ProtoDune runs with telescope trigger

First look at root files

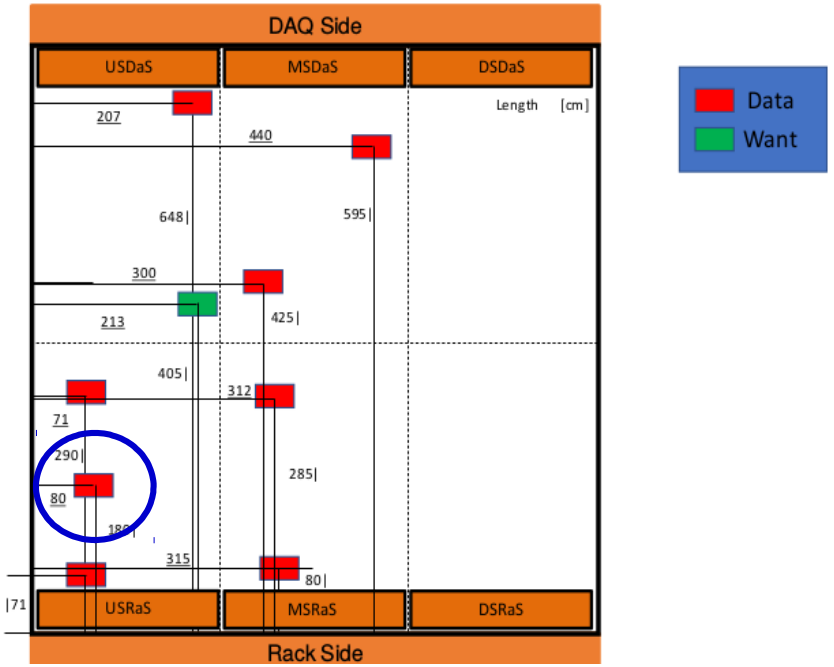
19 May 2019

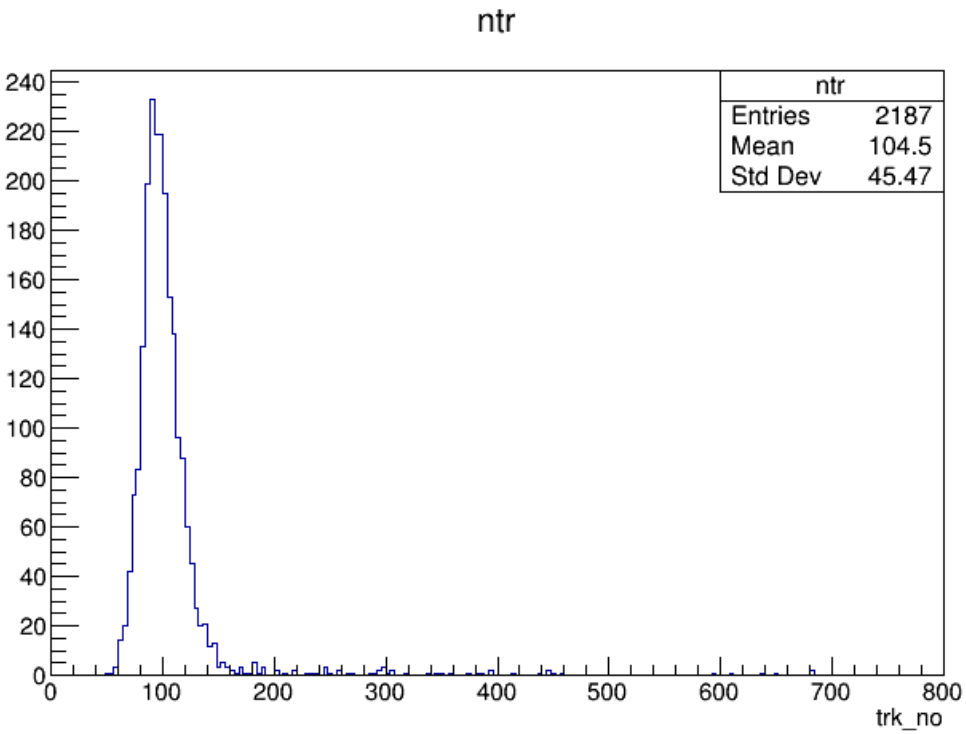
File: **PD_trackinfo_run7336.root**

Run characteristics from Google sheet:

- Long Telescope run- Orientation was changed for this run- top and bottom paddle rotated (90deg), paddle in the middle normal
- Above apa3

Total events: 2187
Total tracks: 229770



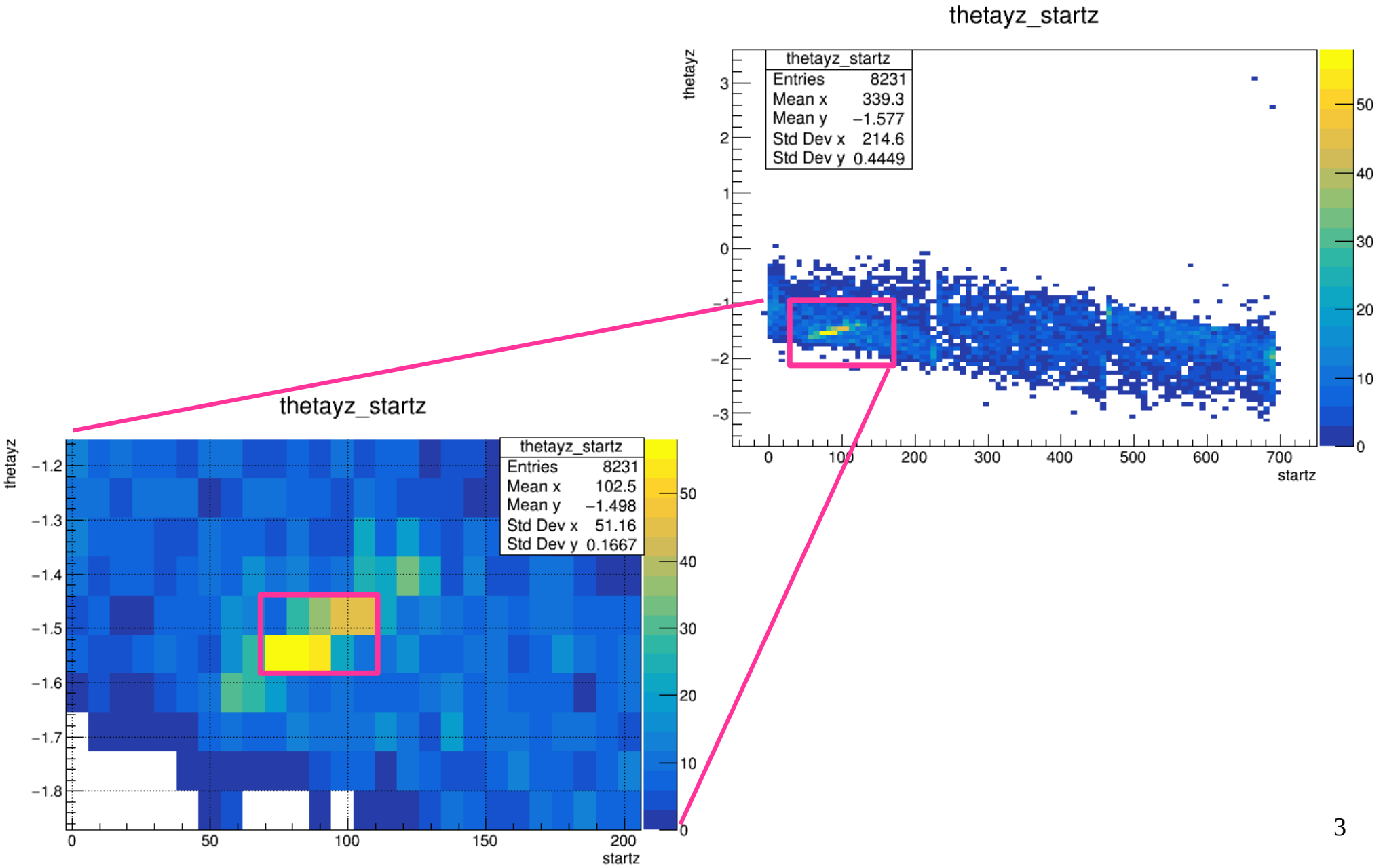


Total track

Find the telescope - PD_trackinfo_run7336.root

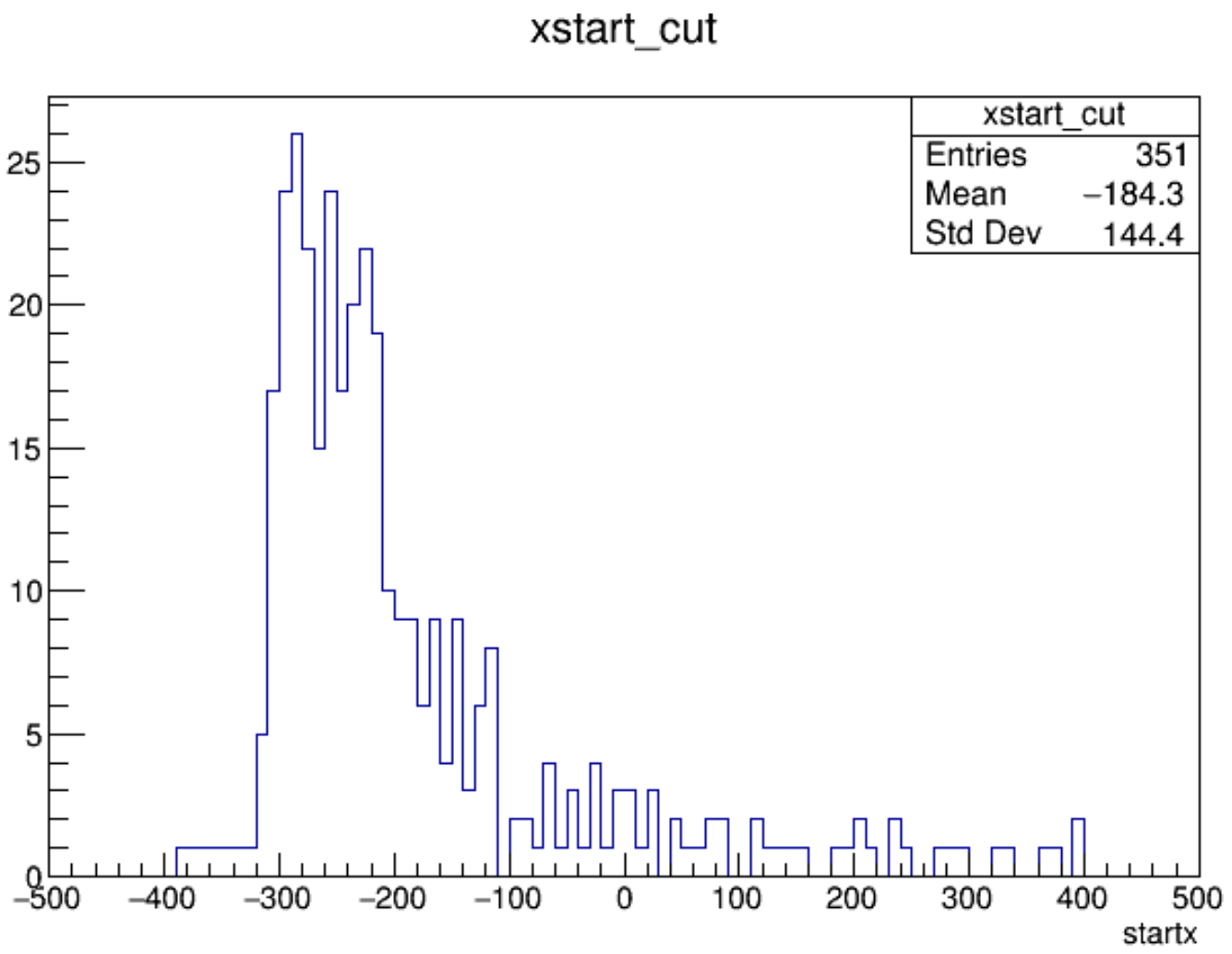
Track selection : 550 < start y < 800 (tracks from the top)

trklen > 500 (tracks that exit from the bottom)



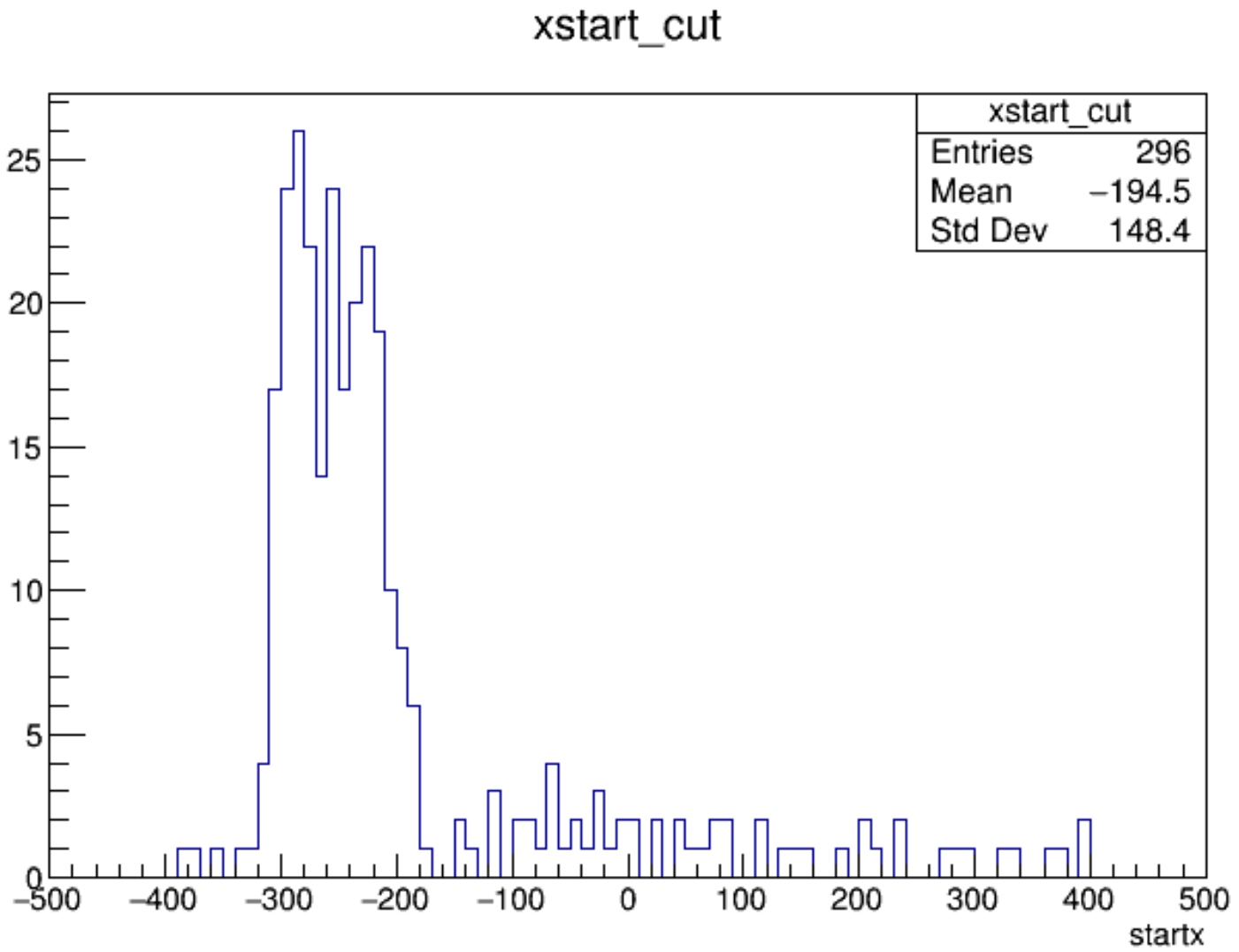
X start distribution - PD_trackinfo_run7336.root

Track selection : 550 < start y < 800 (tracks from the top)
70 < start z < 110 (position of the telescope)
-1.58 < theta yz < -1.44 (telescope acceptance) ~ 8.5˚
trklen > 500 (tracks that exit from the bottom)



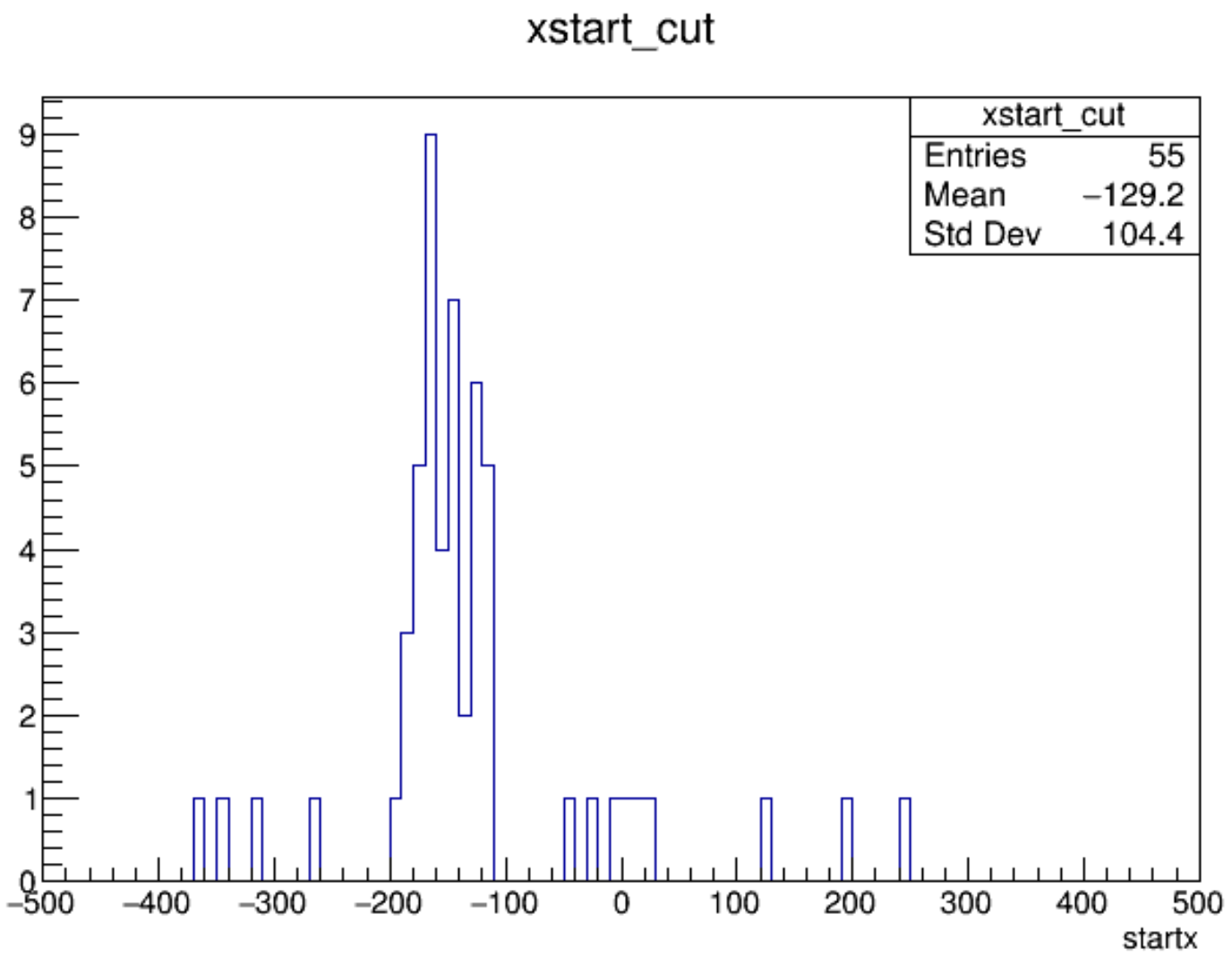
X start distribution - PD_trackinfo_run7336.root

Track selection : 550 < start y < 800 (tracks from the top)
70 < start z < 110 (position of the telescope)
-1.58 < theta yz < -1.44 (telescope acceptance) ~ 8.5˚
trklen > 500 (tracks that exit from the bottom)
cathode_crsossing == false



X start distribution - PD_trackinfo_run7336.root

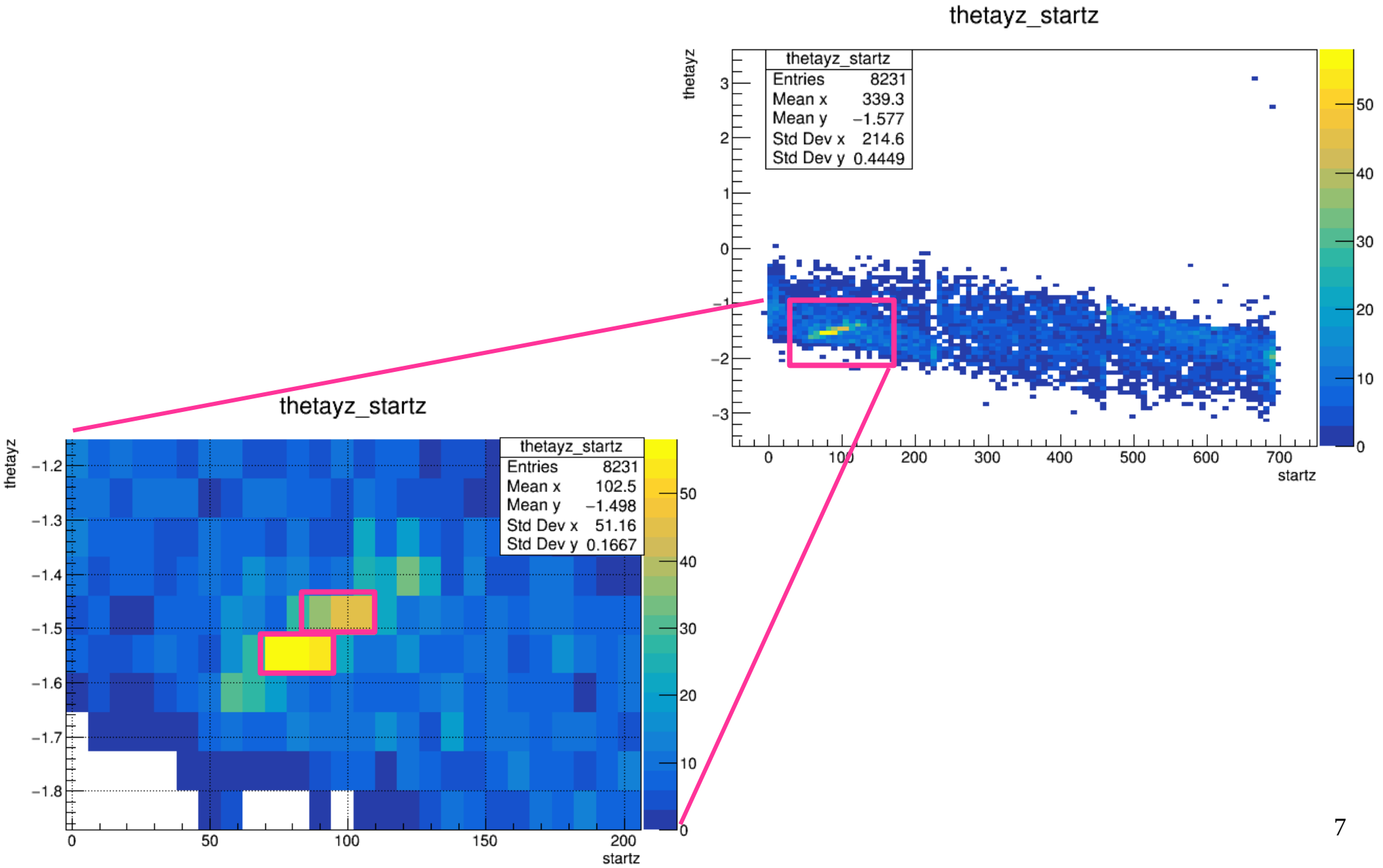
Track selection : 550 < start y < 800 (tracks from the top)
70 < start z < 110 (position of the telescope)
-1.58 < theta yz < -1.44 (telescope acceptance) ~ 8.5˚
trklen > 500 (tracks that exit from the bottom)
cathode_crsossing == true



Find the telescope - PD_trackinfo_run7336.root

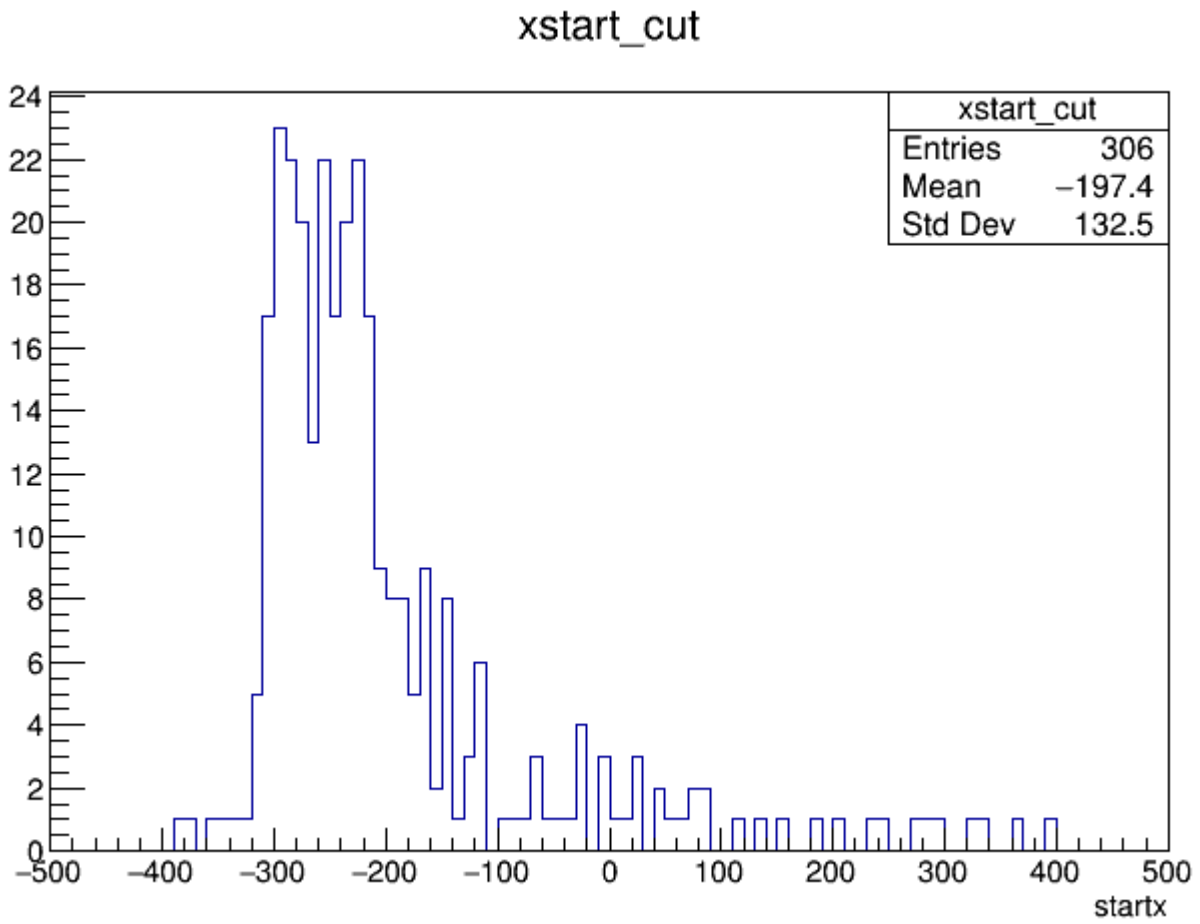
Track selection : 550 < start y < 800 (tracks from the top)

trklen > 500 (tracks that exit from the bottom)



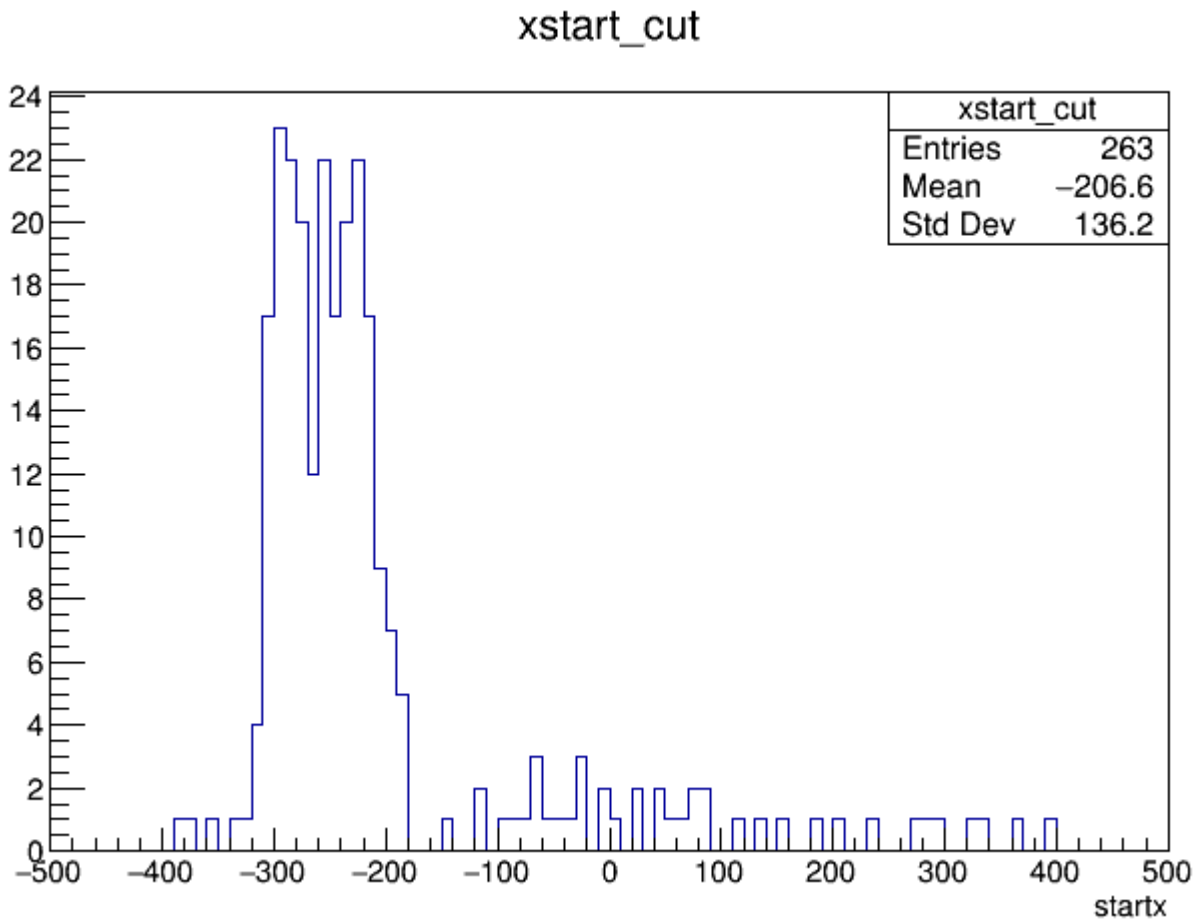
X start distribution - PD_trackinfo_run7336.root

Track selection : 550 < start y < 800 (tracks from the top)
70 < start z < 101 *or* 86 < start z < 110 (position of the telescope)
-1.58 < theta yz < -1.51 *or* -1.51 < theta yz < -1.44 (telescope acceptance)
trklen > 500 (tracks that exit from the bottom)



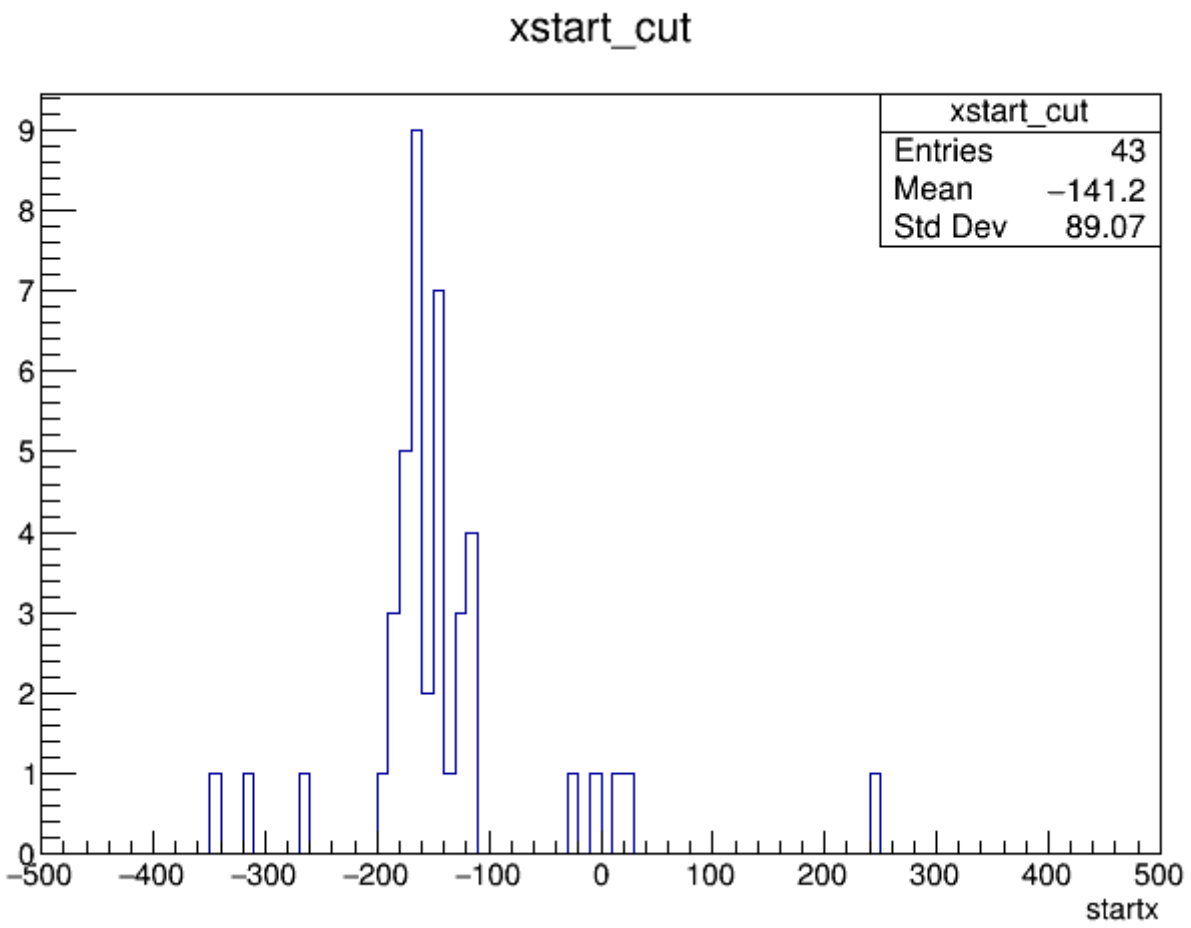
X start distribution - PD_trackinfo_run7336.root

Track selection : 550 < start y < 800 (tracks from the top)
70 < start z < 101 *or* 86 < start z < 110 (position of the telescope)
-1.58 < theta yz < -1.51 *or* -1.51 < theta yz < -1.44 (telescope acceptance)
trklen > 500 (tracks that exit from the bottom)
cathode_crsossing == false



X start distribution - PD_trackinfo_run7336.root

Track selection : 550 < start y < 800 (tracks from the top)
70 < start z < 101 *or* 86 < start z < 110 (position of the telescope)
-1.58 < theta yz < -1.51 *or* -1.51 < theta yz < -1.44 (telescope acceptance)
trklen > 500 (tracks that exit from the bottom)
cathode_crsossing == true

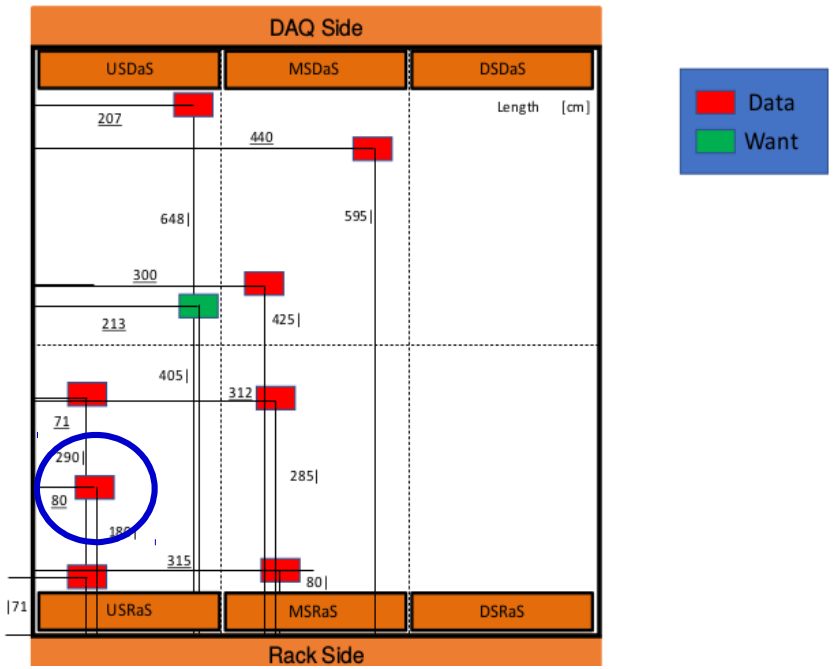


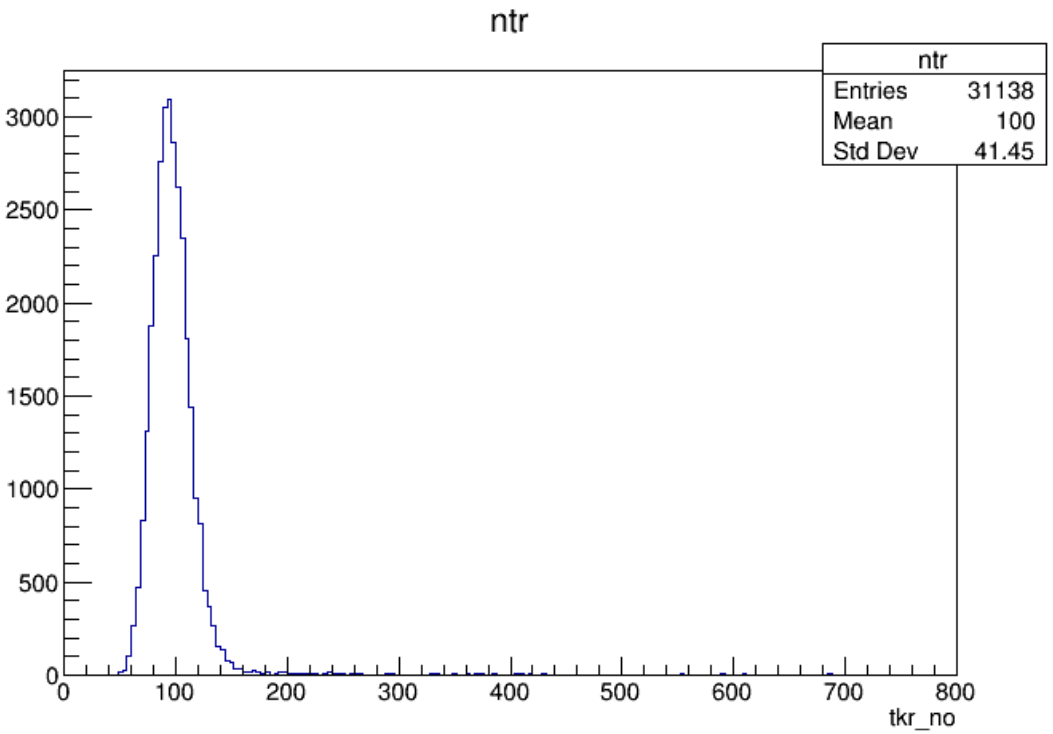
File: **PD_trackinfo_run7298.root**

Run characteristics from Google sheet:

- Long Telescope run- Orientation was changed for this run- the bottom two are crossed like a "T" & top paddle "normal"
- Above apa3

Total events: 31138
Total tracks: 3121339



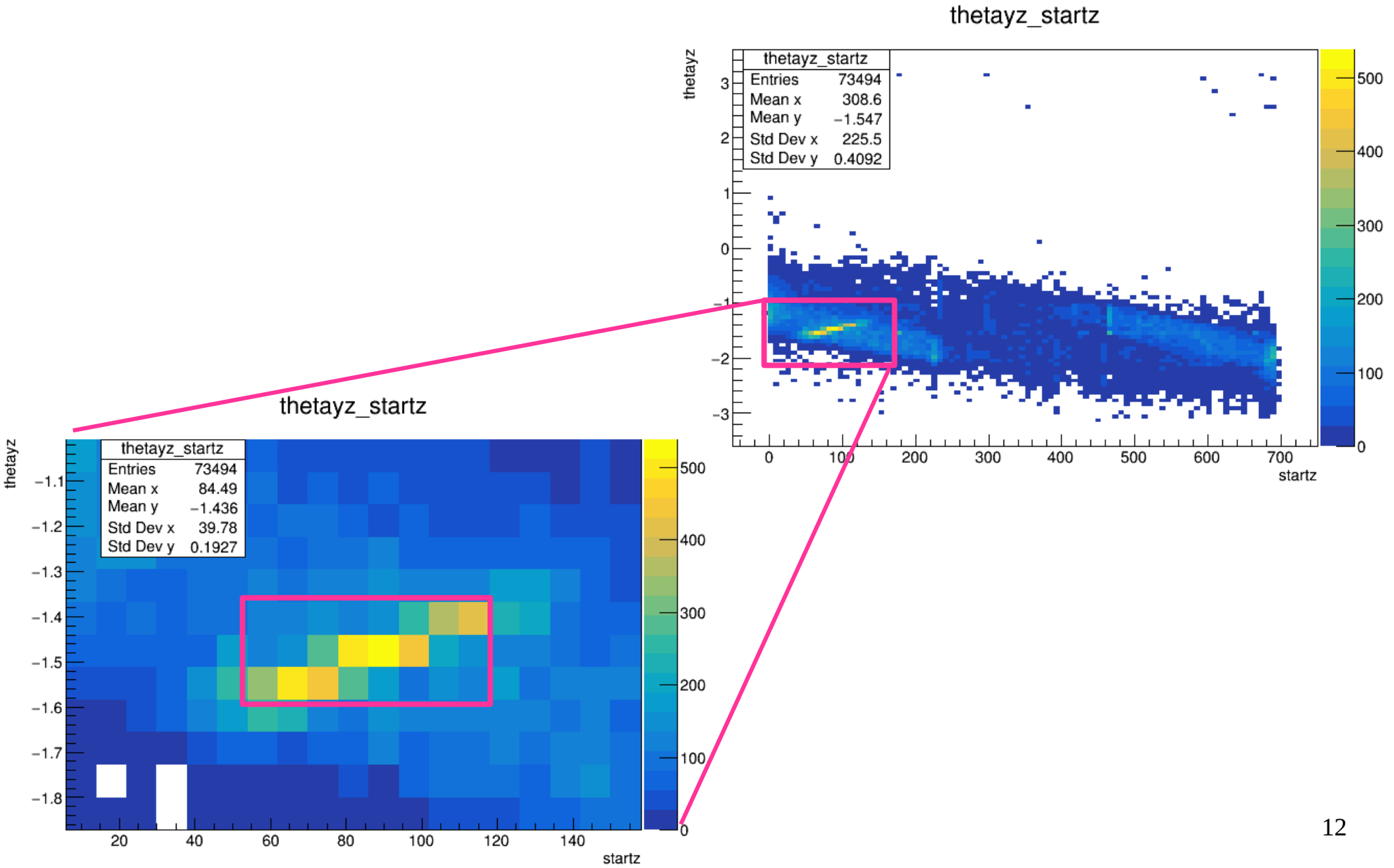


Total track

Find the telescope - PD_trackinfo_run7298.root

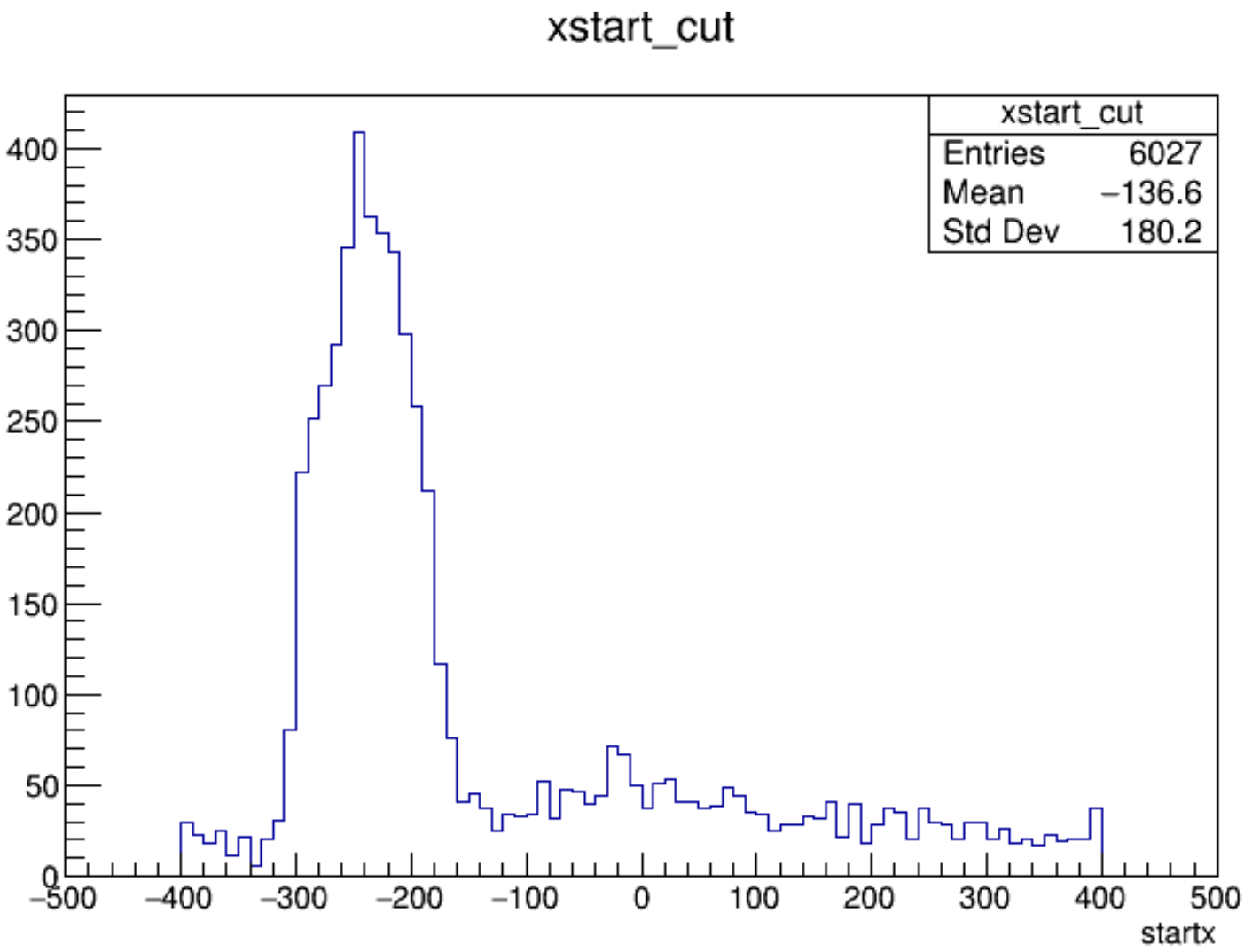
Track selection : 550 < start y < 800 (tracks from the top)

trklen > 500 (tracks that exit from the bottom)



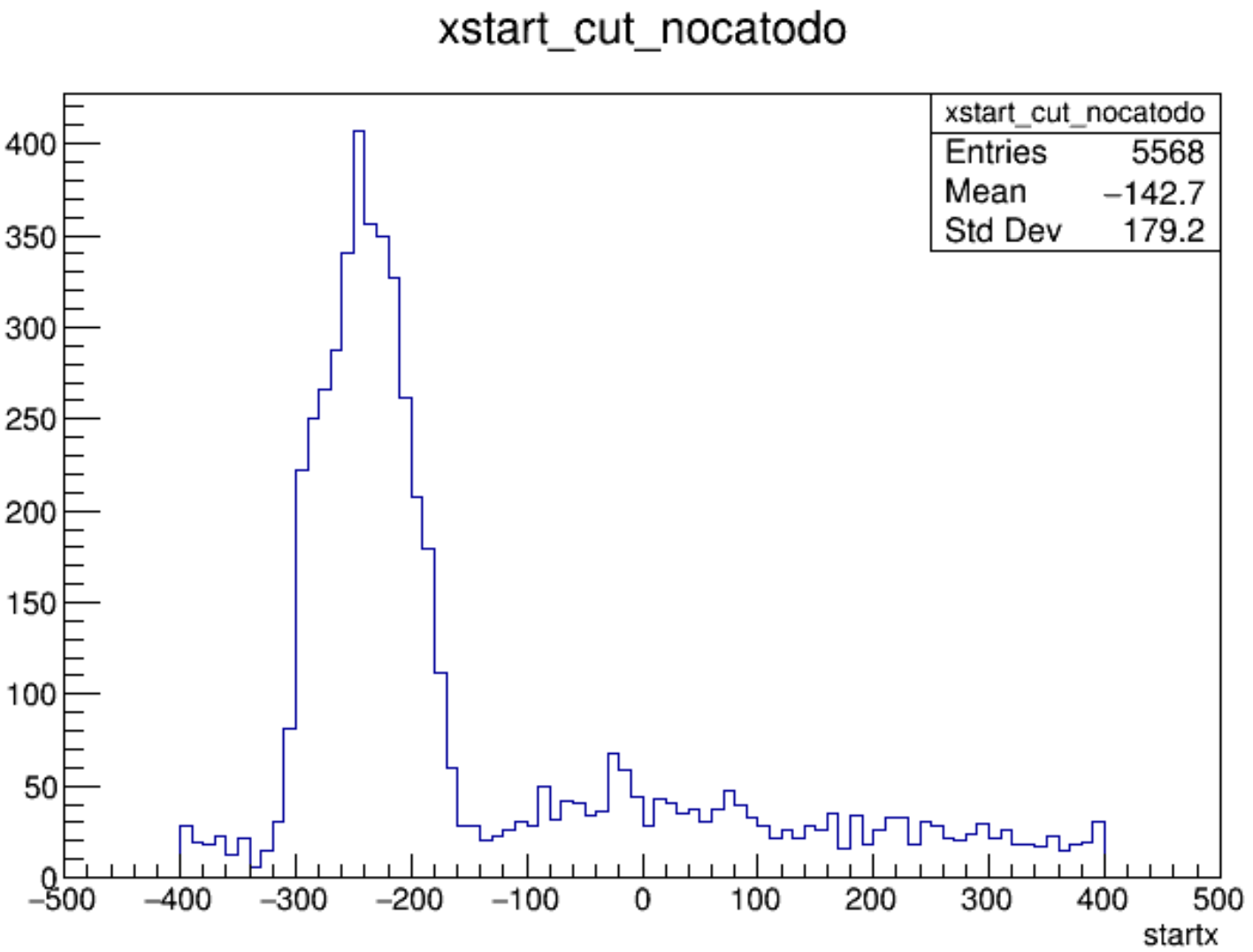
X start distribution - PD_trackinfo_run7298.root

Track selection : 550 < start y < 800 (tracks from the top)
54 < start z < 118 (position of the telescope)
-1.58 < theta yz < -1.37 (telescope acceptance) ~ 8.5˚
trklen > 500 (tracks that exit from the bottom)



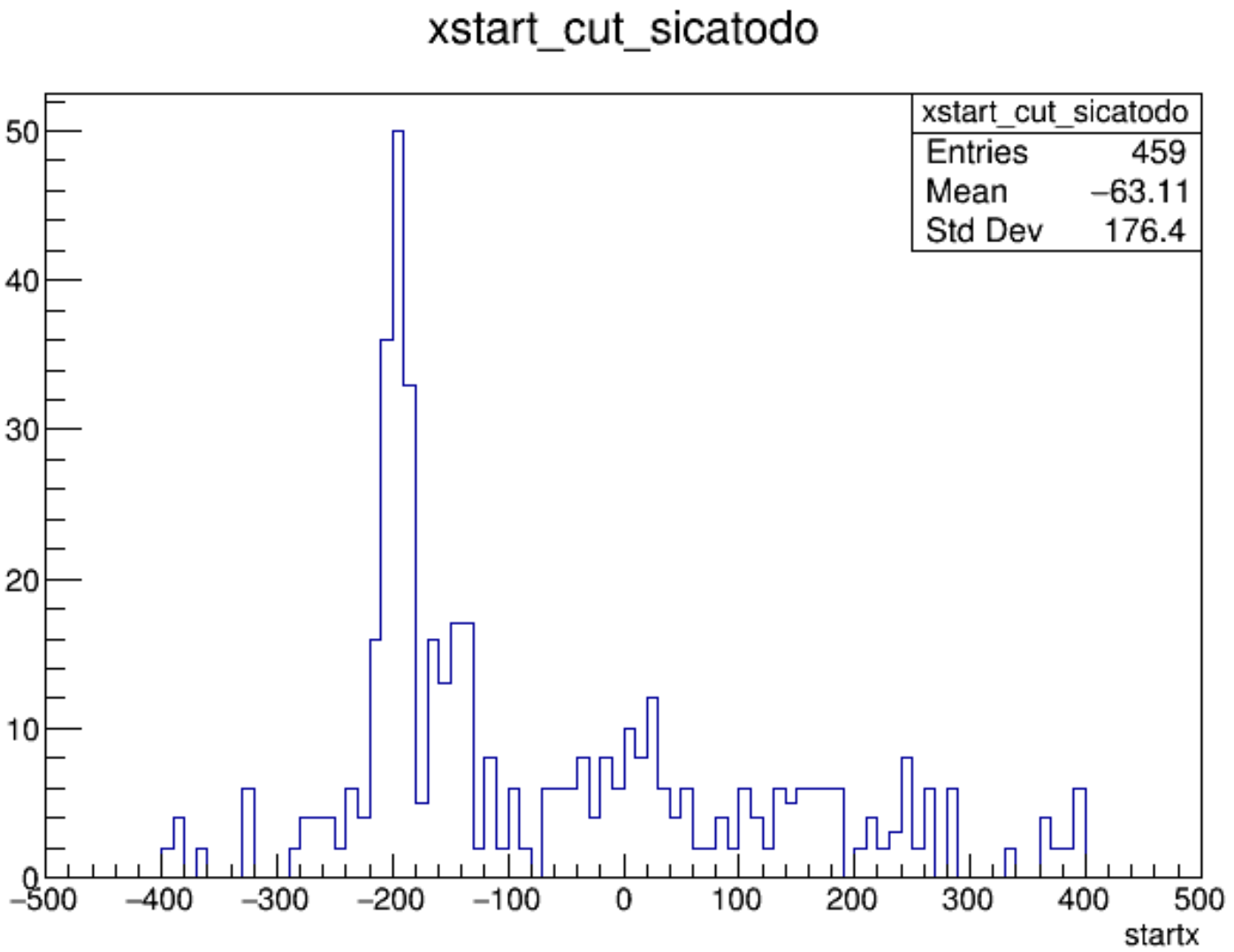
X start distribution - PD_trackinfo_run7298.root

Track selection : 550 < start y < 800 (tracks from the top)
54 < start z < 118 (position of the telescope)
-1.58 < theta yz < -1.37 (telescope acceptance) ~ 8.5˚
trklen > 500 (tracks that exit from the bottom)
cathode_crsossing == false



X start distribution - PD_trackinfo_run7298.root

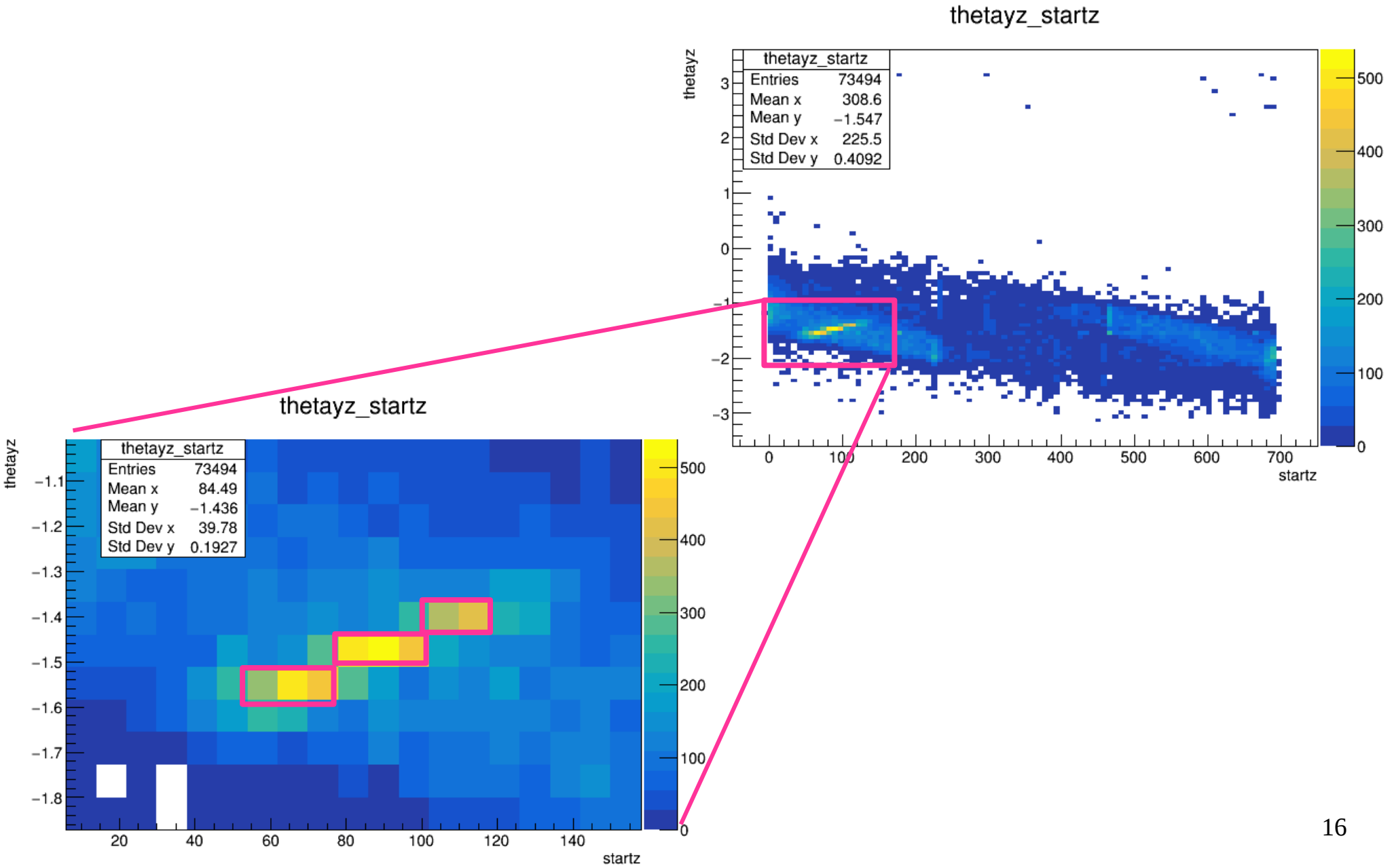
Track selection : 550 < start y < 800 (tracks from the top)
54 < start z < 118 (position of the telescope)
-1.58 < theta yz < -1.37 (telescope acceptance) ~ 8.5˚
trklen > 500 (tracks that exit from the bottom)
cathode_crsossing == true



Find the telescope - PD_trackinfo_run7298.root

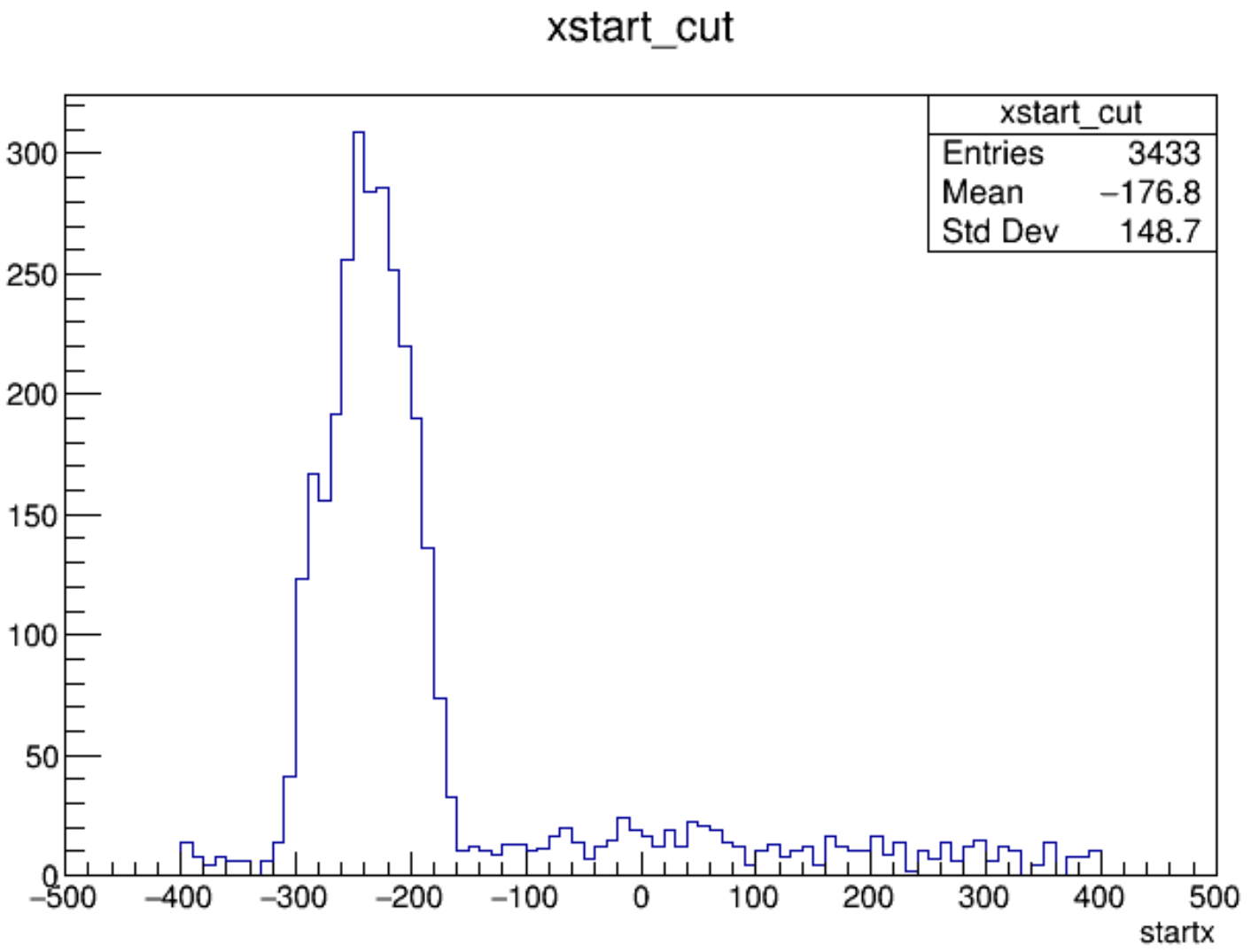
Track selection : 550 < start y < 800 (tracks from the top)

trklen > 500 (tracks that exit from the bottom)



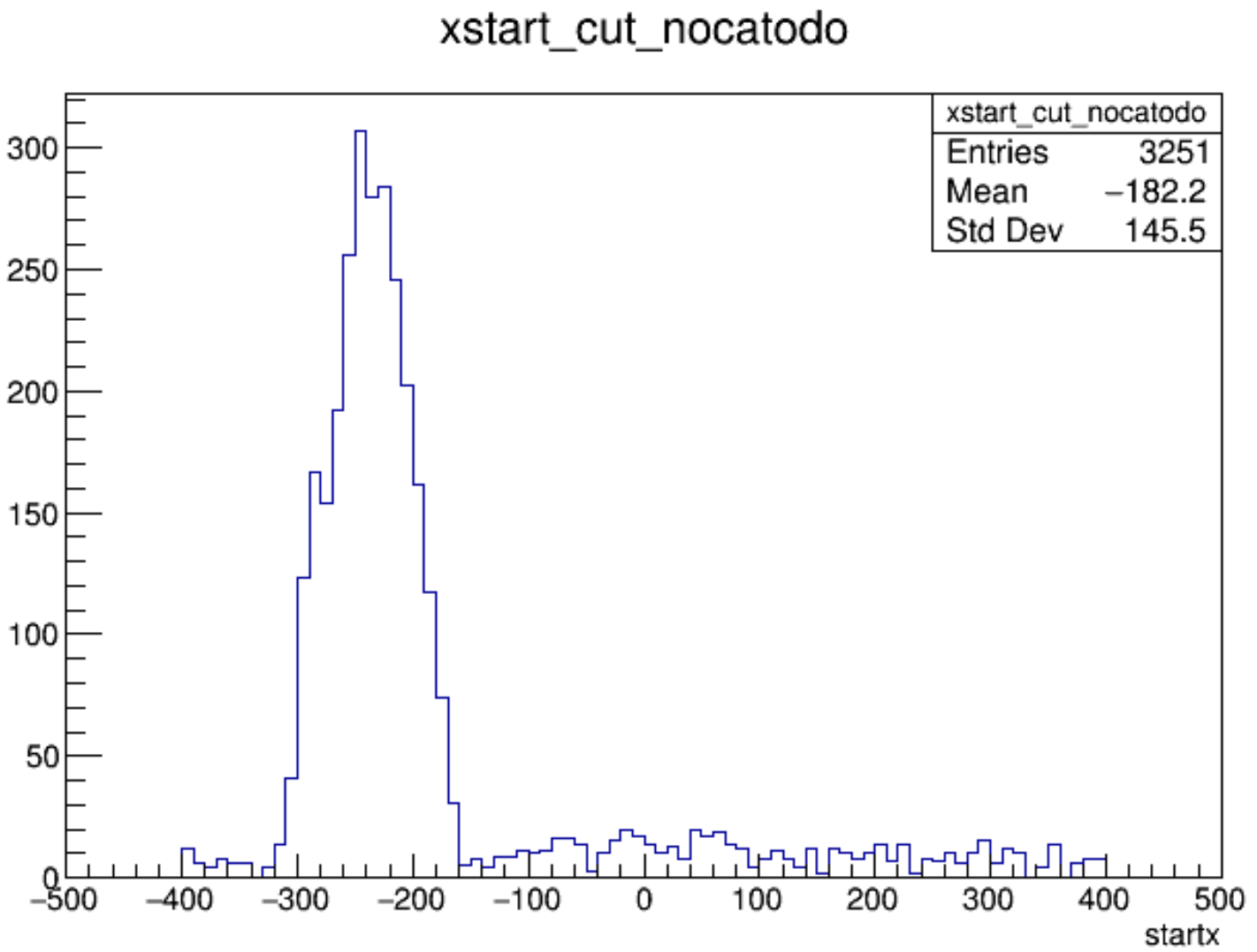
X start distribution - PD_trackinfo_run7298.root

Track selection : 550 < start y < 800 (tracks from the top)
54 < start z < 77 *or* 77 < start z < 102 *or* 102 < start z < 118
-1.58<theta yz<-1.51 *or* -1.51 < theta yz < -1.44 *or* -1.44 < theta yz < -1.37
trklen > 500 (tracks that exit from the bottom)



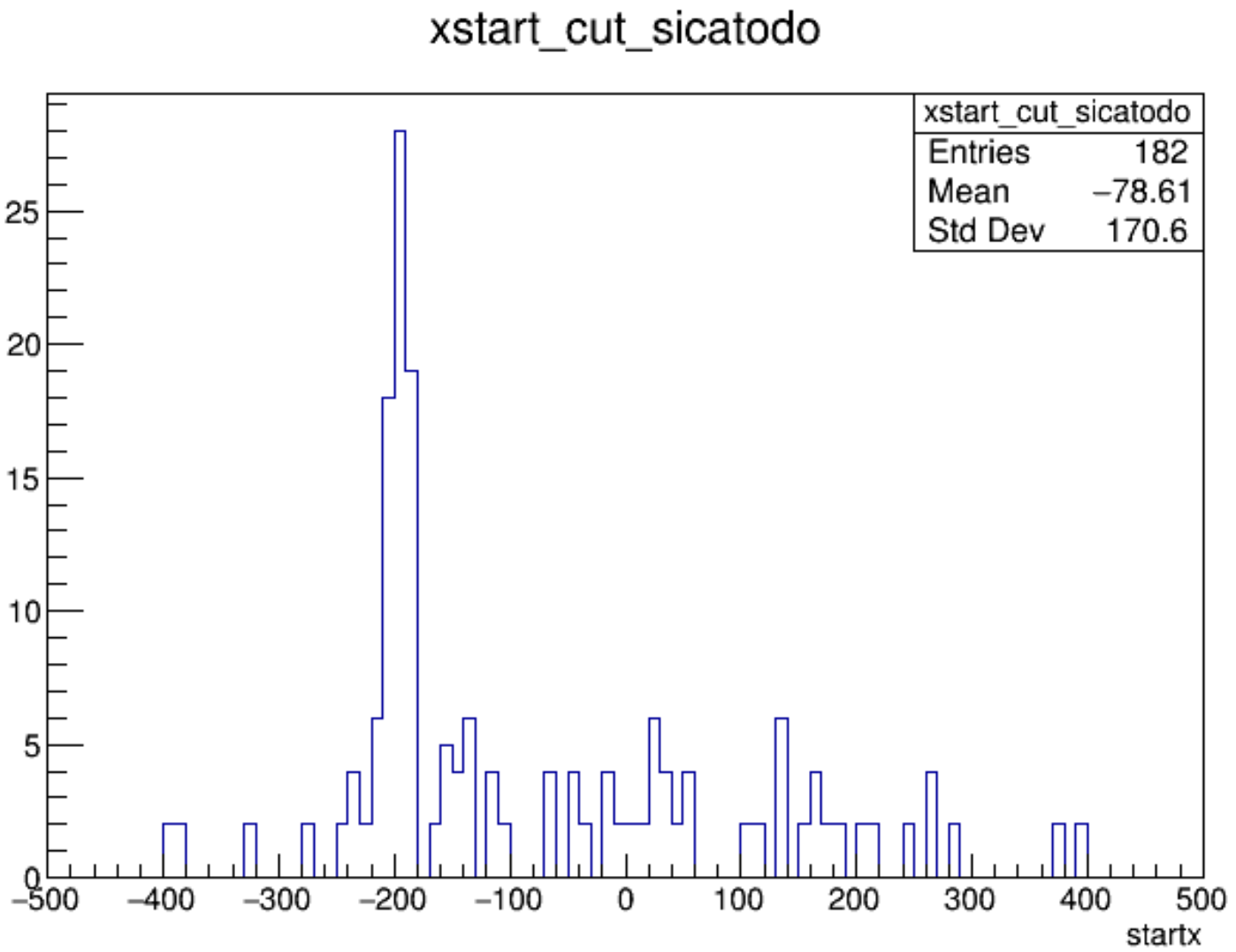
X start distribution - PD_trackinfo_run7298.root

Track selection : 550 < start y < 800 (tracks from the top)
54 < start z < 77 *or* 77 < start z < 102 *or* 102 < start z < 118
-1.58<theta yz<-1.51 *or* -1.51 < theta yz < -1.44 *or* -1.44 < theta yz < -1.37
trklen > 500 (tracks that exit from the bottom)
cathode_crsossing == false



X start distribution - PD_trackinfo_run7298.root

Track selection : 550 < start y < 800 (tracks from the top)
54 < start z < 77 *or* 77 < start z < 102 *or* 102 < start z < 118
-1.58<theta yz<-1.51 *or* -1.51 < theta yz < -1.44 *or* -1.44 < theta yz < -1.37
trklen > 500 (tracks that exit from the bottom)
cathode_crsossing == true

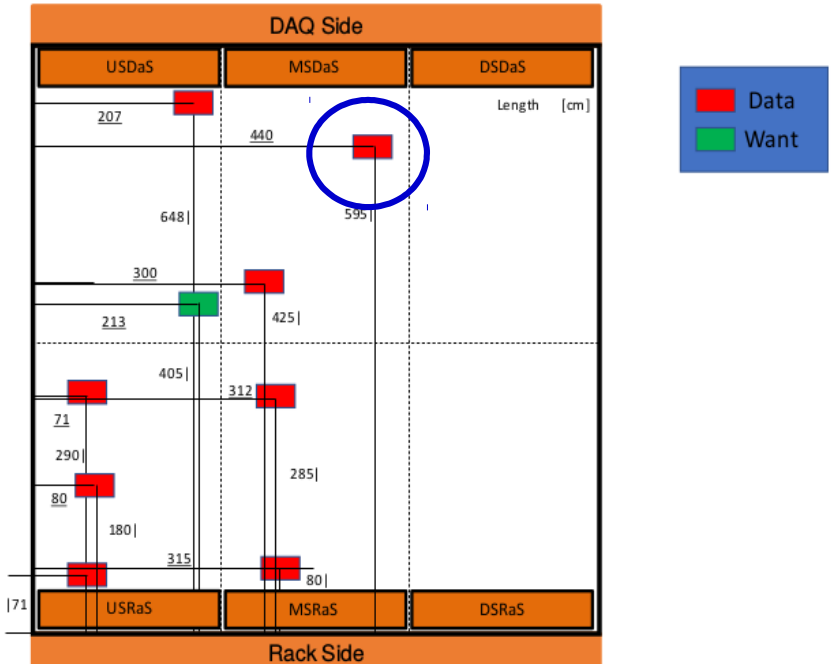


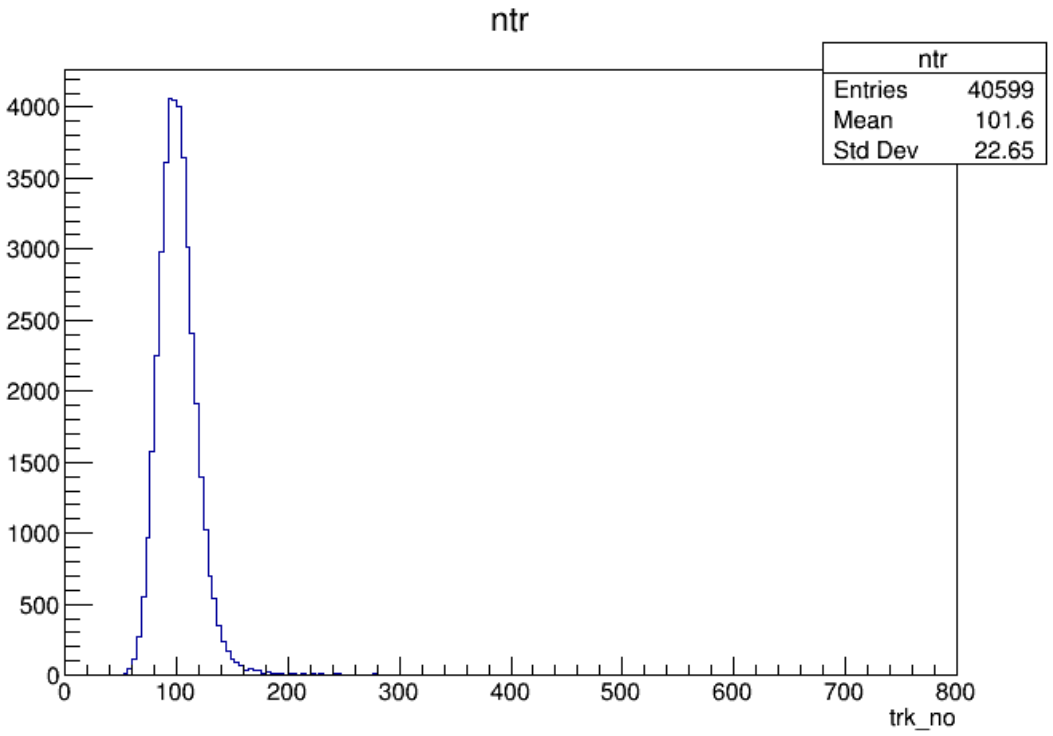
File: **PD_trackinfo_run7301.root**

Run characteristics from Google sheet:

- Telescope run above apa6/apa4
- paddles in stacked (parallel)
- ~38 hours, trigger rate ~1.1Hz

Total events: 40599
Total tracks:4123915



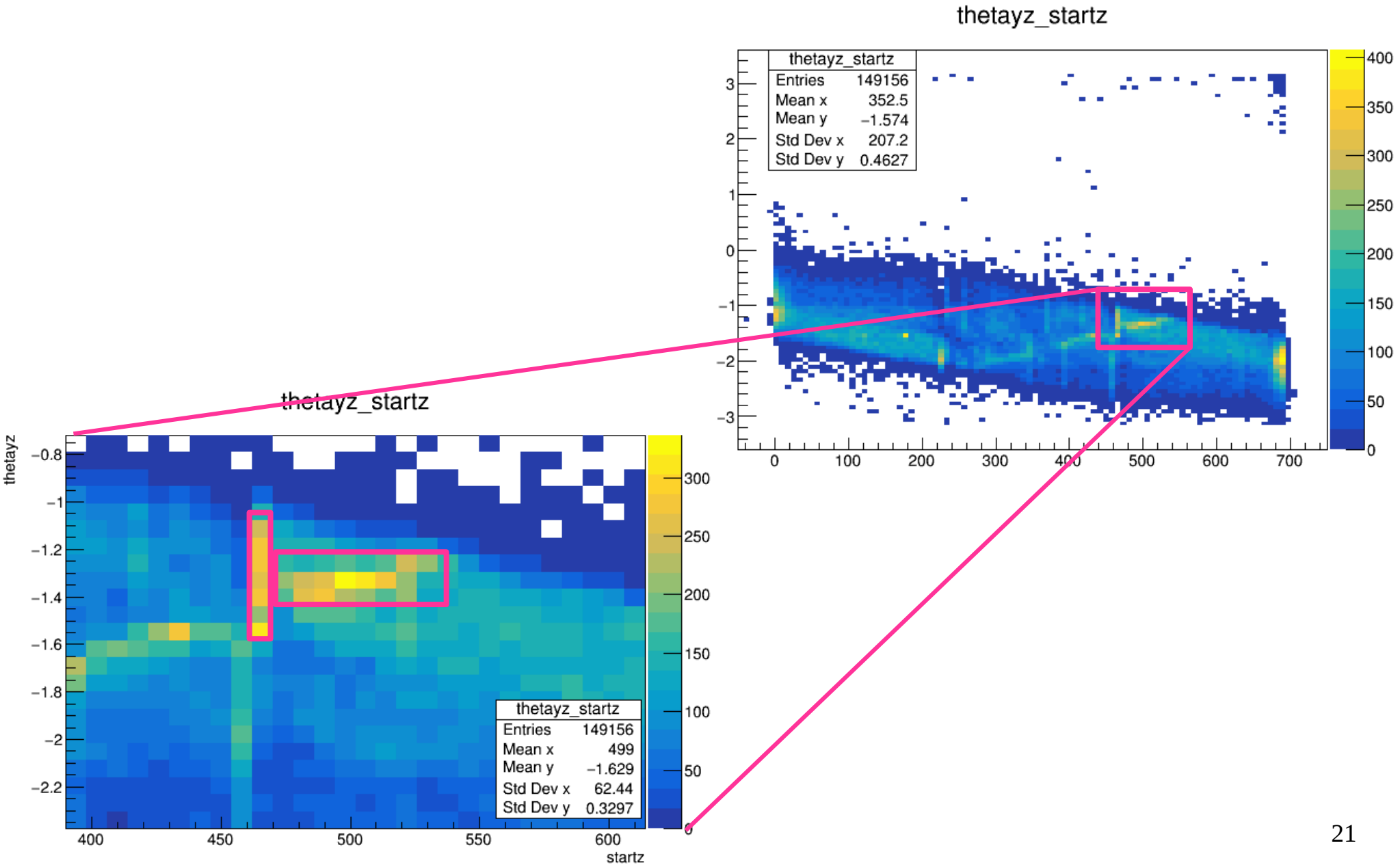


Total track

Find the telescope - PD_trackinfo_run7301.root

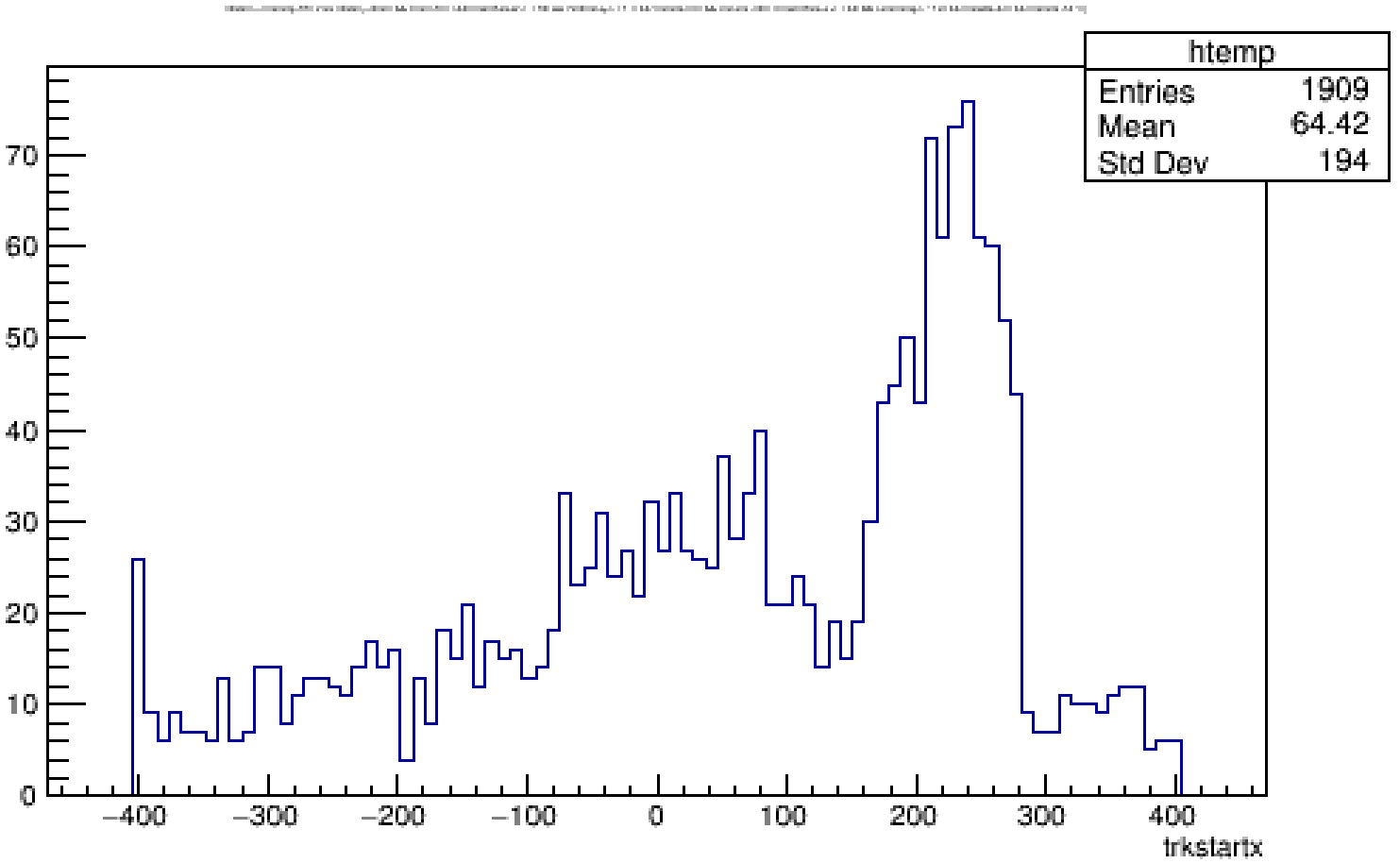
Track selection : 550 < start y < 800 (tracks from the top)

trklen > 500 (tracks that exit from the bottom)



X start distribution - PD_trackinfo_run7301.root

Track selection : 550 < start y < 800 (tracks from the top)
460 < start z < 470 *or* 470 < start z < 537
-1.58 < theta yz < -1.1 *or* -1.44 < theta yz < -1.2
trklen > 500 (tracks that exit from the bottom)



Next steps

- Look at the run with the telescope near the cathode