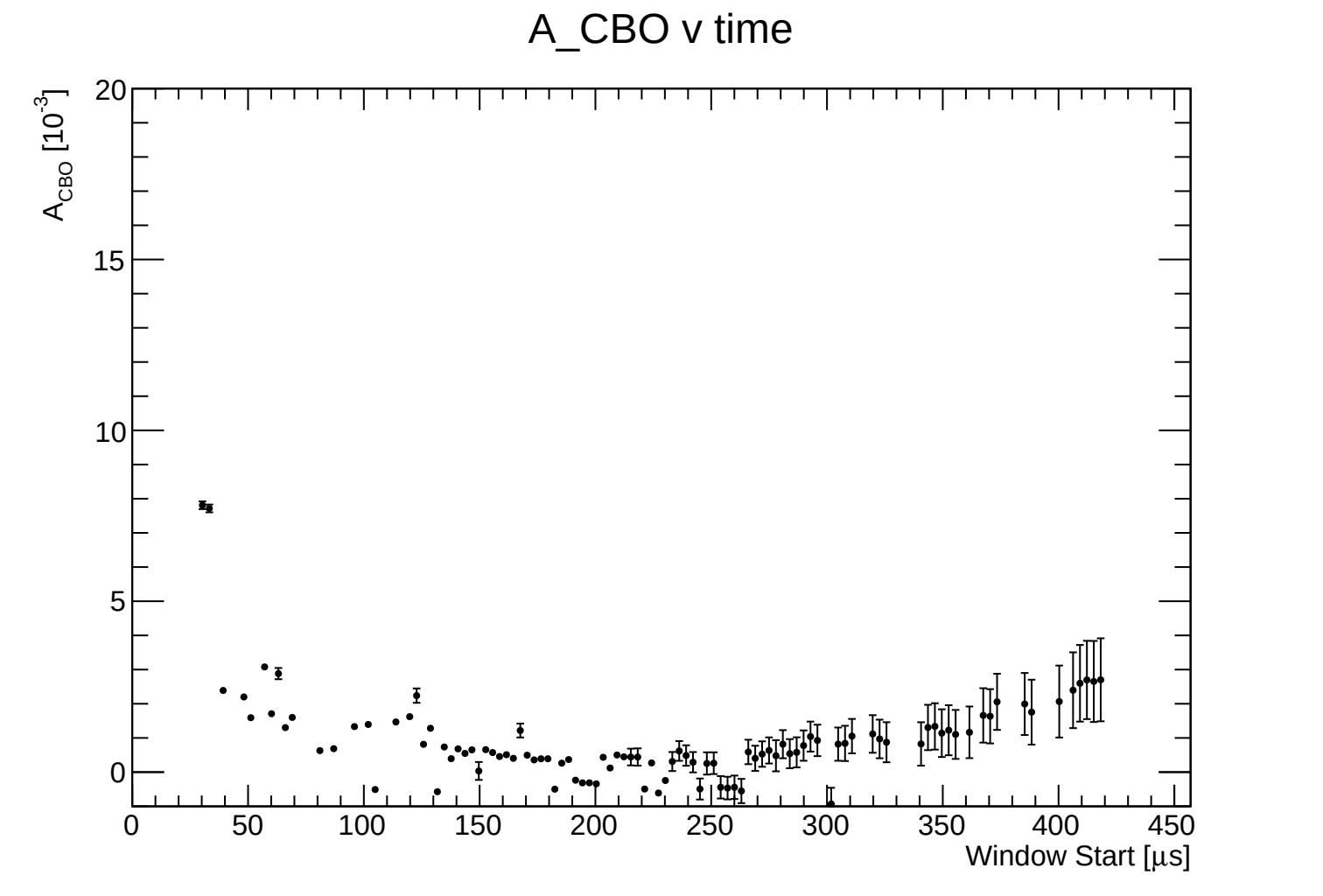
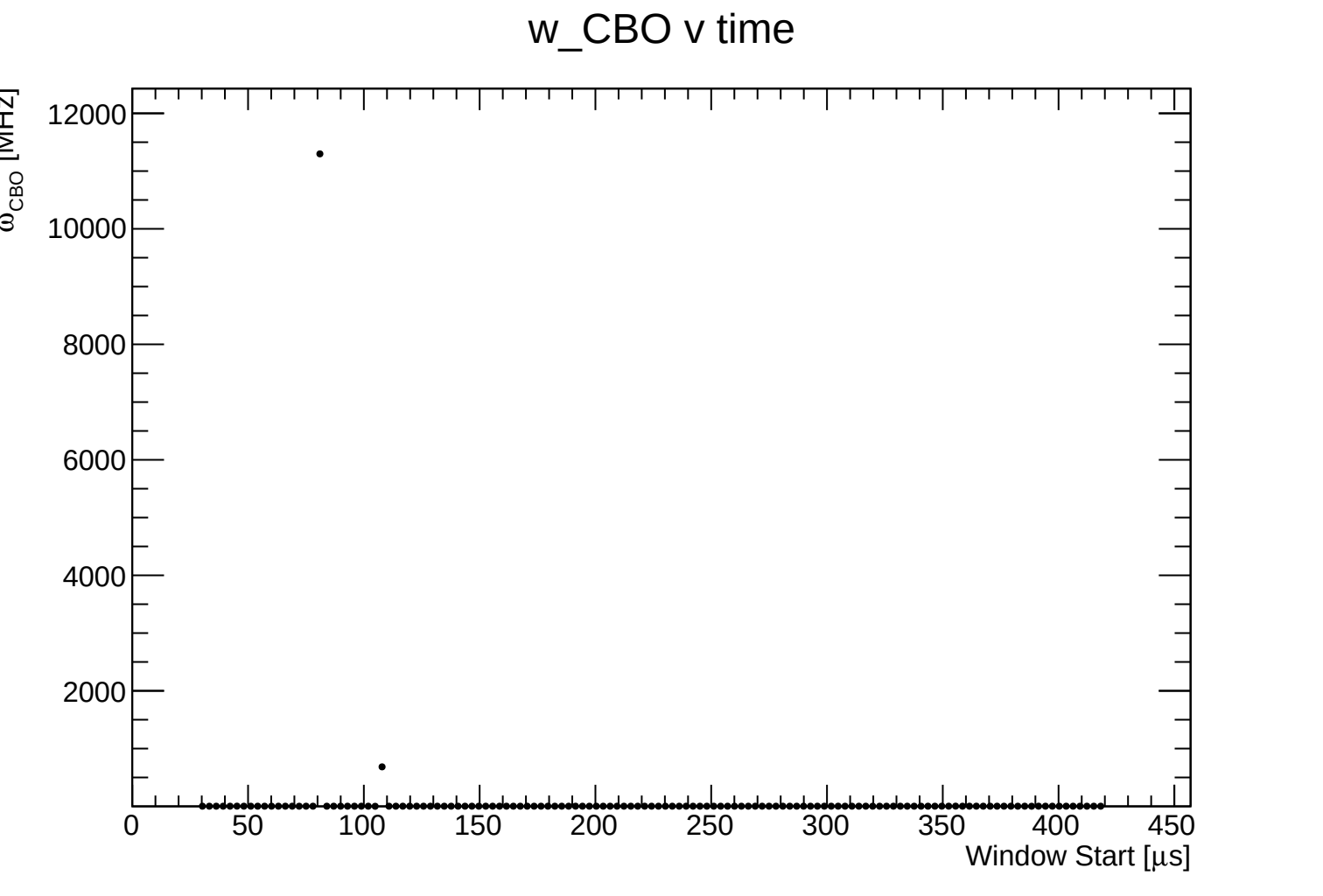
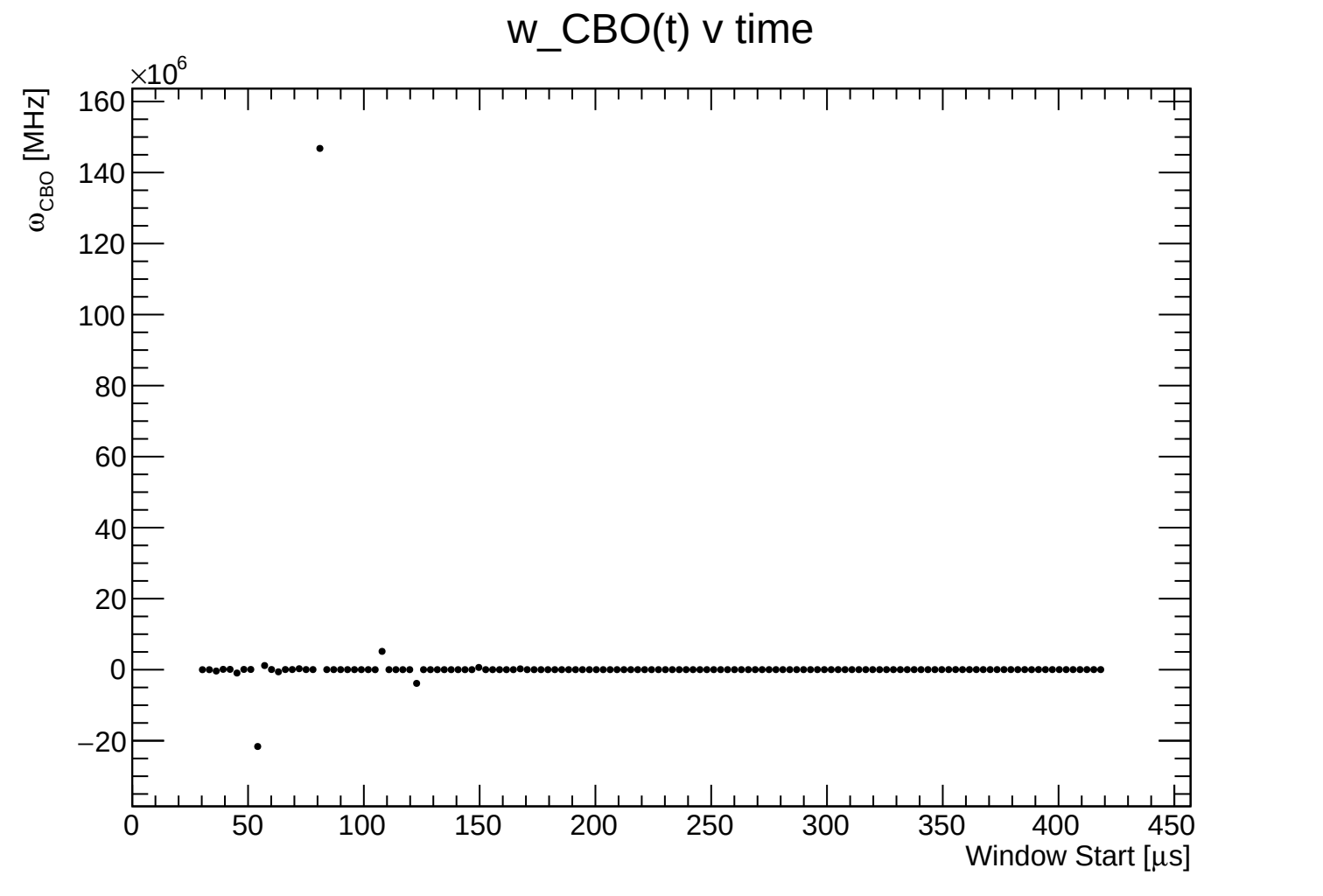
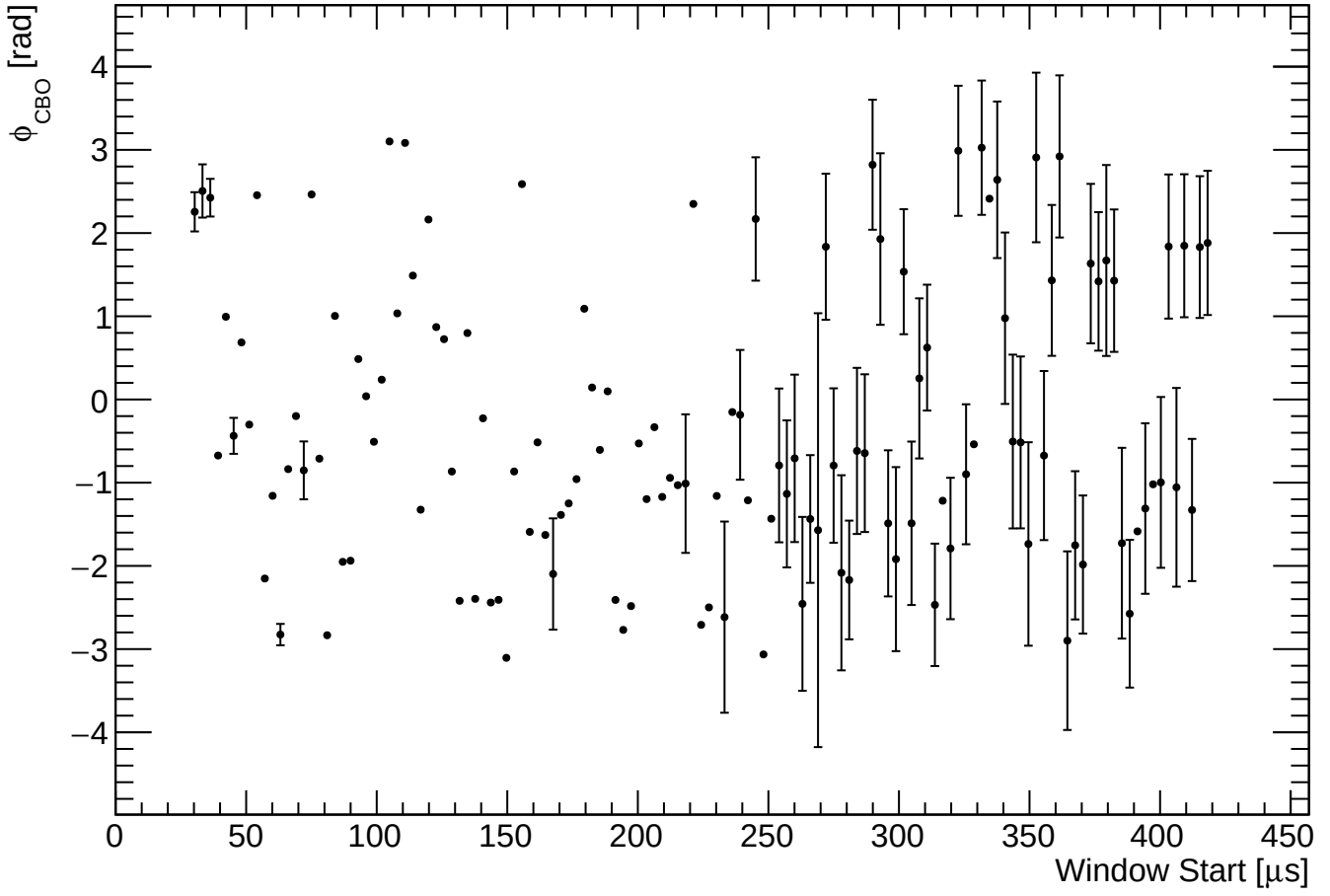
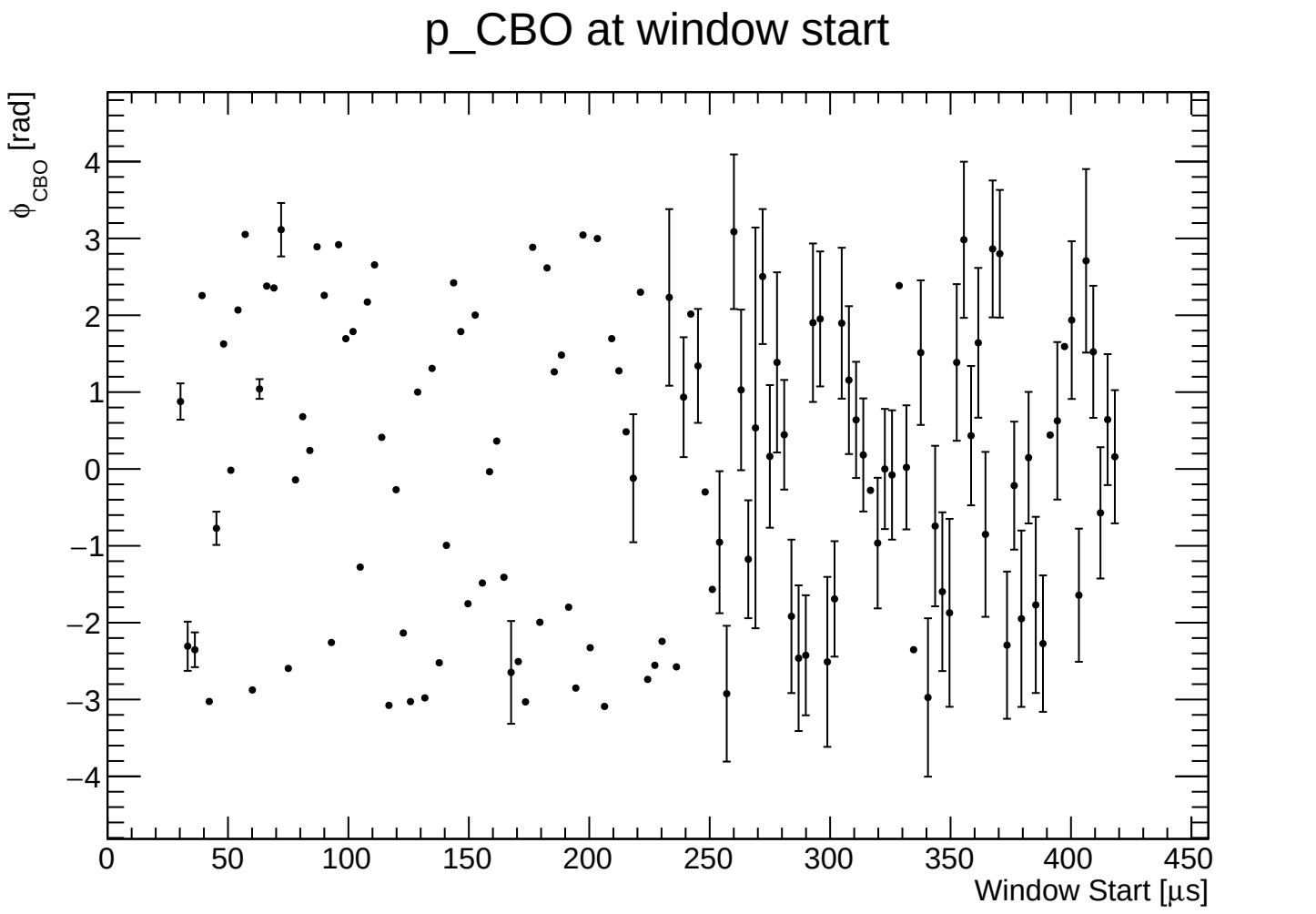
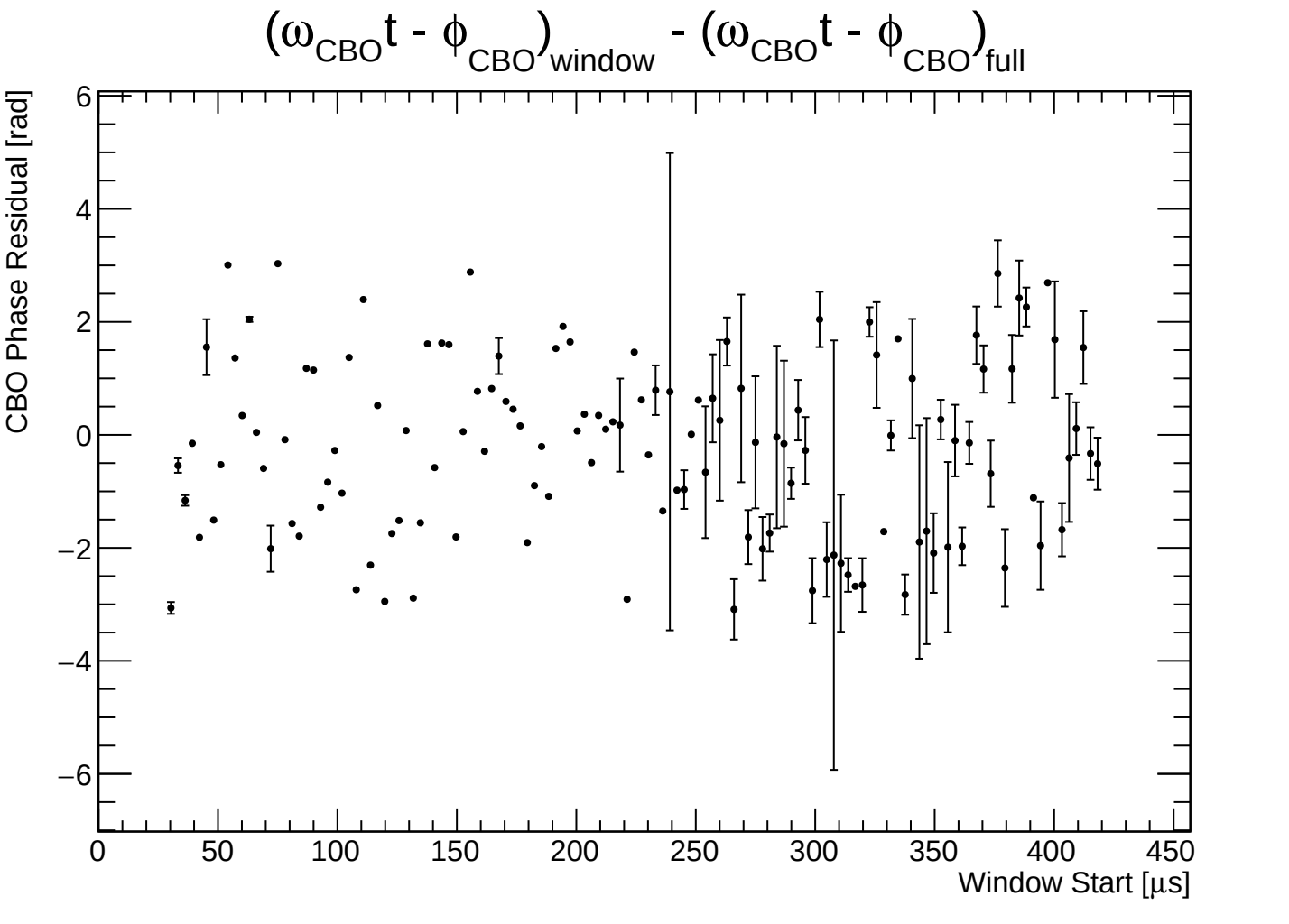

A_CBO v time
A_{CBO} [10^{-3}]
20
15
10
5
0
0
50
100
150
200
250
300
350
400
450
Window Start [μs]

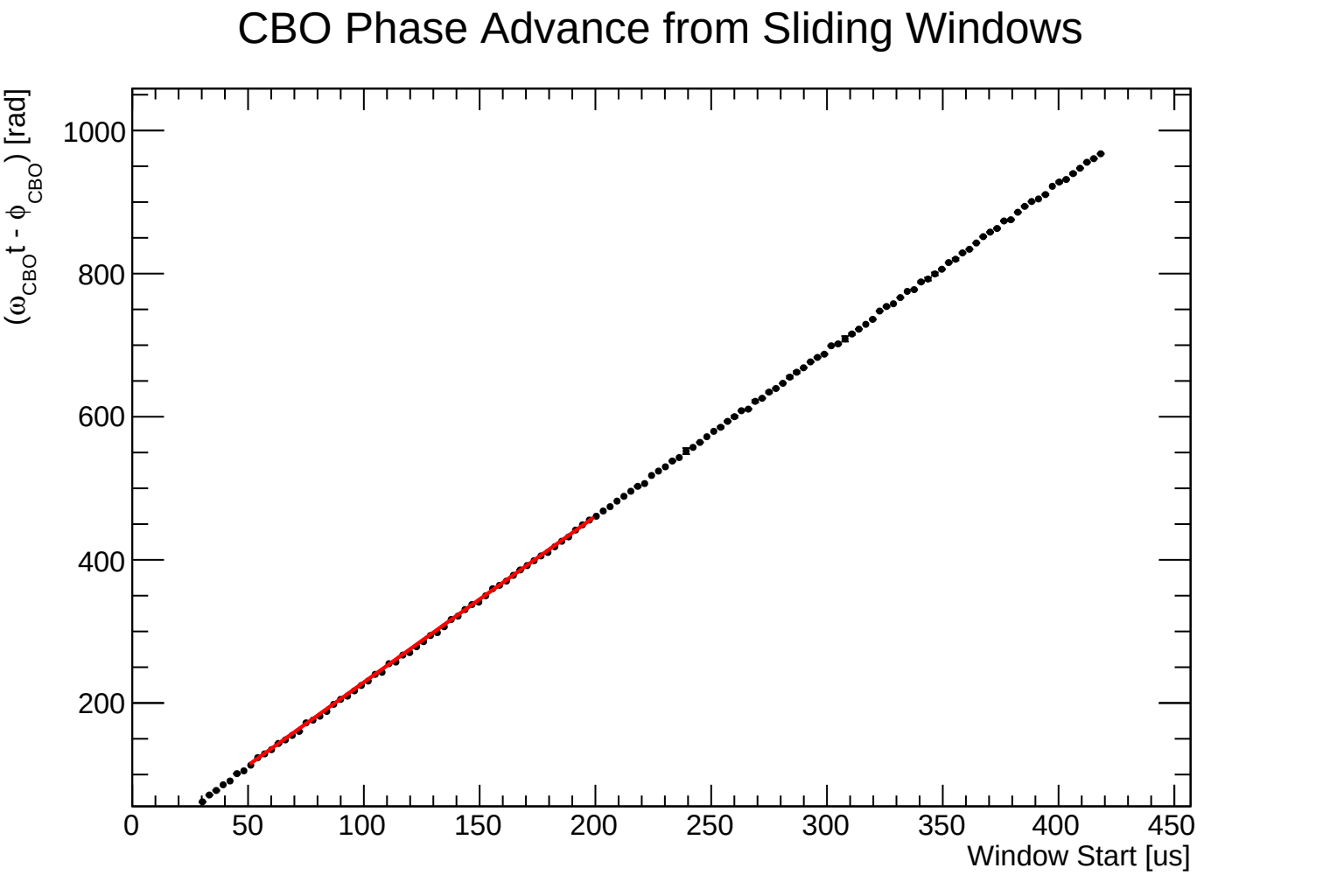

w_CBO v time
ω_{CBO} [MHz]
12000
10000
8000
6000
4000
2000
0
50
100
150
200
250
300
350
400
450
Window Start [μs]

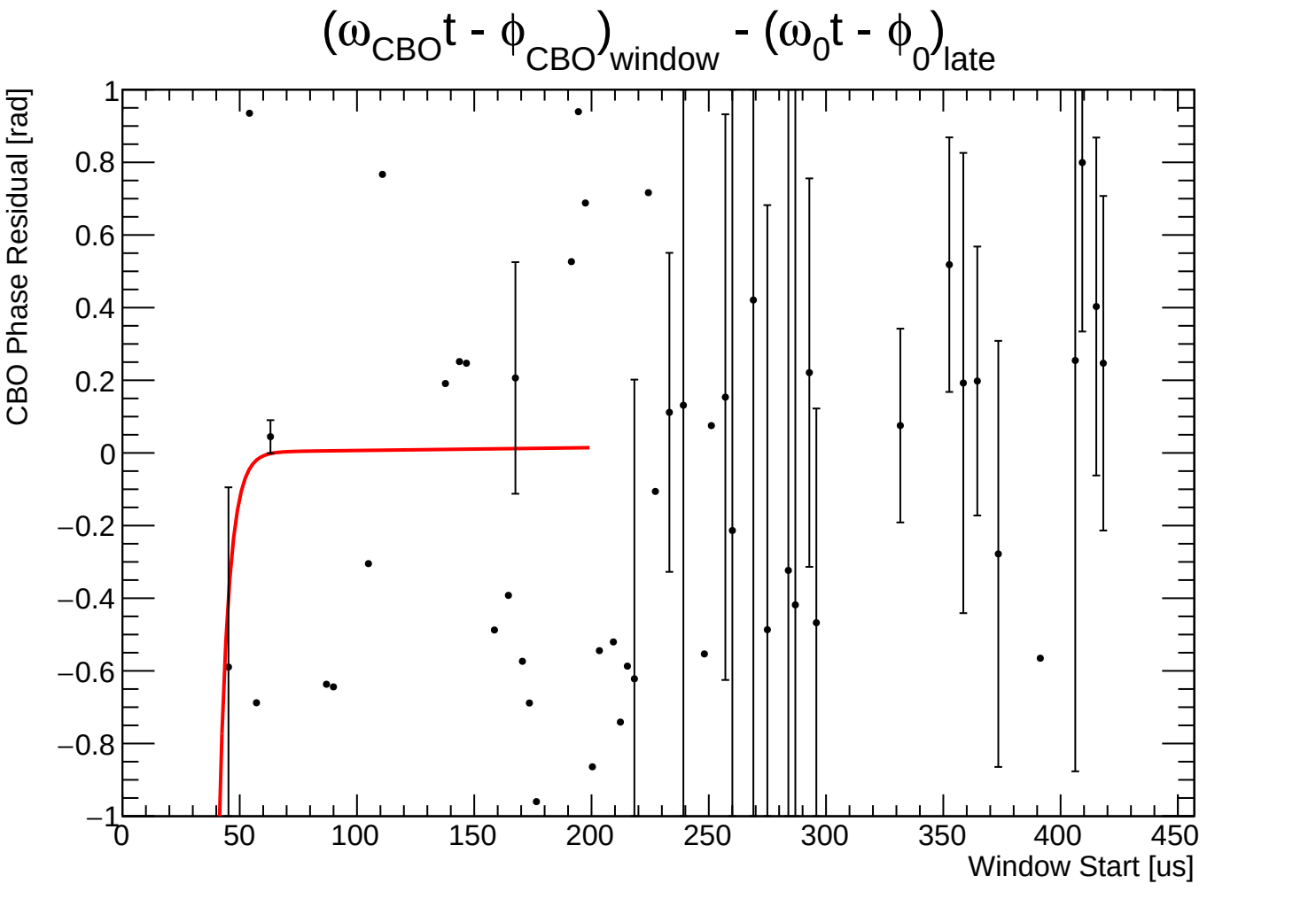

w_CBO(t) v time
×10^6
ω_CBO [MHz]
160
140
120
100
80
60
40
20
0
−20
0
50
100
150
200
250
300
350
400
450
Window Start [μs]

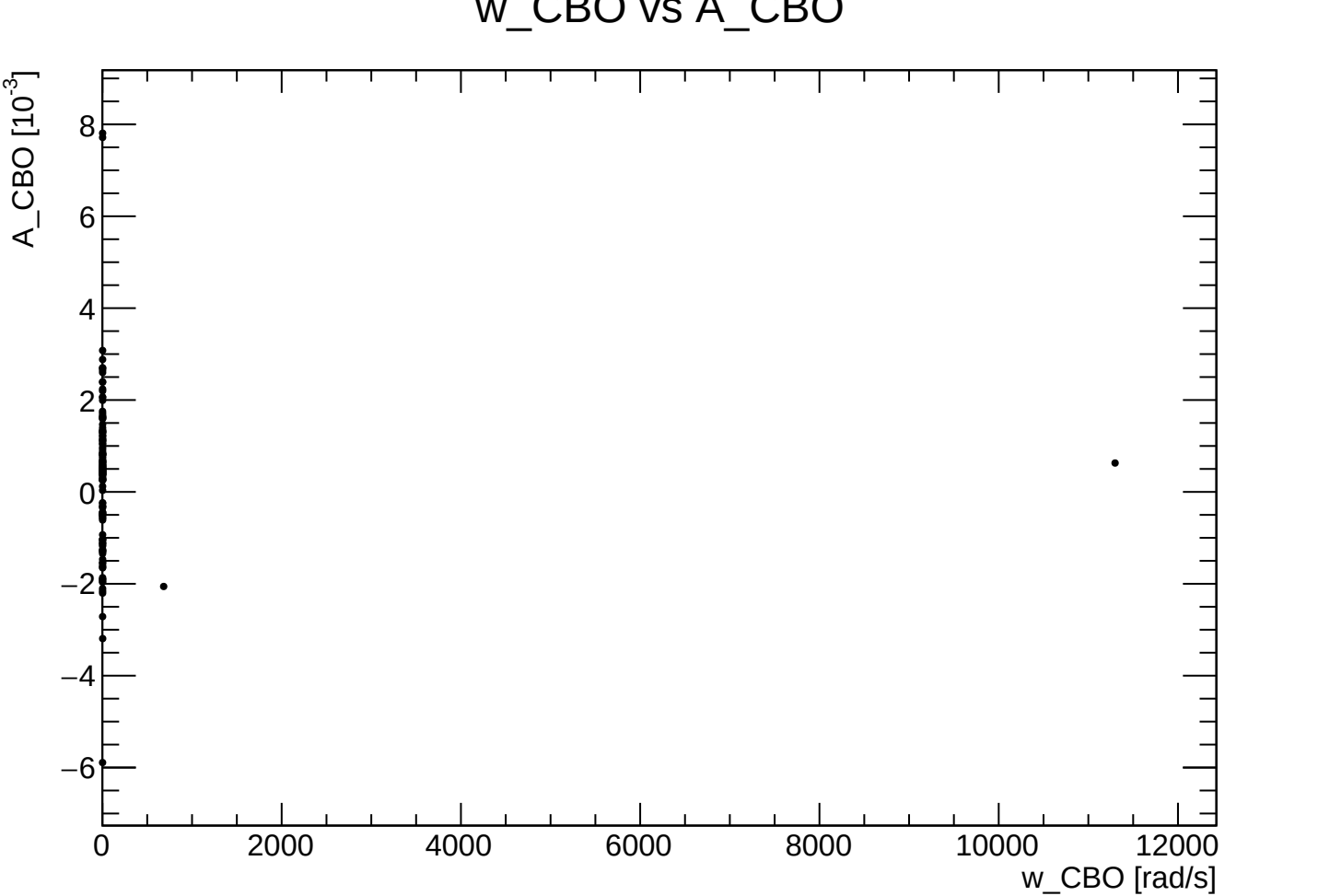

p_CBO v time
ϕ_{CBO} [rad]
4
3
2
1
0
−1
−2
−3
−4
0
50
100
150
200
250
300
350
400
450
Window Start [μs]

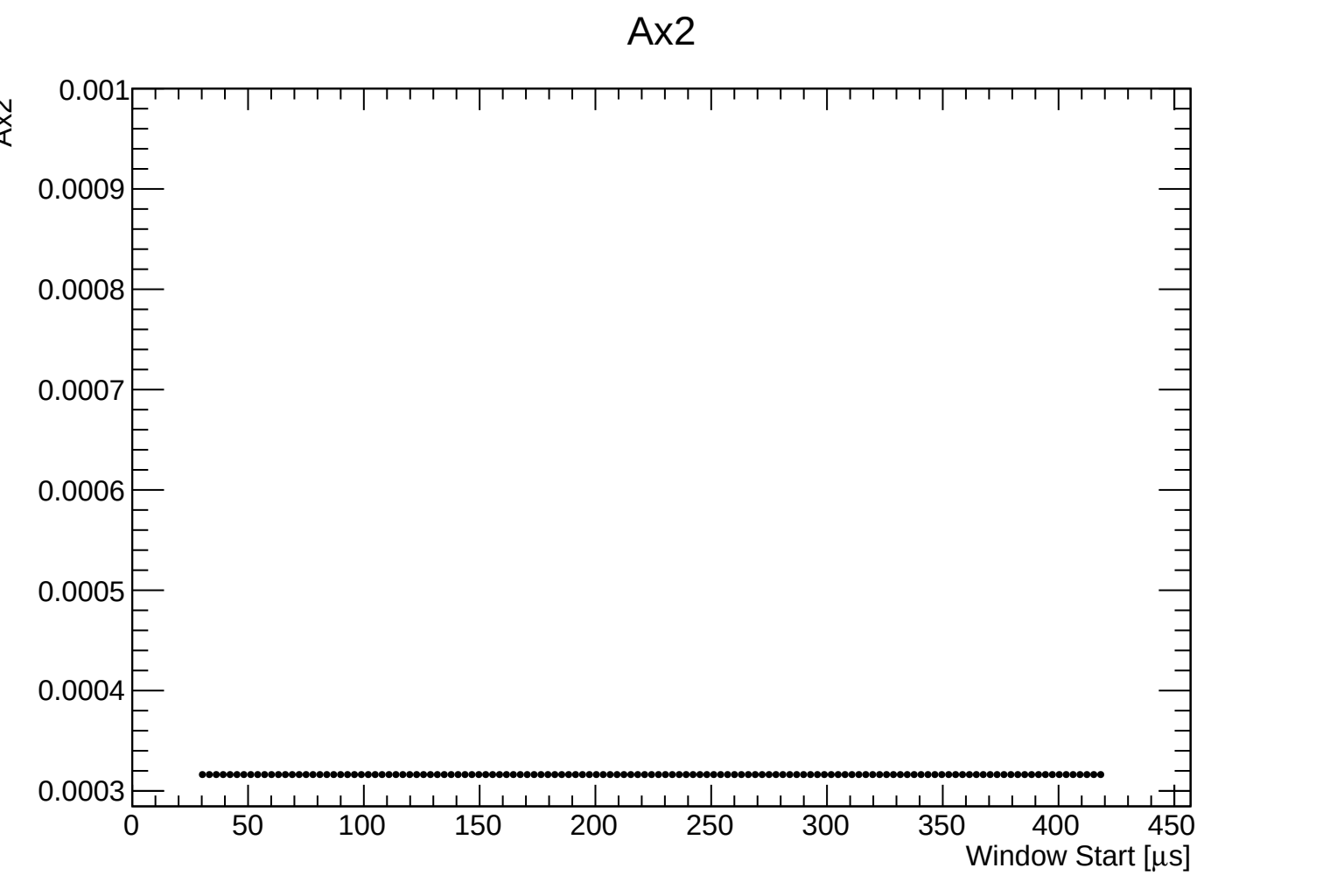

p_CBO at window start
ϕ_{CBO} [rad]
4
3
2
1
0
−1
−2
−3
−4
0
50
100
150
200
250
300
350
400
450
Window Start [μs]

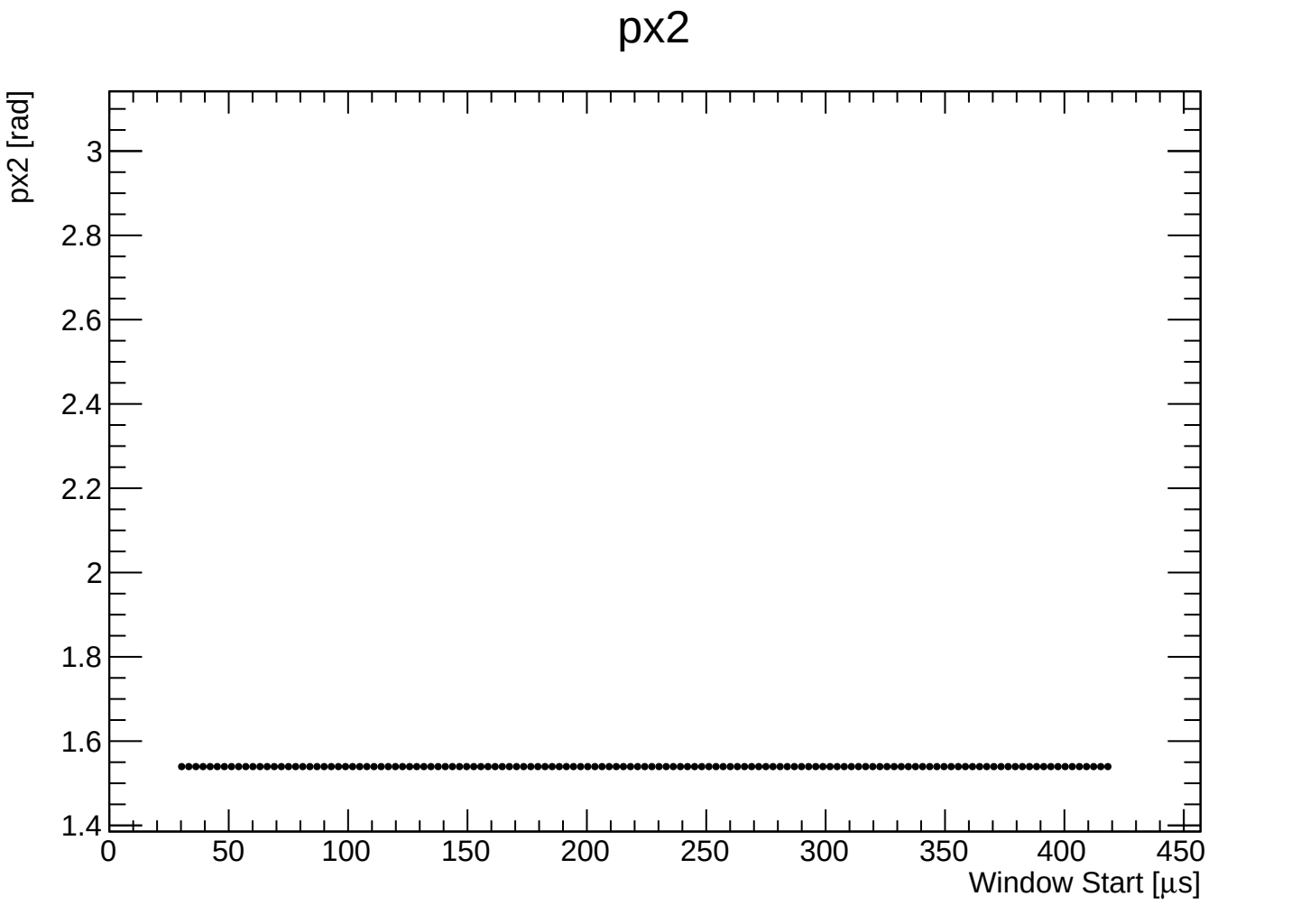

$(\omega_{CBO}t - \phi_{CBO})_{window} - (\omega_{CBO}t - \phi_{CBO})_{full}$
CBO Phase Residual [rad]
6
4
2
0
−2
−4
−6
0
50
100
150
200
250
300
350
400
450
Window Start [μs]

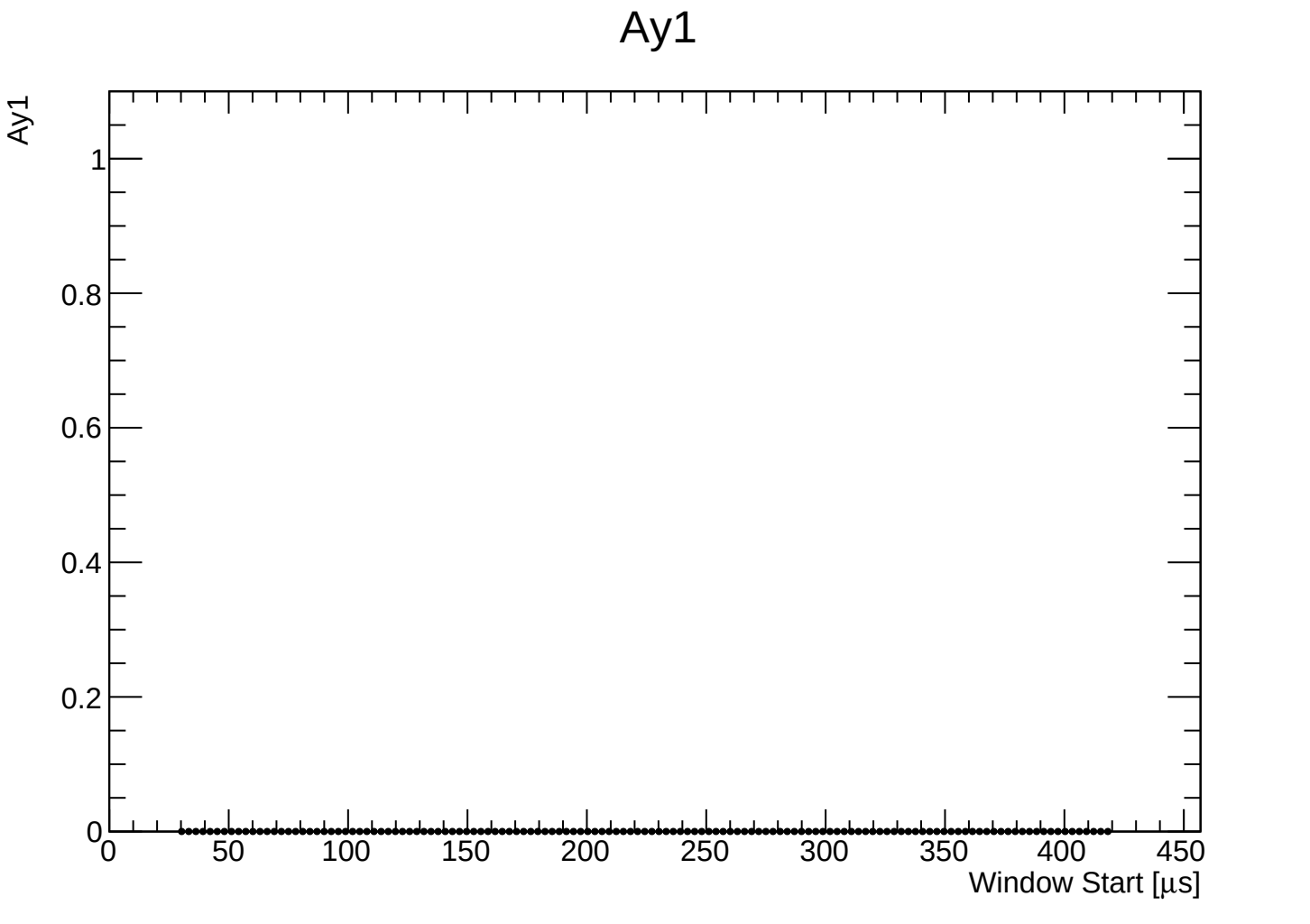

CBO Phase Advance from Sliding Windows
$(\omega_{CBO}t - \phi_{CBO})$ [rad]
1000
800
600
400
200
0
50
100
150
200
250
300
350
400
450
Window Start [us]

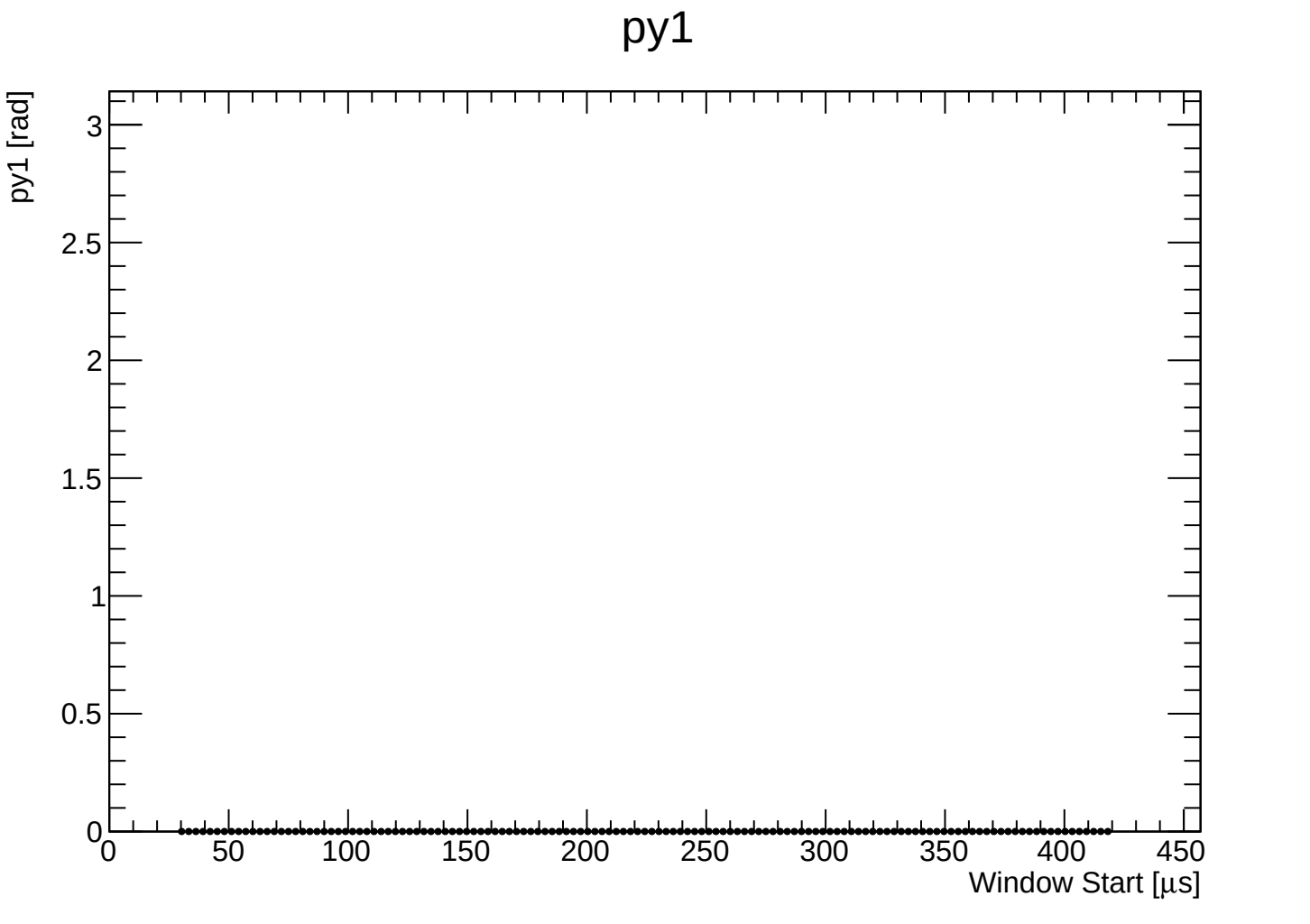

$(\omega_{CBO}t - \phi_{CBO})_{window} - (\omega_0 t - \phi_0)_{late}$
CBO Phase Residual [rad]
1
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
−1
0
50
100
150
200
250
300
350
400
450
Window Start [us]

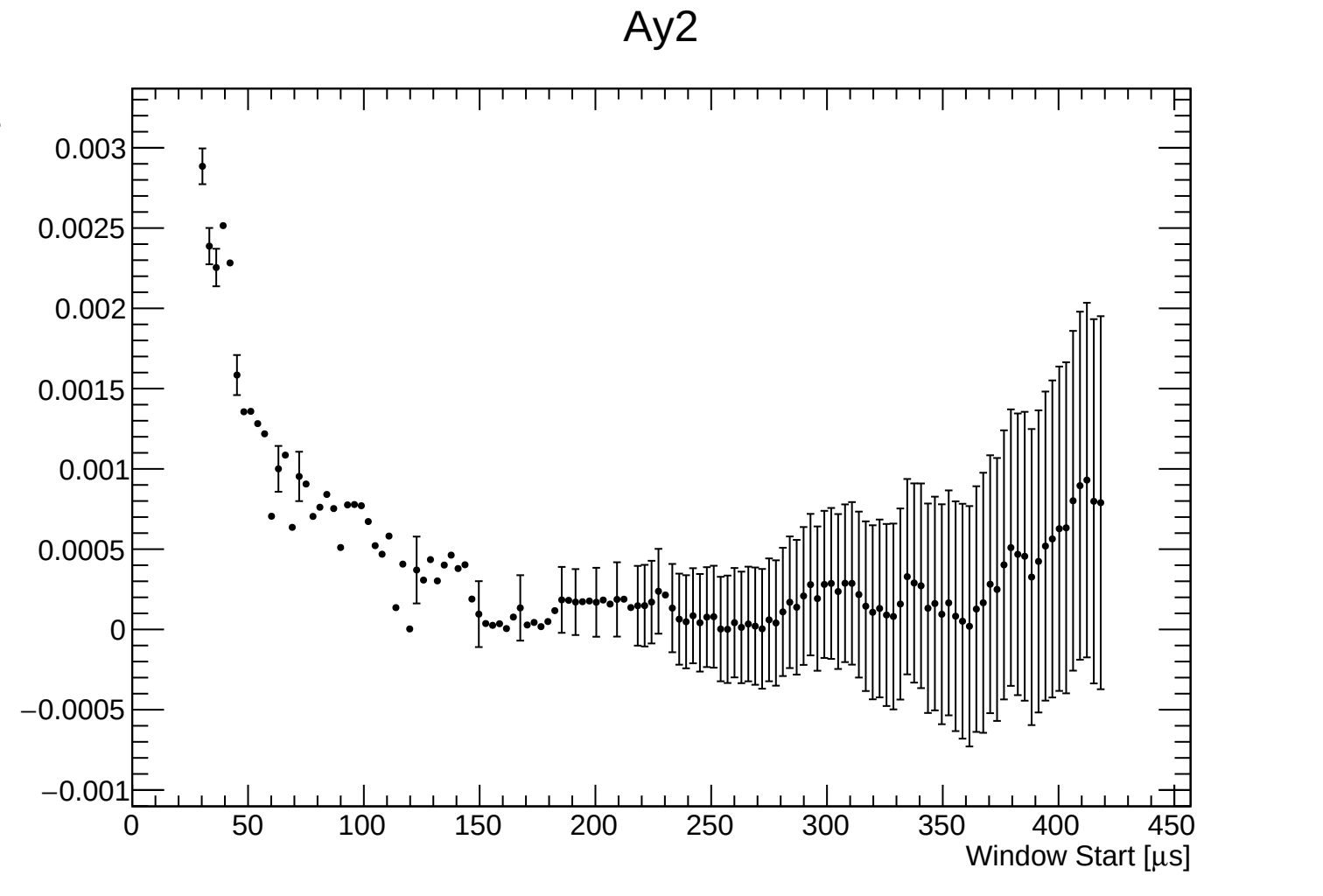

w_CBO vs A_CBO
A_CBO [10^-3]
8
6
4
2
0
−2
−4
−6
0
2000
4000
6000
8000
10000
12000
w_CBO [rad/s]

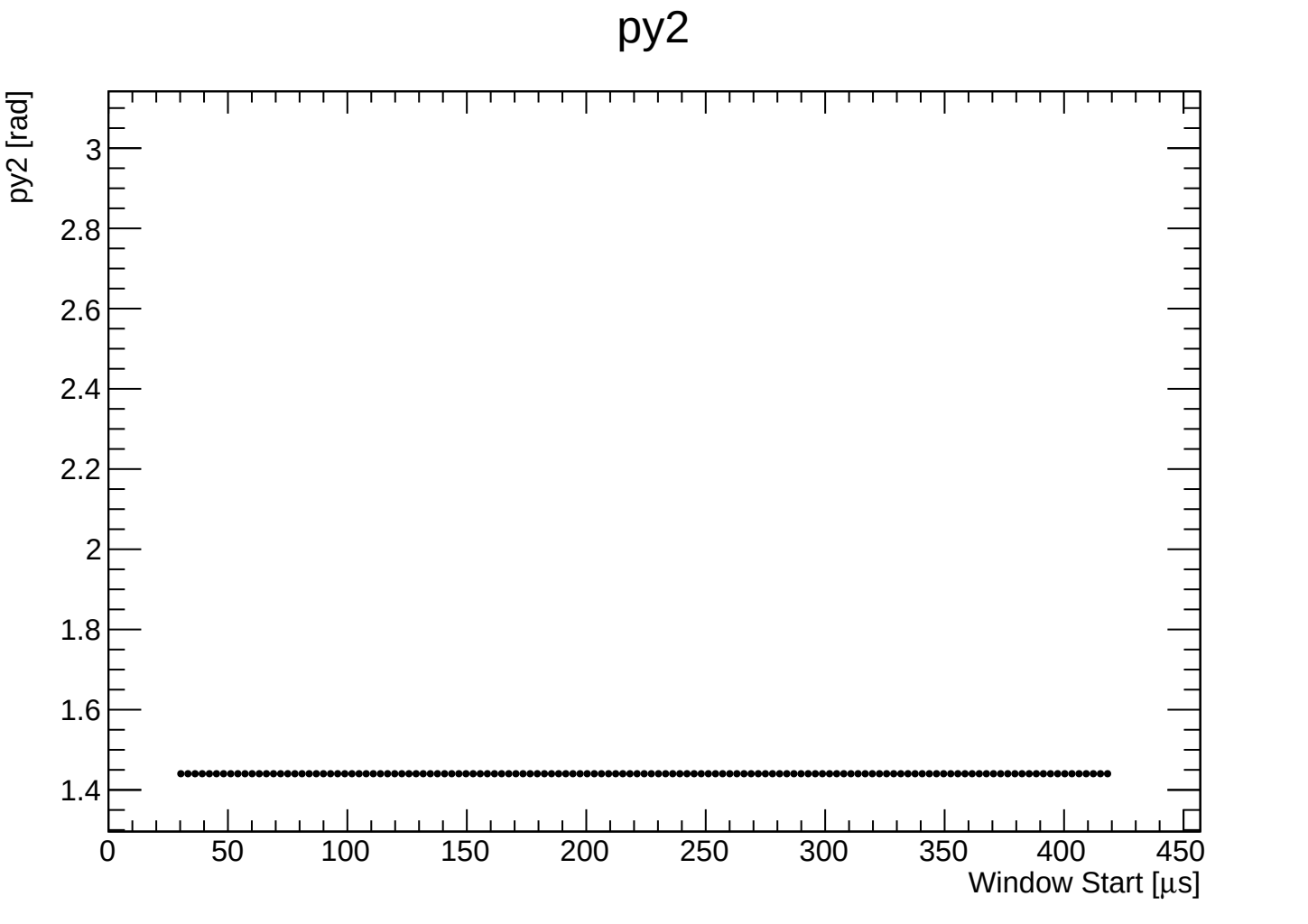

Ax2
Ax2
0.001
0.0009
0.0008
0.0007
0.0006
0.0005
0.0004
0.0003
0
50
100
150
200
250
300
350
400
450
Window Start [μs]

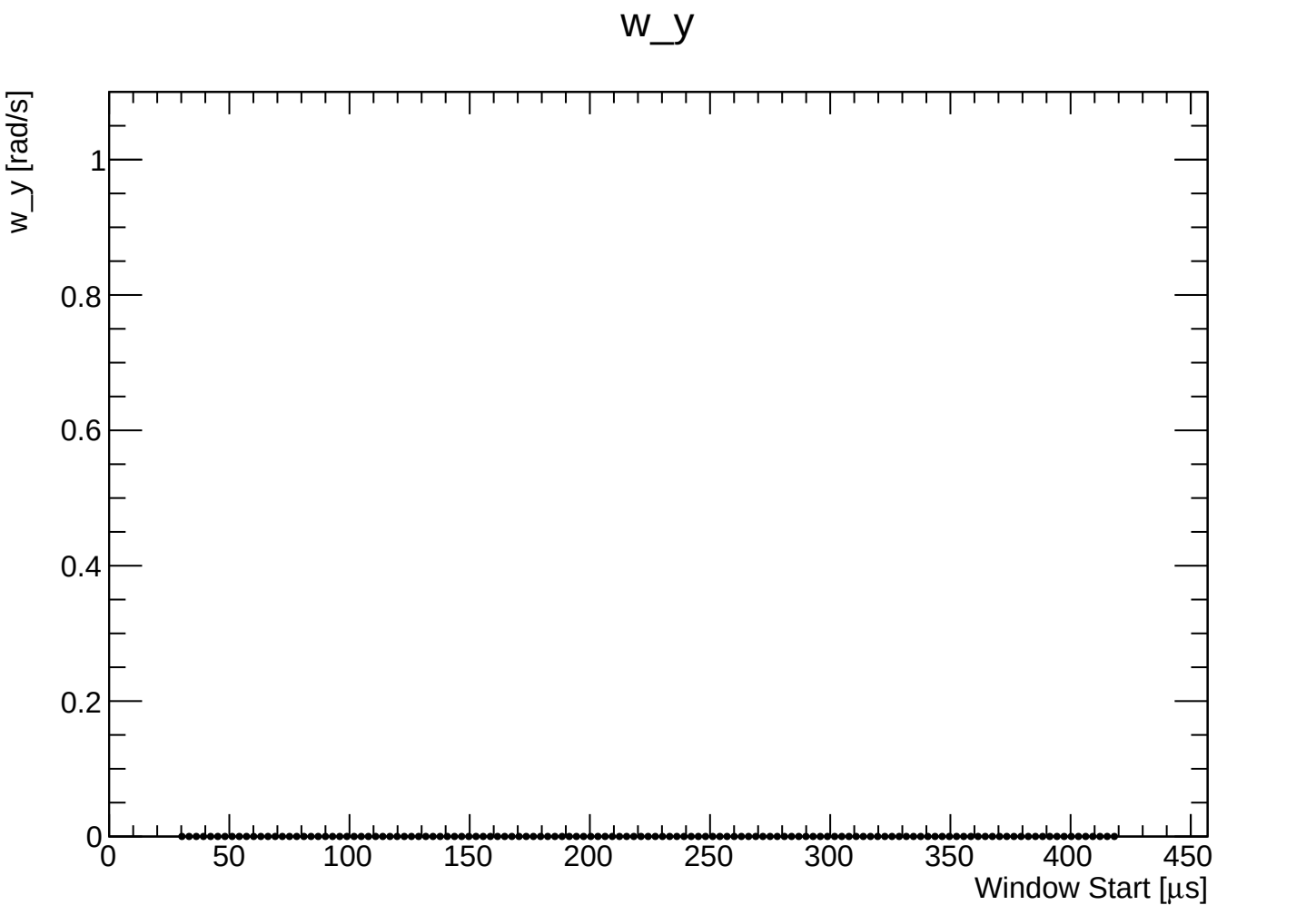

px2
px2 [rad]
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
0
50
100
150
200
250
300
350
400
450
Window Start [μs]

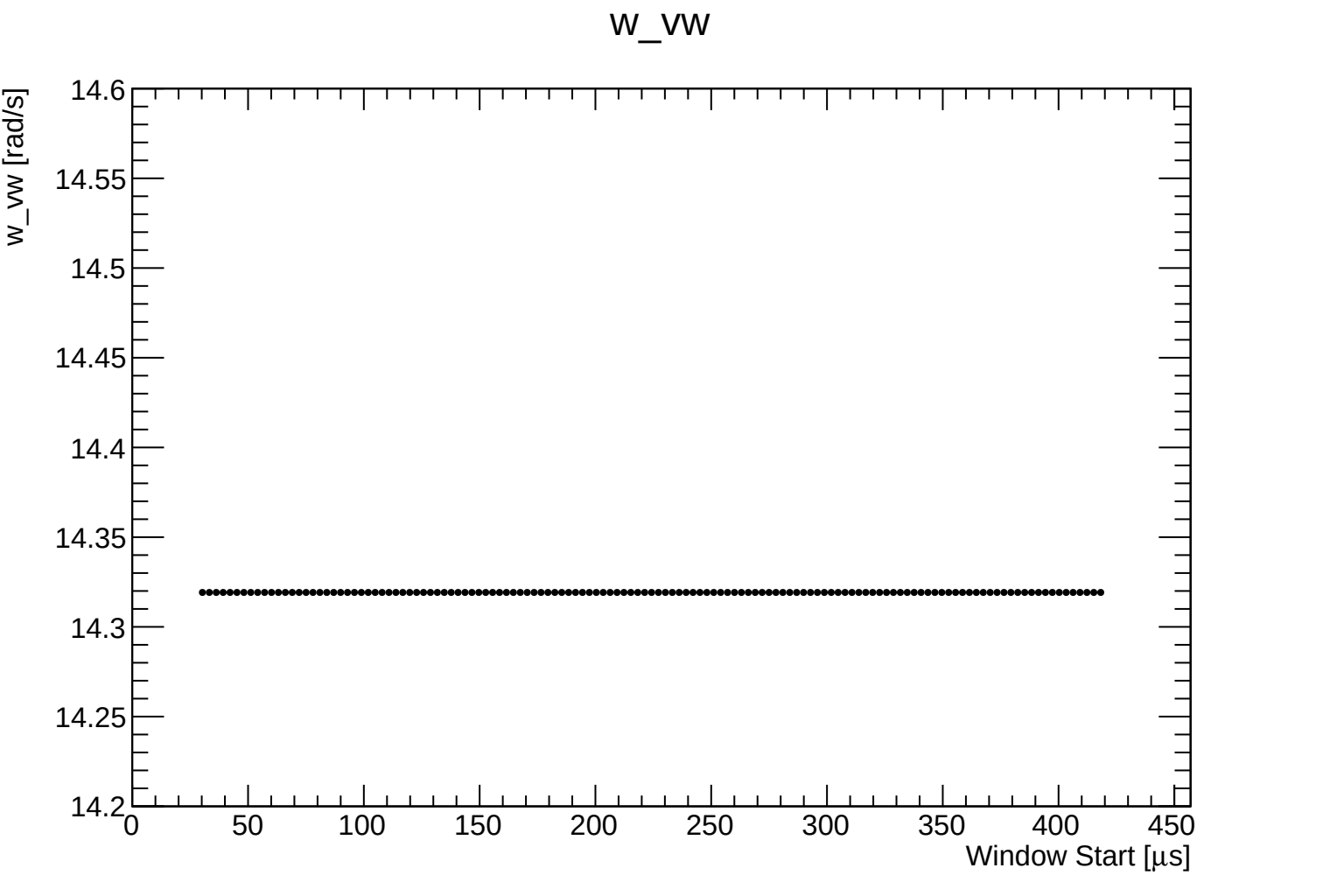

Ay1
Ay1
1
0.8
0.6
0.4
0.2
0
0
50
100
150
200
250
300
350
400
450
Window Start [μs]

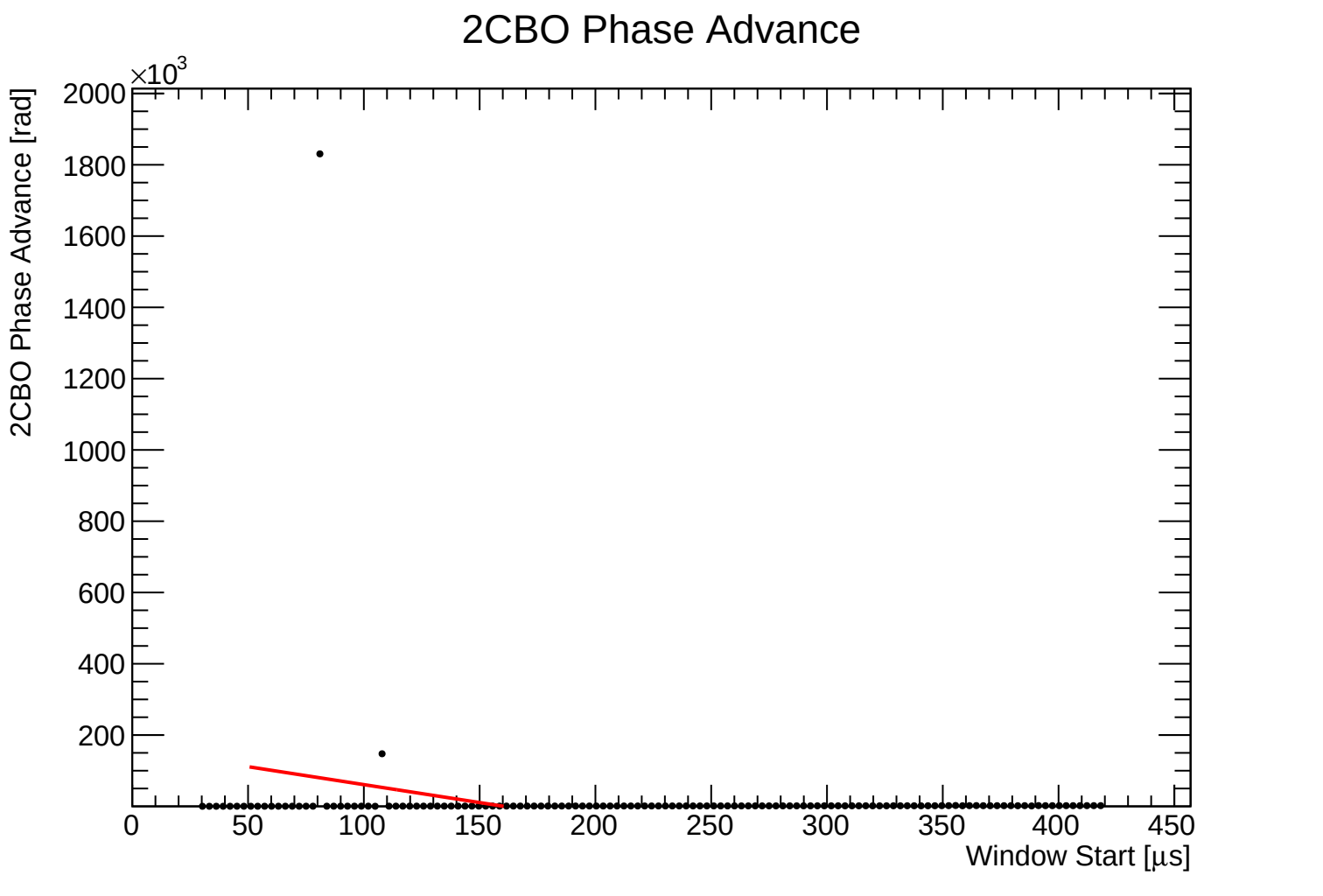

py1
py1 [rad]
3
2.5
2
1.5
1
0.5
0
0
50
100
150
200
250
300
350
400
450
Window Start [μs]

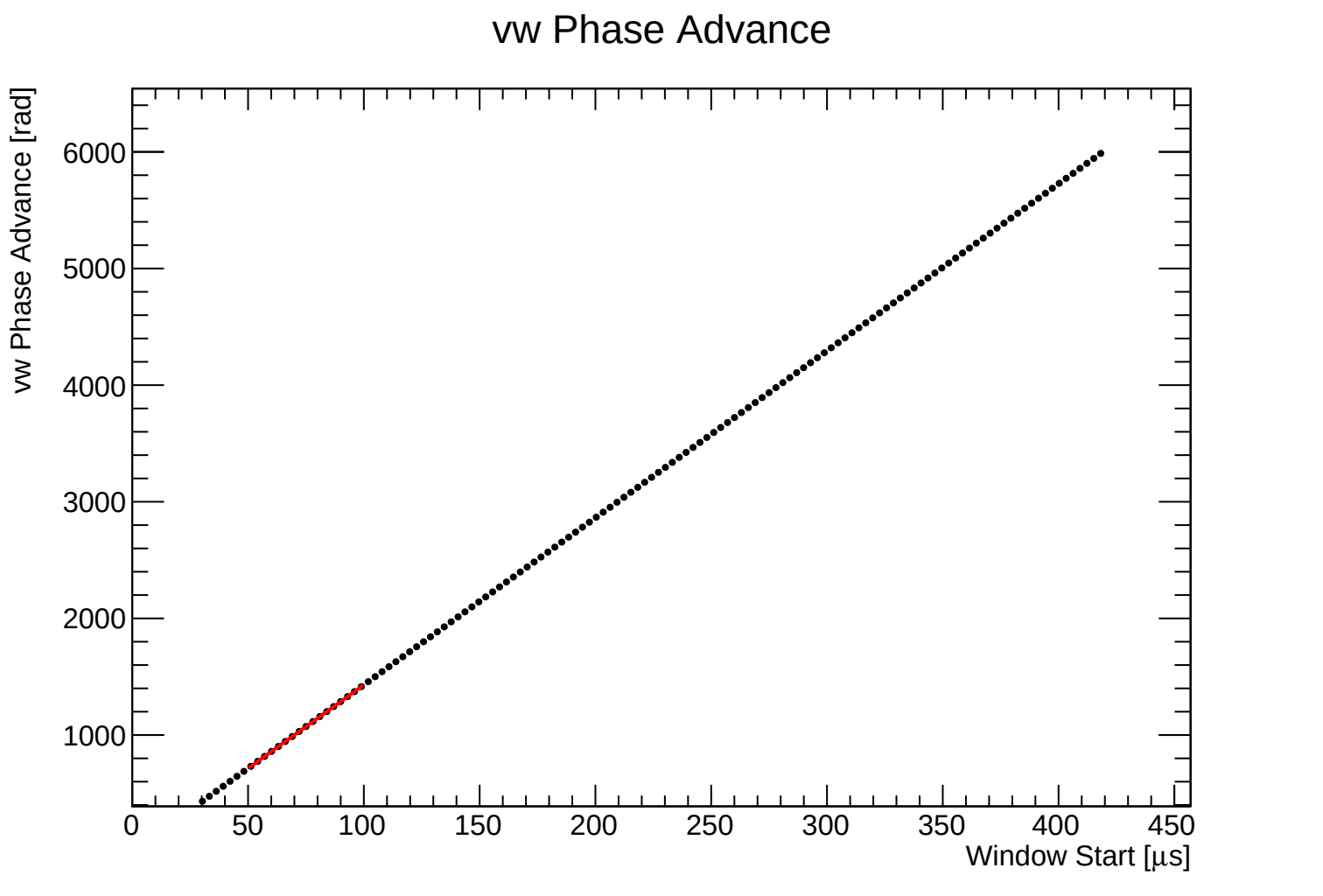

Ay2
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
−0.0005
−0.001
0
50
100
150
200
250
300
350
400
450
Window Start [μs]

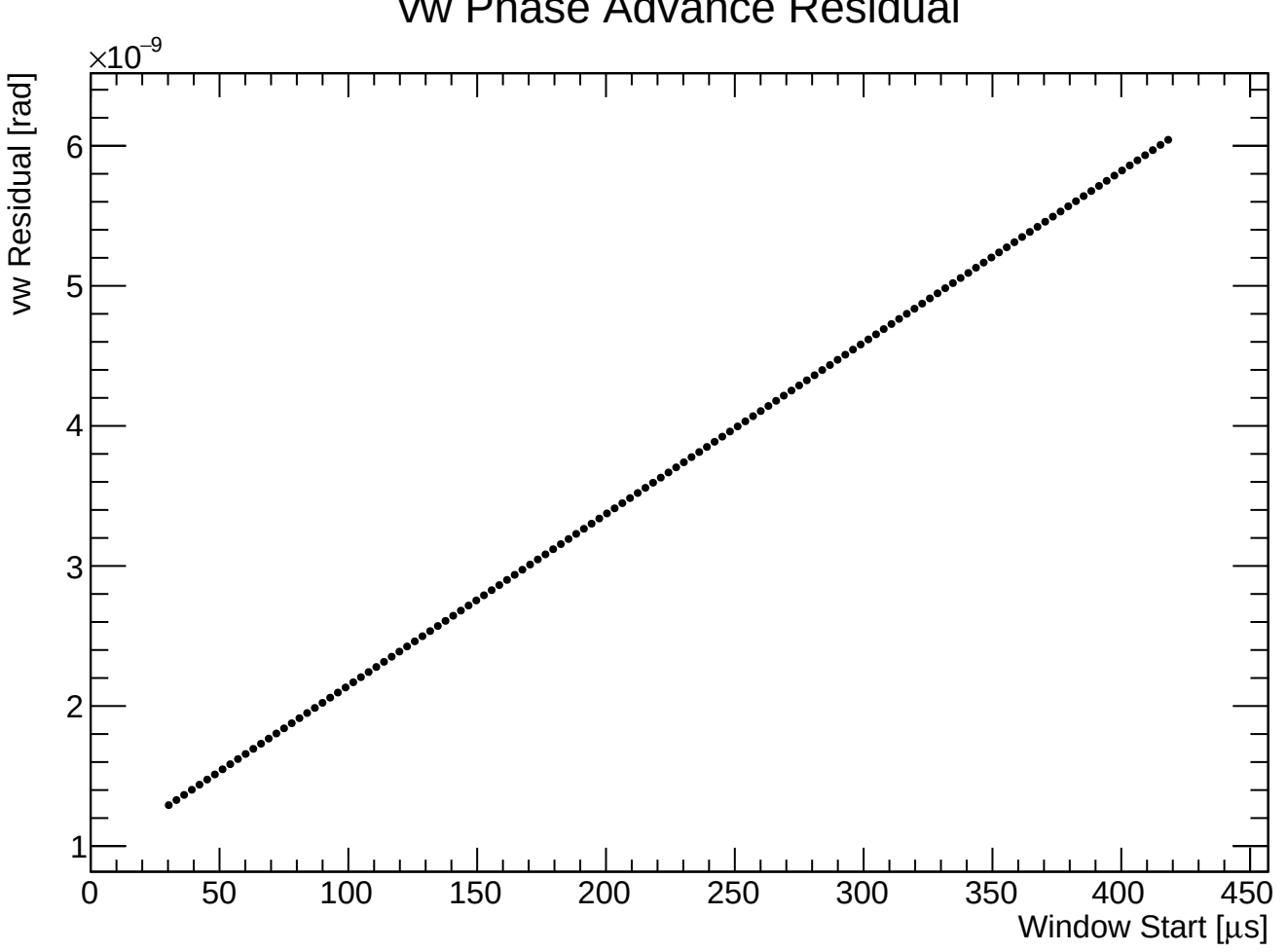

py2
py2 [rad]
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
0
50
100
150
200
250
300
350
400
450
Window Start [μs]

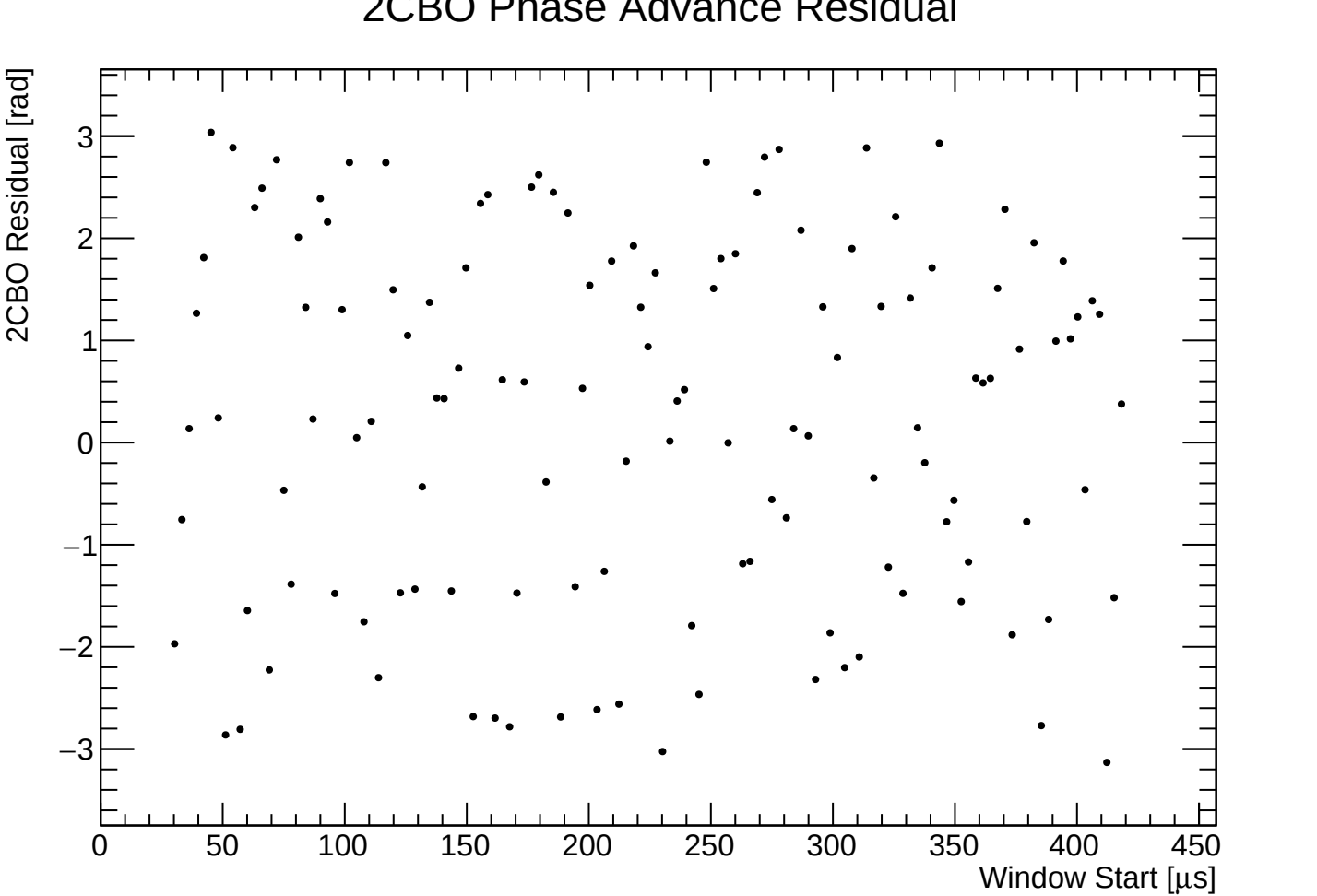

w_y
w_y [rad/s]
1
0.8
0.6
0.4
0.2
0
0
50
100
150
200
250
300
350
400
450
Window Start [μs]


W_VW
w_vw [rad/s]
14.6
14.55
14.5
14.45
14.4
14.35
14.3
14.25
14.2
0
50
100
150
200
250
300
350
400
450
Window Start [μs]


2CBO Phase Advance
×10^3
2000
1800
1600
1400
1200
1000
800
600
400
200
2CBO Phase Advance [rad]
0
50
100
150
200
250
300
350
400
450
Window Start [μs]


vw Phase Advance
vw Phase Advance [rad]
6000
5000
4000
3000
2000
1000
0
50
100
150
200
250
300
350
400
450
Window Start [μs]


vw Phase Advance Residual
×10⁻⁹
vw Residual [rad]
6
5
4
3
2
1
0
50
100
150
200
250
300
350
400
450
Window Start [μs]


2CBO Phase Advance Residual
2CBO Residual [rad]
3
2
1
0
−1
−2
−3
0
50
100
150
200
250
300
350
400
450
Window Start [μs]