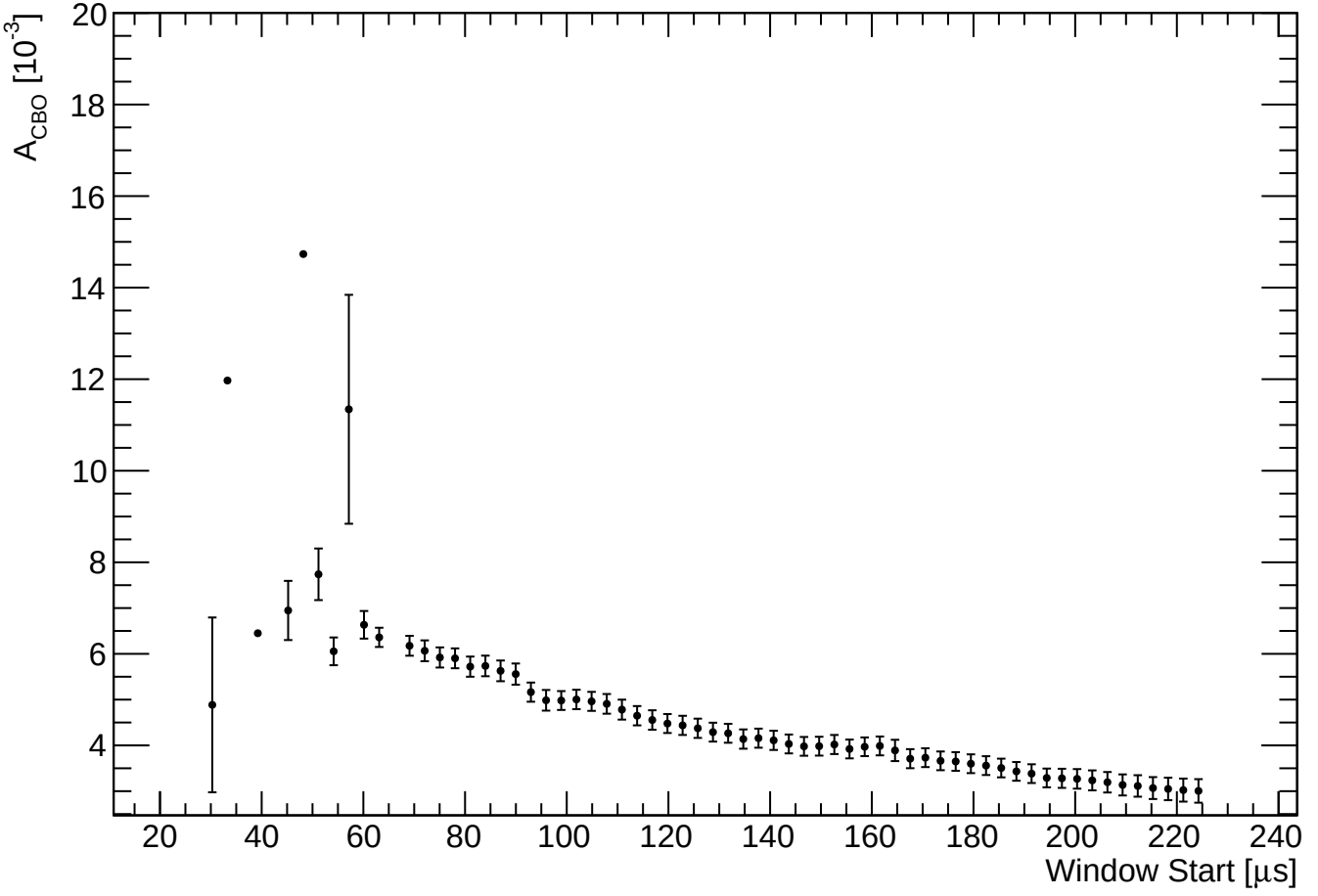
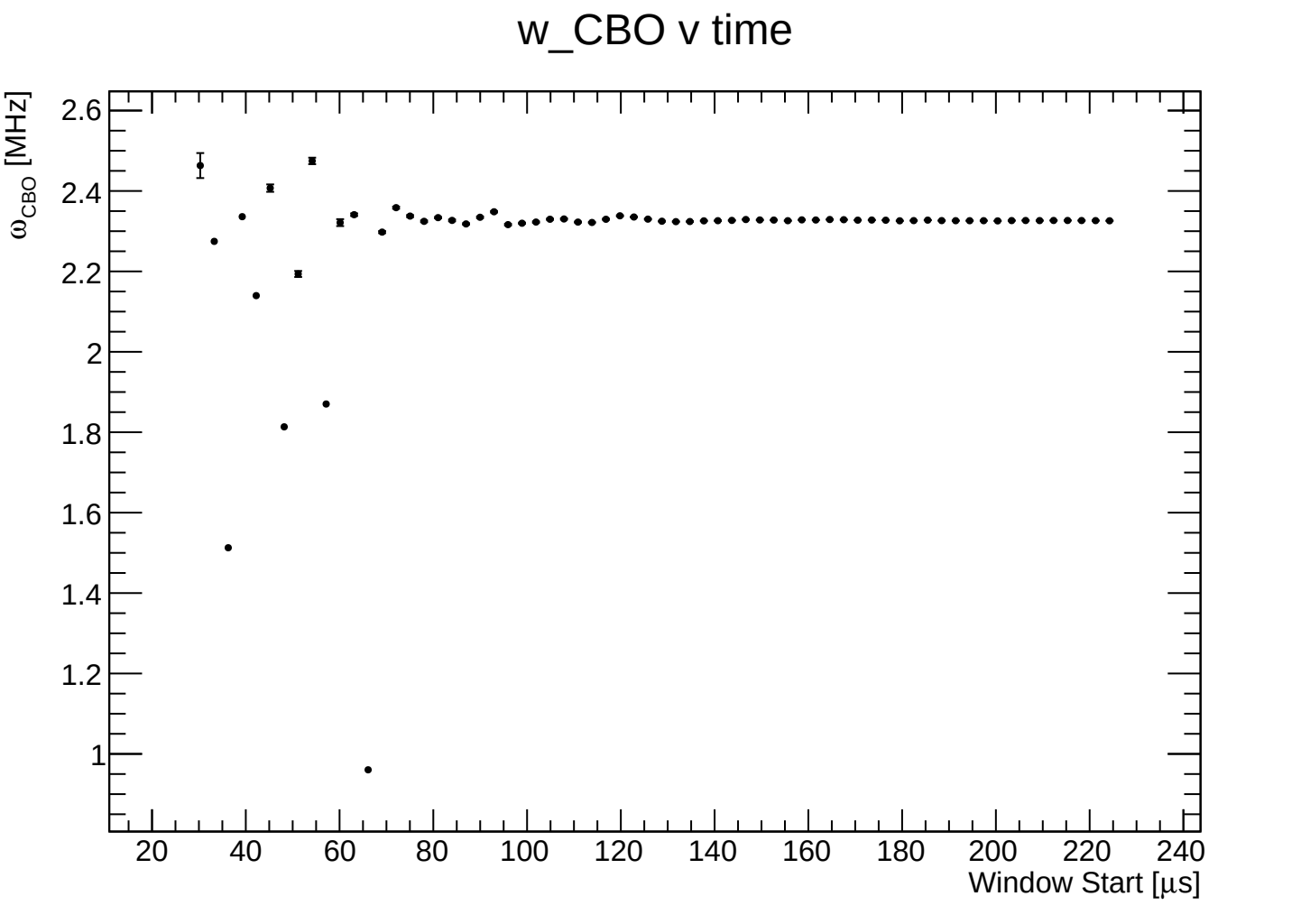
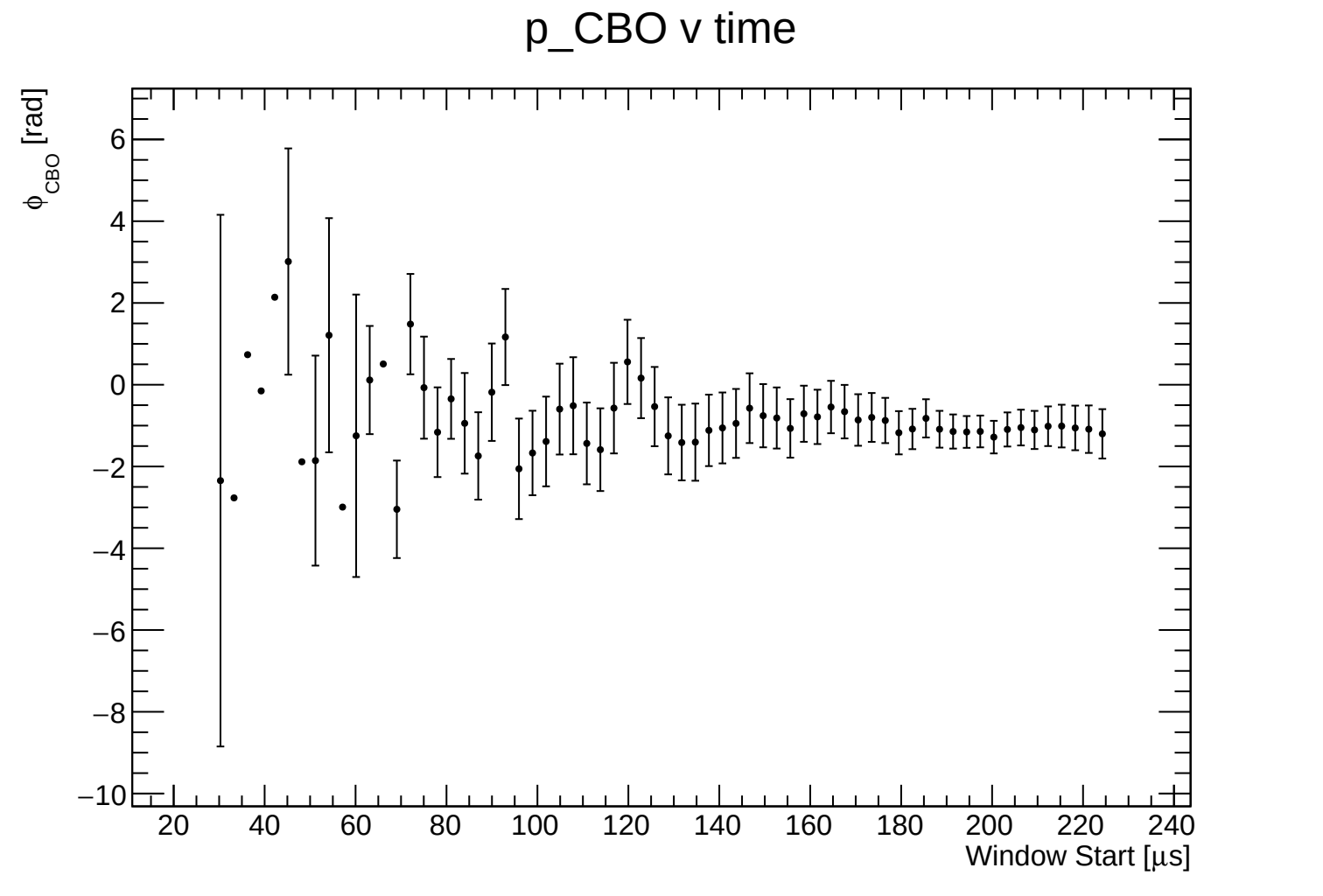
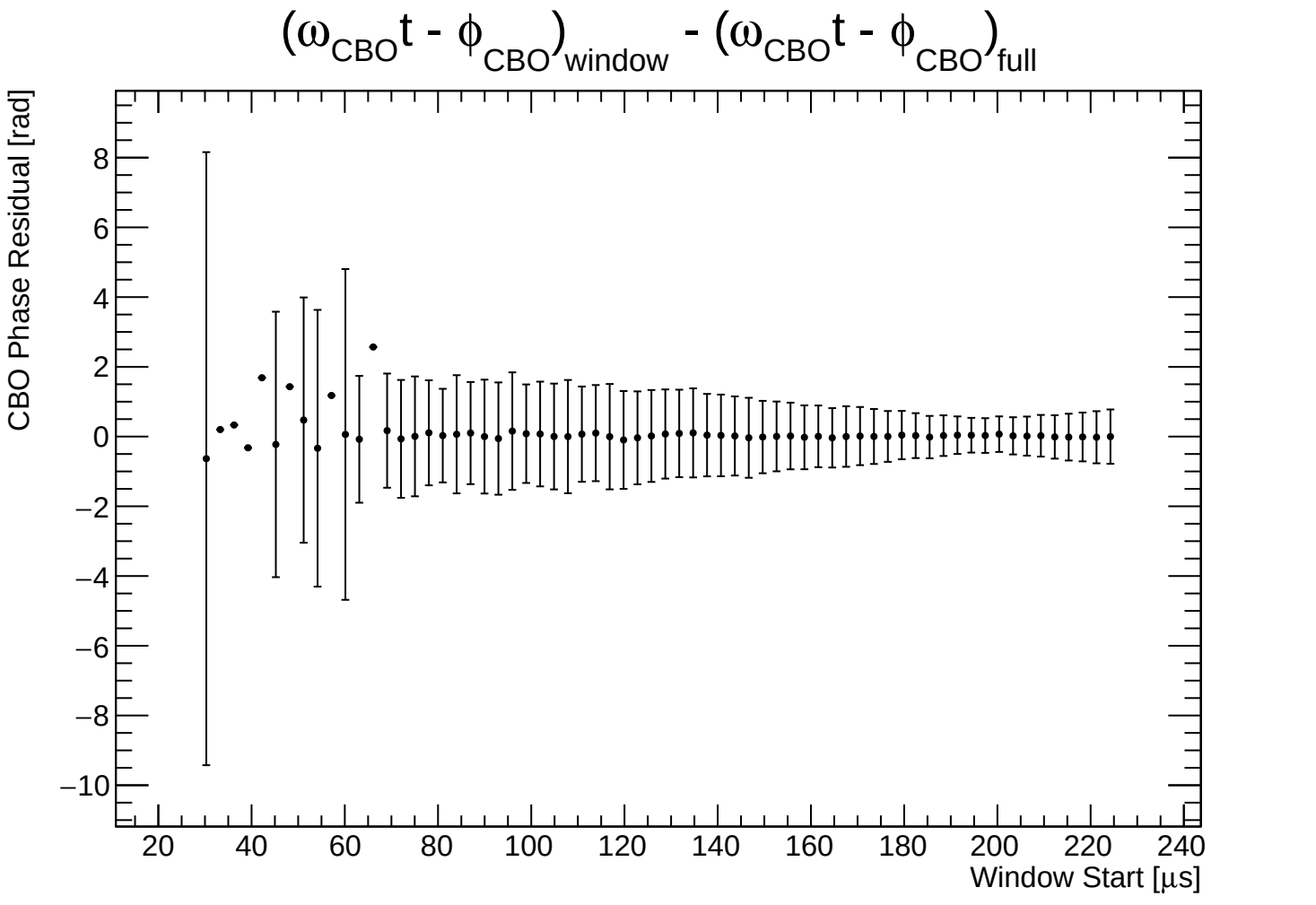
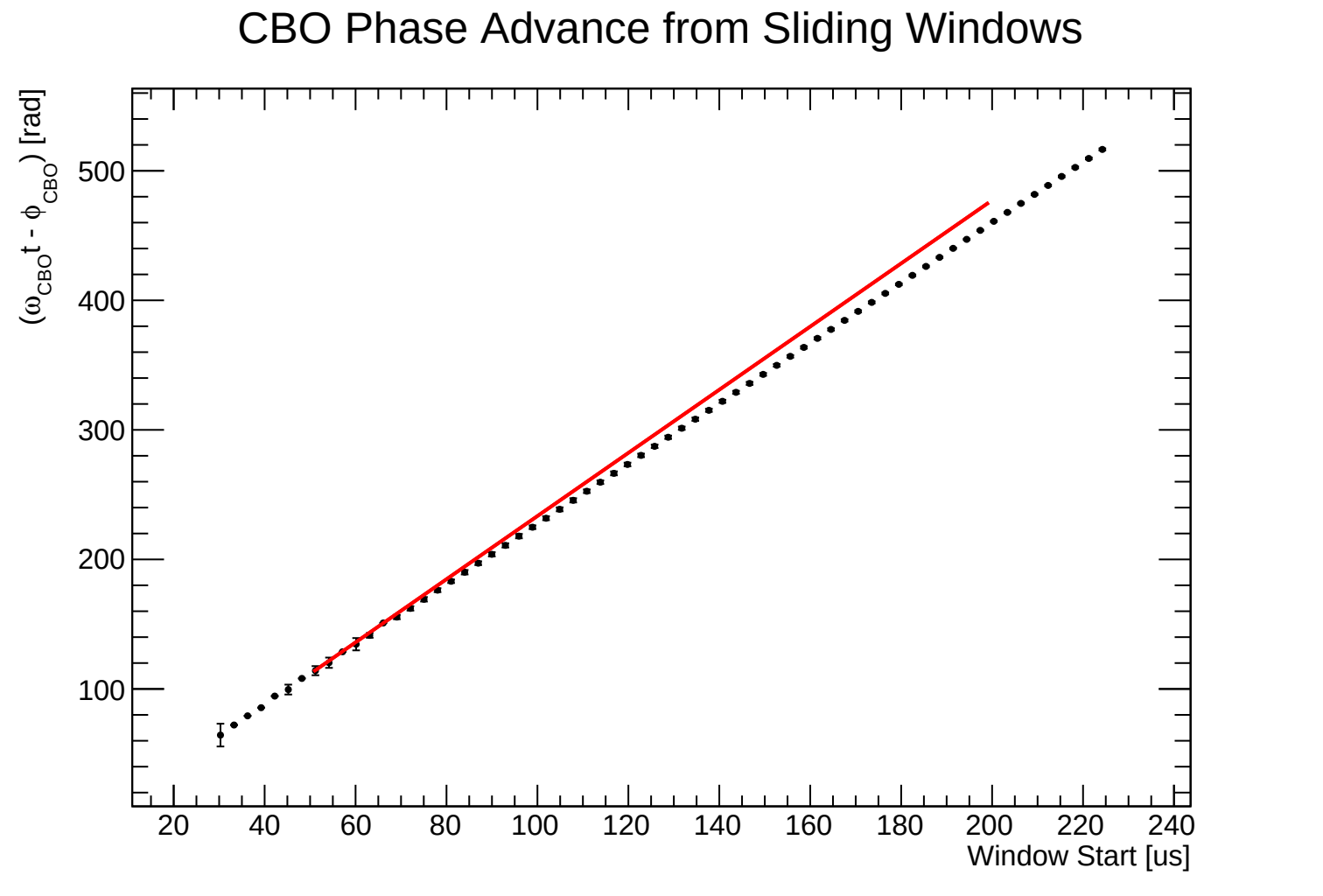
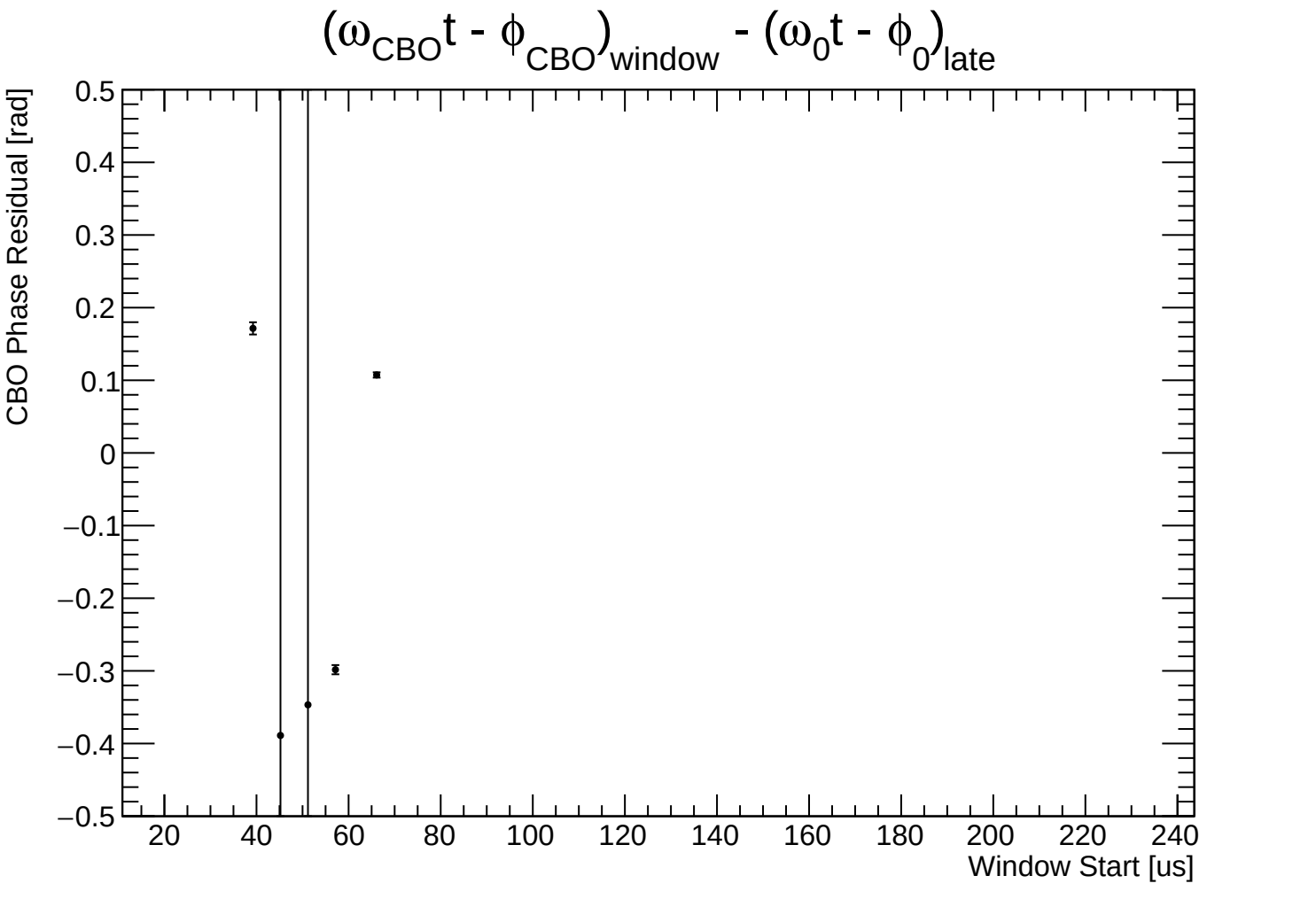

A_CBO v time
A_{CBO} [10^{-3}]
20
18
16
14
12
10
8
6
4
20
40
60
80
100
120
140
160
180
200
220
240
Window Start [μs]

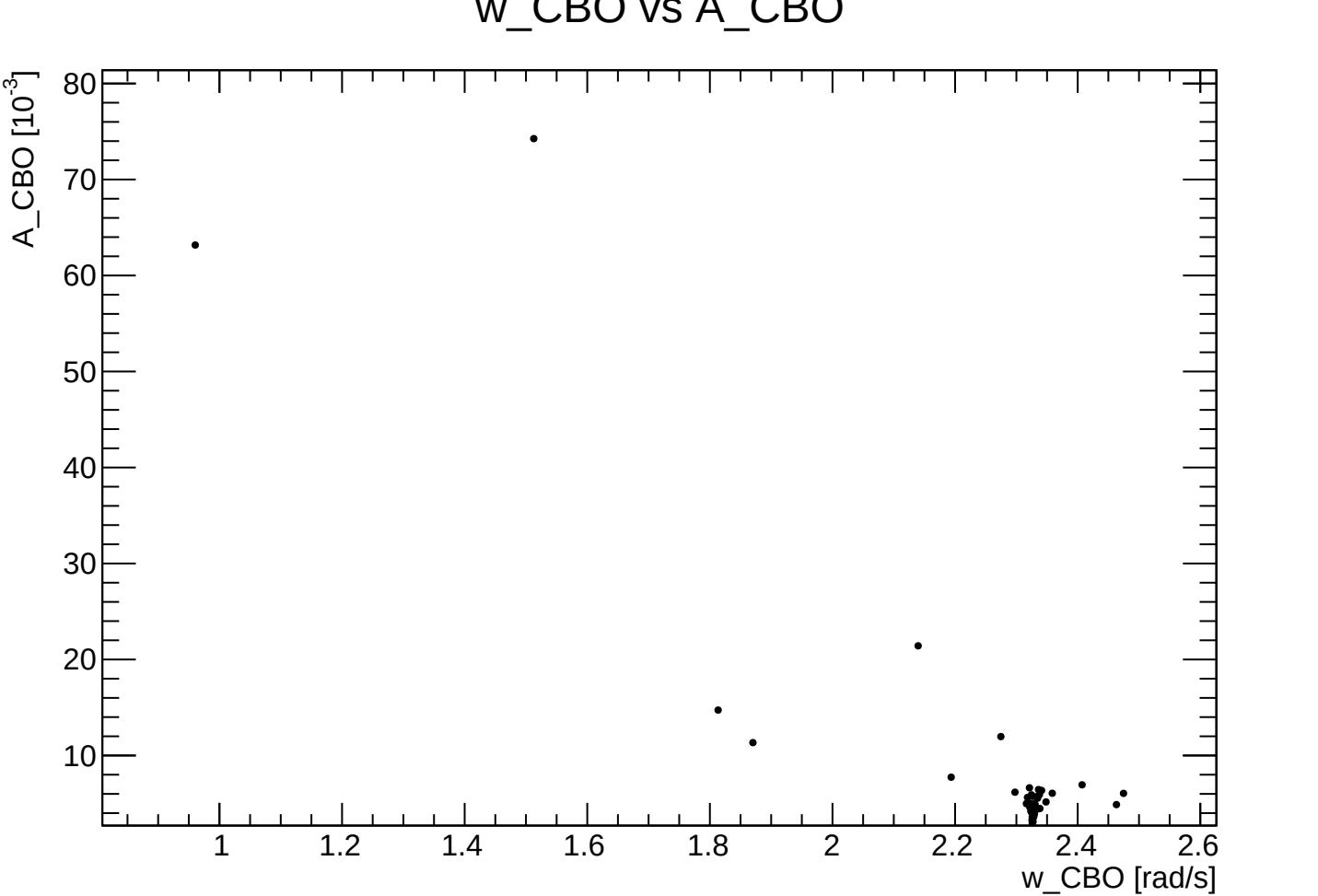

w_CBO v time
ω_{CBO} [MHz]
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
20
40
60
80
100
120
140
160
180
200
220
240
Window Start [μs]

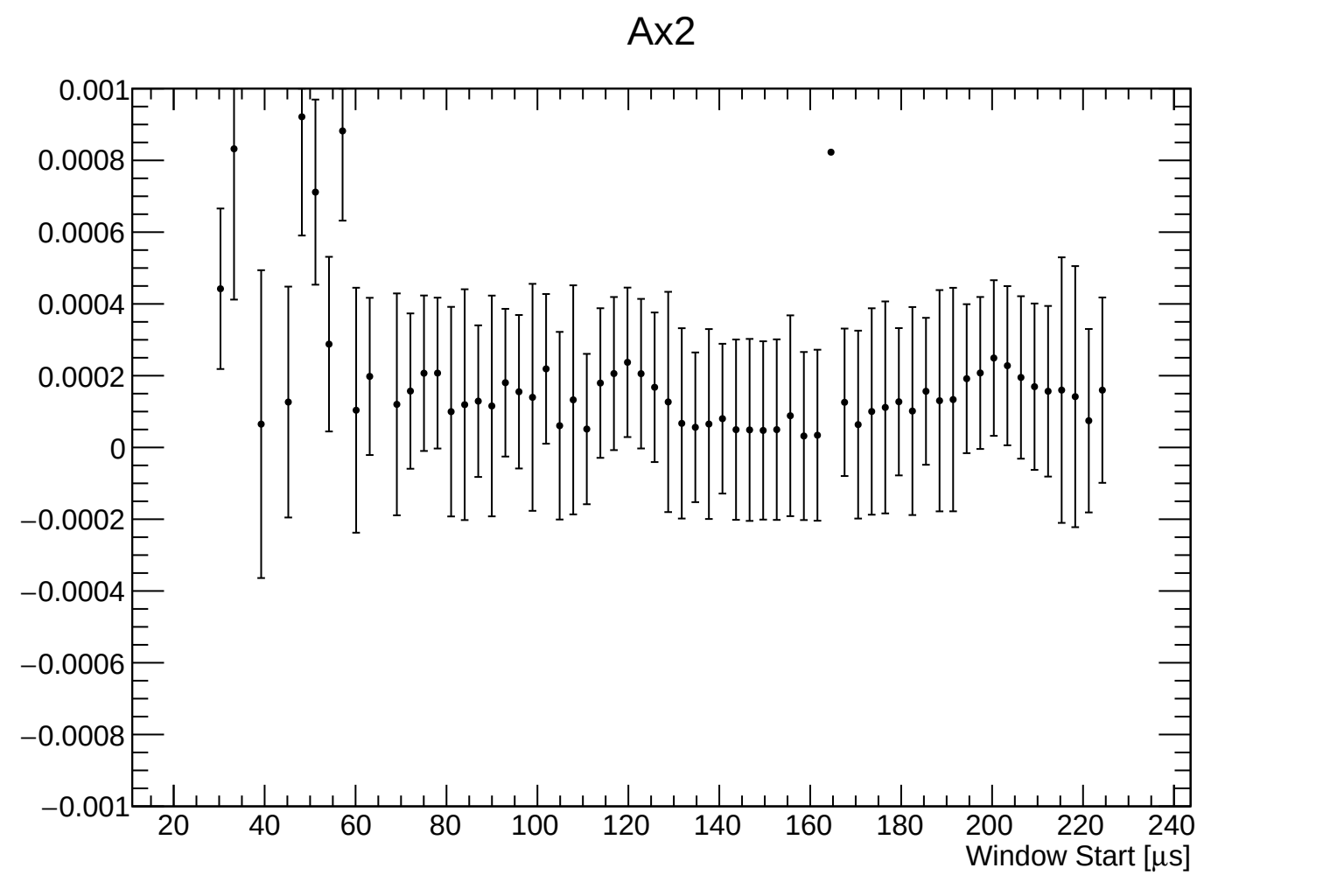

p_CBO v time
ϕ_{CBO} [rad]
6
4
2
0
−2
−4
−6
−8
−10
20
40
60
80
100
120
140
160
180
200
220
240
Window Start [μs]

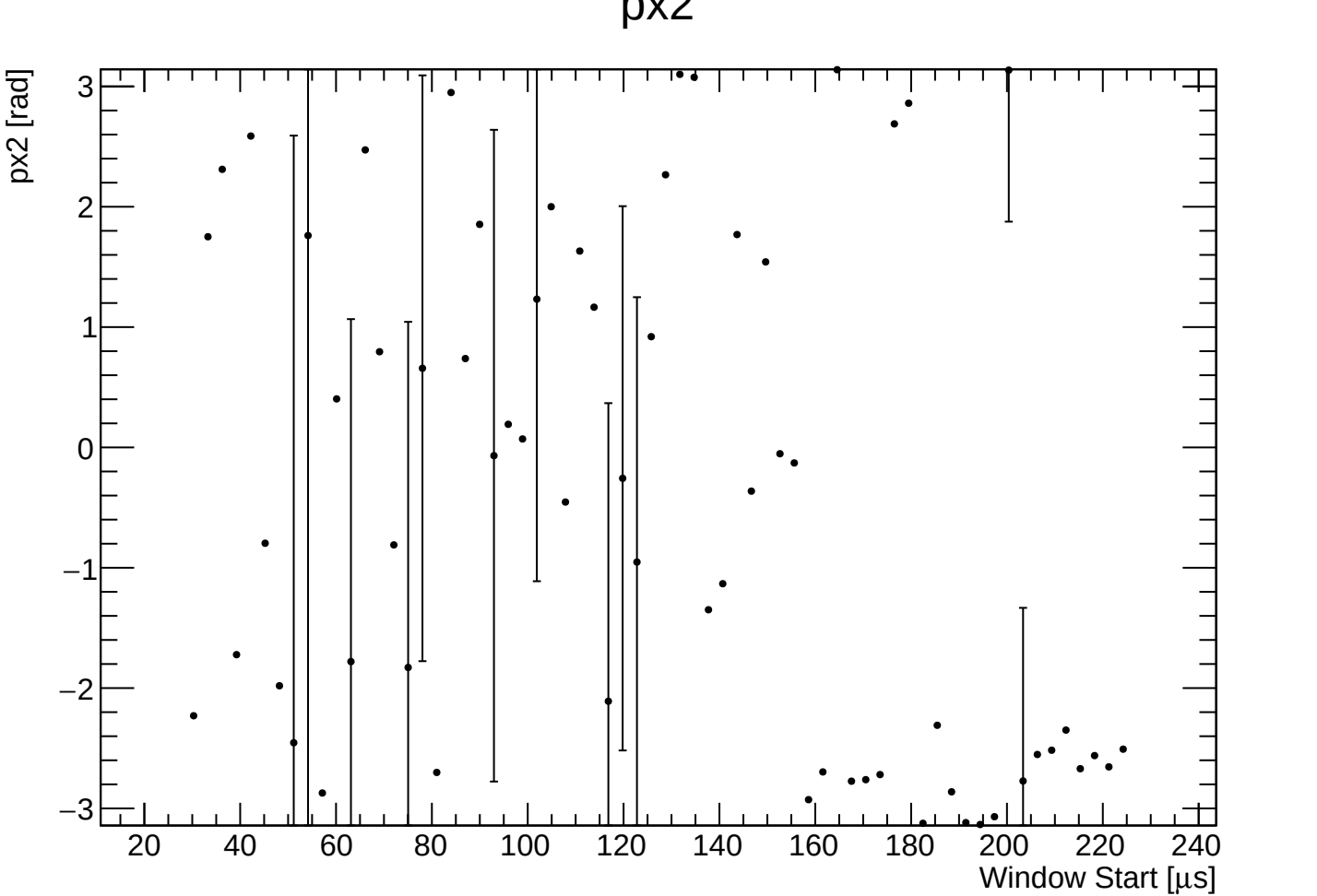

$(\omega_{CBO}t - \phi_{CBO})_{window} - (\omega_{CBO}t - \phi_{CBO})_{full}$
CBO Phase Residual [rad]
8
6
4
2
0
−2
−4
−6
−8
−10
20
40
60
80
100
120
140
160
180
200
220
240
Window Start [μs]

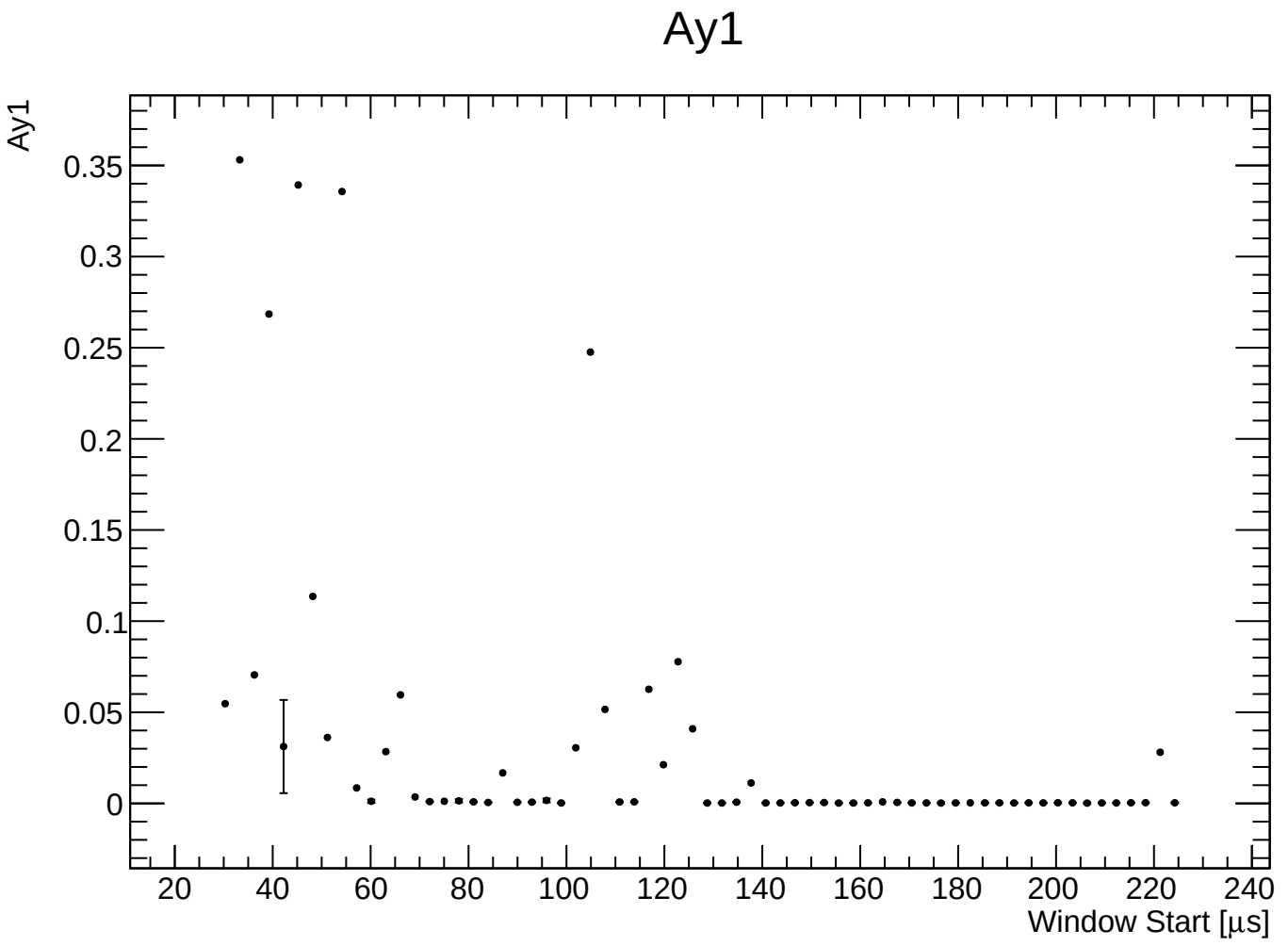

CBO Phase Advance from Sliding Windows
$(\omega_{CBO}t - \phi_{CBO})$ [rad]
100
200
300
400
500
20
40
60
80
100
120
140
160
180
200
220
240
Window Start [us]

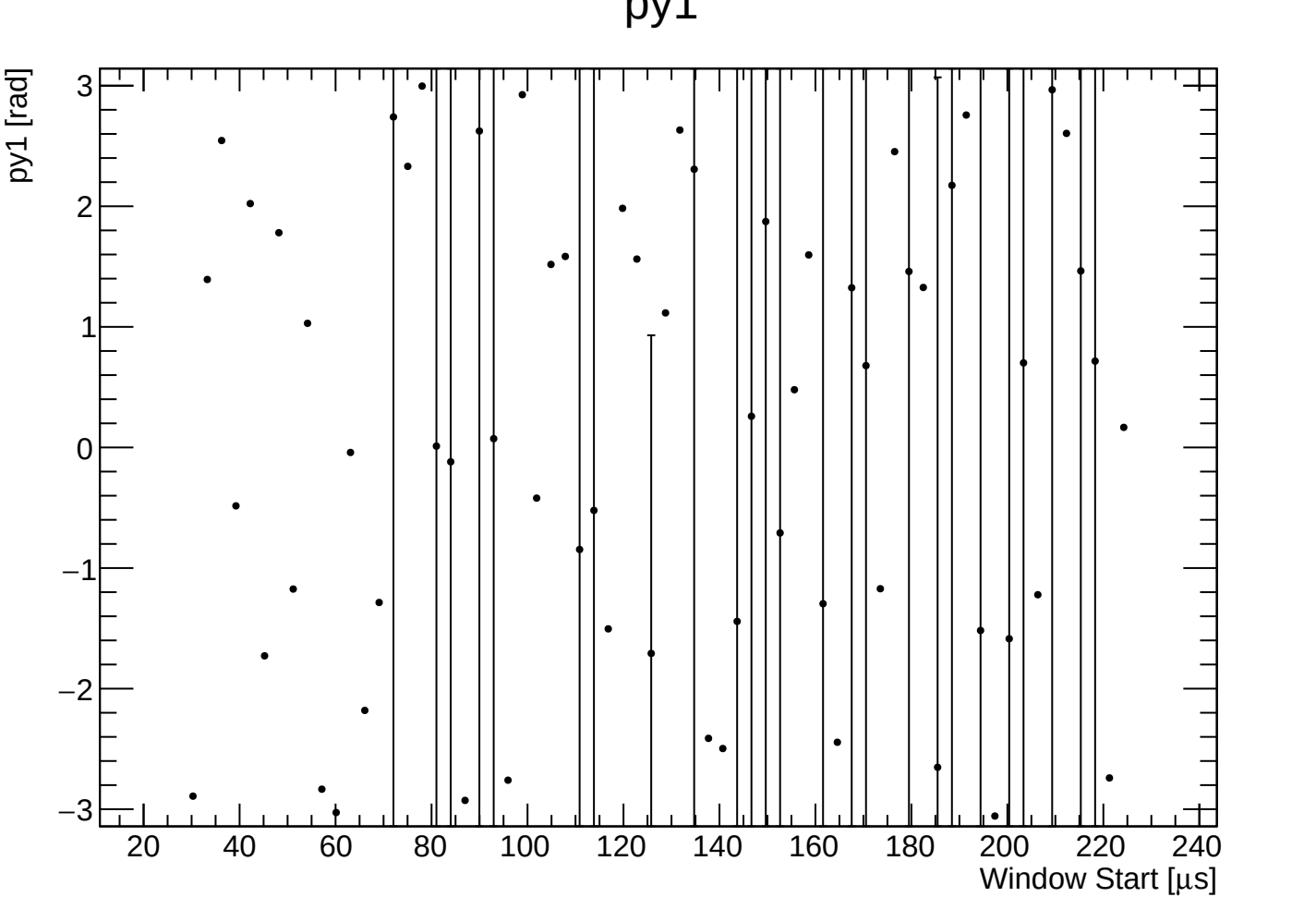

$(\omega_{CBO}t - \phi_{CBO})_{window} - (\omega_0 t - \phi_0)_{late}$
CBO Phase Residual [rad]
0.5
0.4
0.3
0.2
0.1
0
−0.1
−0.2
−0.3
−0.4
−0.5
20
40
60
80
100
120
140
160
180
200
220
240
Window Start [us]

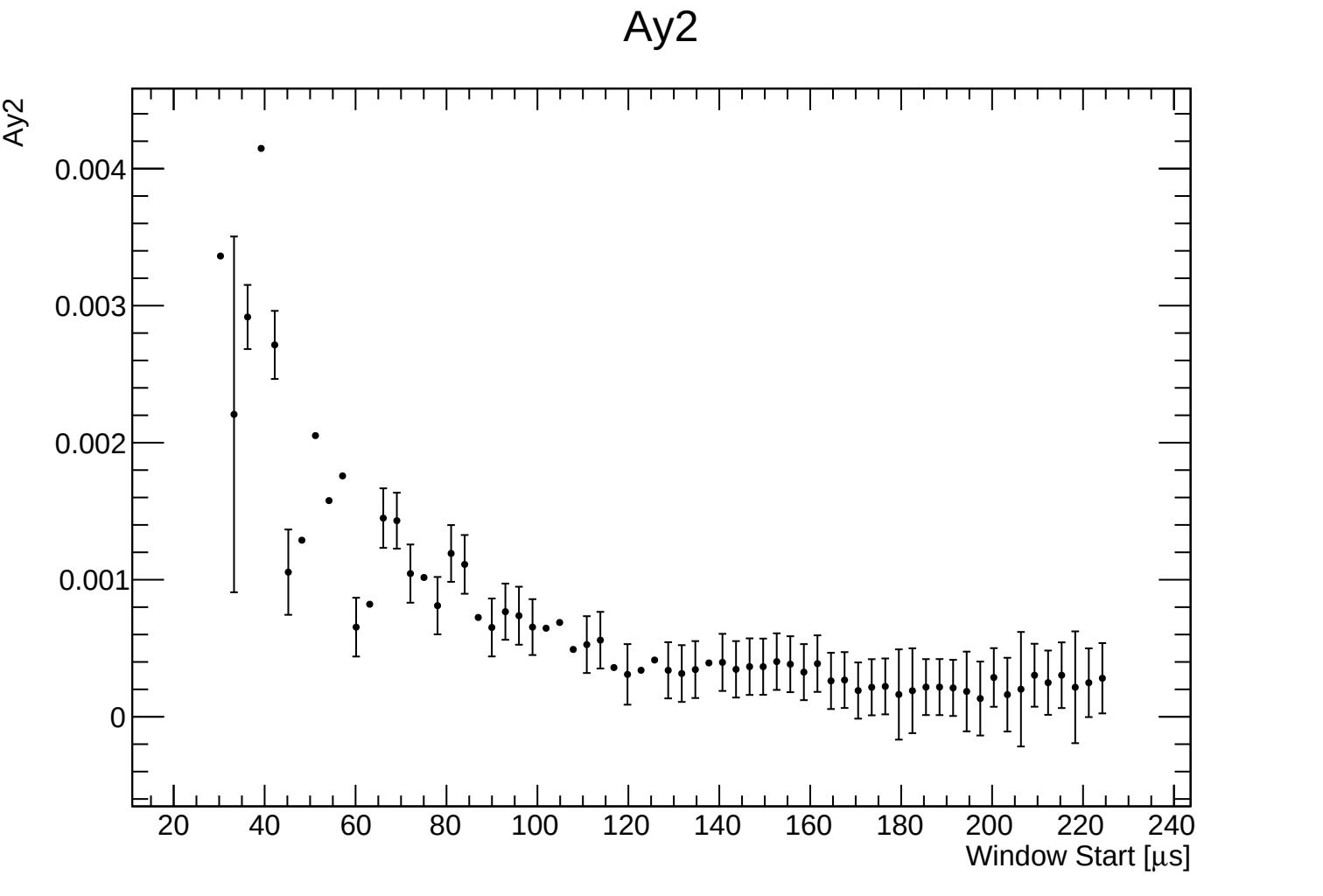

w_CBO vs A_CBO
A_CBO [10^-3]
80
70
60
50
40
30
20
10
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
w_CBO [rad/s]

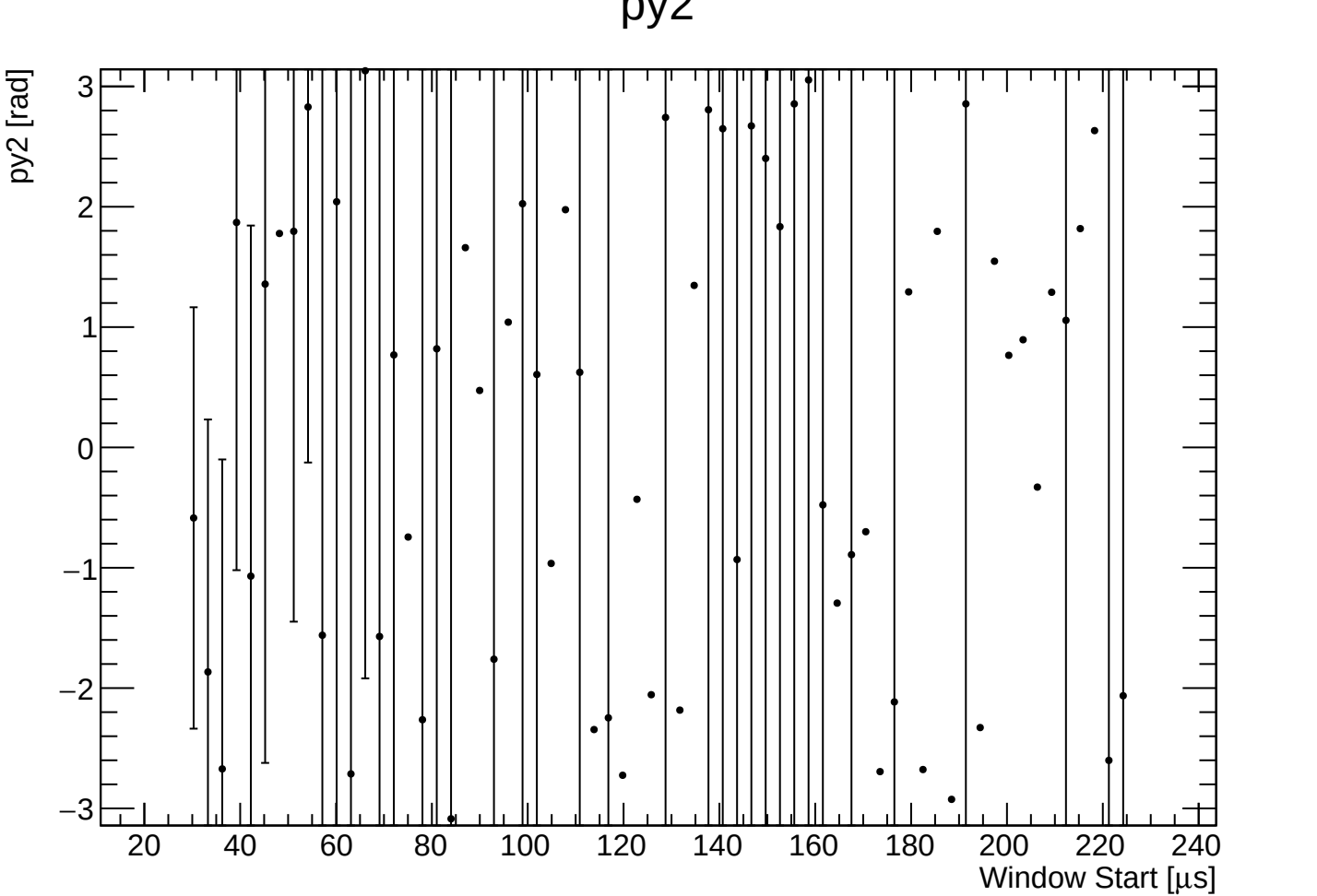

Ax2
0.001
0.0008
0.0006
0.0004
0.0002
0
−0.0002
−0.0004
−0.0006
−0.0008
−0.001
20
40
60
80
100
120
140
160
180
200
220
240
Window Start [μs]

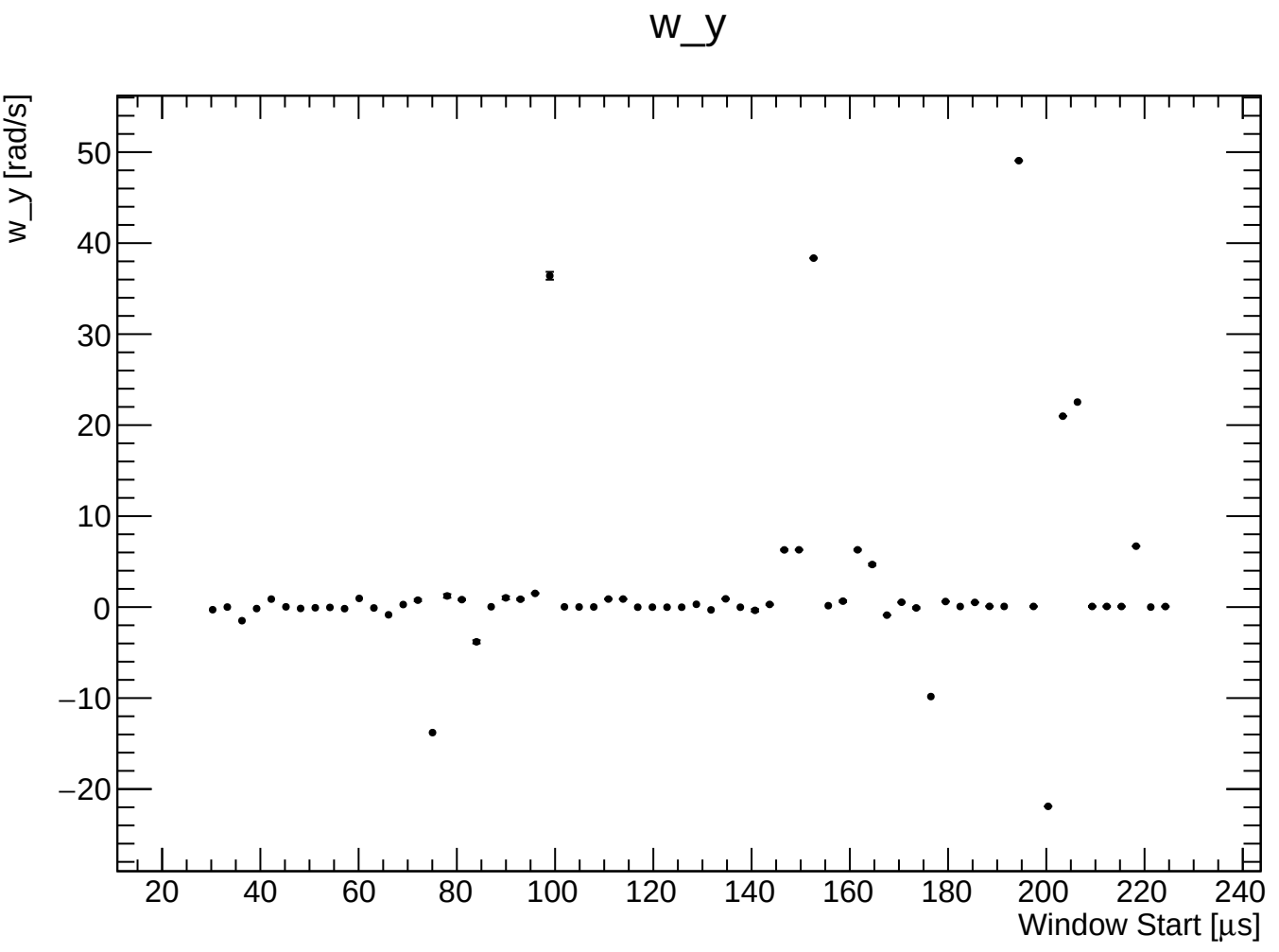

px2
px2 [rad]
3
2
1
0
−1
−2
−3
20
40
60
80
100
120
140
160
180
200
220
240
Window Start [μs]

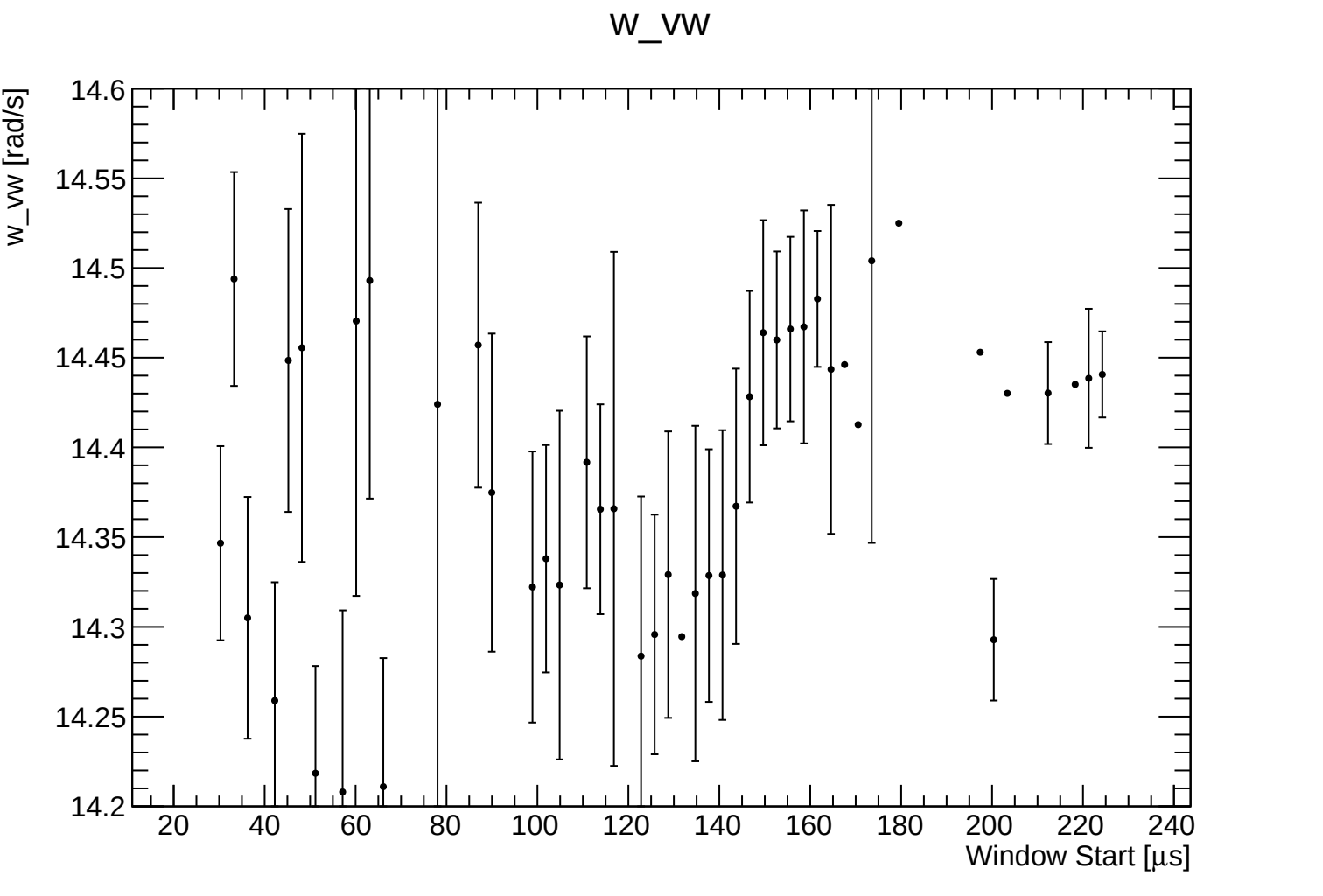

Ay1
Ay1
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
20
40
60
80
100
120
140
160
180
200
220
240
Window Start [μs]

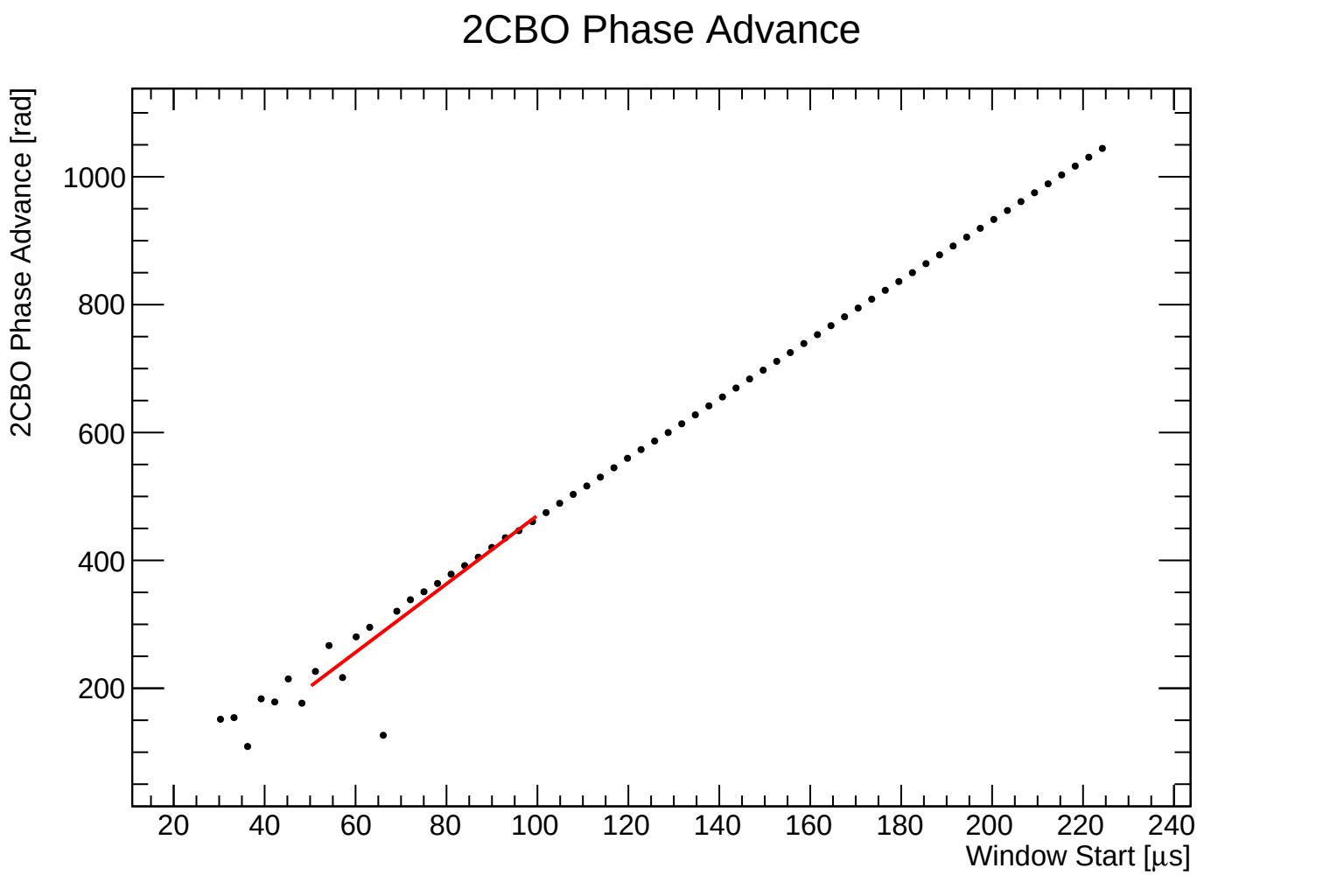

py1
py1 [rad]
3
2
1
0
−1
−2
−3
20
40
60
80
100
120
140
160
180
200
220
240
Window Start [μs]

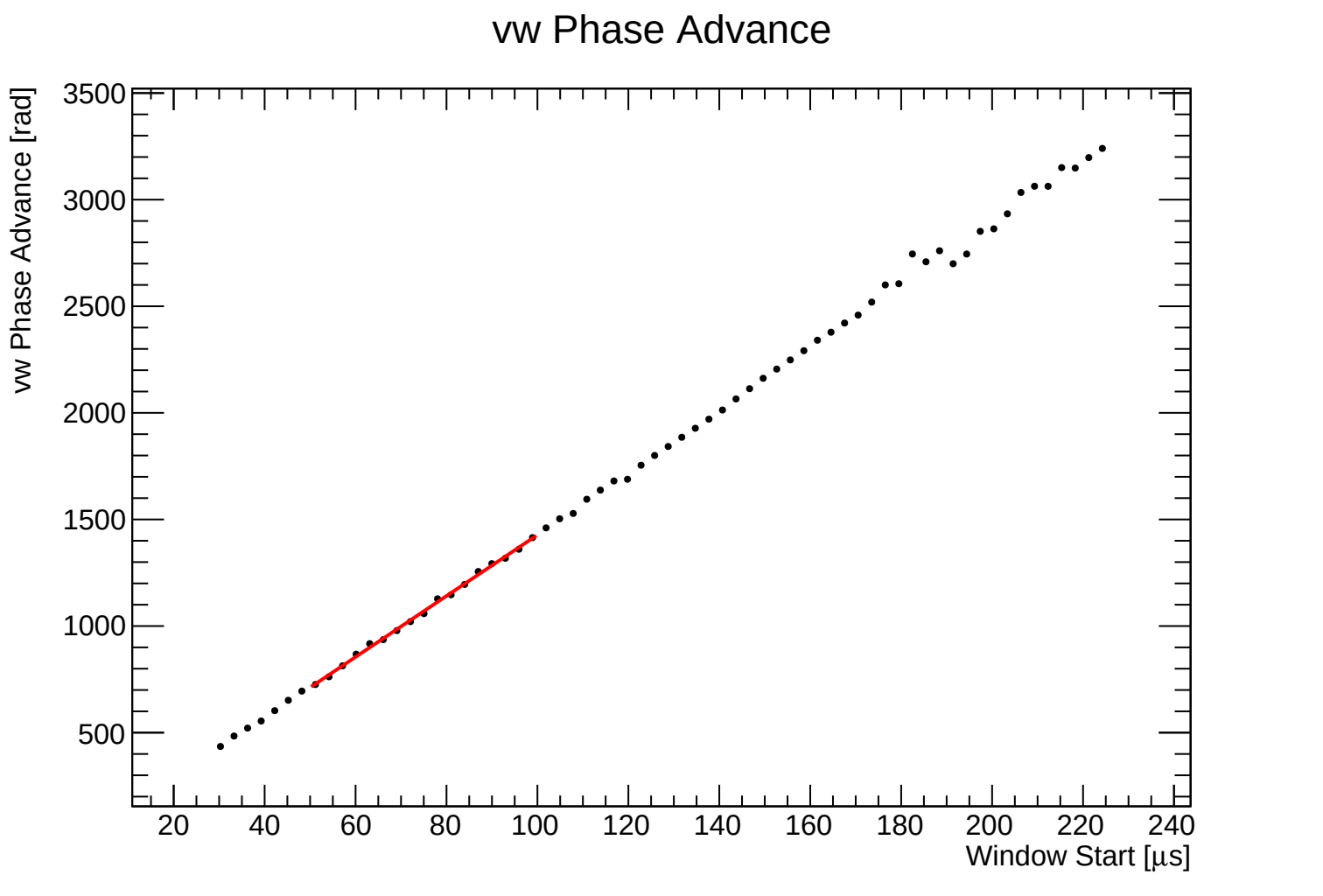

Ay2
Ay2
0.004
0.003
0.002
0.001
0
20
40
60
80
100
120
140
160
180
200
220
240
Window Start [μs]

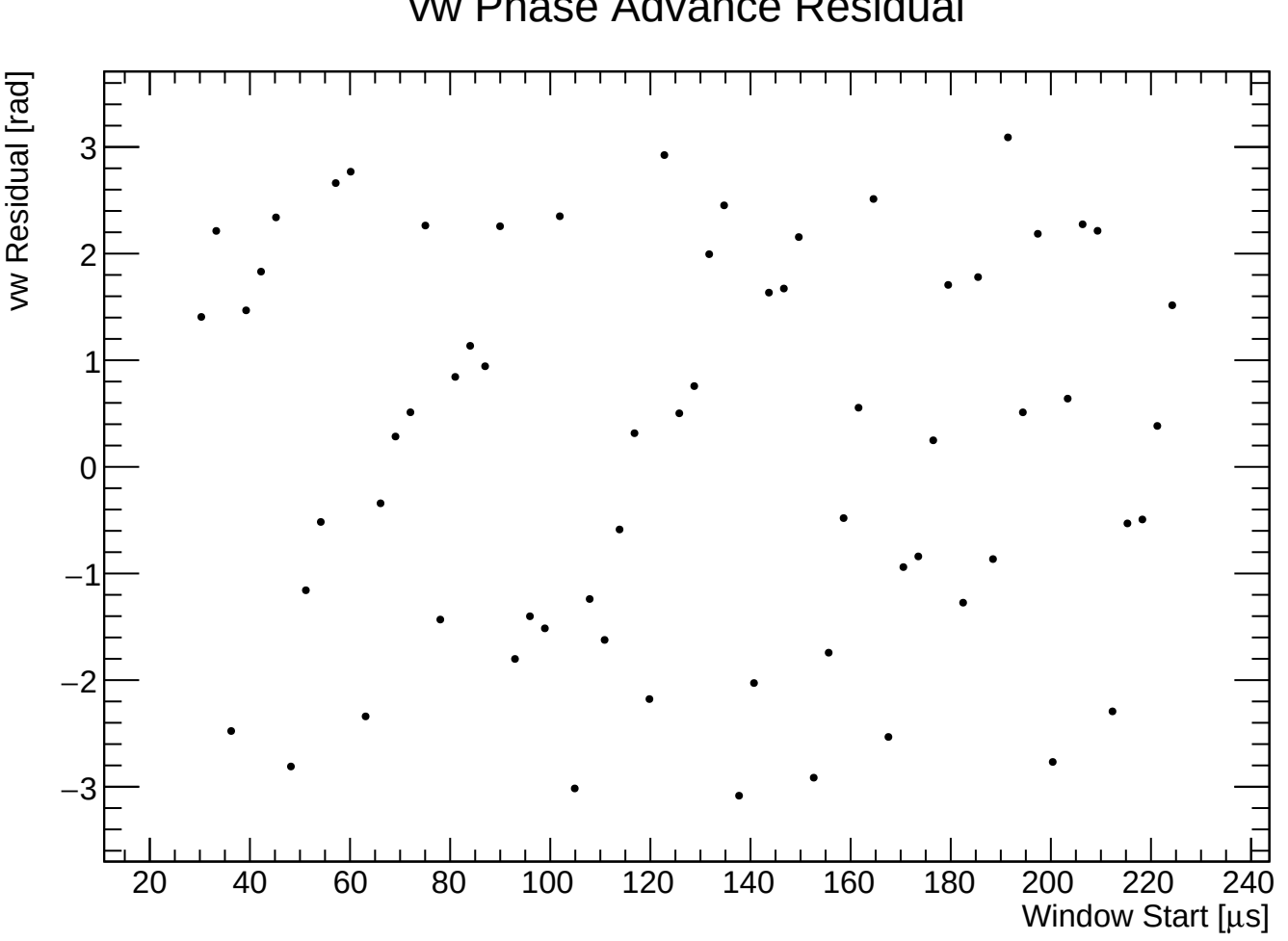

py2
py2 [rad]
3
2
1
0
−1
−2
−3
20
40
60
80
100
120
140
160
180
200
220
240
Window Start [μs]

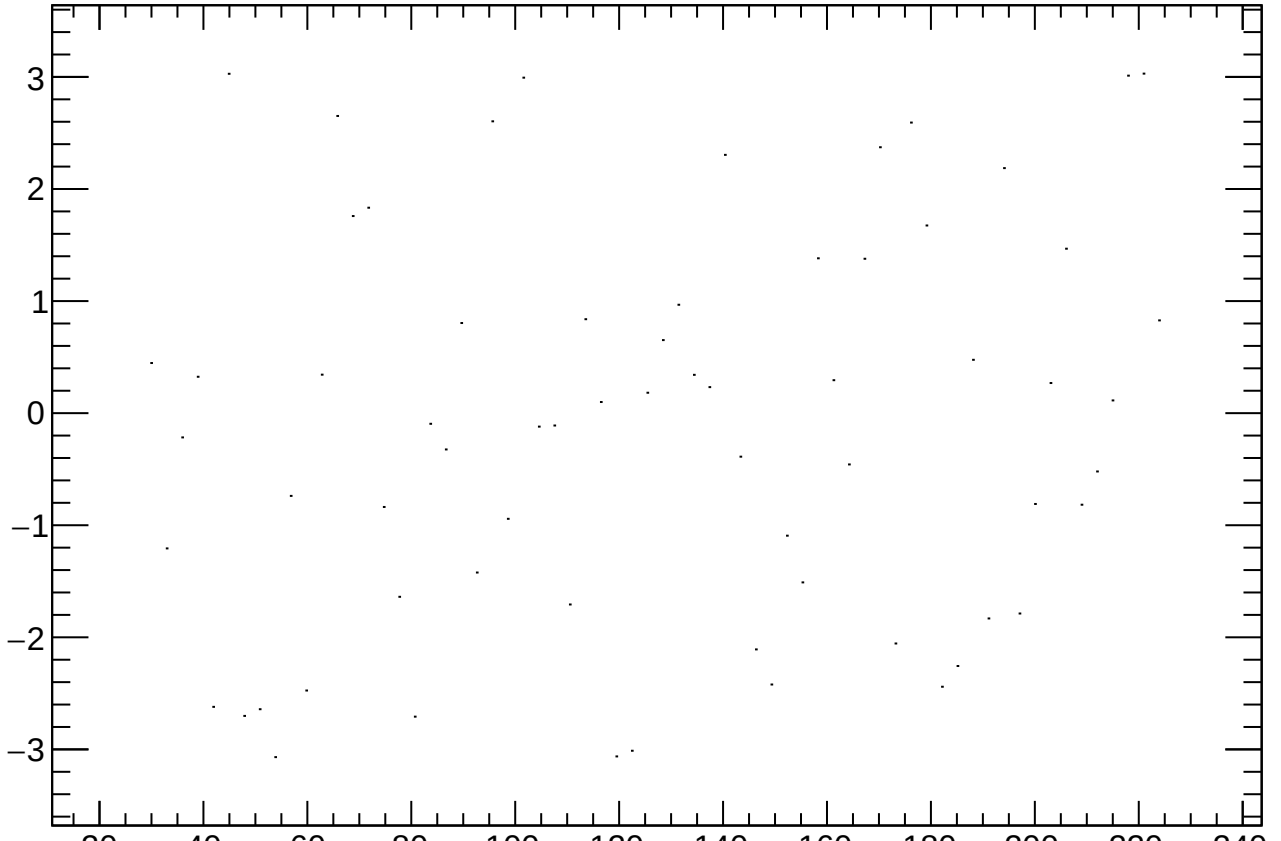

w_y
w_y [rad/s]
50
40
30
20
10
0
−10
−20
20
40
60
80
100
120
140
160
180
200
220
240
Window Start [μs]

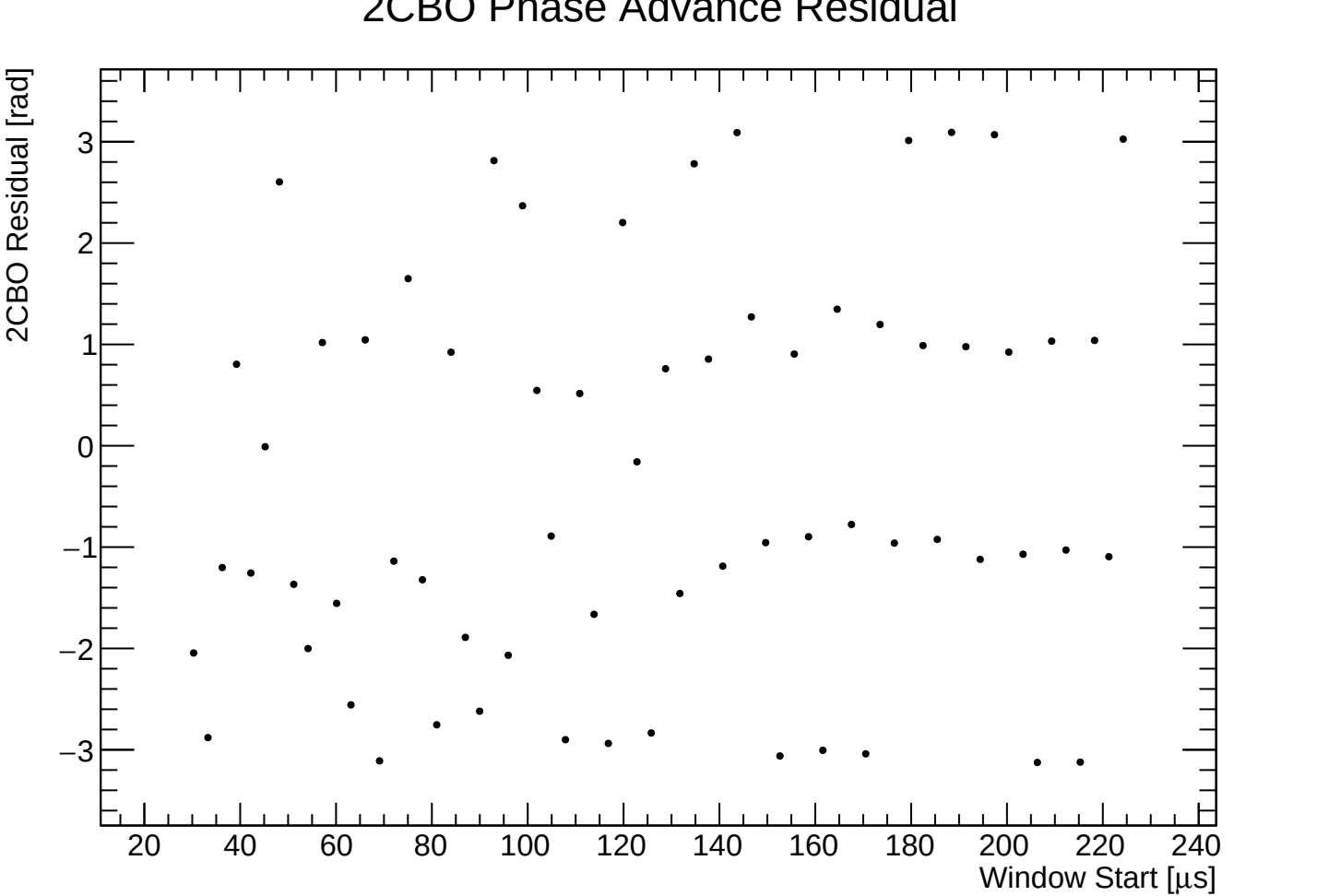

W_VW
w_vw [rad/s]
14.6
14.55
14.5
14.45
14.4
14.35
14.3
14.25
14.2
20
40
60
80
100
120
140
160
180
200
220
240
Window Start [μs]


2CBO Phase Advance
2CBO Phase Advance [rad]
1000
800
600
400
200
20
40
60
80
100
120
140
160
180
200
220
240
Window Start [μs]


vw Phase Advance
vw Phase Advance [rad]
3500
3000
2500
2000
1500
1000
500
20
40
60
80
100
120
140
160
180
200
220
240
Window Start [μs]


vw Phase Advance Residual
vw Residual [rad]
3
2
1
0
−1
−2
−3
20
40
60
80
100
120
140
160
180
200
220
240
Window Start [μs]


3
2
1
0
−1
−2
−3
20
40
60
80
100
120
140
160
180
200
220
240


2CBO Phase Advance Residual
2CBO Residual [rad]
3
2
1
0
−1
−2
−3
20
40
60
80
100
120
140
160
180
200
220
240
Window Start [μs]