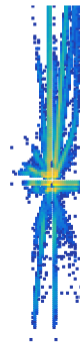
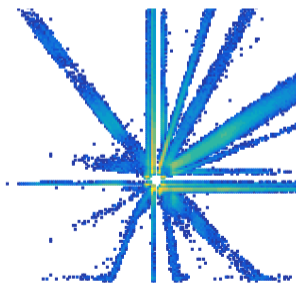
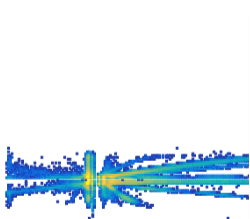


# Charge Analysis Update

Harrison Ritchie-Yates

6<sup>th</sup> of April, 2020



# Introduction

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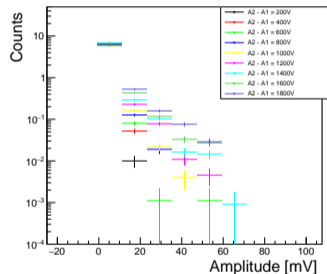
- ▶ We are continuing to look at the data taken in March.
- ▶ We are continuing to look at plots of voltage vs number of entries, as well as fitting and plotting the positions of peaks in the amplitude spectra against voltage.
- ▶ This weeks update focuses only on voltage scheme C.

## Amplitude spectra

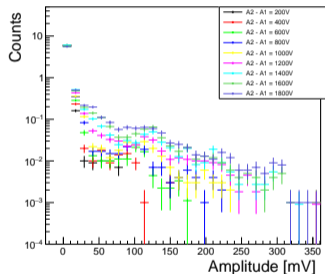
- ▶ In the following, amplitude spectra for the three anodes are shown.
- ▶ On the vertical axis counts are shown, normalised to one event (*i.e.* a 2 s exposure).
- ▶ Amplitude spectra shown are summed data over approx 10 runs at different voltage configs.
- ▶ For **voltage scheme B**, anodes 1 and 2 were held at constant voltages (at 1200V and 2400V respectively) and anode 3 was varied from 2400V through 5000V.
- ▶ For **voltage scheme C**, anode 1 was held at constant voltages (at 1200V) and anodes 2 and 3 were varied from 1400V through 3000V, and 2600V through 4600V respectively (keeping A3 - A2 constant).

# Scheme C 3 barA pure Ar

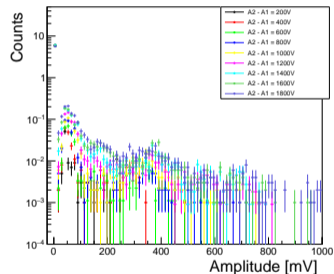
## Anode 1



## Anode 2



## Anode 3

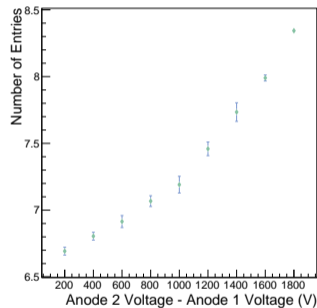


## No. Entries Vs Voltage Plots

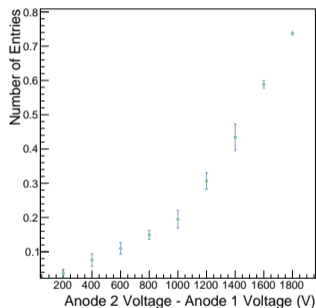
- ▶ In the following, plots of number of entries vs voltage are shown.
- ▶ On the vertical axis are the number of entries, normalised to one event (*i.e.* a 2 s exposure).
- ▶ Errors bars are calculated from the standard deviation of the number of entries in 10 runs.
- ▶ On the horizontal axis is the anode 1 anode 2 voltage difference.
- ▶ For **voltage scheme C**, anode 1 was held at constant voltages (at 1200V) and anodes 2 and 3 were varied from 1400V through 3000V, and 2600V through 4600V respectively (keeping A3 - A2 constant).

# Scheme C 3 barA pure Ar, Entries vs Voltage

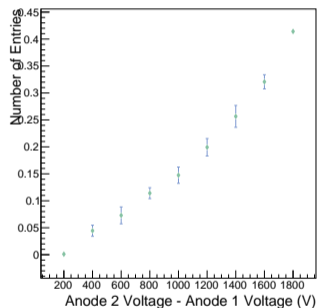
Mean No. entries in one run



A3 amplitude > 100mV

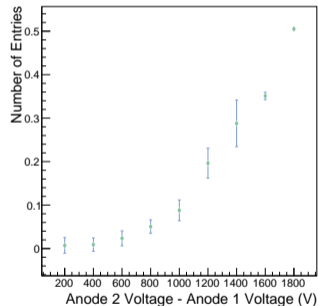


A3 amplitude > 250mV

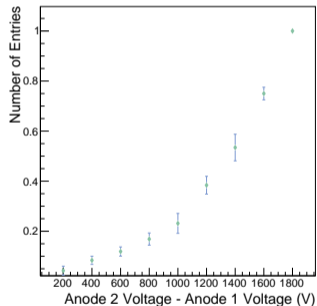


# Scheme C 3 barA pure Ar, Entries vs Voltage

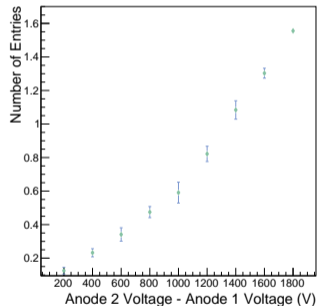
Anode 1 Max Value above threshold



Anode 2 Max Value above threshold

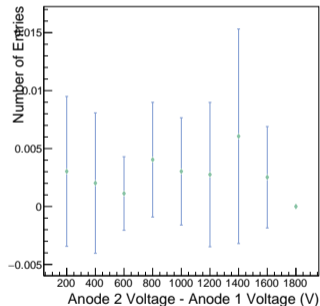


Anode 3 Max Value above threshold

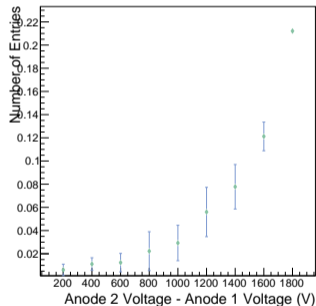


# Scheme C 3 barA pure Ar, Entries vs Voltage

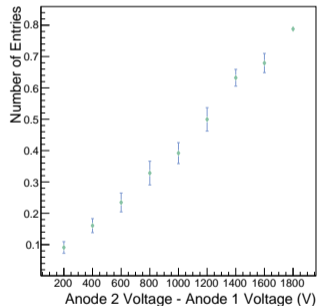
Only anode 1 Max Value above threshold



Only anode 2 Max Value above threshold



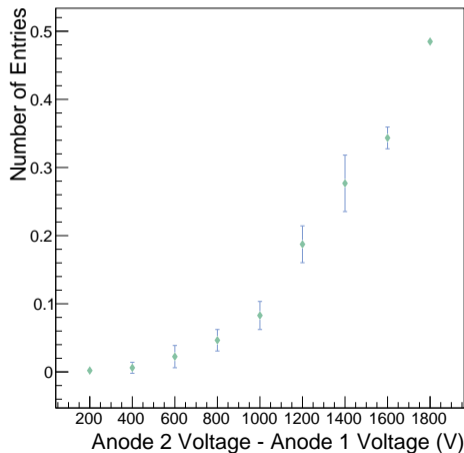
Only anode 3 Max Value above threshold



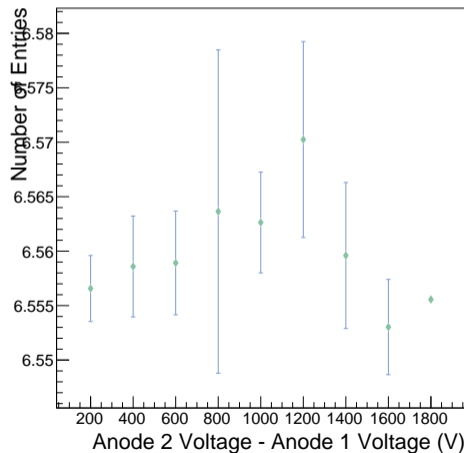


# Scheme C 3 barA pure Ar, Entries vs Voltage

All anodes max value above threshold

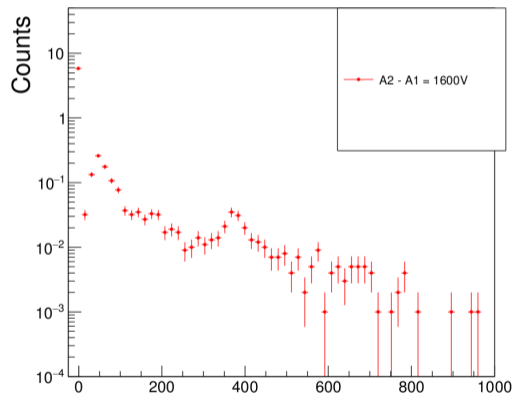


No anodes max value above threshold

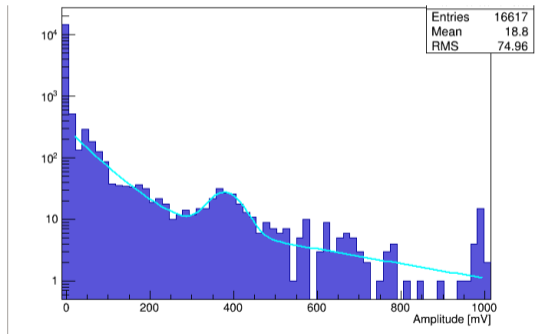


# Scheme C 3 barA pure Ar peaks in anode 2 spectra

## Anode 3 amplitude spectra

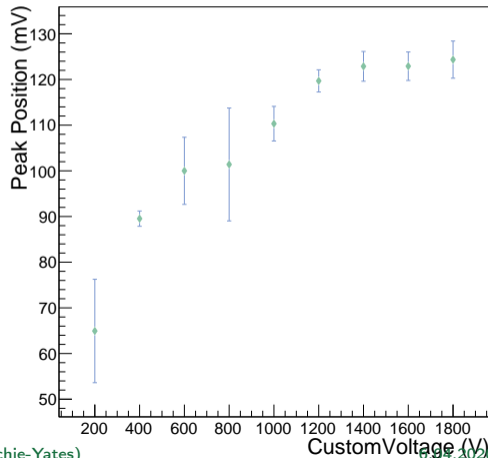


## Anode 3 Amplitude Spectra (Fitted)

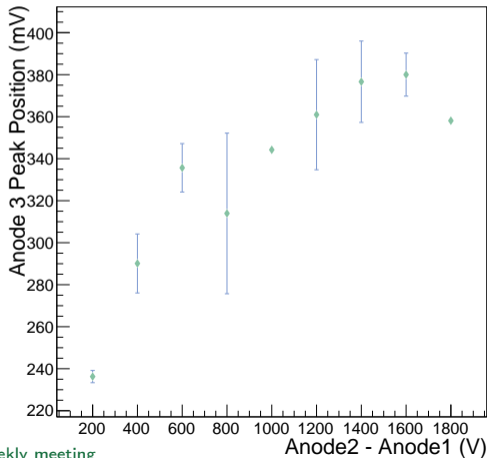


# Scheme C 3 barA pure Ar amplitude spectra peaks vs anode 2 voltage - anode 1 voltage (preliminary)

## Anode 2 Peak Position vs A2 - A1



## Anode 3 Peak Position vs A2 - A1



## Plan for this week

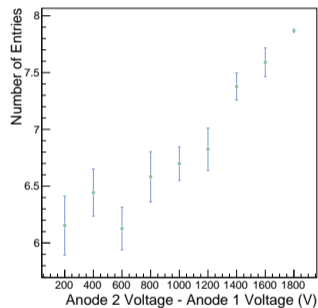
---

- ▶ Continue to improve peak position vs voltage plots with waveform fitting etc. to provide clearer amplitude spectra.
- ▶ Compare the data taken last week with the previous 3 barA data, also compare spectra shape to 2018 data.
- ▶ Each day we took a set of runs at the same voltage config, we can compare these to investigate any gas ageing effects.

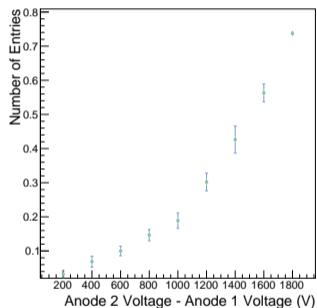
# Extra Slides

# Scheme C 3 barA pure Ar, Entries vs Voltage (Clean)

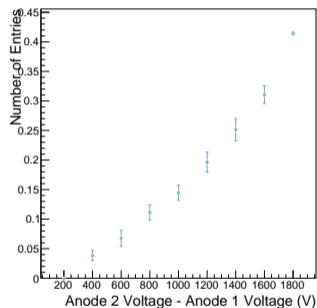
Mean No. entries in one run



A3 amplitude > 100mV

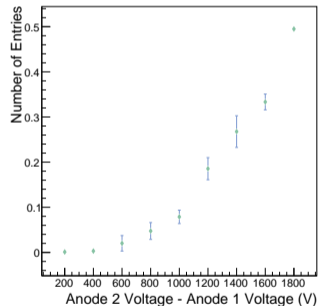


A3 amplitude > 250mV

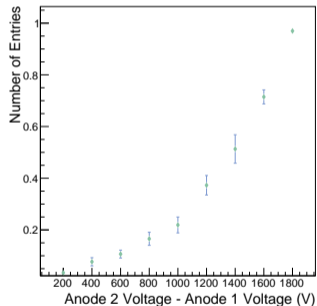


# Scheme C 3 barA pure Ar, Entries vs Voltage (Clean)

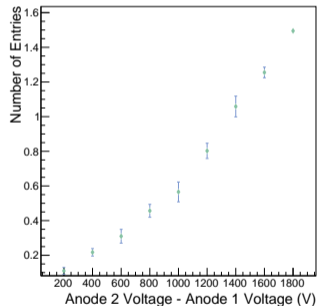
Anode 1 Max Value above threshold



Anode 2 Max Value above threshold

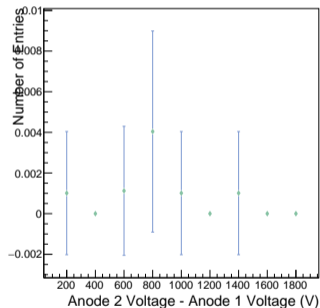


Anode 3 Max Value above threshold

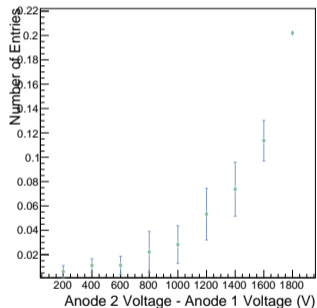


# Scheme C 3 barA pure Ar, Entries vs Voltage (Clean)

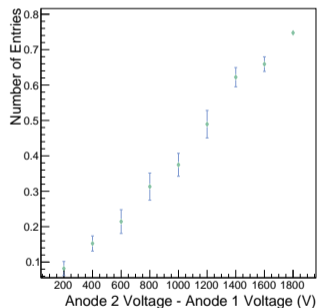
Only anode 1 Max Value above threshold



Only anode 2 Max Value above threshold



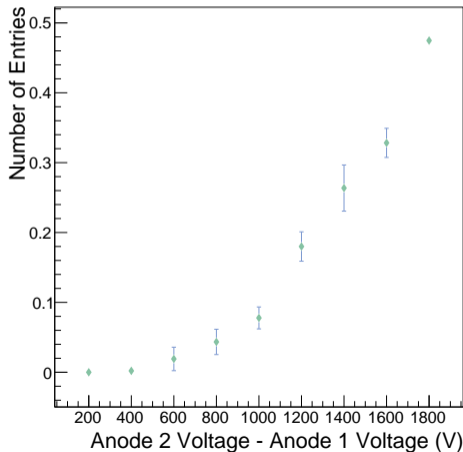
Only anode 3 Max Value above threshold



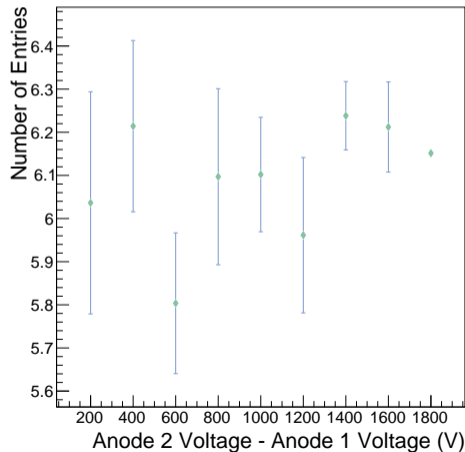


# Scheme C 3 barA pure Ar, Entries vs Voltage (Clean)

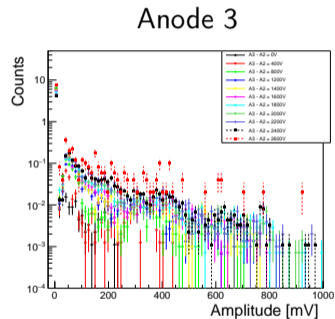
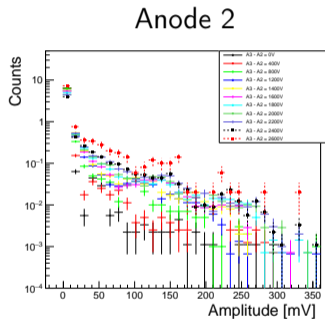
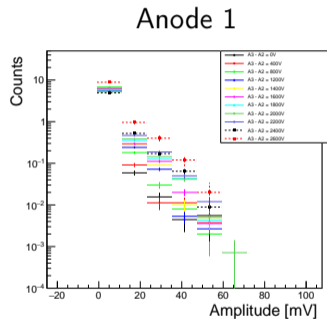
All anodes max value above threshold



No anodes max value above threshold

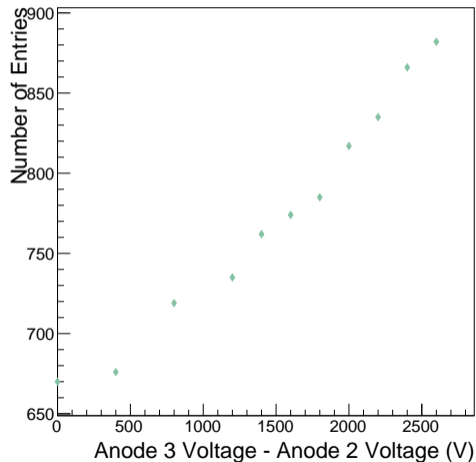


# Scheme B 3 barA pure Ar



# Scheme B 3 barA pure Ar (Preliminary)

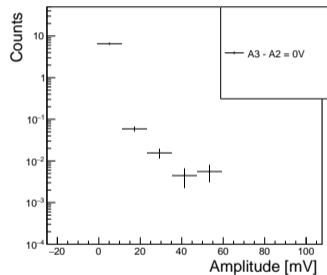
Entries in one run from each config



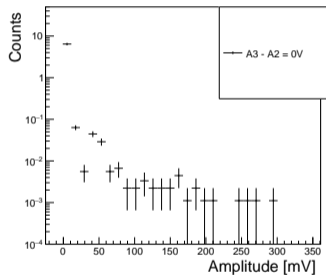
# SchemeB Indiv Spectra)

# Scheme B 3 barA pure Ar

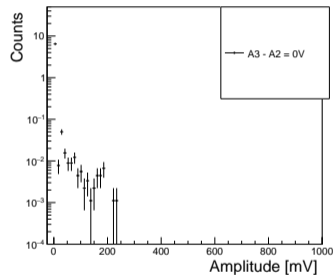
## Anode 1



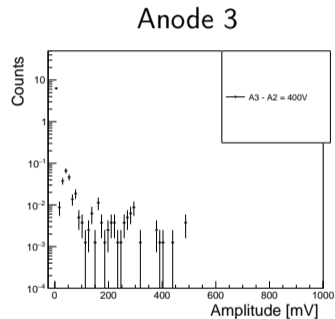
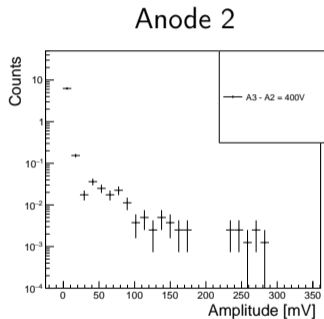
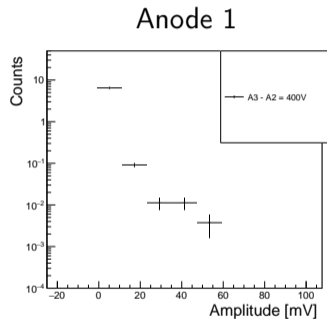
## Anode 2



## Anode 3

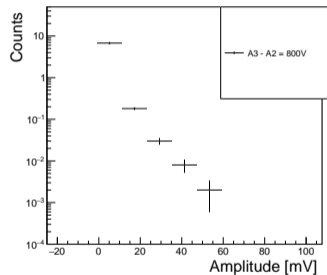


# Scheme B 3 barA pure Ar

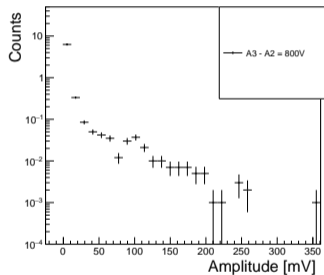


# Scheme B 3 barA pure Ar

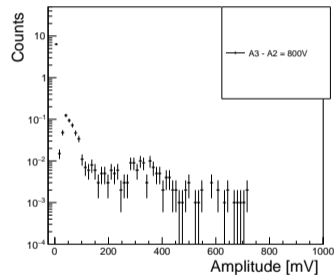
## Anode 1



## Anode 2

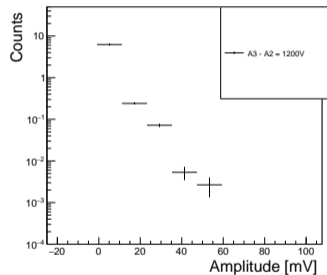


## Anode 3

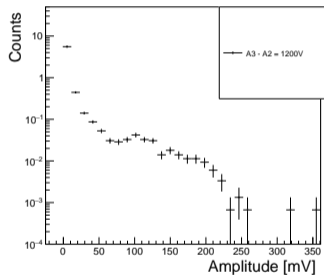


# Scheme B 3 barA pure Ar

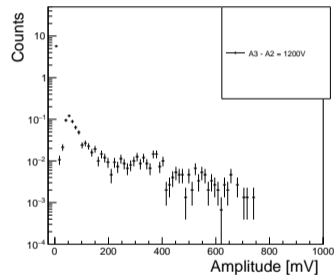
## Anode 1



## Anode 2



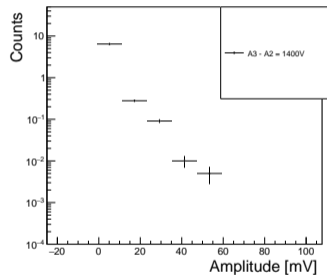
## Anode 3



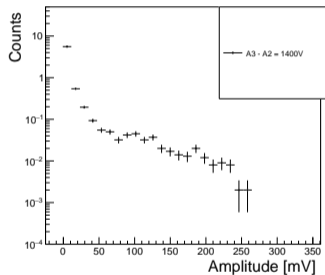


# Scheme B 3 barA pure Ar

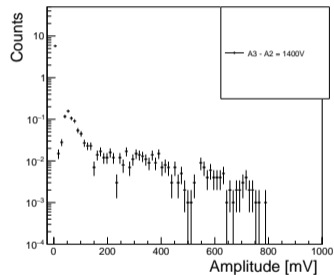
## Anode 1



## Anode 2

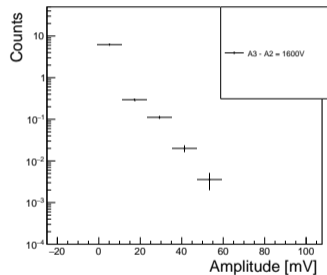


## Anode 3

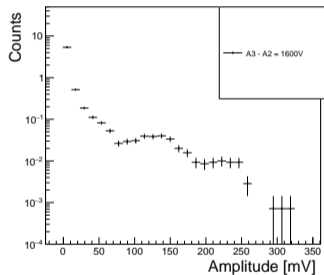


# Scheme B 3 barA pure Ar

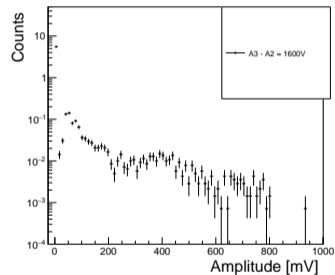
## Anode 1



## Anode 2

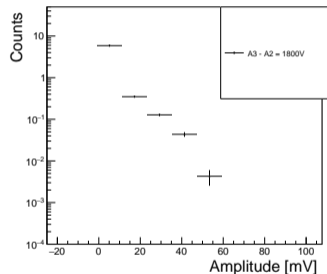


## Anode 3

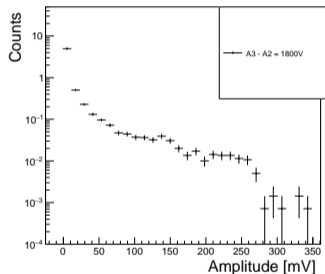


# Scheme B 3 barA pure Ar

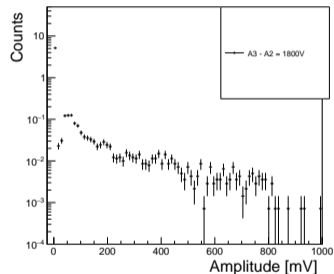
## Anode 1



## Anode 2

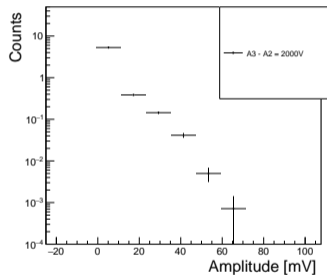


## Anode 3

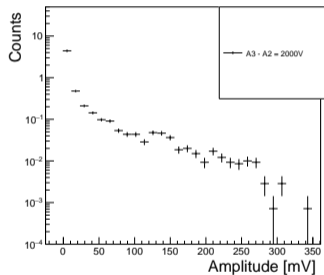


# Scheme B 3 barA pure Ar

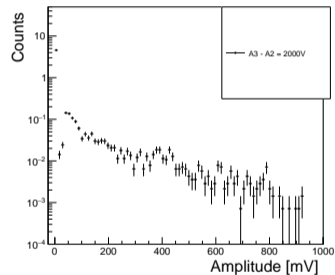
## Anode 1



## Anode 2

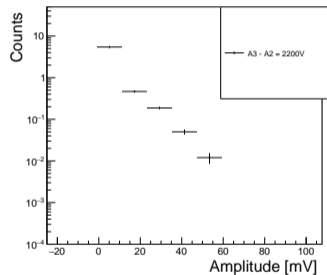


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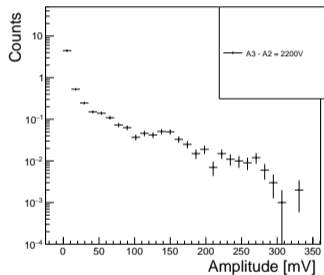


# Scheme B 3 barA pure Ar

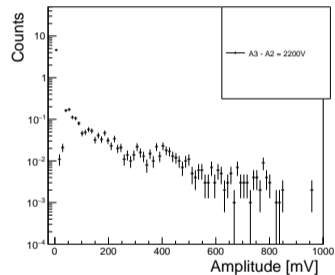
## Anode 1



## Anode 2

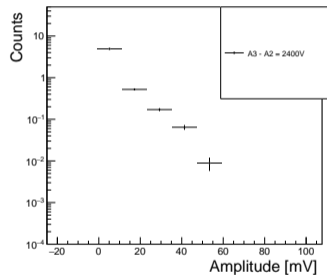


## Anode 3

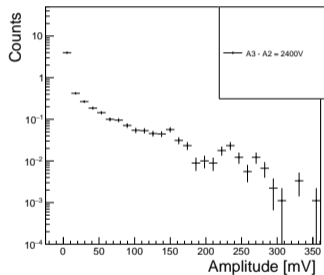


# Scheme B 3 barA pure Ar

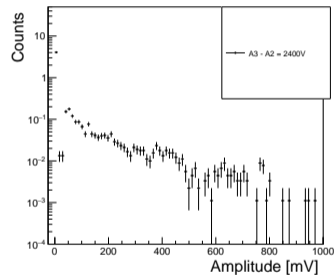
## Anode 1



## Anode 2

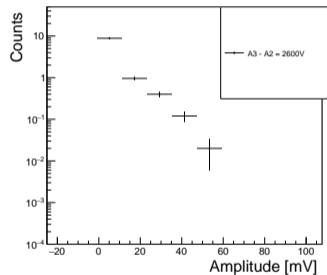


## Anode 3

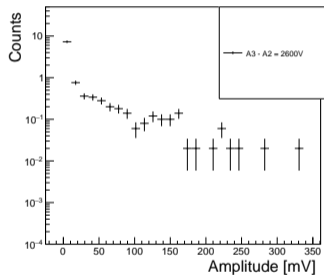


# Scheme B 3 barA pure Ar

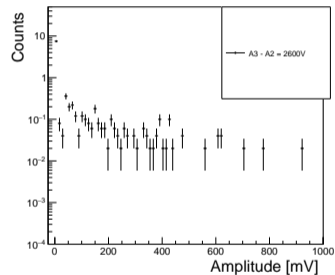
## Anode 1



## Anode 2

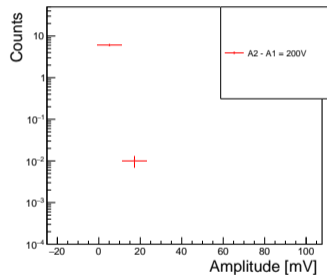


## Anode 3

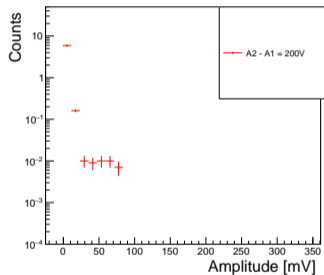


# Scheme C 3 barA pure Ar

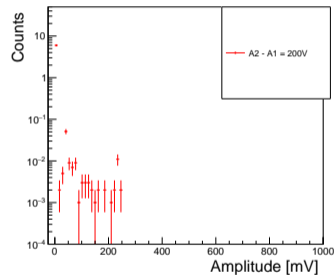
## Anode 1



## Anode 2



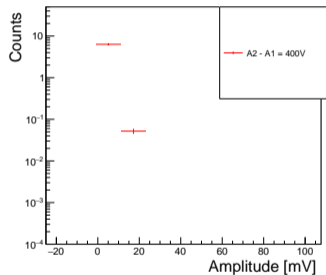
## Anode 3



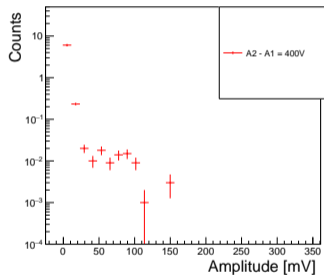


# Scheme C 3 barA pure Ar

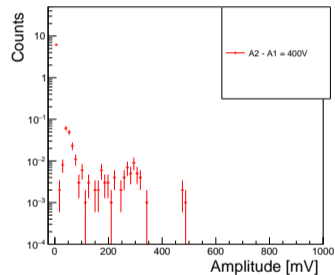
## Anode 1



## Anode 2

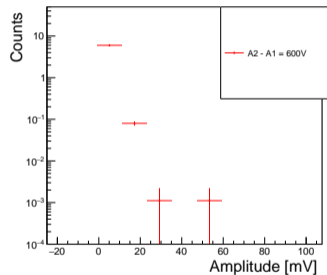


## Anode 3

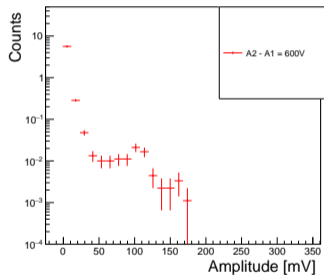


# Scheme C 3 barA pure Ar

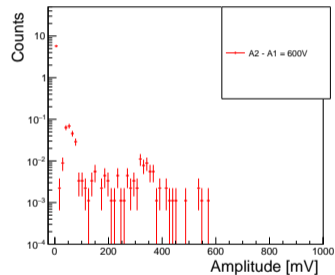
## Anode 1



## Anode 2

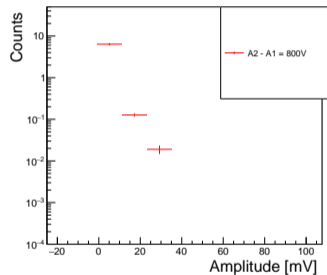


## Anode 3

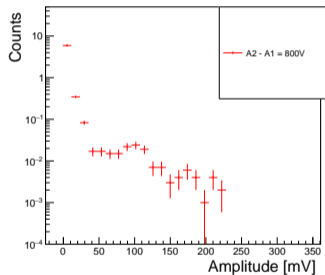


# Scheme C 3 barA pure Ar

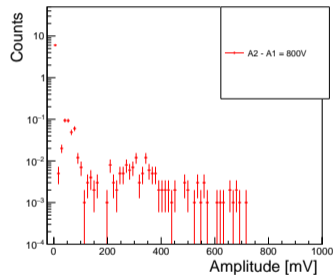
## Anode 1



## Anode 2

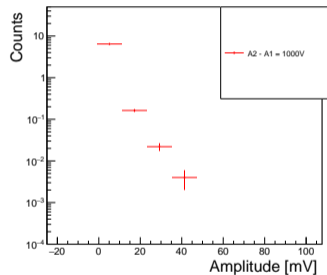


## Anode 3

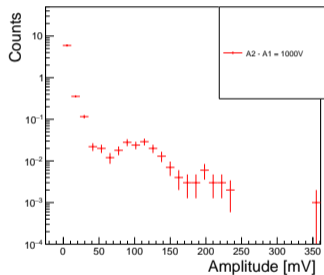


# Scheme C 3 barA pure Ar

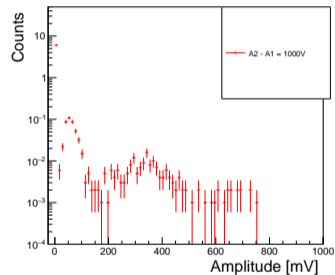
## Anode 1



## Anode 2

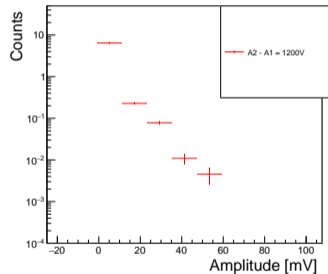


## Anode 3

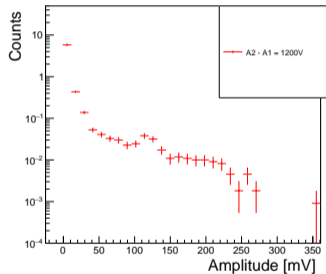


# Scheme C 3 barA pure Ar

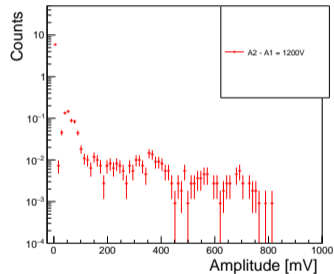
## Anode 1



## Anode 2

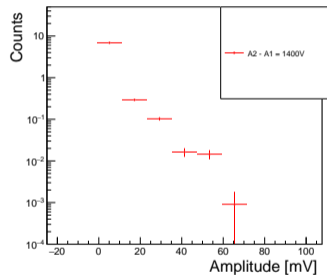


## Anode 3

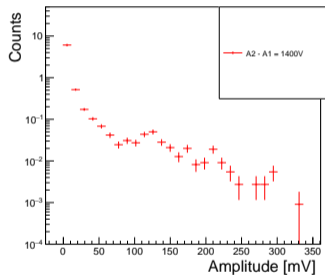


# Scheme C 3 barA pure Ar

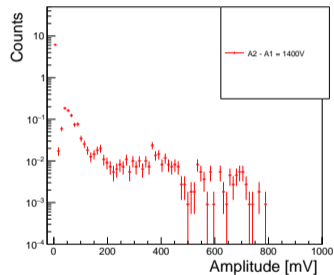
## Anode 1



## Anode 2

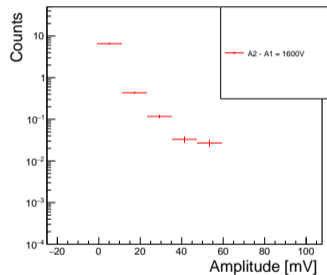


## Anode 3

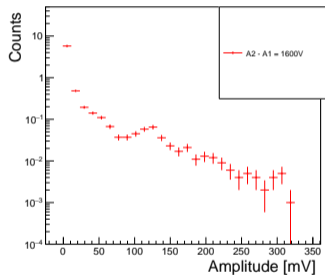


# Scheme C 3 barA pure Ar

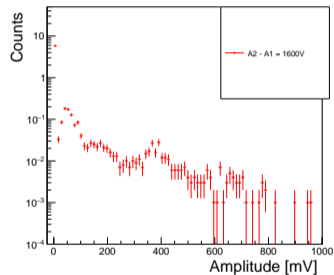
## Anode 1



## Anode 2

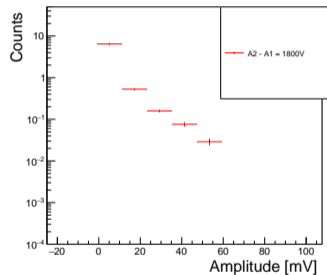


## Anode 3

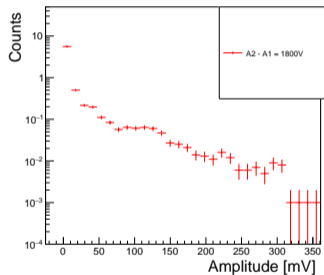


# Scheme C 3 barA pure Ar

## Anode 1



## Anode 2



## Anode 3

