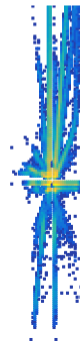
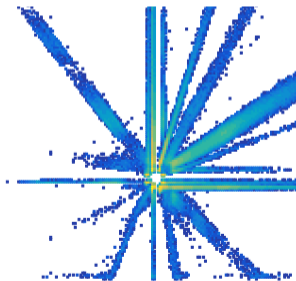
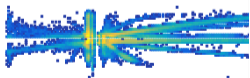


# Charge Analysis Update

Harrison Ritchie-Yates

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



# Introduction

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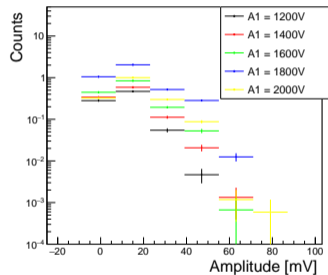
- ▶ We are continuing to look at the 3 barA pure Ar data taken in March.
- ▶ The analysis has been repeated for voltage scheme A.
- ▶ Peak position vs voltage plots have been upgraded to gas gain vs voltage plots.

## Amplitude spectra

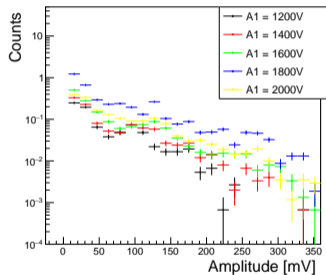
- ▶ In the following, amplitude spectra for the three anodes are shown.
- ▶ On the vertical axis counts are shown, normalised to one event (*i.e.* a 2 s exposure).
- ▶ Amplitude spectra shown are summed data over approx 10 runs at different voltage configs.
- ▶ For **voltage scheme A**, anode 1 is varied from 1200V through 2000V, and anodes 2 and 3 are increased simultaneously to keep  $A_3 - A_2$  and  $A_2 - A_1$  constant.

# Scheme A 3 barA pure Ar

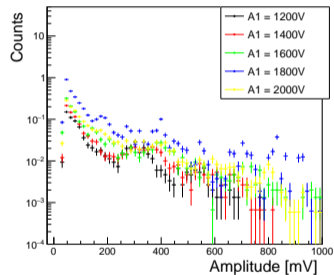
## Anode 1



## Anode 2



## Anode 3

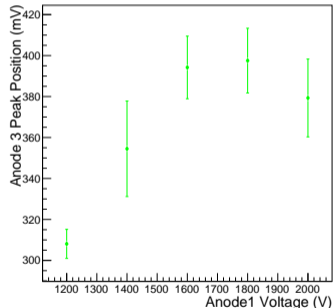


## Gain Vs Voltage Plots

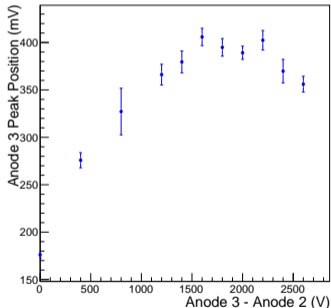
- ▶ In the following, plots of peak position vs voltage and gain vs voltage are shown.
- ▶ Errors bars are calculated from the error on the mean from the fits of the amplitude spectra.
- ▶ For **voltage scheme A**, anode 1 is varied from 1200V through 2000V, and anodes 2 and 3 are increased simultaneously to keep  $A_3 - A_2$  and  $A_2 - A_1$  constant.
- ▶ For **voltage scheme B**, anodes 1 and 2 are held at constant voltages (at 1200V and 2400V respectively) and anode 3 is varied from 2400V through 5000V.
- ▶ For **voltage scheme C**, anode 1 is held at constant voltages (at 1200V) and anodes 2 and 3 are varied from 1400V through 3000V, and 2600V through 4600V respectively (keeping  $A_3 - A_2$  constant).

# 3 barA pure Ar, peak position vs voltage

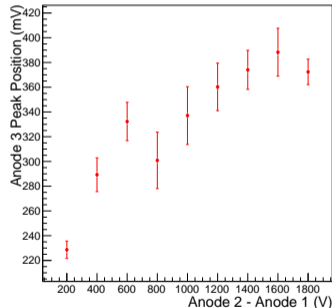
Scheme A peak position Vs  
A1



Scheme B peak position Vs  
A3 - A2

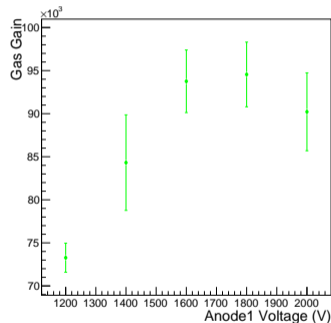


Scheme C peak position Vs  
A2 - A1

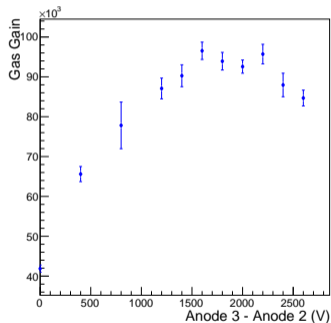


# 3 barA pure Ar, gain vs voltage

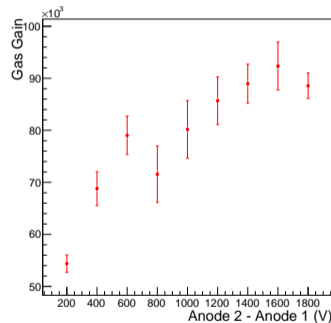
Scheme A gas gain vs A1



Scheme B gas gain vs A3 - A2



Scheme C gas gain vs A2 - A1



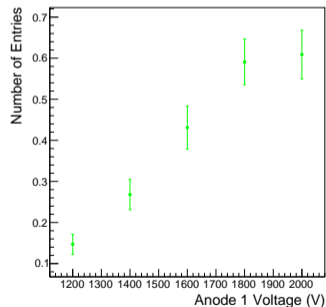
## No. Entries Vs Voltage Plots

- ▶ 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 A**, anode 1 is varied from 1200V through 2000V, and anodes 2 and 3 are increased simultaneously to keep  $A3 - A2$  and  $A2 - A1$  constant.

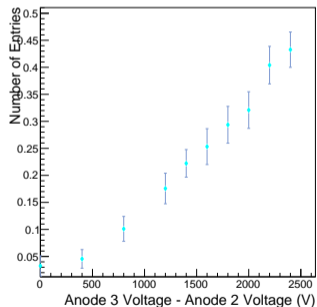


# Scheme A 3 barA pure Ar, Entries vs Voltage (Clean)

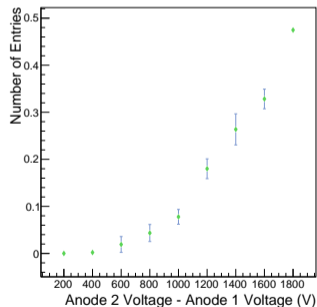
Scheme A, all anodes max value above threshold



Scheme B, all anodes max value above threshold



Scheme C, all anodes max value above threshold



## Plan for this week/ the future

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- ▶ Continue to improve entries vs voltage plots.
- ▶ Continue to improve peak position vs voltage plots with waveform fitting etc. to provide clearer amplitude spectra. Background subtraction using voltage-off data does not seem useful.
- ▶ Compare the data taken in March with the previous 3 barA pure Ar 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.

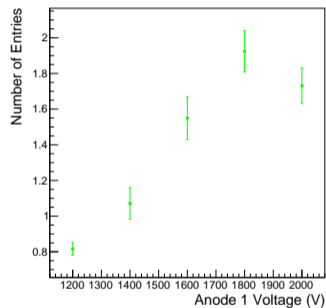
# Extra Slides

## No. Entries Vs Voltage Plots

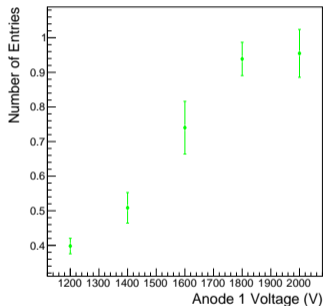
- ▶ In the following, plots of number of entries vs voltage are shown.
- ▶ On the vertical axis are the number of entries, normalised to one event (*i.e.* a 2 s exposure).
- ▶ Errors bars are calculated from the standard deviation of the number of entries in 10 runs.
- ▶ On the horizontal axis is the anode 1 anode 2 voltage difference.
- ▶ For **voltage scheme A**, anode 1 was varied from 1200V through 2000V, and anodes 2 and 3 were increased simultaneously to keep  $A3 - A2$  and  $A2 - A1$  constant.

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

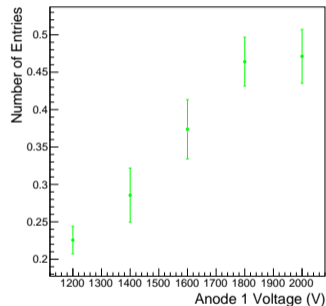
Mean No. entries in one run



A3 amplitude > 100mV

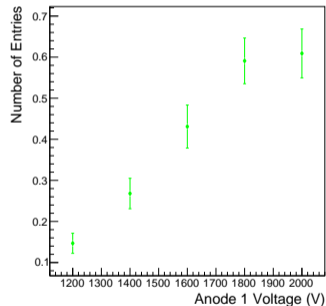


A3 amplitude > 250mV

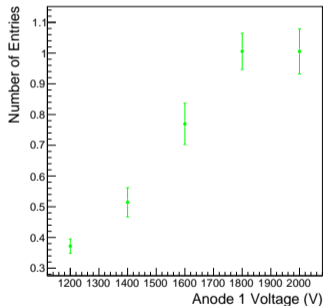


# Scheme A 3 barA pure Ar, Entries vs Voltage (Clean)

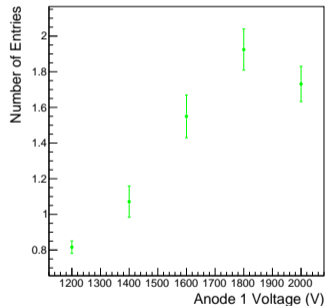
Anode 1 Max Value above threshold



Anode 2 Max Value above threshold

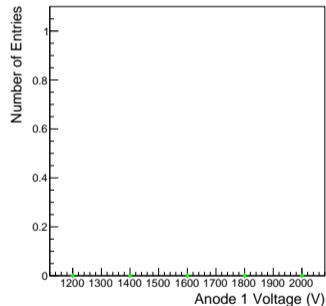


Anode 3 Max Value above threshold

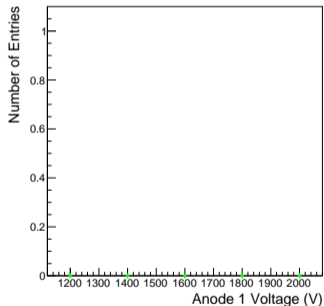


# Scheme A 3 barA pure Ar, Entries vs Voltage (Clean)

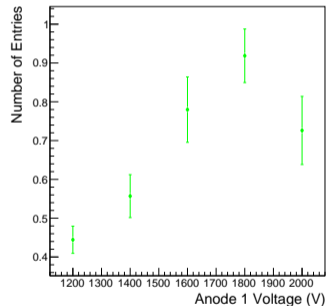
Only anode 1 Max Value above threshold



Only anode 2 Max Value above threshold

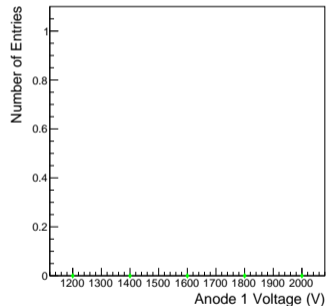


Only anode 3 Max Value above threshold

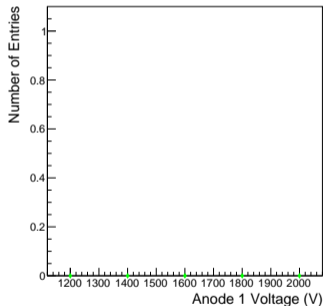


# Scheme A 3 barA pure Ar, Entries vs Voltage (Clean)

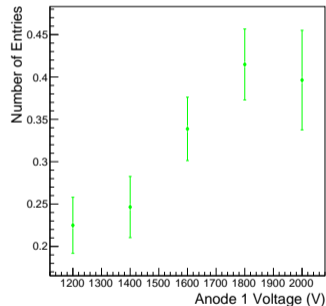
Only anode 1 and 2 max value above threshold



Only anode 1 and 3 max value above threshold



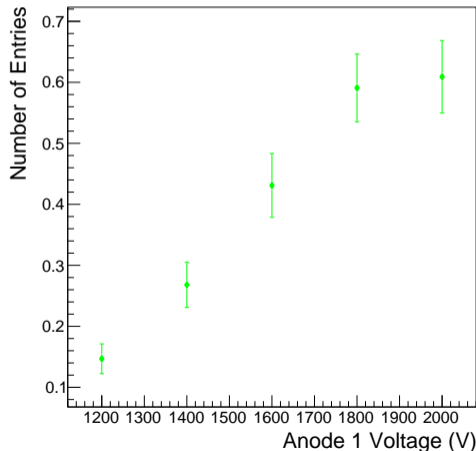
Only anode 2 and 3 max value above threshold



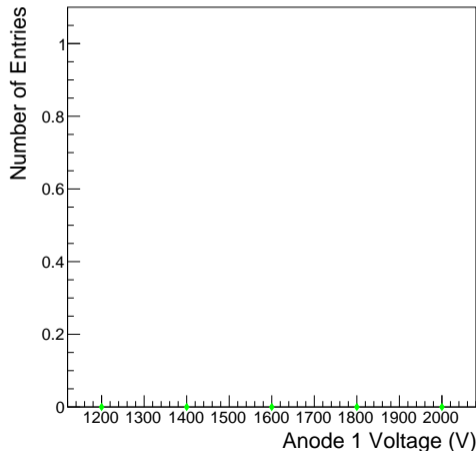


# Scheme A 3 barA pure Ar, Entries vs Voltage (Clean)

All anodes max value above threshold



No anodes max value above threshold

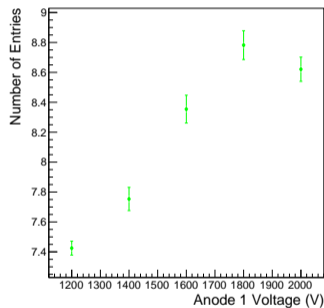


## No. Entries Vs Voltage Plots

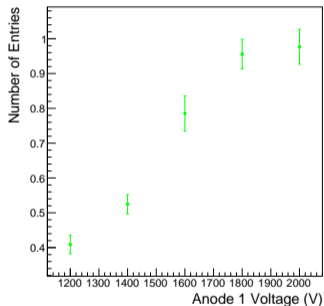
- ▶ In the following, plots of number of entries vs voltage are shown.
- ▶ On the vertical axis are the number of entries, normalised to one event (*i.e.* a 2 s exposure).
- ▶ Errors bars are calculated from the standard deviation of the number of entries in 10 runs.
- ▶ On the horizontal axis is the anode 1 anode 2 voltage difference.
- ▶ For **voltage scheme A**, anode 1 was varied from 1200V through 2000V, and anodes 2 and 3 were increased simultaneously to keep  $A3 - A2$  and  $A2 - A1$  constant.

# Scheme A 3 barA pure Ar, Entries vs Voltage (Unclean)

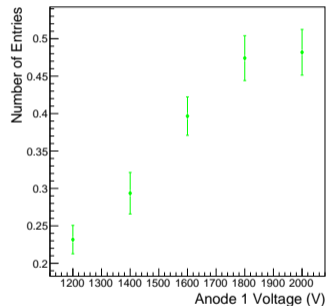
Mean No. entries in one run



A3 amplitude > 100mV

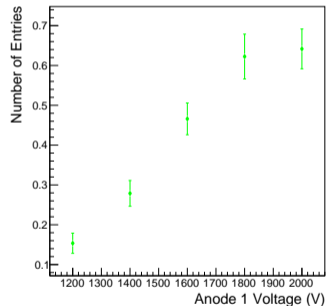


A3 amplitude > 250mV

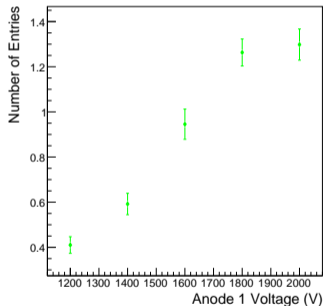


# Scheme A 3 barA pure Ar, Entries vs Voltage (Unclean)

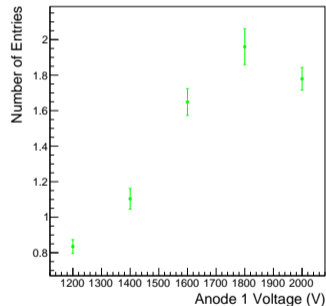
Anode 1 Max Value above threshold



Anode 2 Max Value above threshold

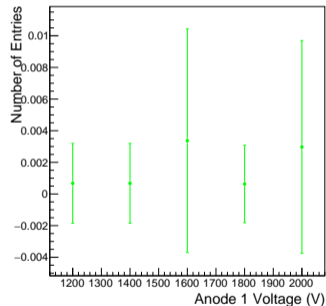


Anode 3 Max Value above threshold

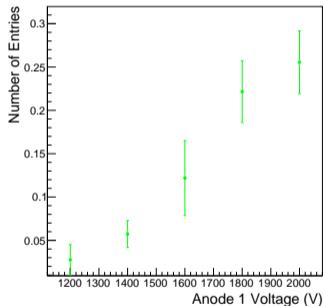


# Scheme A 3 barA pure Ar, Entries vs Voltage (Unclean)

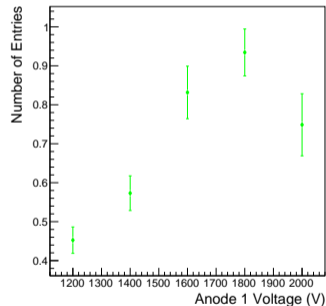
Only anode 1 Max Value above threshold



Only anode 2 Max Value above threshold

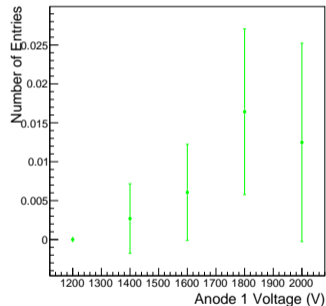


Only anode 3 Max Value above threshold

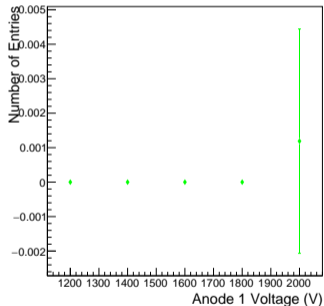


# Scheme A 3 barA pure Ar, Entries vs Voltage (Unclean)

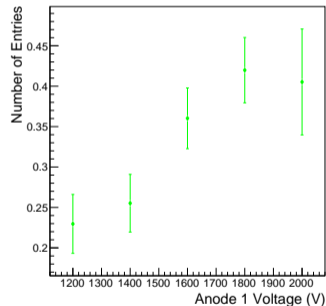
Only anode 1 and 2 max value above threshold



Only anode 1 and 3 max value above threshold

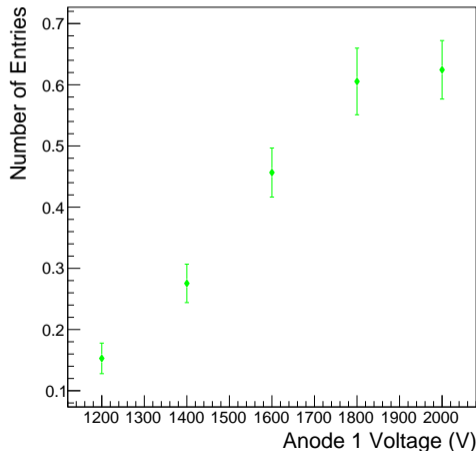


Only anode 2 and 3 max value above threshold

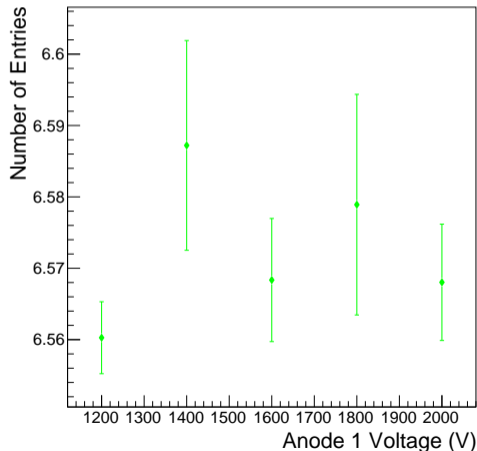


# Scheme A 3 barA pure Ar, Entries vs Voltage (Unclean)

All anodes max value above threshold



No anodes max value above threshold



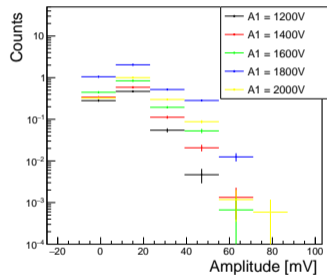
## Amplitude spectra

- ▶ 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 A**, anode 1 was varied from 1200V through 2000V, and anodes 2 and 3 were increased simultaneously to keep  $A3 - A2$  and  $A2 - A1$  constant.

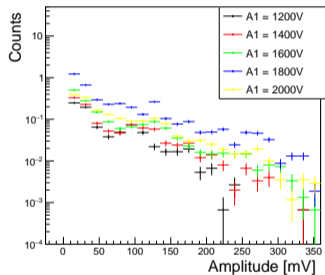


# Scheme A 3 barA pure Ar

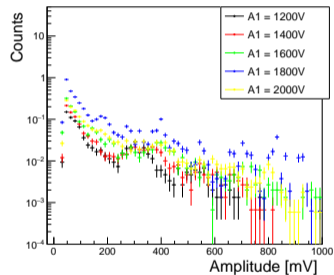
## Anode 1



## Anode 2

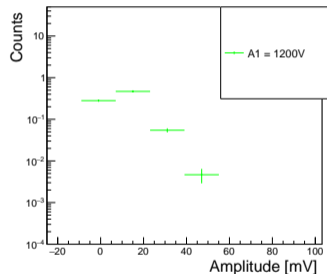


## Anode 3

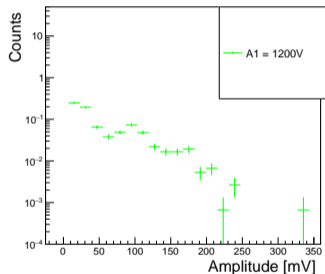


# Scheme A 3 barA pure Ar (Anode 1 at 1200V)

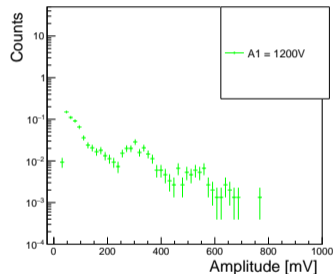
## Anode 1



## Anode 2

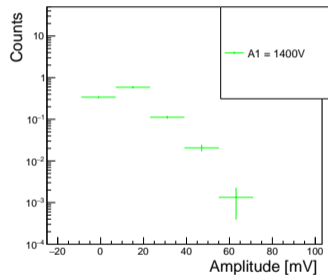


## Anode 3

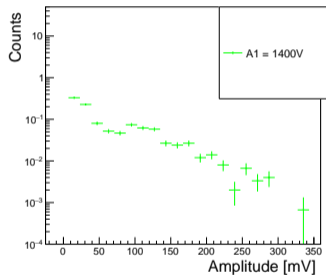


# Scheme A 3 barA pure Ar (Anode 1 at 1400V)

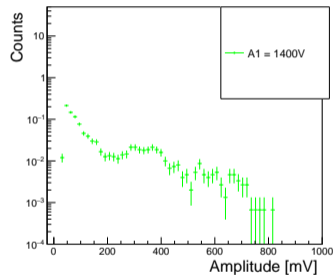
## Anode 1



## Anode 2

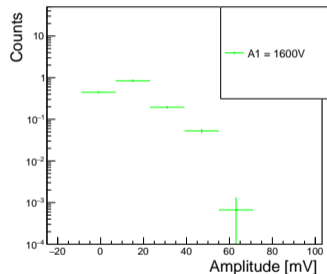


## Anode 3

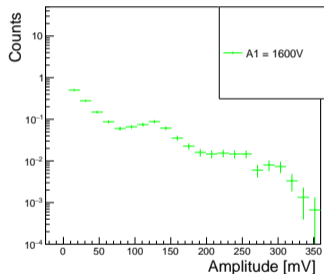


# Scheme A 3 barA pure Ar (Anode 1 at 1600V)

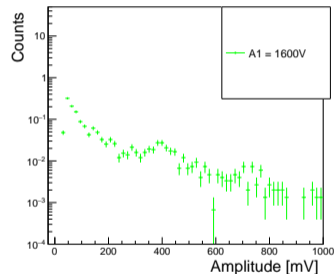
## Anode 1



## Anode 2

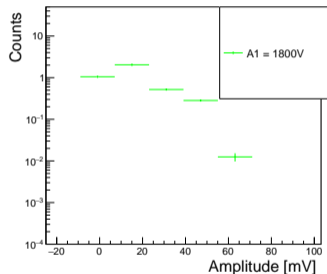


## Anode 3

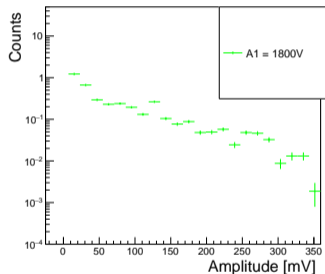


# Scheme A 3 barA pure Ar (Anode 1 at 1800V)

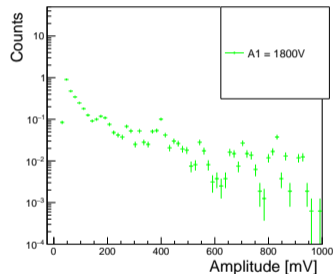
## Anode 1



## Anode 2

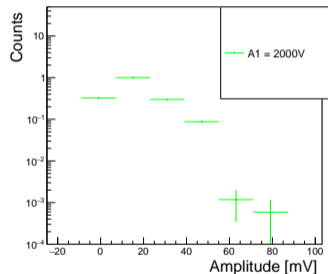


## Anode 3

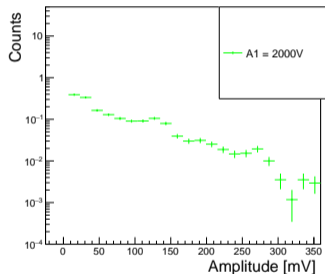


# Scheme A 3 barA pure Ar (Anode 1 at 2000V)

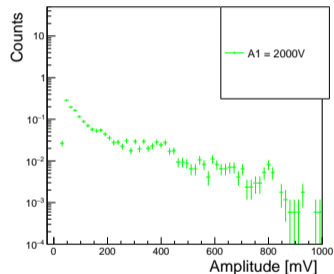
## Anode 1



## Anode 2



## Anode 3

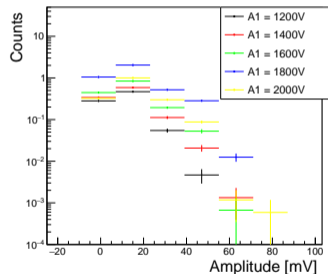


## Amplitude spectra

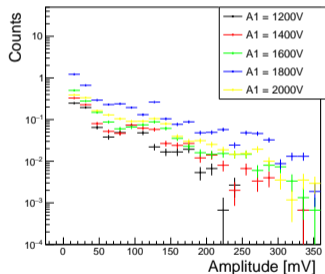
- ▶ In the following, amplitude spectra for the three anodes are shown.
- ▶ On the vertical axis counts are shown, normalised to one event (*i.e.* a 2 s exposure).
- ▶ Amplitude spectra shown are summed data over approx 10 runs at different voltage configs.
- ▶ For **voltage scheme A**, anode 1 was varied from 1200V through 2000V, and anodes 2 and 3 were increased simultaneously to keep  $A3 - A2$  and  $A2 - A1$  constant.

## Without Additional Cuts

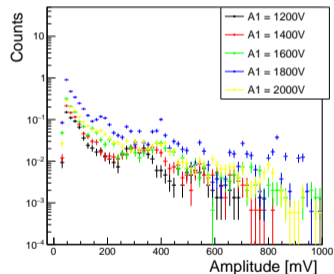
### Anode 1



### Anode 2



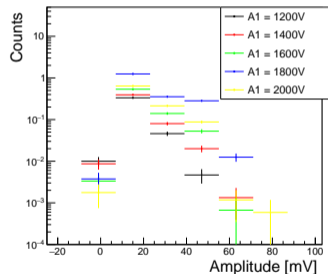
### Anode 3



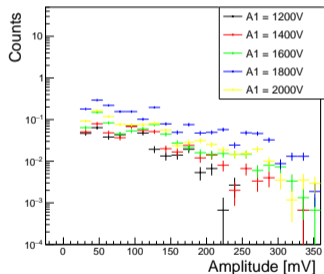


Amplitude Anode 3 > 100mV

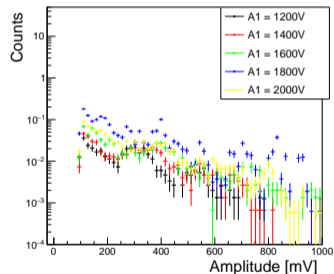
Anode 1



Anode 2

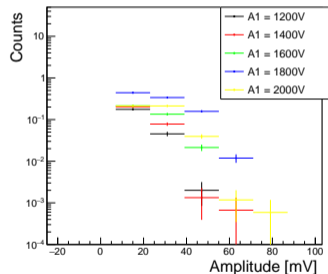


Anode 3

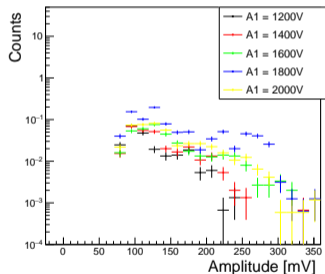


Amplitude Anode 3 > 250mV

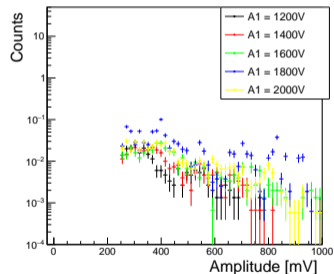
Anode 1



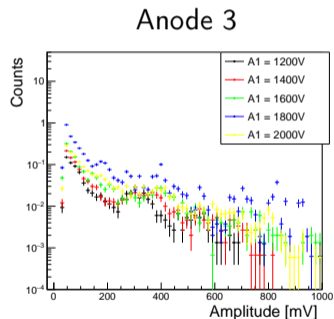
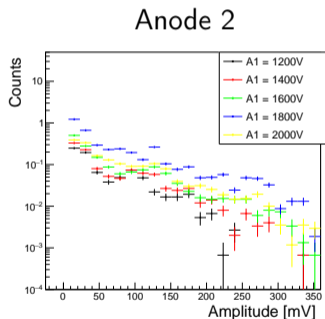
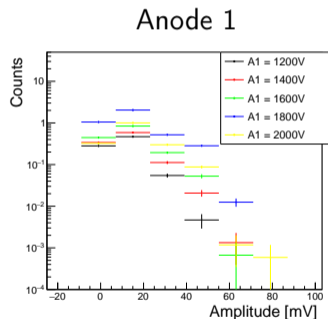
Anode 2



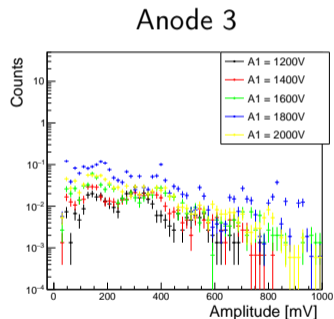
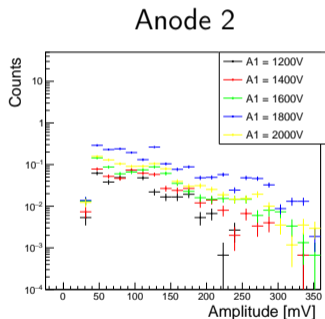
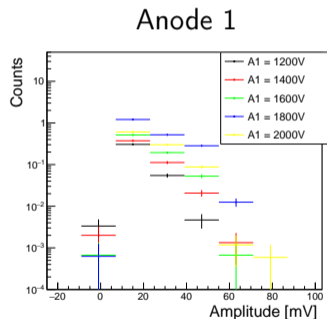
Anode 3



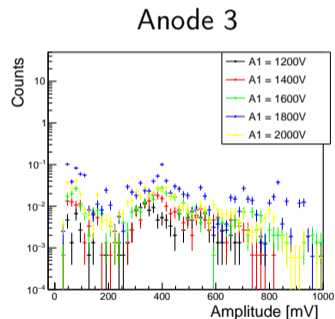
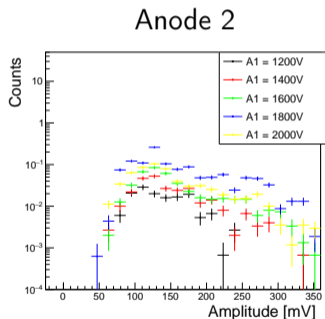
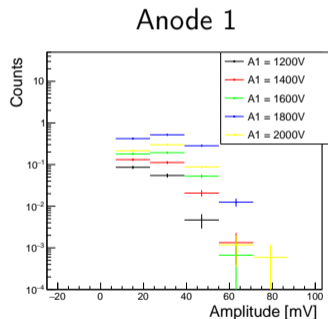
## Anode 3 max value above threshold



## Anode 2 max value above threshold

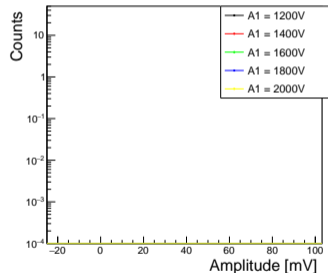


## Anode 1 max value above threshold

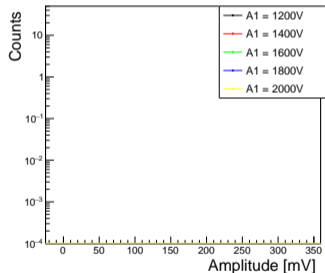


Only anode 1 max value above threshold

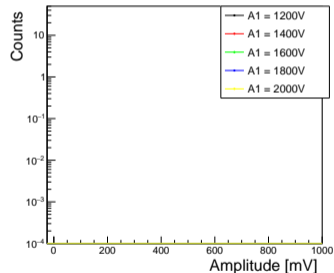
### Anode 1



### Anode 2

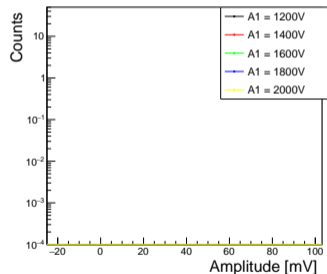


### Anode 3

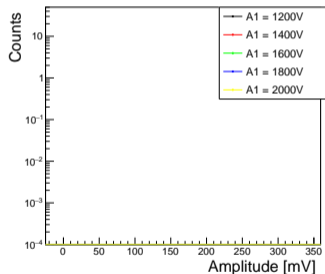


Only anode 2 max value above threshold

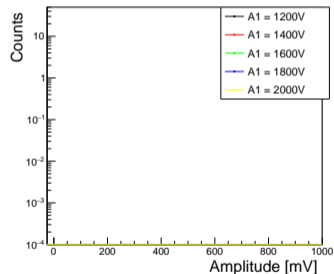
### Anode 1



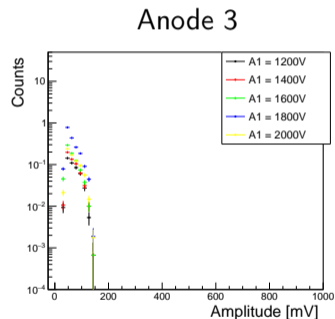
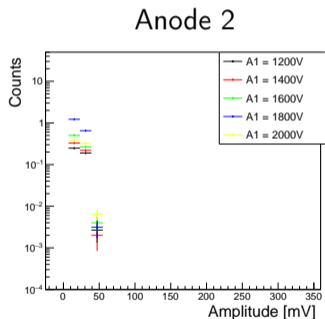
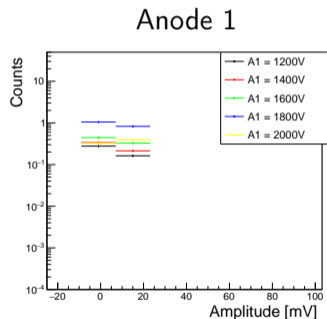
### Anode 2



### Anode 3



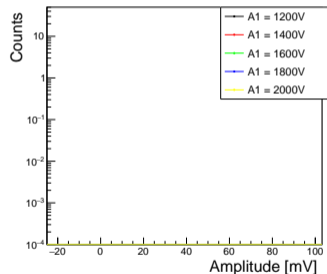
Only anode 3 max value above threshold



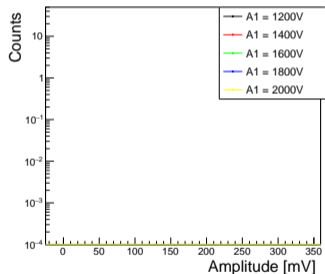


Only anode 1 and 2 max value above threshold

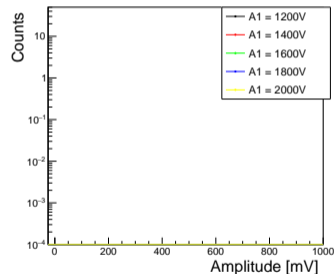
## Anode 1



## Anode 2

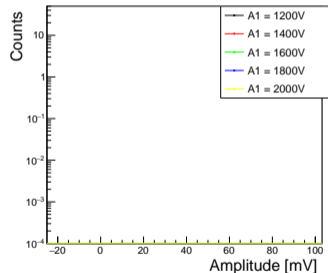


## Anode 3

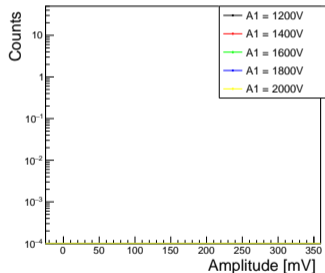


Only anode 1 and 3 max value above threshold

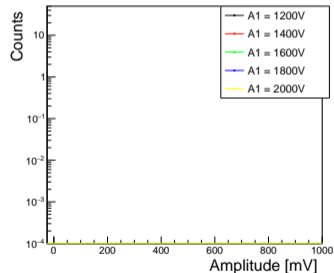
### Anode 1



### Anode 2

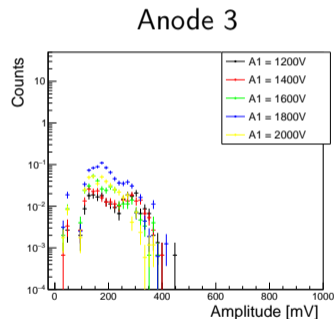
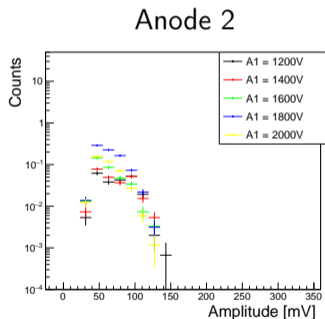
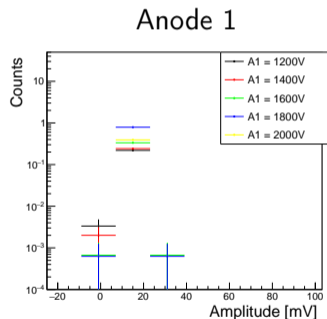


### Anode 3



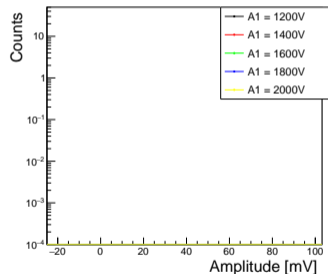
# Scheme A 3 barA pure Ar

Only anode 2 and 3 max value above threshold

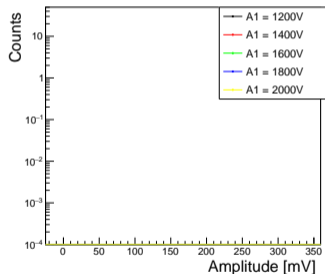


No anodes max value above threshold

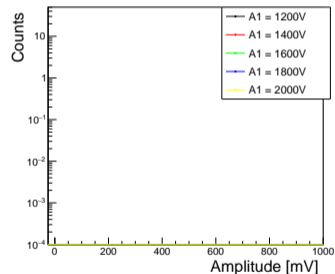
## Anode 1



## Anode 2

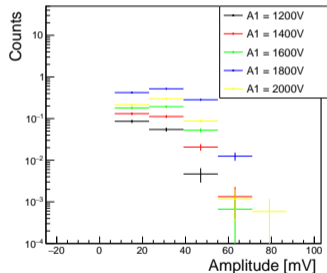


## Anode 3

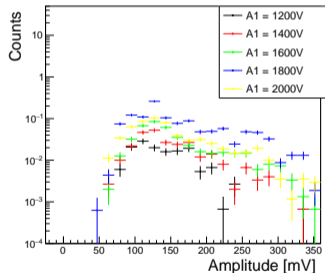


All anodes max value above threshold

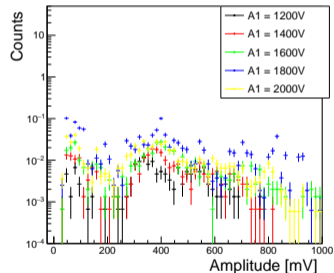
### Anode 1



### Anode 2



### Anode 3

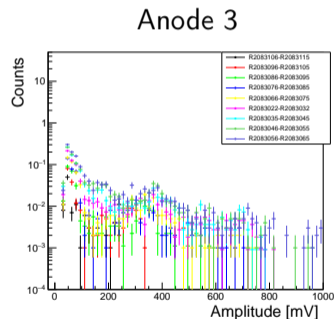
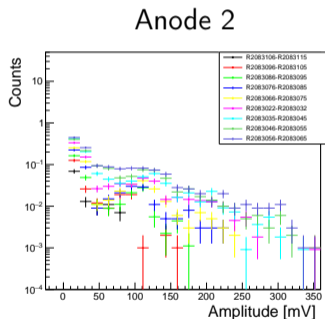
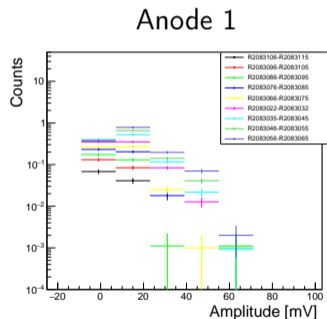


## Amplitude spectra

- ▶ 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 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  $A_3 - A_2$  constant).

# Scheme C 3 barA pure Ar

With Improved Data Cleaning



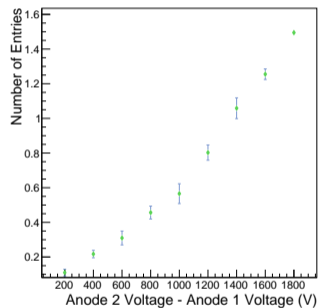
## No. Entries Vs Voltage Plots

- ▶ 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).

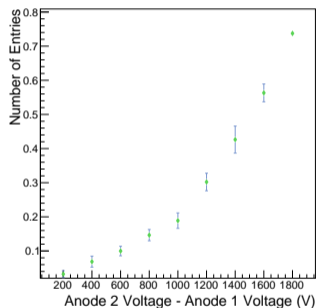


# Scheme C 3 barA pure Ar, Entries vs Voltage (Clean)

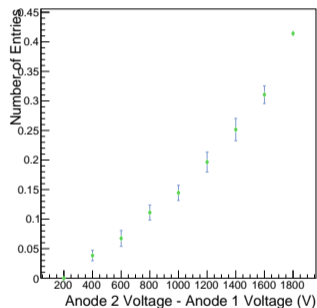
Mean No. entries in one run



A3 amplitude > 100mV

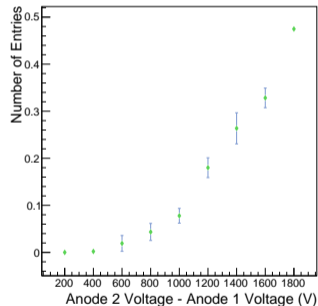


A3 amplitude > 250mV

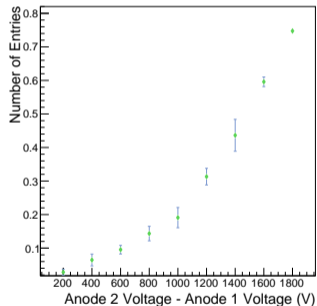


# Scheme C 3 barA pure Ar, Entries vs Voltage (Clean)

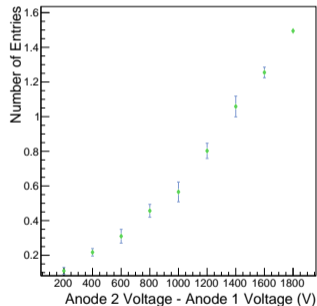
Anode 1 Max Value above threshold



Anode 2 Max Value above threshold

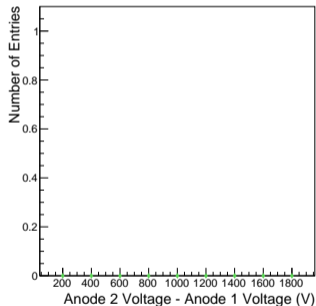


Anode 3 Max Value above threshold

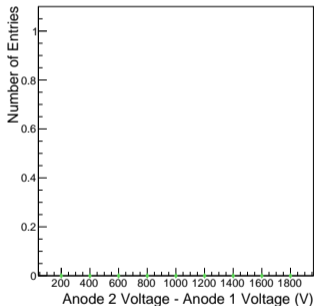


# Scheme C 3 barA pure Ar, Entries vs Voltage (Clean)

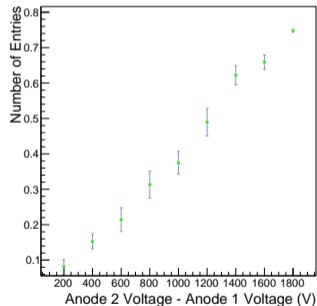
Only anode 1 Max Value above threshold



Only anode 2 Max Value above threshold

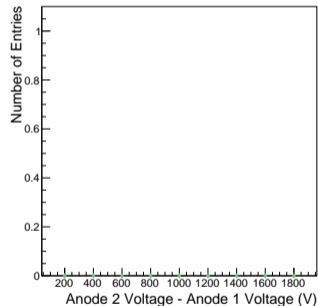


Only anode 3 Max Value above threshold

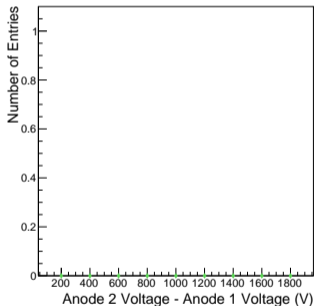


# Scheme C 3 barA pure Ar, Entries vs Voltage (Clean)

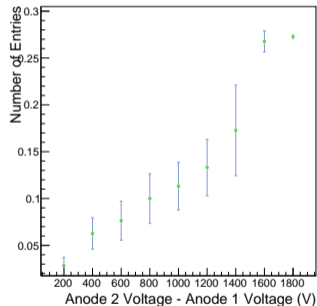
Only anode 1 and 2 max value above threshold



Only anode 1 and 3 max value above threshold

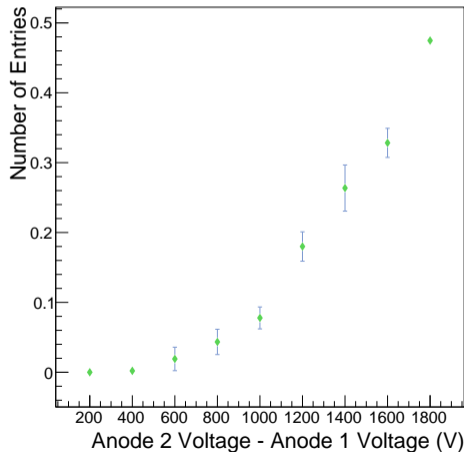


Only anode 2 and 3 max value above threshold

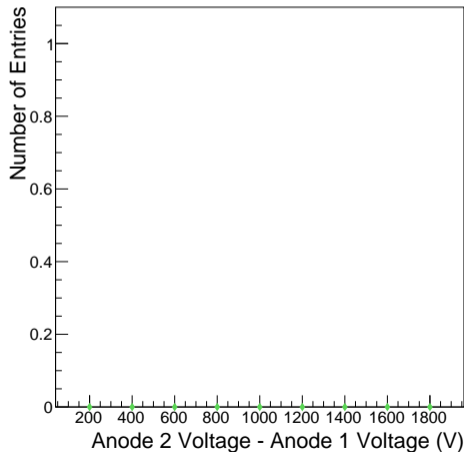


# Scheme C 3 barA pure Ar, Entries vs Voltage (Clean)

All anodes max value above threshold



No anodes max value above threshold



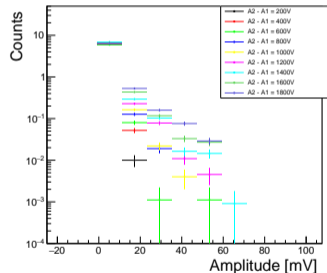
## Amplitude spectra

- ▶ 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.

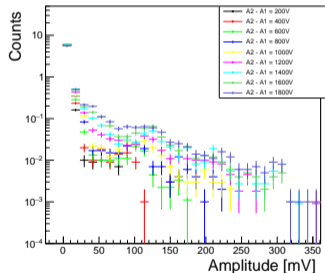
# Scheme C 3 barA pure Ar, data cleaning

With Previous Data Cleaning

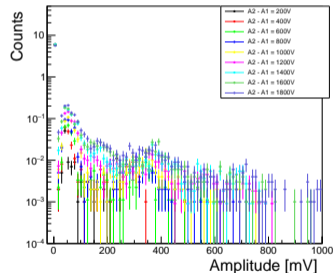
Anode 1



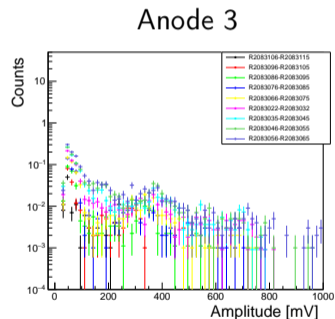
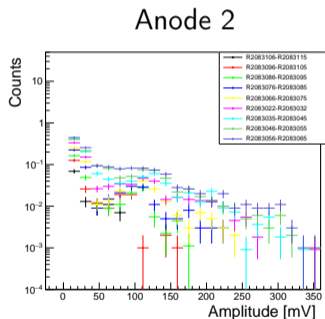
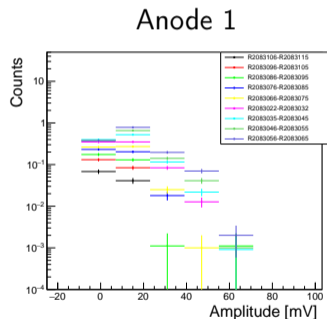
Anode 2



Anode 3

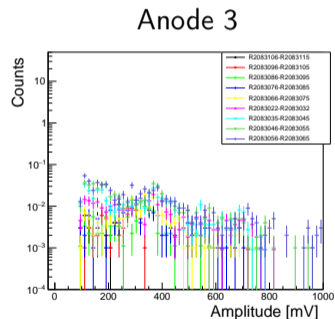
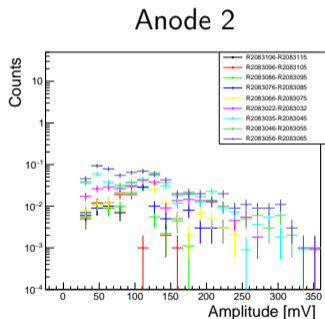
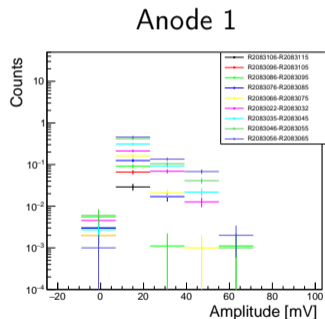


With Improved Data Cleaning, Without Additional Cuts



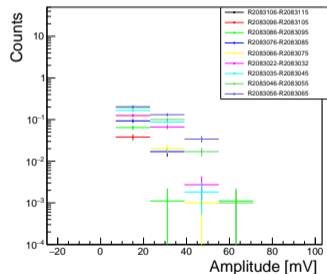


Amplitude Anode 3 > 100mV

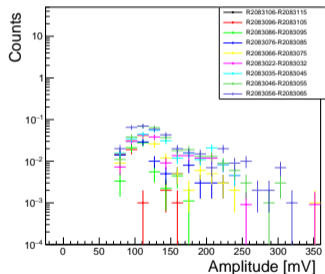


Amplitude Anode 3 > 250mV

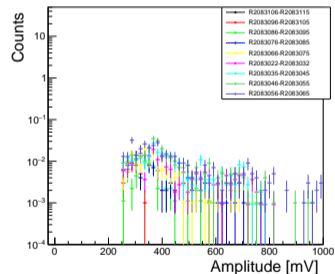
Anode 1



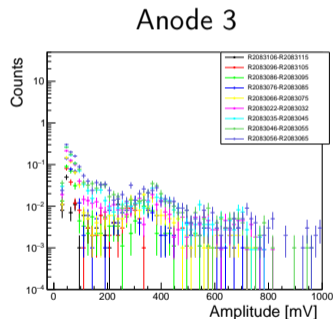
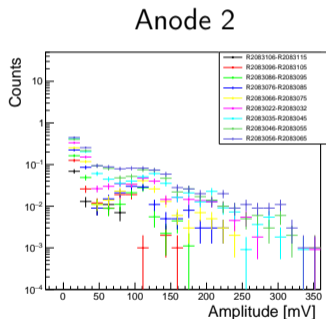
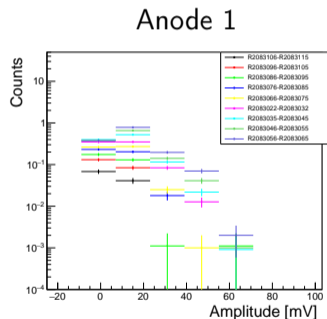
Anode 2



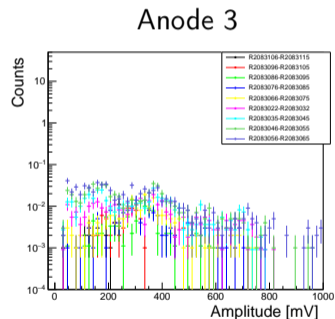
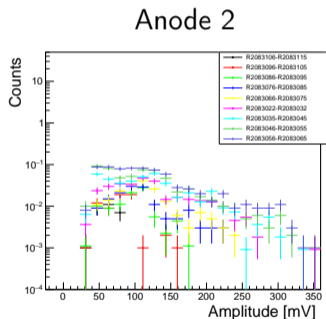
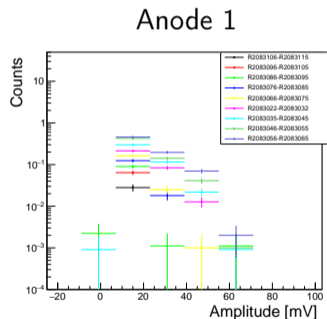
Anode 3



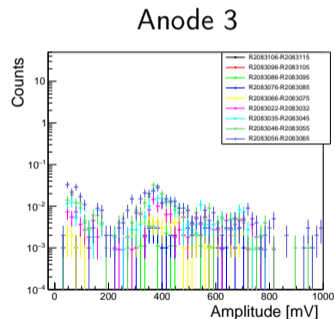
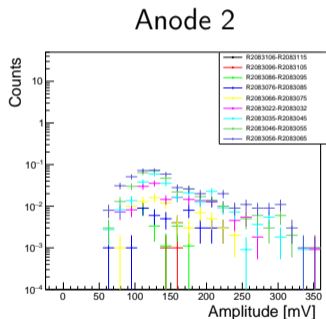
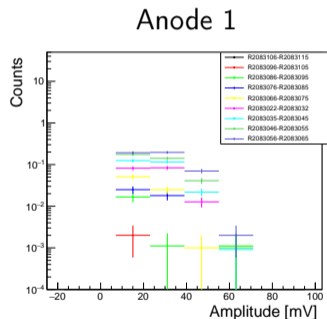
## Anode 3 max value above threshold



## Anode 2 max value above threshold

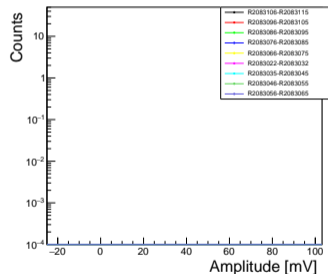


## Anode 1 max value above threshold

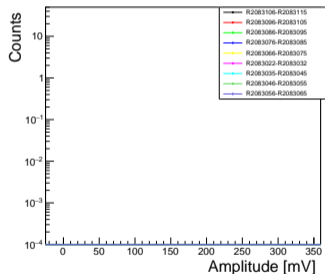


Only anode 1 max value above threshold

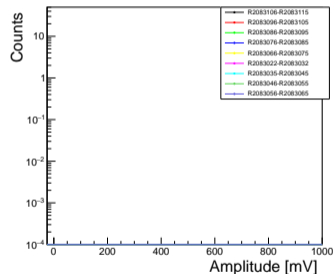
Anode 1



Anode 2

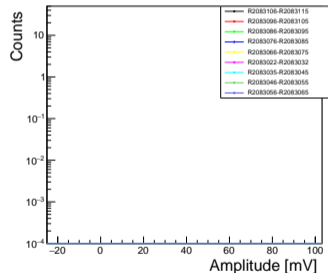


Anode 3

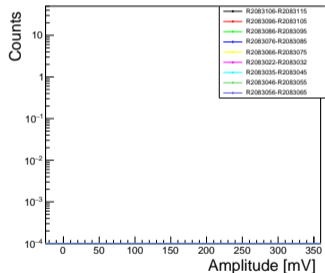


Only anode 2 max value above threshold

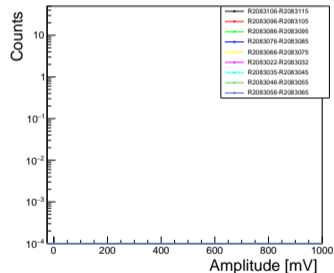
Anode 1



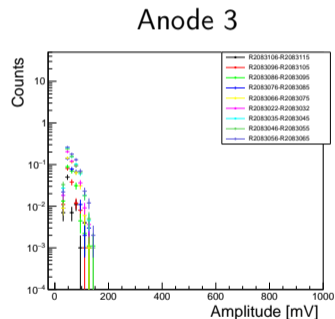
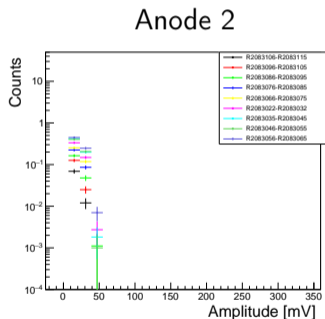
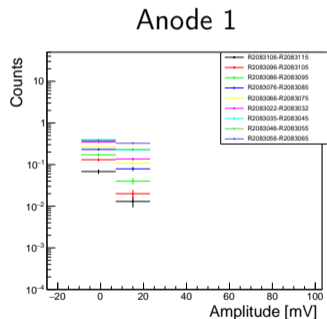
Anode 2



Anode 3



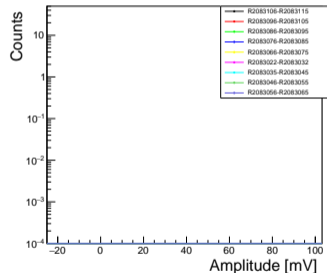
Only anode 3 max value above threshold



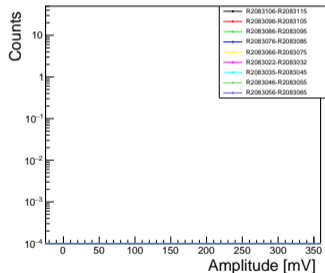


Only anode 1 and 2 max value above threshold

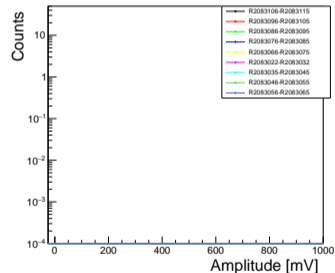
Anode 1



Anode 2

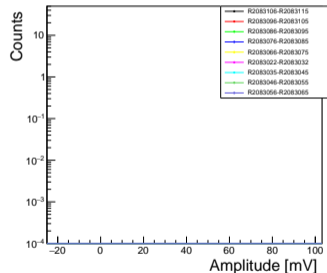


Anode 3

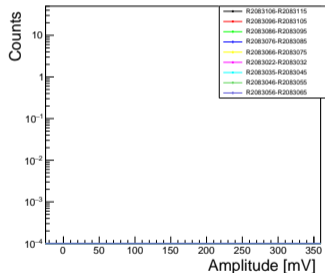


Only anode 1 and 3 max value above threshold

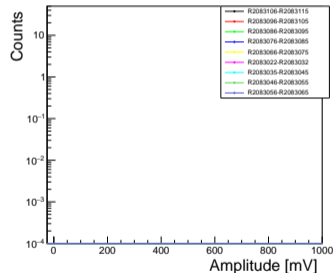
### Anode 1



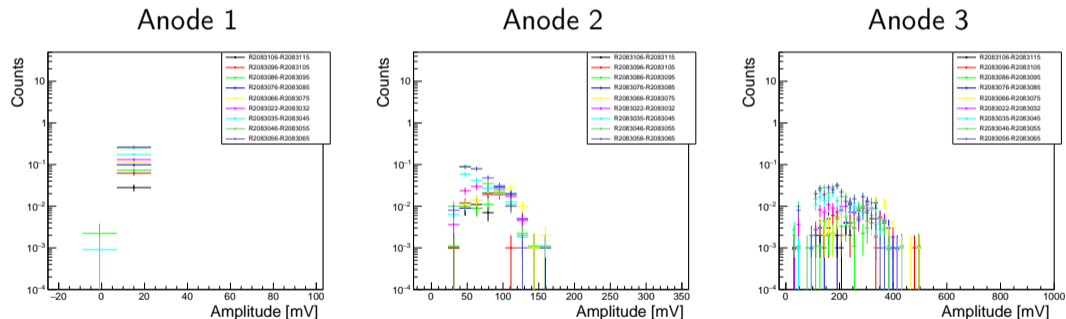
### Anode 2



### Anode 3

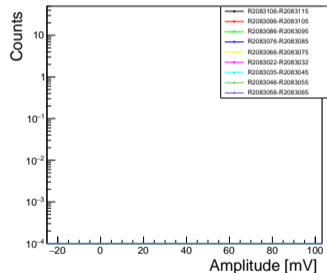


Only anode 2 and 3 max value above threshold

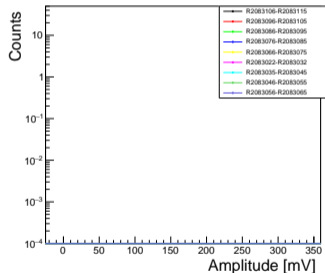


No anodes max value above threshold

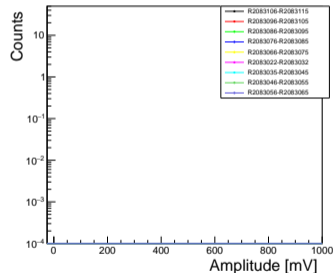
Anode 1



Anode 2

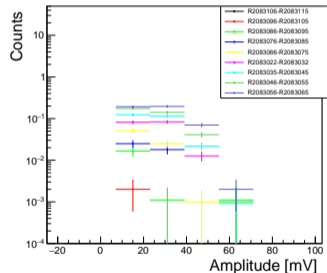


Anode 3

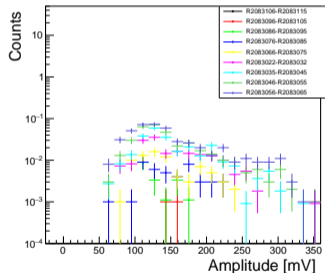


All anodes max value above threshold

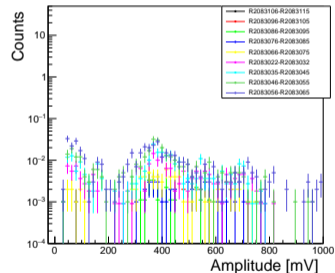
### Anode 1



### Anode 2

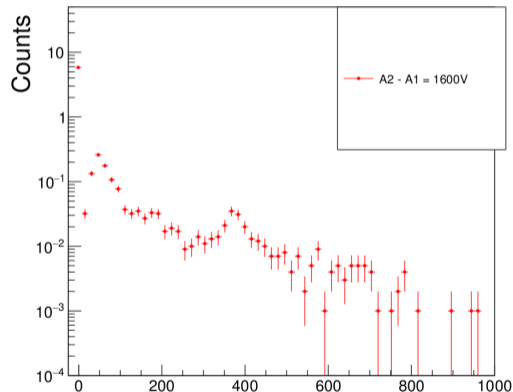


### Anode 3

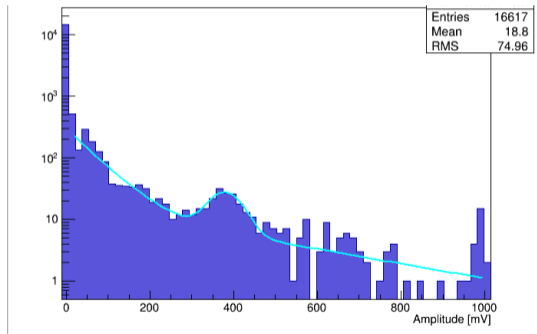


# Scheme C 3 barA pure Ar peaks in anode 3 spectra

## Anode 3 amplitude spectra

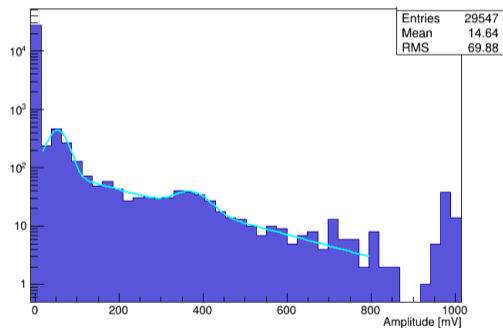


## Anode 3 Amplitude Spectra (Fitted)

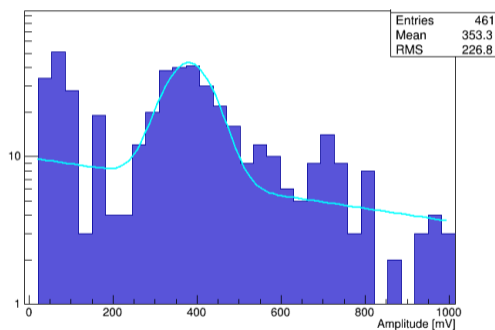


# Scheme C 3 barA pure Ar peaks in anode 3 spectra

Anode 3 amplitude spectra

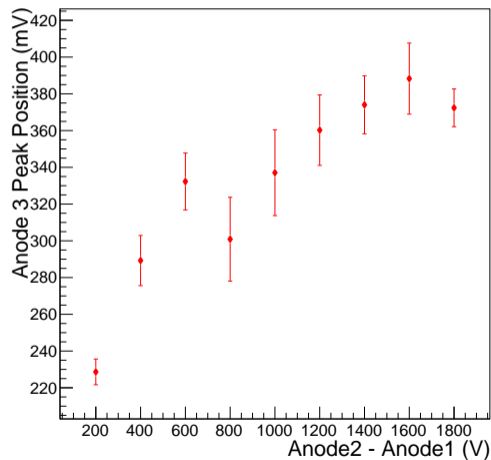


Anode 3 Amplitude Spectra (Clean)

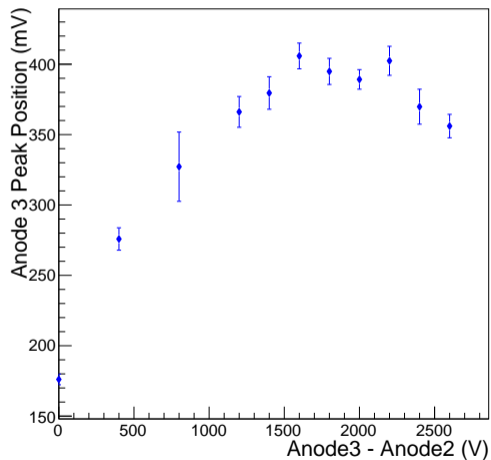


# 3 barA pure Ar, peak position vs voltage

## Scheme C Peak Position Vs A2 - A1



## Scheme B Peak Position Vs A3 - A2





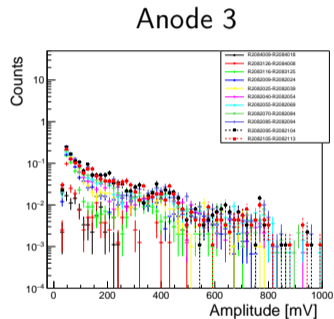
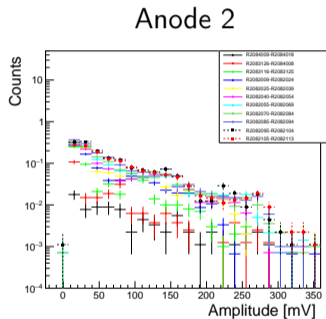
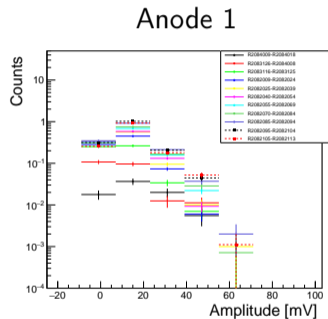
## Plan for this week/ the future

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- ▶ Convert peak position to gain, to make gain vs voltage plots.
- ▶ Repeat charge analysis for voltage scheme A.
- ▶ Some of the spectra for lower voltage settings are not made easier to fit by the current cuts. Continue to improve peak position vs voltage plots with waveform fitting etc. to provide clearer amplitude spectra. Investigate whether the voltage off data can be used for background subtraction.
- ▶ Compare the data taken in March with the previous 3 barA pure Ar 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 Extra Slides

# Scheme B 3 barA pure Ar

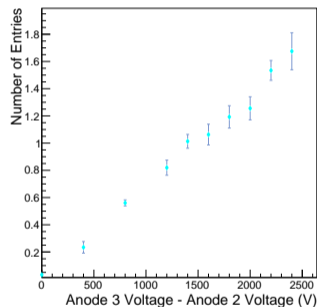


## No. Entries Vs Voltage Plots

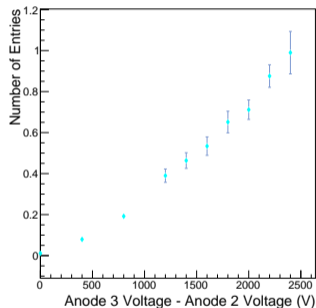
- ▶ In the following, plots of number of entries vs voltage are shown.
- ▶ On the vertical axis are the number of entries, normalised to one event (*i.e.* a 2 s exposure).
- ▶ Errors bars are calculated from the standard deviation of the number of entries in 10 runs.
- ▶ On the horizontal axis is the anode 1 anode 2 voltage difference.
- ▶ For **voltage scheme B**, anodes 1 and 2 were held at constant voltages (at 1200V and 2400V respectively) and anode 3 was varied from 2400V through 5000V.

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

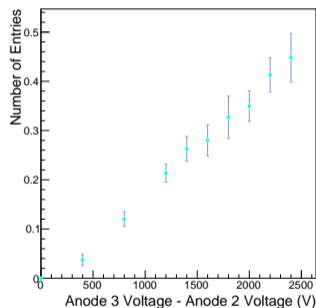
Mean No. entries in one run



A3 amplitude > 100mV

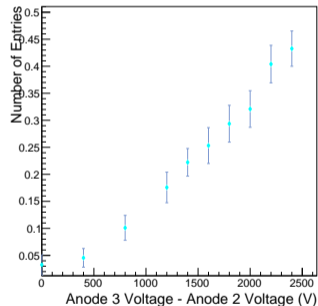


A3 amplitude > 250mV

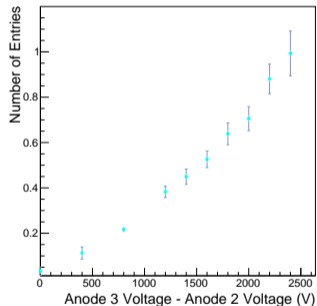


# Scheme B 3 barA pure Ar, Entries vs Voltage (Clean)

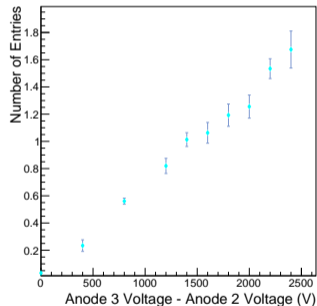
Anode 1 Max Value above threshold



Anode 2 Max Value above threshold

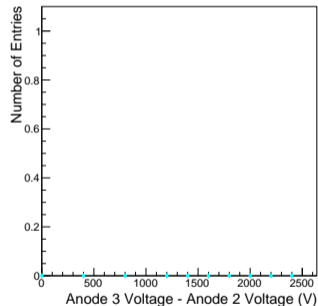


Anode 3 Max Value above threshold

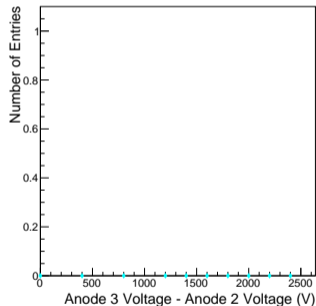


# Scheme B 3 barA pure Ar, Entries vs Voltage (Clean)

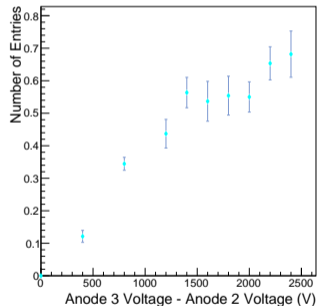
Only anode 1 Max Value above threshold



Only anode 2 Max Value above threshold

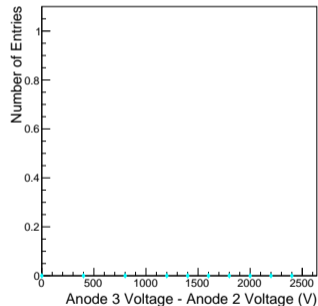


Only anode 3 Max Value above threshold

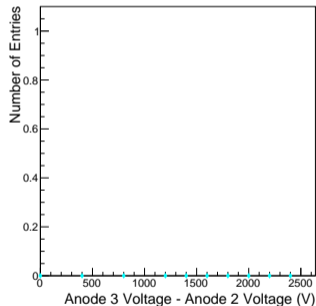


# Scheme B 3 barA pure Ar, Entries vs Voltage (Clean)

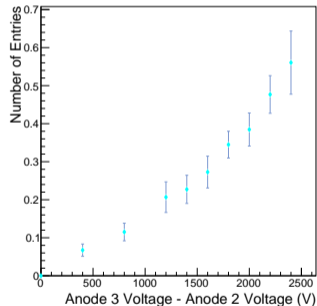
Only anode 1 and 2 max value above threshold



Only anode 1 and 3 max value above threshold



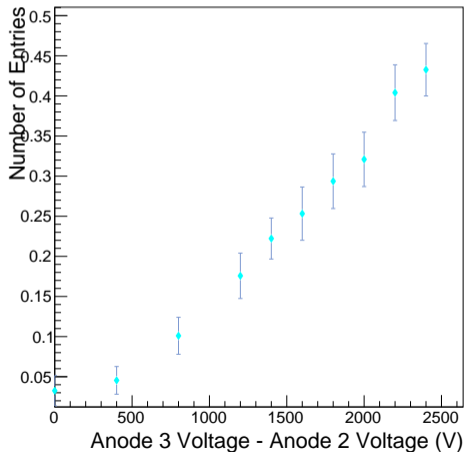
Only anode 2 and 3 max value above threshold



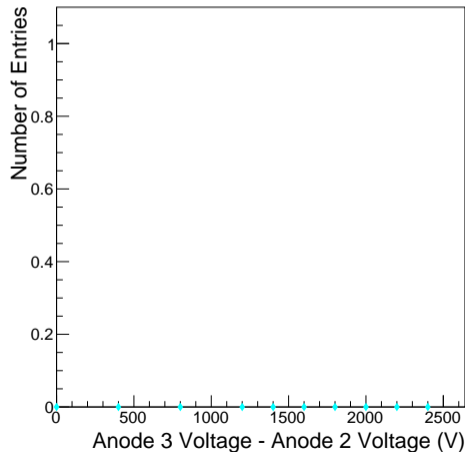


# Scheme B 3 barA pure Ar, Entries vs Voltage (Clean)

All anodes max value above threshold



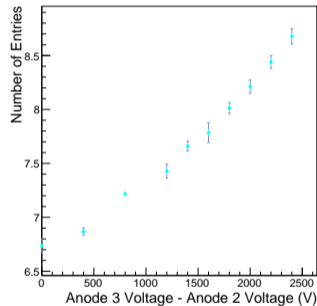
No anodes max value above threshold



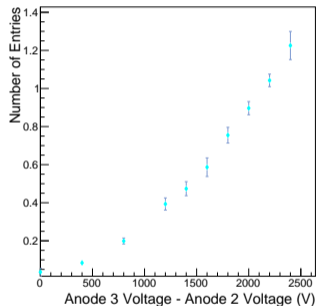
# Entries Vs Volatge For Unclean Data (Scheme C and B)

# Scheme B 3 barA pure Ar, Entries vs Voltage

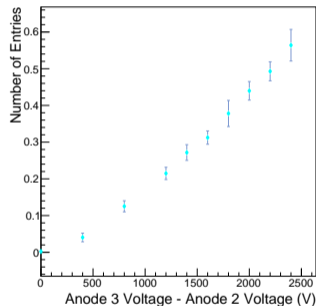
Mean No. entries in one run



A3 amplitude > 100mV

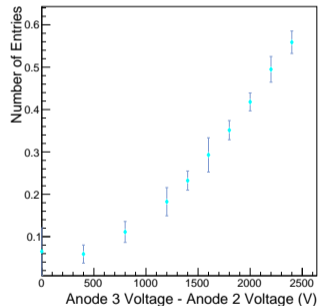


A3 amplitude > 250mV

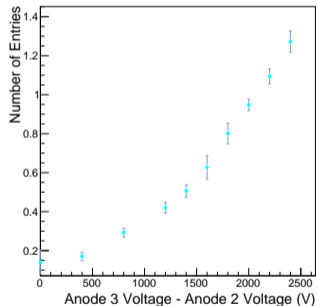


# Scheme B 3 barA pure Ar, Entries vs Voltage

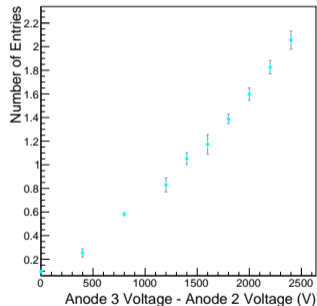
Anode 1 Max Value above threshold



Anode 2 Max Value above threshold

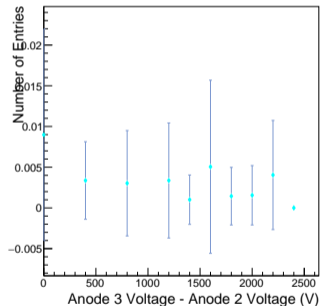


Anode 3 Max Value above threshold

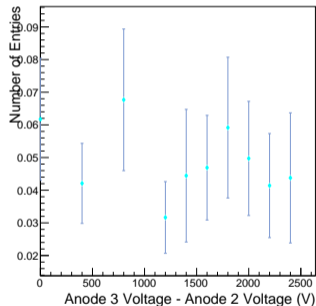


# Scheme B 3 barA pure Ar, Entries vs Voltage

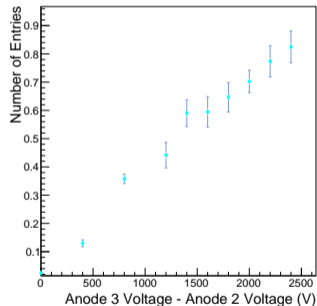
Only anode 1 Max Value above threshold



Only anode 2 Max Value above threshold

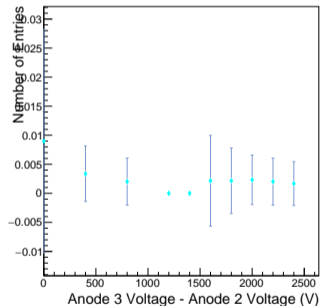


Only anode 3 Max Value above threshold

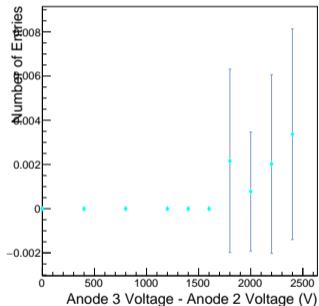


# Scheme B 3 barA pure Ar, Entries vs Voltage

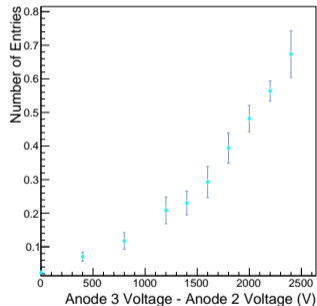
Only anode 1 and 2 max value above threshold



Only anode 1 and 3 max value above threshold

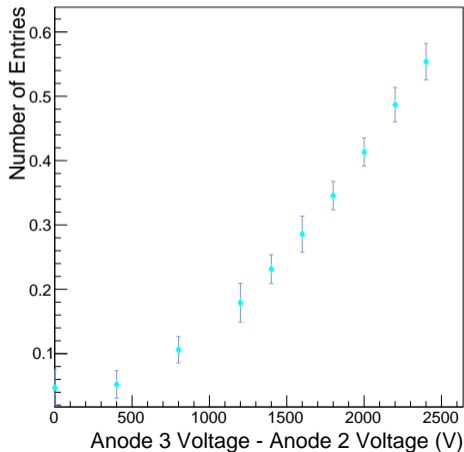


Only anode 2 and 3 max value above threshold

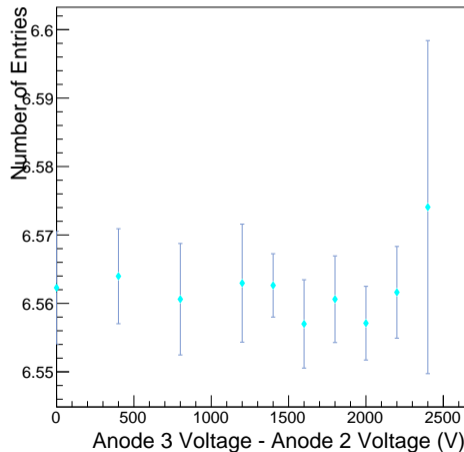


# Scheme B 3 barA pure Ar, Entries vs Voltage

All anodes max value above threshold

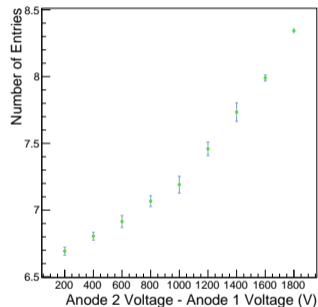


No anodes max value above threshold

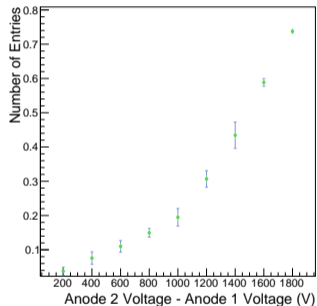


# Scheme C 3 barA pure Ar, Entries vs Voltage

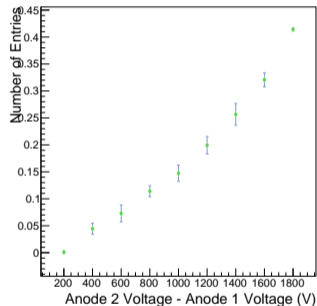
Mean No. entries in one run



A3 amplitude > 100mV



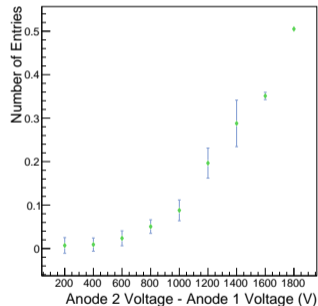
A3 amplitude > 250mV



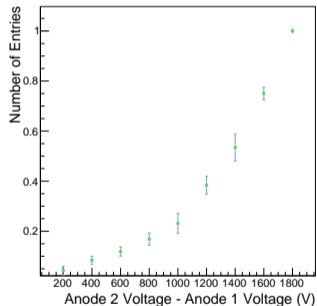


# Scheme C 3 barA pure Ar, Entries vs Voltage

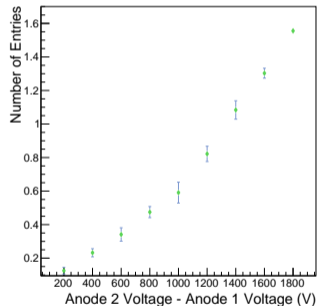
Anode 1 Max Value above threshold



Anode 2 Max Value above threshold

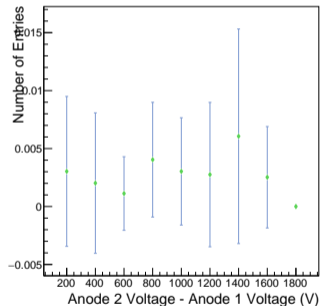


Anode 3 Max Value above threshold

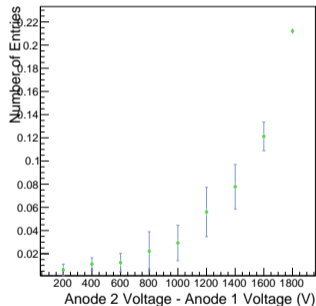


# Scheme C 3 barA pure Ar, Entries vs Voltage

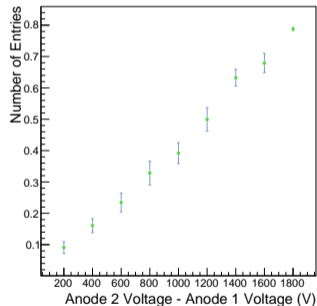
Only anode 1 Max Value above threshold



Only anode 2 Max Value above threshold

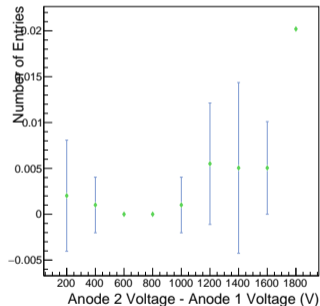


Only anode 3 Max Value above threshold

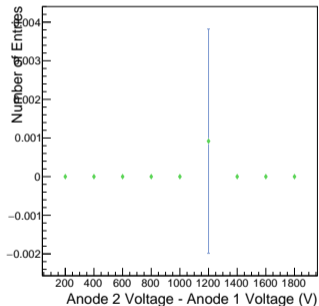


# Scheme C 3 barA pure Ar, Entries vs Voltage

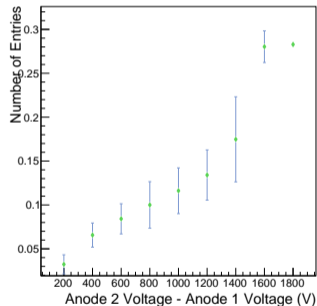
Only anode 1 and 2 max value above threshold



Only anode 1 and 3 max value above threshold

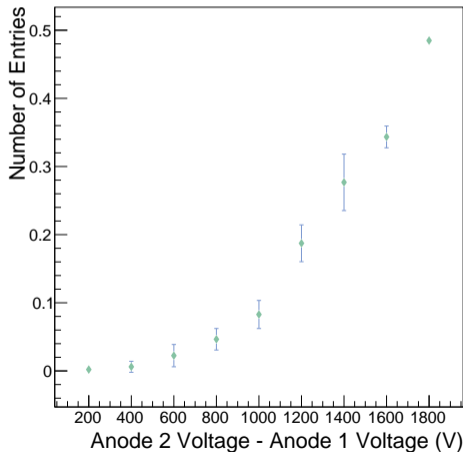


Only anode 2 and 3 max value above threshold

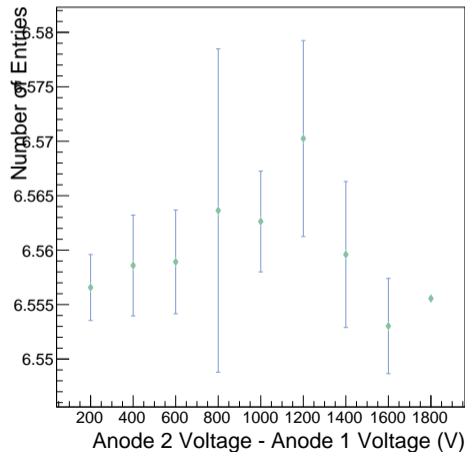


# Scheme C 3 barA pure Ar, Entries vs Voltage

All anodes max value above threshold



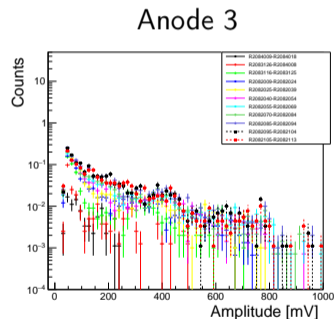
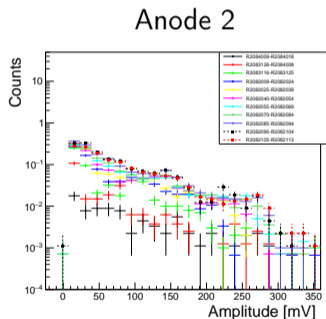
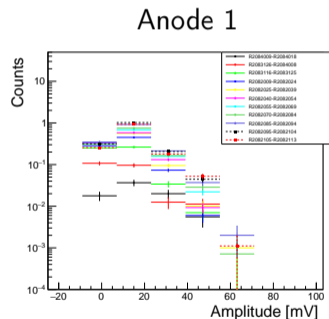
No anodes max value above threshold



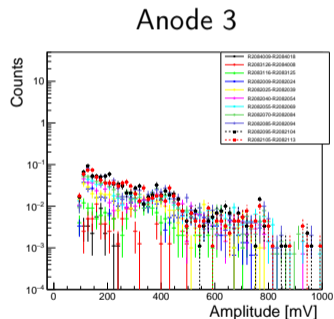
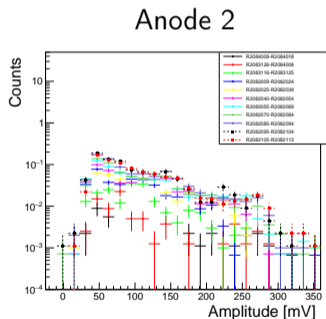
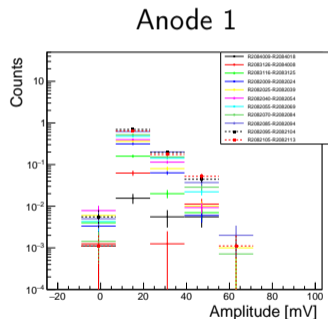
## Amplitude spectra

- ▶ 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.

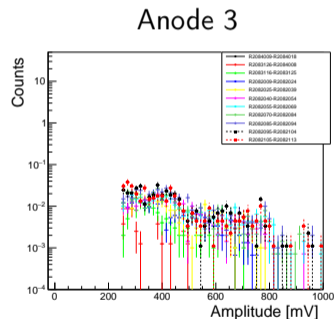
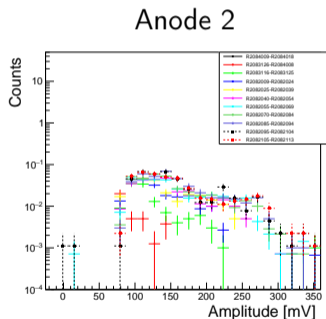
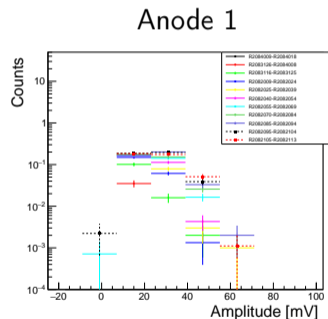
## Without Additional Cuts



Amplitude Anode 3 > 100mV

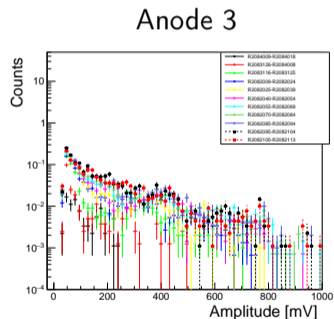
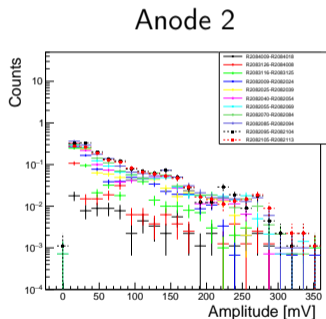
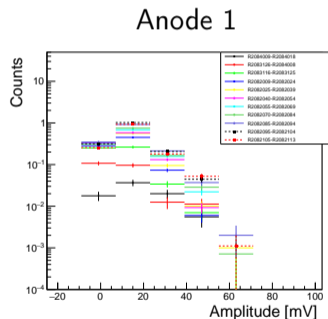


Amplitude Anode 3 > 250mV

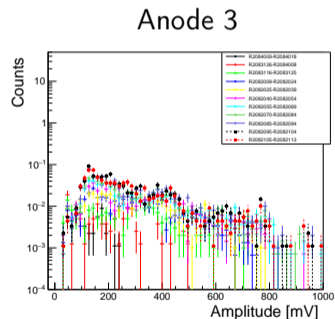
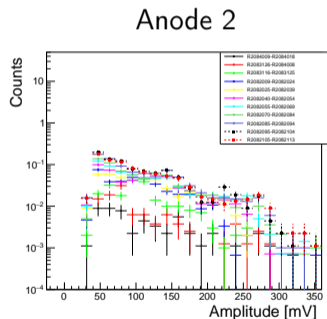
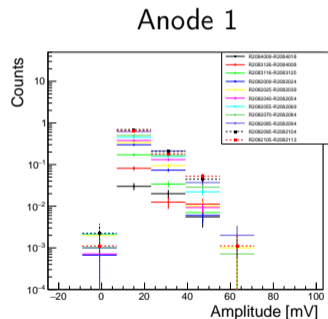




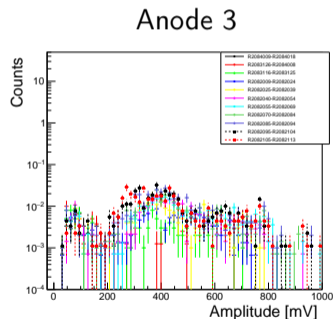
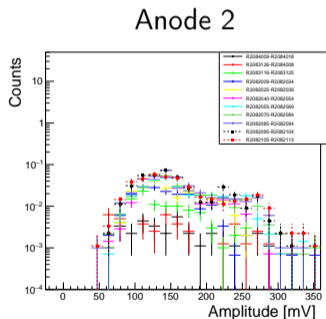
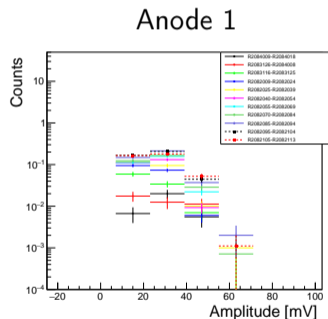
## Anode 3 max value above threshold



Anode 2 max value above threshold

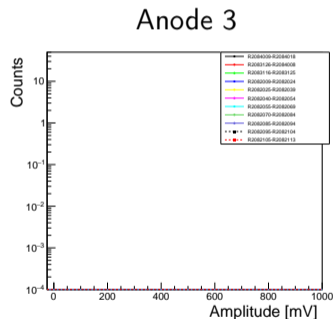
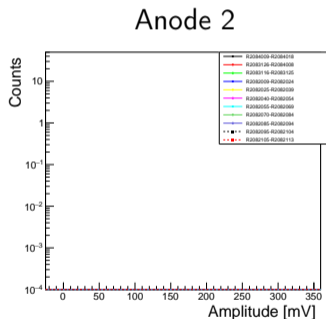
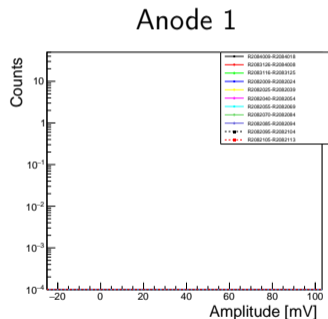


Anode 1 max value above threshold



# Scheme B 3 barA pure Ar

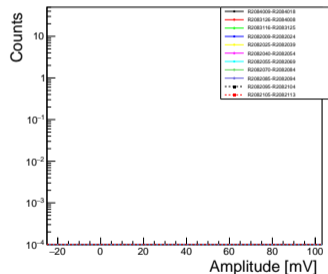
Only anode 1 max value above threshold



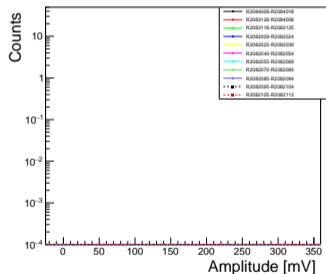
# Scheme B 3 barA pure Ar

Only anode 2 max value above threshold

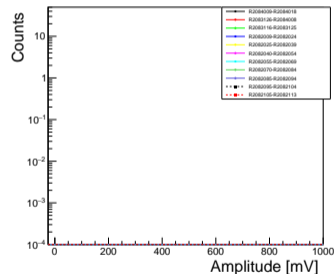
Anode 1



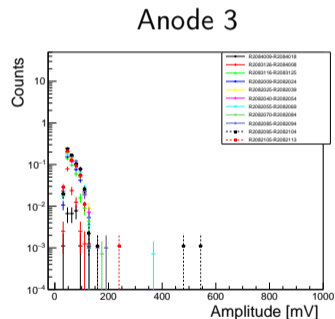
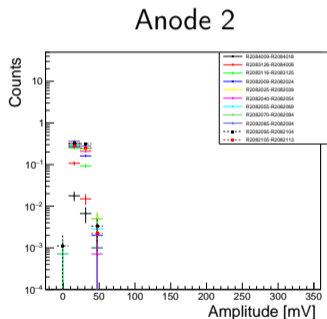
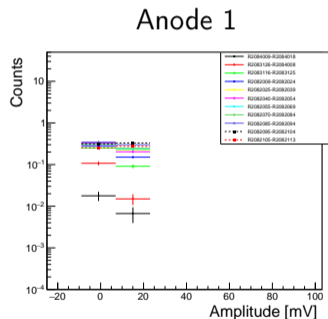
Anode 2



Anode 3

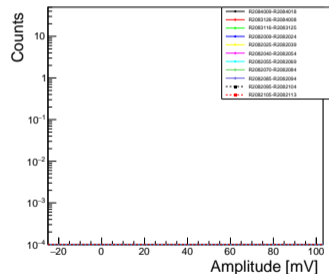


Only anode 3 max value above threshold

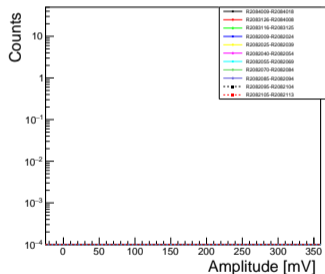


Only anode 1 and 2 max value above threshold

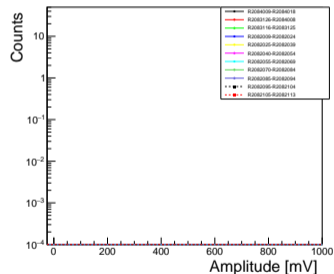
## Anode 1



## Anode 2

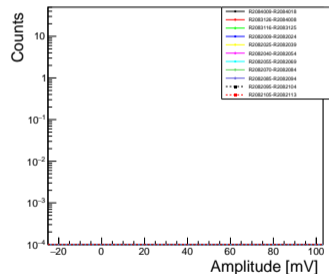


## Anode 3

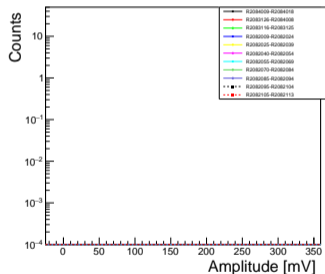


Only anode 1 and 3 max value above threshold

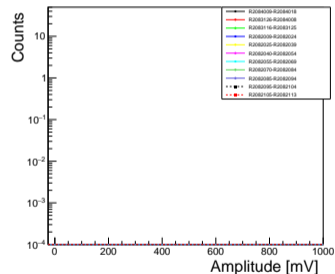
## Anode 1



## Anode 2

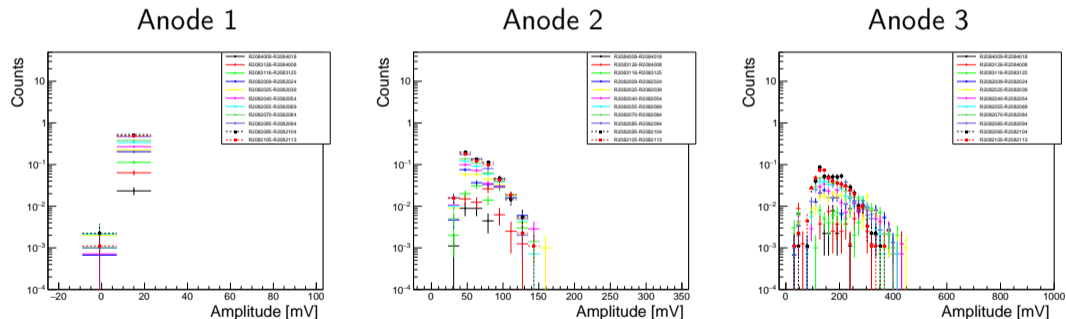


## Anode 3





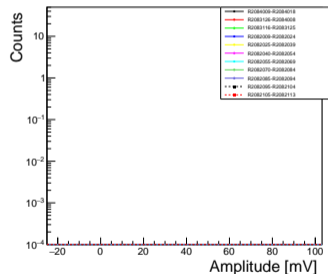
Only anode 2 and 3 max value above threshold



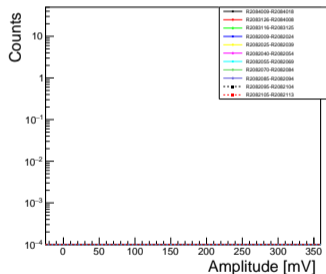
# Scheme B 3 barA pure Ar

No anodes max value above threshold

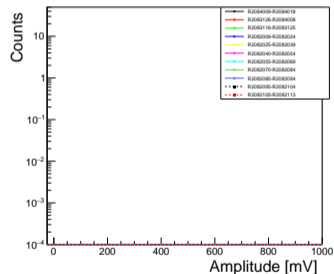
Anode 1



Anode 2

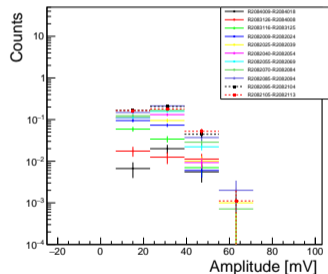


Anode 3

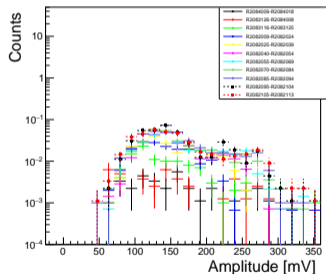


All anodes max value above threshold

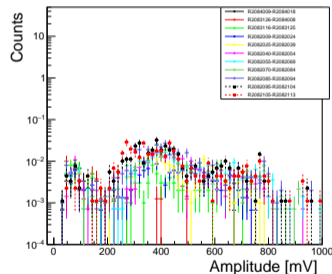
### Anode 1



### Anode 2



### Anode 3



# Extra Extra Extra Slides

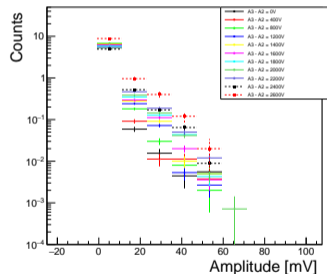
## Secret Slide

- ▶ If you actually read this far, congratulations! You have found my secret slide!
- ▶ Thank you for taking the time to look through, here's a poem I've written just for you:
- ▶ Secret slide, I never knew it was you,
- ▶ I can't believe that it's true,
- ▶ Oh, secret slide...

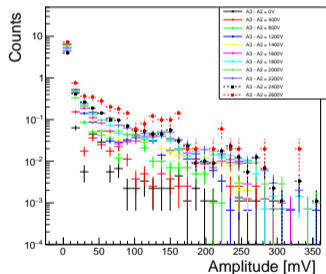
# Scheme B 3 barA pure Ar, data cleaning

With Data Cleaning

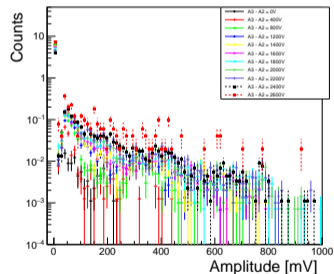
Anode 1



Anode 2

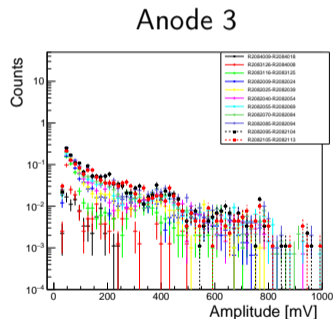
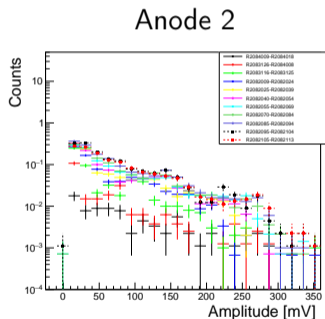
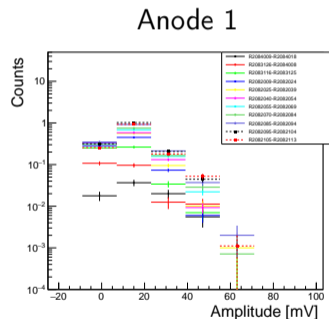


Anode 3



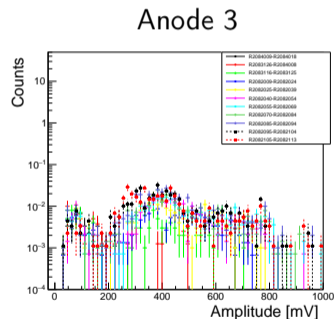
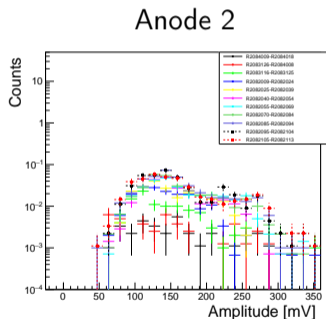
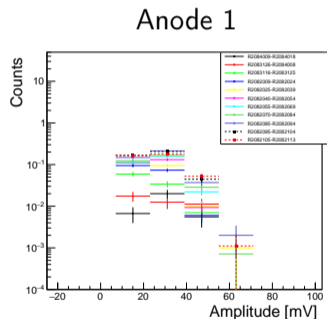
# Scheme B 3 barA pure Ar, data cleaning

With Improved Data Cleaning



# Scheme B 3 barA pure Ar, data cleaning

Only Events Which Trigger on all 3 Anodes

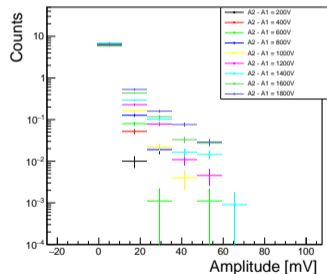




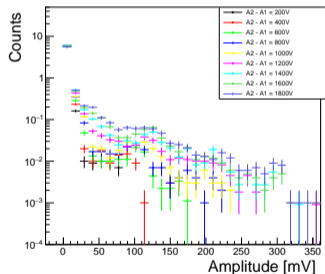
# Scheme C 3 barA pure Ar, data cleaning

With Data Cleaning

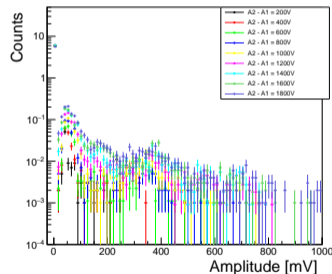
Anode 1



Anode 2

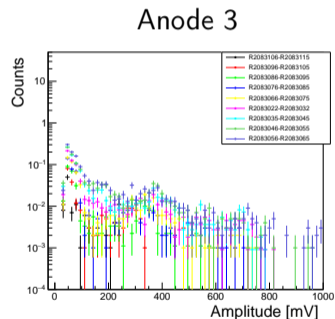
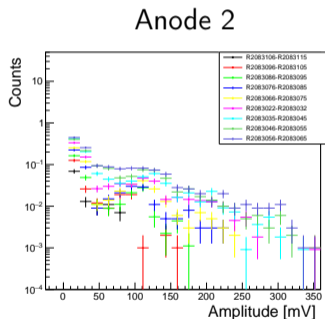
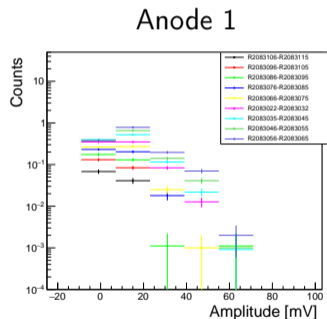


Anode 3



# Scheme C 3 barA pure Ar, data cleaning

With Improved Data Cleaning



# Scheme C 3 barA pure Ar, data cleaning

Only Events Which Trigger on all 3 Anodes

