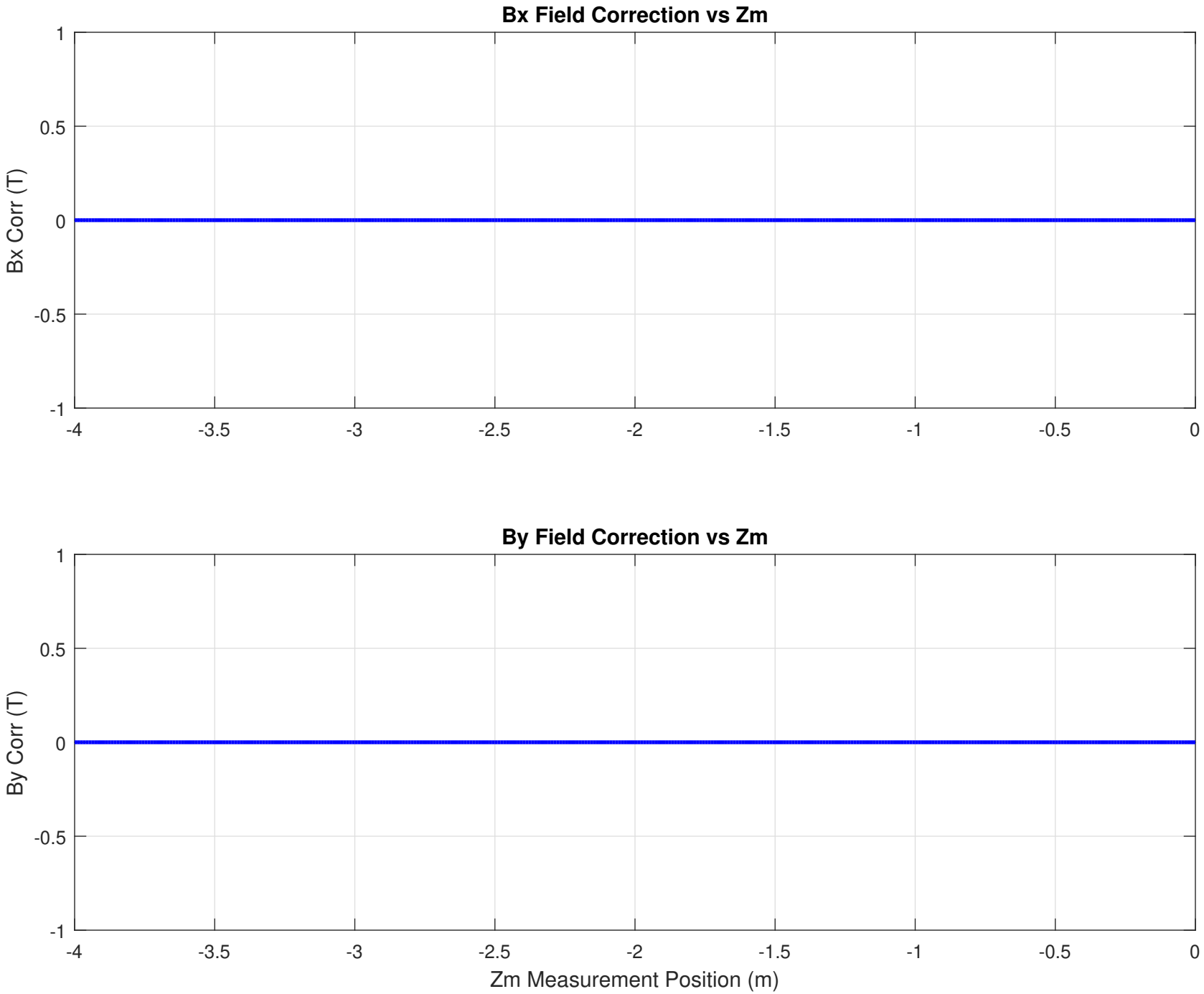
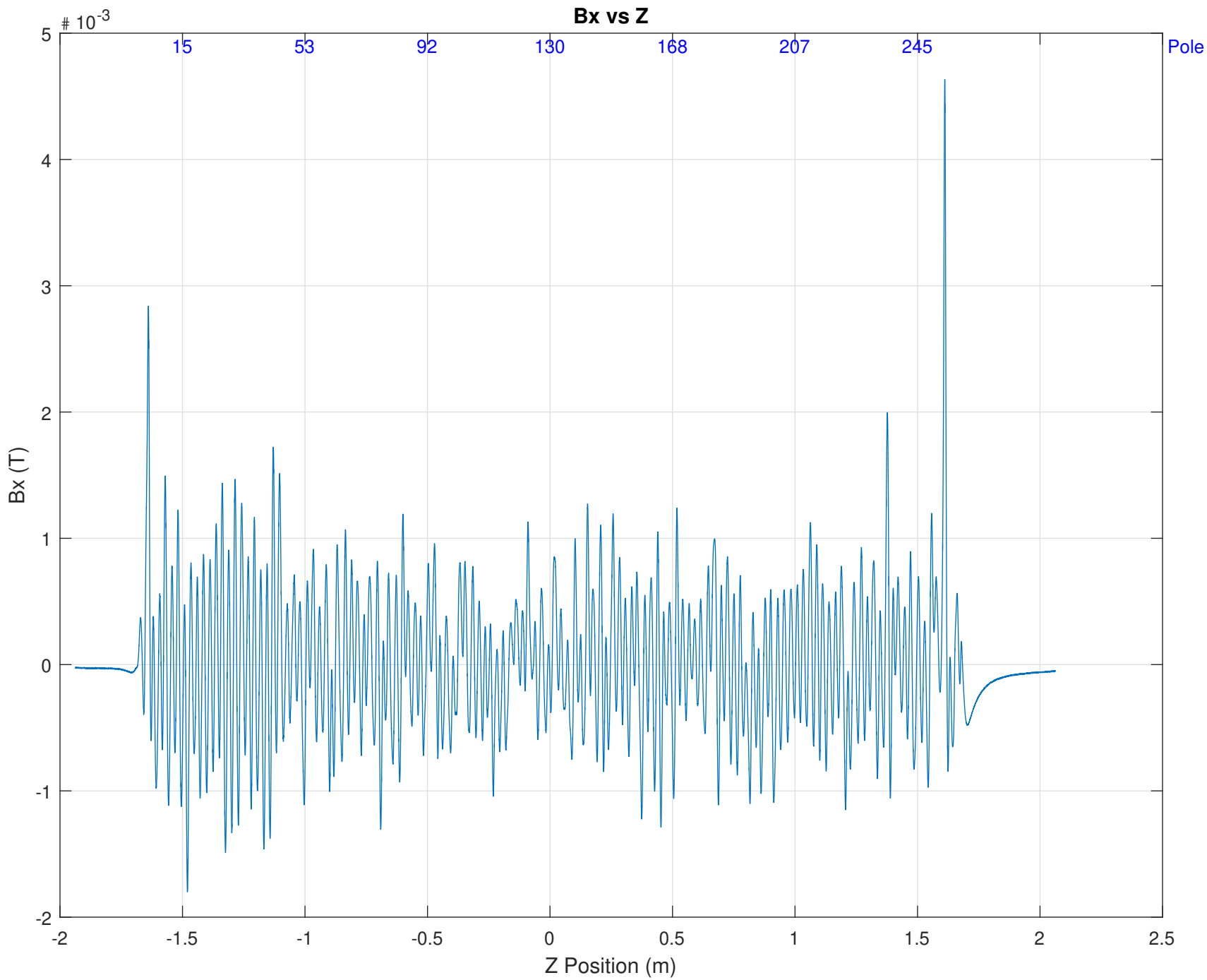
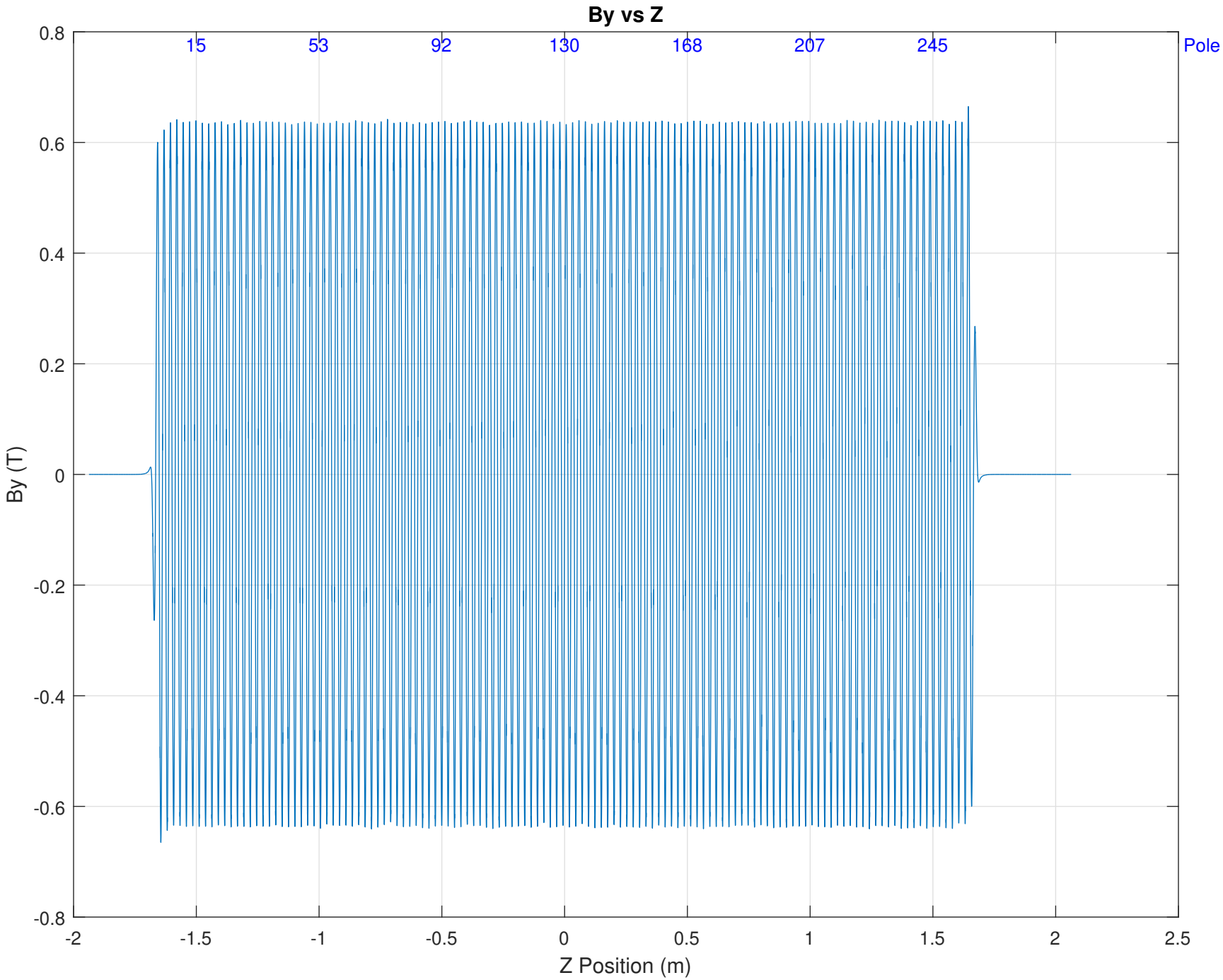
SLAC Magnetic Measurements

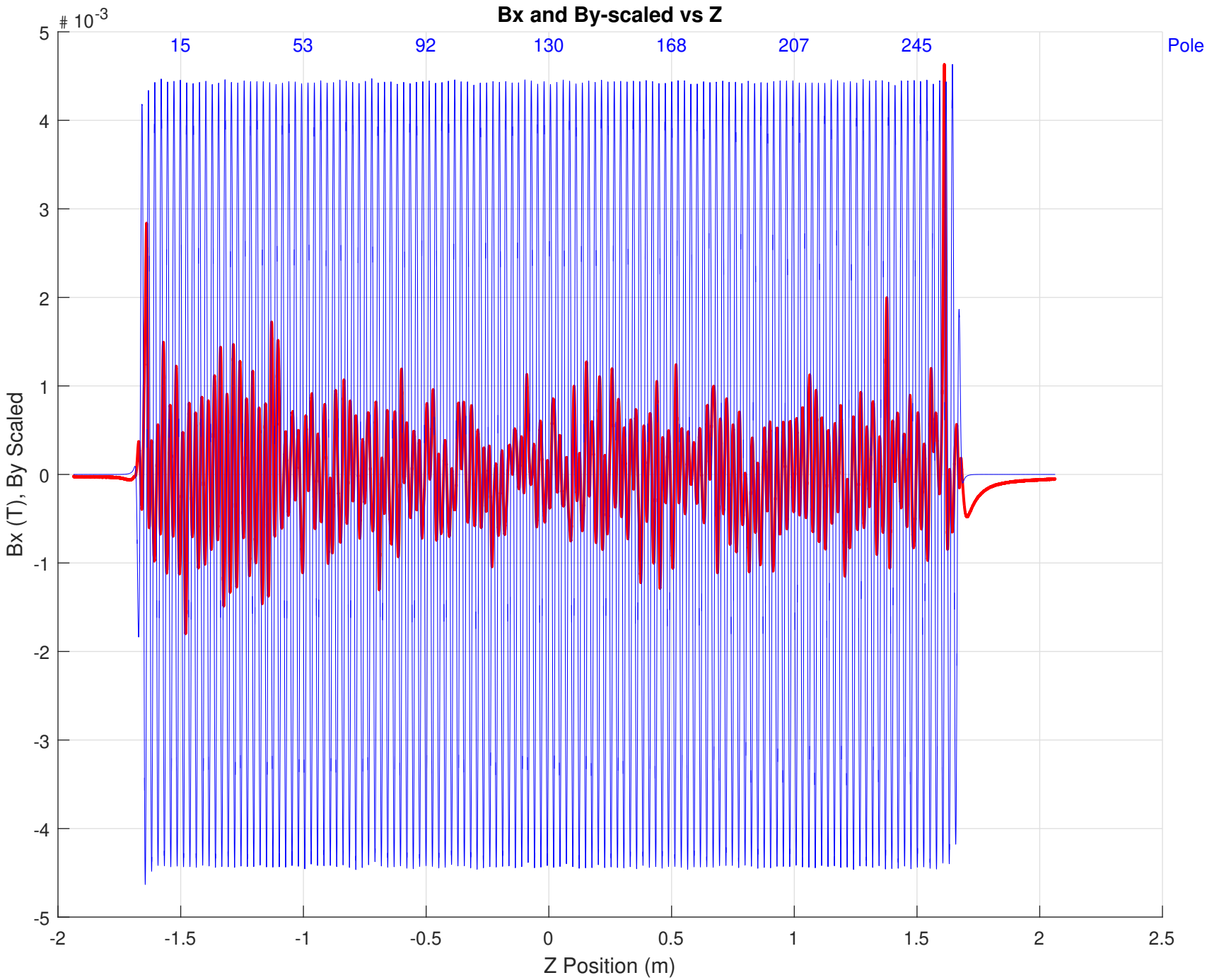
Planar Insertion Device Analysis

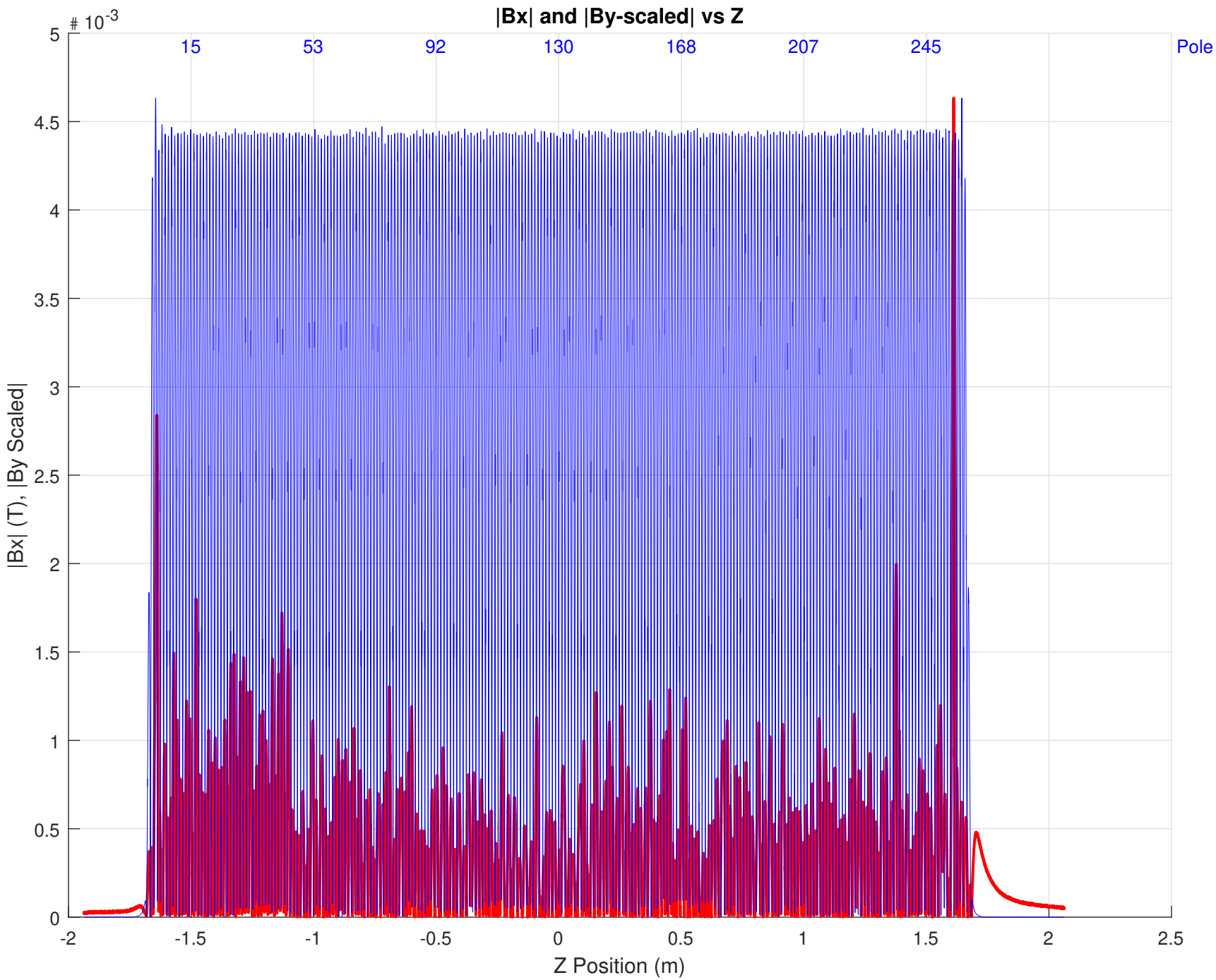
Parameters:
INPUT-FILE-DIR =s:\magdata\LCLS2\Undulator\HGVPU\DATASET0001\Fine Tuning\Z Scans\Run 060\
INPUT-FILE-NAME =x+00000-y+000-bscanz.dat
INPUT-FILE-TYPE =ZVXYBXYH
CORR-REQUIRED =1
GAMMA =26689
NOM-LAMBDA-U =0.026
NOM-K-VALUE =3.5
NOM-LAMBDA-R =1.3004e-10
NUM-POLES =260
NUM-END-POLES =4
CELL-LENGTH =3.656

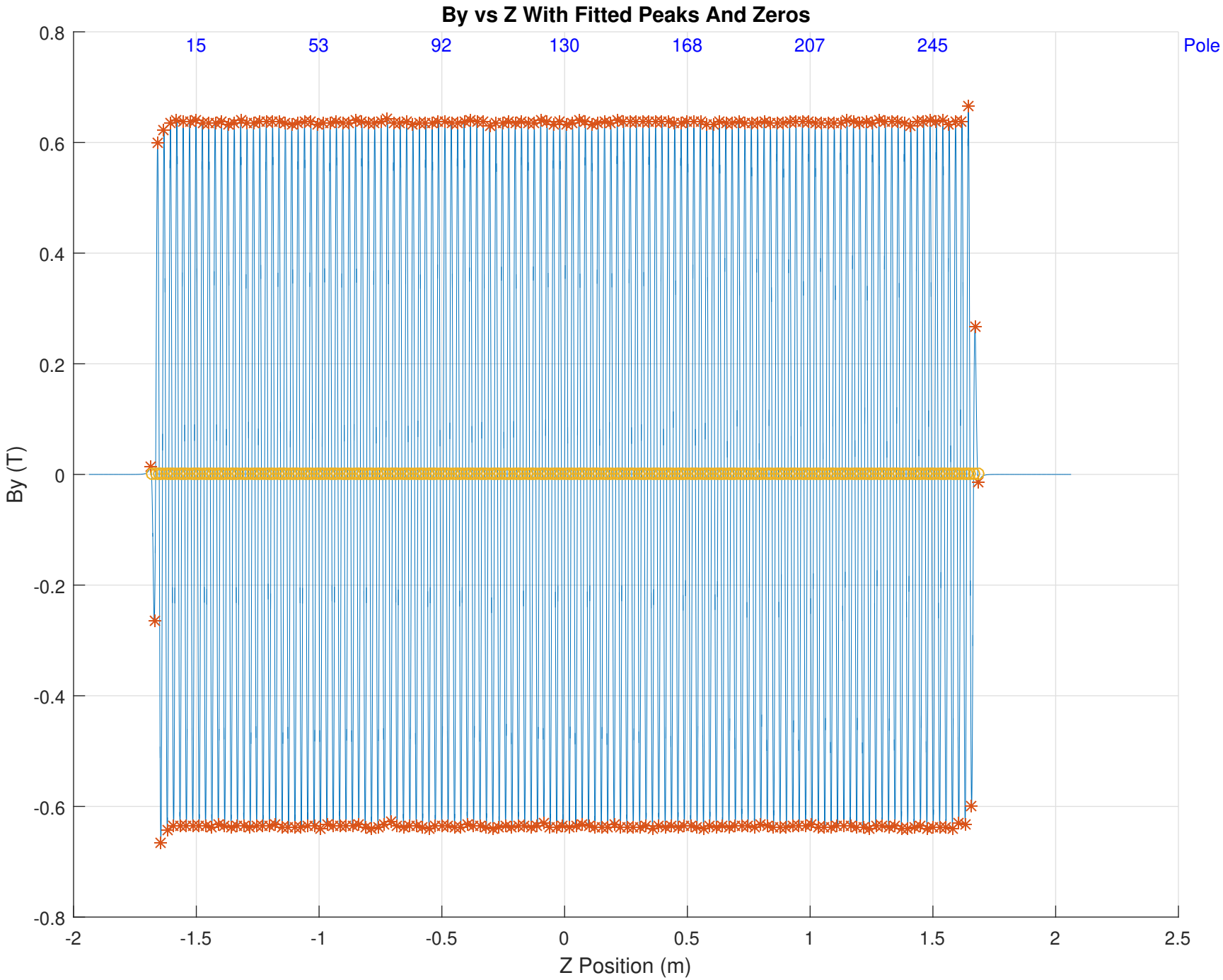

Bx Field Correction vs Zm
Bx Corr (T)
1
0.5
0
-0.5
-1
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
By Field Correction vs Zm
By Corr (T)
1
0.5
0
-0.5
-1
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
Zm Measurement Position (m)

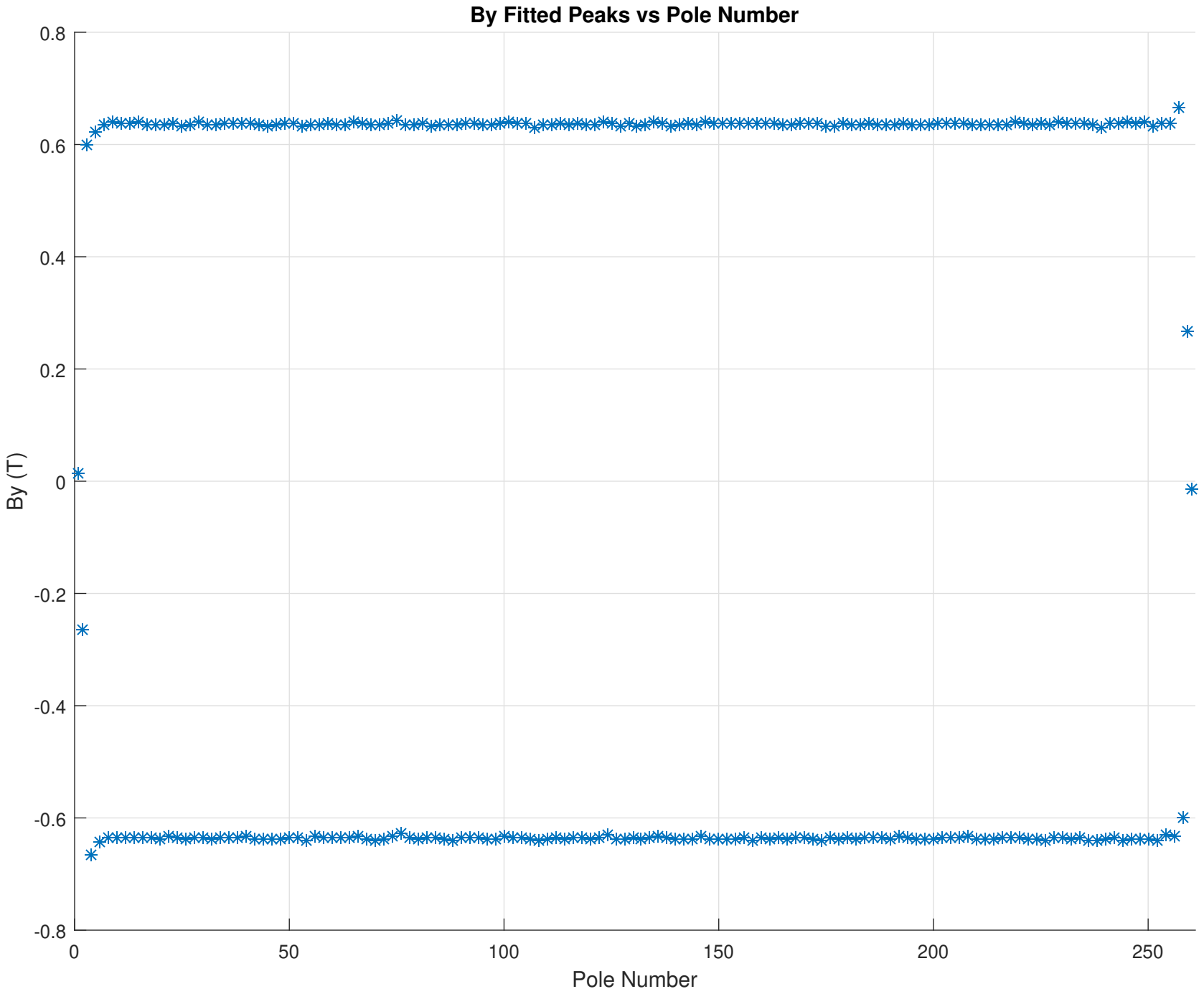

Bx vs Z
10^-3
5
4
3
2
1
0
-1
-2
15
53
92
130
168
207
245
Pole
Bx (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z Position (m)

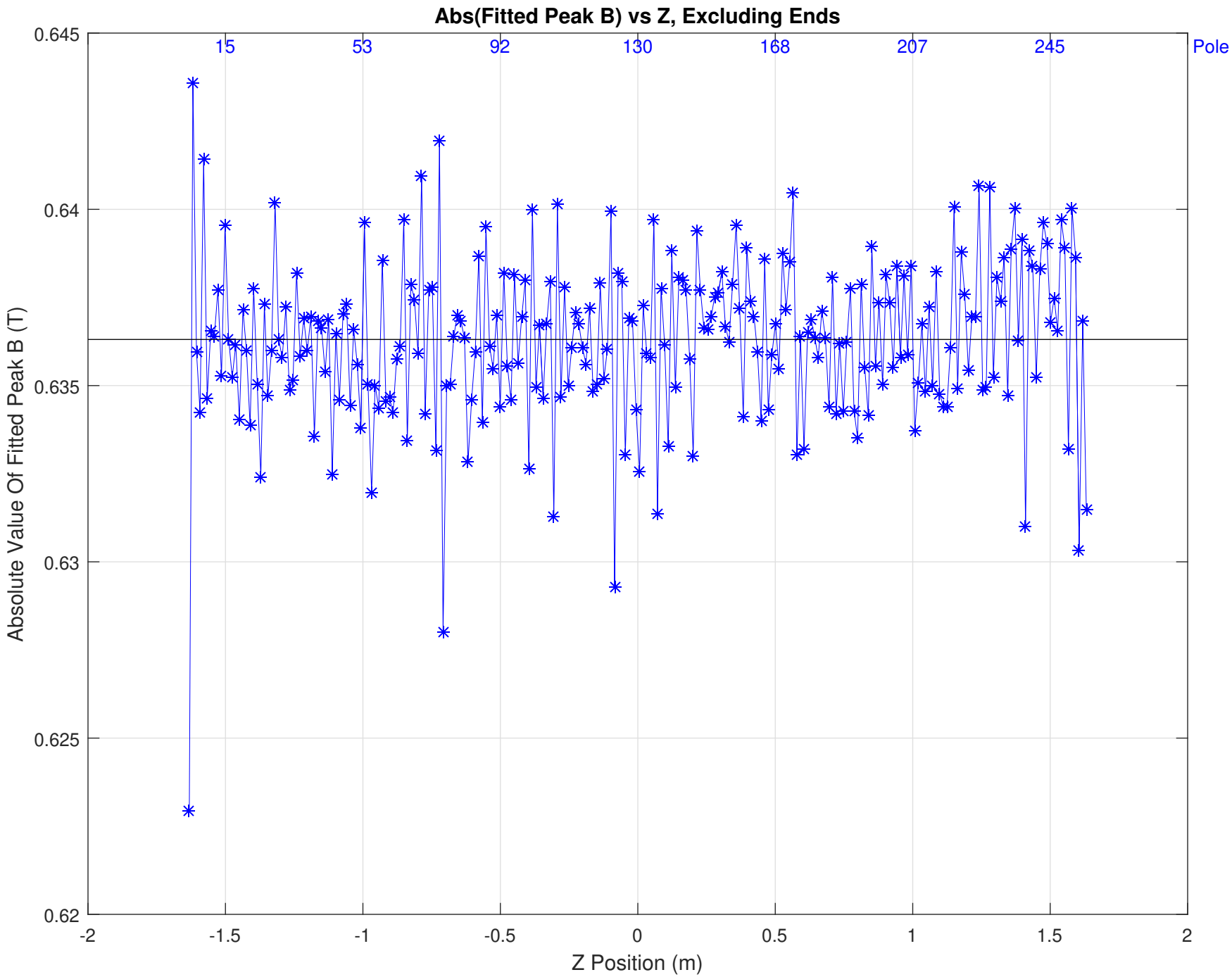

By vs Z
15
53
92
130
168
207
245
Pole
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z Position (m)


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

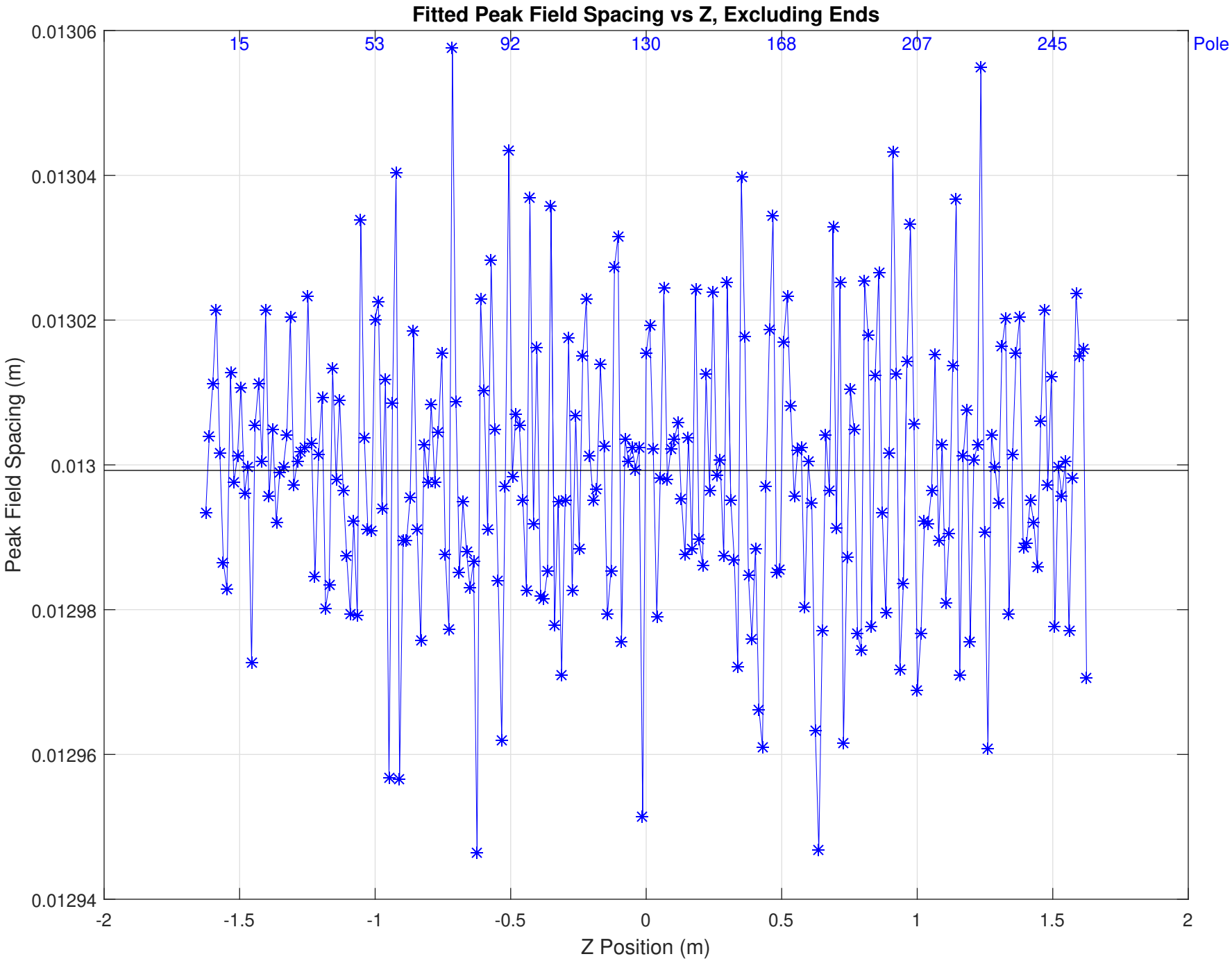

|Bx| and |By-scaled| vs Z
10-3
Pole
15
53
92
130
168
207
245
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
|Bx| (T), |By Scaled|
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z Position (m)


By vs Z With Fitted Peaks And Zeros
15
53
92
130
168
207
245
Pole
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z Position (m)

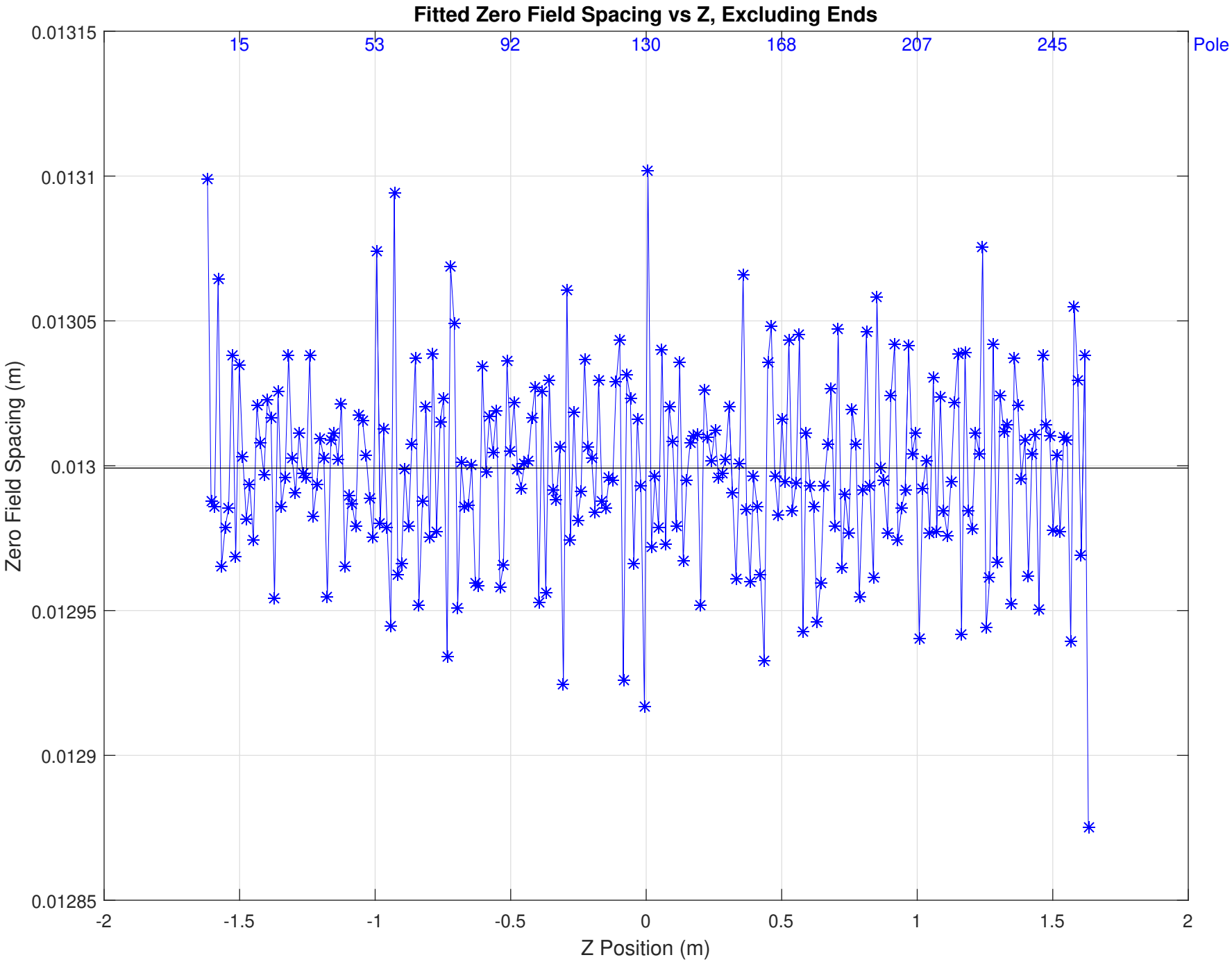

By Fitted Peaks vs Pole Number
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
By (T)
0
50
100
150
200
250
Pole Number



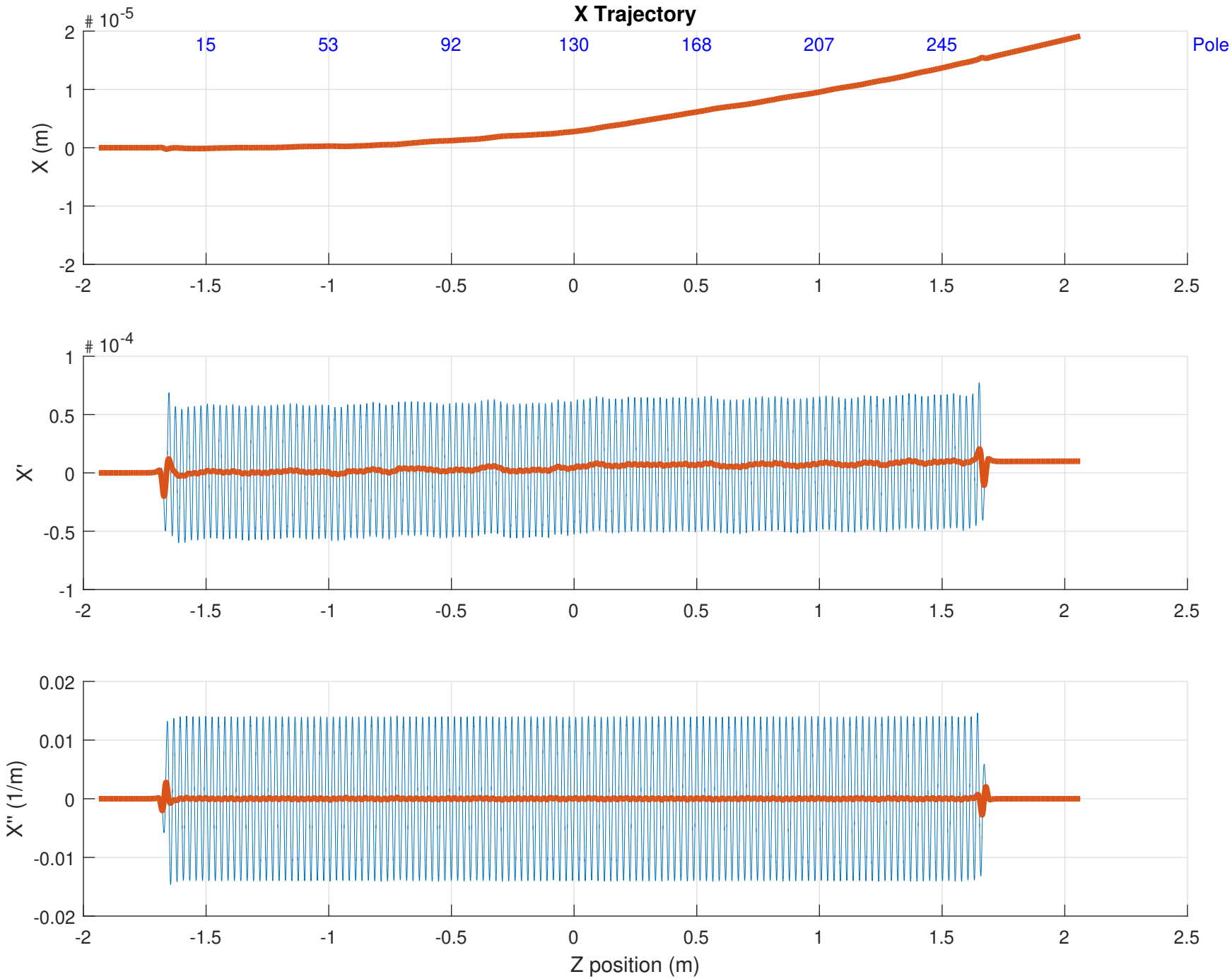
Peak Fields: Ave = 0.636308 T, RMS = 0.002364 T

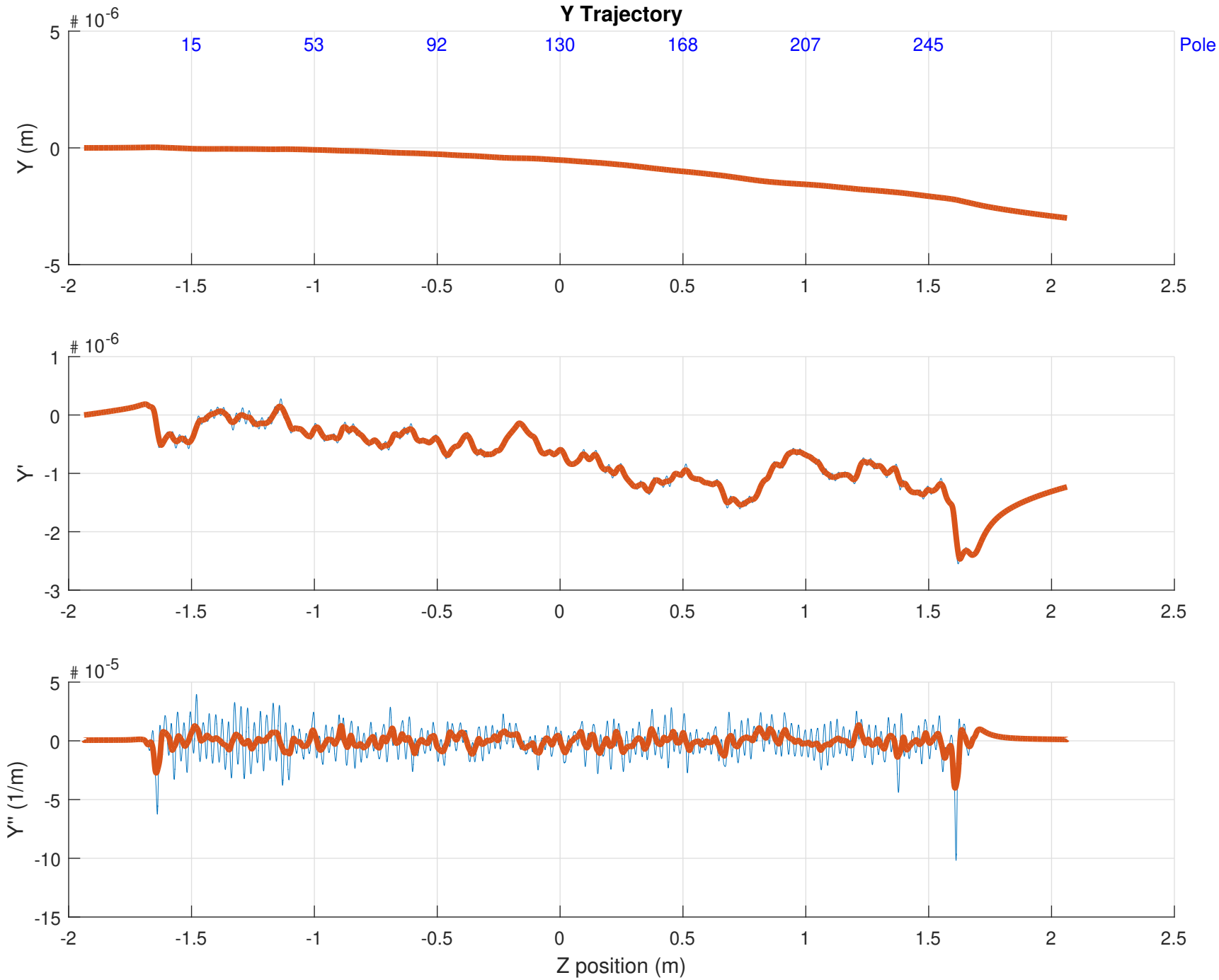


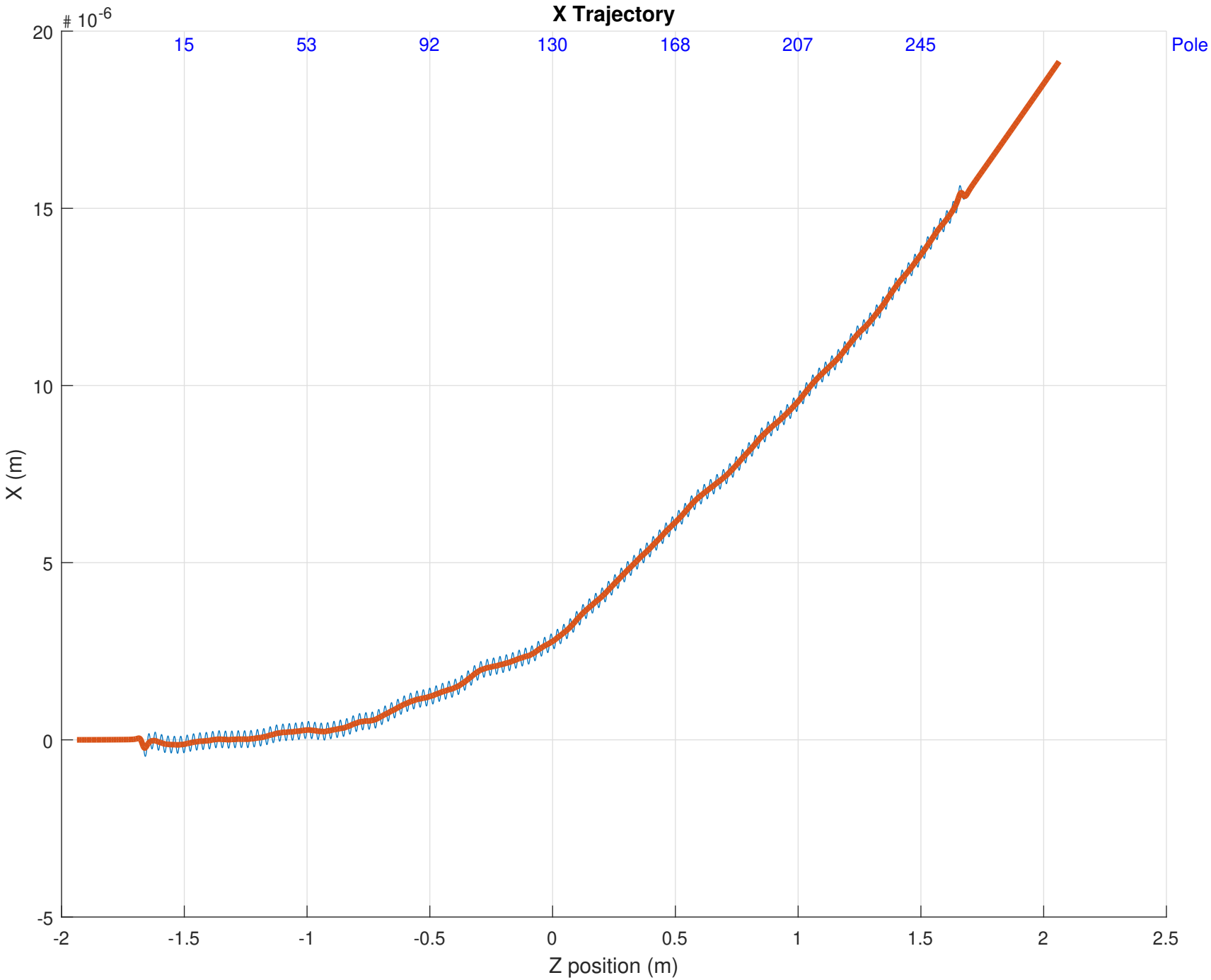
Peak Field Spacing: Ave = 0.012999 m, RMS = 0.000019 m

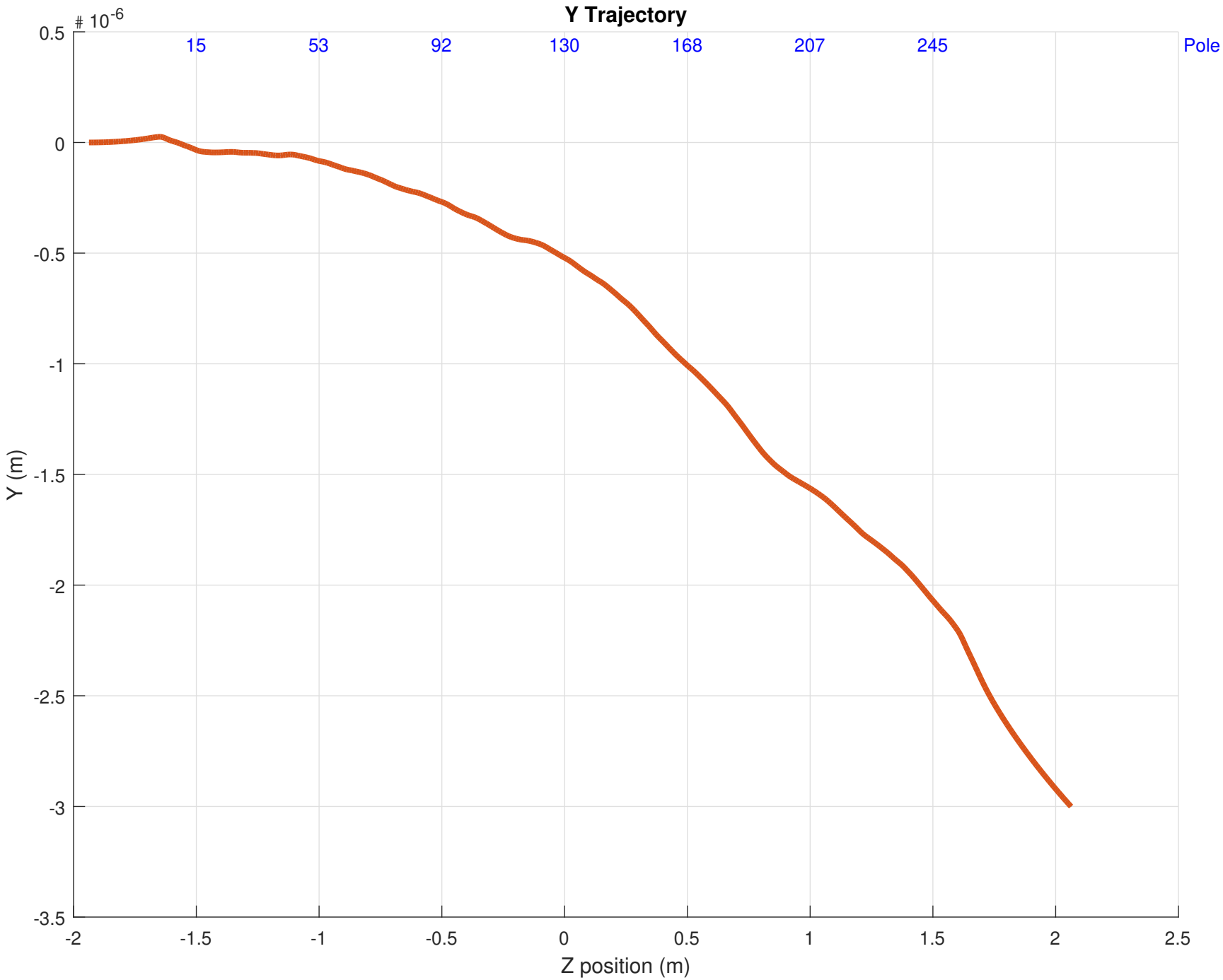


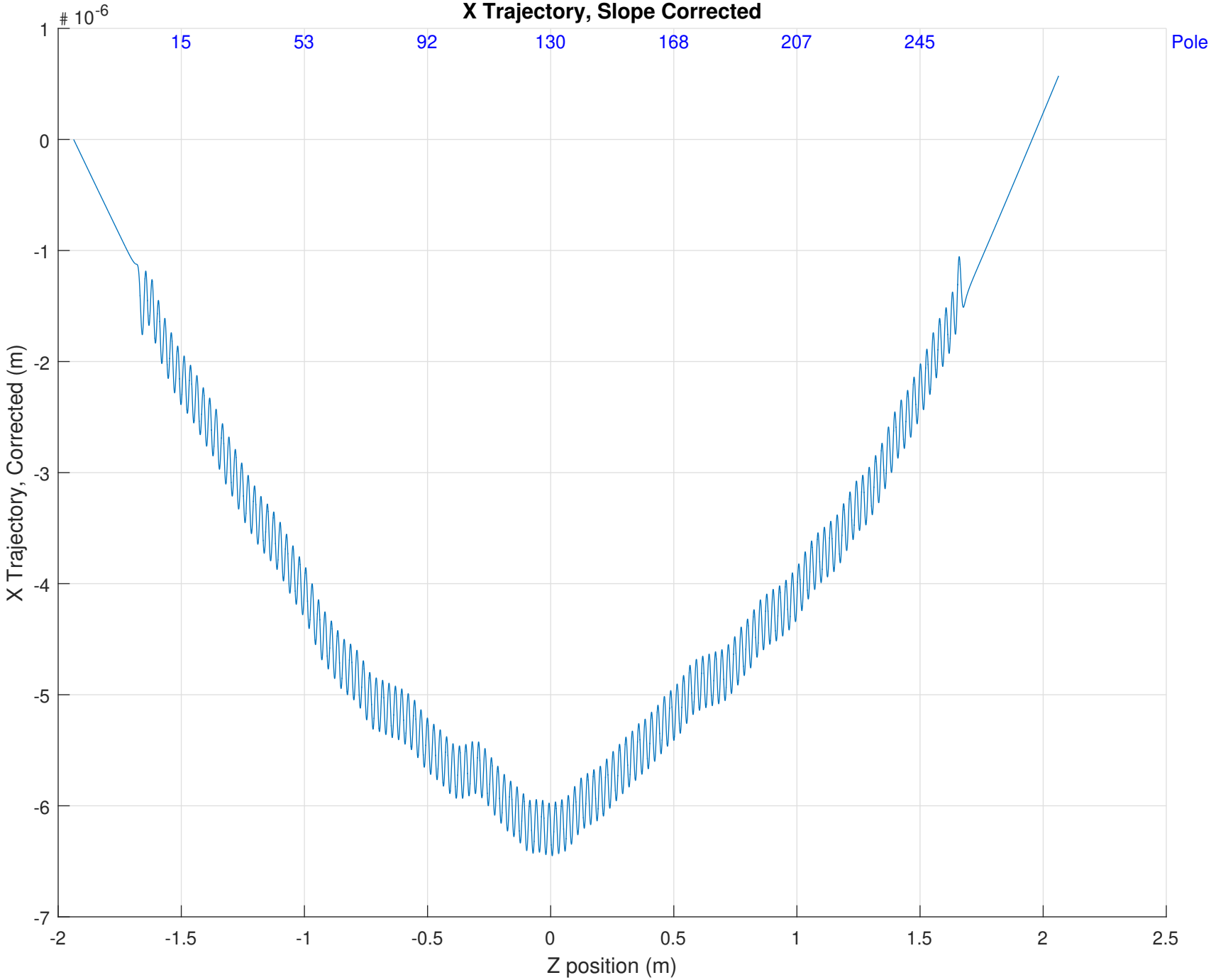
Zero Field Spacing: Ave = 0.012999 m, RMS = 0.000033 m

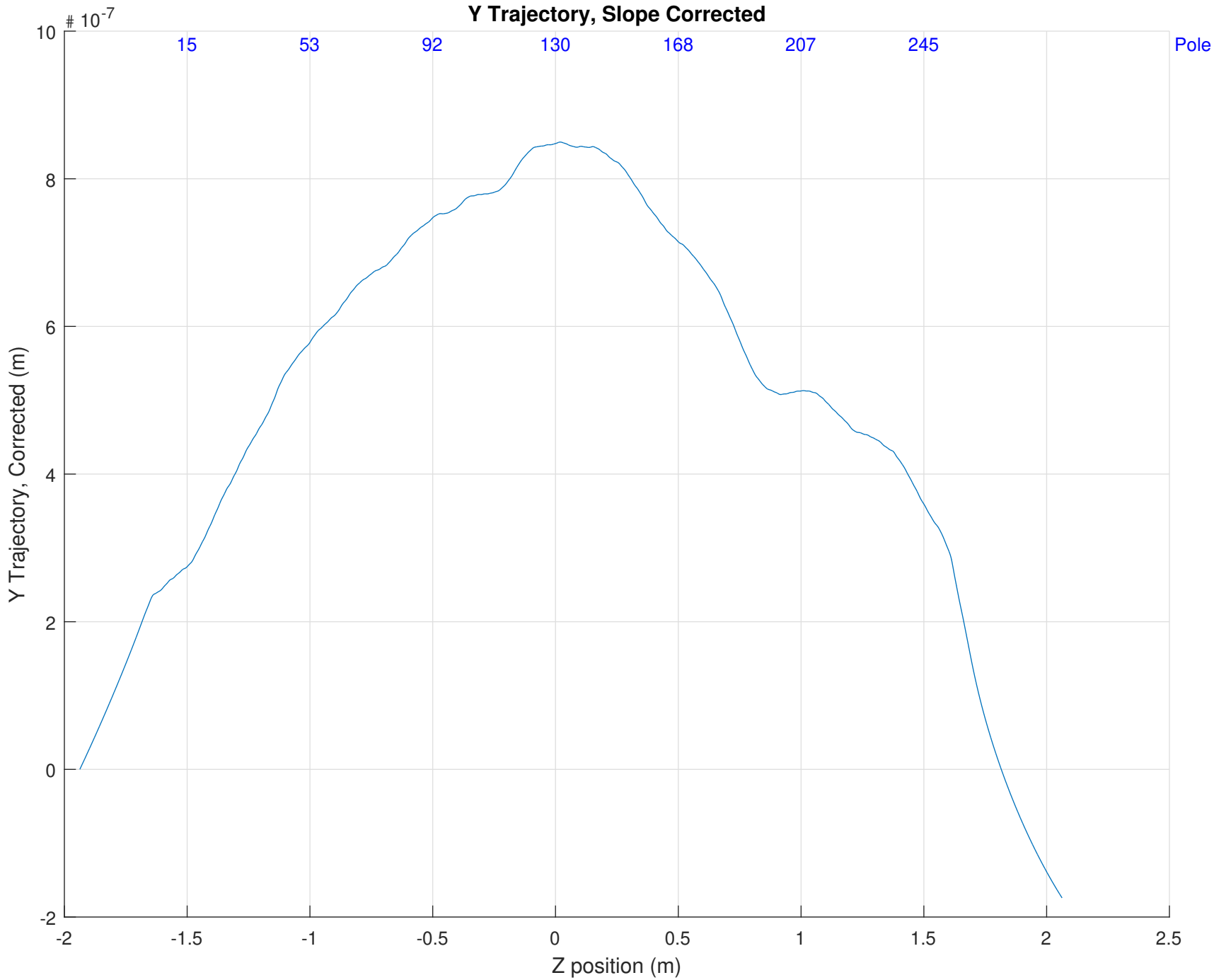

X Trajectory
10^-5
15
53
92
130
168
207
245
Pole
X (m)
10^-4
X'
X'' (1/m)
Z position (m)

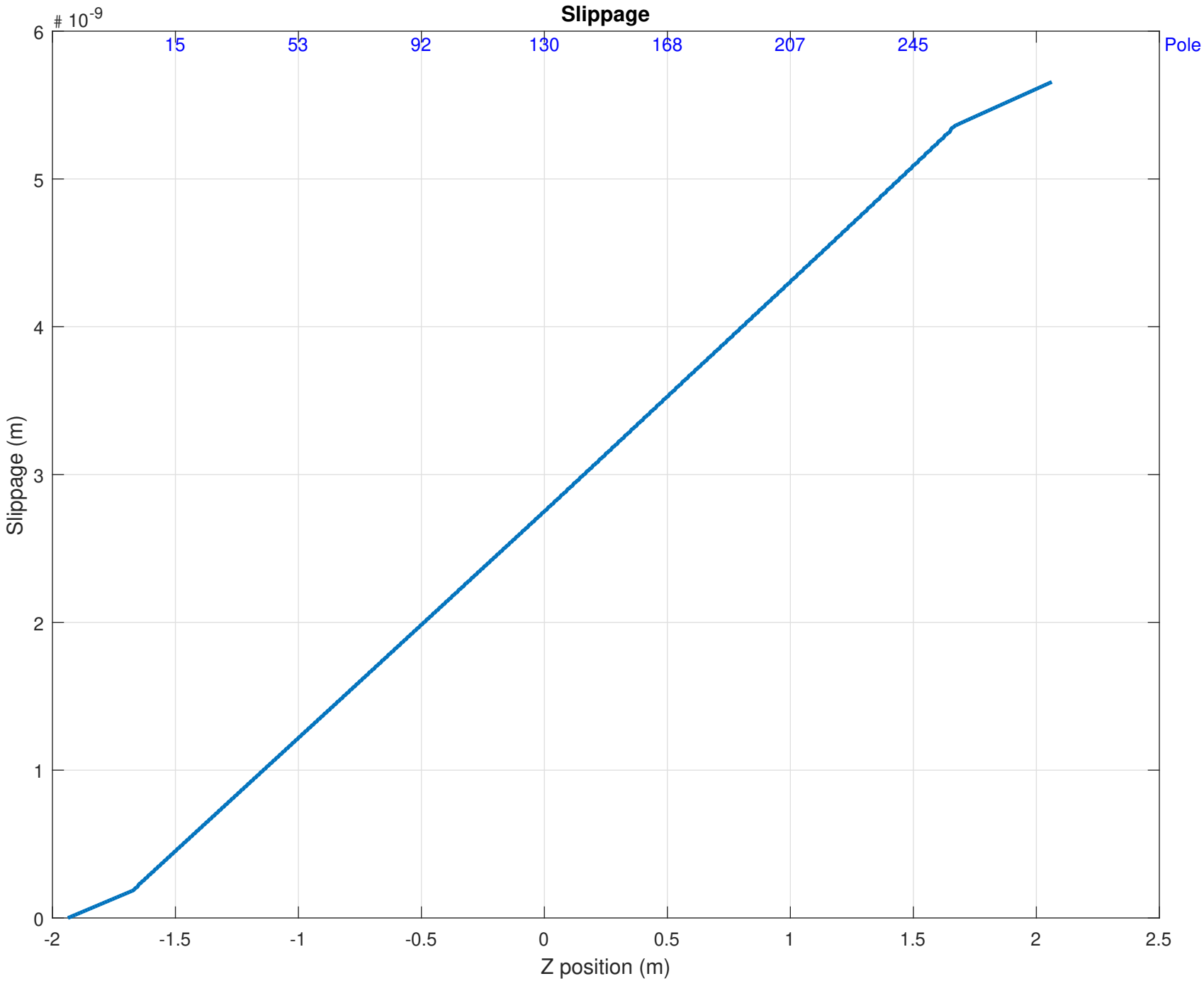

Y Trajectory
10^-6
15
53
92
130
168
207
245
Pole
Y (m)
5
0
-5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
10^-6
Y'
1
0
-1
-2
-3
10^-5
Y'' (1/m)
5
0
-5
-10
-15
Z position (m)

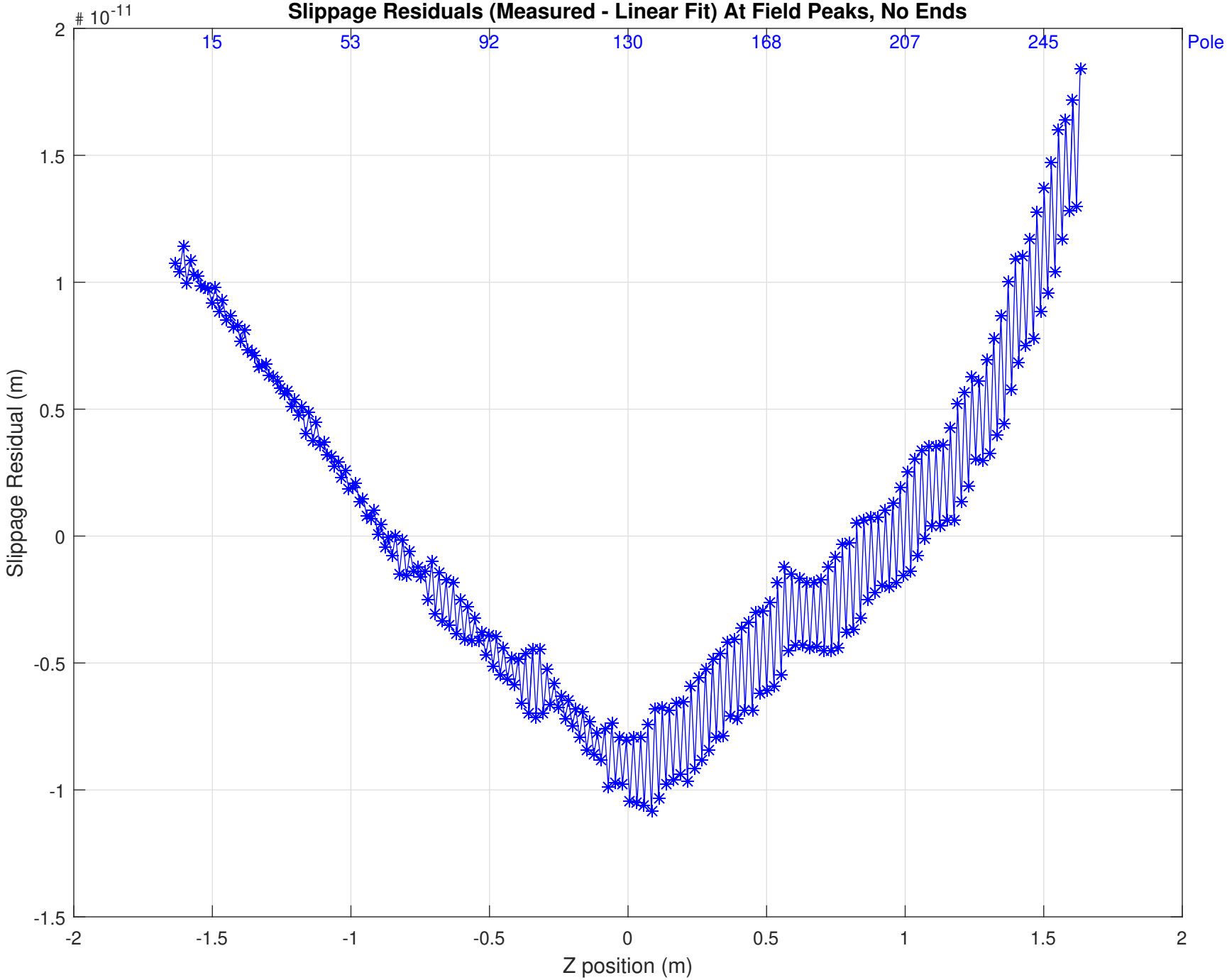

X Trajectory
10-6
15
53
92
130
168
207
245
Pole
20
15
10
5
0
-5
X (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)

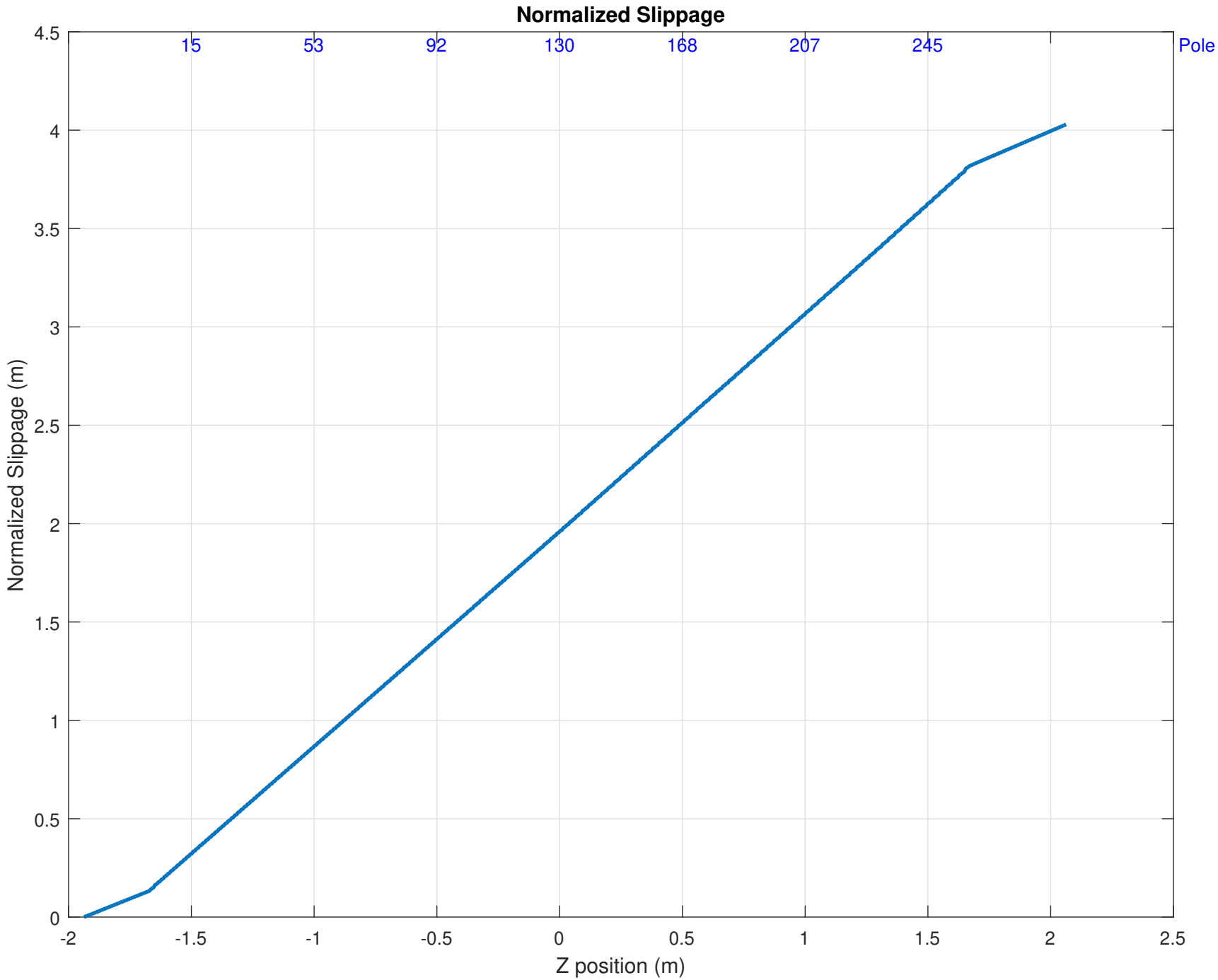

Y Trajectory
10^-6
15
53
92
130
168
207
245
Pole
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
-3.5
Y (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)

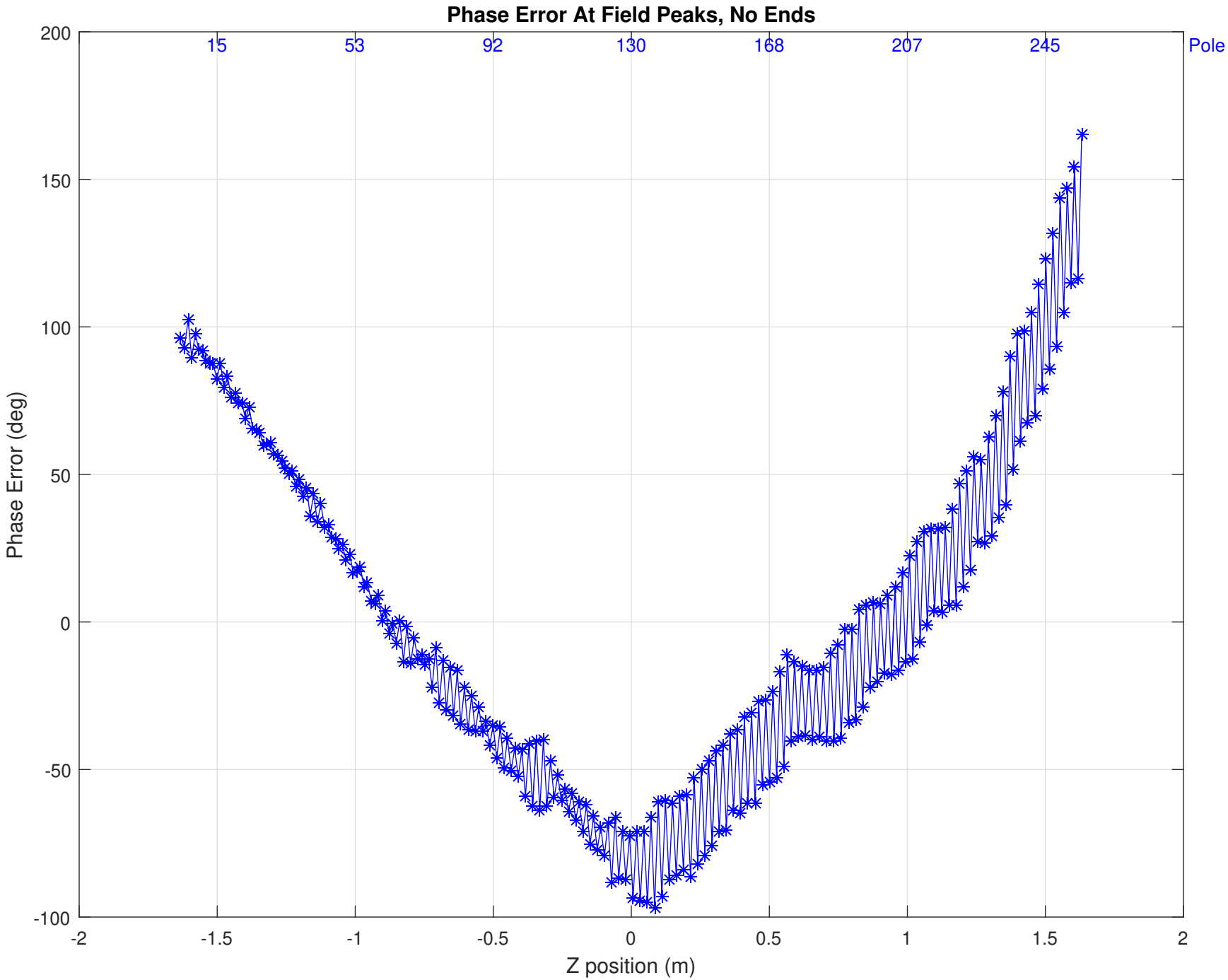

X Trajectory, Slope Corrected
10-6
15
53
92
130
168
207
245
Pole
1
0
-1
-2
-3
-4
-5
-6
-7
X Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)


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

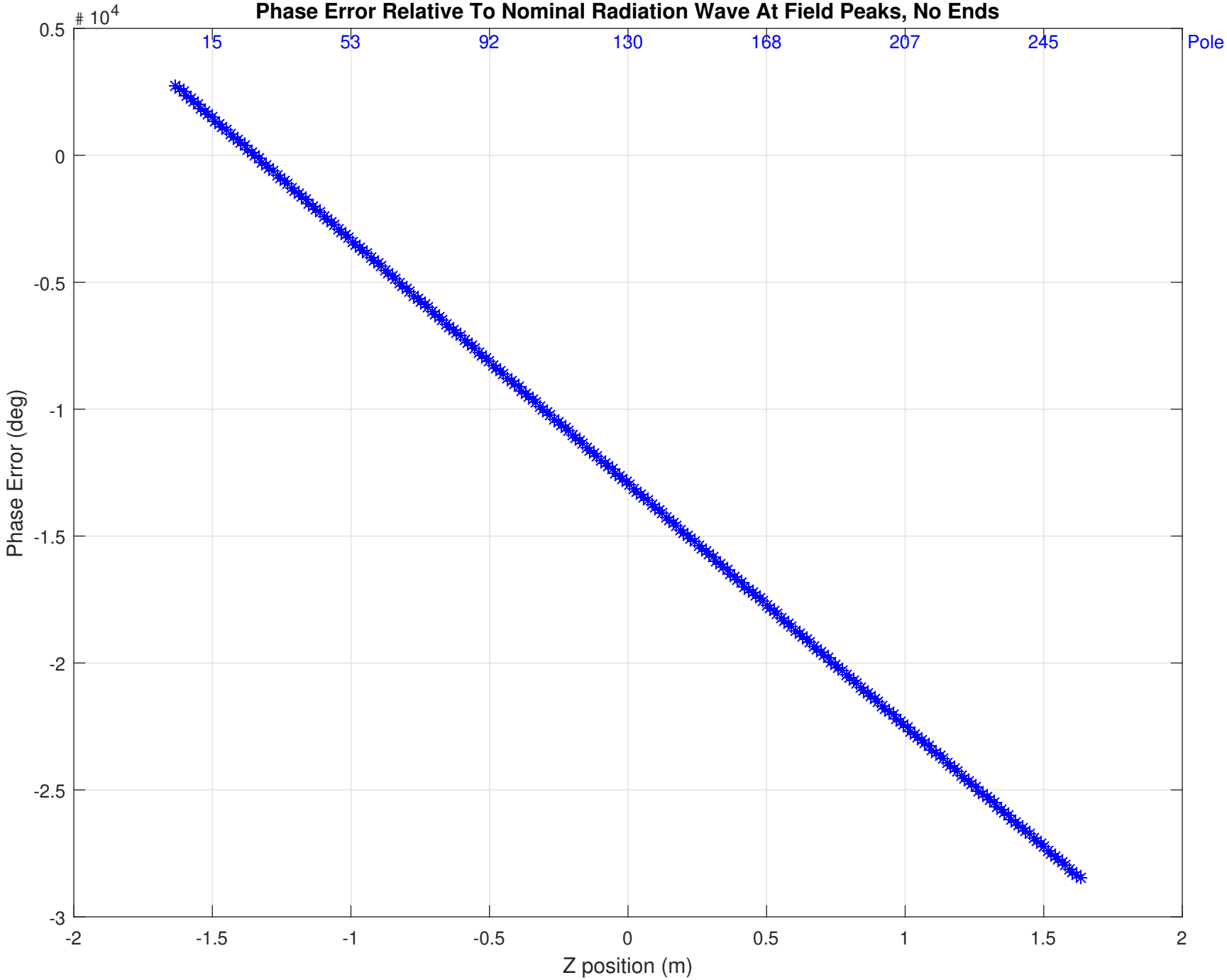

Slippage
10^-9
6
5
4
3
2
1
0
15
53
92
130
168
207
245
Pole
Slippage (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)


Slippage Residuals (Measured - Linear Fit) At Field Peaks, No Ends
10^-11
15
53
92
130
168
207
245
Pole
2
1.5
1
0.5
0
-0.5
-1
-1.5
Slippage Residual (m)
-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
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Normalized Slippage (m)
-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 = 58.657900 deg


Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
10^4
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
Phase Error (deg)
15
53
92
130
168
207
245
Pole
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z position (m)