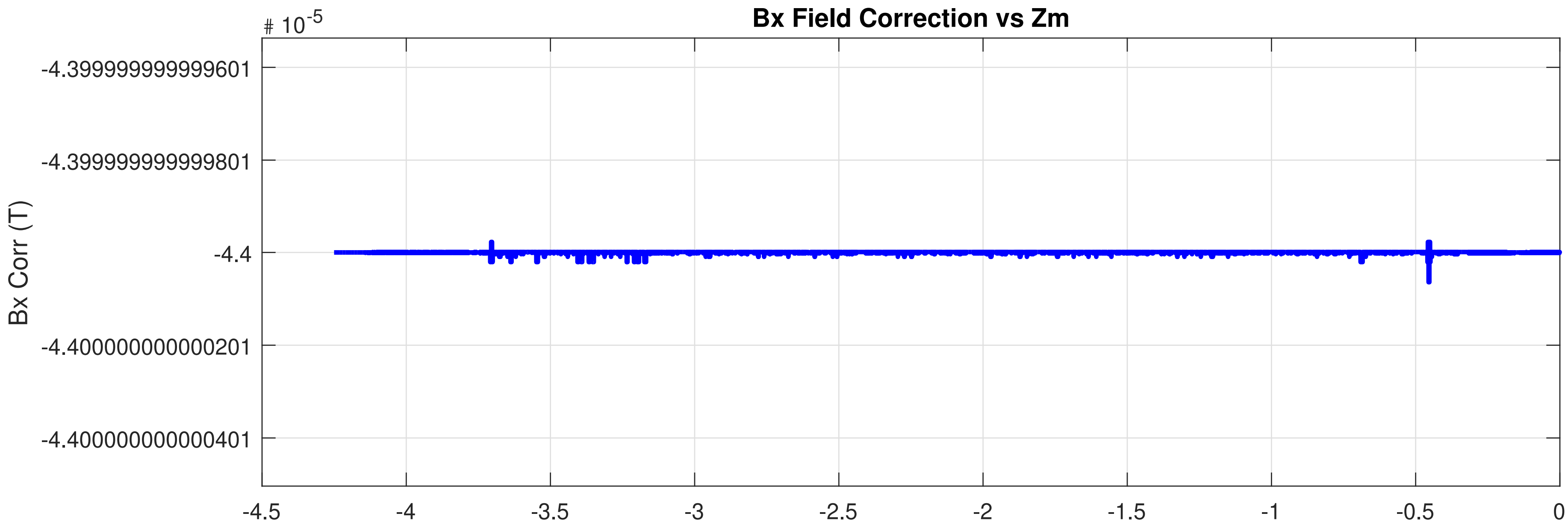
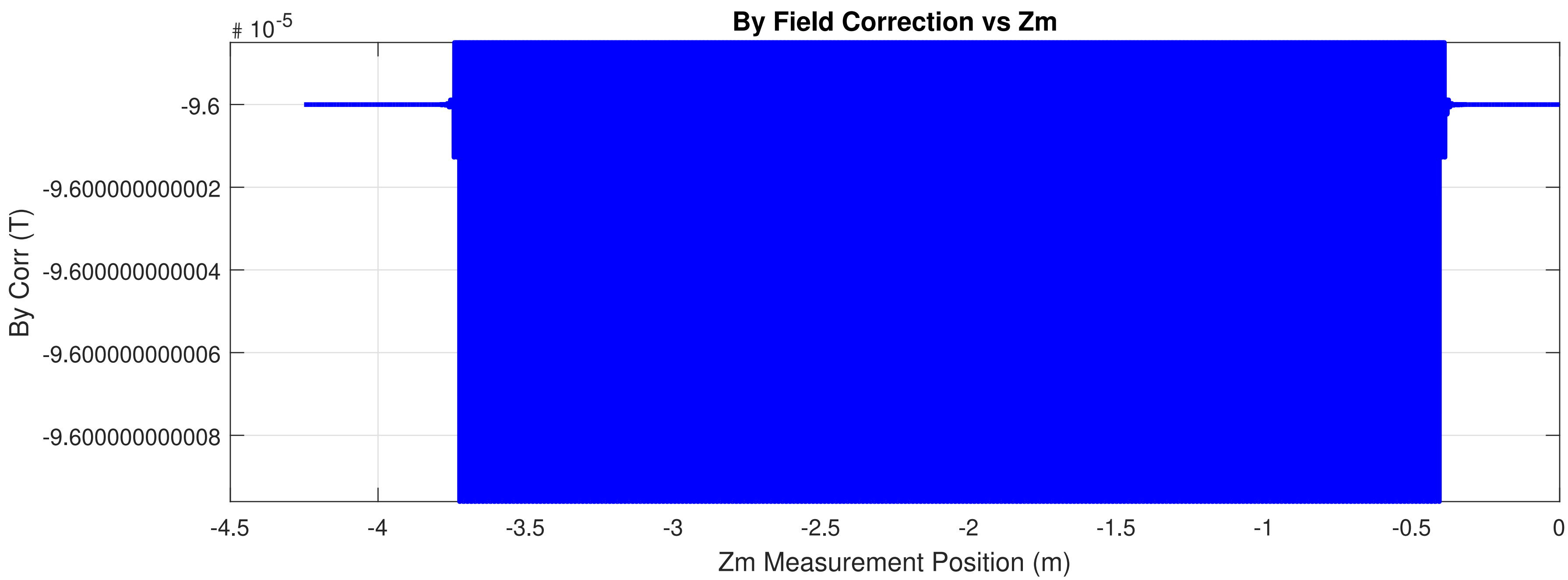
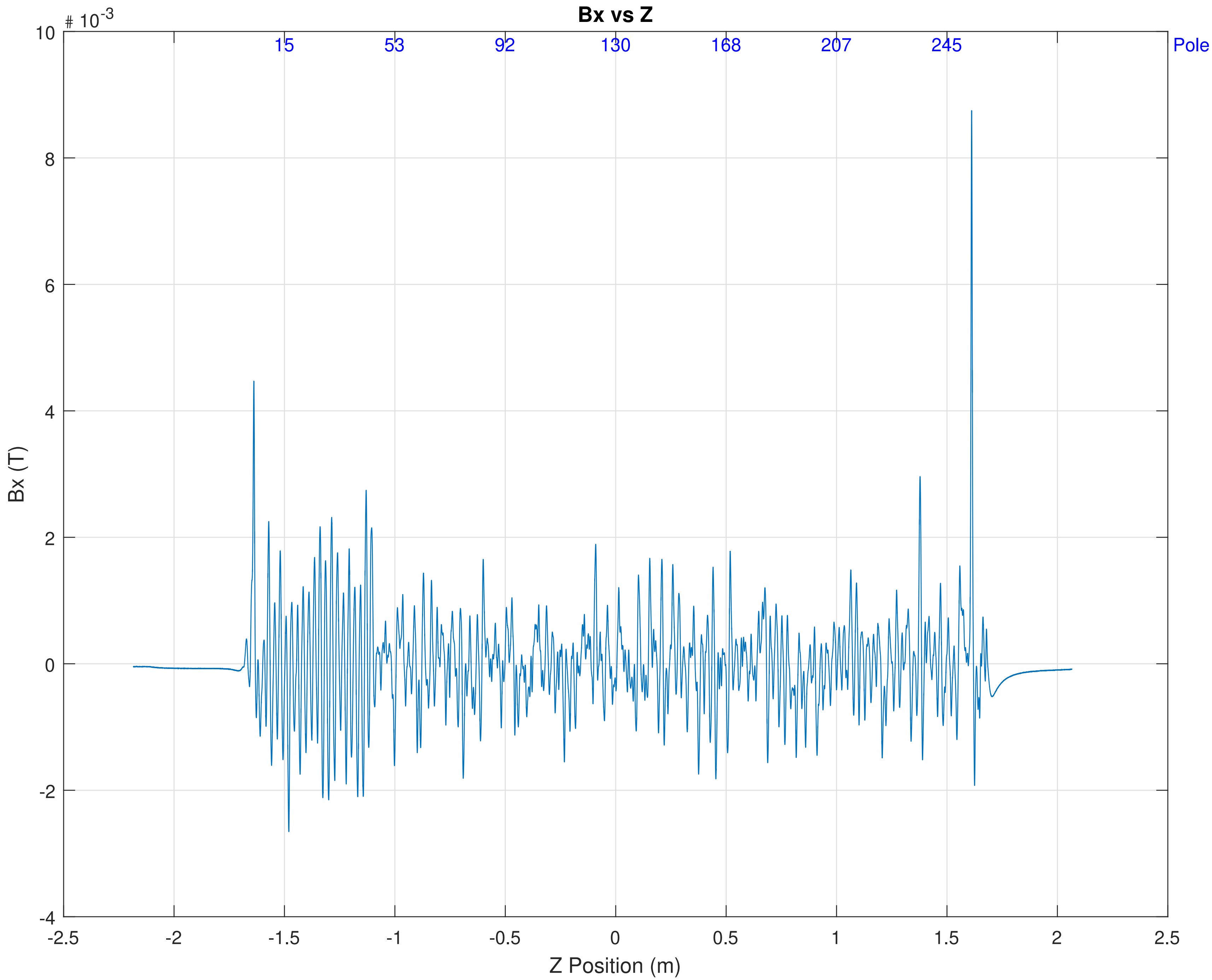
SLAC Magnetic Measurements

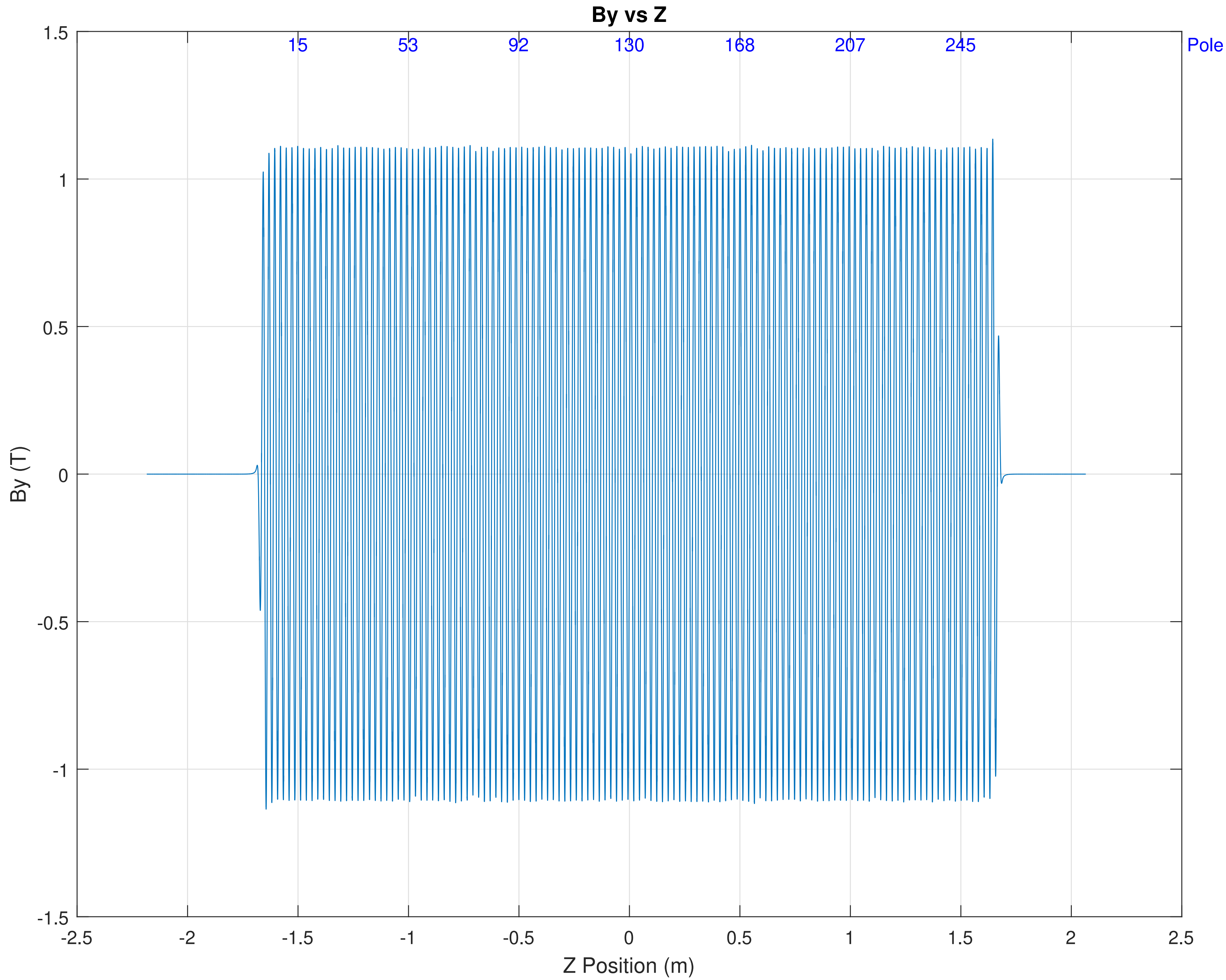
Planar Insertion Device Analysis

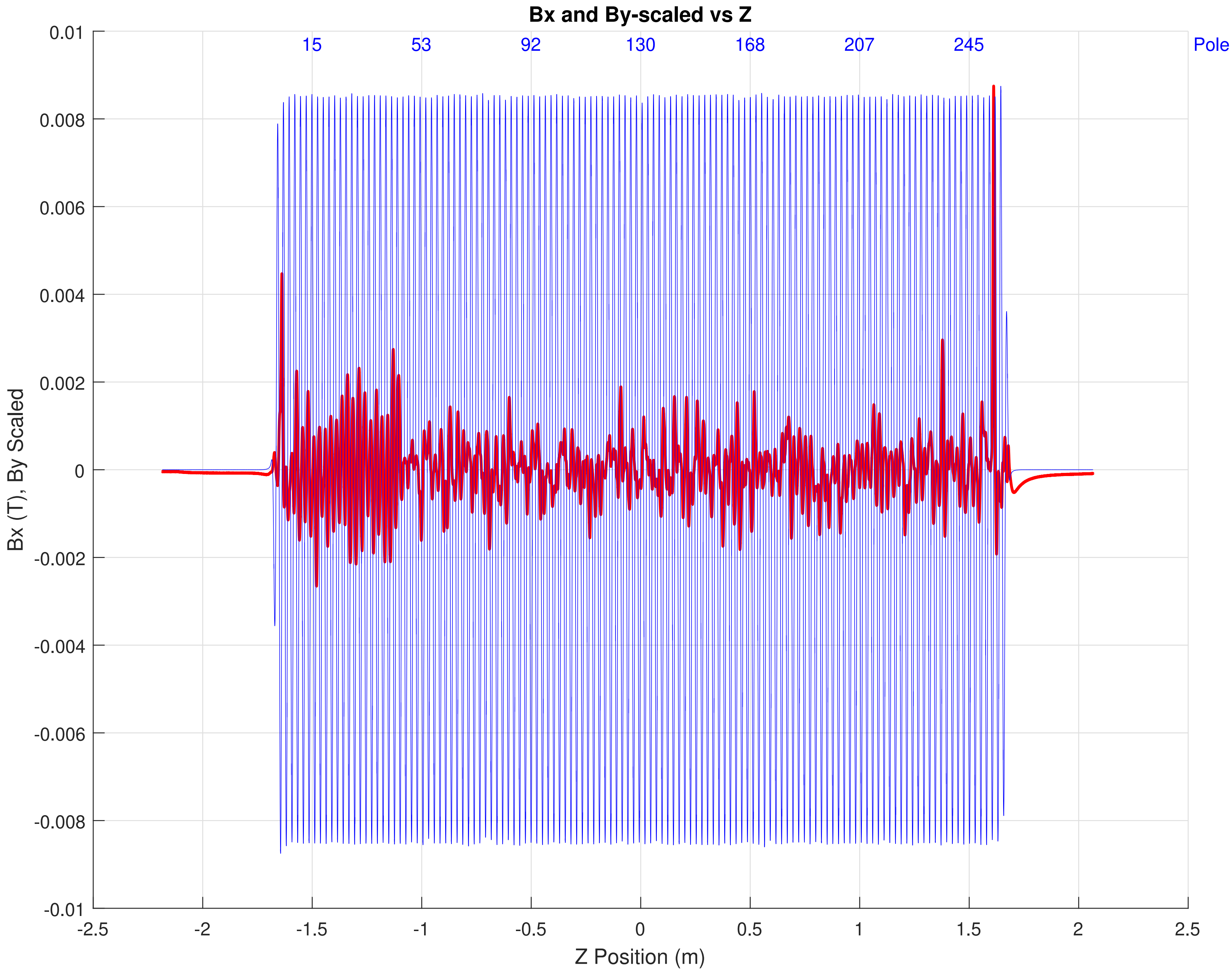
Parameters:
INPUT-FILE-DIR =S:\MagData\LCLS2\Undulator\HGVPU\DATASET0001\Fine Tuning\Z Scans\Run 029\
INPUT-FILE-NAME =x+00000-y+000-bscanz.dat
INPUT-FILE-TYPE =ZVXYBXYH
CORR-REQUIRED =1
GAMMA =27397
NOM-LAMBDA-U =0.026
NOM-K-VALUE =1.5363
NOM-LAMBDA-R =3.7759e-11
NUM-POLES =260
NUM-END-POLES =4
CELL-LENGTH =3.656

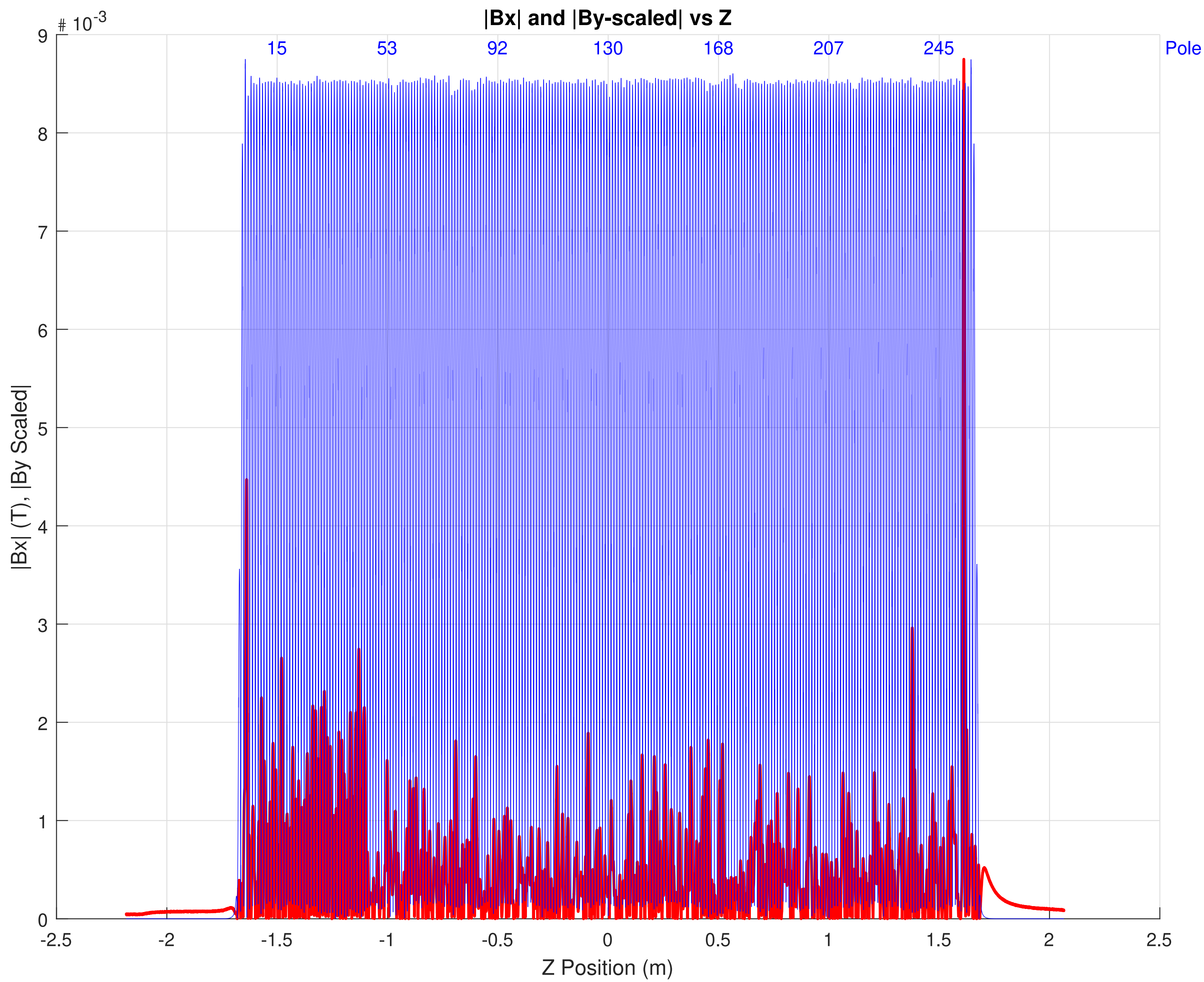

Bx Field Correction vs Zm
10^-5
-4.399999999999601
-4.399999999999801
-4.4
-4.400000000000201
-4.400000000000401
Bx Corr (T)
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0

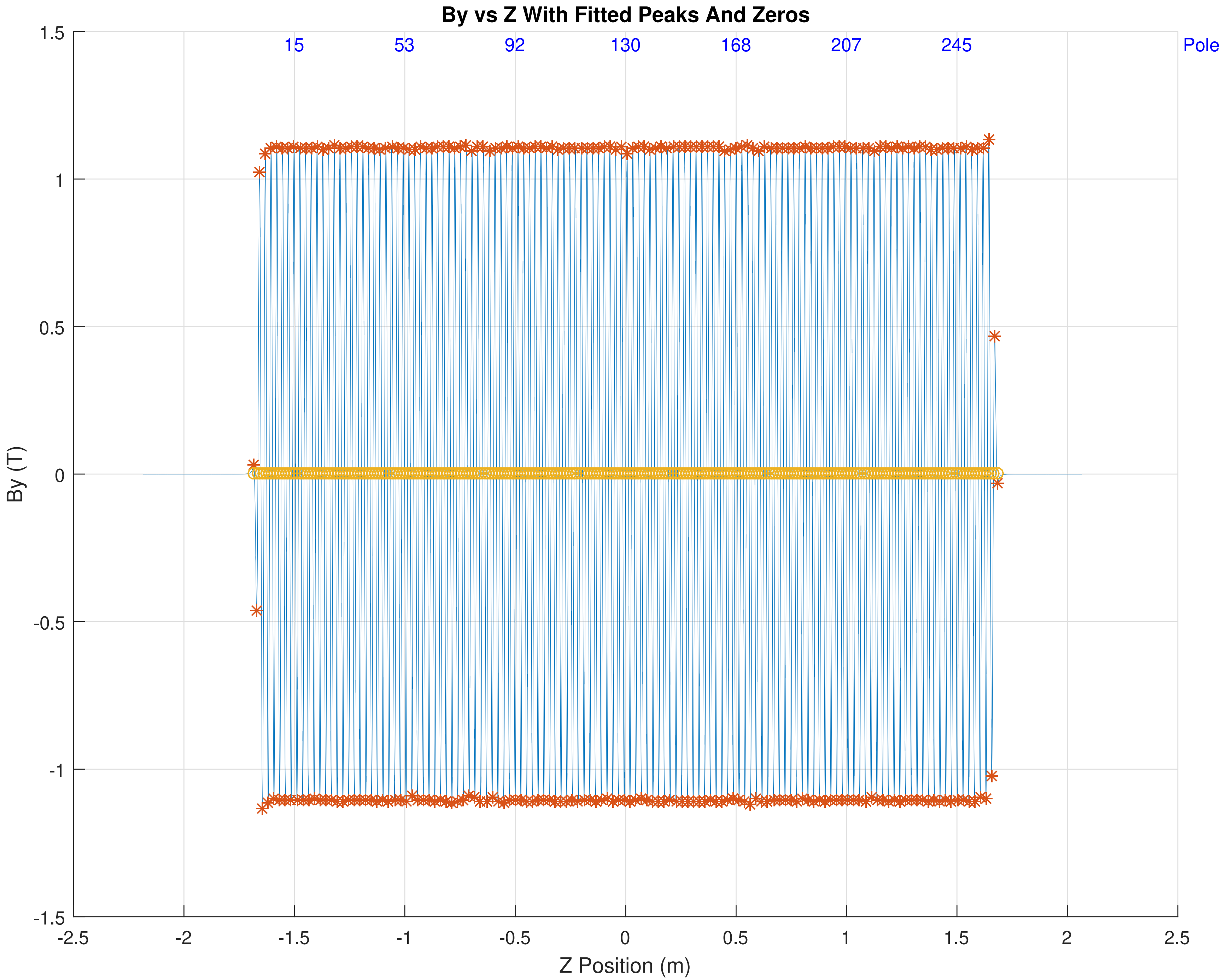

By Field Correction vs Zm
10^-5
-9.6
-9.600000000002
-9.600000000004
-9.600000000006
-9.600000000008
By Corr (T)
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
Zm Measurement Position (m)


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

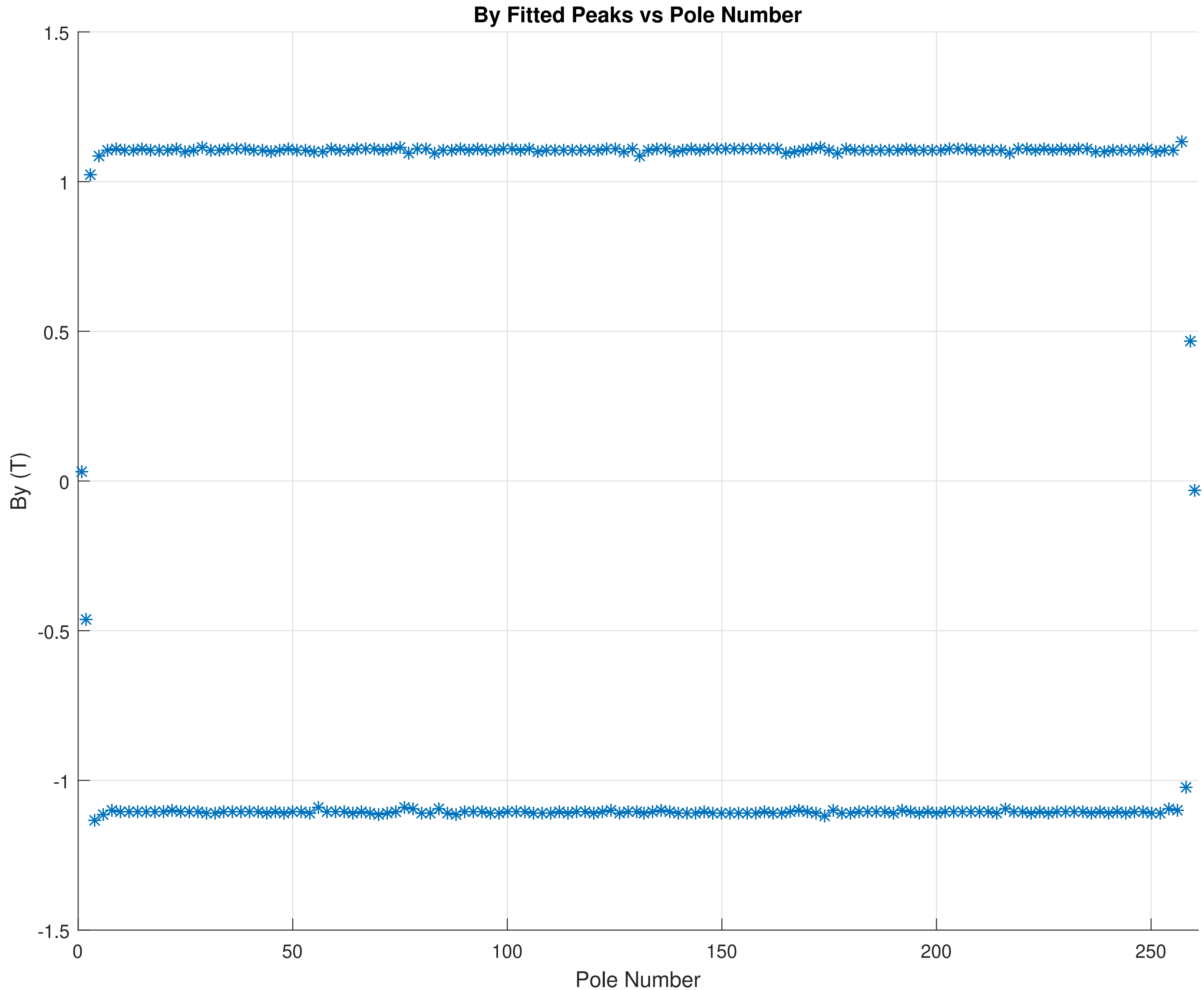

By vs Z
15
53
92
130
168
207
245
Pole
1.5
1
0.5
0
-0.5
-1
-1.5
By (T)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z Position (m)


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

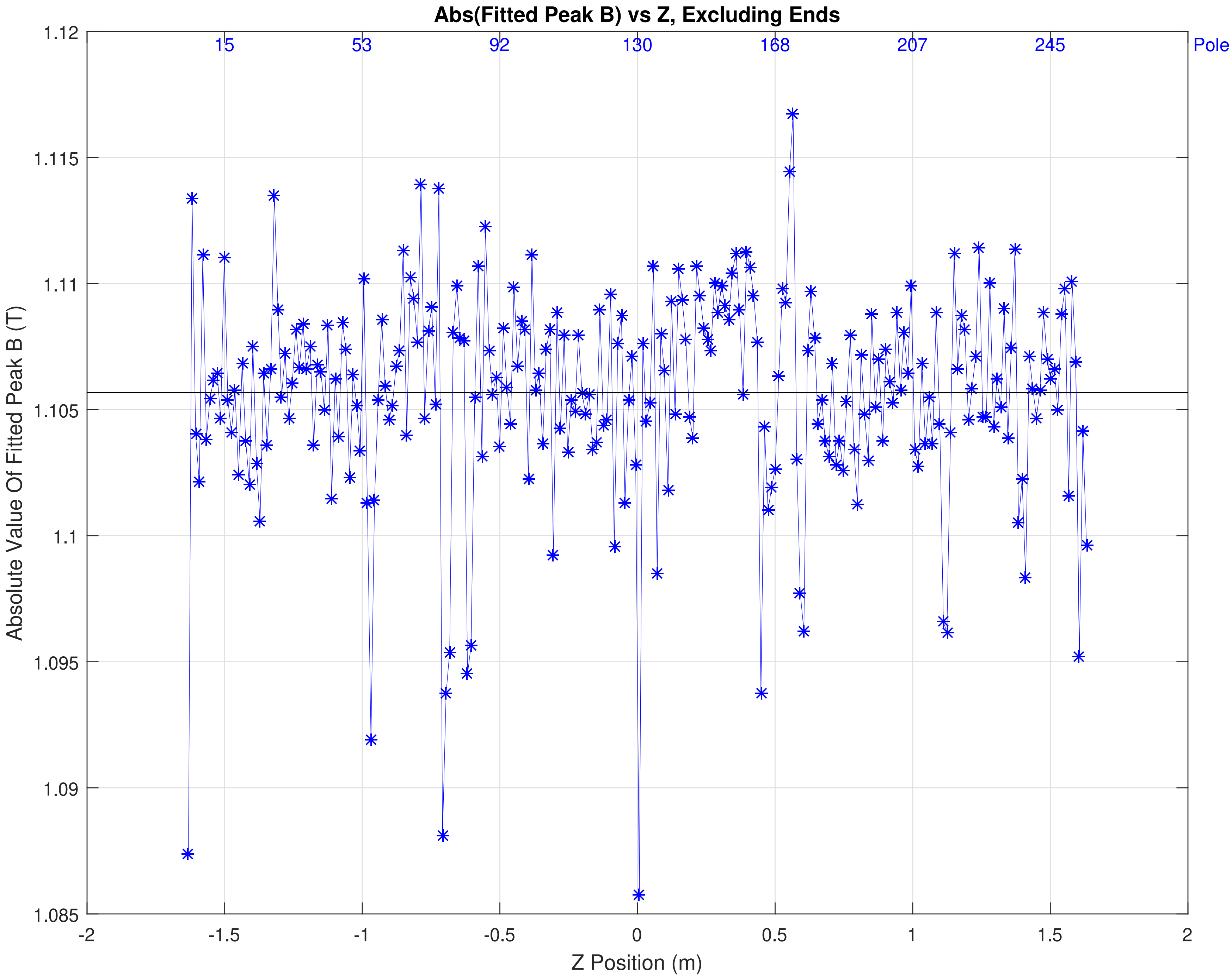

|Bx| and |By-scaled| vs Z
10^-3
15
53
92
130
168
207
245
Pole
9
8
7
6
5
4
3
2
1
0
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z Position (m)
|Bx| (T), |By Scaled|



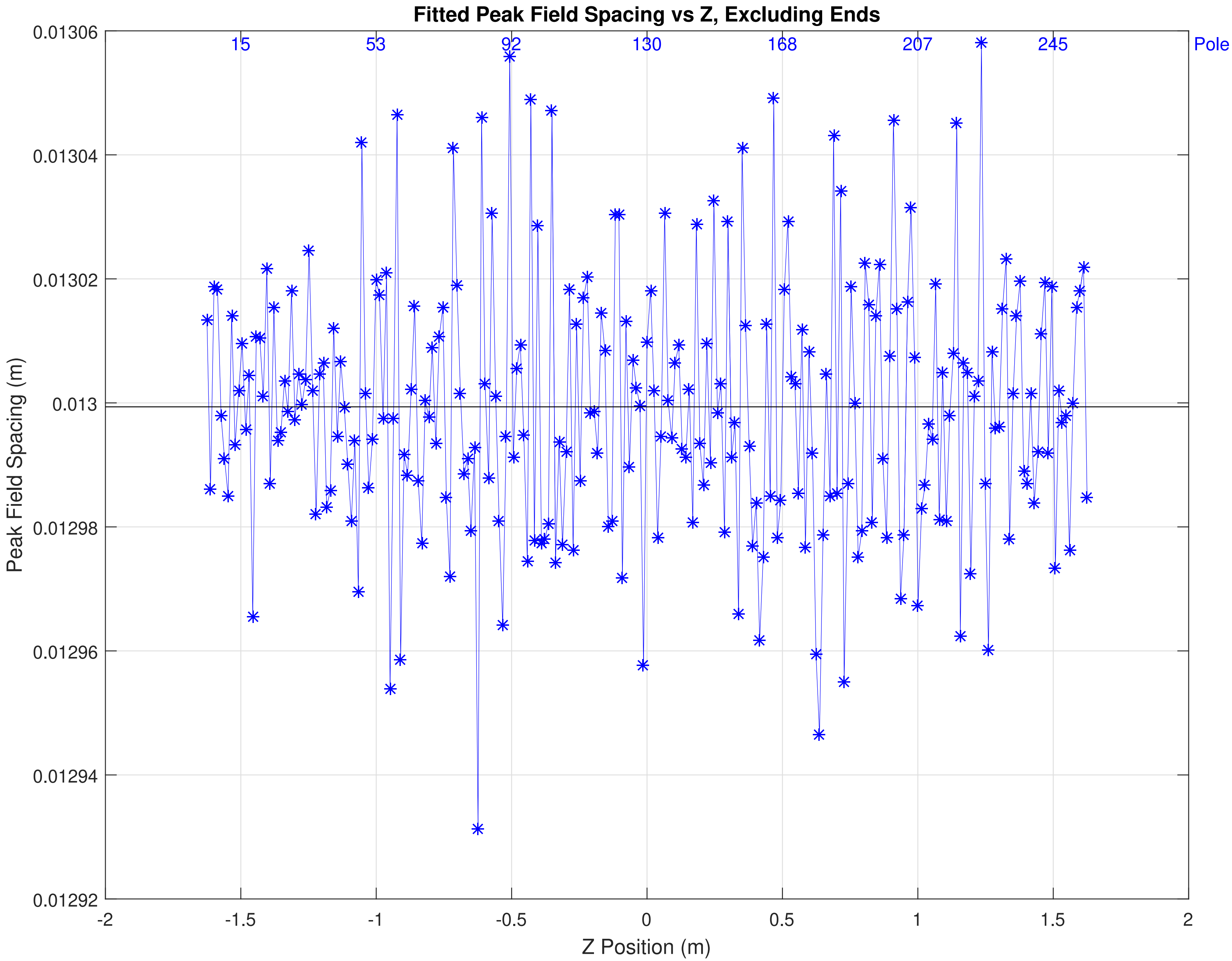
By vs Z With Fitted Peaks And Zeros
15
53
92
130
168
207
245
Pole
1.5
1
0.5
0
-0.5
-1
-1.5
By (T)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z Position (m)



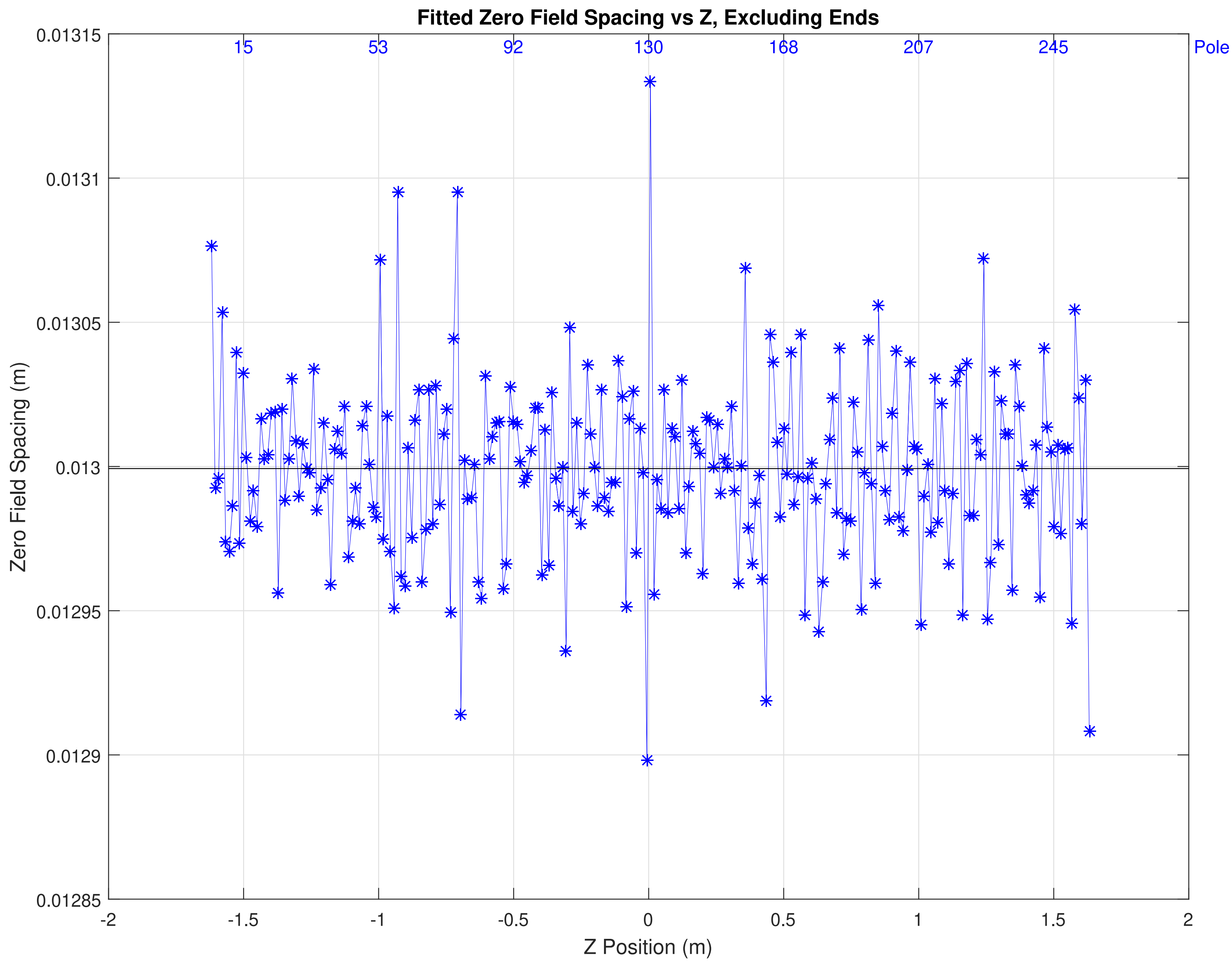
By Fitted Peaks vs Pole Number
1.5
1
0.5
0
-0.5
-1
-1.5
By (T)
0
50
100
150
200
250
Pole Number



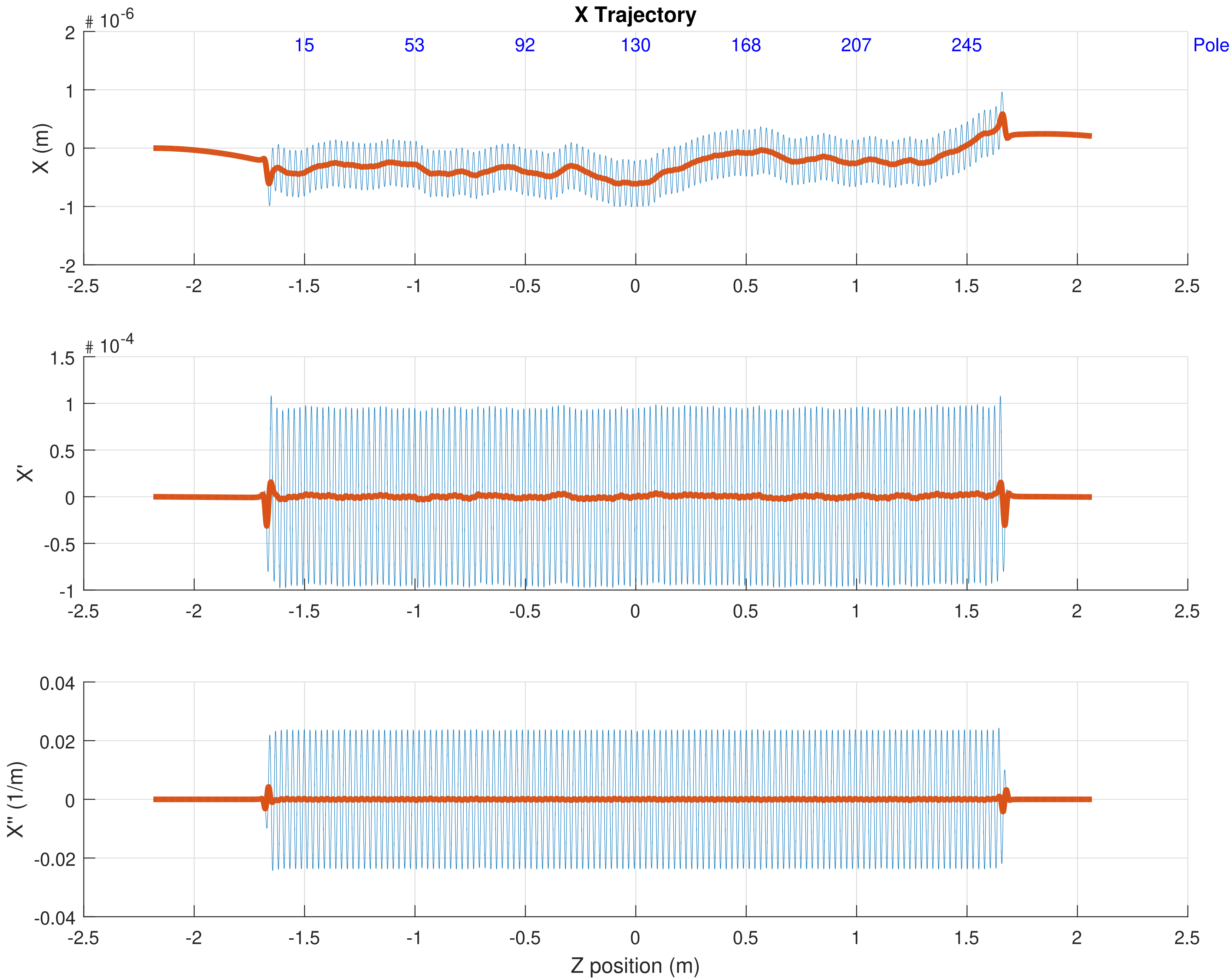
Peak Fields: Ave = 1.105672 T, RMS = 0.004286 T



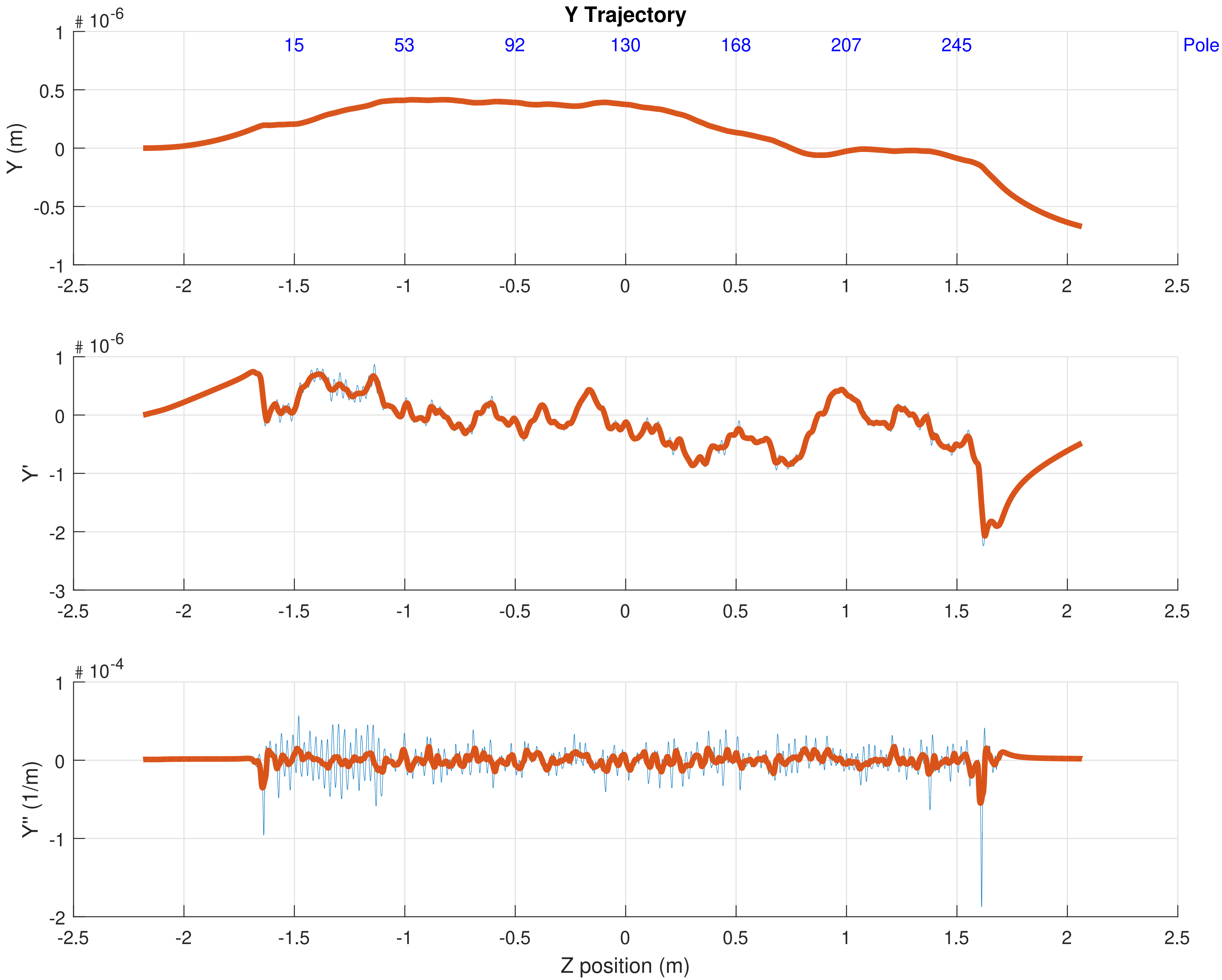
Peak Field Spacing: Ave = 0.012999 m, RMS = 0.000021 m



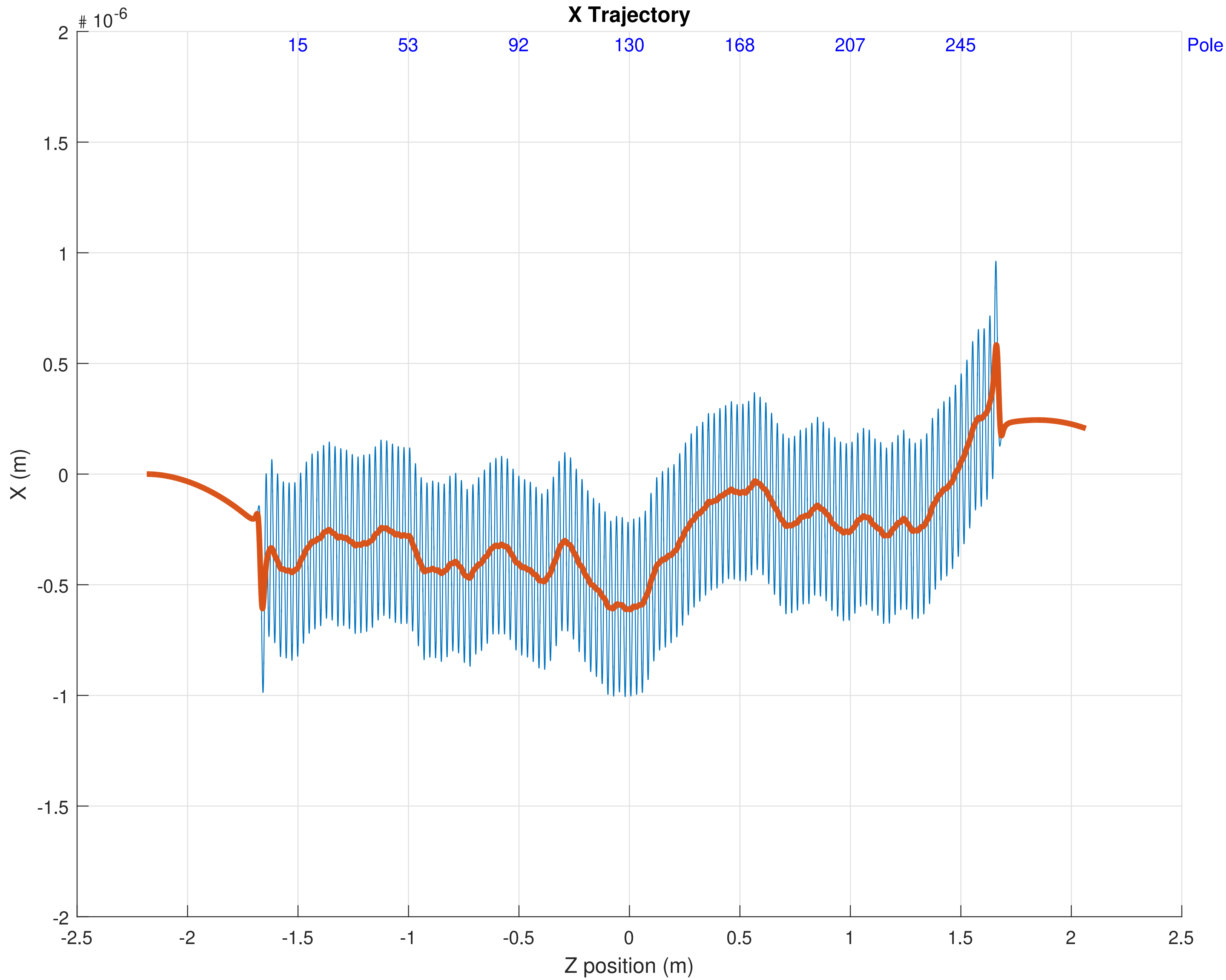
Zero Field Spacing: Ave = 0.012999 m, RMS = 0.000031 m

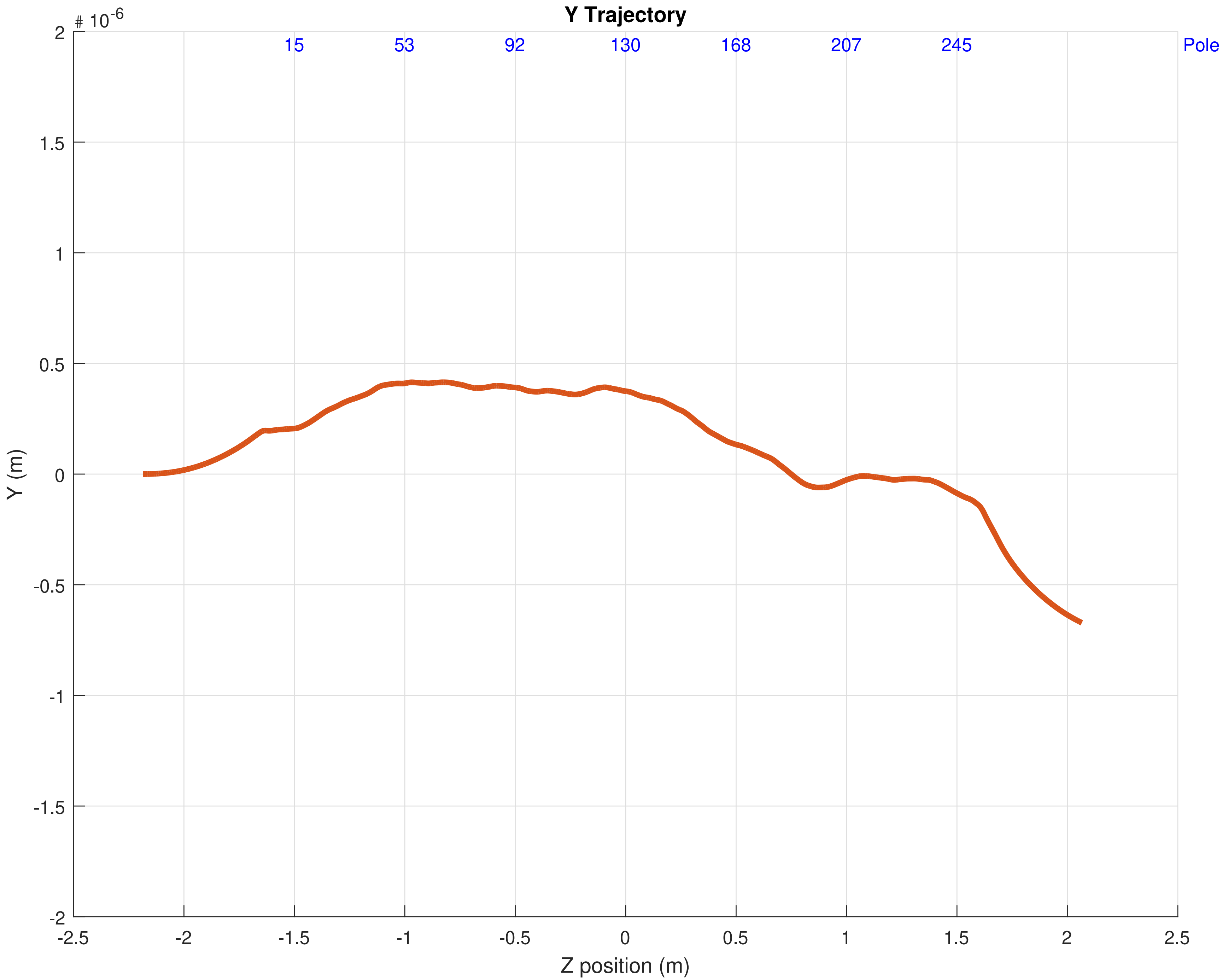


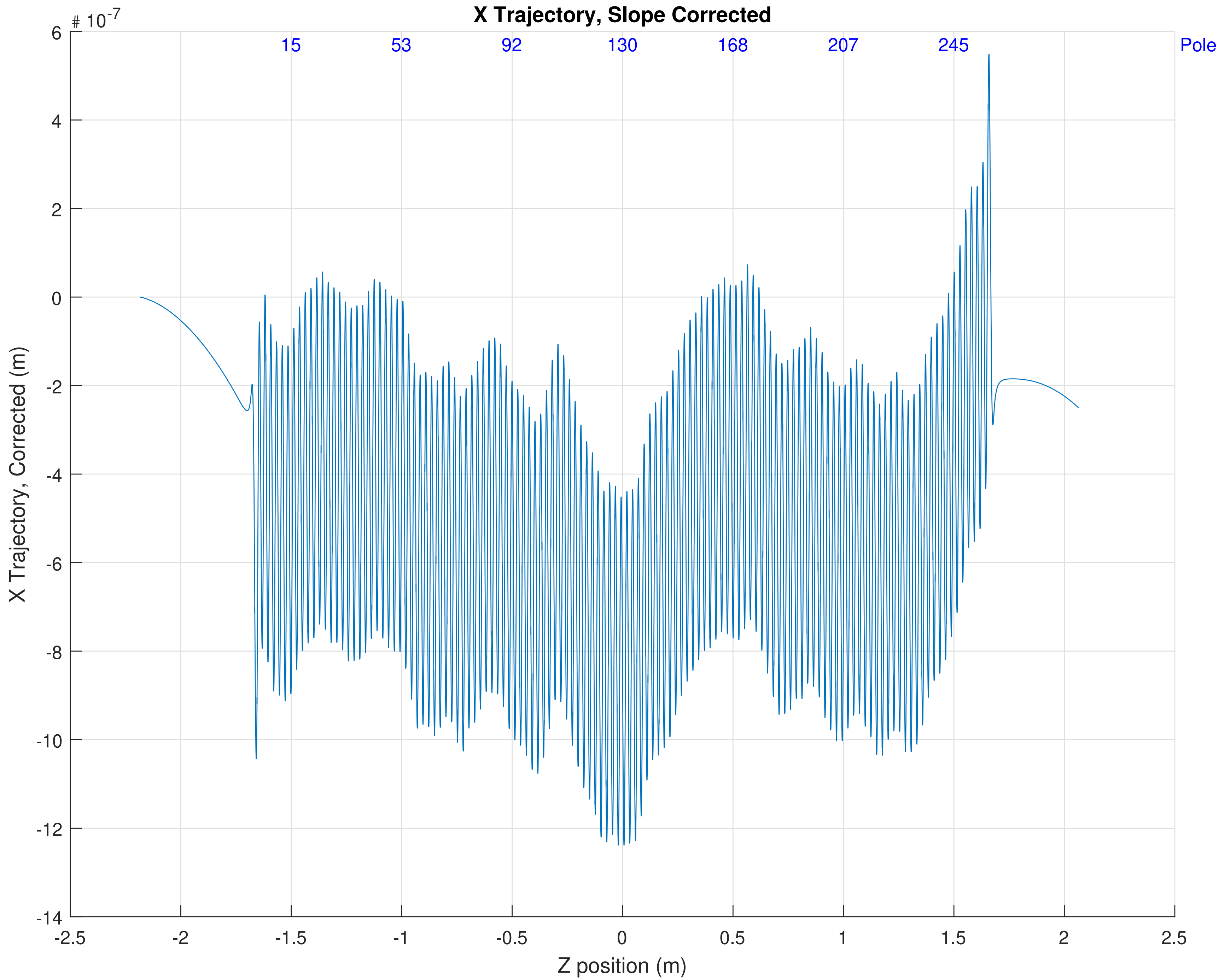
X Trajectory
10-6
15
53
92
130
168
207
245
Pole
X (m)
10-4
X'
X'' (1/m)
Z position (m)

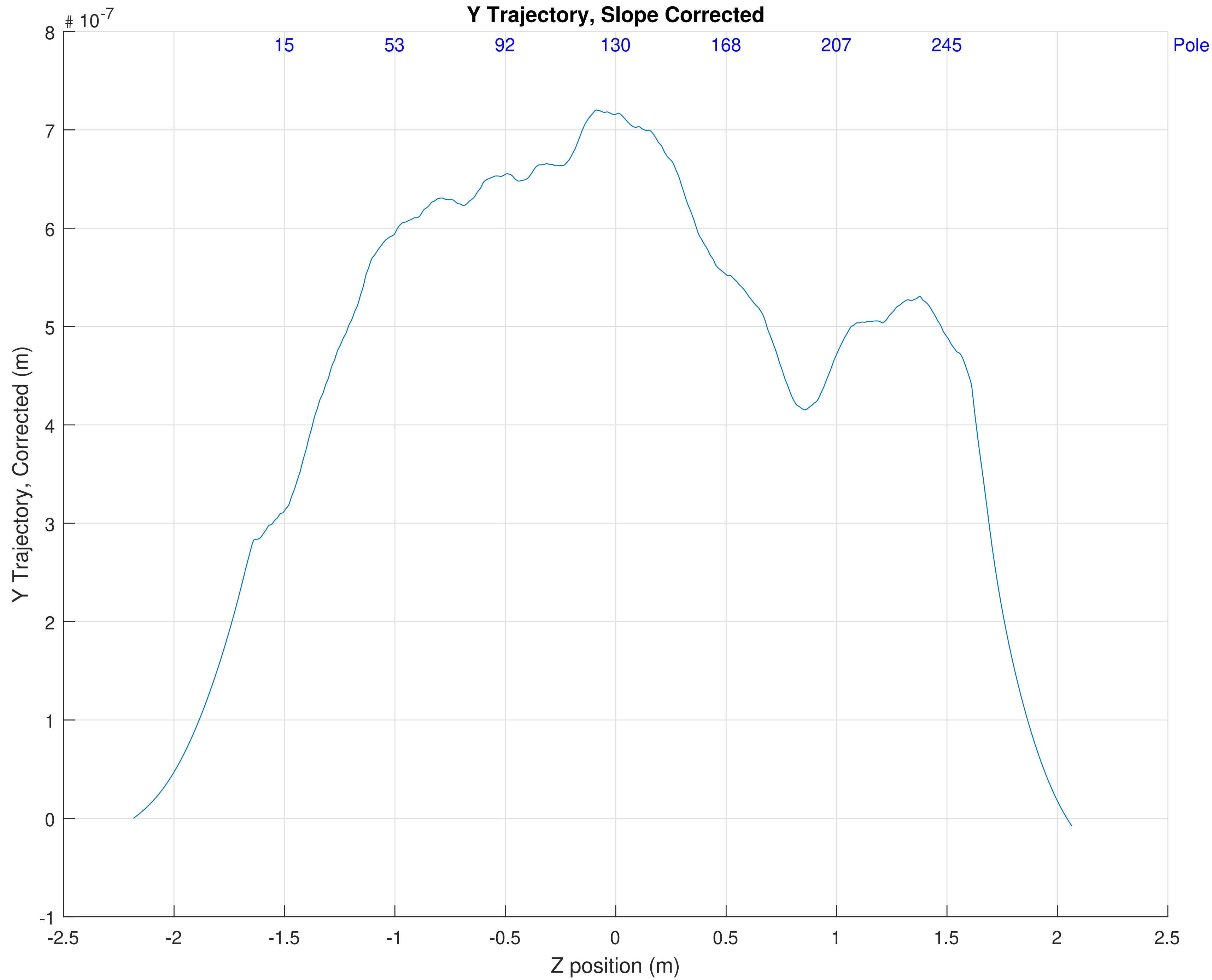


Y Trajectory
10^-6
15
53
92
130
168
207
245
Pole
Y (m)
Y'
10^-6
10^-4
Y'' (1/m)
Z position (m)

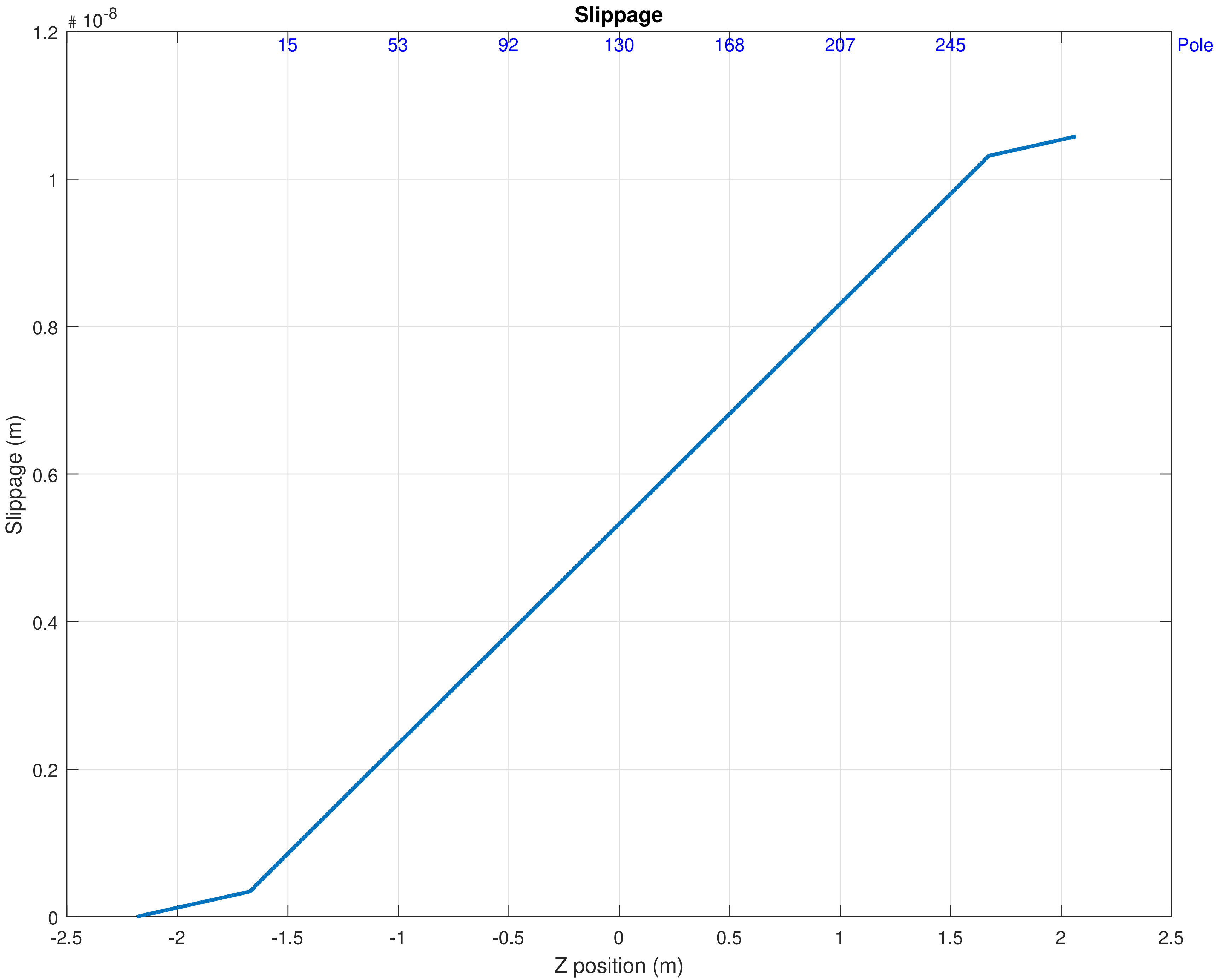

X Trajectory
10^-6
15
53
92
130
168
207
245
Pole
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
X (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)


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
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Y (m)
Z position (m)

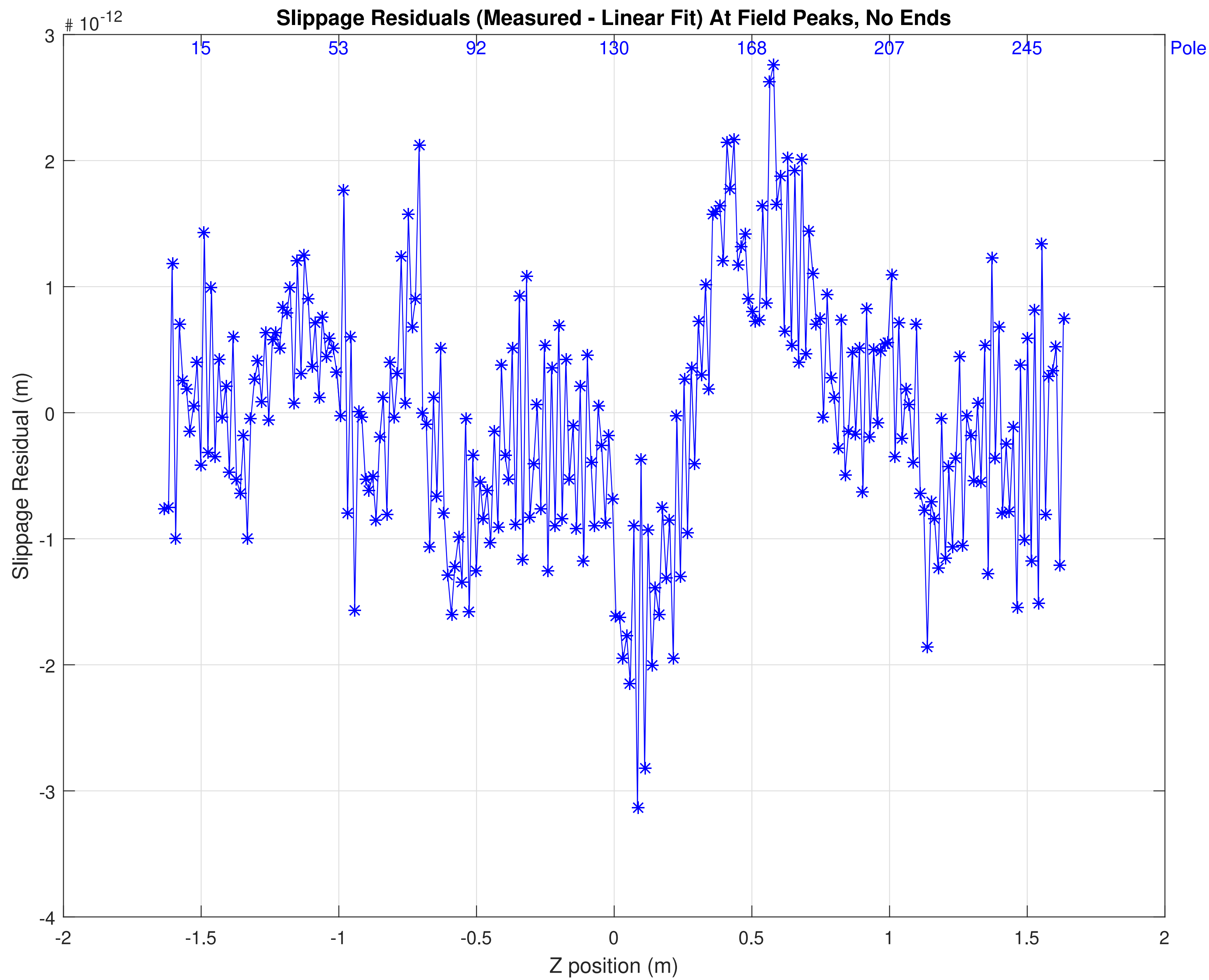

X Trajectory, Slope Corrected
10^-7
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
15
53
92
130
168
207
245
Pole
X Trajectory, Corrected (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)

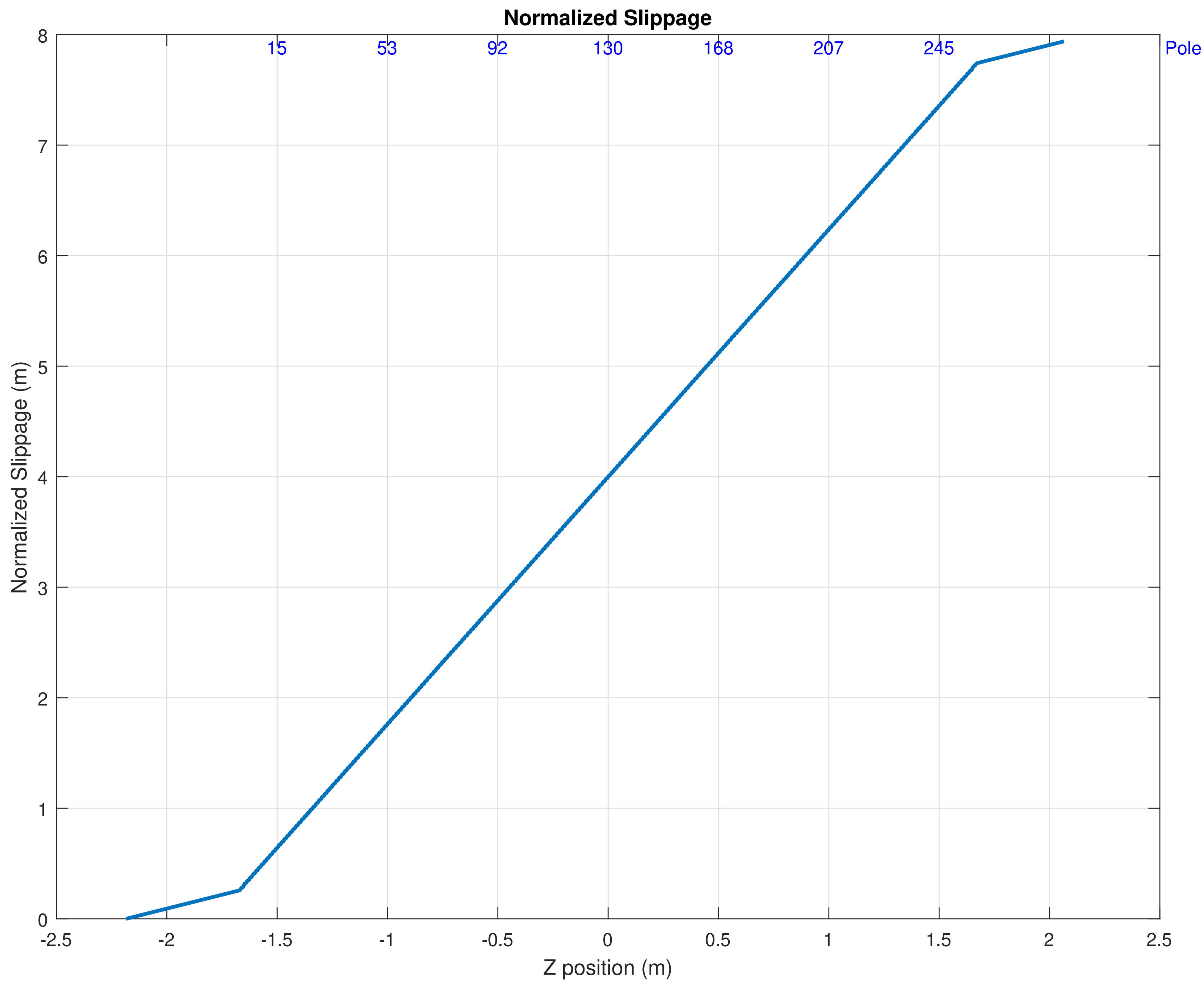


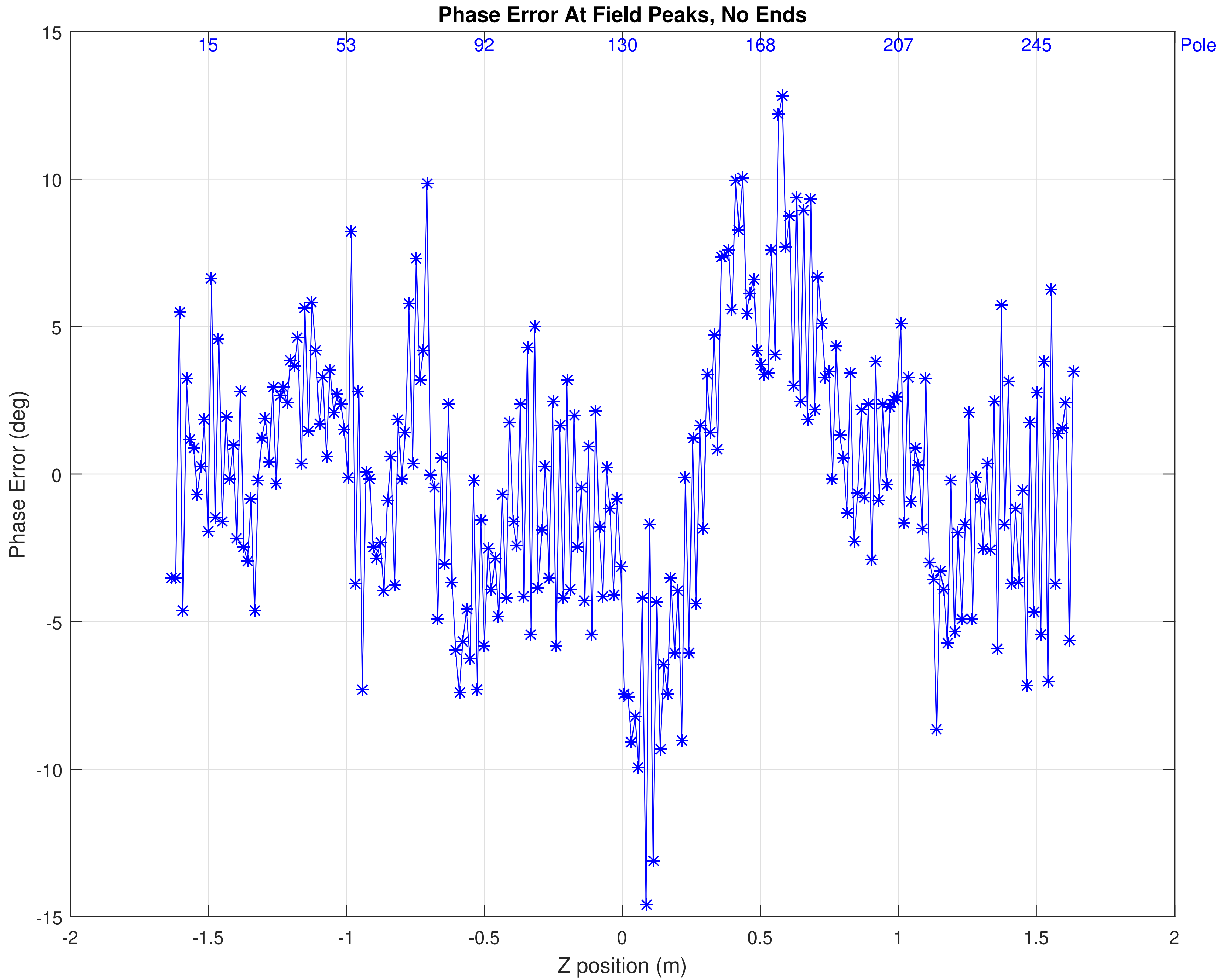
Y Trajectory, Slope Corrected
10-7
15
53
92
130
168
207
245
Pole
8
7
6
5
4
3
2
1
0
-1
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)
Y Trajectory, Corrected (m)



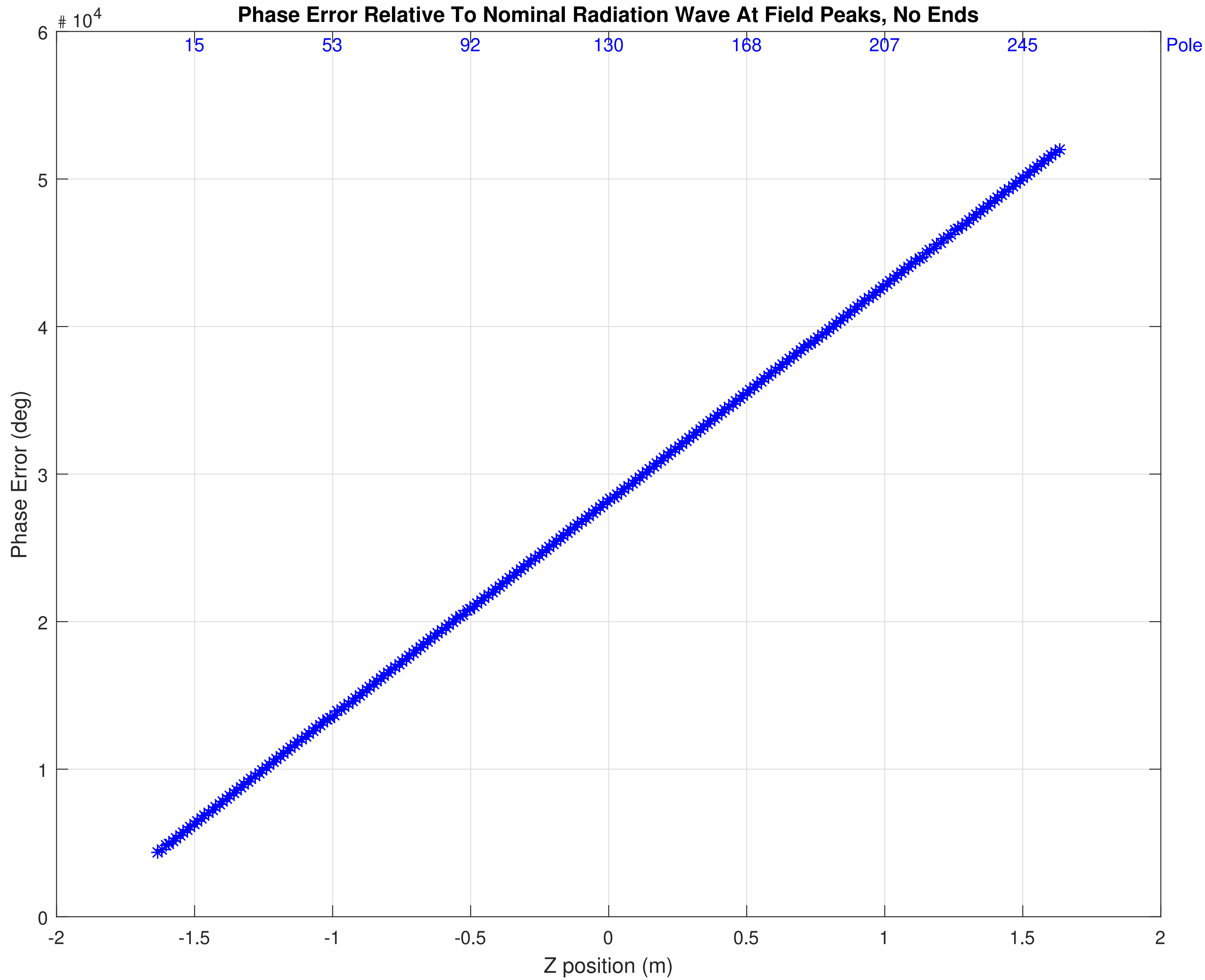
Slippage
10-8
1.2
1
0.8
0.6
0.4
0.2
0
15
53
92
130
168
207
245
Pole
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)
Slippage (m)


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


Normalized Slippage
15
53
92
130
168
207
245
Pole
Normalized Slippage (m)
0
1
2
3
4
5
6
7
8
-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 = 4.522570 deg



Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
10^4
15
53
92
130
168
207
245
Pole
Phase Error (deg)
0
1
2
3
4
5
6
Z position (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2