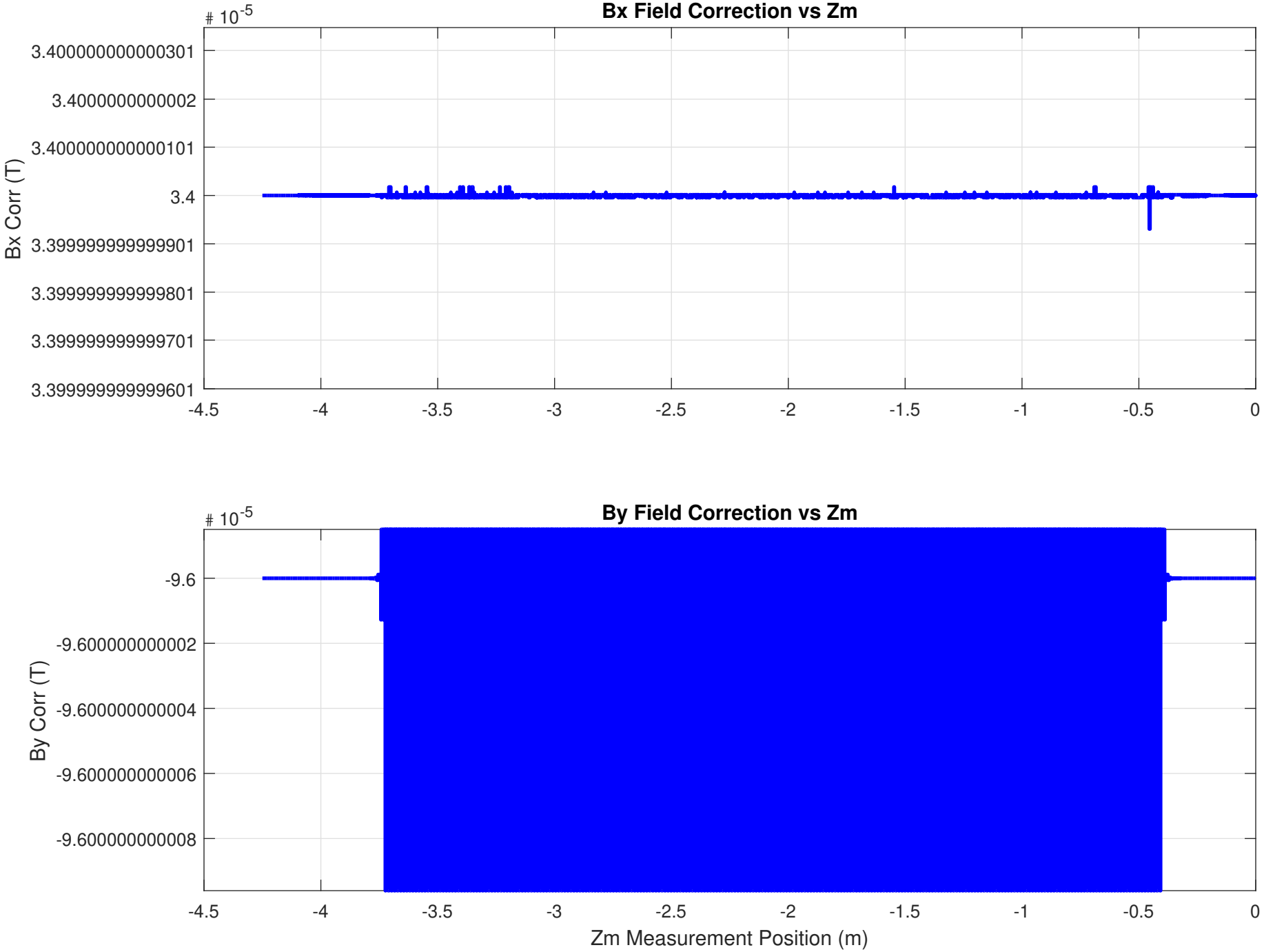
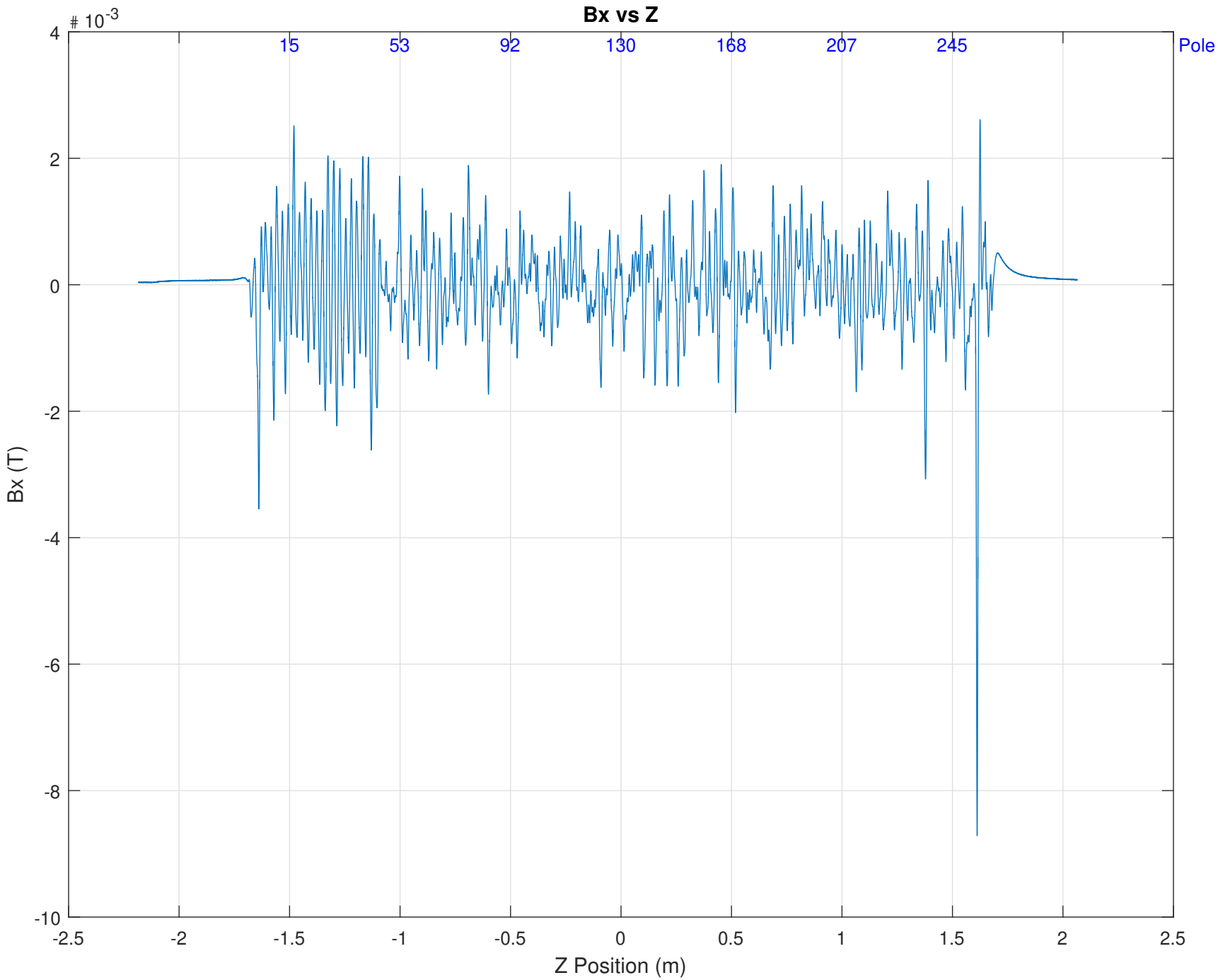
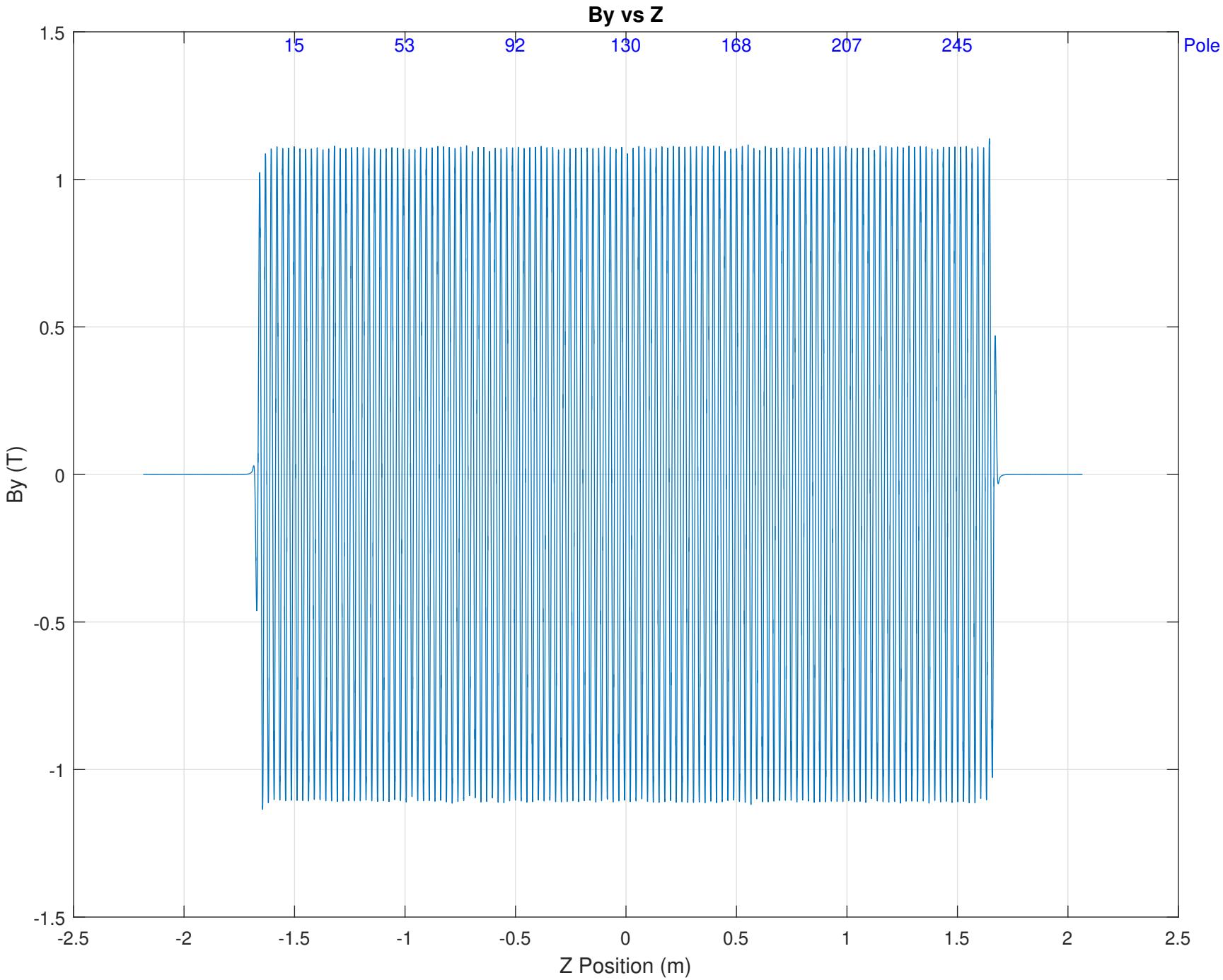
SLAC Magnetic Measurements

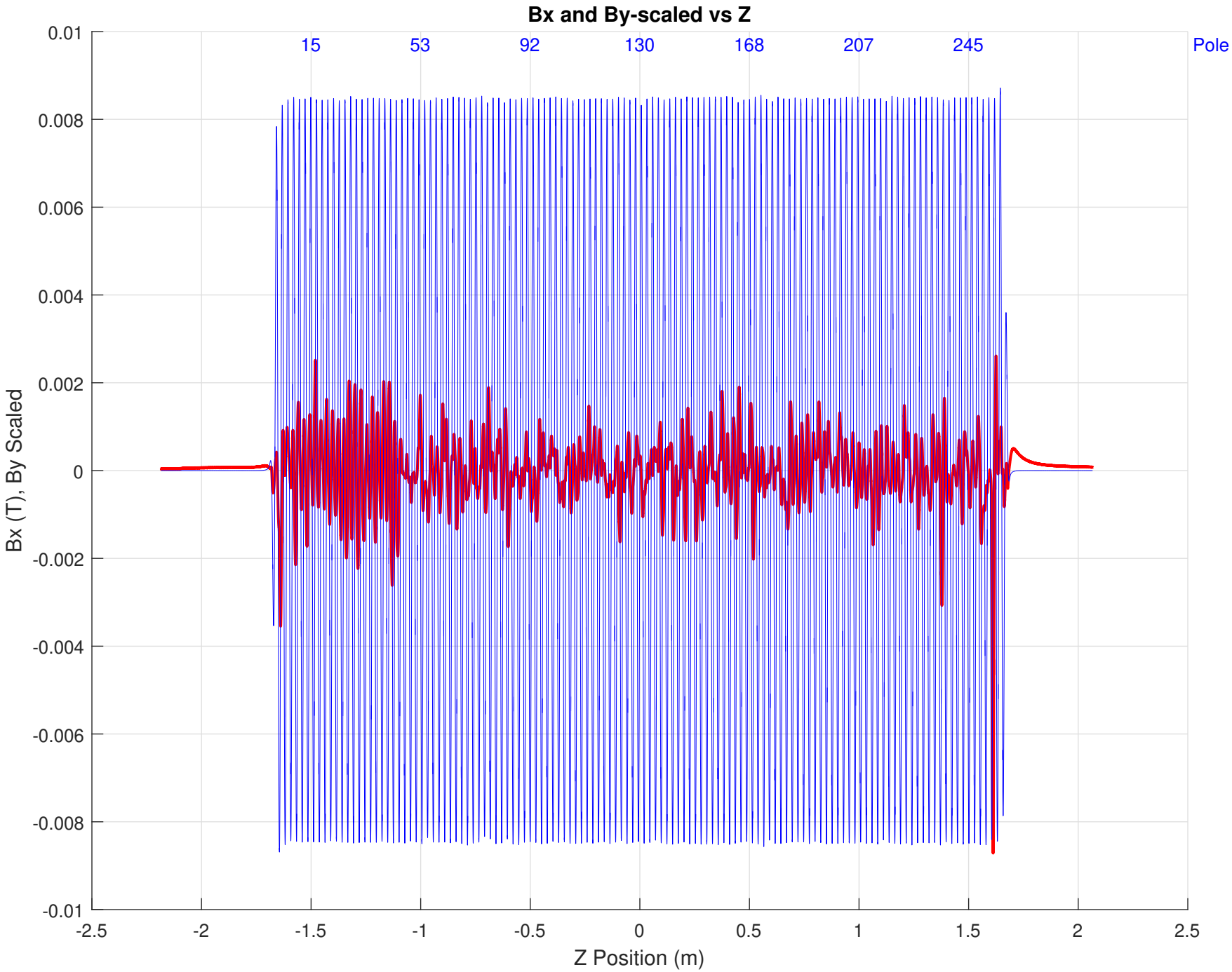
Planar Insertion Device Analysis

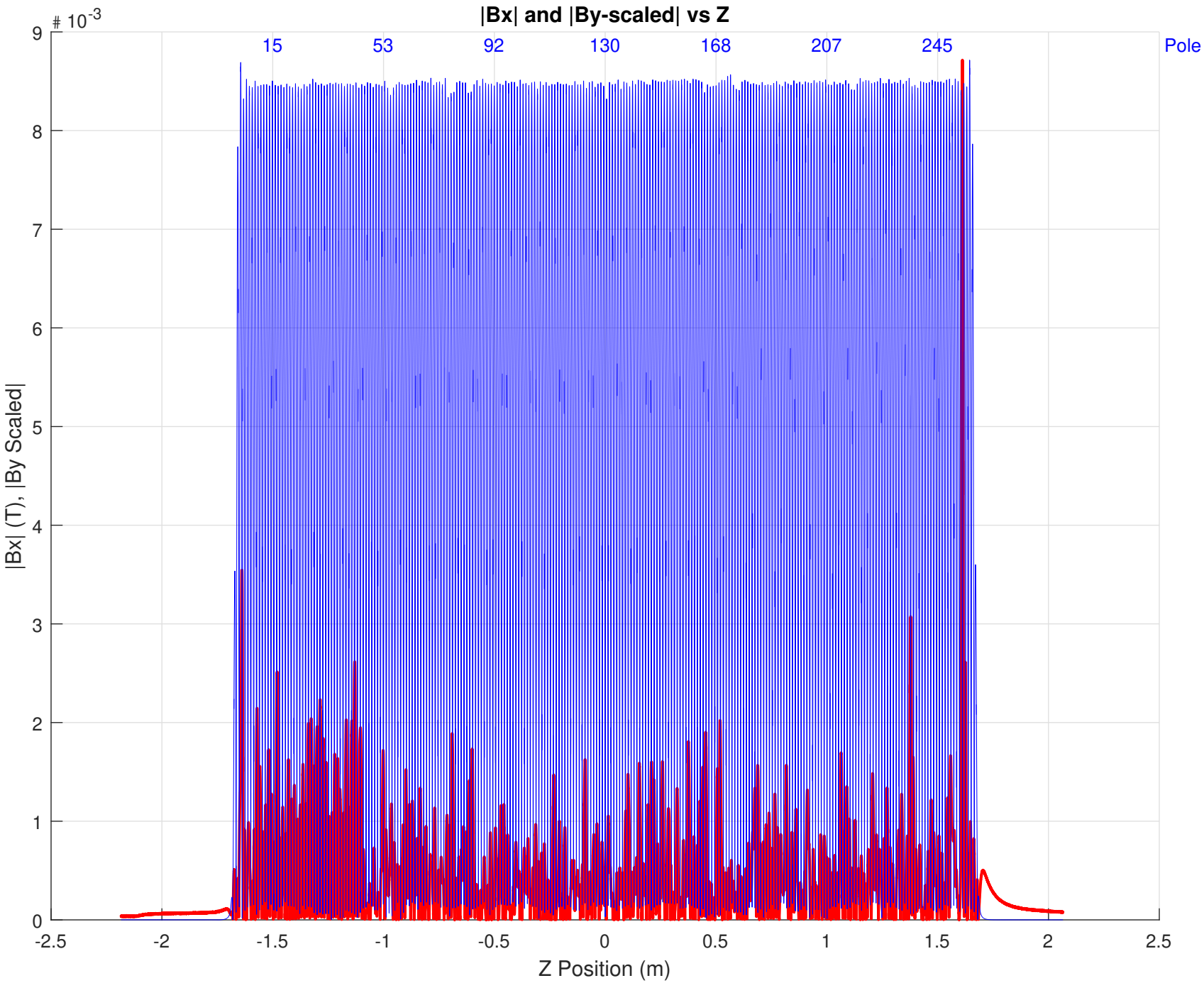
Parameters:
INPUT-FILE-DIR =s:\magdata\LCLS2\Undulator\HGVPU\DATASET0001\Fine Tuning\Z Scans\Run 009\
INPUT-FILE-NAME =x+00000-y+000-bscanz.dat
INPUT-FILE-TYPE =ZVXYBXYH
CORR-REQUIRED =1
GAMMA =27397
NOM-LAMBDA-U =0.026
NOM-K-VALUE =3.5
NOM-LAMBDA-R =1.234e-10
NUM-POLES =260
NUM-END-POLES =4
CELL-LENGTH =3.656

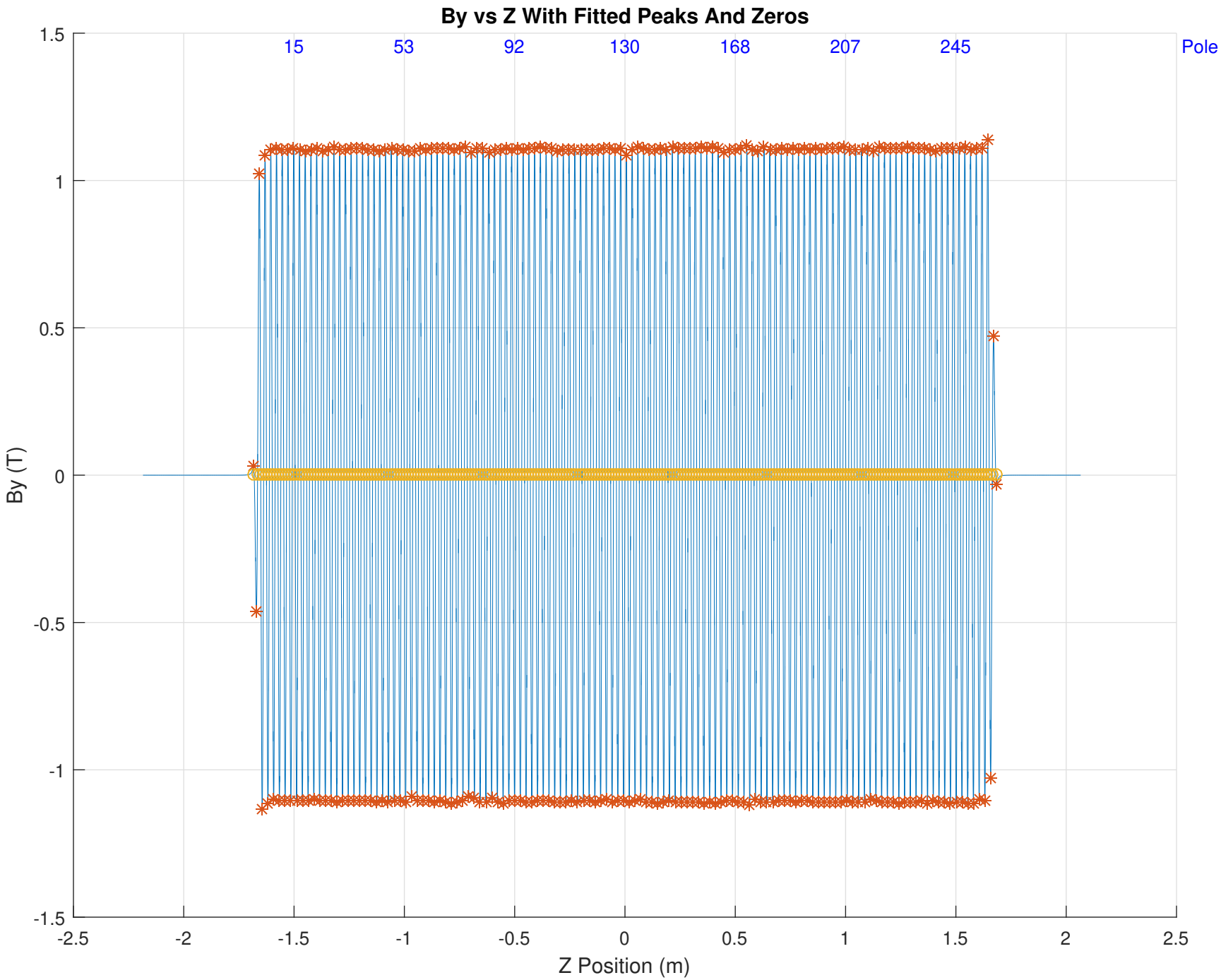

Bx Field Correction vs Zm
10^-5
3.400000000000301
3.4000000000002
3.400000000000101
3.4
3.399999999999901
3.399999999999801
3.399999999999701
3.399999999999601
Bx Corr (T)
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
By Field Correction vs Zm
10^-5
-9.6
-9.600000000002
-9.600000000004
-9.600000000006
-9.600000000008
By Corr (T)
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
Zm Measurement Position (m)

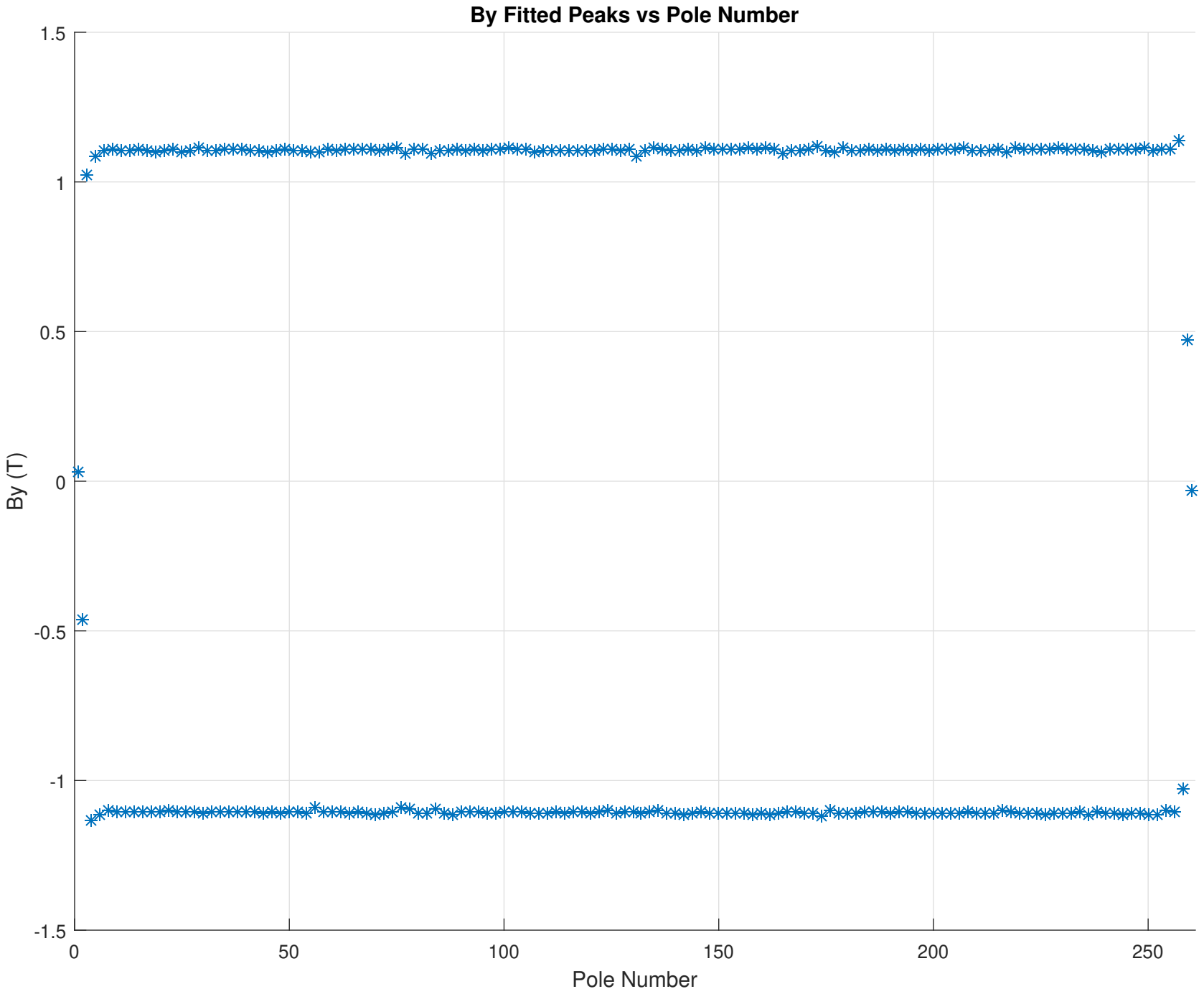

Bx vs Z
10^-3
4
2
0
-2
-4
-6
-8
-10
15
53
92
130
168
207
245
Pole
Bx (T)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z Position (m)

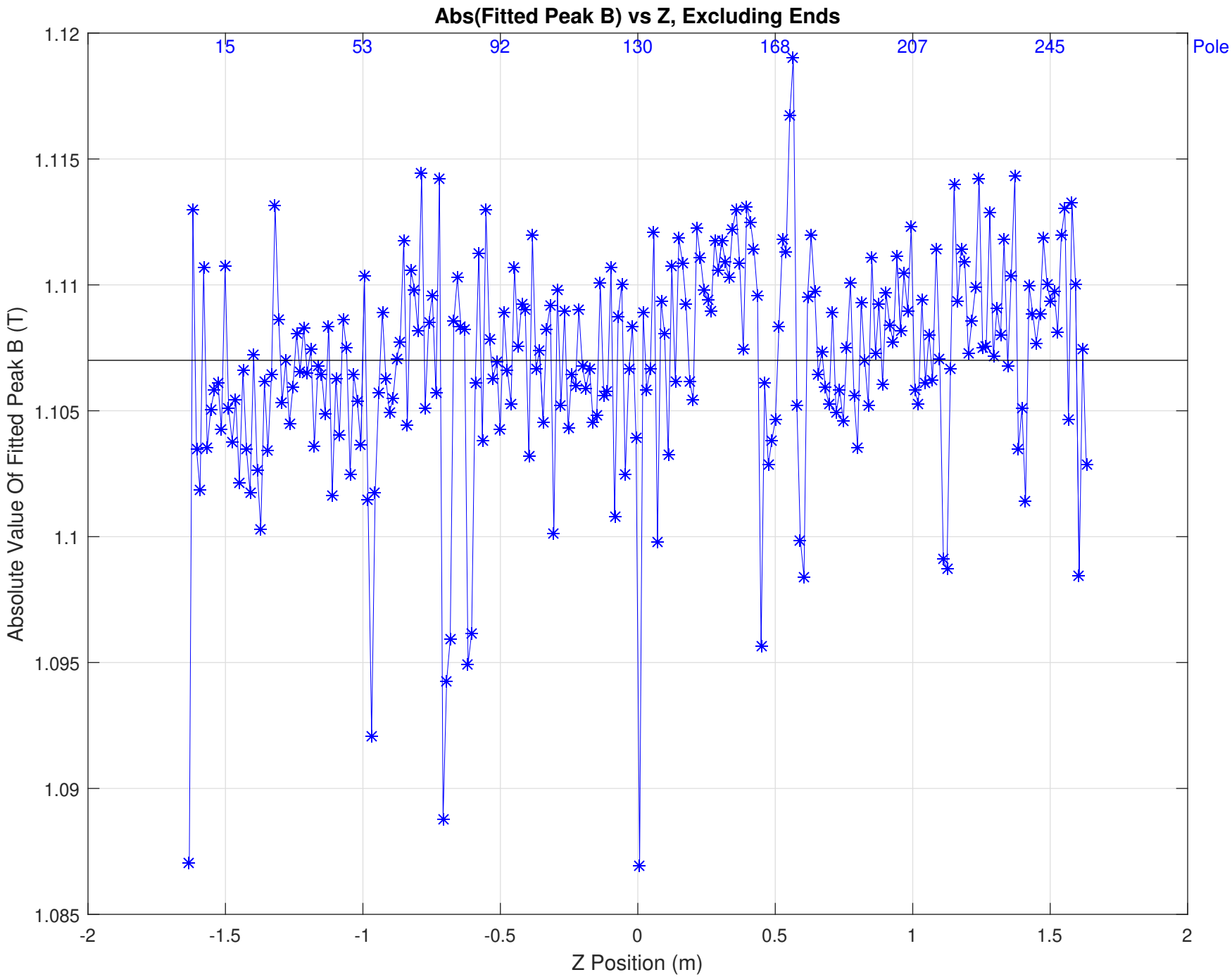

By vs Z
15
53
92
130
168
207
245
Pole
1.5
1
0.5
0
-0.5
-1
-1.5
By (T)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z Position (m)


Bx and By-scaled vs Z
15
53
92
130
168
207
245
Pole
0.01
0.008
0.006
0.004
0.002
0
-0.002
-0.004
-0.006
-0.008
-0.01
Bx (T), By Scaled
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z Position (m)

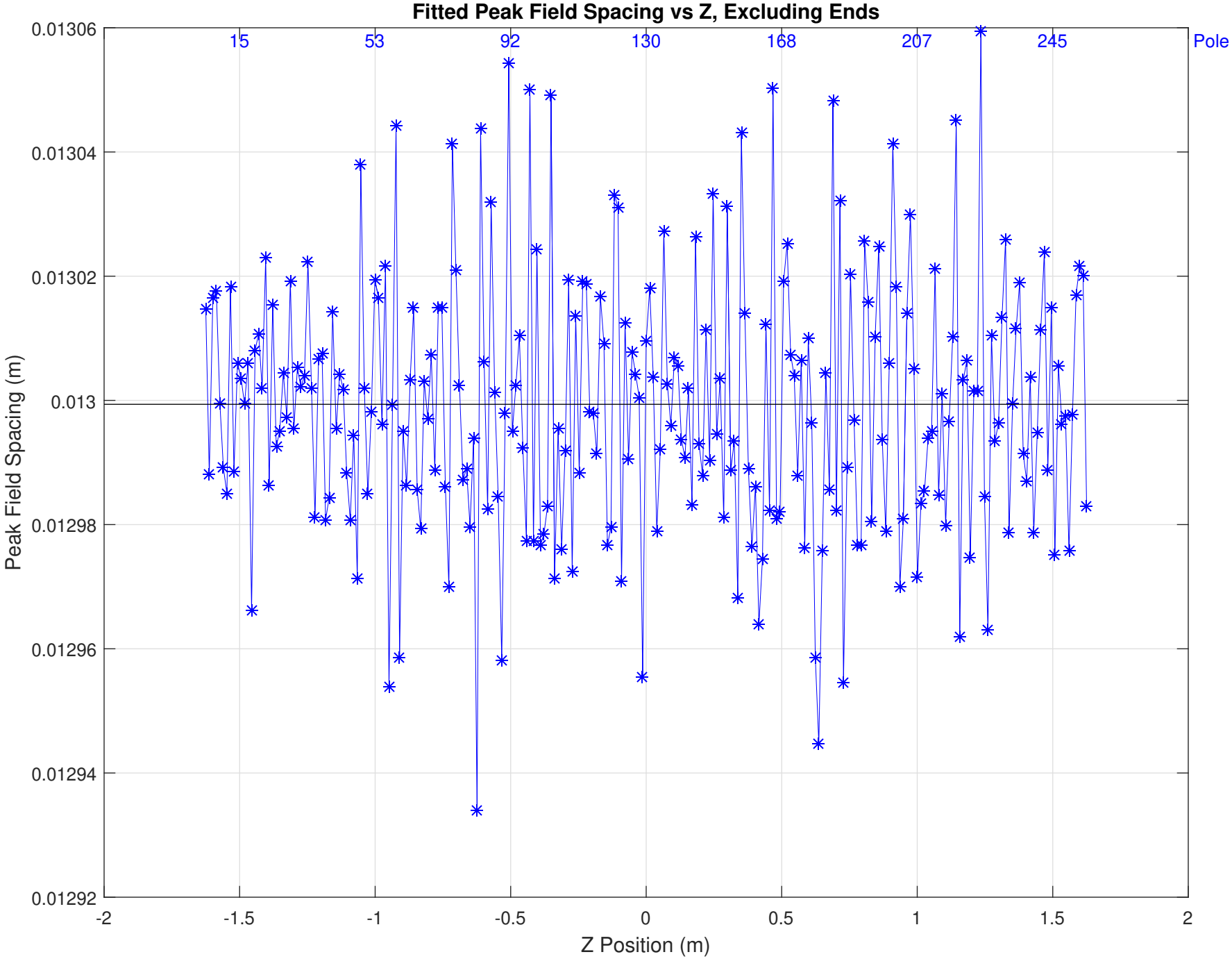

|Bx| and |By-scaled| vs Z
10-3
9
8
7
6
5
4
3
2
1
0
15
53
92
130
168
207
245
Pole
|Bx| (T), |By Scaled|
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z Position (m)


By vs Z With Fitted Peaks And Zeros
15
53
92
130
168
207
245
Pole
1.5
1
0.5
0
-0.5
-1
-1.5
By (T)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z Position (m)

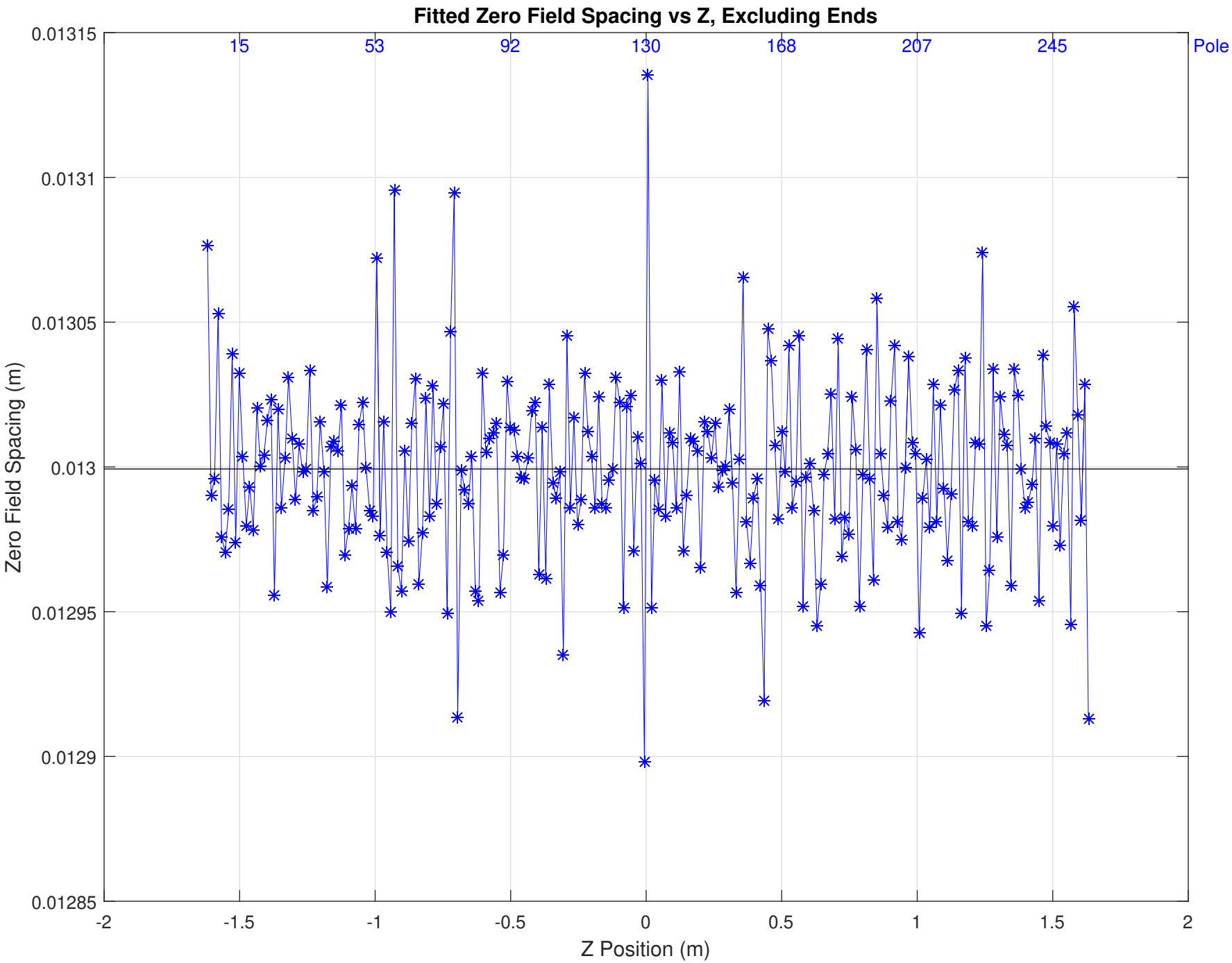

By Fitted Peaks vs Pole Number
By (T)
Pole Number
1.5
1
0.5
0
-0.5
-1
-1.5
0
50
100
150
200
250



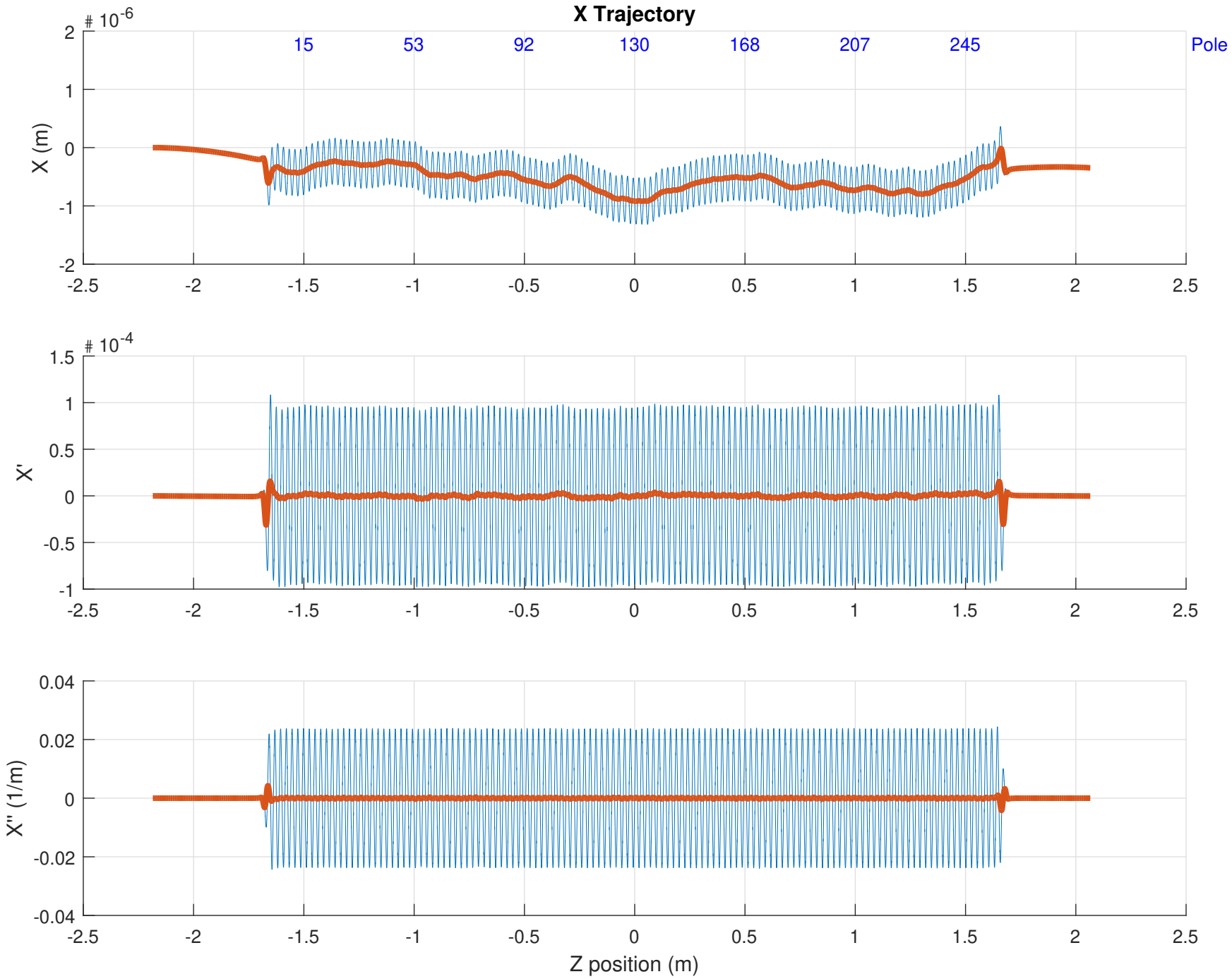
Peak Fields: Ave = 1.107004 T, RMS = 0.004446 T

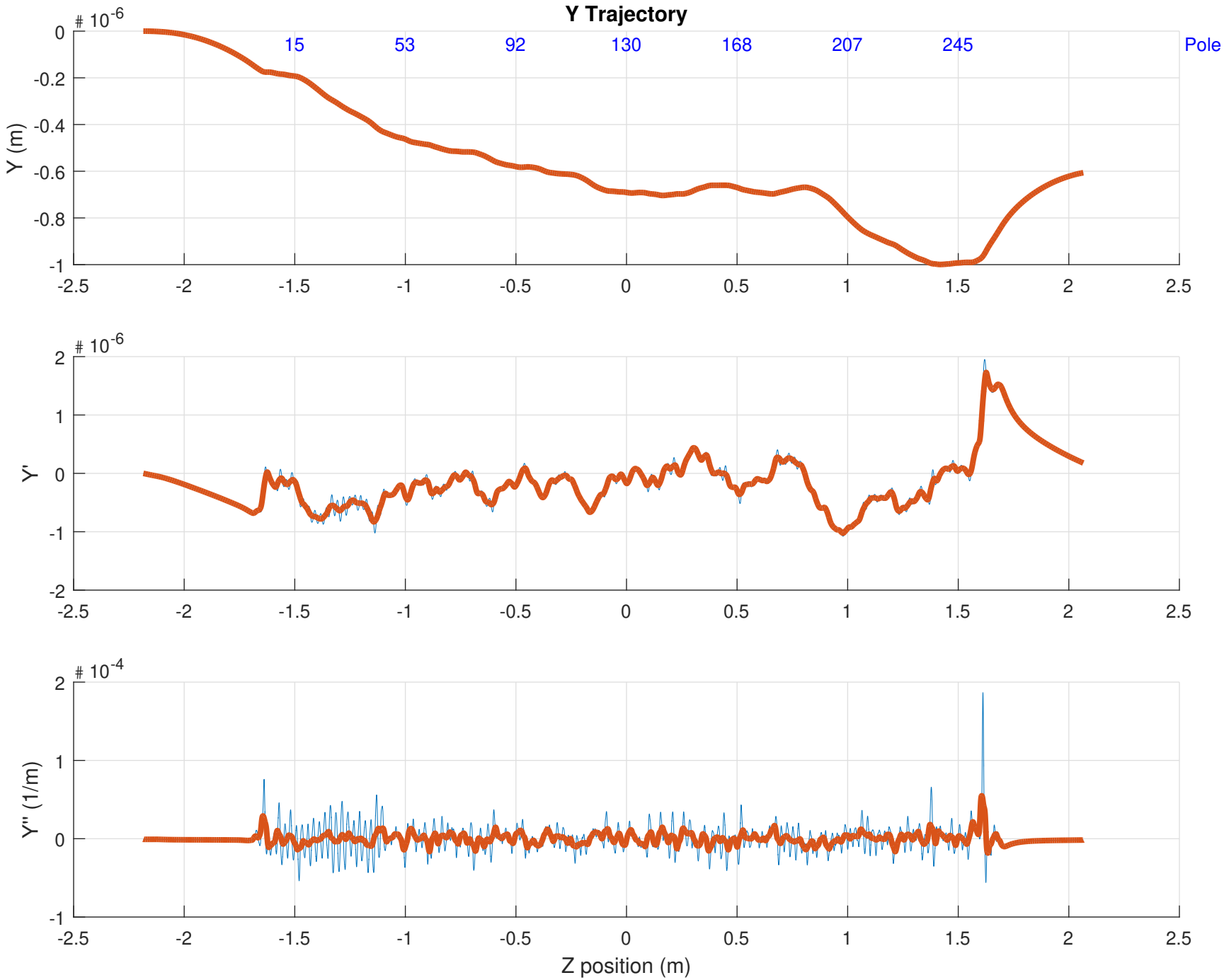


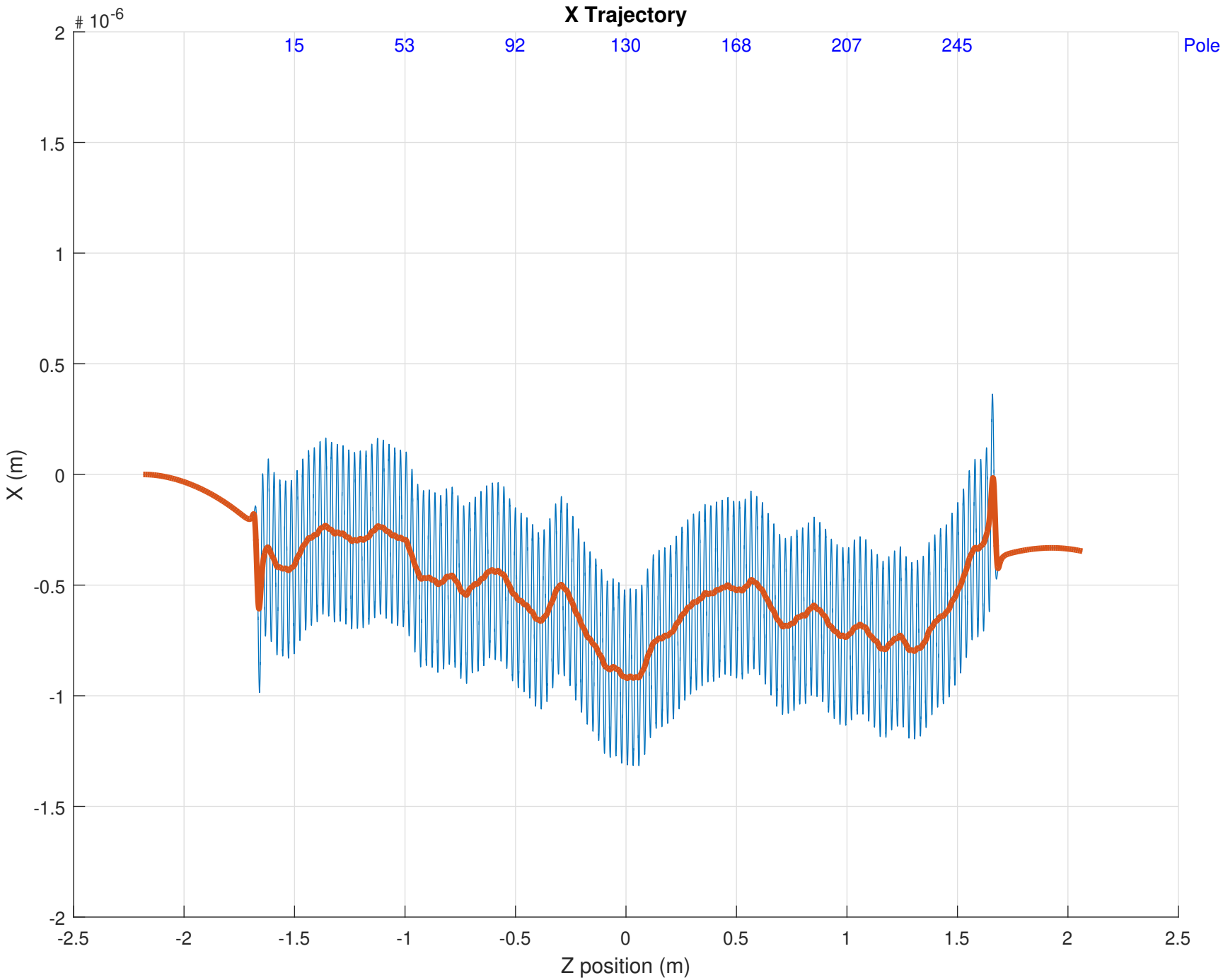
Peak Field Spacing: Ave = 0.012999 m, RMS = 0.000021 m

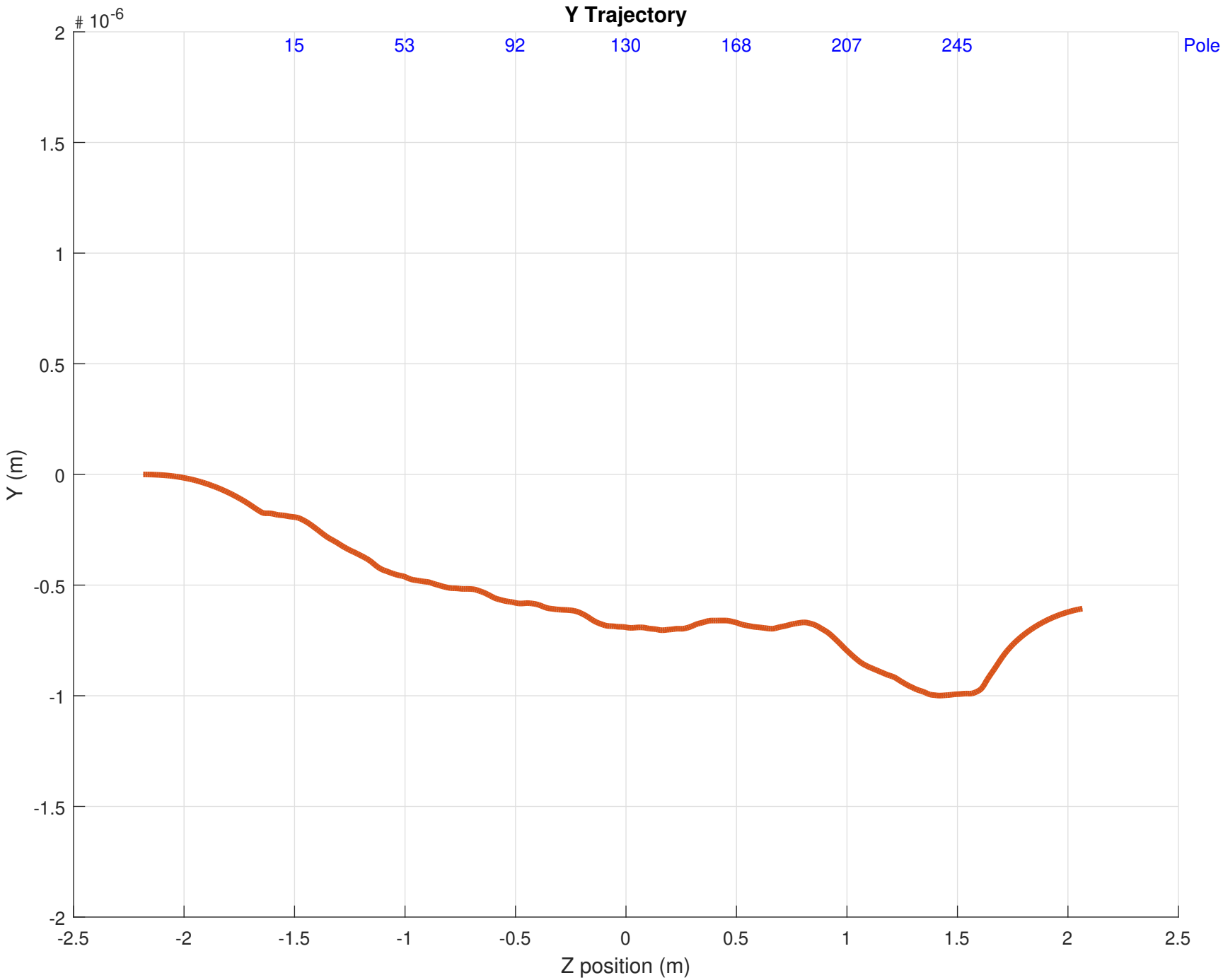


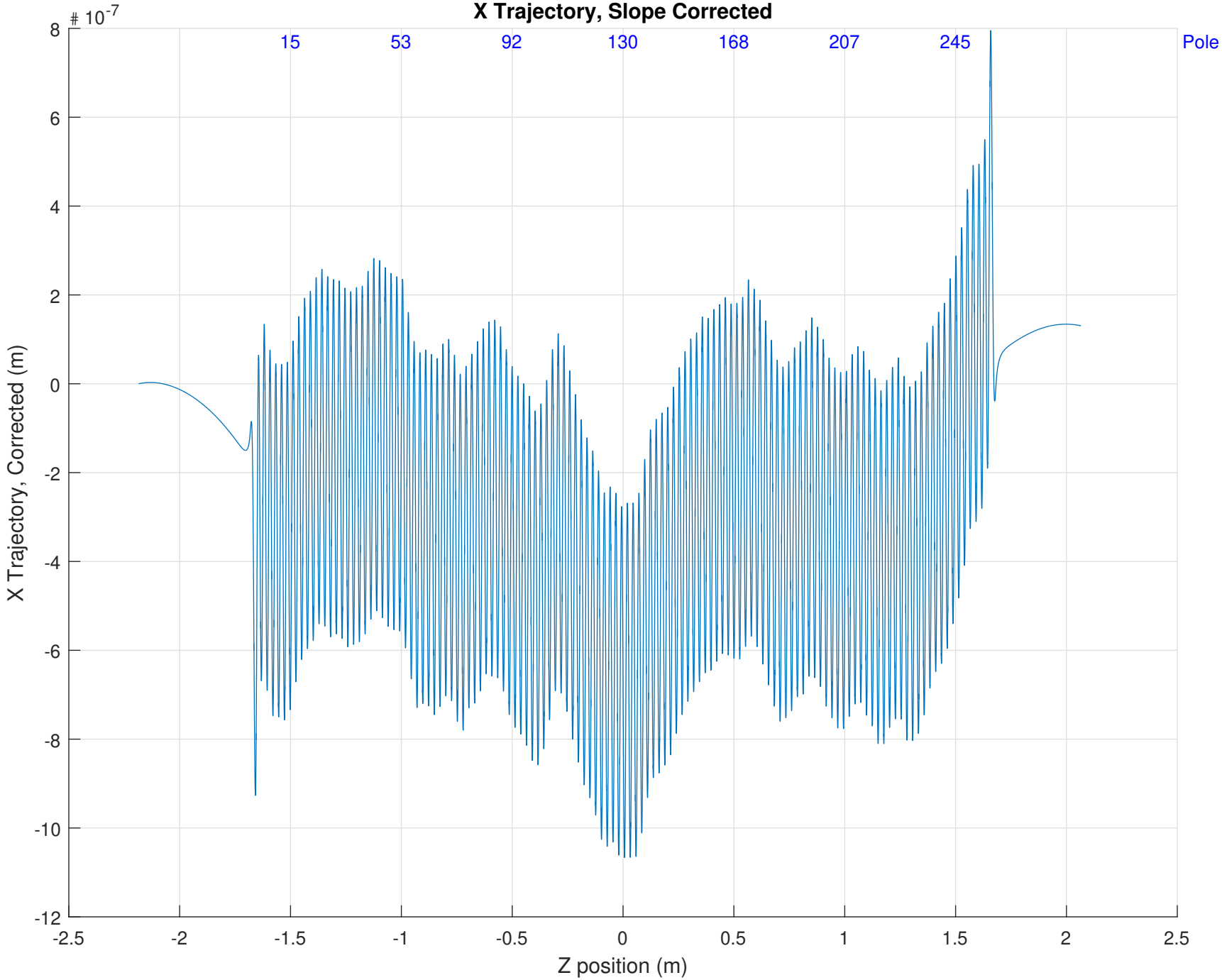
Zero Field Spacing: Ave = 0.012999 m, RMS = 0.000031 m

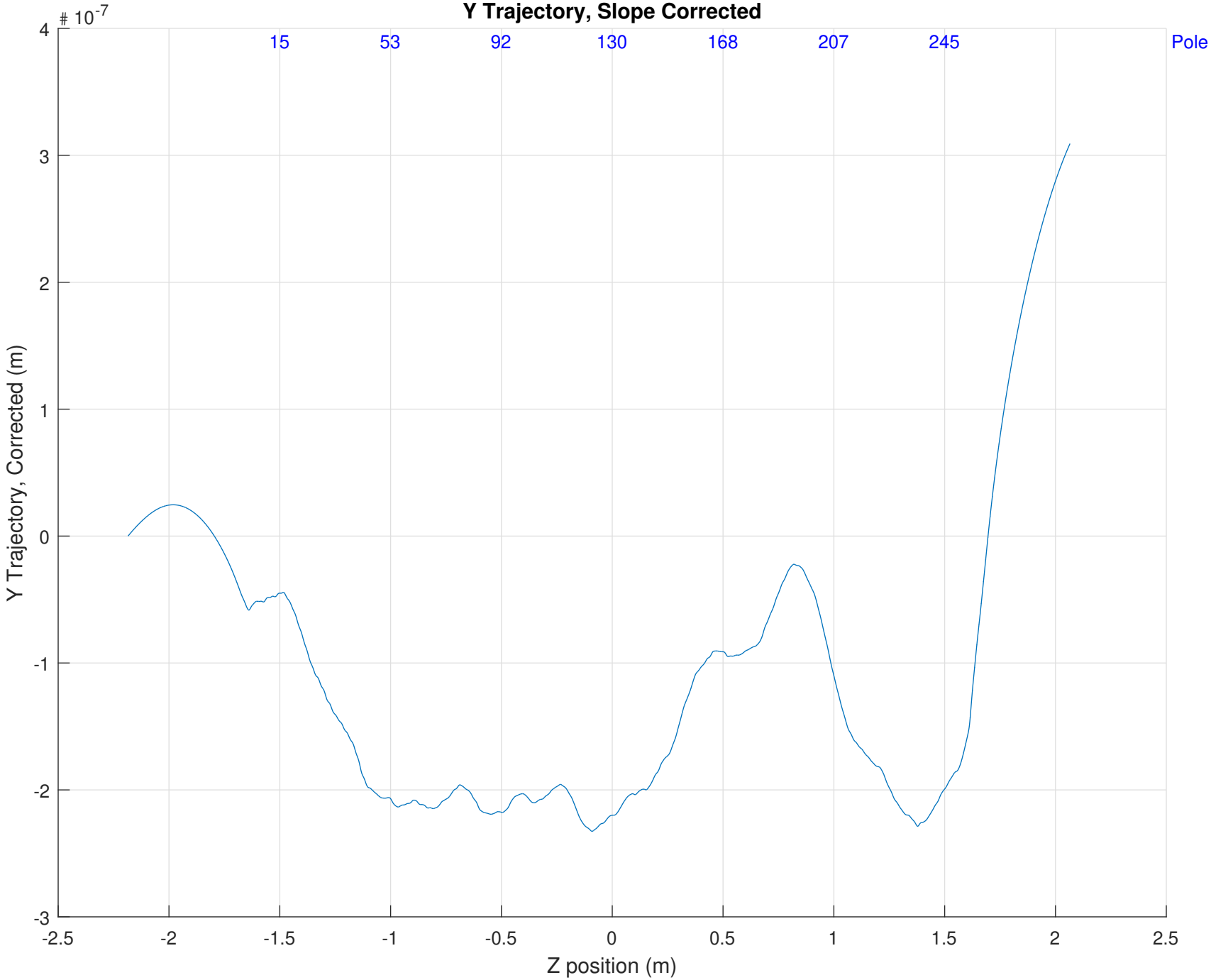

X Trajectory
10^-6
15
53
92
130
168
207
245
Pole
X (m)
10^-4
X'
X'' (1/m)
Z position (m)

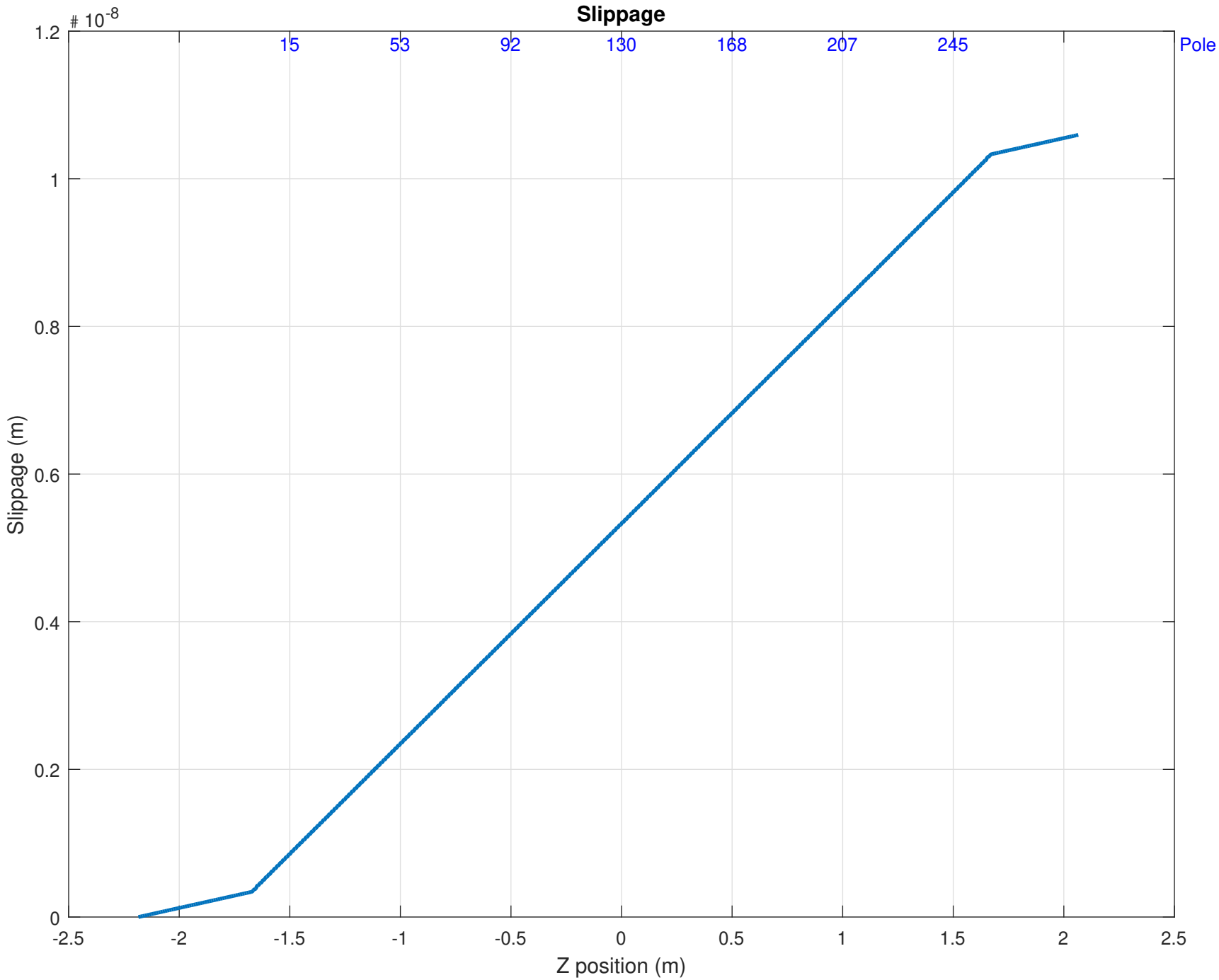

Y Trajectory
10^-6
Y (m)
15
53
92
130
168
207
245
Pole
10^-6
Y'
10^-4
Y'' (1/m)
Z position (m)

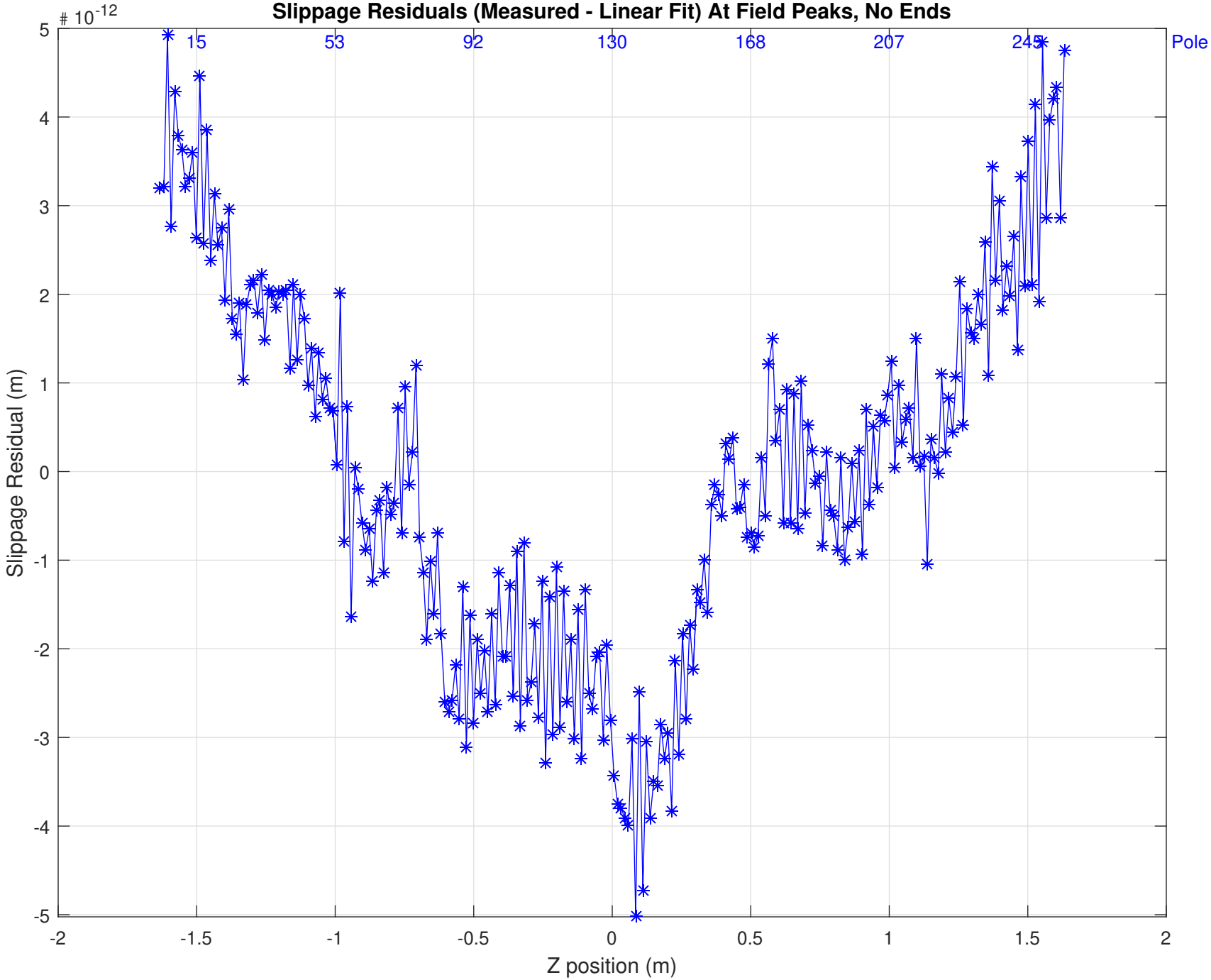

X Trajectory
10^-6
15
53
92
130
168
207
245
Pole
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
X (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)

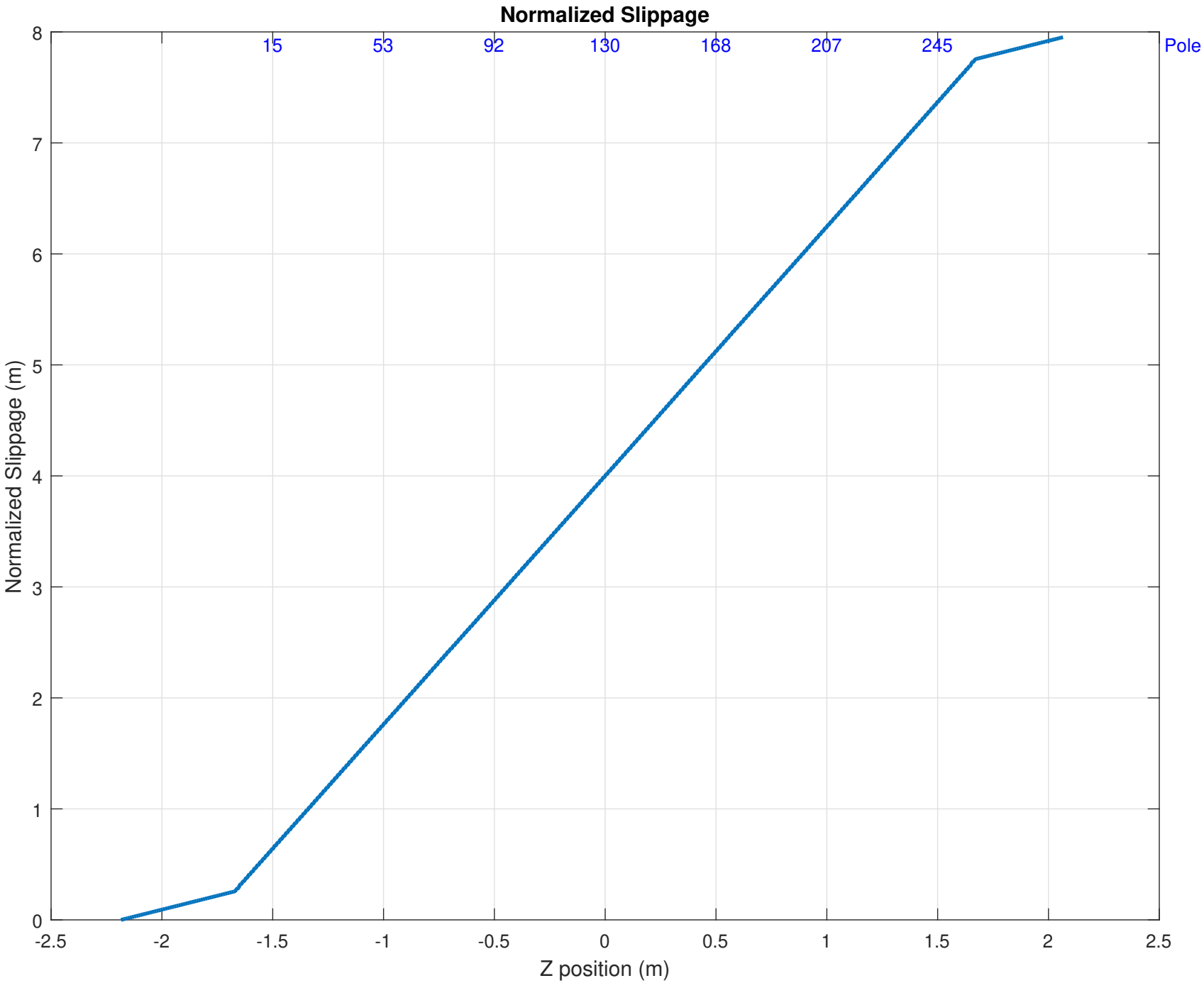

Y Trajectory
10^-6
15
53
92
130
168
207
245
Pole
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
Y (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)

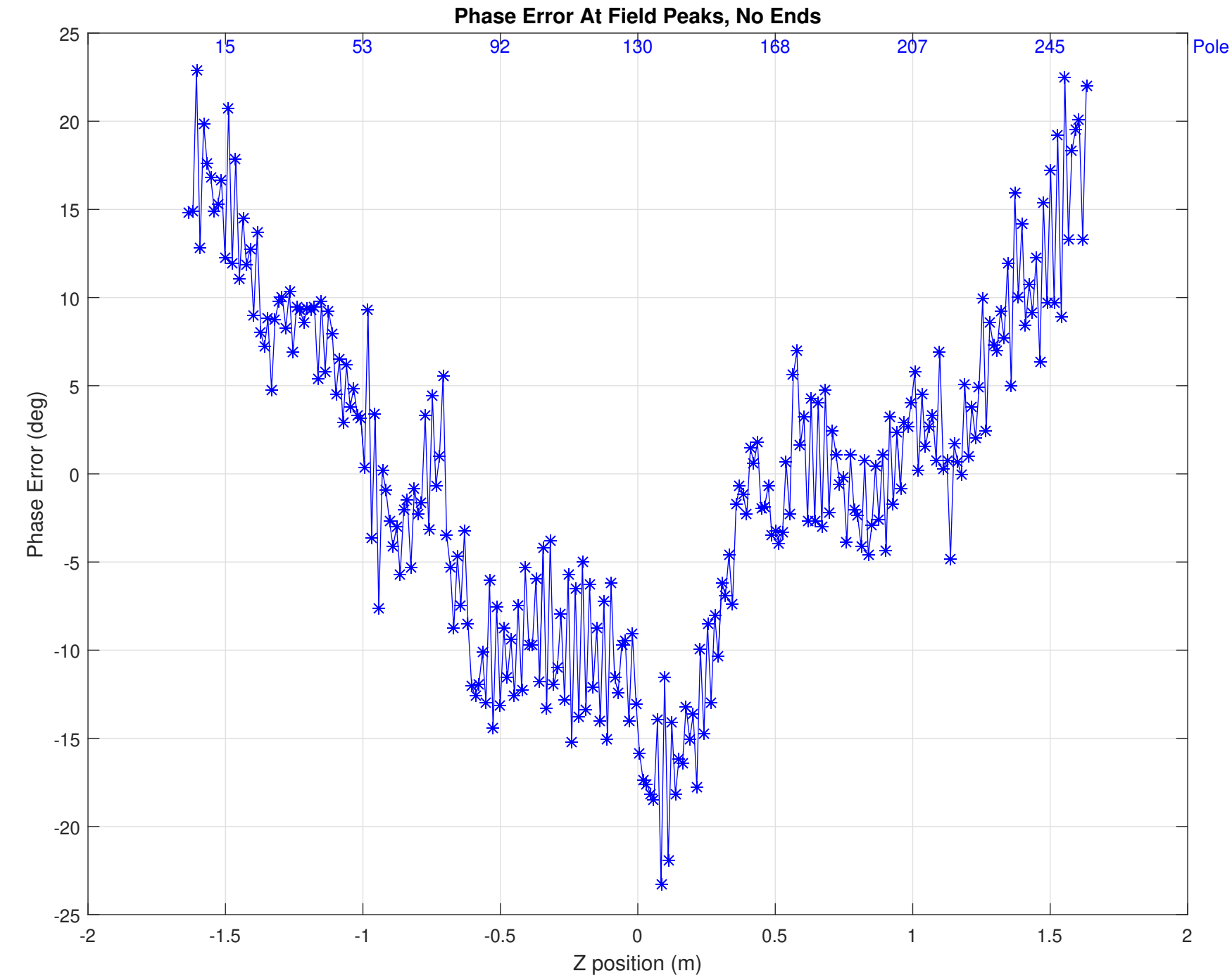

X Trajectory, Slope Corrected
10^-7
15
53
92
130
168
207
245
Pole
8
6
4
2
0
-2
-4
-6
-8
-10
-12
X Trajectory, Corrected (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)


Y Trajectory, Slope Corrected
10^-7
4
3
2
1
0
-1
-2
-3
15
53
92
130
168
207
245
Pole
Y Trajectory, Corrected (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)

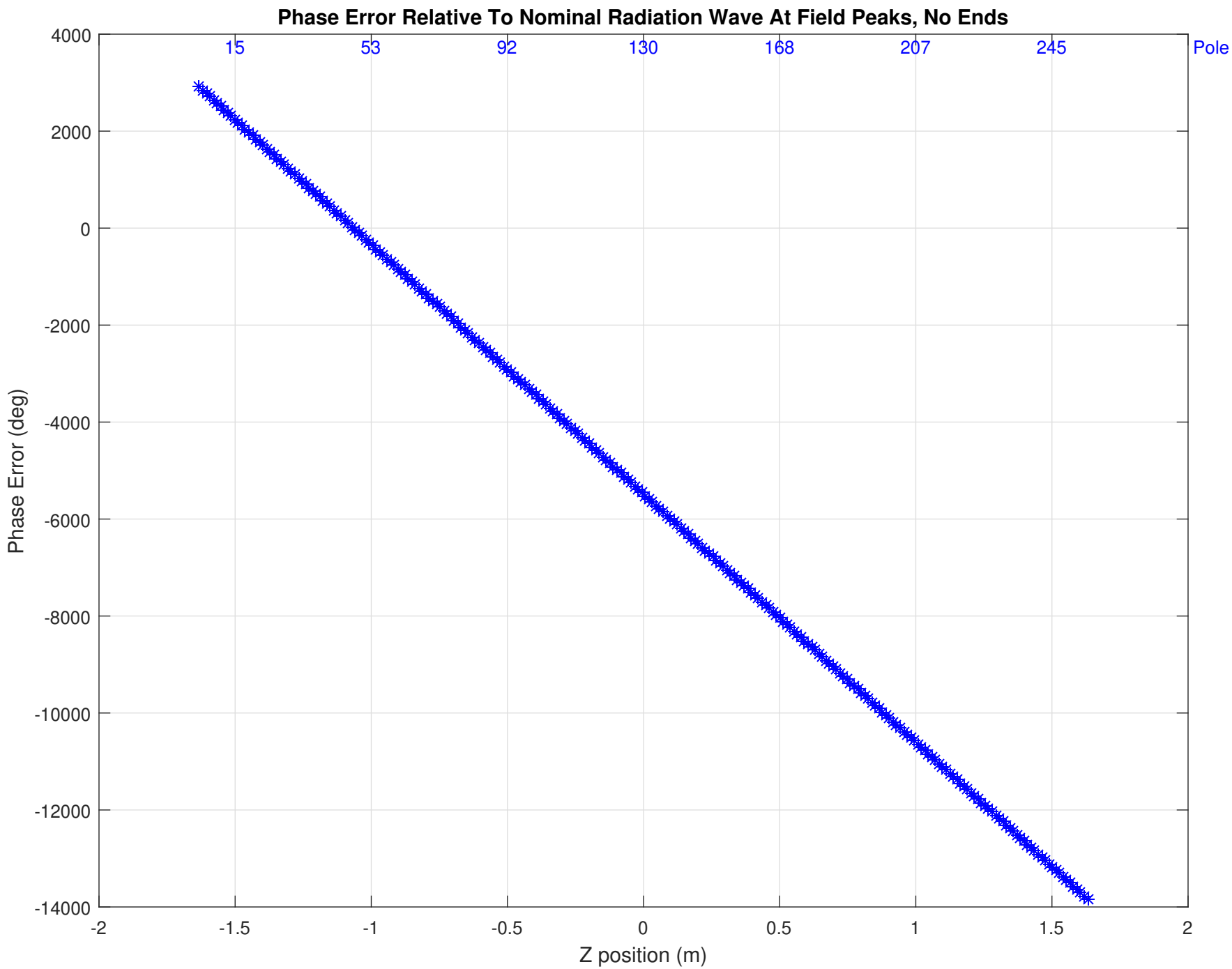

Slippage
10^-8
1.2
1
0.8
0.6
0.4
0.2
0
Slippage (m)
15
53
92
130
168
207
245
Pole
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)


Slippage Residuals (Measured - Linear Fit) At Field Peaks, No Ends
10^-12
15
53
92
130
168
207
245
Pole
Slippage Residual (m)
Z position (m)
5
4
3
2
1
0
-1
-2
-3
-4
-5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2


Normalized Slippage
15
53
92
130
168
207
245
Pole
8
7
6
5
4
3
2
1
0
Normalized Slippage (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)



Phase Error: Ave = 0.000000 deg, RMS = 9.794943 deg


Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
15
53
92
130
168
207
245
Pole
4000
2000
0
-2000
-4000
-6000
-8000
-10000
-12000
-14000
Phase Error (deg)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z position (m)