VDC Tracking Issue

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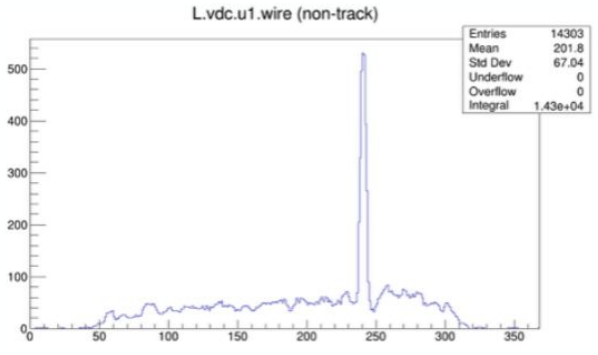
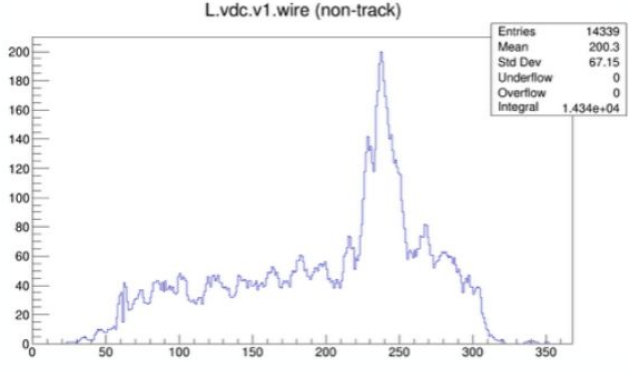
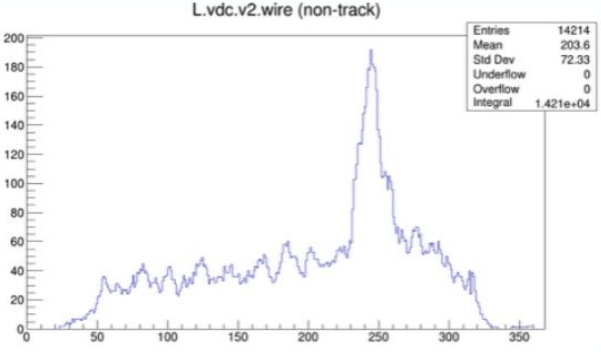
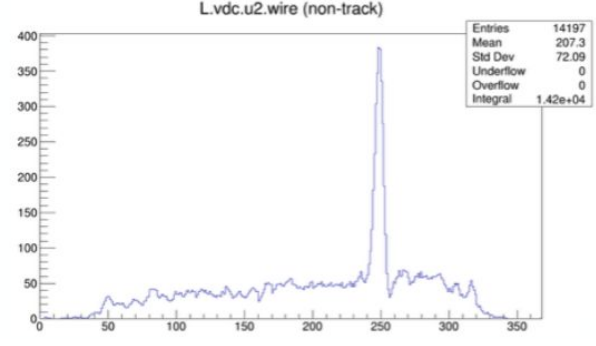
Questions:

Lots of non-track potential electron events are around wire 240-250

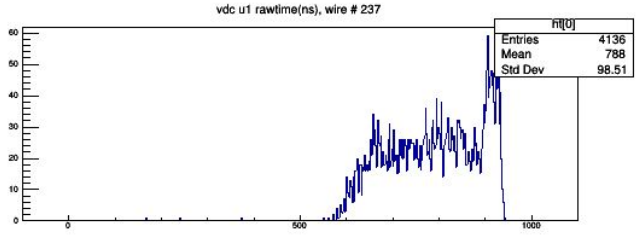


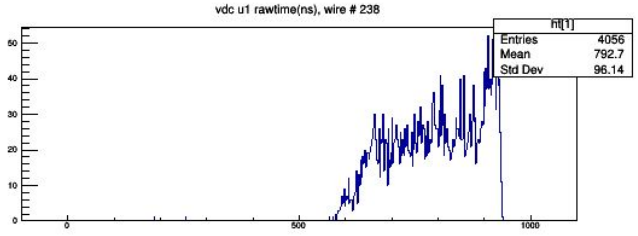


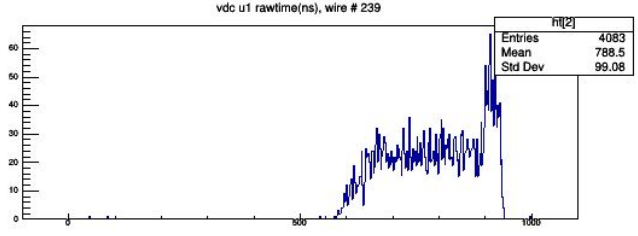


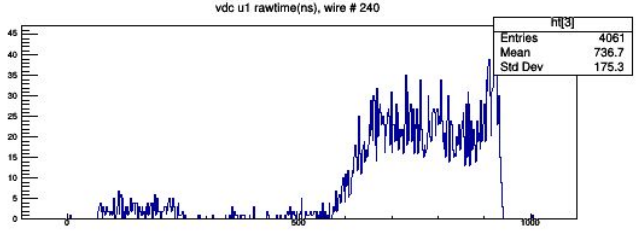


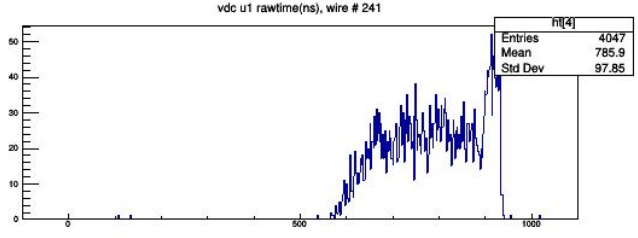
Run 3142 is used to make plots unless specified.

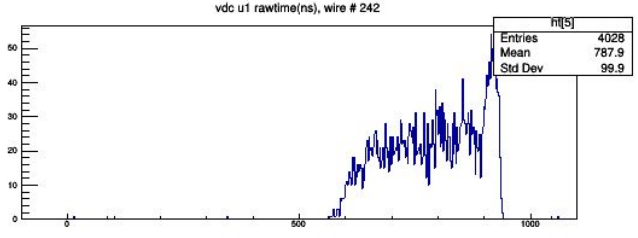


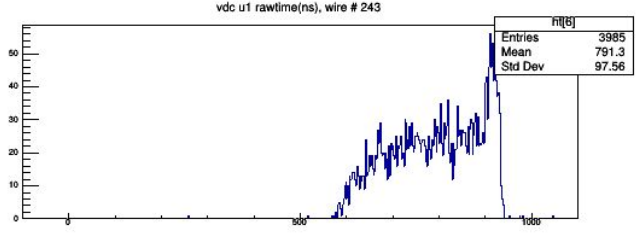


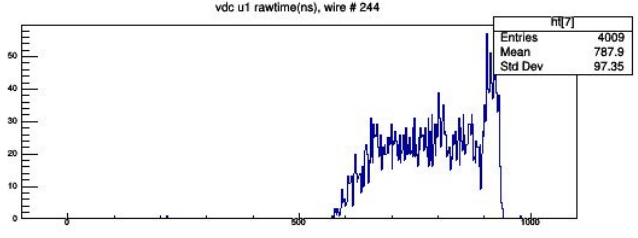


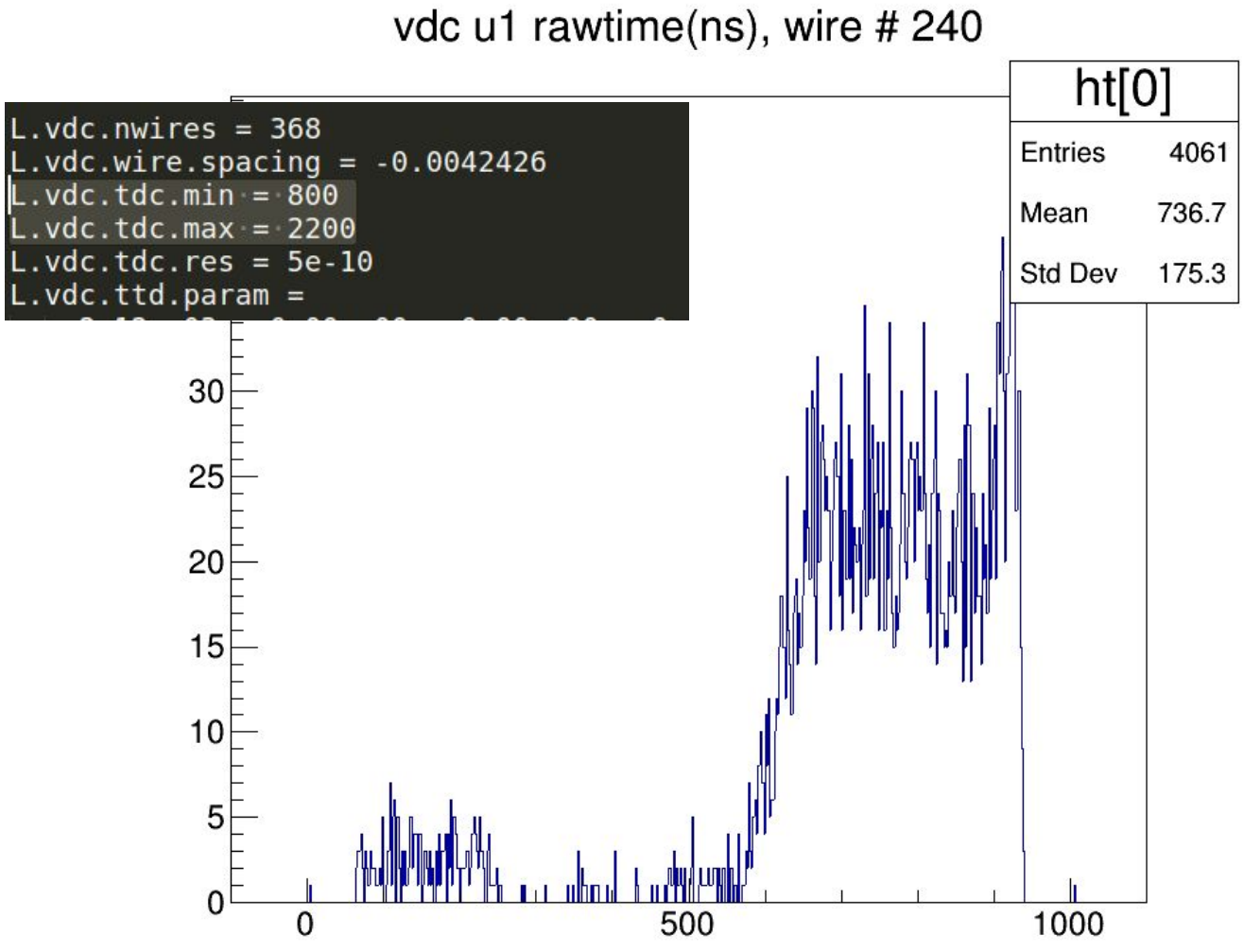


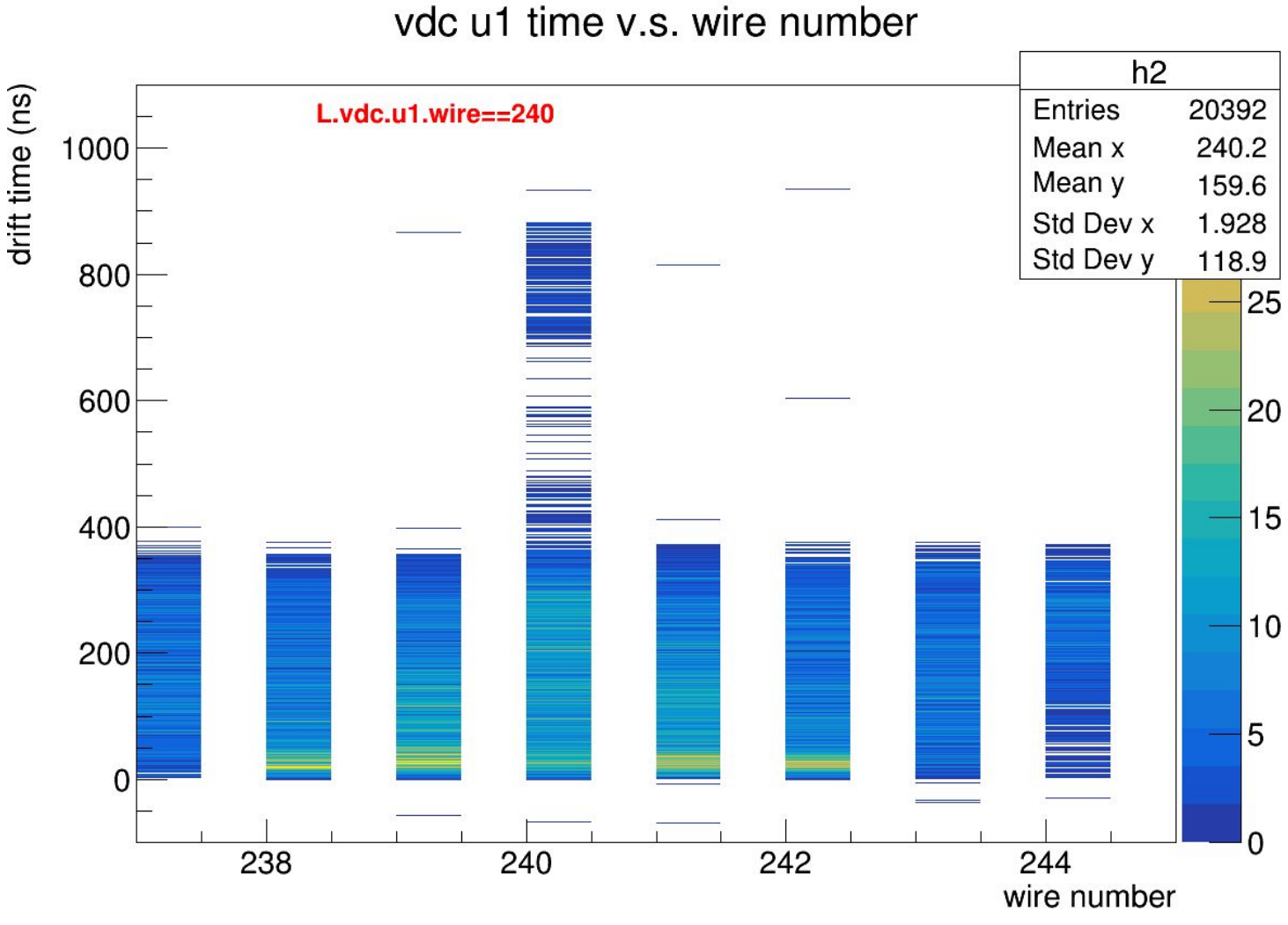


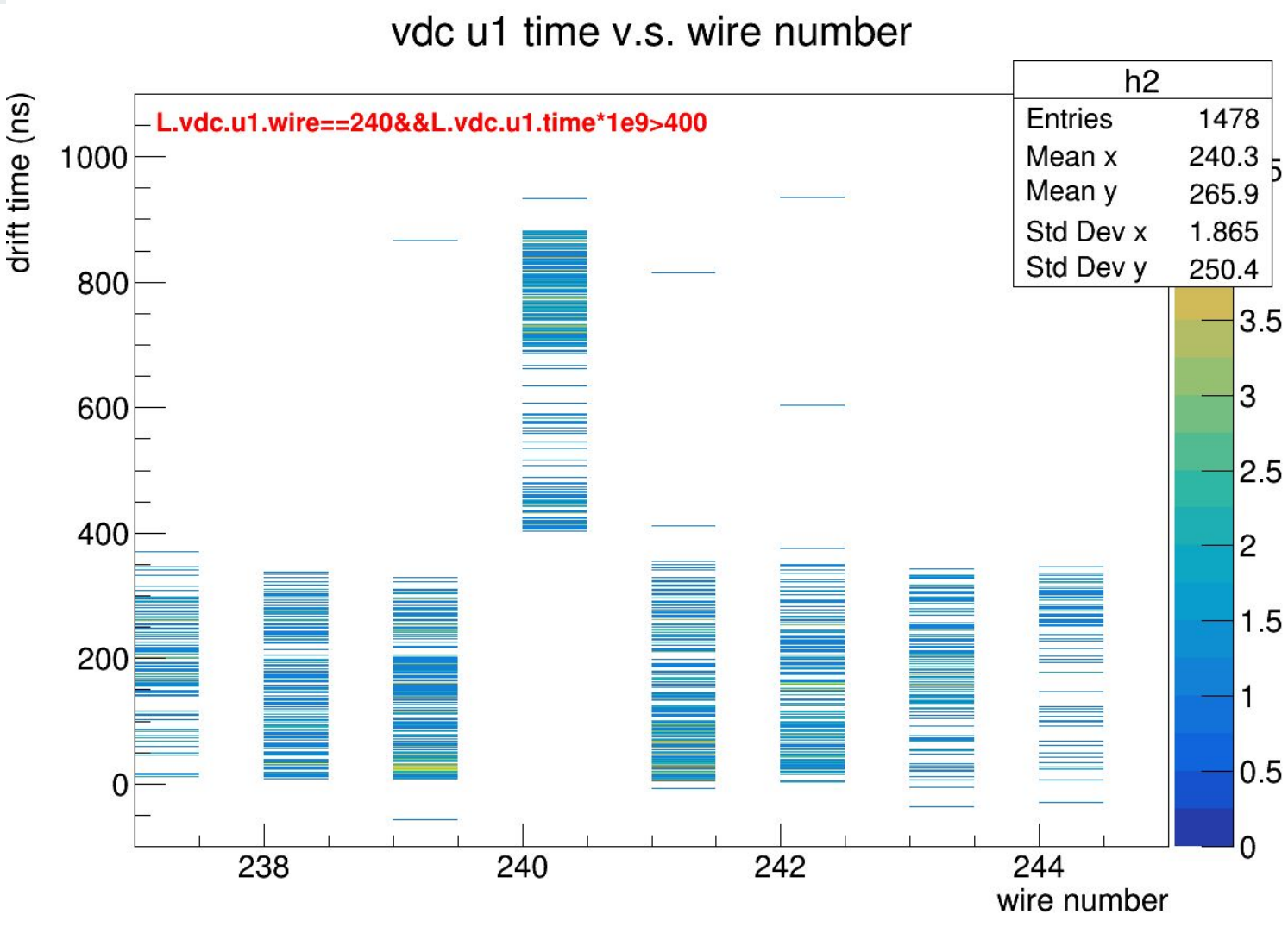




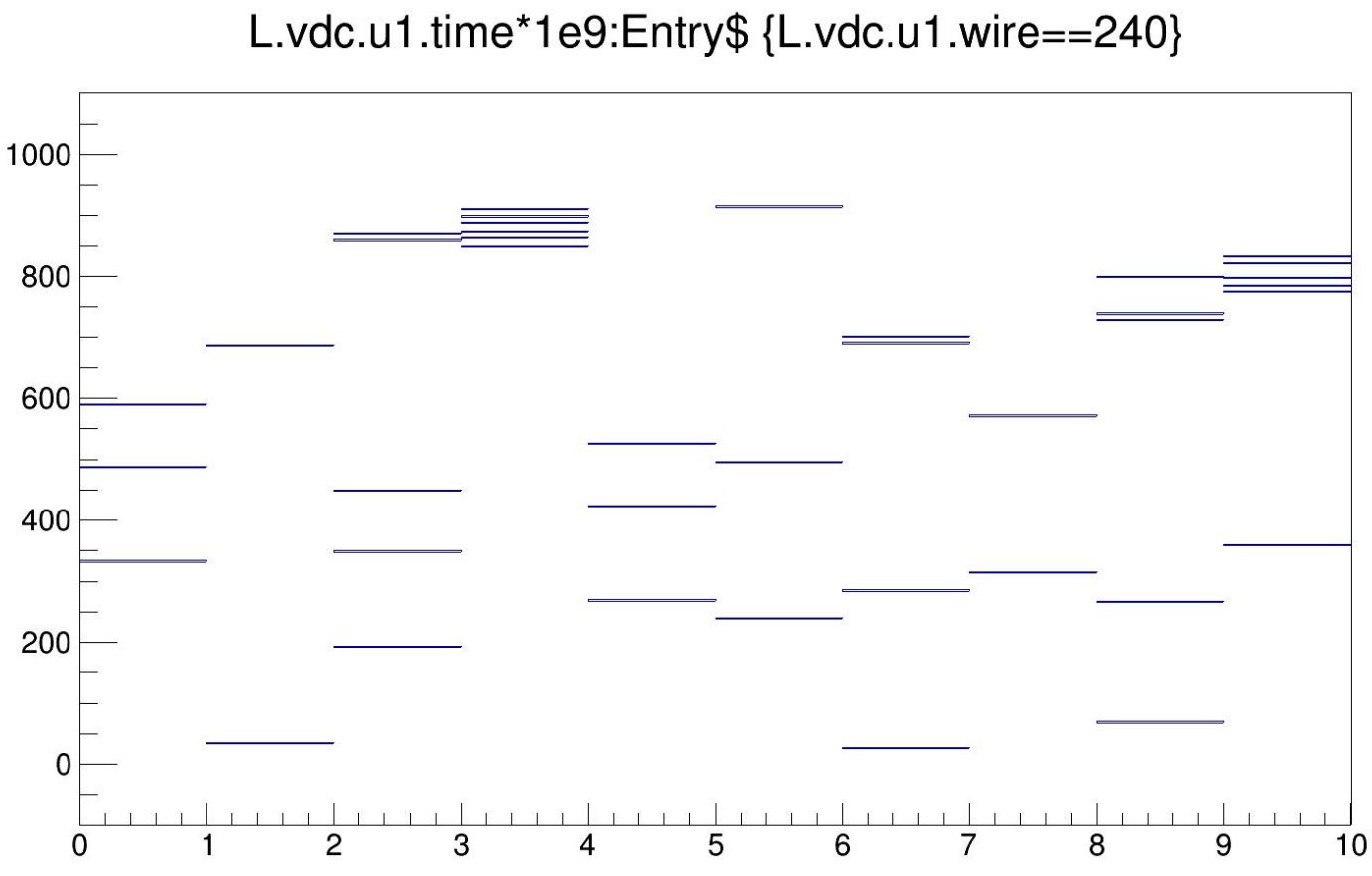


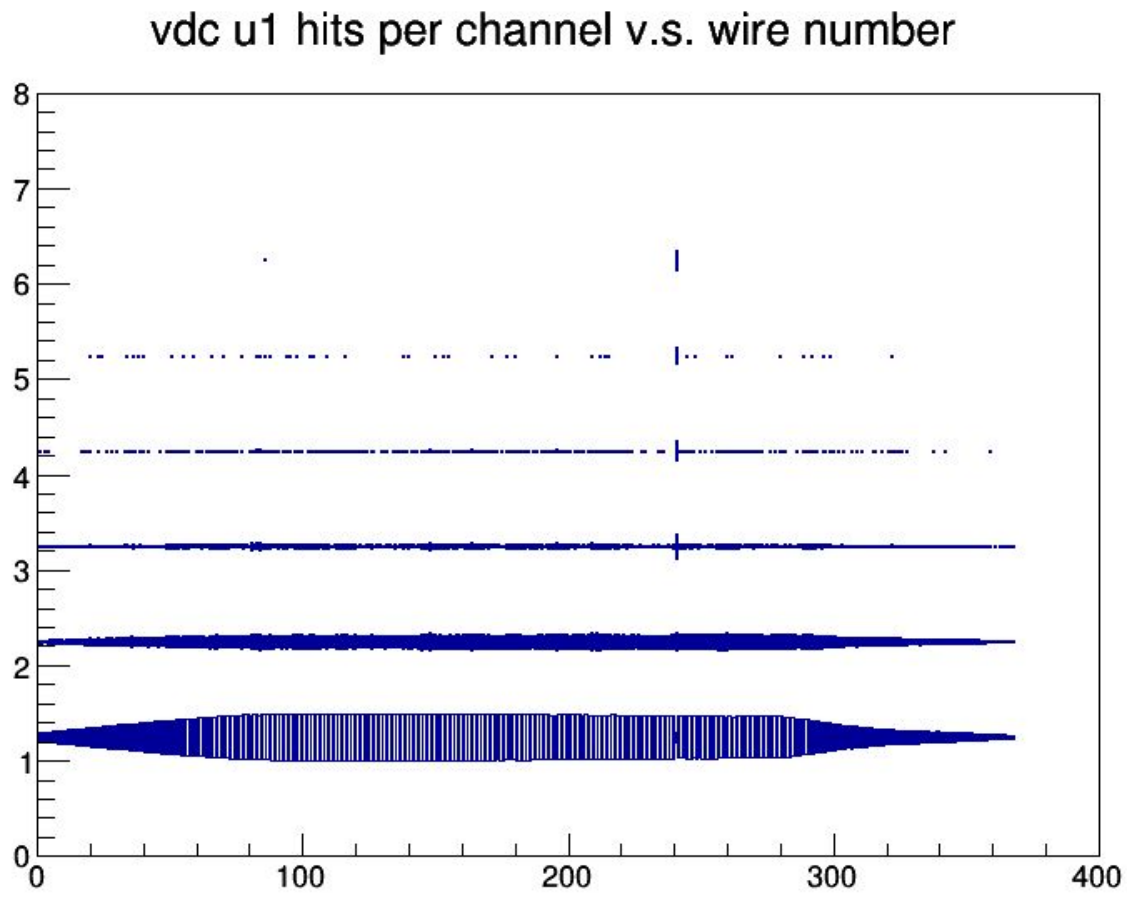

vdc u1 rawtime(ns), wire # 240
L.vdc.nwires = 368
L.vdc.wire.spacing = -0.0042426
L.vdc.tdc.min = 800
L.vdc.tdc.max = 2200
L.vdc.tdc.res = 5e-10
L.vdc.ttd.param =
ht[0]
Entries 4061
Mean 736.7
Std Dev 175.3
30
25
20
15
10
5
0
0
500
1000


vdc u1 time v.s. wire number
L.vdc.u1.wire==240
h2
Entries 20392
Mean x 240.2
Mean y 159.6
Std Dev x 1.928
Std Dev y 118.9
drift time (ns)
1000
800
600
400
200
0
238
240
242
244
wire number
25
20
15
10
5
0


vdc u1 time v.s. wire number
L.vdc.u1.wire==240&&L.vdc.u1.time*1e9>400
h2
Entries 1478
Mean x 240.3
Mean y 265.9
Std Dev x 1.865
Std Dev y 250.4
drift time (ns)
1000
800
600
400
200
0
238
240
242
244
wire number
3.5
3
2.5
2
1.5
1
0.5
0

Wire 240 has a lot of multi hits: bad wire? Bad electronics?




vdc u1 hits per channel v.s. wire number
0
1
2
3
4
5
6
7
8
0
100
200
300
400

Wire 240 Tracking Quality Check:

Q:

1. Percentage of “bad“ hit from wire 240
2. When the wire 240 tdc value passed hard_cut but has multi hits, can we trust it?

Wire 240 Tracking Quality Check:

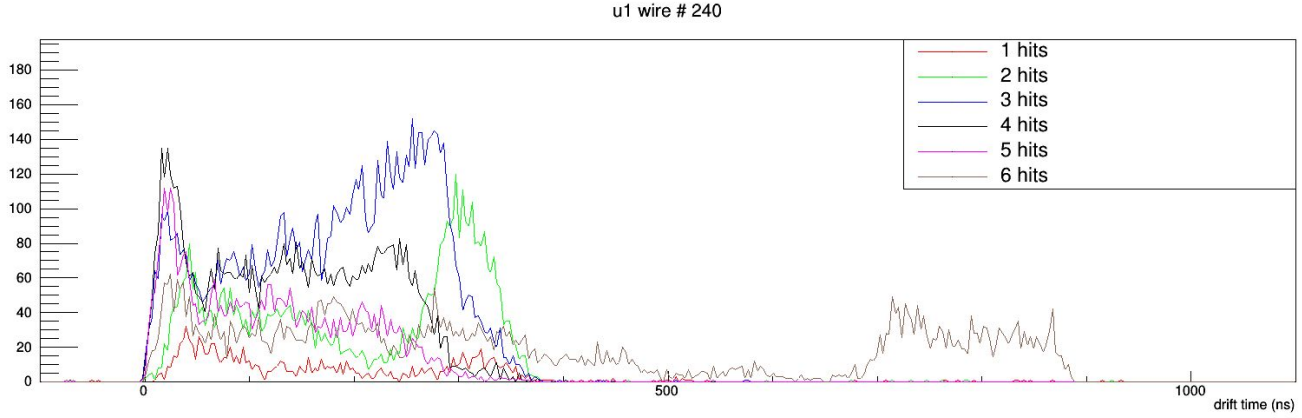
1. Find potential good electron events:

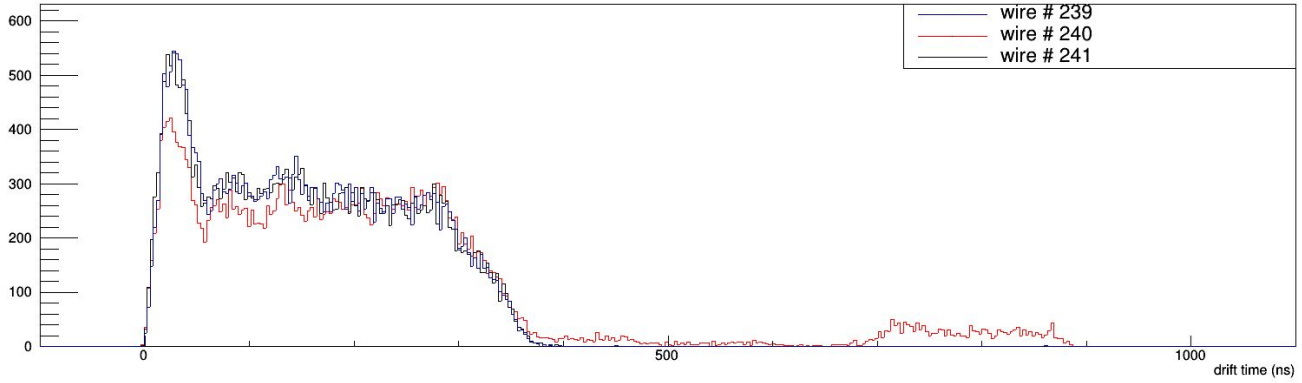
TCut pid = "DL.bit2>0&&L.cer.asum_c>2000 &&
(L.prl1.e+L.prl2.e)>(HacL_D1_P0rb*800)";

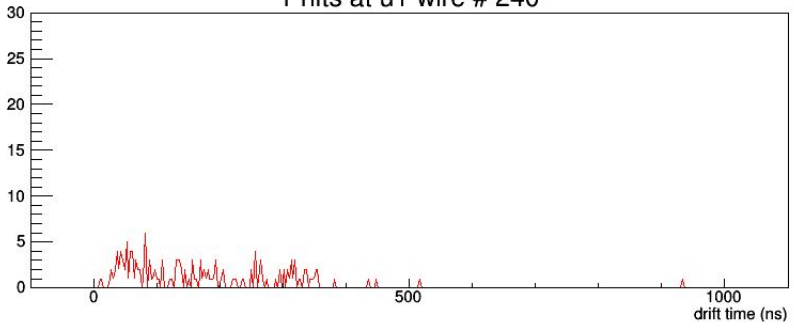
2. Look at hits / tracks per wire

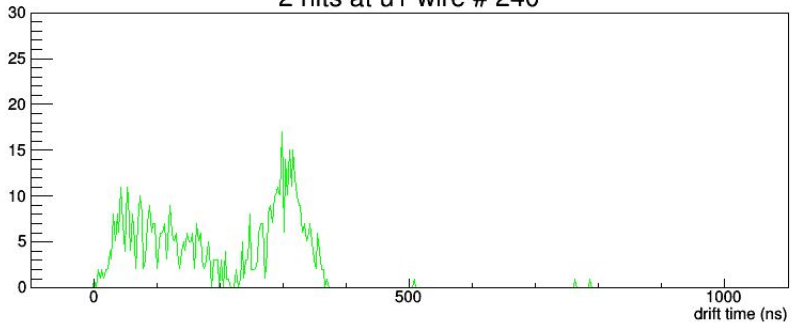
3. If no track , is the fired wire not used for cluster or cluster formed but not used for track ??

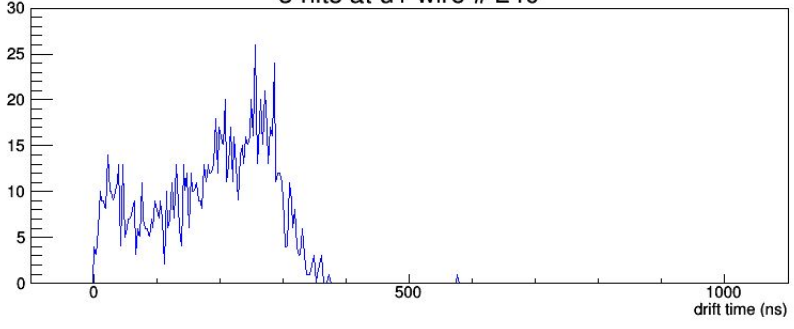
"L.vdc.u1.clbeg[0]<=240&&L.vdc.u1.clend[0]>=240&&L.vdc.u1.wire==240”

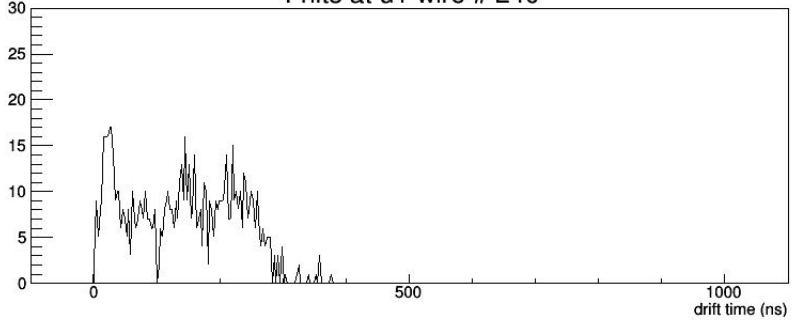

u1 wire # 240
1 hits
2 hits
3 hits
4 hits
5 hits
6 hits
0
20
40
60
80
100
120
140
160
180
0
500
1000
drift time (ns)

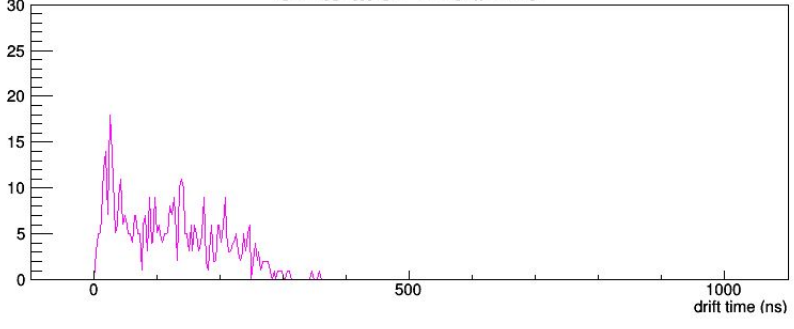

wire # 239
wire # 240
wire # 241
0
100
200
300
400
500
600
0
500
1000
drift time (ns)

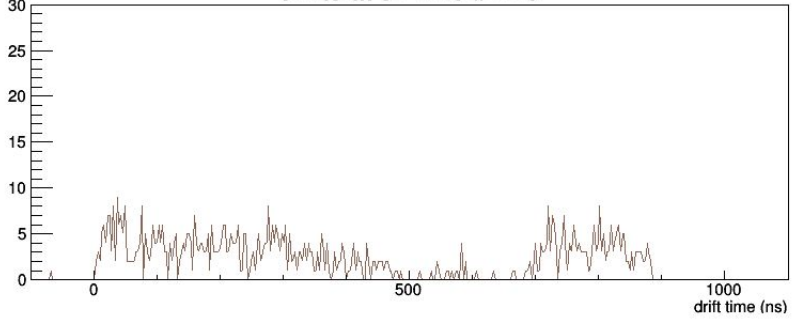

1 hits at u1 wire # 240
30
25
20
15
10
5
0
0
500
1000
drift time (ns)


2 hits at u1 wire # 240
30
25
20
15
10
5
0
0
500
1000
drift time (ns)


3 hits at u1 wire # 240
30
25
20
15
10
5
0
0
500
1000
drift time (ns)

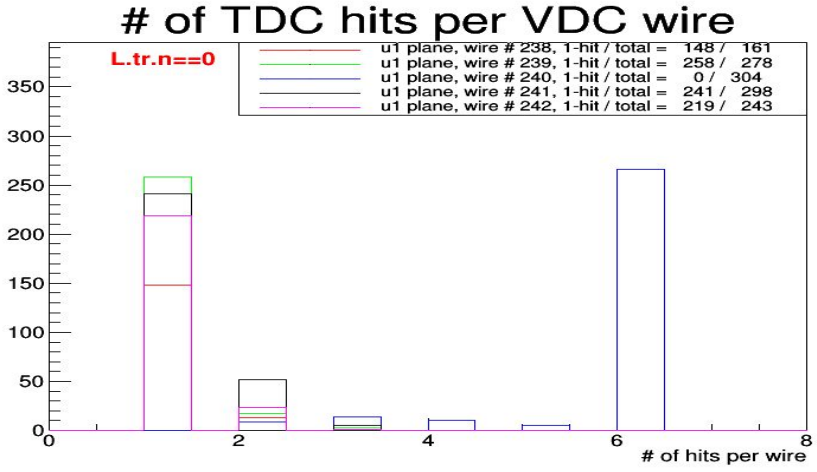

4 hits at u1 wire # 240
30
25
20
15
10
5
0
0
500
1000
drift time (ns)


5 hits at u1 wire # 240
30
25
20
15
10
5
0
0
500
1000
drift time (ns)

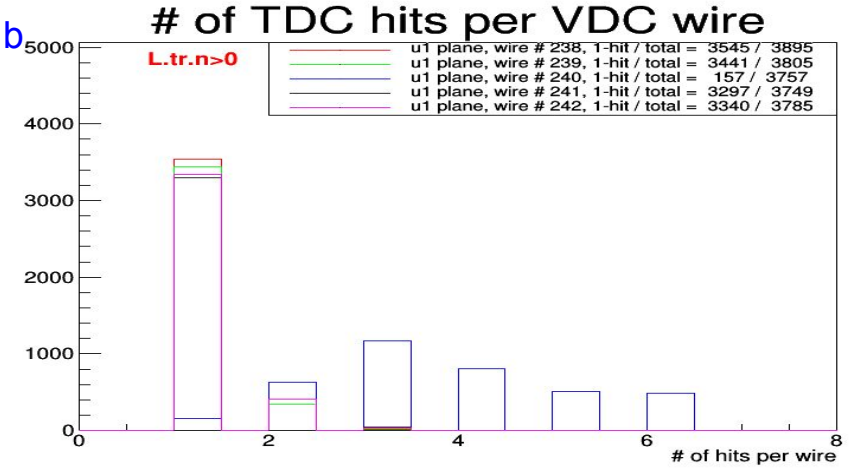

6 hits at u1 wire # 240
30
25
20
15
10
5
0
0
500
1000
drift time (ns)

Wire 238-242

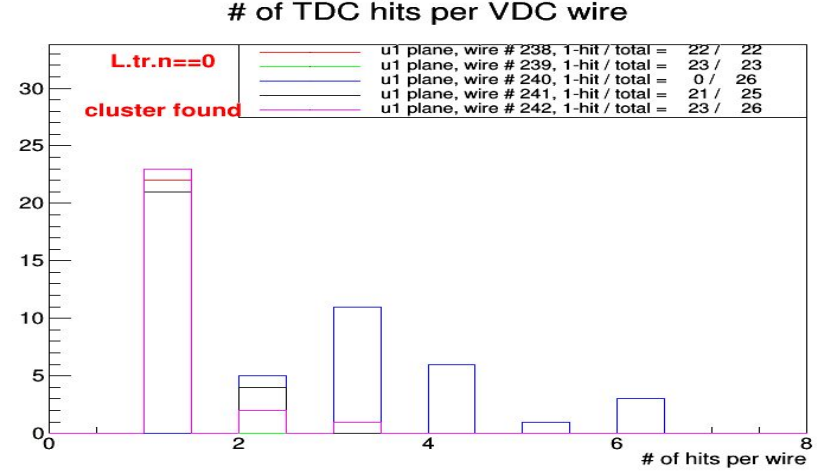
a



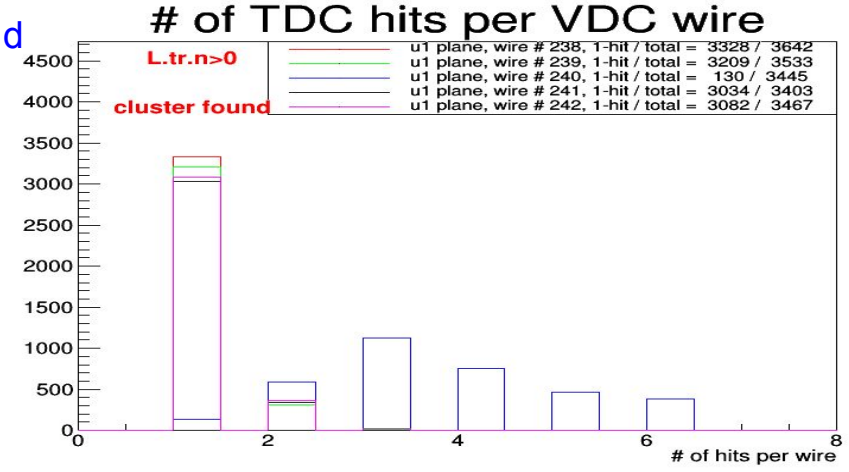
b



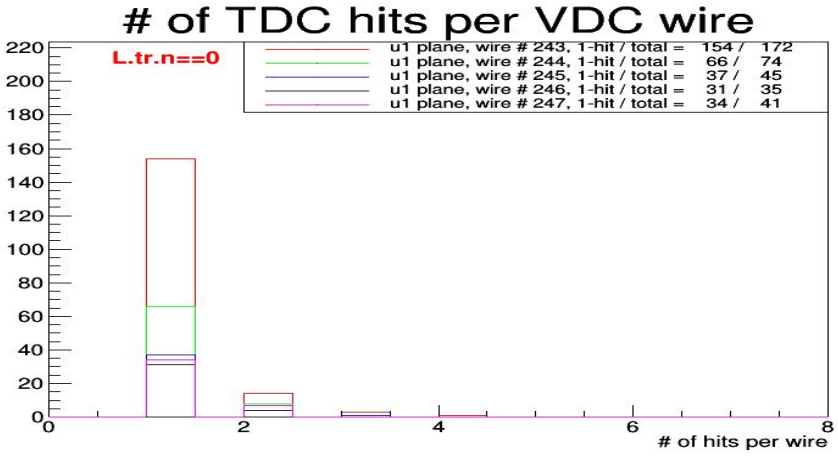
c

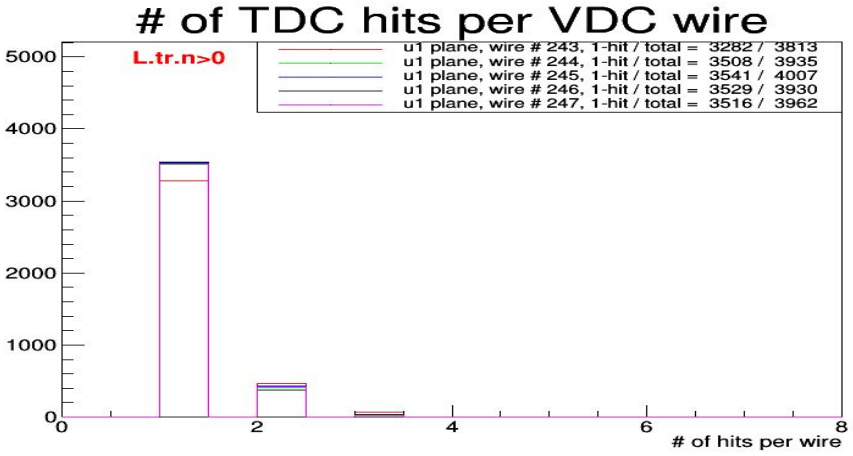


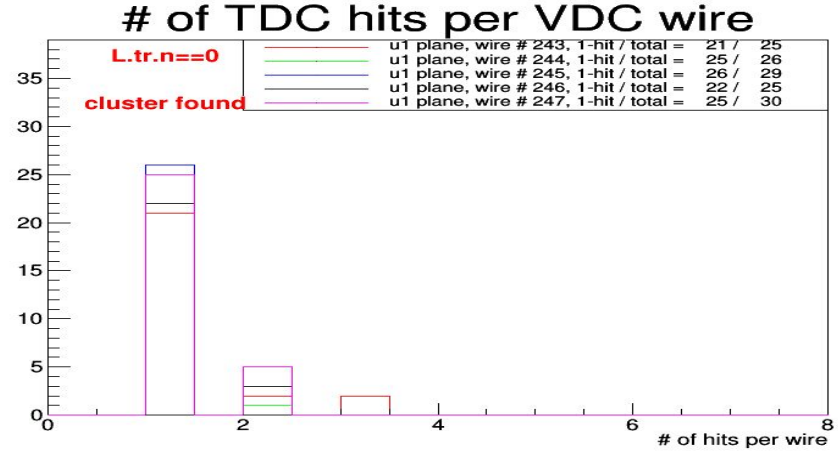
d

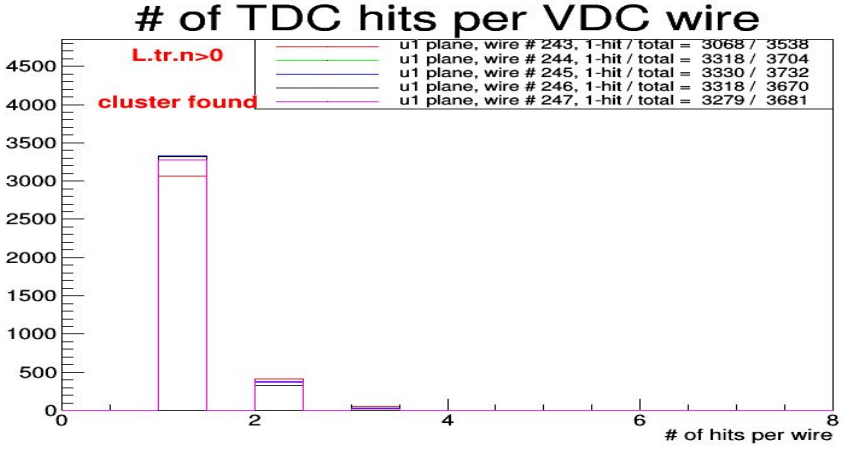


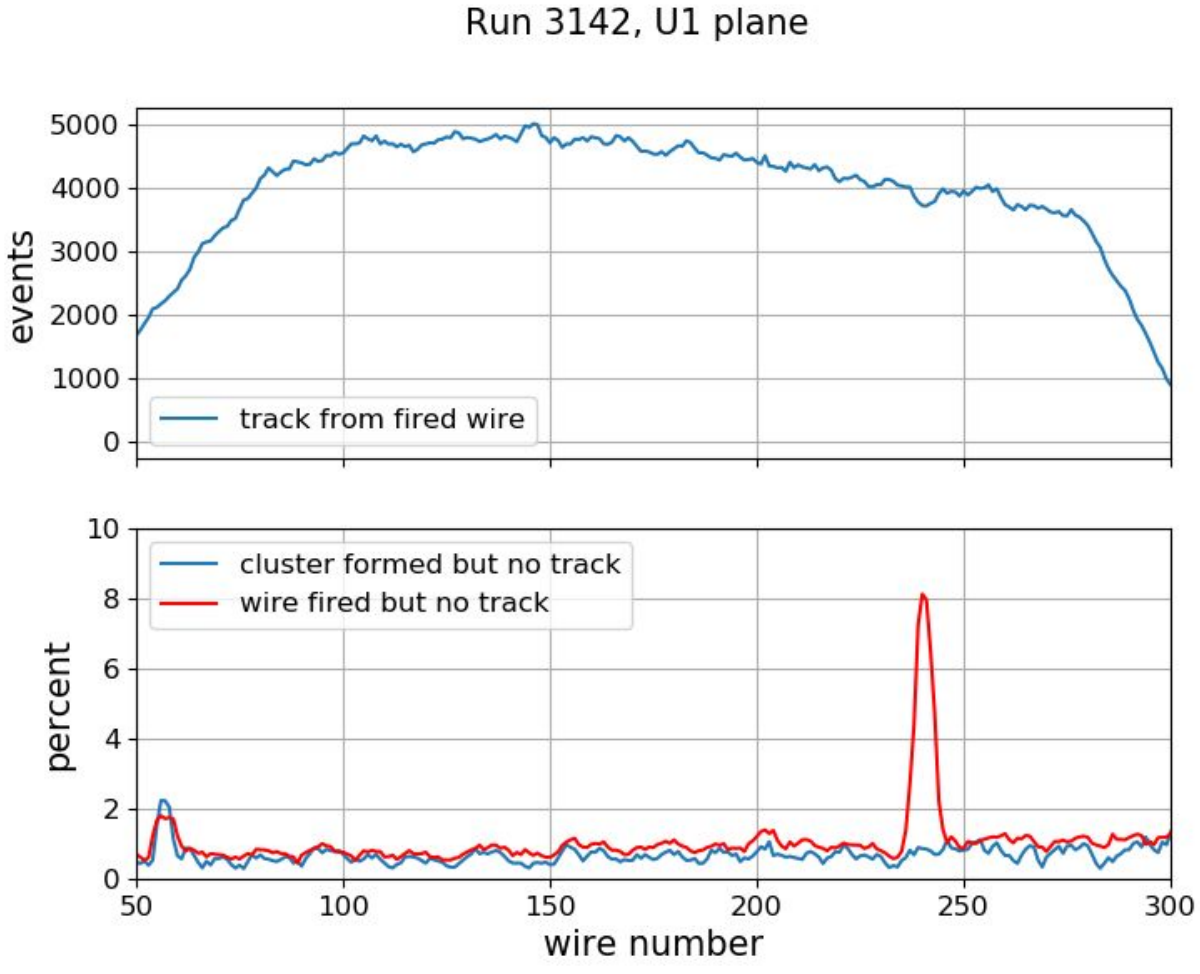
Wire 243-247

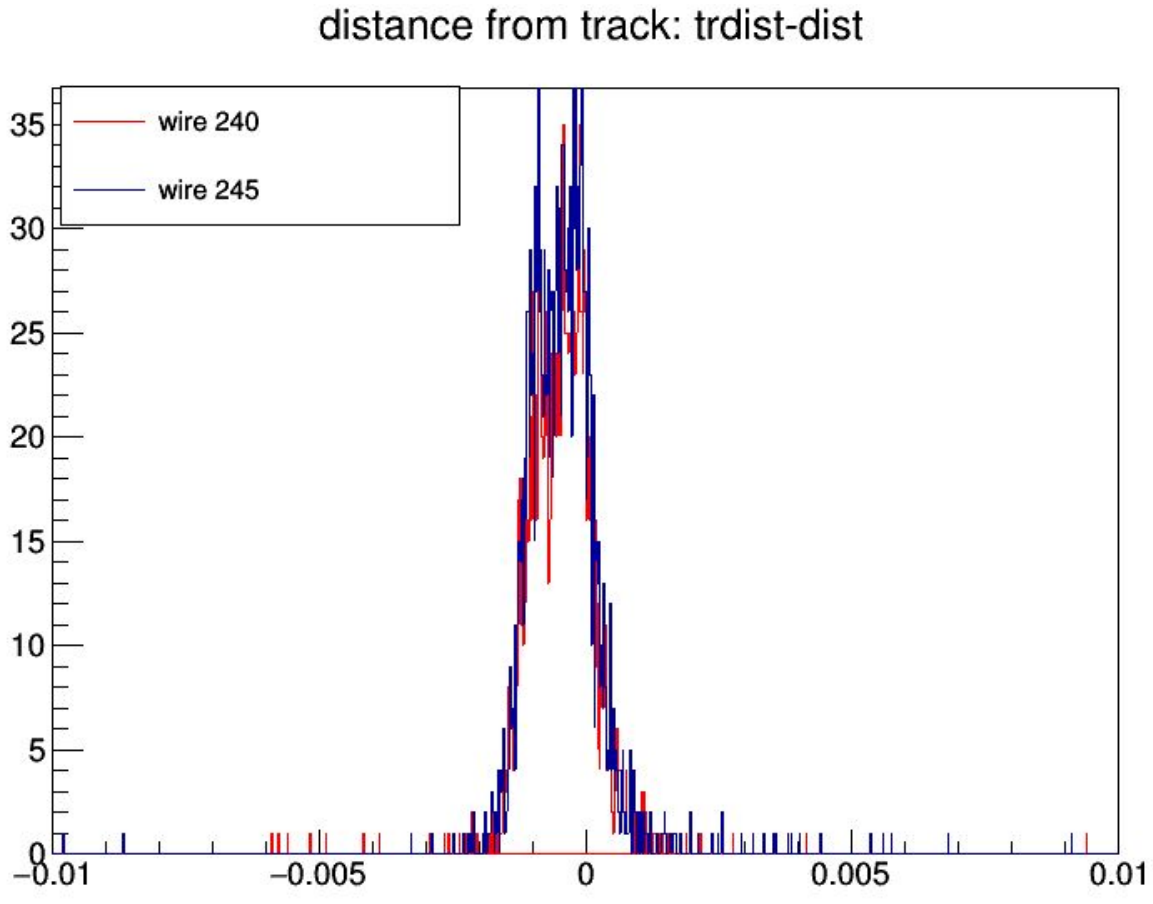

# of TDC hits per VDC wire
L.tr.n==0
u1 plane, wire # 243, 1-hit / total = 154 / 172
u1 plane, wire # 244, 1-hit / total = 66 / 74
u1 plane, wire # 245, 1-hit / total = 37 / 45
u1 plane, wire # 246, 1-hit / total = 31 / 35
u1 plane, wire # 247, 1-hit / total = 34 / 41
# of hits per wire


# of TDC hits per VDC wire
L.tr.n>0
u1 plane, wire # 243, 1-hit / total = 3282 / 3813
u1 plane, wire # 244, 1-hit / total = 3508 / 3935
u1 plane, wire # 245, 1-hit / total = 3541 / 4007
u1 plane, wire # 246, 1-hit / total = 3529 / 3930
u1 plane, wire # 247, 1-hit / total = 3516 / 3962
# of hits per wire


# of TDC hits per VDC wire
L.tr.n==0
cluster found
u1 plane, wire # 243, 1-hit / total = 21 / 25
u1 plane, wire # 244, 1-hit / total = 25 / 26
u1 plane, wire # 245, 1-hit / total = 26 / 29
u1 plane, wire # 246, 1-hit / total = 22 / 25
u1 plane, wire # 247, 1-hit / total = 25 / 30
# of hits per wire


# of TDC hits per VDC wire
L.tr.n>0
cluster found
u1 plane, wire # 243, 1-hit / total = 3068 / 3538
u1 plane, wire # 244, 1-hit / total = 3318 / 3704
u1 plane, wire # 245, 1-hit / total = 3330 / 3732
u1 plane, wire # 246, 1-hit / total = 3318 / 3670
u1 plane, wire # 247, 1-hit / total = 3279 / 3681
# of hits per wire


Run 3142, U1 plane
events
track from fired wire
percent
cluster formed but no track
wire fired but no track
wire number


distance from track: trdist-dist
wire 240
wire 245
35
30
25
20
15
10
5
0
−0.01
−0.005
0
0.005
0.01

Conclusion:

1. U1 wire 240 is noisy (multi-hits) across the spring run period
2. When analyzer was able to find cluster with wire 240, the track looks OK (?)
3. 8% of hit from the wire could be good but didn’t used to for cluster