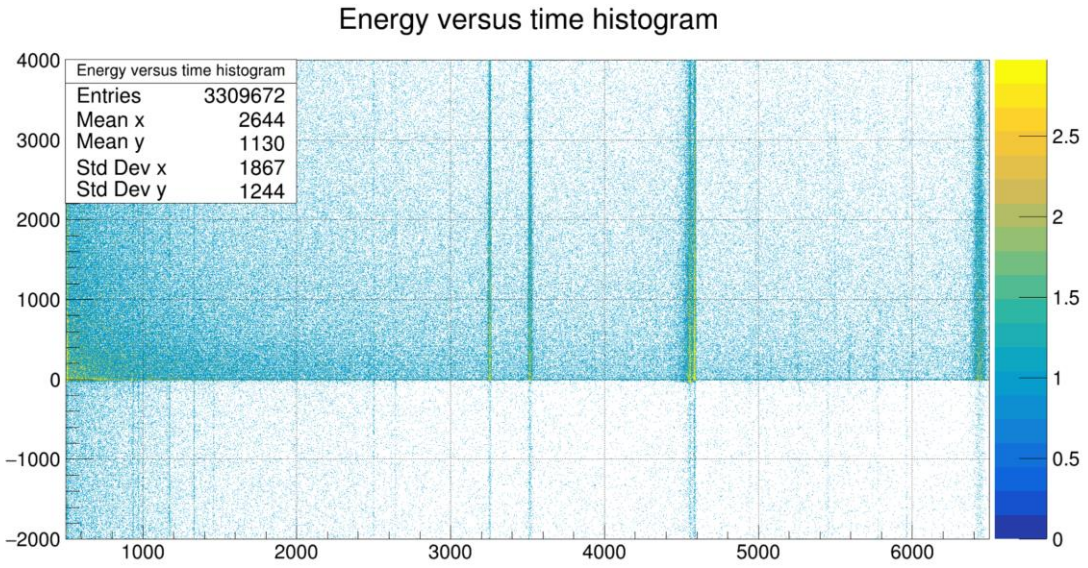
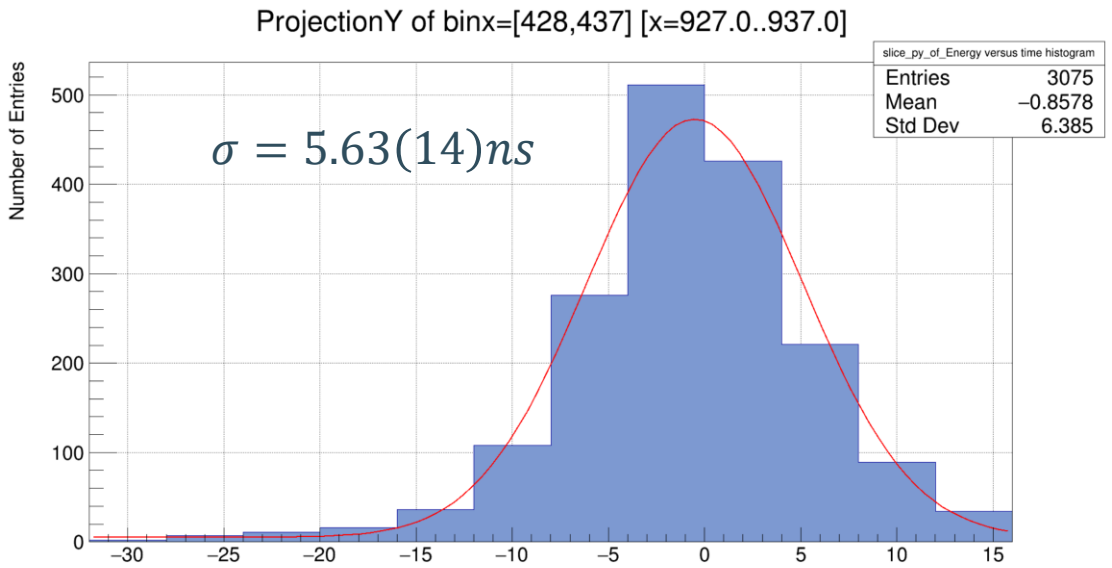
KU LEUVEN

Update muX meeting 27/01

Michael Heines

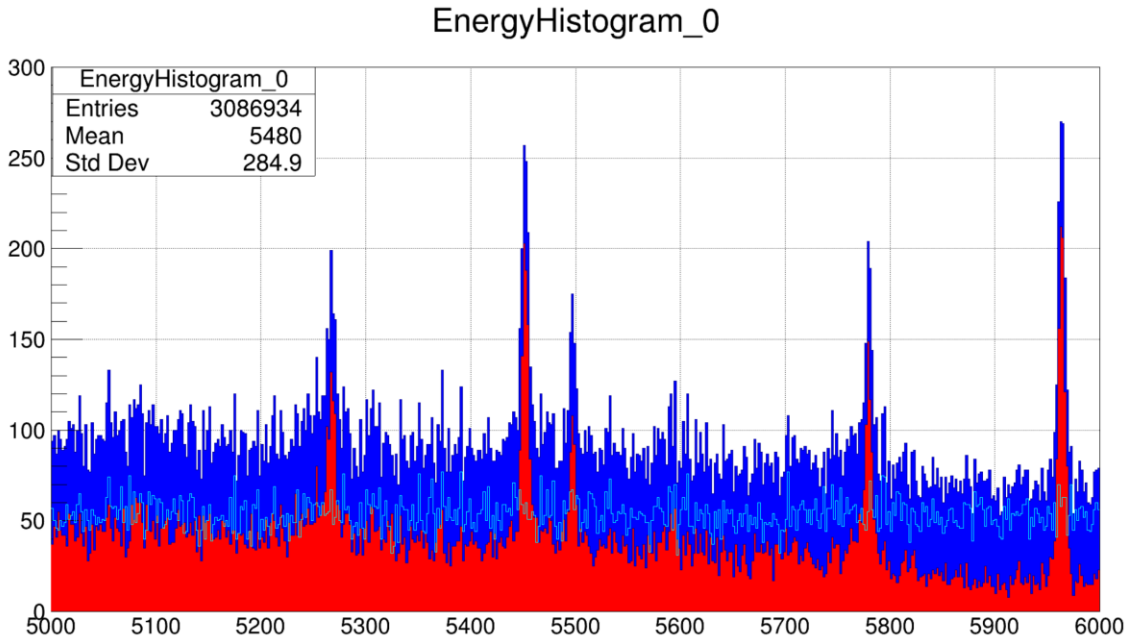
Running the analyzer – Au and Ba





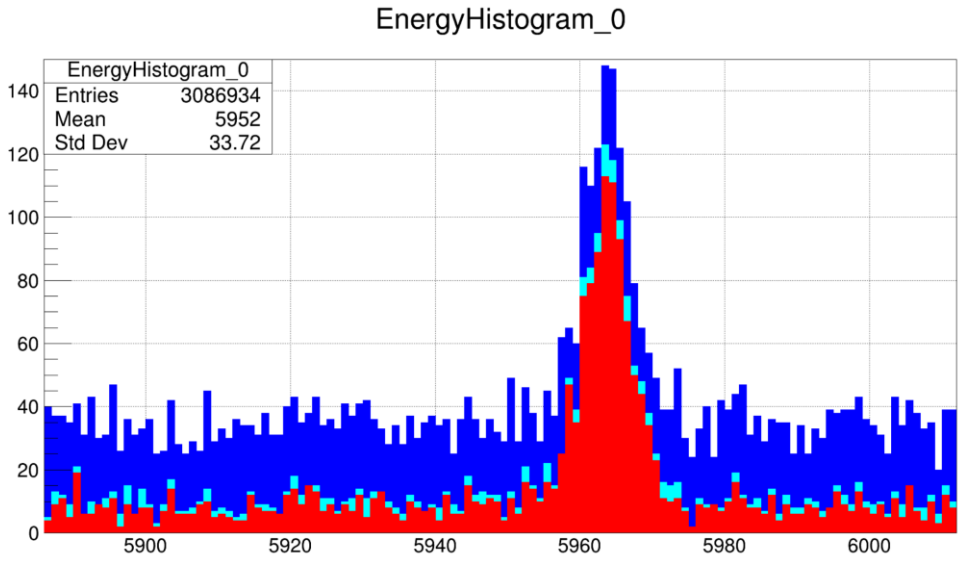
Flags

- From tree output → new tree with:
  - Germanium energy
  - $t_\gamma - t_\mu$
  - Germanium channel
  - PP flag [-5; +3] µs
  - Muon veto flag [-10; +10]ns
  - Electron from decay flag
  - Electron veto flag [-500; 500] ns
  - $t_e - t_{Ge}$



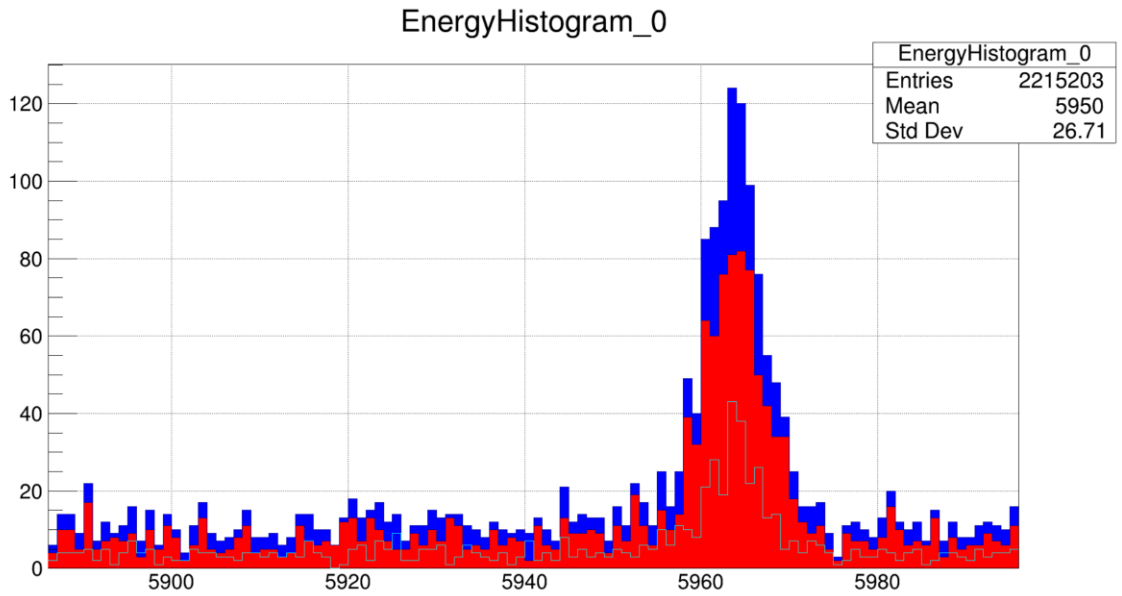
Electron veto

- Substantial improvement of background
- No real difference for windows larger than 20ns



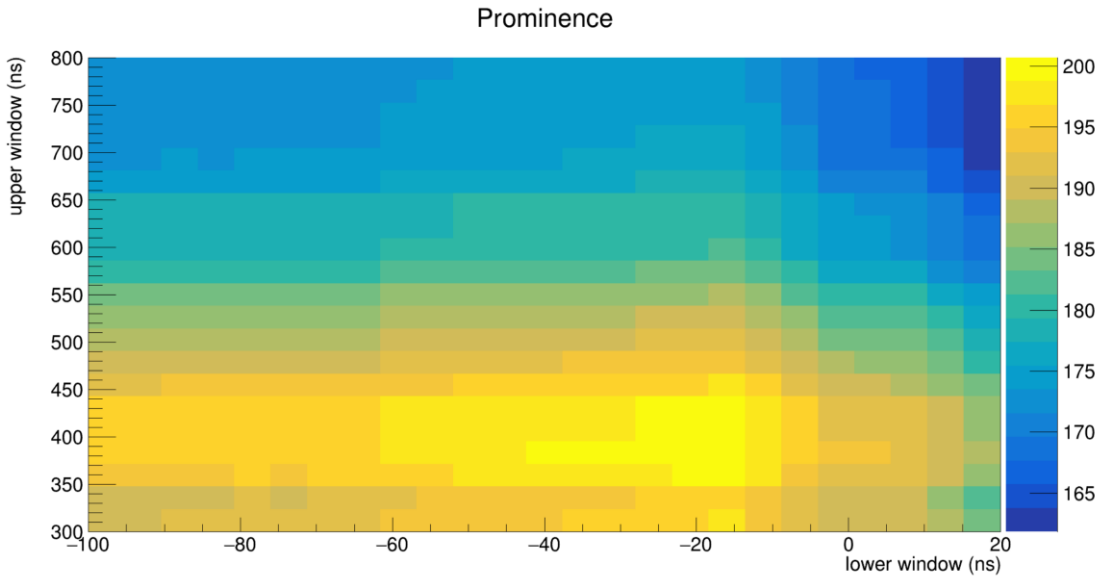
Decay electron

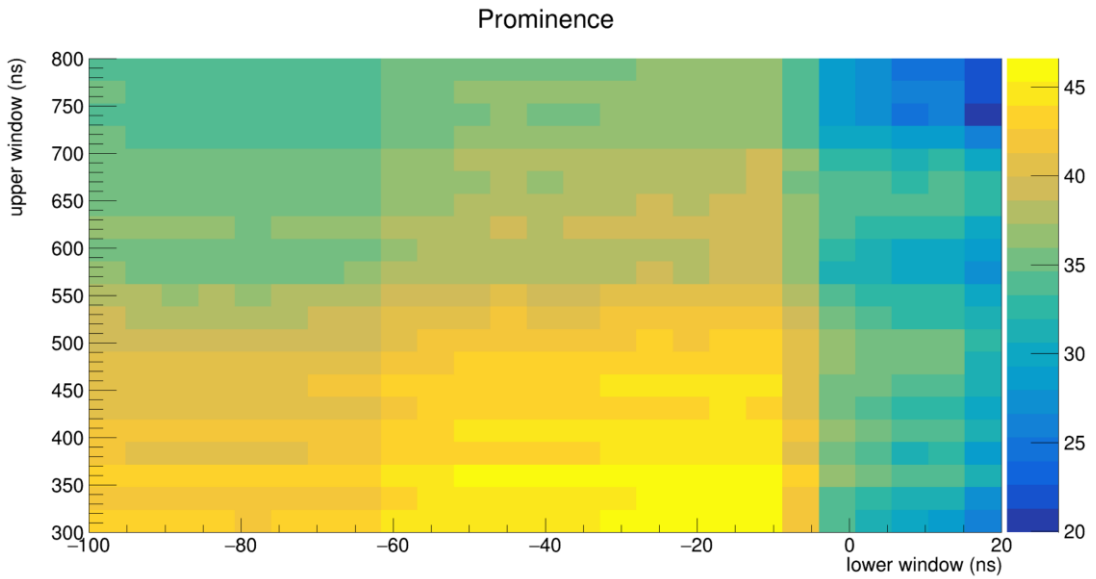
- Any electron between the muon and germanium hit?
- No real improvement in signal to noise and a clear reduction in signal
- At least at this energy not useful



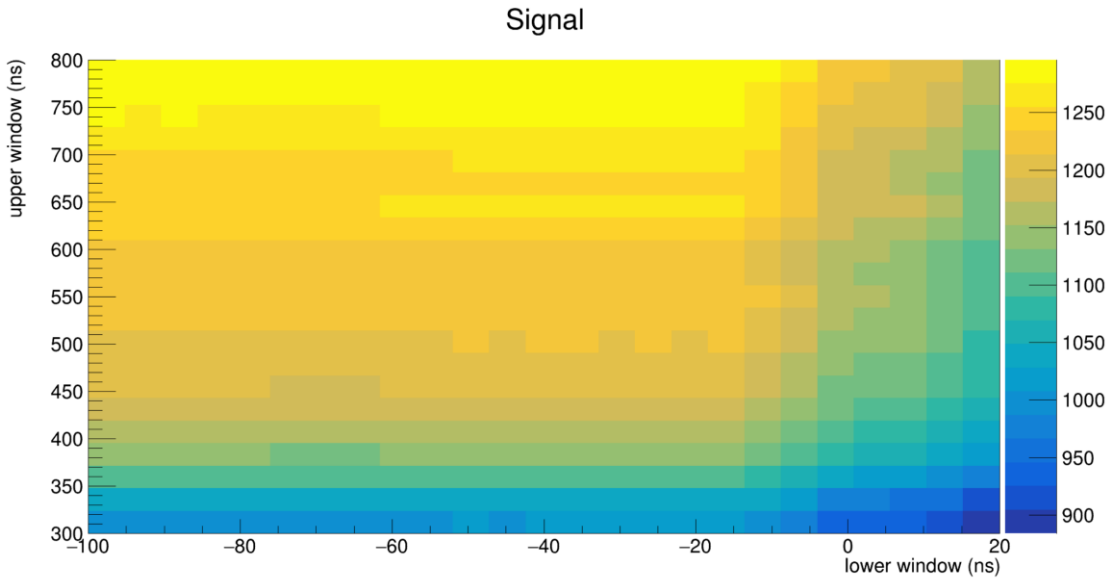
Prominence

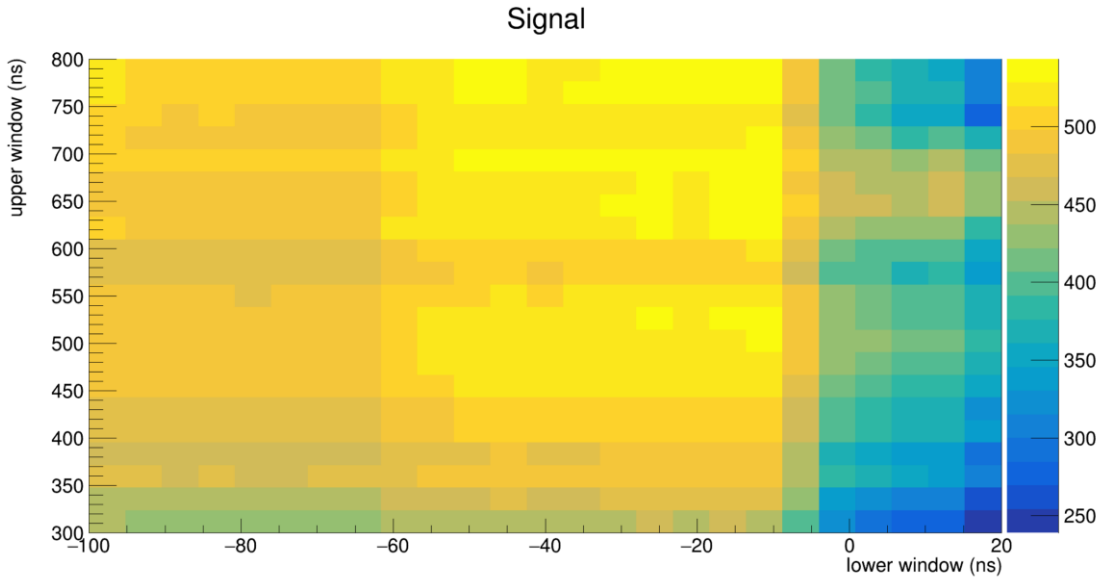
Muon hit at about -5ns (very slight slope in ELET)



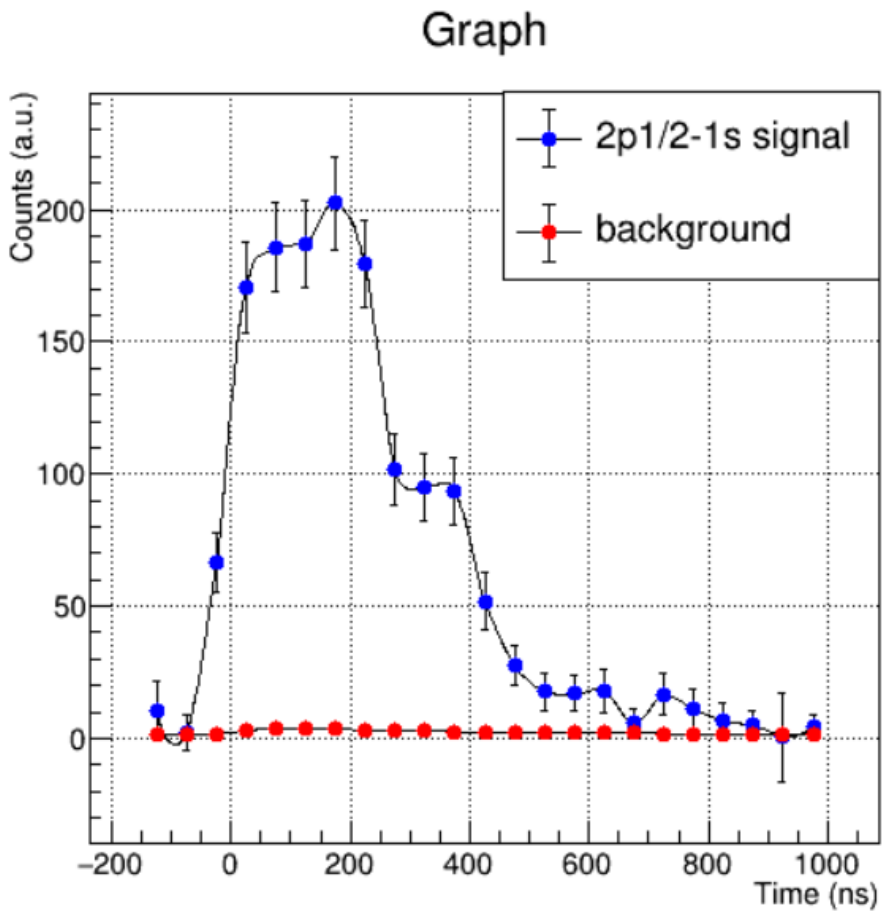


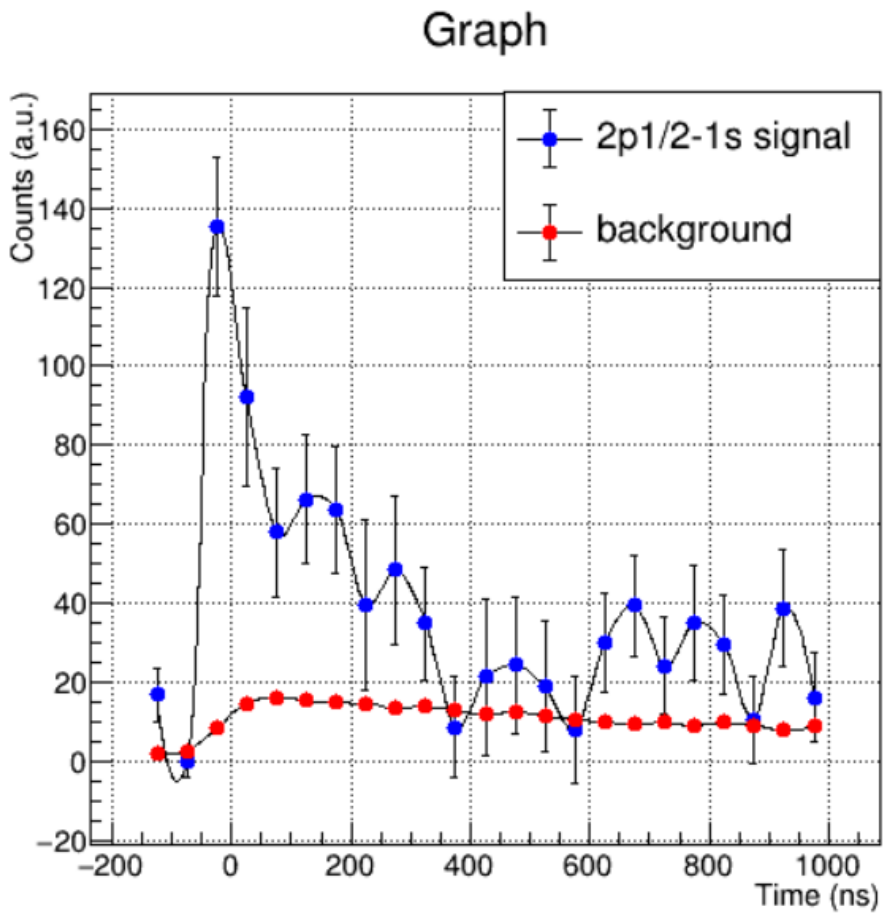
Signal


Signal
upper window (ns)
800
750
700
650
600
550
500
450
400
350
300
−100
−80
−60
−40
−20
0
20
lower window (ns)
1250
1200
1150
1100
1050
1000
950
900


Signal
upper window (ns)
800
750
700
650
600
550
500
450
400
350
300
−100
−80
−60
−40
−20
0
20
lower window (ns)
500
450
400
350
300
250

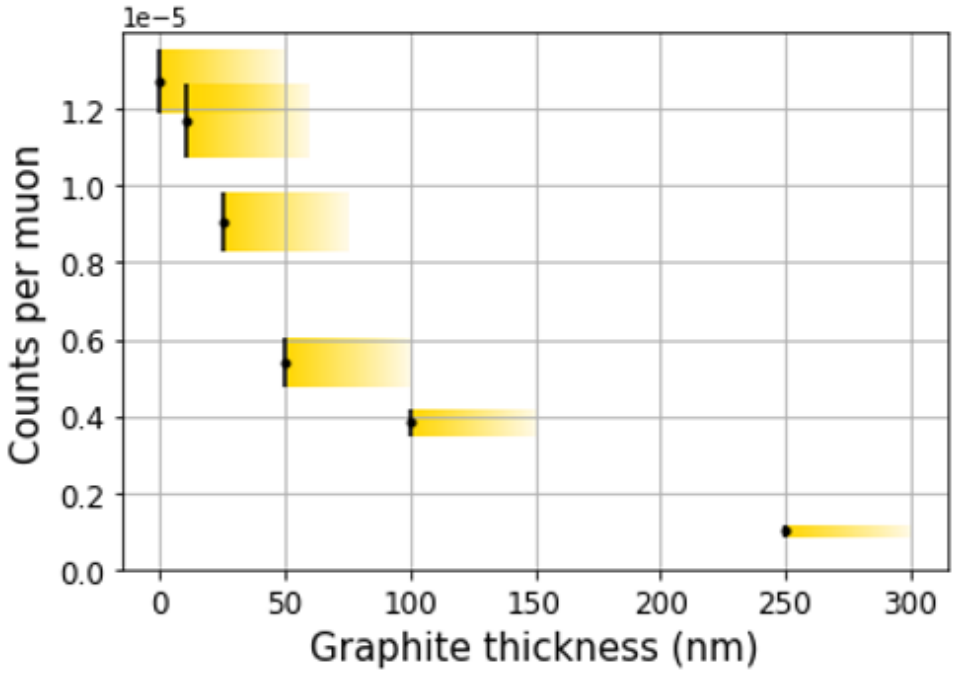
Time window


Graph
2p1/2-1s signal
background
Counts (a.u.)
Time (ns)
−200
0
200
400
600
800
1000
0
50
100
150
200

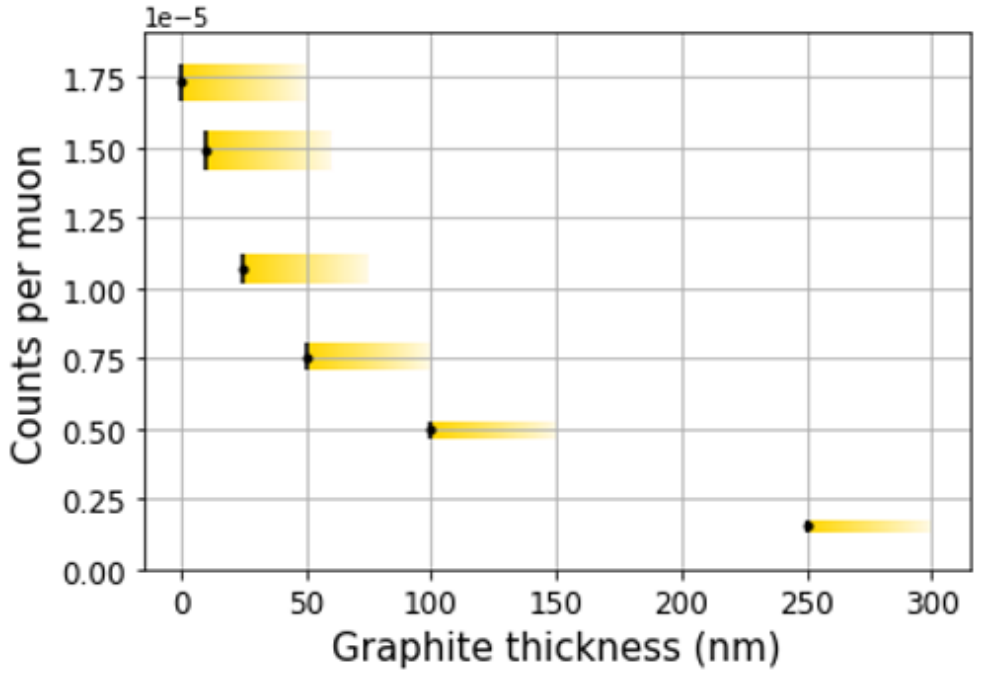

Graph
2p1/2-1s signal
background
Counts (a.u.)
Time (ns)
−200
0
200
400
600
800
1000
−20
0
20
40
60
80
100
120
140
160

Attenuation of the signal through graphite

- Online analysis

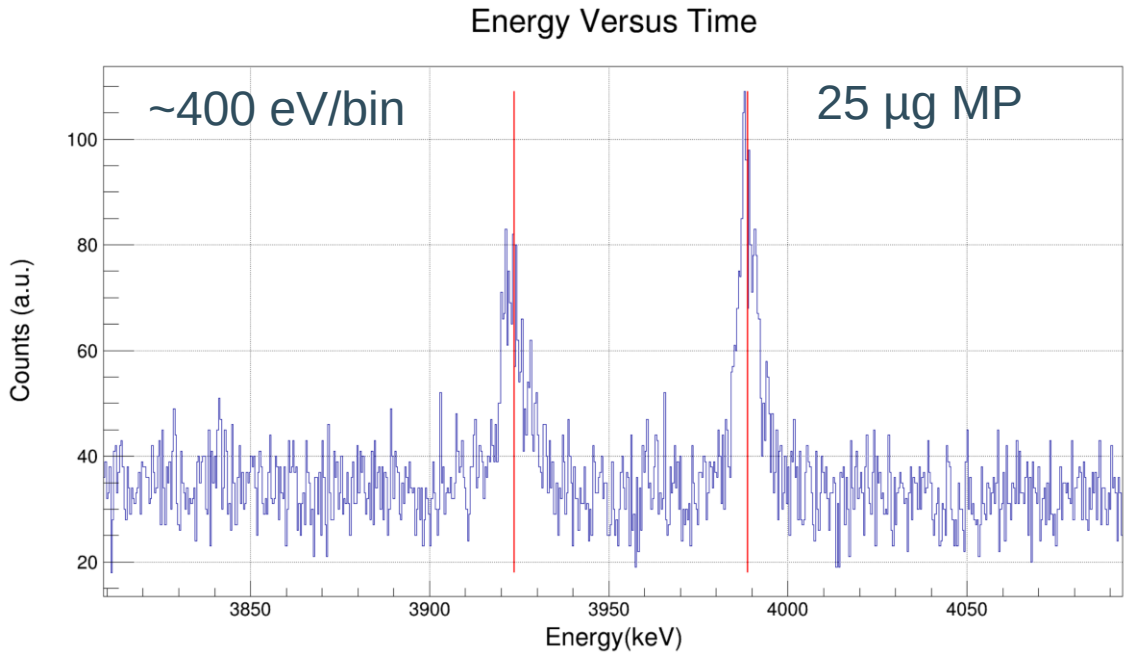


- Offline analysis



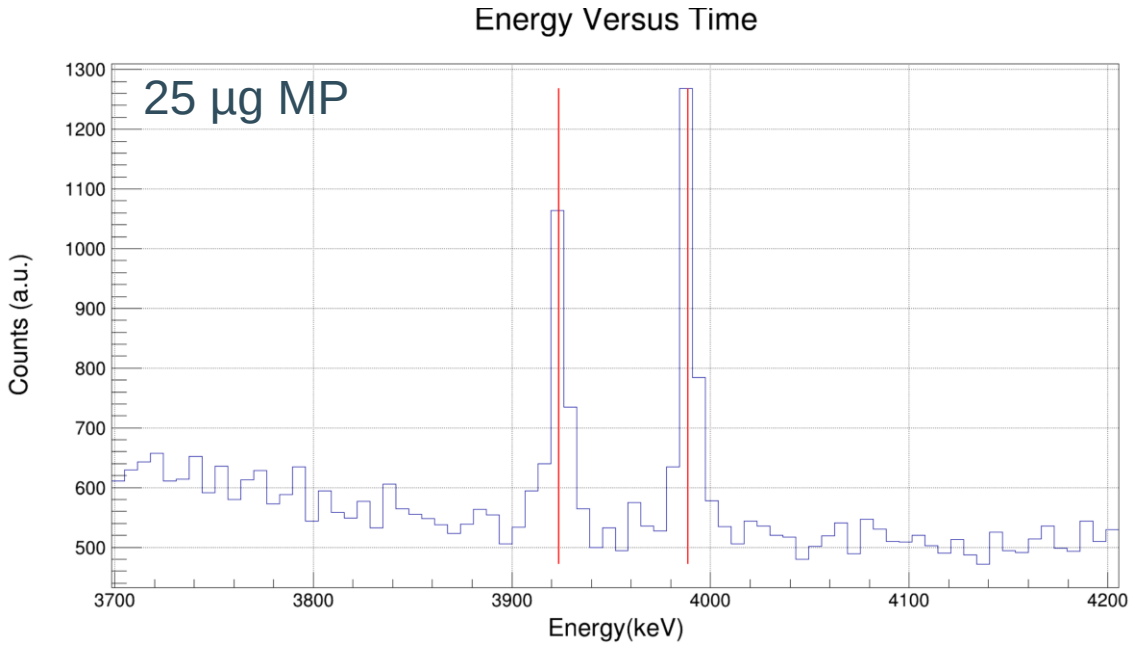
Barium – MP

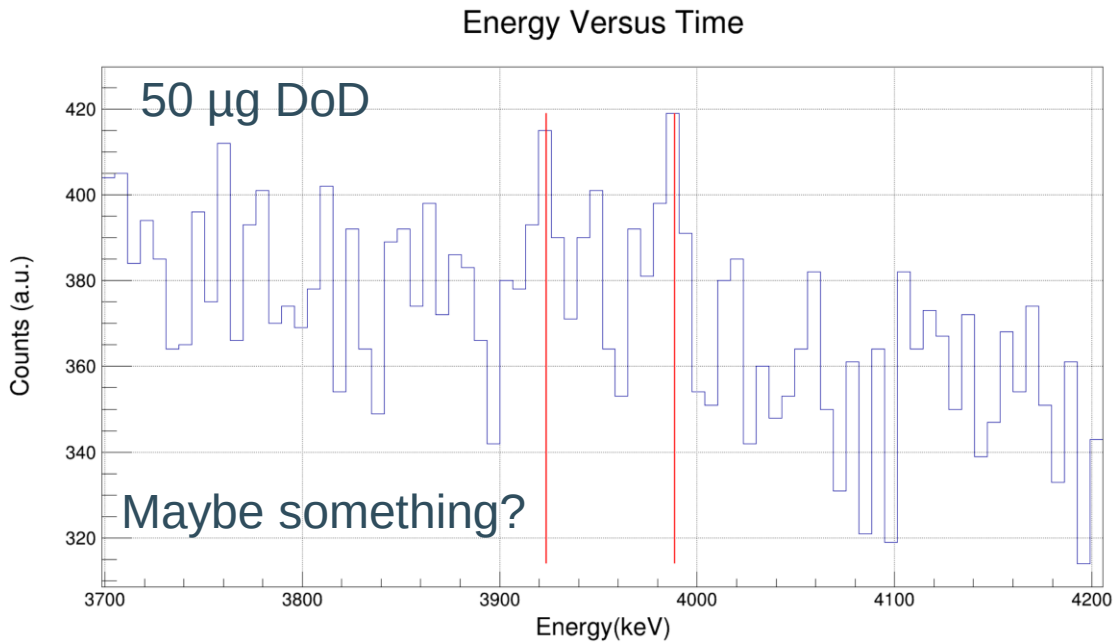
Mass (µg)	2p3/2 - 1s (e-06 /muon)	2p1/2-1s (e-06 /muon)	p3/2-p1/2 ratio
25	9.12689 +/- 0.463407	6.91748 +/- 0.560281	1.319 +/- 0.127
10	5.84666 +/- 0.32254	3.84825 +/- 0.297474	1.519 +/- 0.145
5	3.46282 +/- 0.320905	2.38675 +/- 0.262796	1.451 +/- 0.209



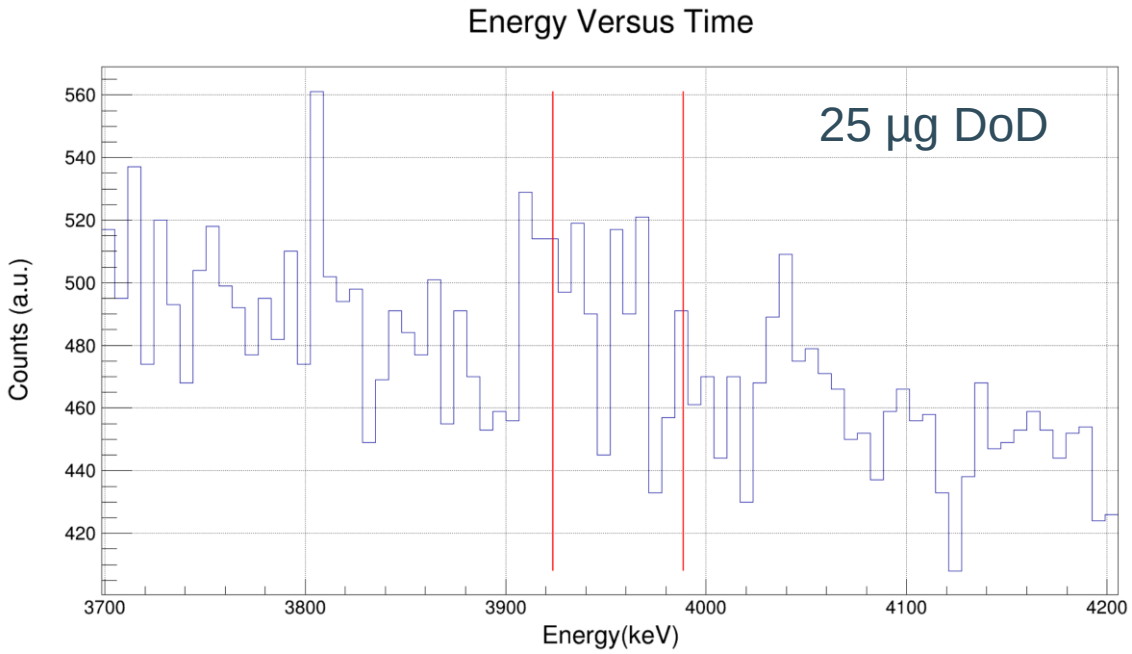
Barium – MP Vs DoD

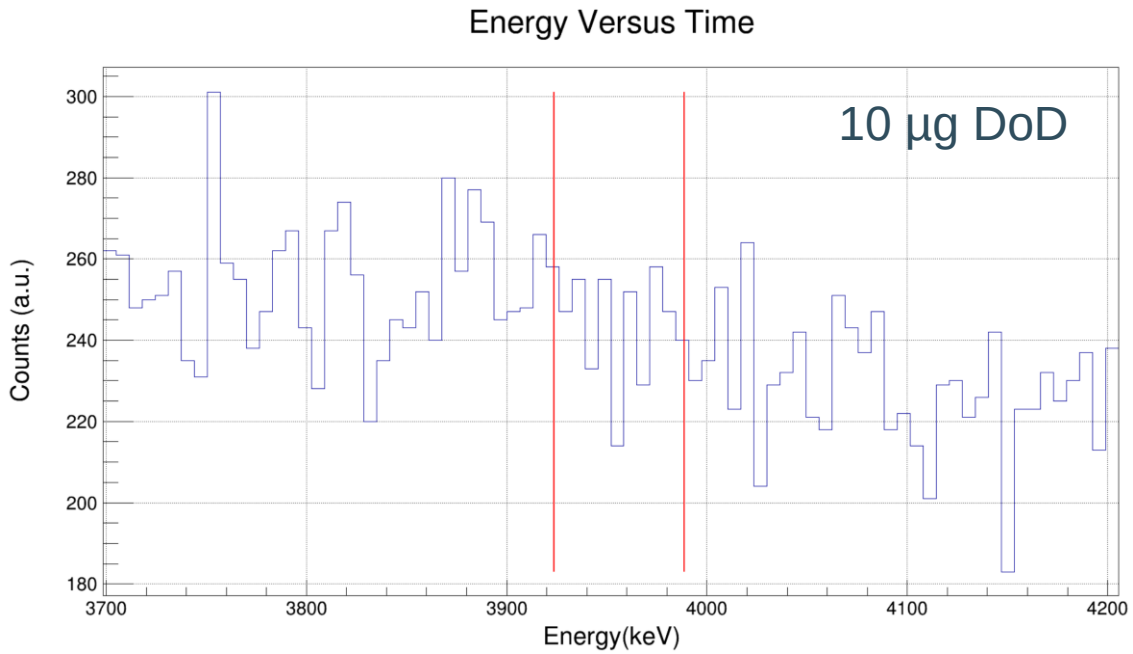
Had to rebin to 6keV/bin





Barium – MP Vs DoD





Conclusion

- Time resolution is nice ($\sigma = 5 - 6\,ns$)
- Electron veto time window = 20ns
- Decayed electron cut doesn’t help (at least at high energy)
- Ideal time window [-50; 500] ns
- Attenuation in graphite:
  - Higher signal
  - A lot smaller error than online analysis
- Barium:
  - Consistent p3/2-p1/2 ratio
  - Maybe something very minor in DoD (still much smaller)

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