Z dependence in density change of the gas targets

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Cuts used in this analysis

$$Trigger2$$

$$-0.03 < d\theta < 0.05$$

$$|d\phi| < 0.025$$

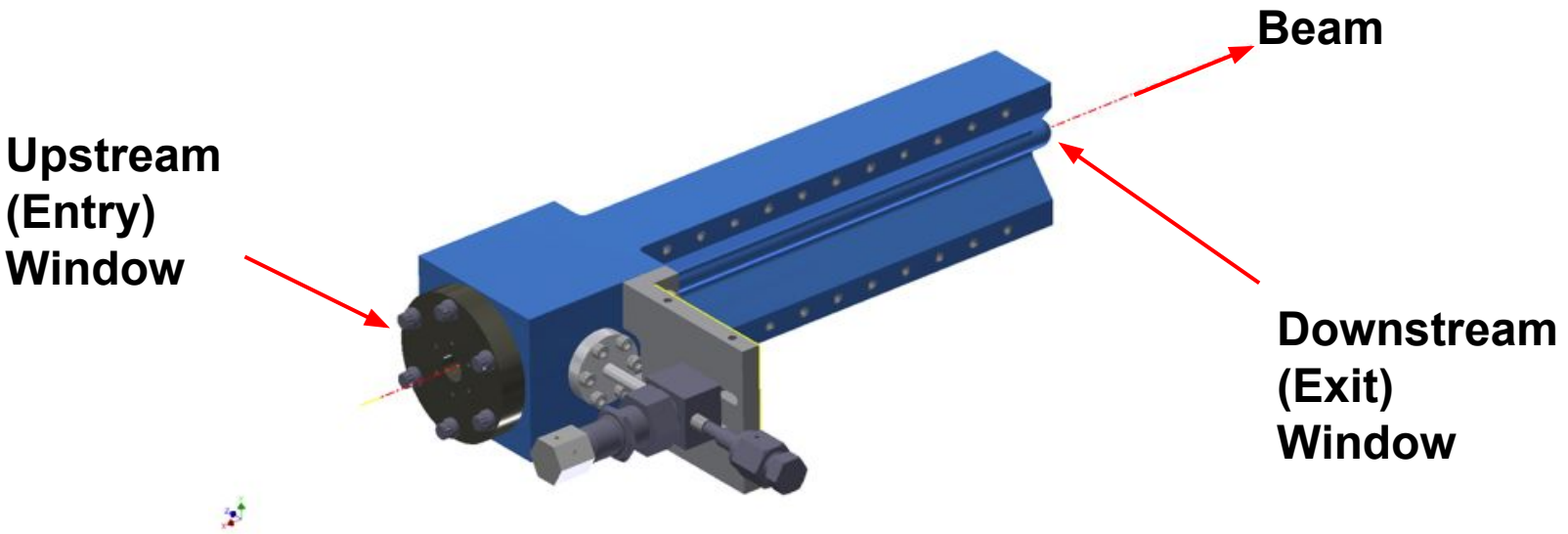
$$|dp| < 0.045$$

L.tr.n==1

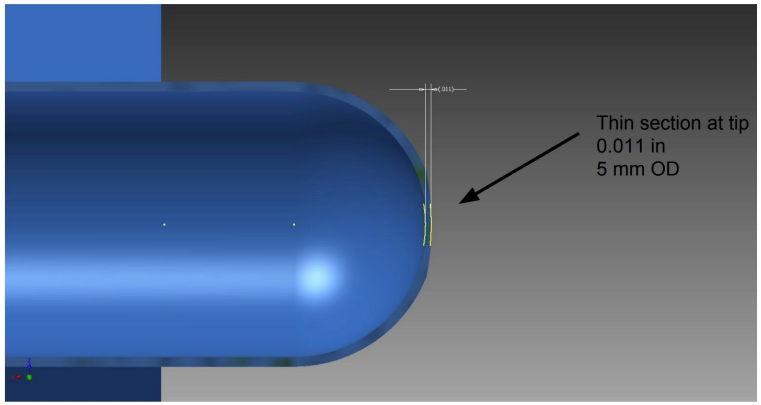
$$1500 < cer\_asum < 30000$$

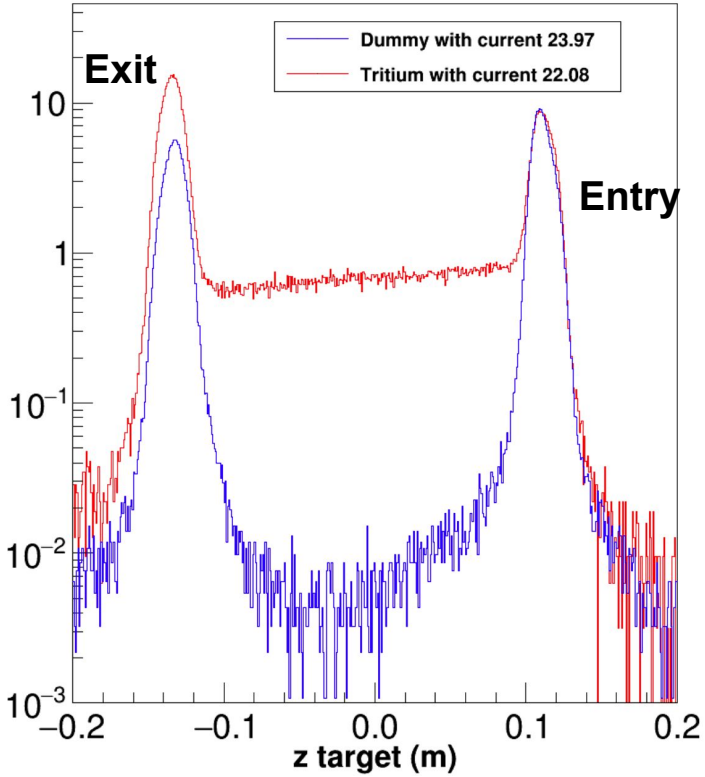
$$0.3 < E/P < 1.7$$

$$L.prl2.asum\_c > -L.prl1.asum\_c + 1700$$


Beam
Upstream
(Entry)
Window
Downstream
(Exit)
Window

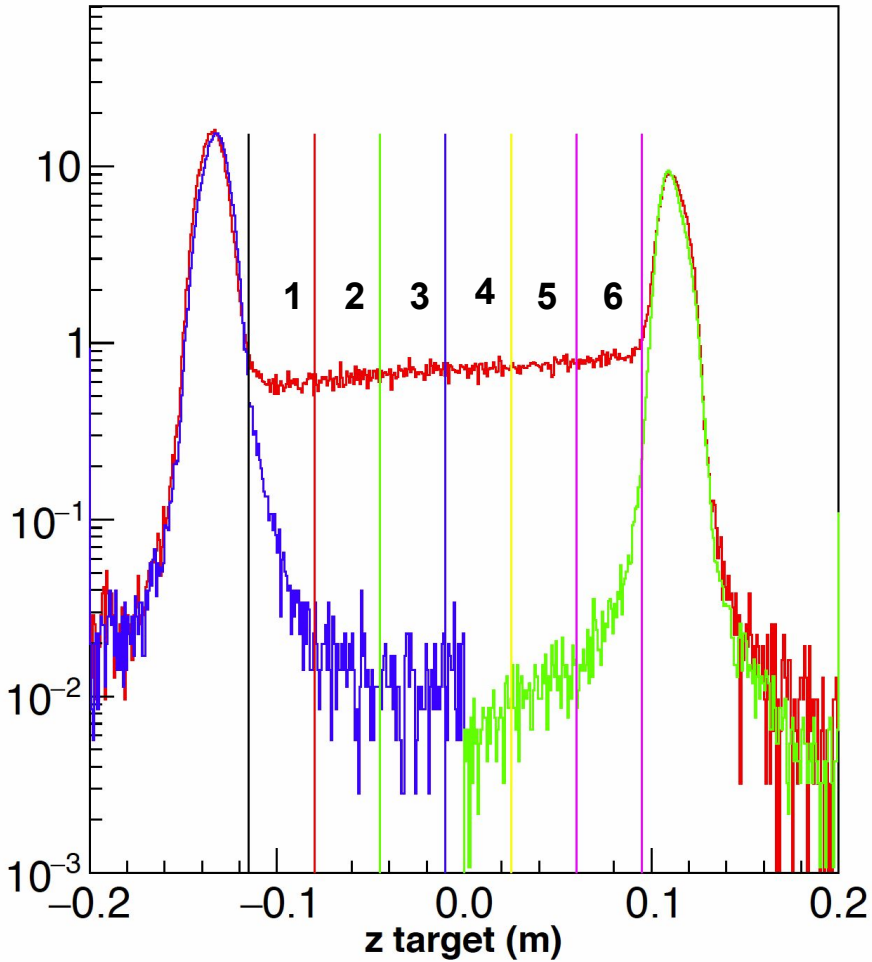
Exit Window thickness is slightly different for each cell.





Plan

- Use the Yield of the gas (tritium, helium, ...) and the dummy, to calculate the background contamination..
- Divide the spectrum in two halfs and scale each foil of the dummy with respect to the corresponding cap in the cells.
- Use cuts of 3.5 cm and calculate the background for each cut.
- Use the same cuts in the gas and calculate the Normalized Yield with respect to the lowest current run, after doing background subtraction.

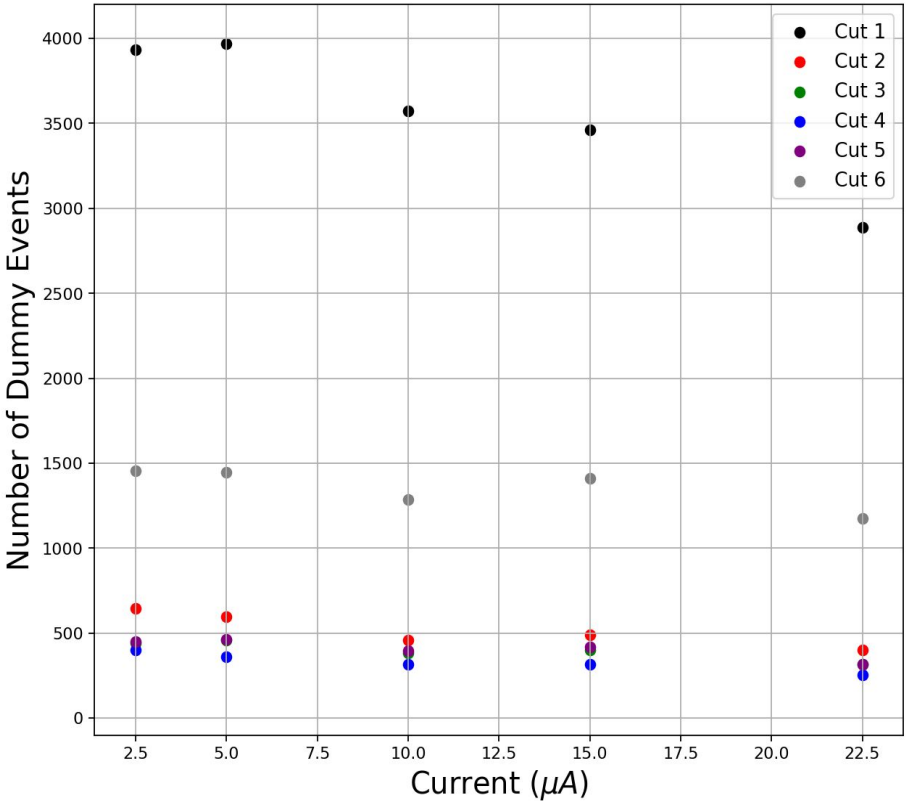


Target Cuts

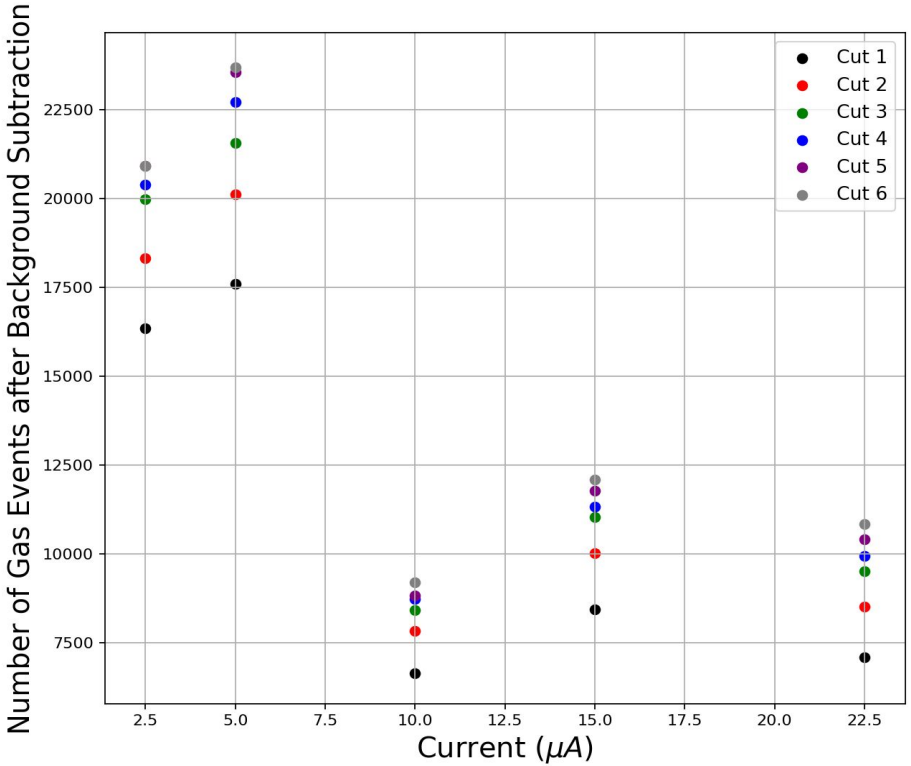
Cut 1: -0.115--0.080 m
Cut 2: -0.080--0.045 m
Cut 3: -0.045--0.010 m
Cut 4: -0.010-0.025 m
Cut 5: 0.025-0.060 m
Cut 6: 0.060-0.095 m

Tritium

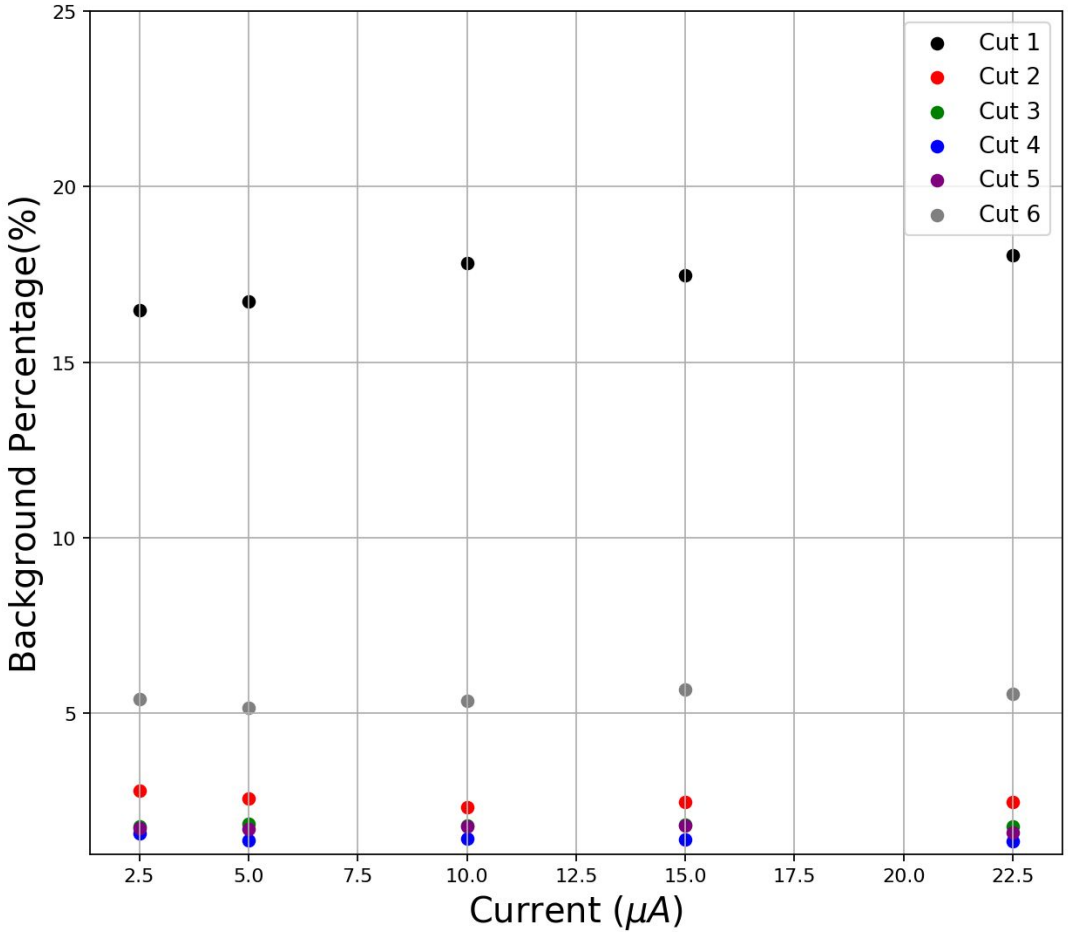
Dummy Events after scaling



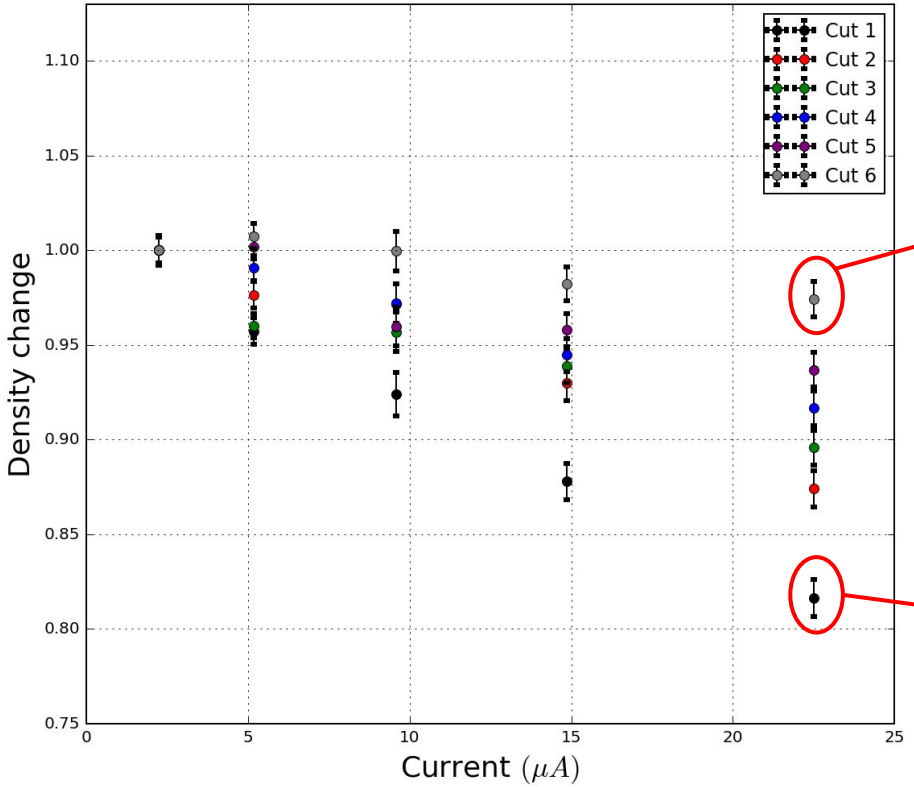
Gas Events after Background subtraction



Background percentage from the Normalized Yield and after scaling.



Tritium Normalized Yield for the different cuts

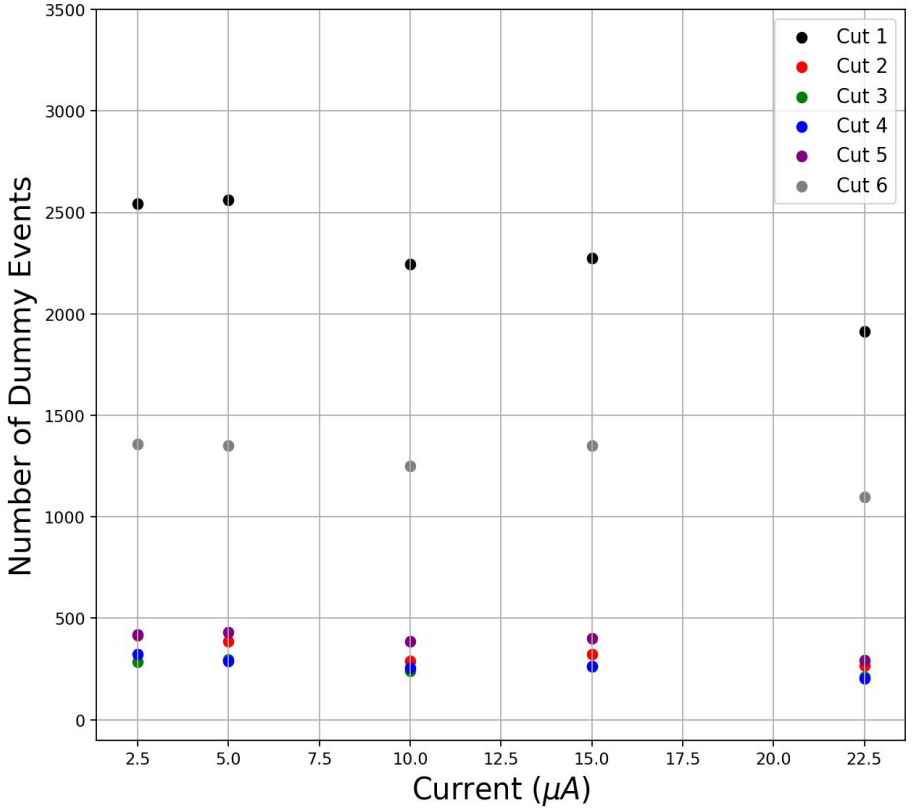


Nearest to the entrance window

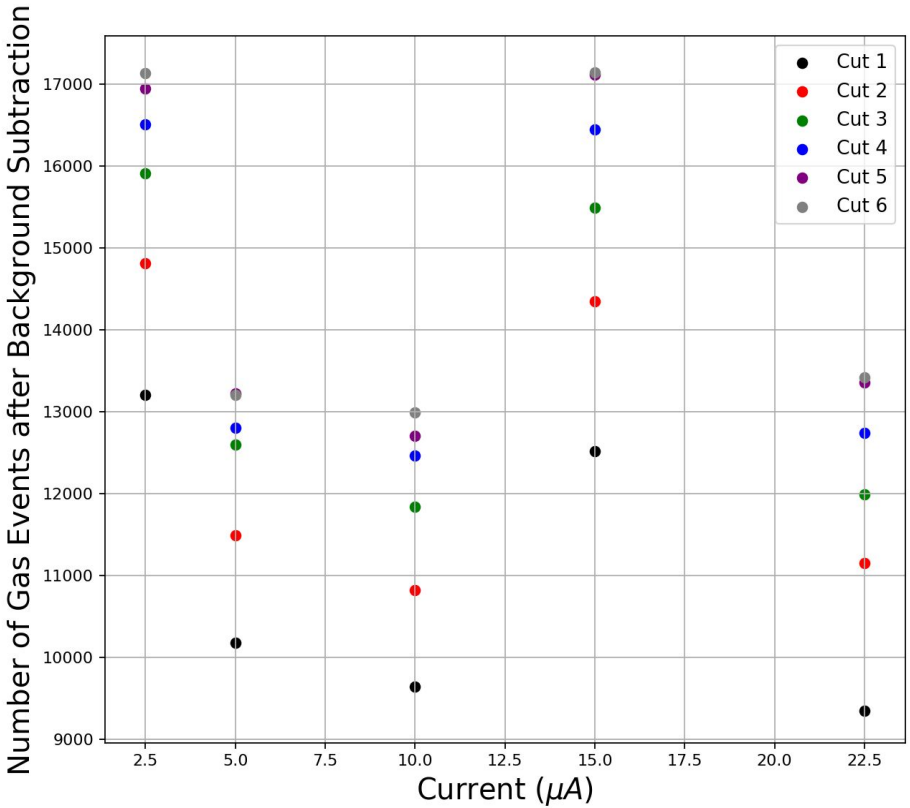
Nearest to the exit window

Helium

Dummy Events after scaling

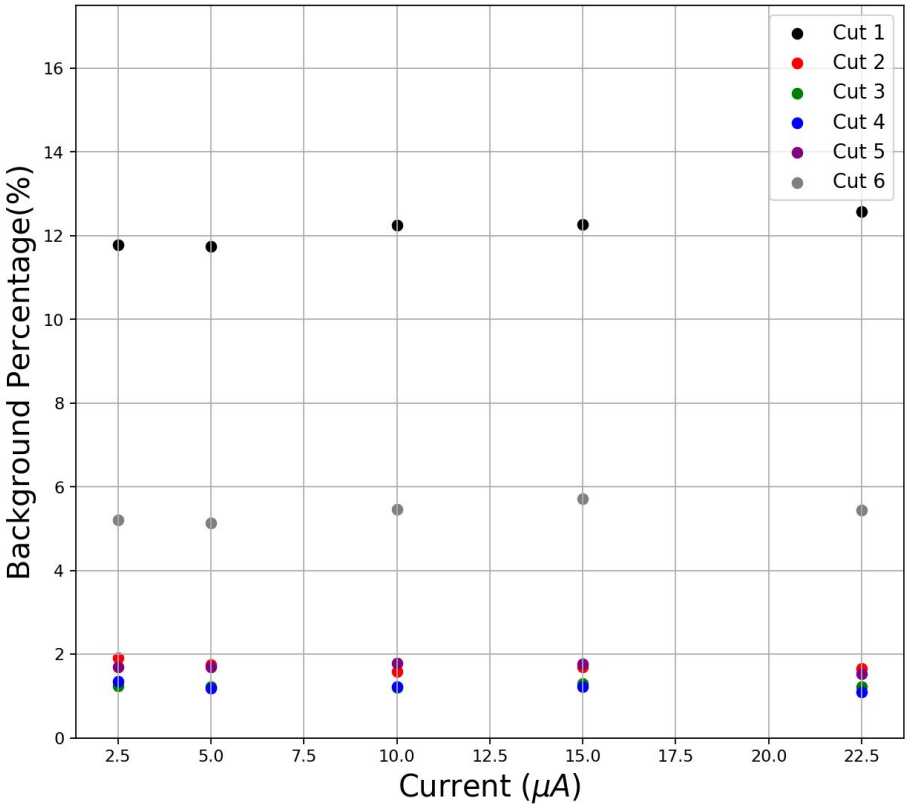


Gas Events after Background subtraction

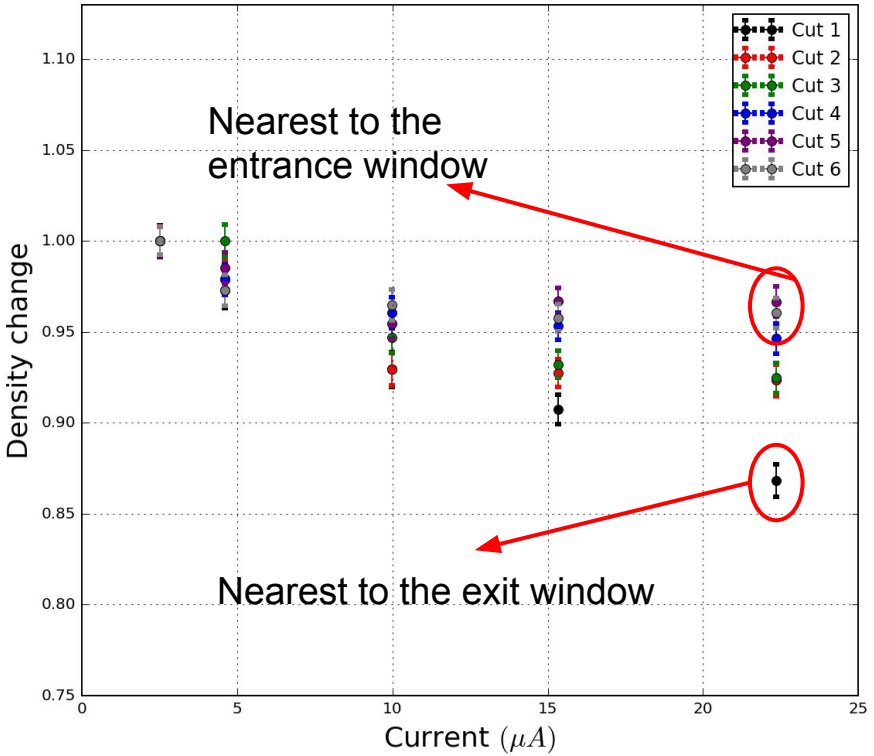


Helium

Background

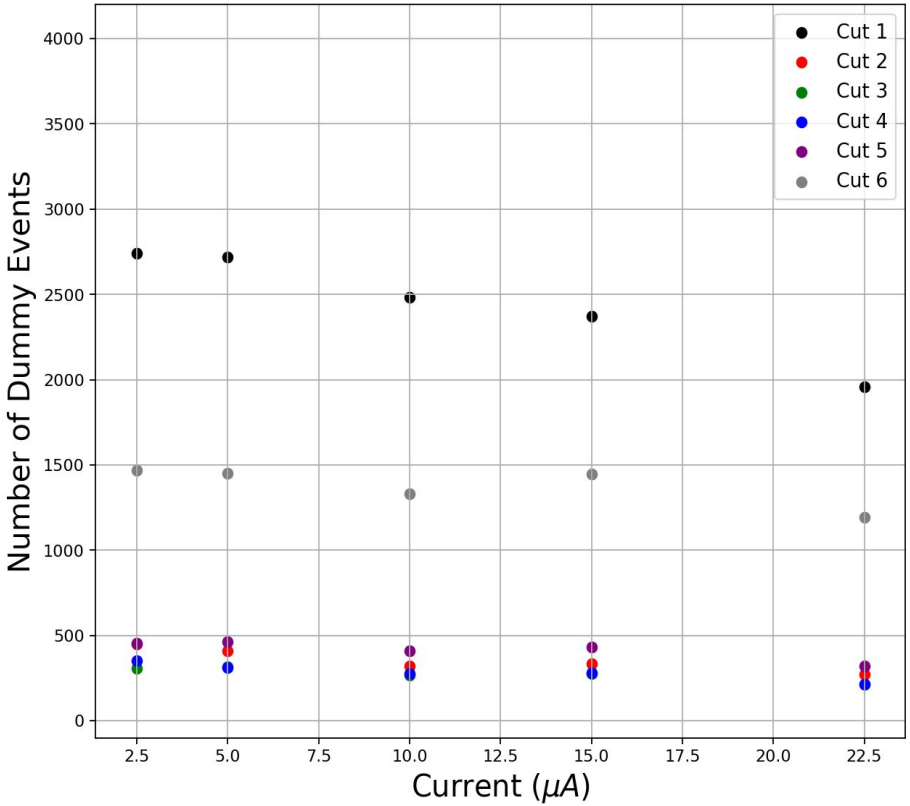


Normalized Yield with respect to the lowest current

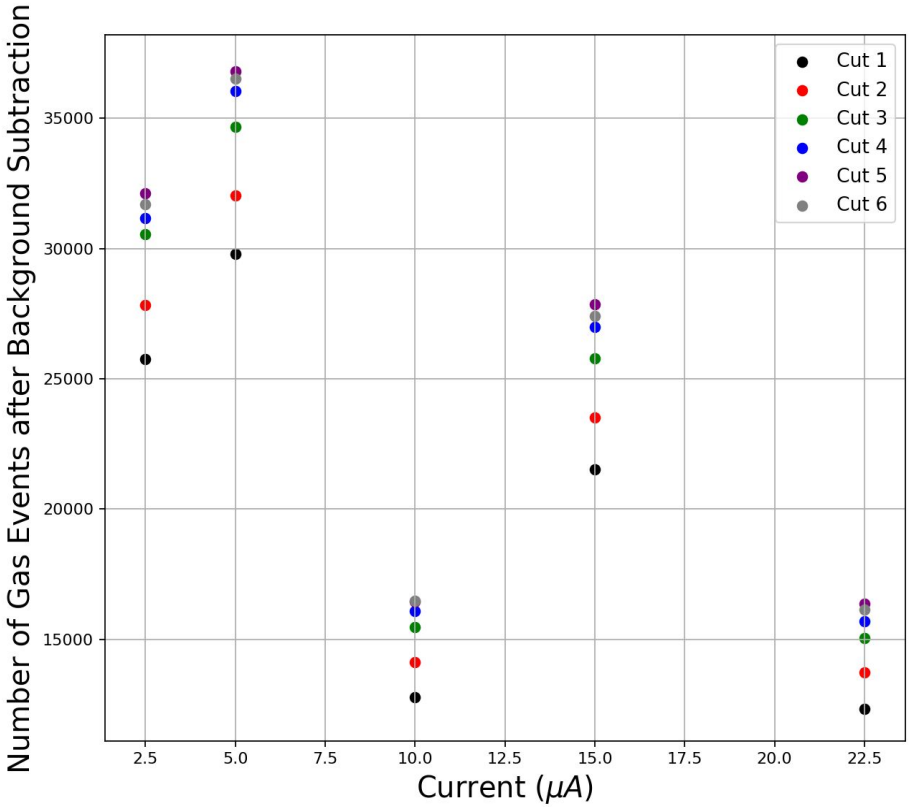


Deuterium

Dummy Events after scaling

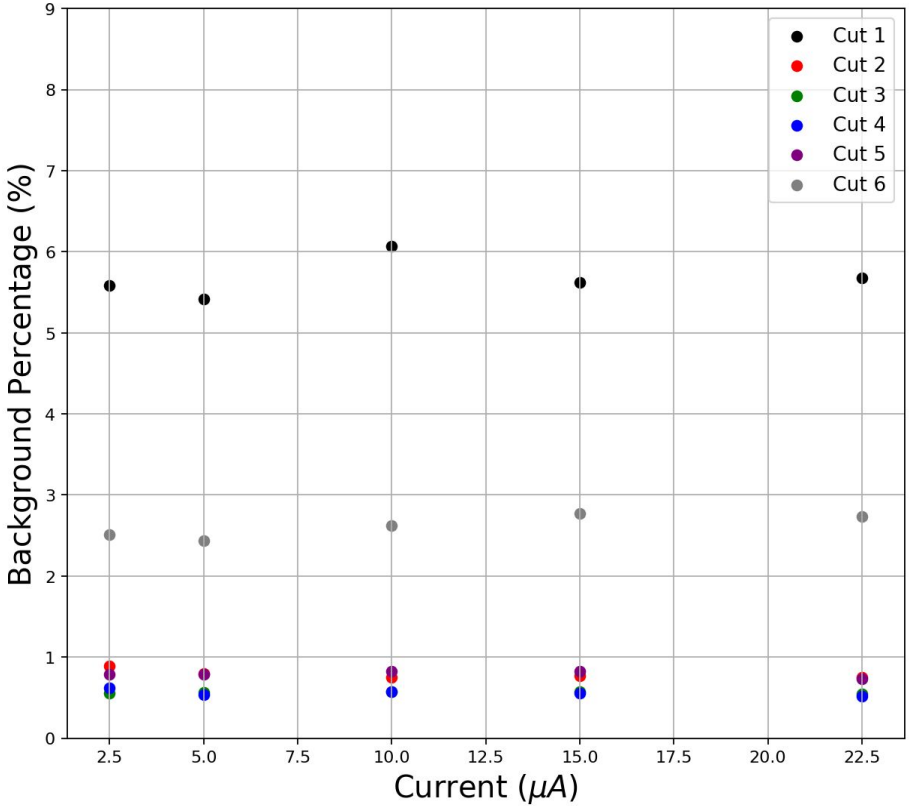


Gas Events after Background subtraction

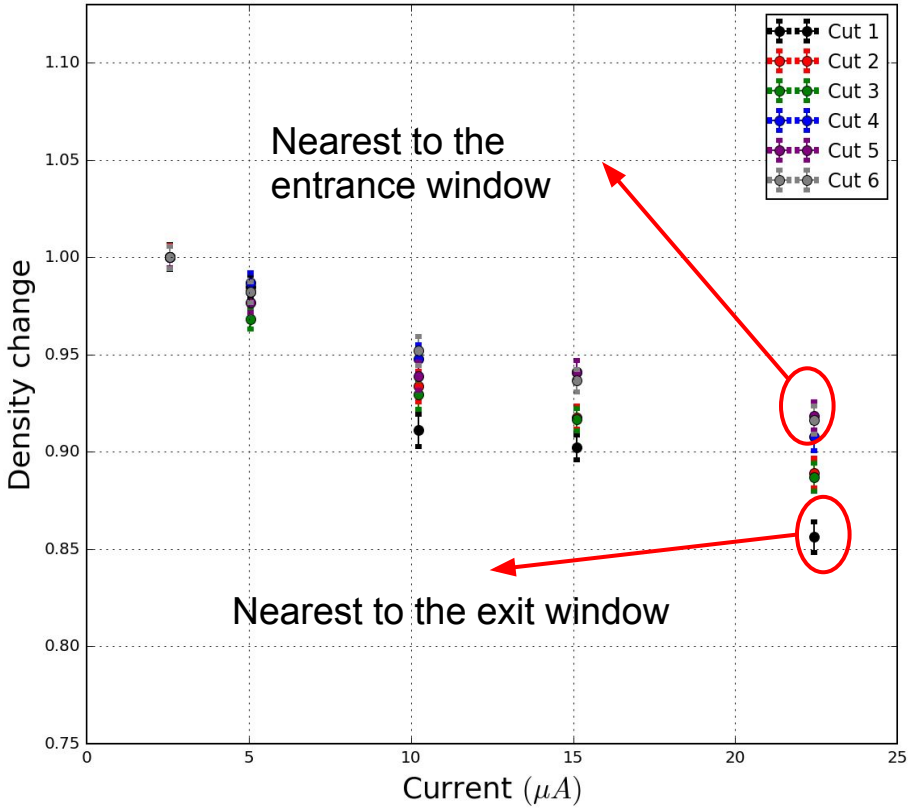


Deuterium

Background

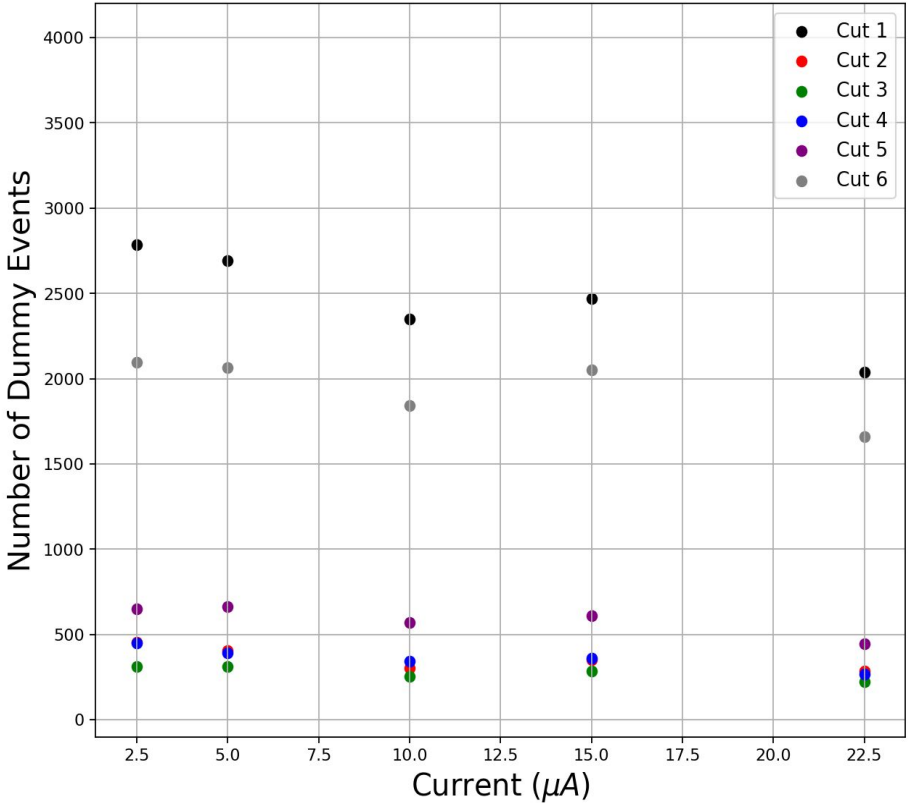


Normalized Yield with respect to the lowest current

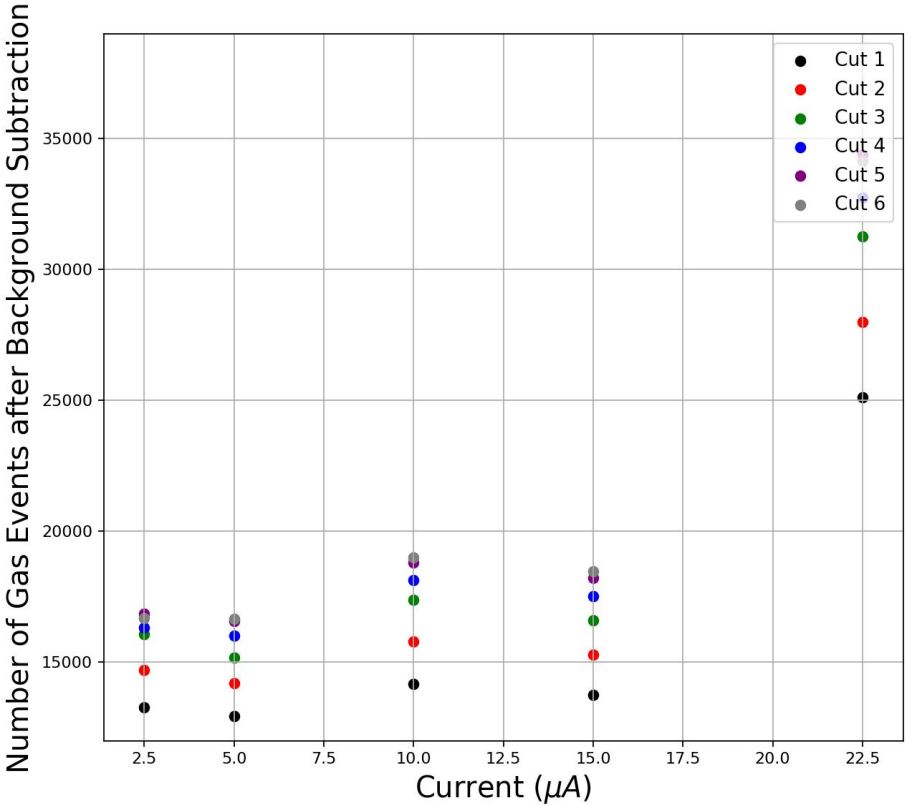


Hydrogen

Dummy Events after scaling

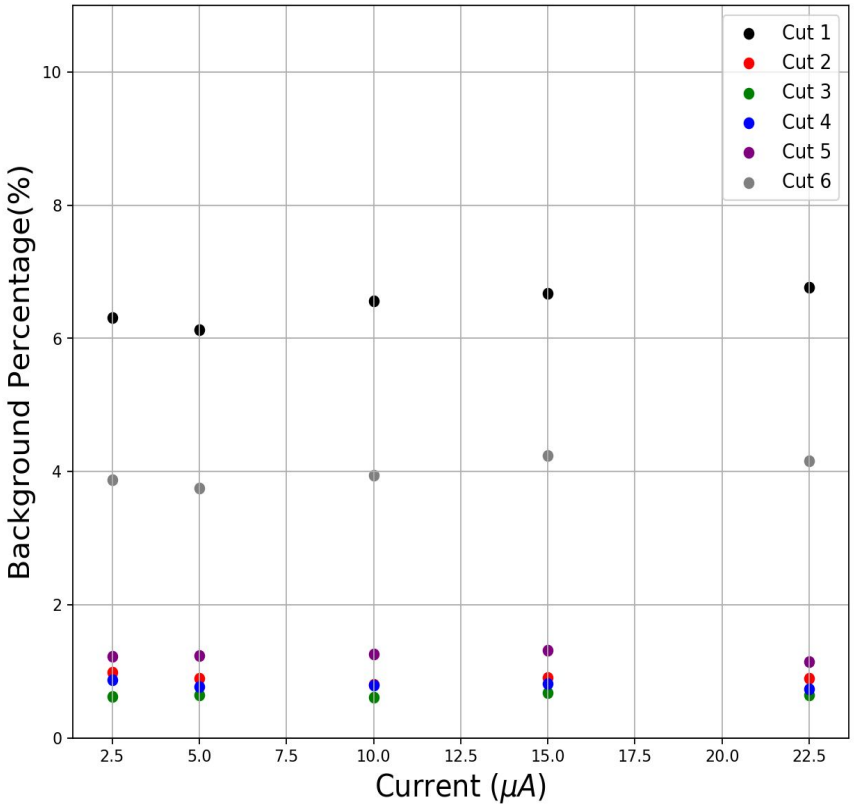


Gas Events after Background subtraction

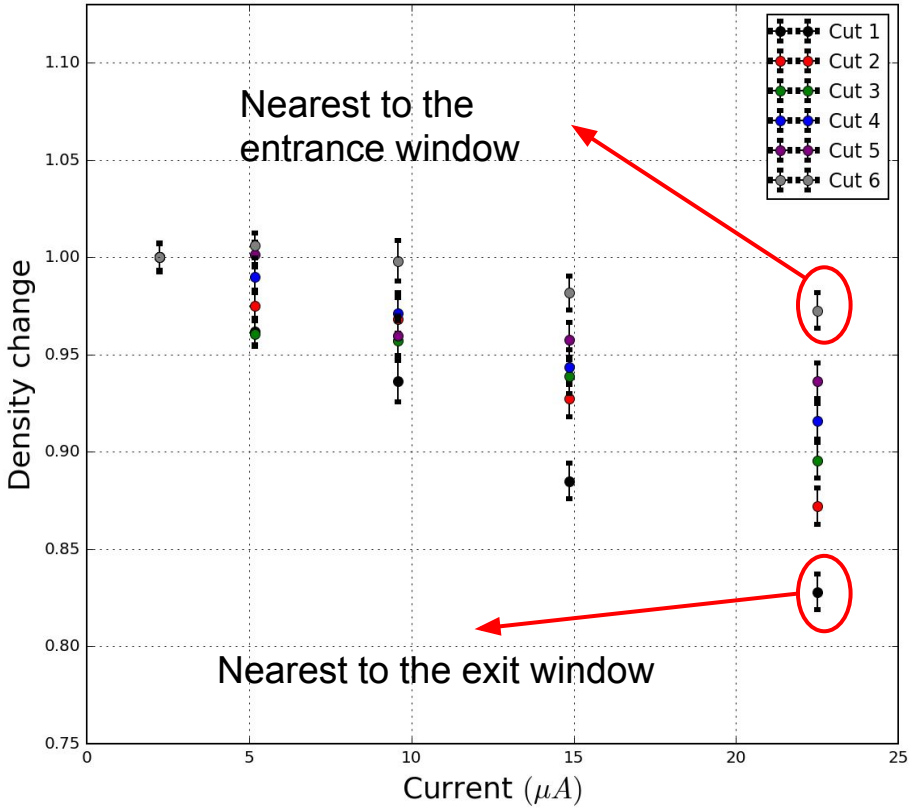


Hydrogen

Background



Normalized Yield with respect to the lowest current



Conclusions

It seems to be a z dependence in the target, where the gas nearest to the entrance window is less sensitive to the density change. Note: the cooling system is nearest to the entrance window. And the gas closest to the exit window, is the region where is more sensitive to density change.

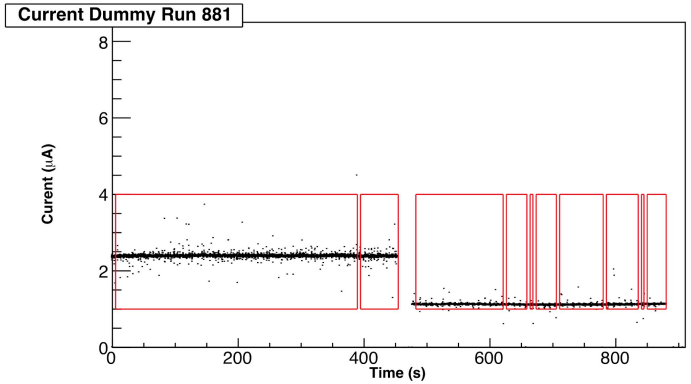
To do:

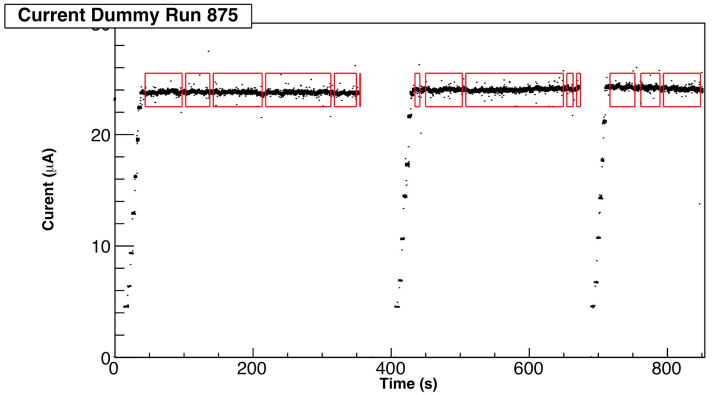
The usual cut used for the target is in around the center ~(-0.07 to 0.07 m). What is the z dependence in that region?

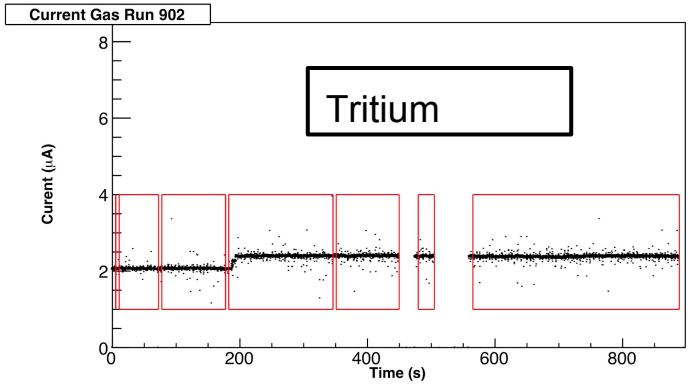
Current Trip Cut

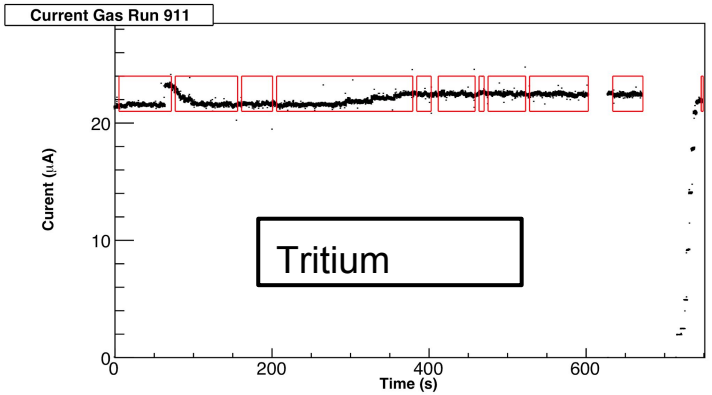
I +/- 1.5 μA

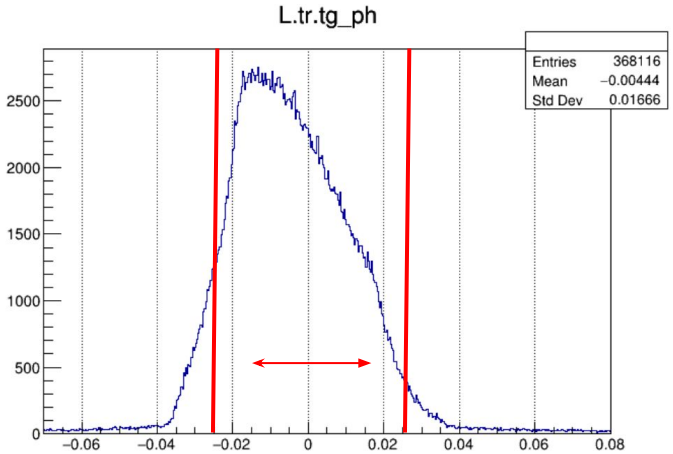
If there was a trip or the current was higher than I+1.5 μA, wait 10 s for the gas to be in equilibrium.

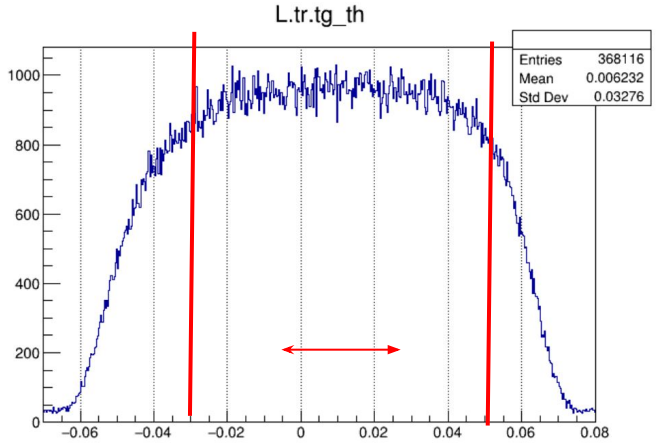


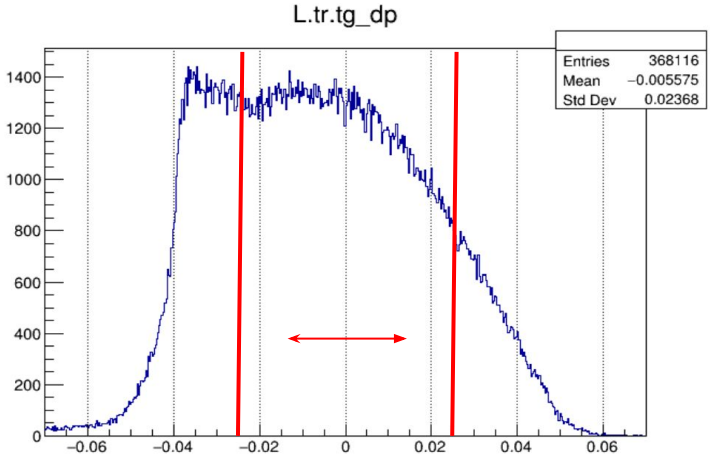


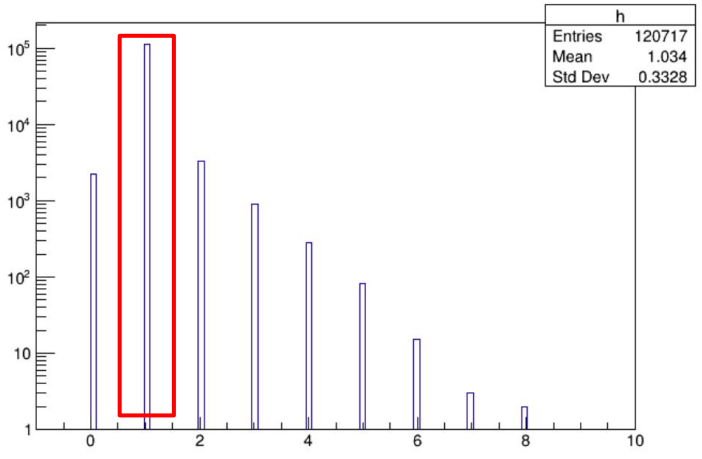


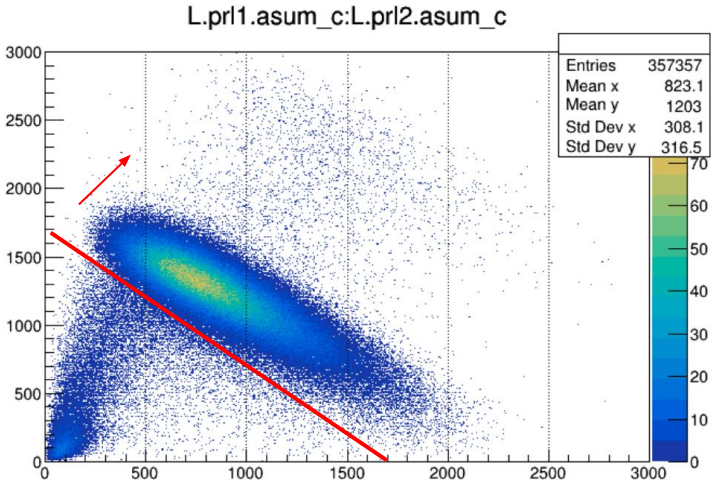


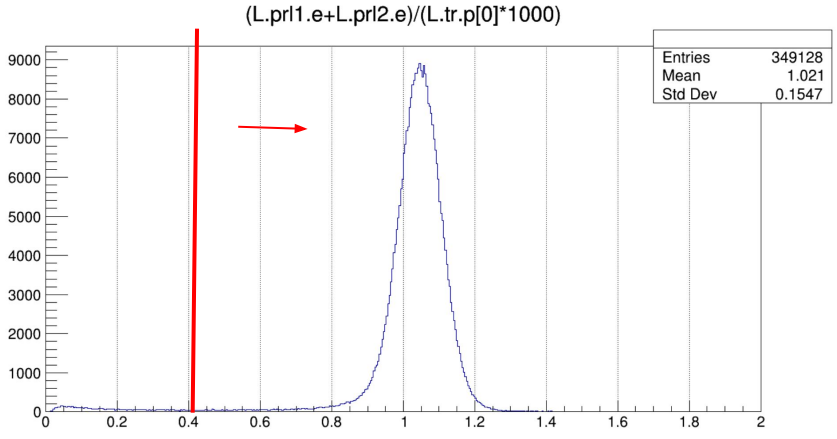

L.tr.tg_ph
Entries 368116
Mean −0.00444
Std Dev 0.01666
2500
2000
1500
1000
500
0
−0.06
−0.04
−0.02
0
0.02
0.04
0.06
0.08

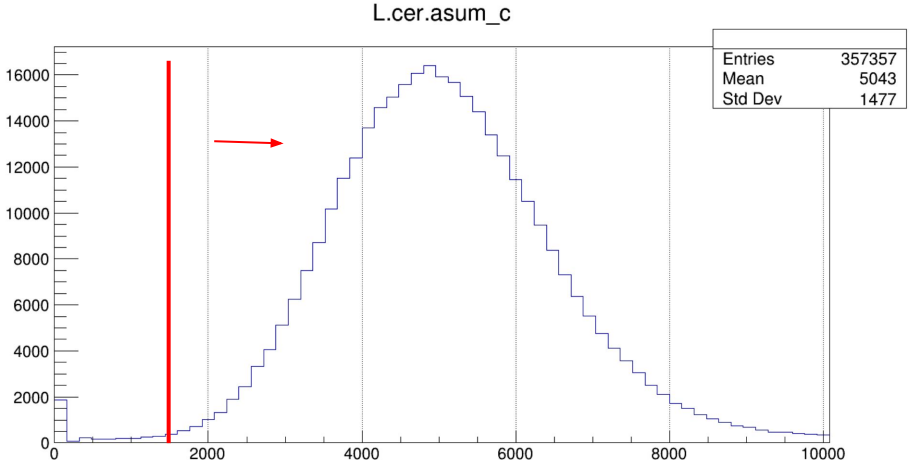

L.tr.tg_th
Entries 368116
Mean 0.006232
Std Dev 0.03276
1000
800
600
400
200
0
−0.06
−0.04
−0.02
0
0.02
0.04
0.06
0.08


L.tr.tg_dp
Entries 368116
Mean −0.005575
Std Dev 0.02368
1400
1200
1000
800
600
400
200
0
−0.06
−0.04
−0.02
0
0.02
0.04
0.06


h
Entries 120717
Mean 1.034
Std Dev 0.3328


L.prl1.asum_c:L.prl2.asum_c
Entries 357357
Mean x 823.1
Mean y 1203
Std Dev x 308.1
Std Dev y 316.5


(L.prl1.e+L.prl2.e)/(L.tr.p[0]*1000)
Entries 349128
Mean 1.021
Std Dev 0.1547


L.cer.asum_c
Entries 357357
Mean 5043
Std Dev 1477