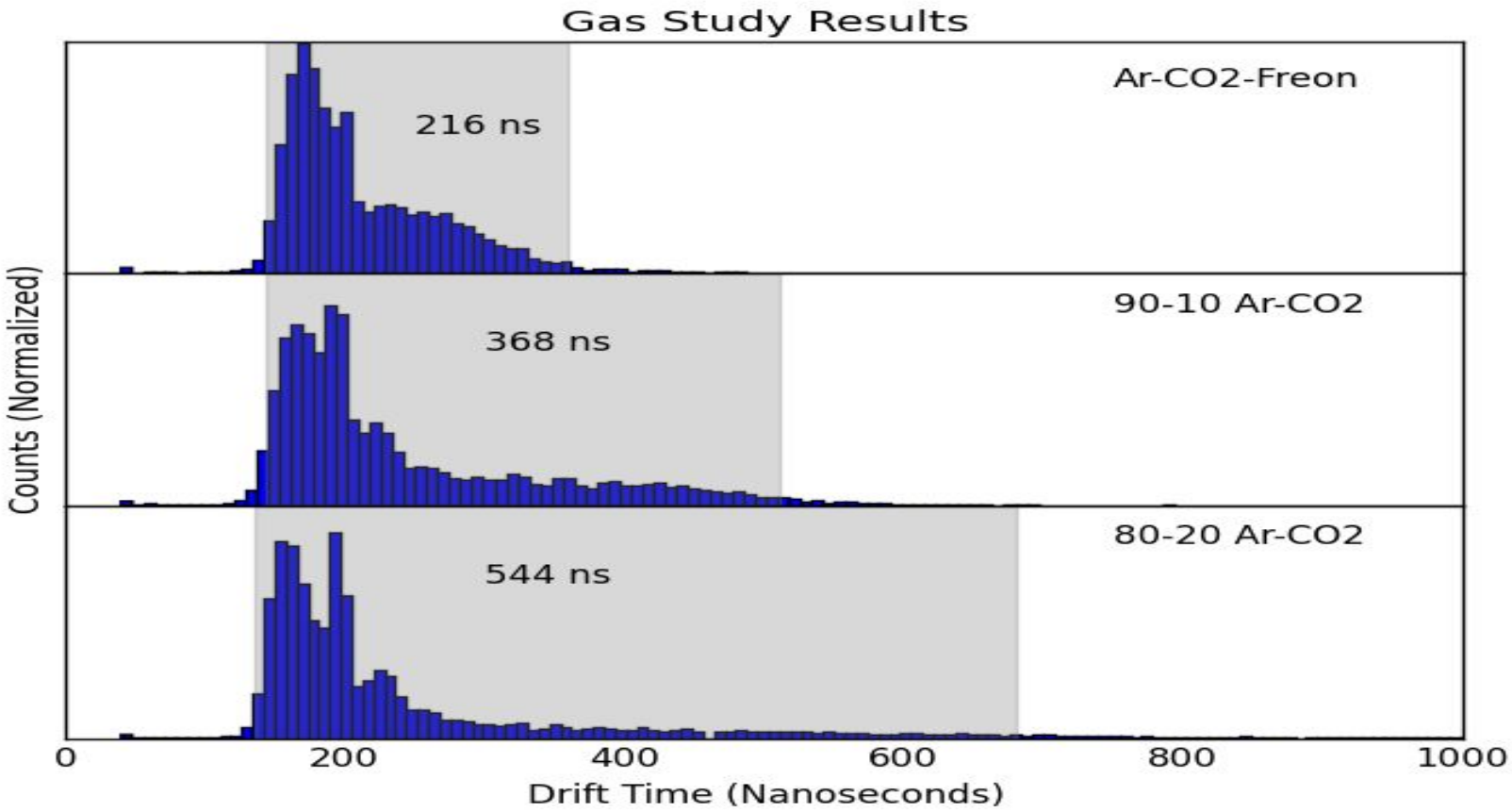
Peak Condition:

$$\text{max} - \text{baseline} \geq \text{baseline} \times \text{threshold1}$$

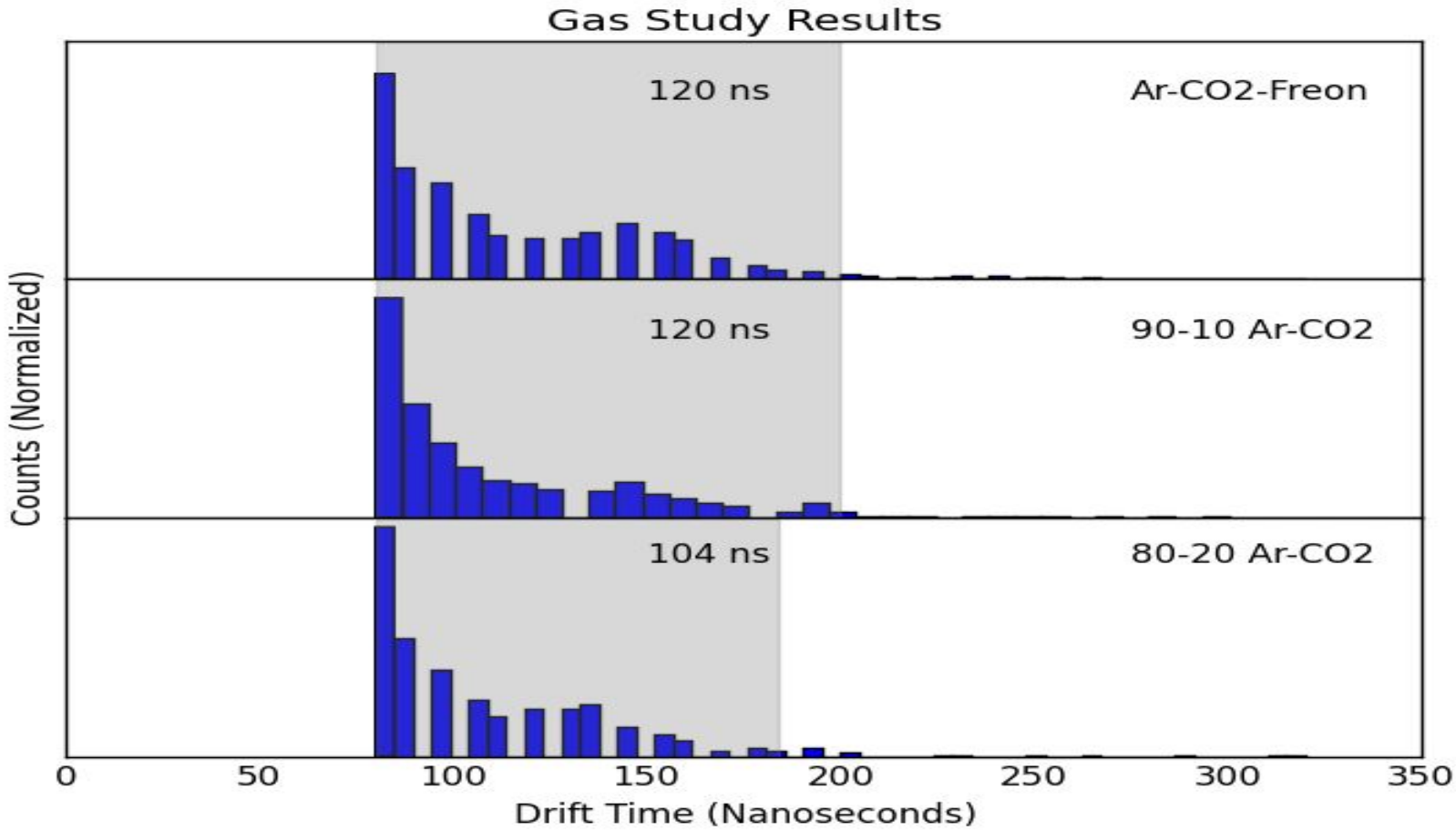
Set by user, about 0.05


ADC Channel
baseline + max × threshold2
Time

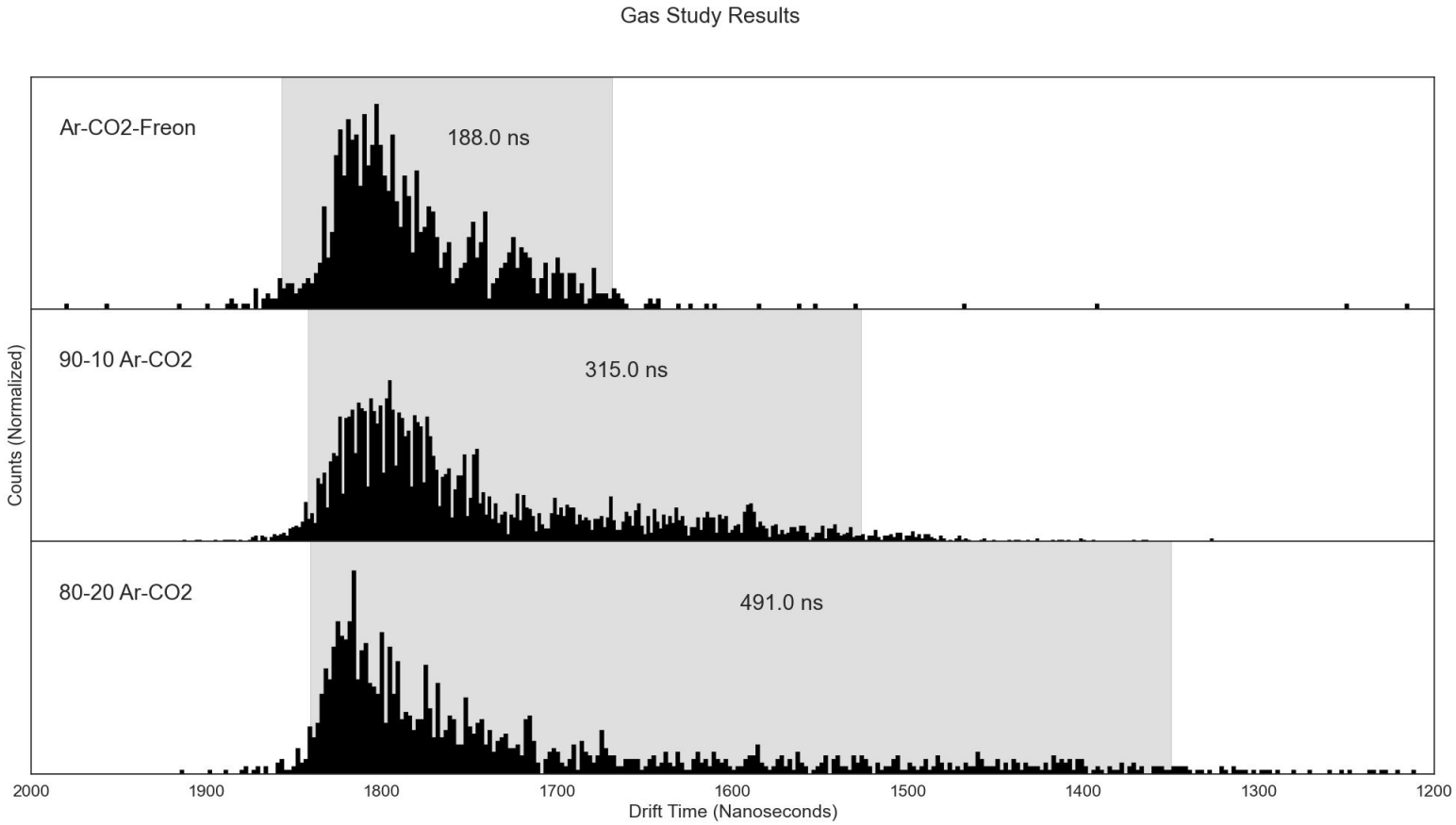

peak
ADC Channel
baseline + max × threshold2
Time



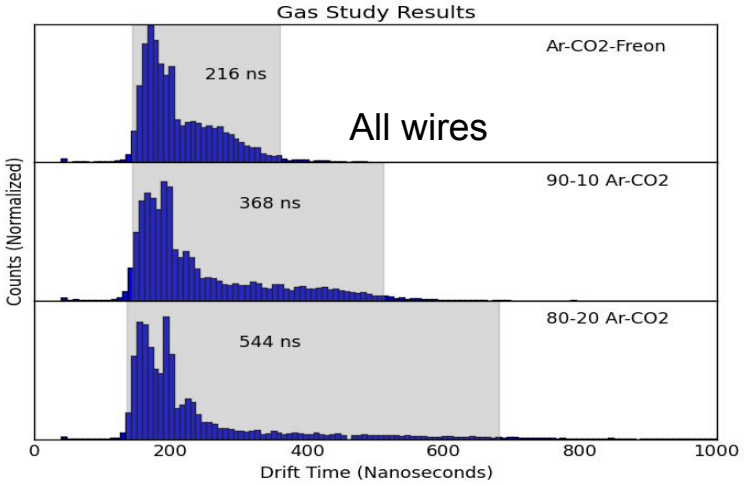
Analyzing the signal from all wires

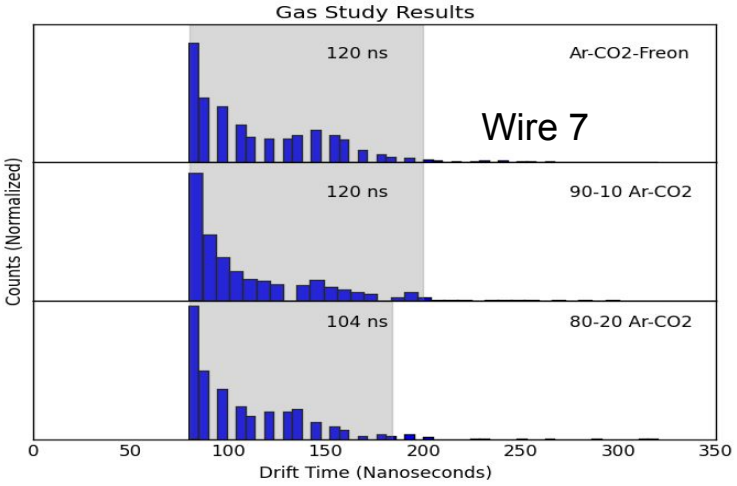


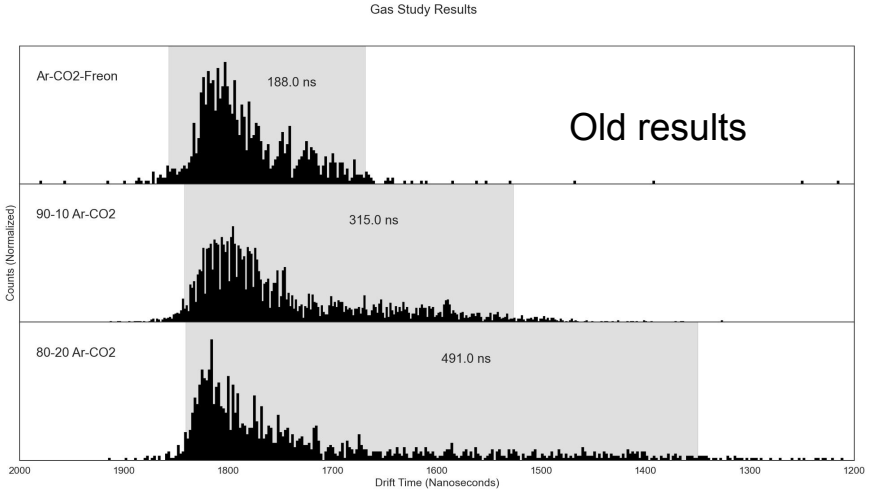
Just analyzing one wire (the 7th in, directly under the PMT)



Drift time studies from last summer utilizing ScopeOut


Gas Study Results
Ar-CO2-Freon
216 ns
All wires
90-10 Ar-CO2
368 ns
80-20 Ar-CO2
544 ns
Counts (Normalized)
0
200
400
600
800
1000
Drift Time (Nanoseconds)


Gas Study Results
120 ns
Ar-CO2-Freon
Wire 7
120 ns
90-10 Ar-CO2
104 ns
80-20 Ar-CO2
Counts (Normalized)
0
50
100
150
200
250
300
350
Drift Time (Nanoseconds)


Gas Study Results
Ar-CO2-Freon
188.0 ns
Old results
90-10 Ar-CO2
315.0 ns
80-20 Ar-CO2
491.0 ns
Counts (Normalized)
2000
1900
1800
1700
1600
1500
1400
1300
1200
Drift Time (Nanoseconds)