e843 analysis meeting

10.12.2024

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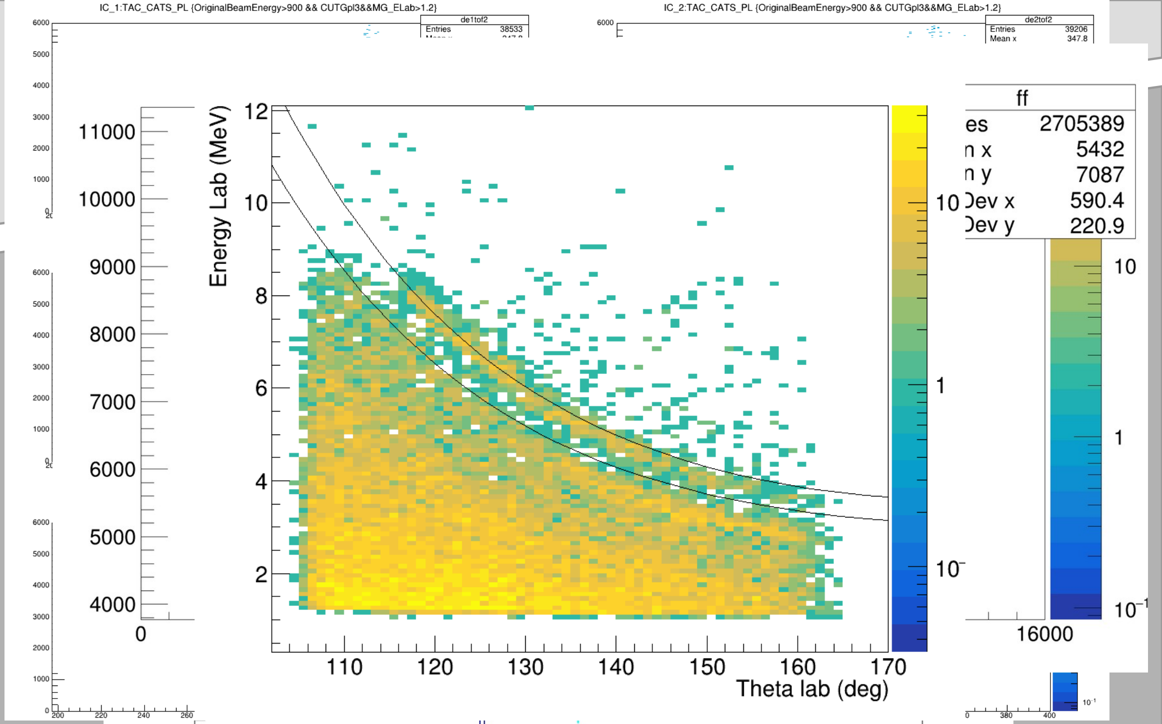
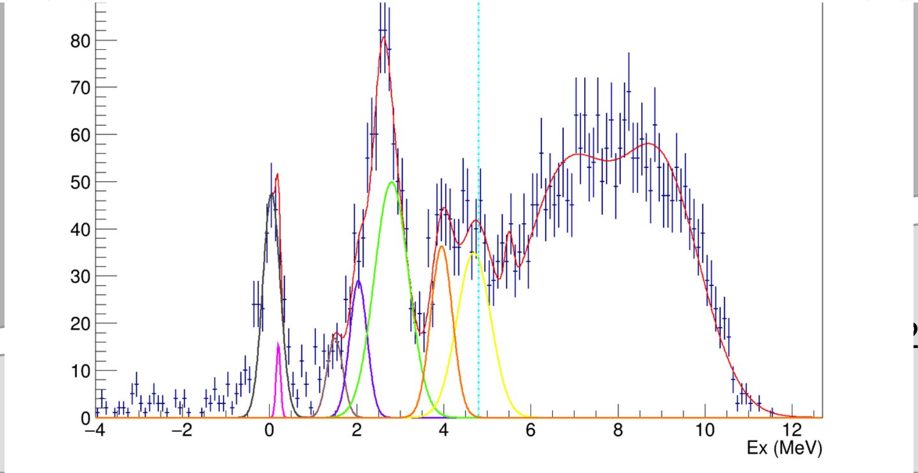
OUTLINE

- Recent Excitation Energy for 68Ni(d,p)69Ni reaction
  - Problems to solve ?
- 68Ni inelastic breakup component
- Exogam
  - Exogam correlation for excited states
- What to do next

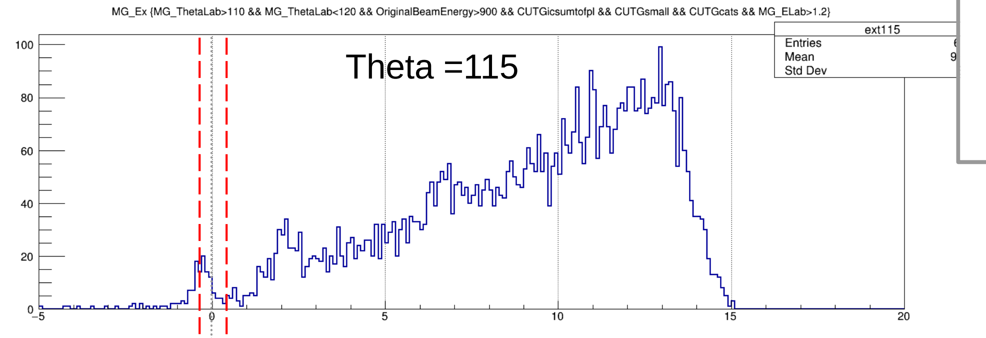
Ex with all cuts

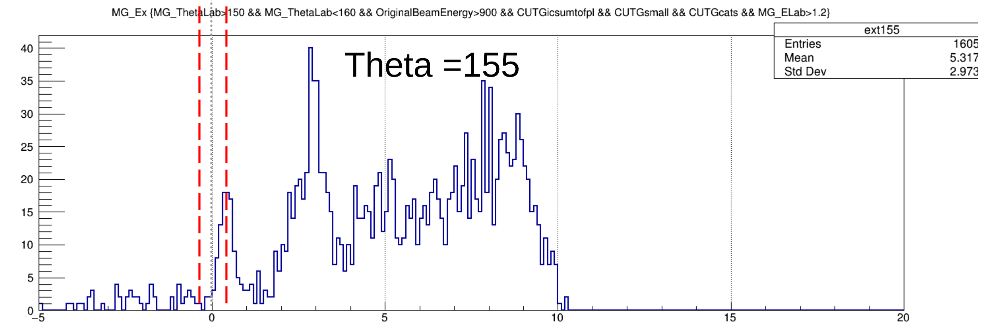
- Cuts & Selections
  - OriginalBeamEnergy → Tof
  - IC-dE – Tof: D4-CATS
  - IC-dE – Tof :CATS-PL
  - IC dE- Plastic E
  - Theta Lab > 130

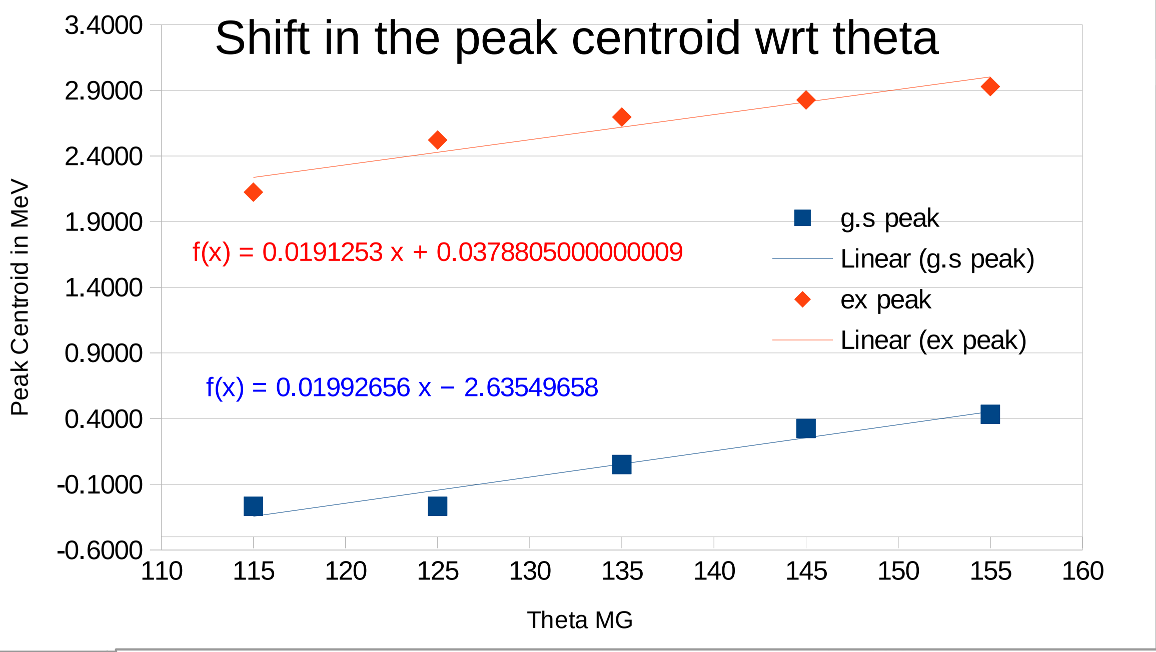


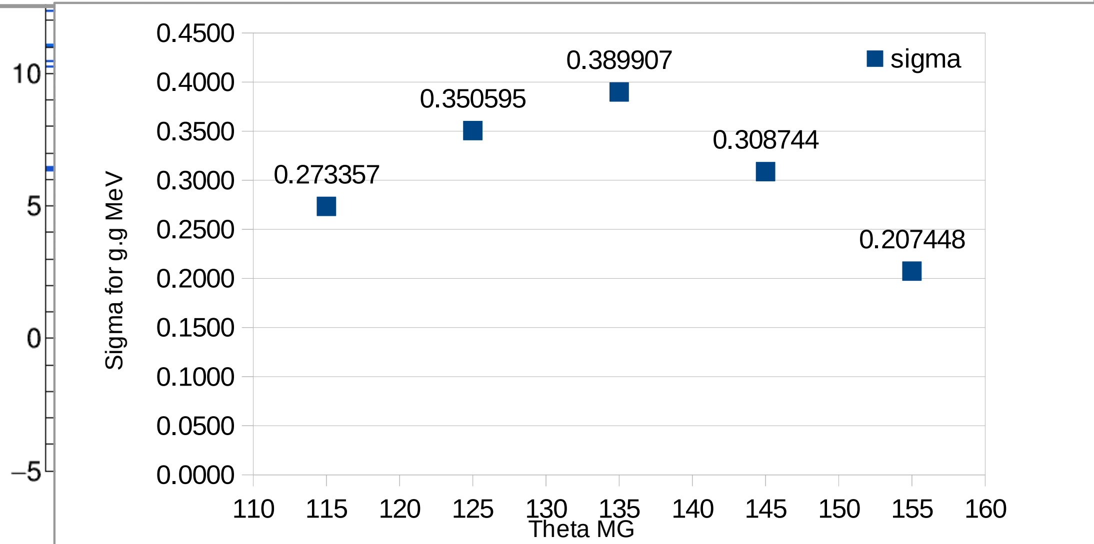


Questions to solve

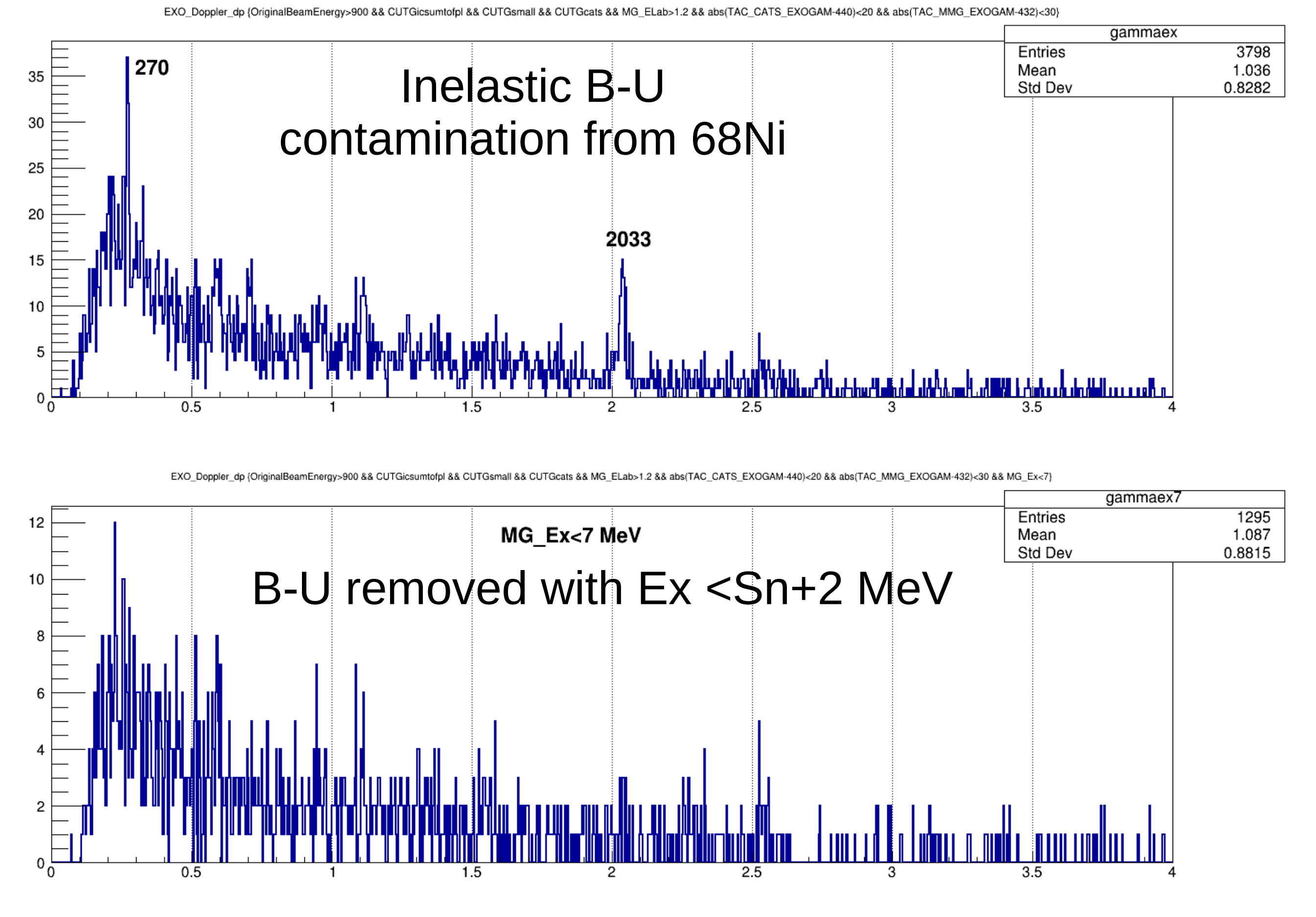


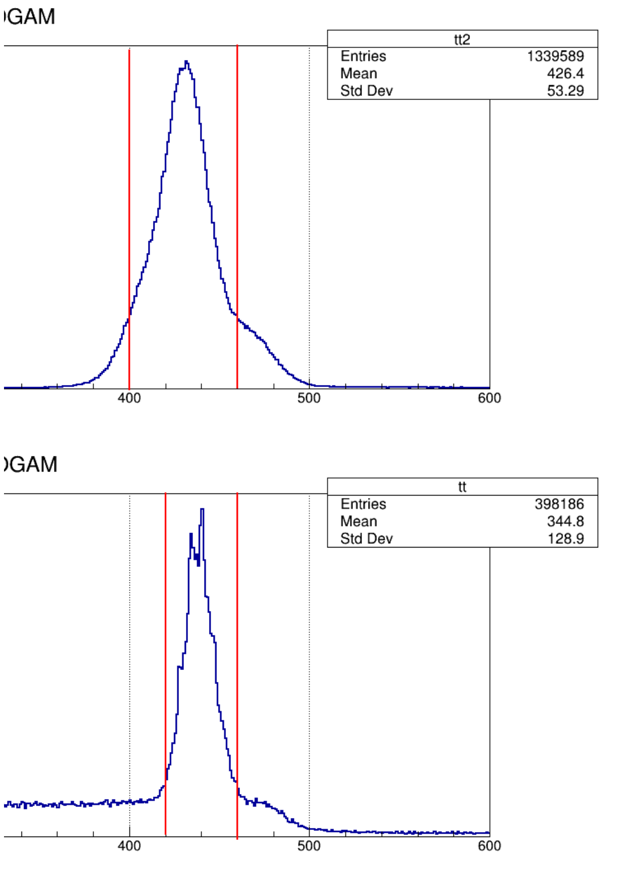






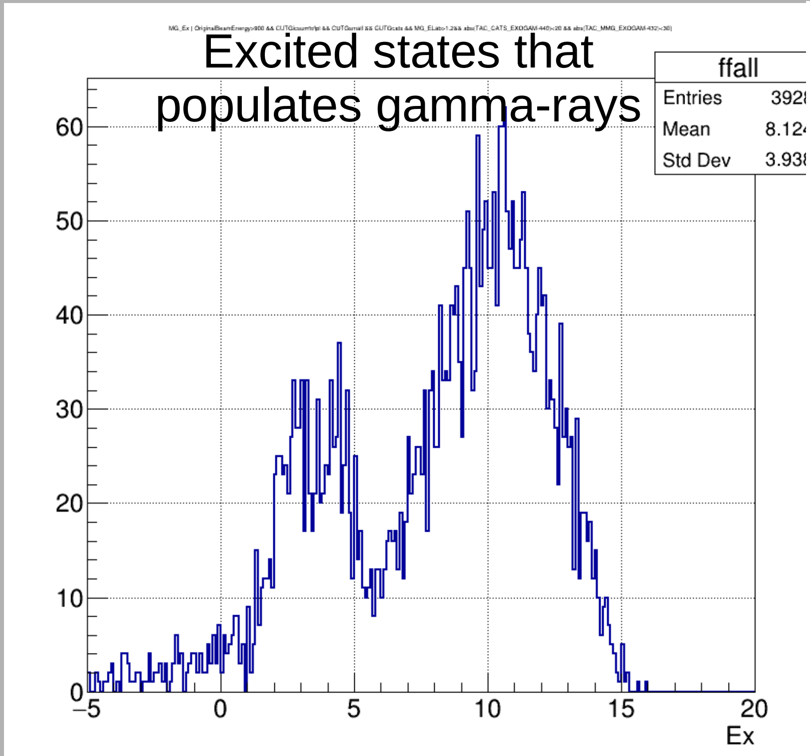
For Exogam correlations
extra cuts in TACs

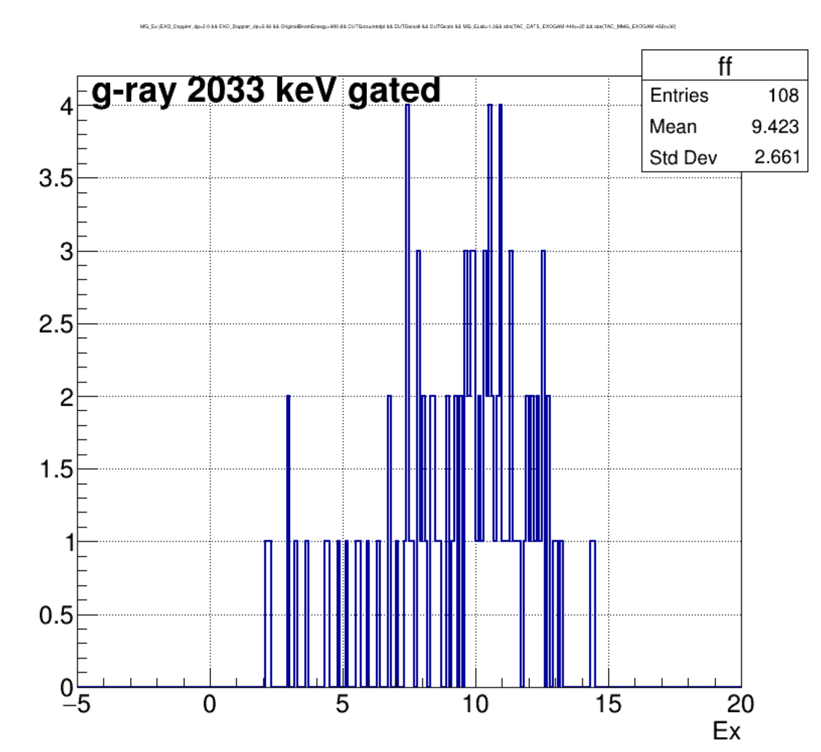




Break Up components – inelastic 68Ni
Exogam tac gated & 2033 gated Ex

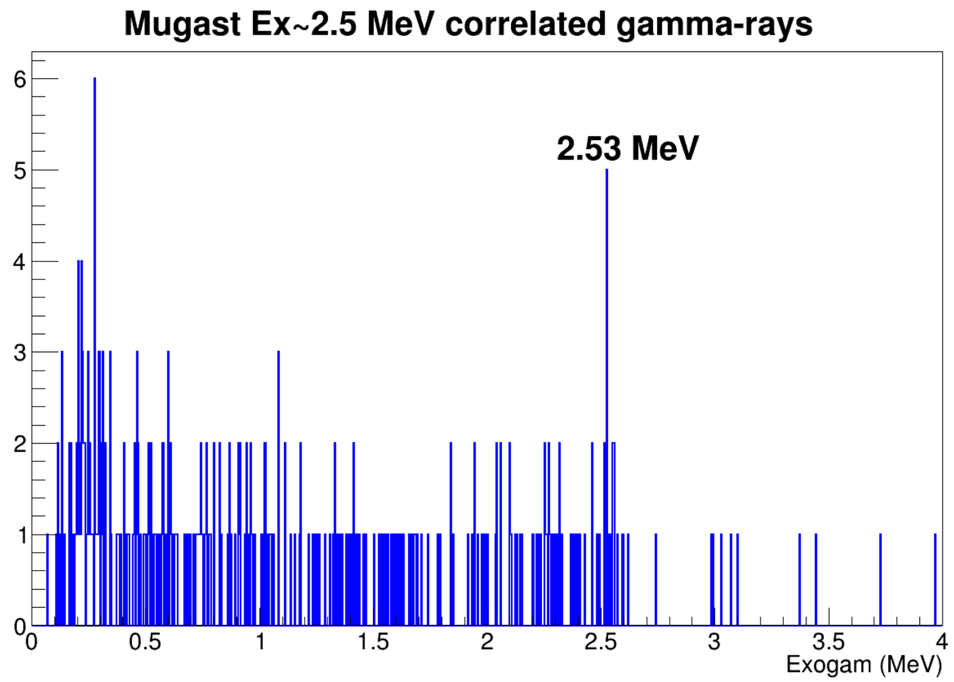
2+ → 0+ = 2033 keV

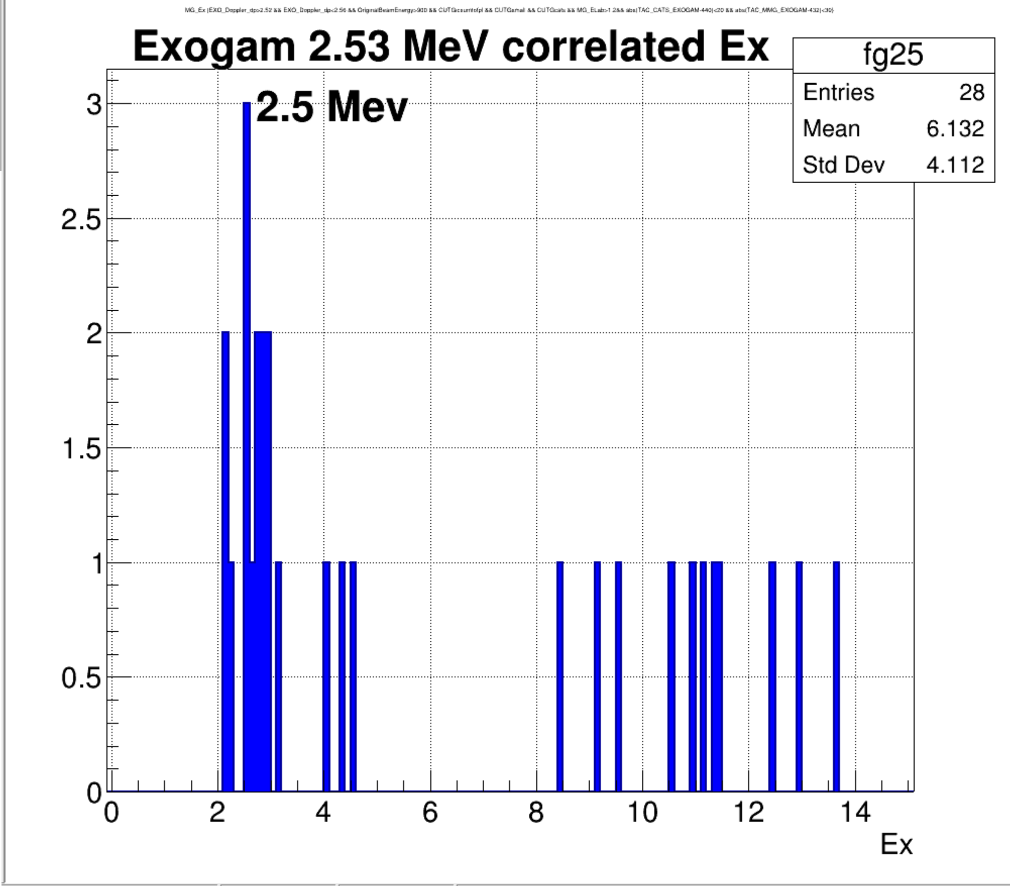




Normally, it should start from 7 MeV (Sn(4.8 MeV)+2 MeV) , but even removing background, we couldn't clean the Ex until 7 MeV
Most probably there is gamma-ray correlated to 2-5 MeV states.
Above Sn 5 to 7 Mev can be populated with unbound neutron states decaying to 2+ 68Ni.
Next step is simulate Phase Space and get the contribution of ine.BU reaction.

Exogam correlation with 2.5 MeV state(s)

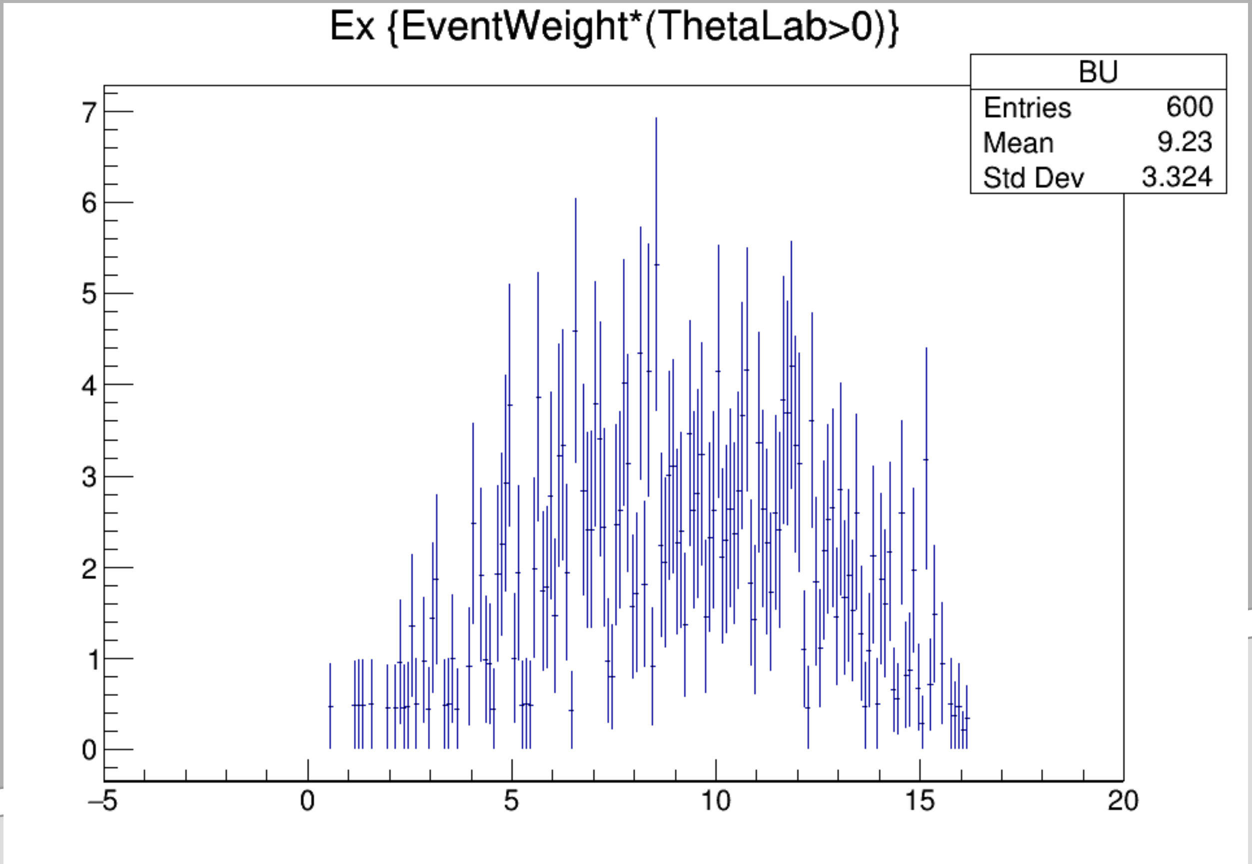


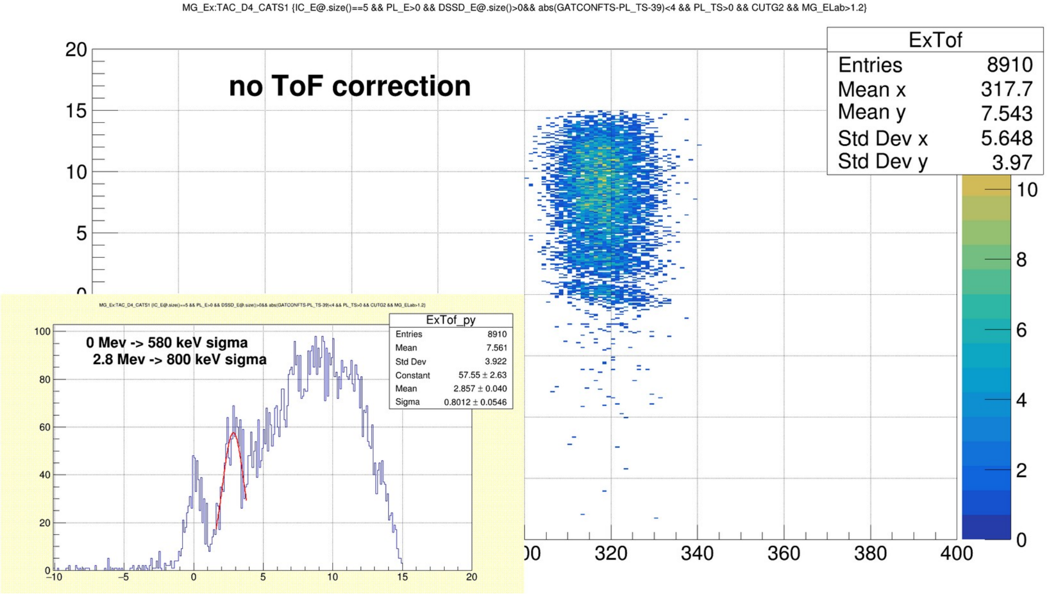


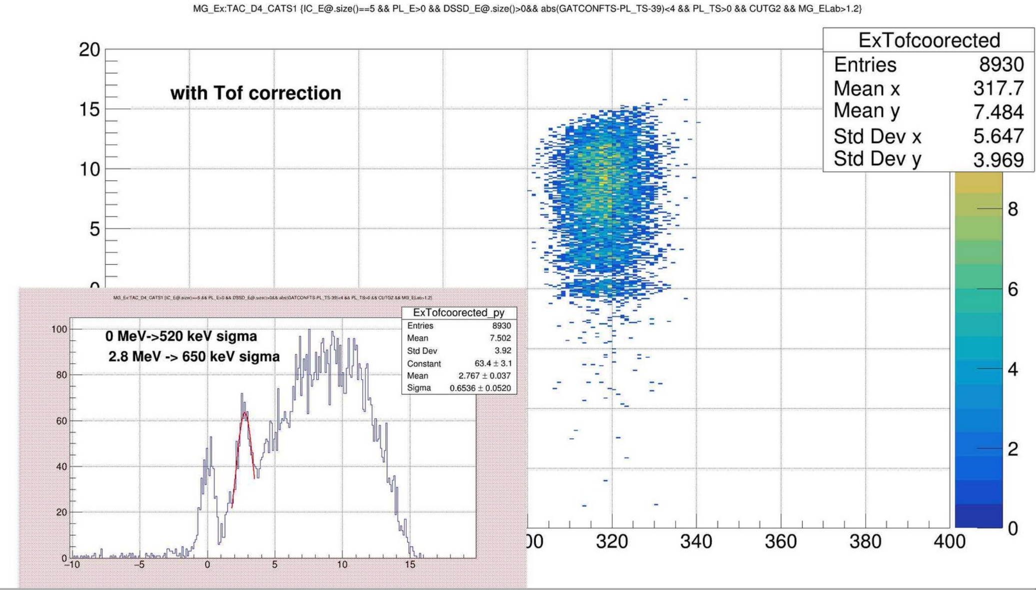
TO DO List

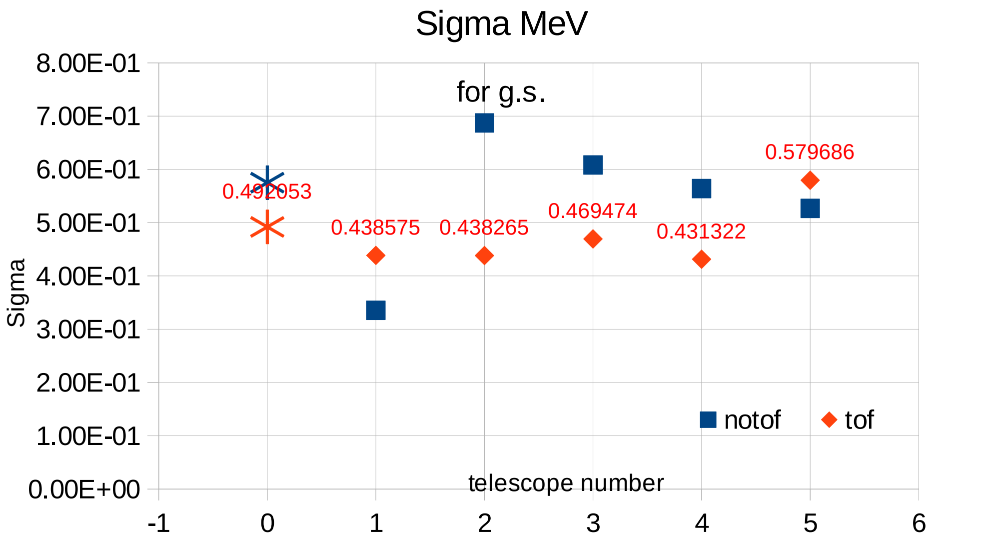
- Using the BU cross section information define the deuteron BU component (Phase Space) simulation
- Simulate inelastic BU
- Theta proton -Theta Heavy ion correlation (DC)
- Add CATS in simulation to fix angular dependency
-

Deuteron break-up simulation in phase space → I need angular cross section to remove it from Ex

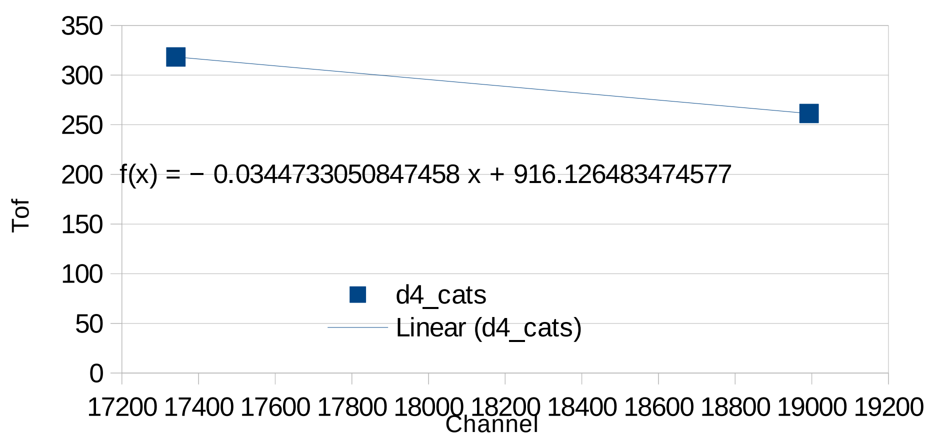


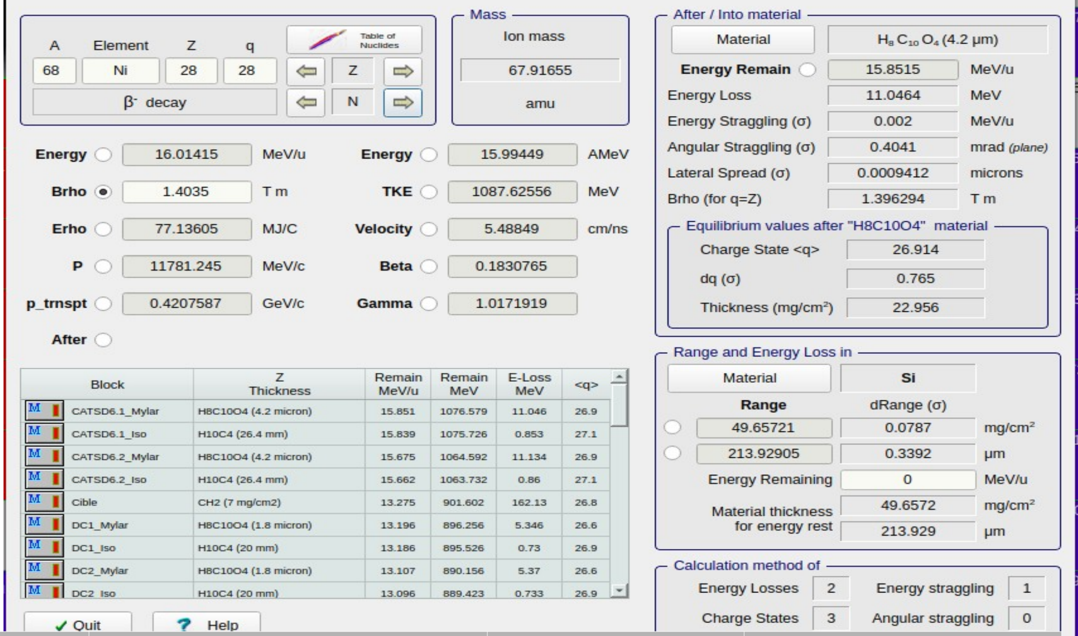

MG_Ex:TAC_D4_CATS1 {IC_E@.size()==5 && PL_E>0 && DSSD_E@.size()>0&& abs(GATCONFTS-PL_TS-39)<4 && PL_TS>0 && CUTG2 && MG_ELab>1.2}
no ToF correction
ExTof
Entries 8910
Mean x 317.7
Mean y 7.543
Std Dev x 5.648
Std Dev y 3.97
ExTof_py
Entries 8910
Mean 7.561
Std Dev 3.922
Constant 57.55 ± 2.63
Mean 2.857 ± 0.040
Sigma 0.8012 ± 0.0546
0 Mev -> 580 keV sigma
2.8 Mev -> 800 keV sigma


MG_Ex:TAC_D4_CATS1 {IC_E@.size()==5 && PL_E>0 && DSSD_E@.size()>0&& abs(GATCONFTS-PL_TS-39)<4 && PL_TS>0 && CUTG2 && MG_ELab>1.2}
with Tof correction
ExTofcoorected
Entries 8930
Mean x 317.7
Mean y 7.484
Std Dev x 5.647
Std Dev y 3.969
ExTofcoorected_py
Entries 8930
Mean 7.502
Std Dev 3.92
Constant 63.4 ± 3.1
Mean 2.767 ± 0.037
Sigma 0.6536 ± 0.0520
0 MeV->520 keV sigma
2.8 MeV -> 650 keV sigma


Sigma MeV
for g.s.
Sigma
telescope number
0.492053
0.438575
0.438265
0.469474
0.431322
0.579686
notof
tof

TAC_D4_CATS1





d4_cats	channel 70Zn	tof 70zn			
	18993	261.375			
	channel 68Ni	tof 68ni			
	17341	318.3249			
	channel 68ni slowed	tof calculated	velocity calculated	brho2	Energy
	12627	480.832056704332	5.48840278680243	1.4	16.01 MeV/u

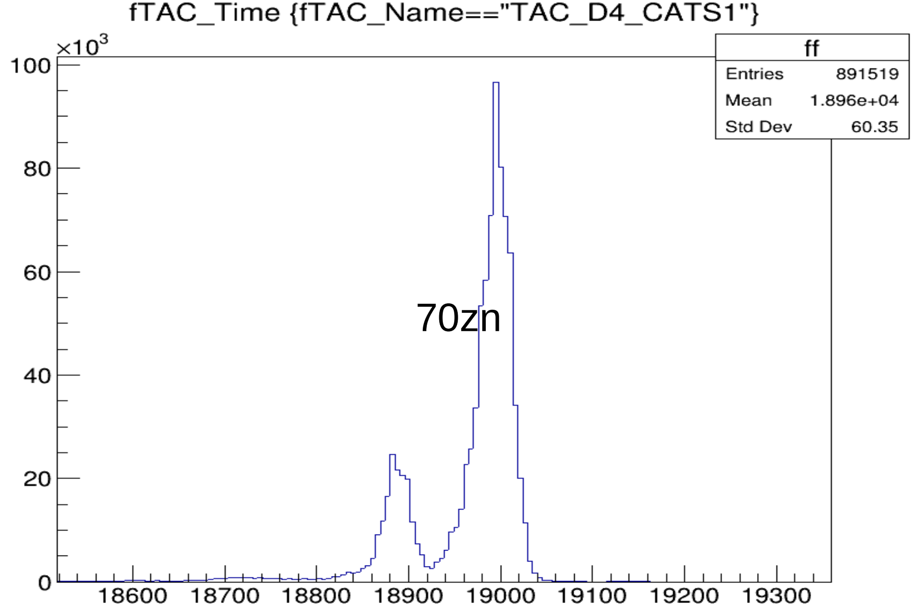
New tof calculation :
For d4 cats and dd6 dd4

Given during the experiment

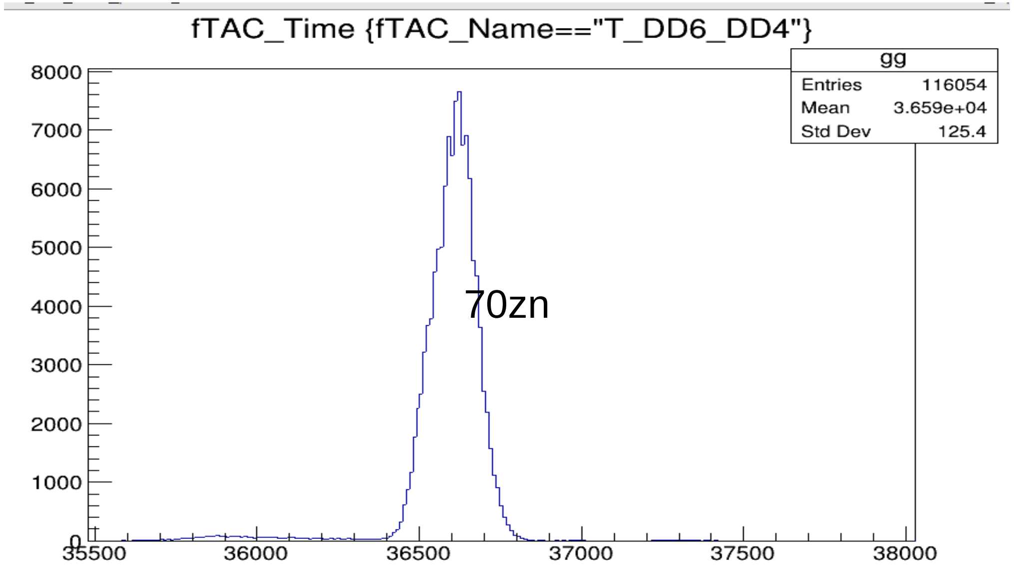
calculated

	Channel	brho2	velocity	distance	• tof	• slope	• gain
d4_cats 70zn	18993 (17.87)	2.5898	10.09658	2639	261.37563	• -0.034473	• +916.126483
dd6_dd4 70zn	36607 (67.4)	2.5898	10.09658	2147	212.646262398	-0.01032819	+590.7303
d4_cats 68Ni	17341 (47.5)	2.1687	8.29027	2639	318.3249		
dd6_dd4 68Ni	32121 (135)	2.1687	8.29027	2147	258.9783		

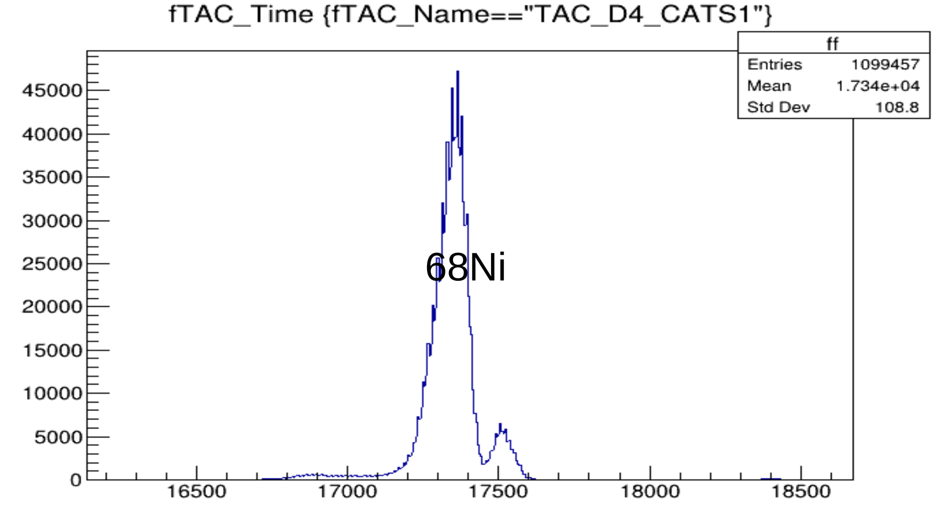
It is not possible to use J-C DD4 CATS1 tac, I think they change the range of the tac, because the 68Ni 38 Mev is flying faster than 70Zn which is not possible.



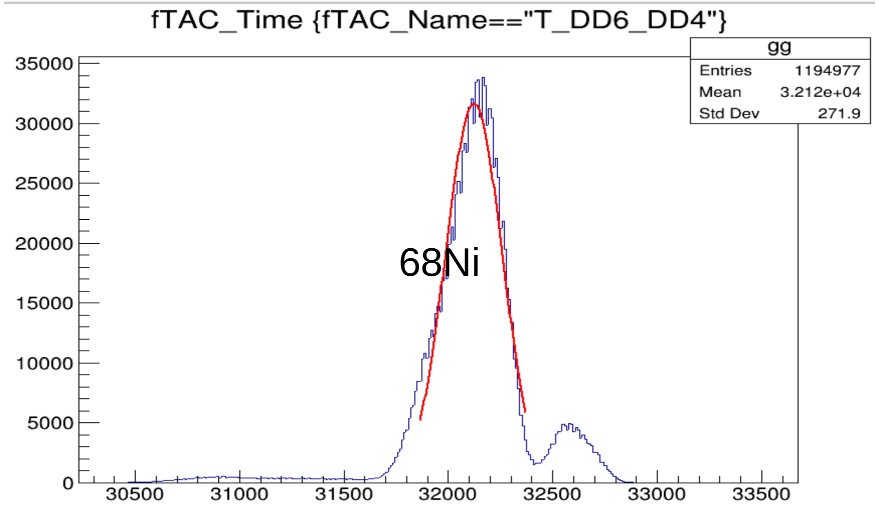
fTAC_Time {fTAC_Name=="TAC_D4_CATS1"}
ff
Entries 891519
Mean 1.896e+04
Std Dev 60.35
×10^3
70zn
18600 18700 18800 18900 19000 19100 19200 19300



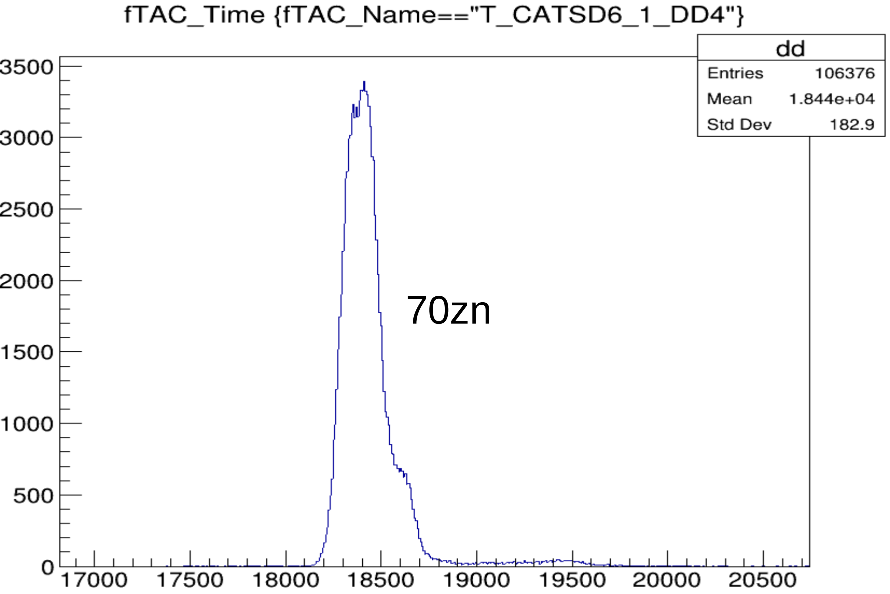
fTAC_Time {fTAC_Name=="T_DD6_DD4"}
gg
Entries 116054
Mean 3.659e+04
Std Dev 125.4
70zn
35500 36000 36500 37000 37500 38000

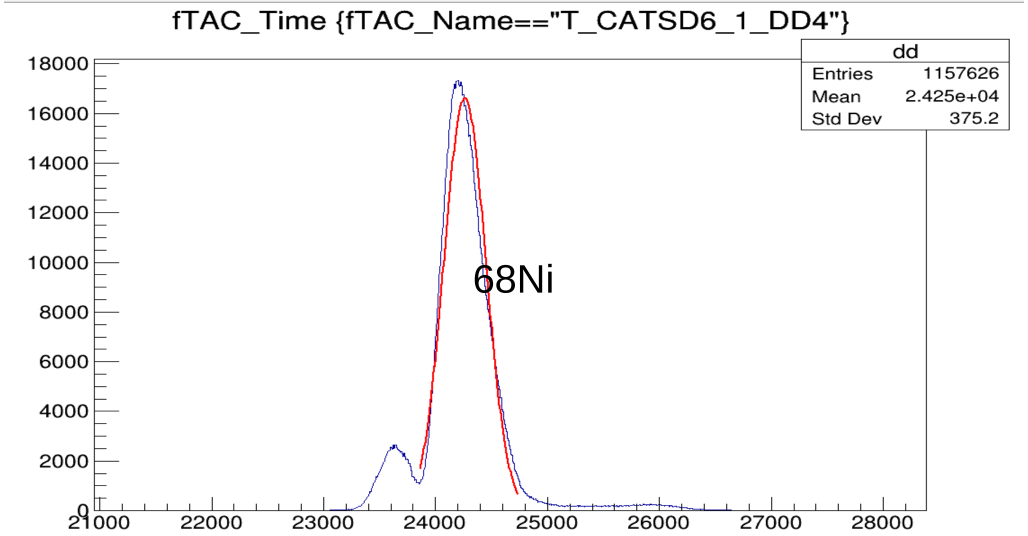


fTAC_Time {fTAC_Name=="TAC_D4_CATS1"}
ff
Entries 1099457
Mean 1.734e+04
Std Dev 108.8
68Ni
16500 17000 17500 18000 18500



fTAC_Time {fTAC_Name=="T_DD6_DD4"}
gg
Entries 1194977
Mean 3.212e+04
Std Dev 271.9
68Ni
30500 31000 31500 32000 32500 33000 33500


fTAC_Time {fTAC_Name=="T_CATSD6_1_DD4"}
dd
Entries 106376
Mean 1.844e+04
Std Dev 182.9
70zn
0
500
1000
1500
2000
2500
3000
3500
17000
17500
18000
18500
19000
19500
20000
20500


fTAC_Time {fTAC_Name=="T_CATSD6_1_DD4"}
dd
Entries 1157626
Mean 2.425e+04
Std Dev 375.2
68Ni
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
21000
22000
23000
24000
25000
26000
27000
28000