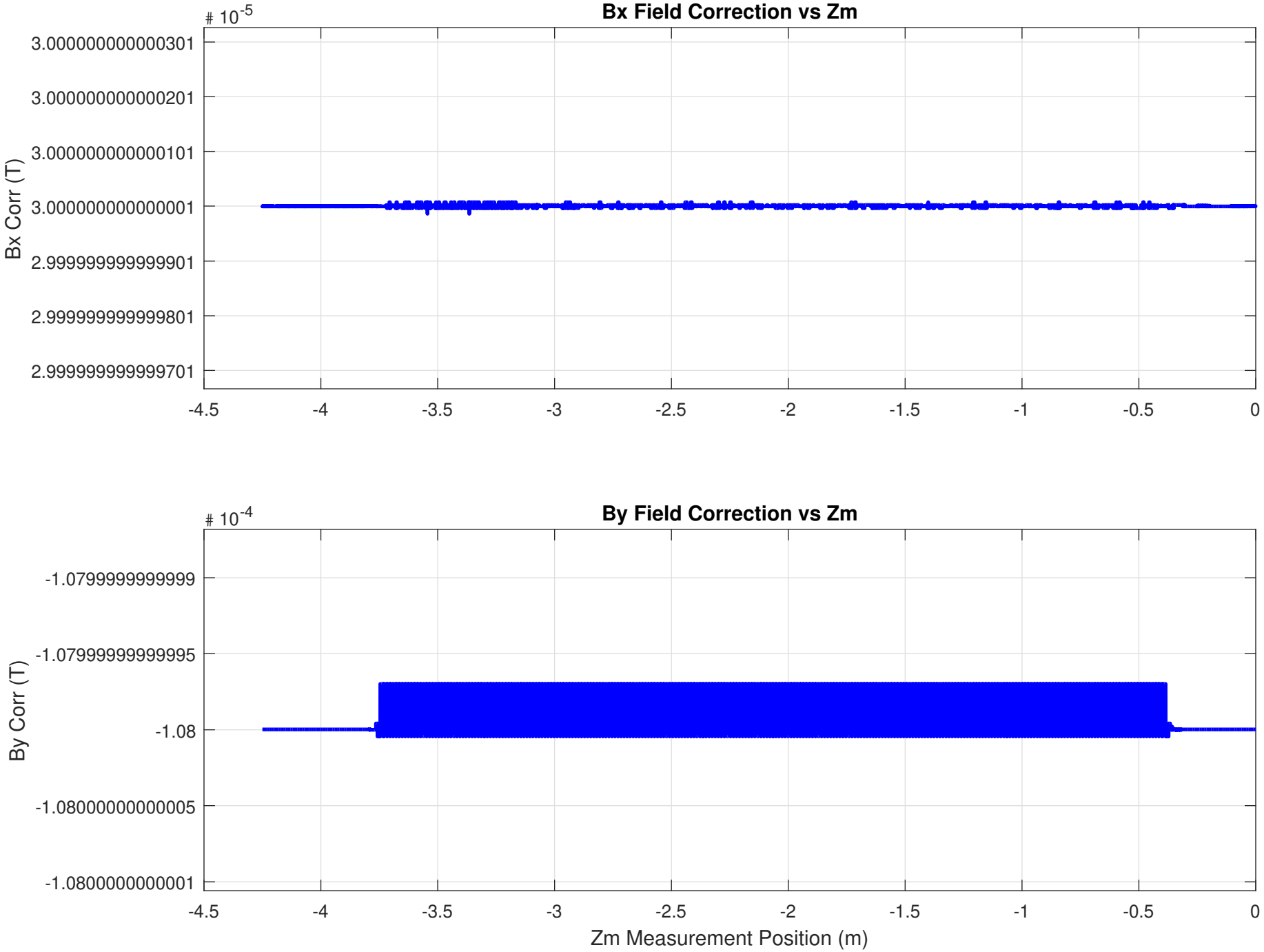
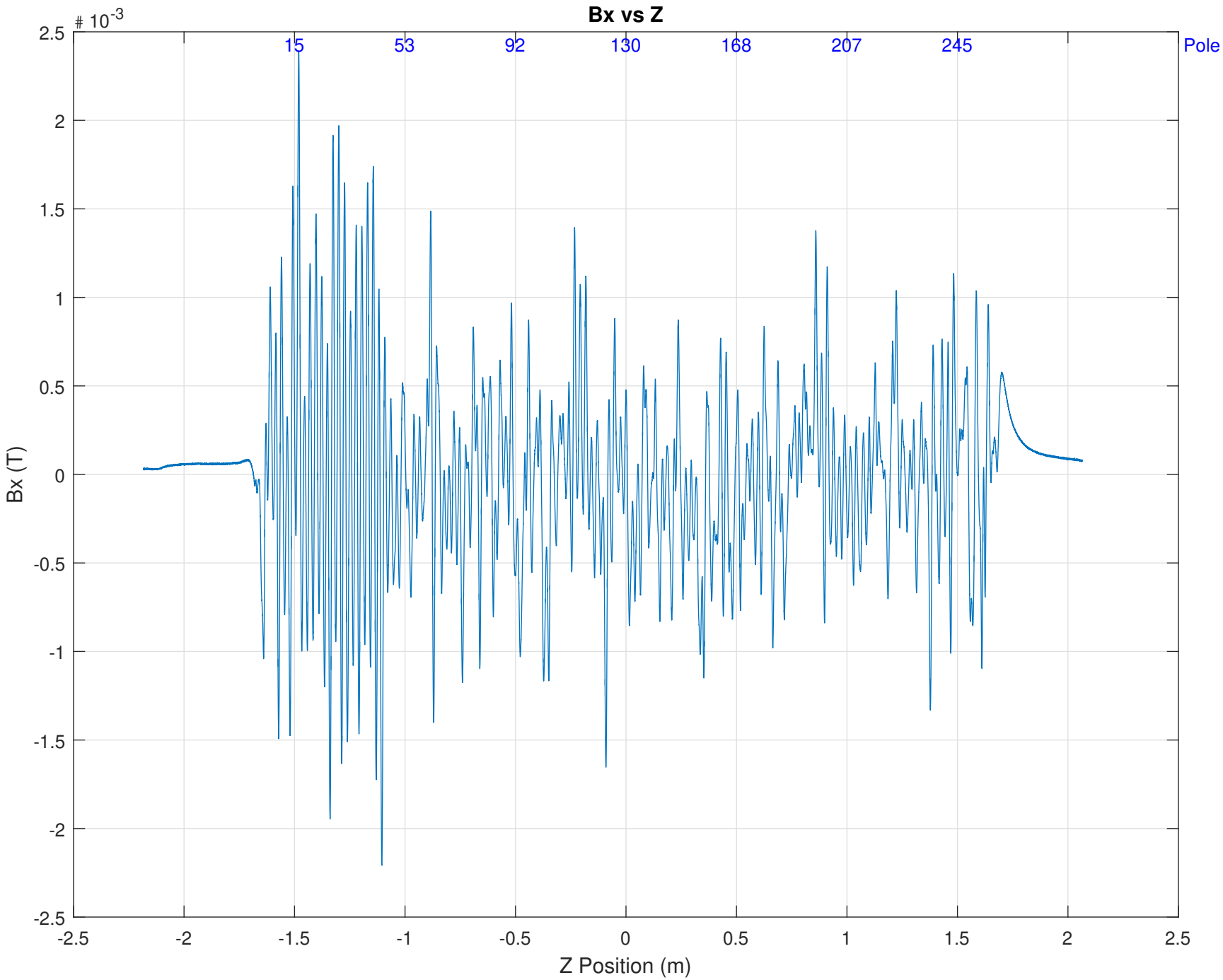
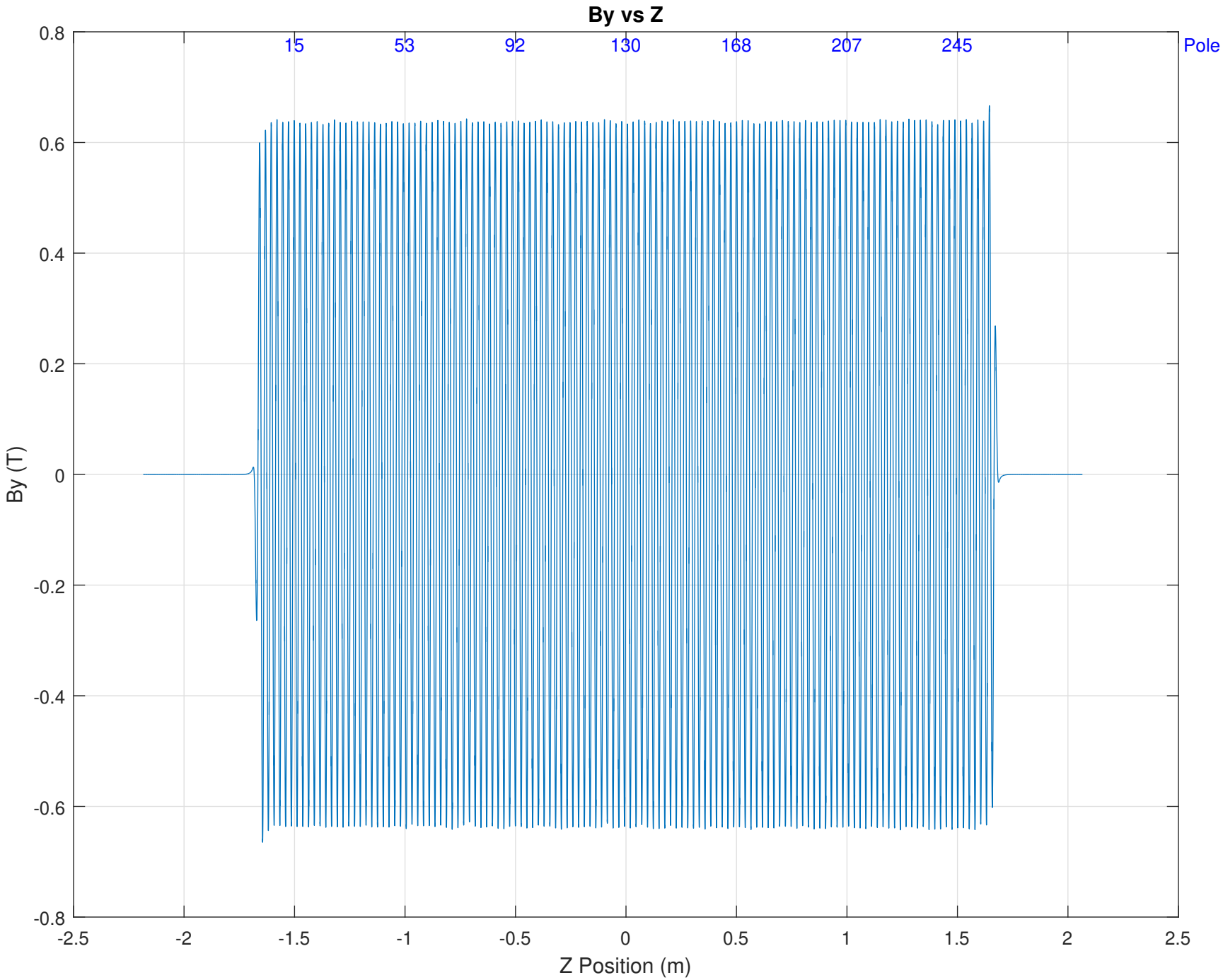
SLAC Magnetic Measurements

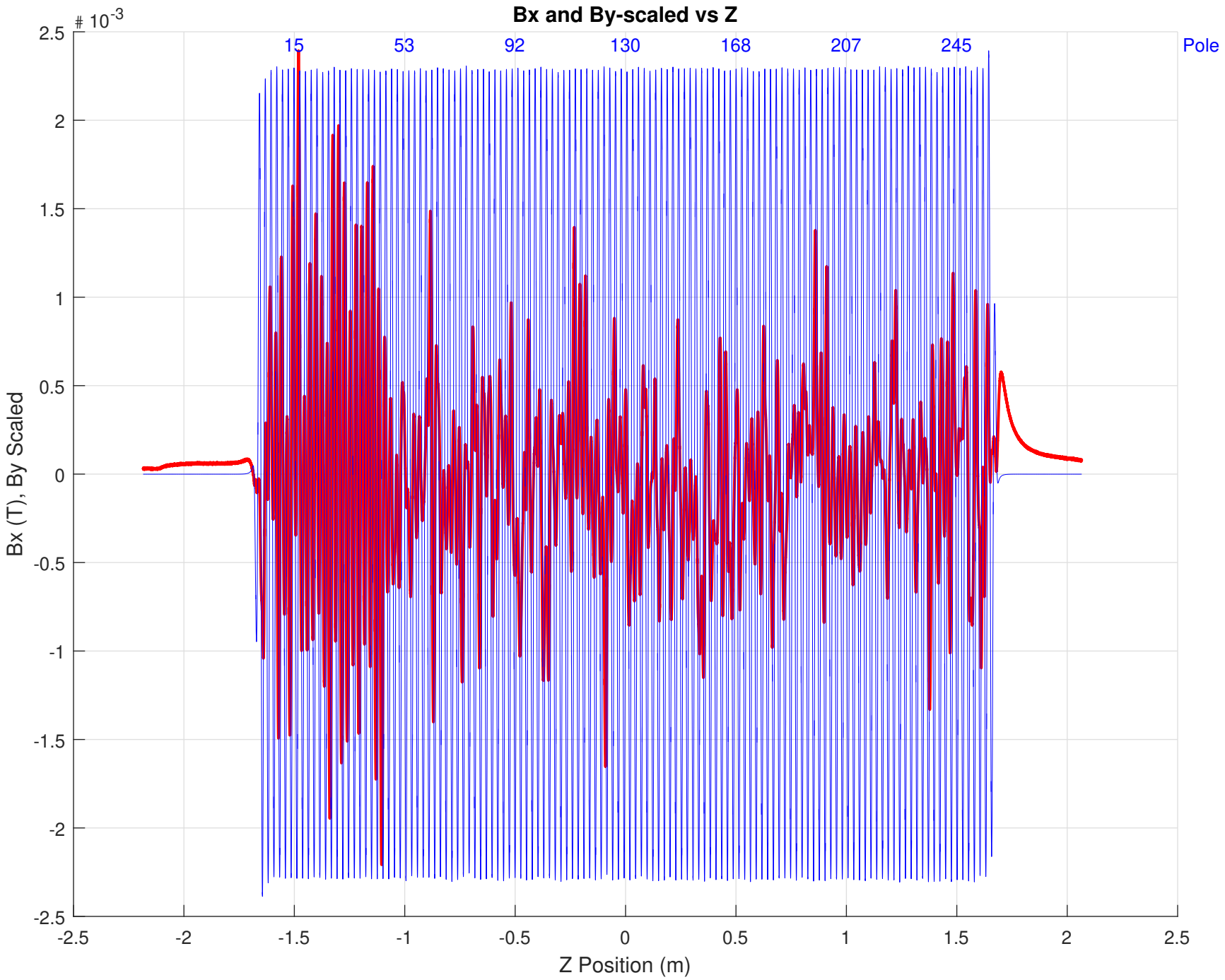
Planar Insertion Device Analysis

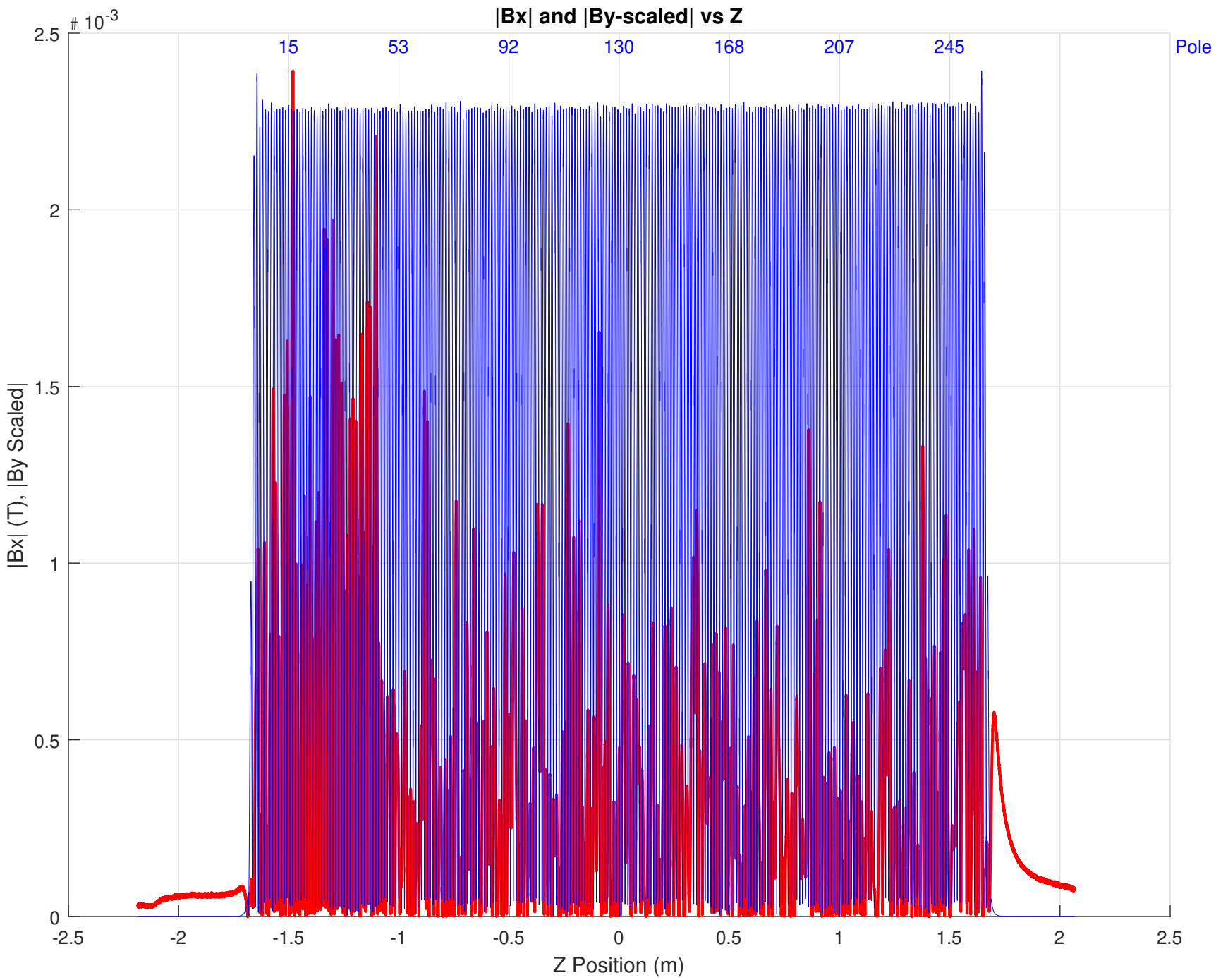
Parameters:
INPUT-FILE-DIR =S:\MagData\LCLS2\Undulator\HGVPU\DATASET0001\Fine Tuning\Z Scans\Run 005\
INPUT-FILE-NAME =x+00000-y+000-bscanz.dat
INPUT-FILE-TYPE =ZVXYBXYH
CORR-REQUIRED =1
GAMMA =27397
NOM-LAMBDA-U =0.026
NOM-K-VALUE =1.5363
NOM-LAMBDA-R =3.7759e-11
NUM-POLES =260
NUM-END-POLES =4
CELL-LENGTH =3.656

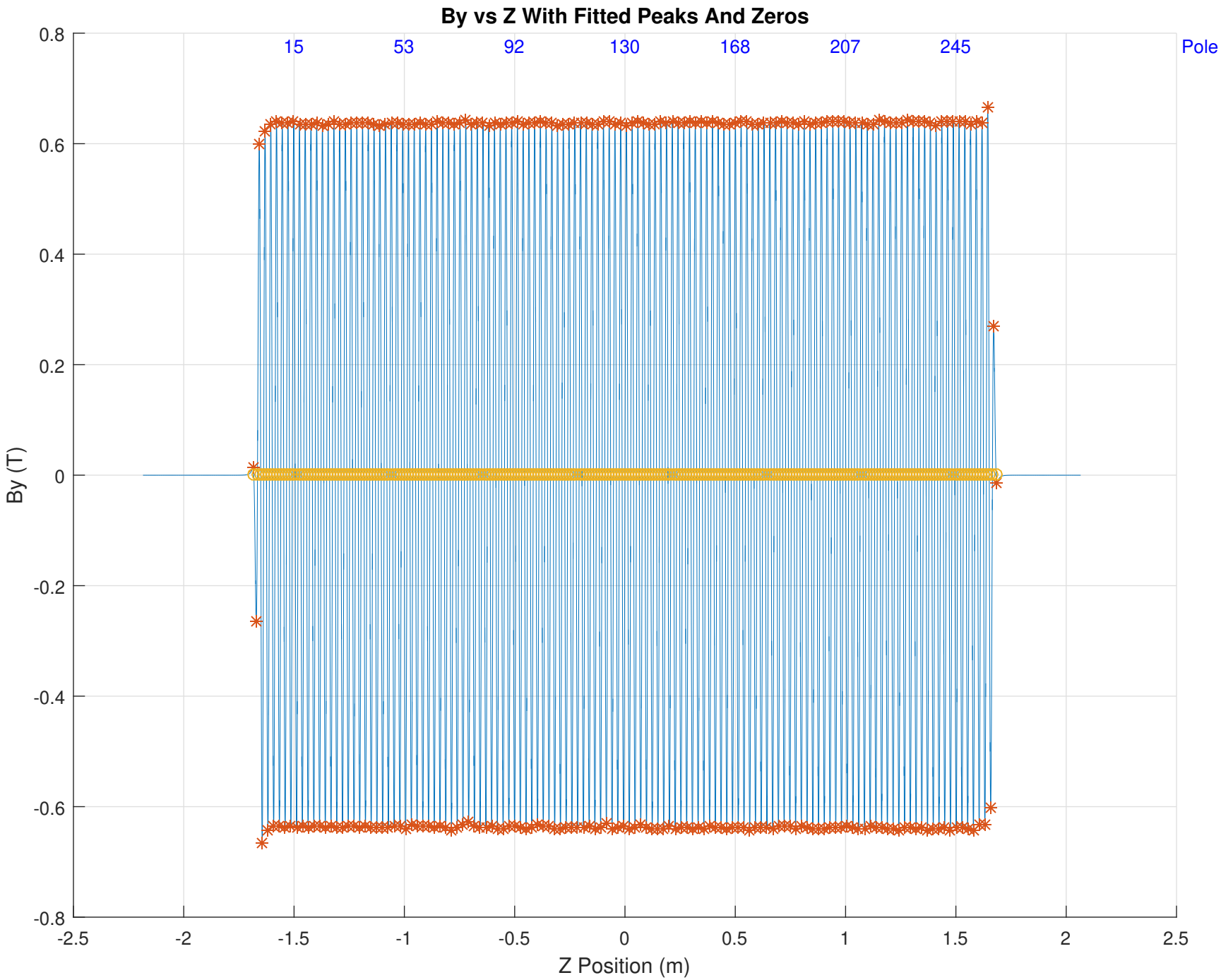

Bx Field Correction vs Zm
10^-5
3.000000000000301
3.000000000000201
3.000000000000101
3.000000000000001
2.999999999999901
2.999999999999801
2.999999999999701
Bx Corr (T)
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
By Field Correction vs Zm
10^-4
-1.0799999999999
-1.07999999999995
-1.08
-1.08000000000005
-1.0800000000001
By Corr (T)
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
Zm Measurement Position (m)

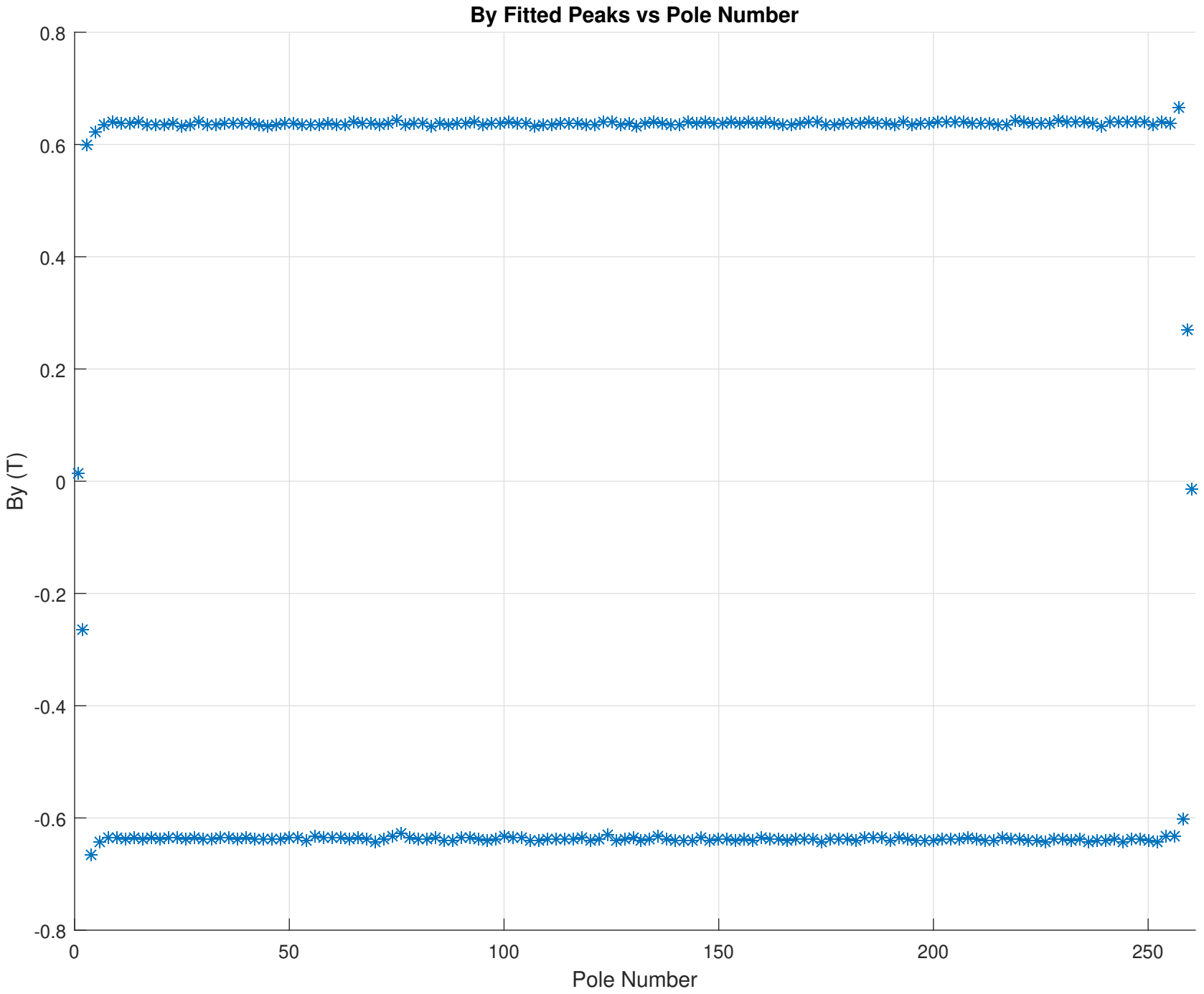

Bx vs Z
10^-3
15
53
92
130
168
207
245
Pole
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
Bx (T)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z Position (m)

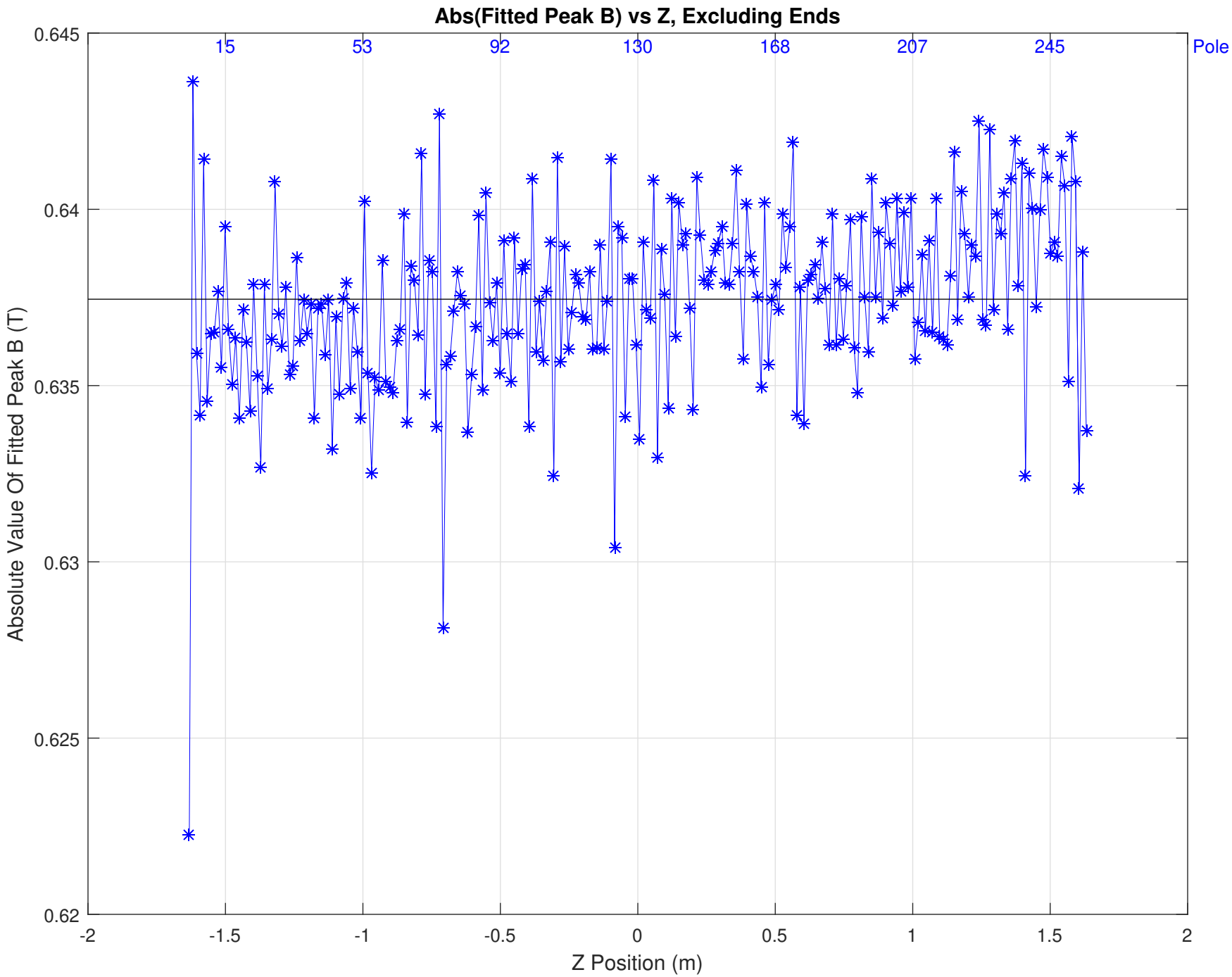

By vs Z
15
53
92
130
168
207
245
Pole
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
By (T)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z Position (m)


Bx and By-scaled vs Z
10^-3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
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)

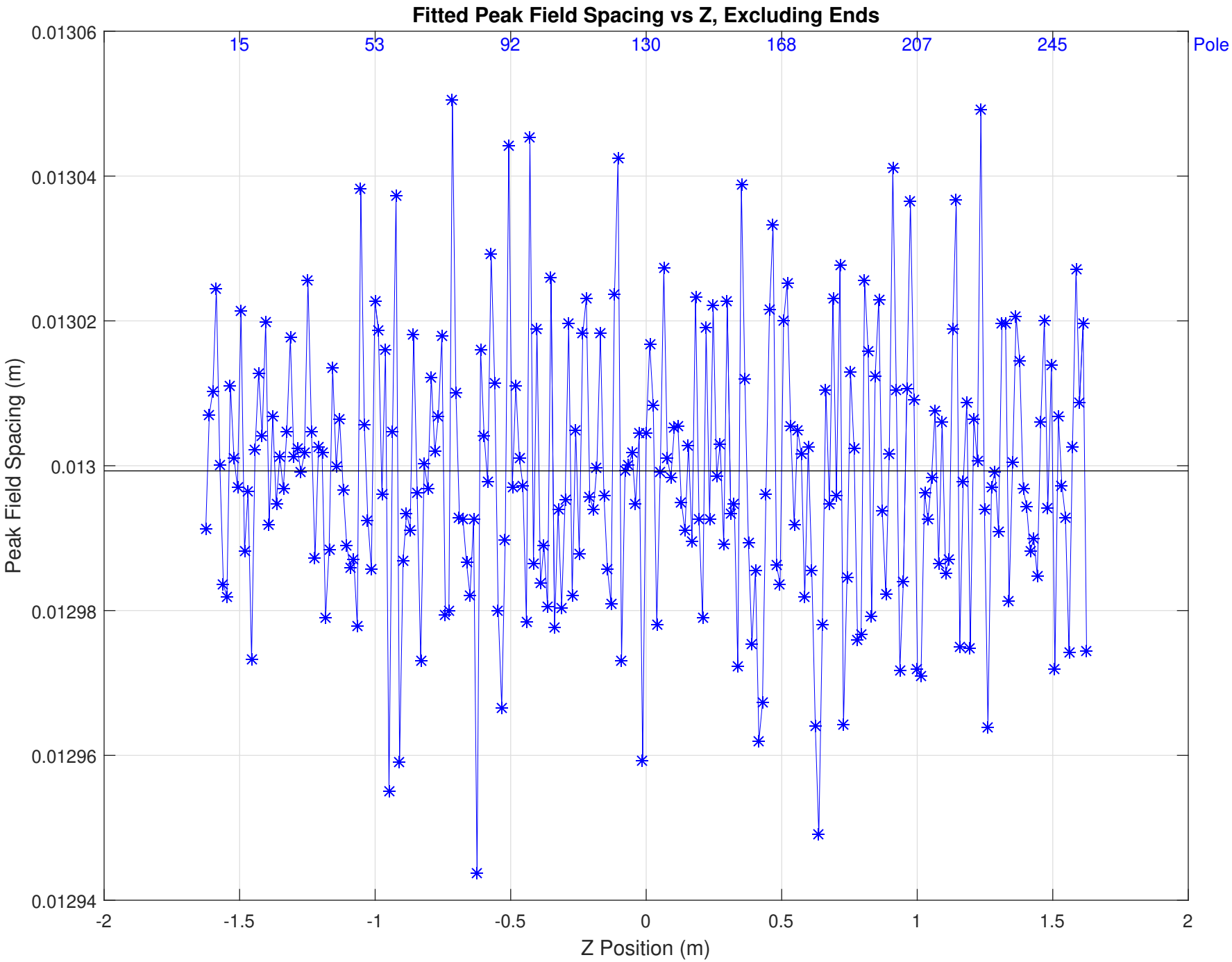

|Bx| and |By-scaled| vs Z
10-3
2.5
2
1.5
1
0.5
0
15
53
92
130
168
207
245
Pole
|Bx| (T), |By Scaled|
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z Position (m)


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

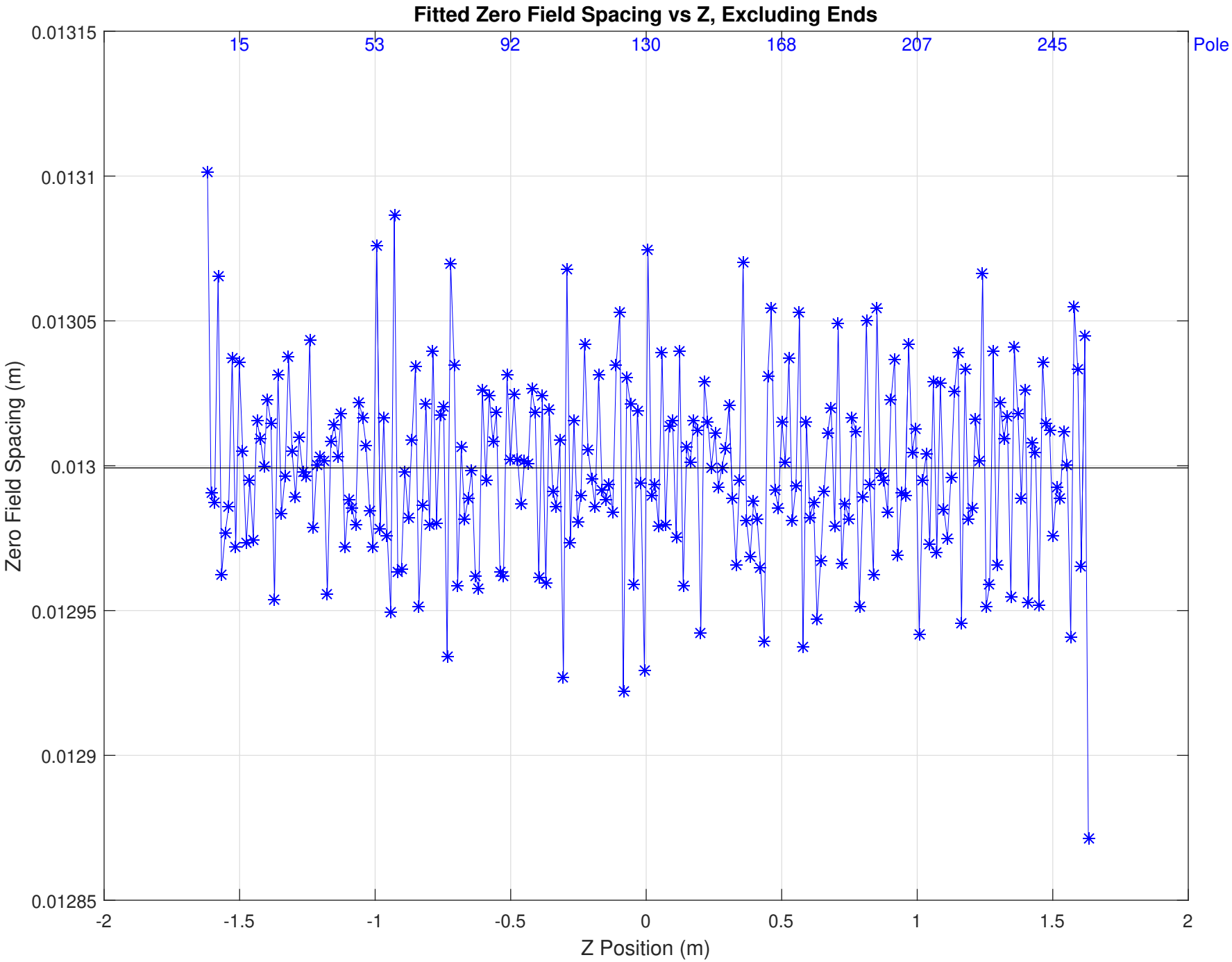

By Fitted Peaks vs Pole Number
By (T)
Pole Number
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
0
50
100
150
200
250



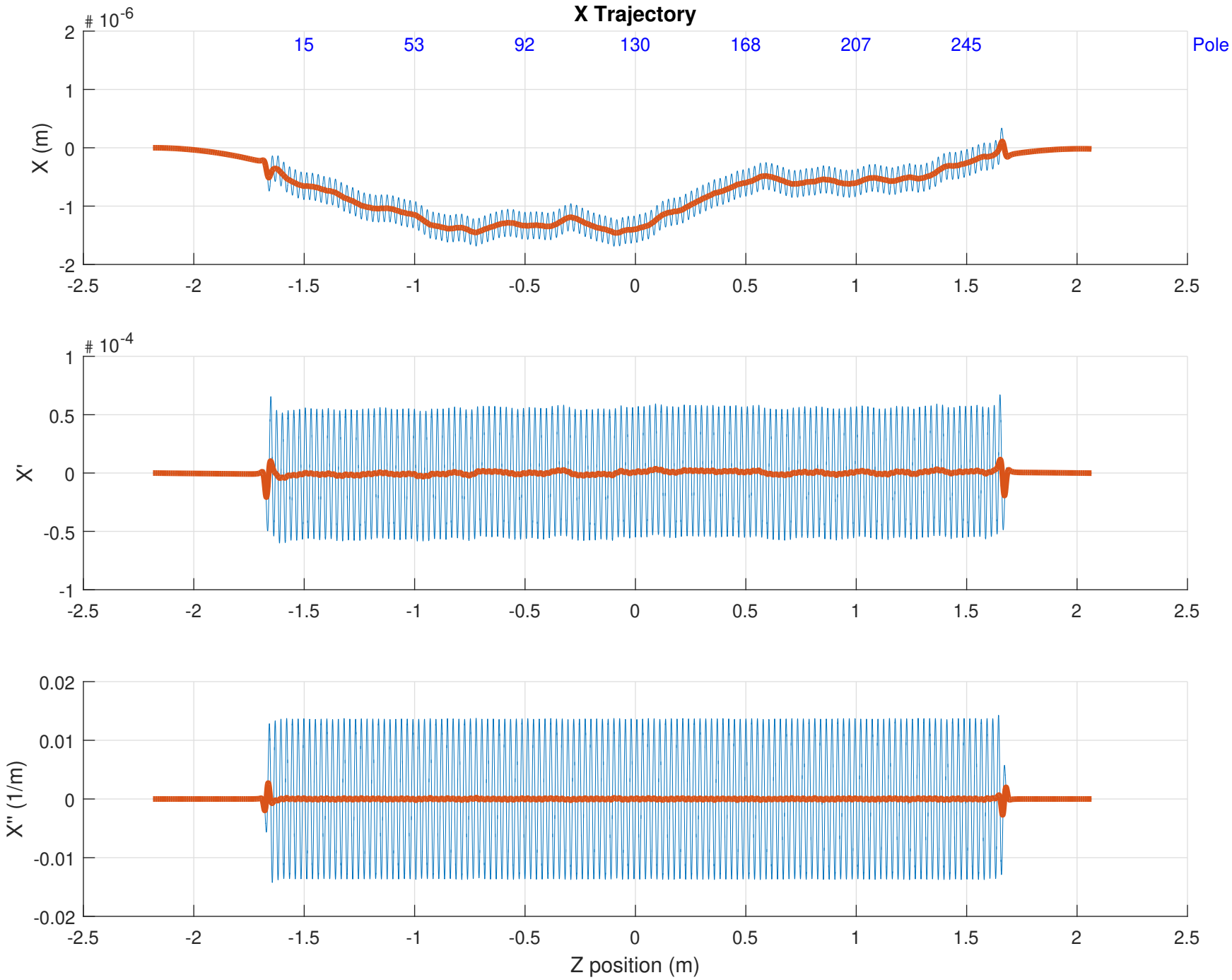
Peak Fields: Ave = 0.637450 T, RMS = 0.002549 T

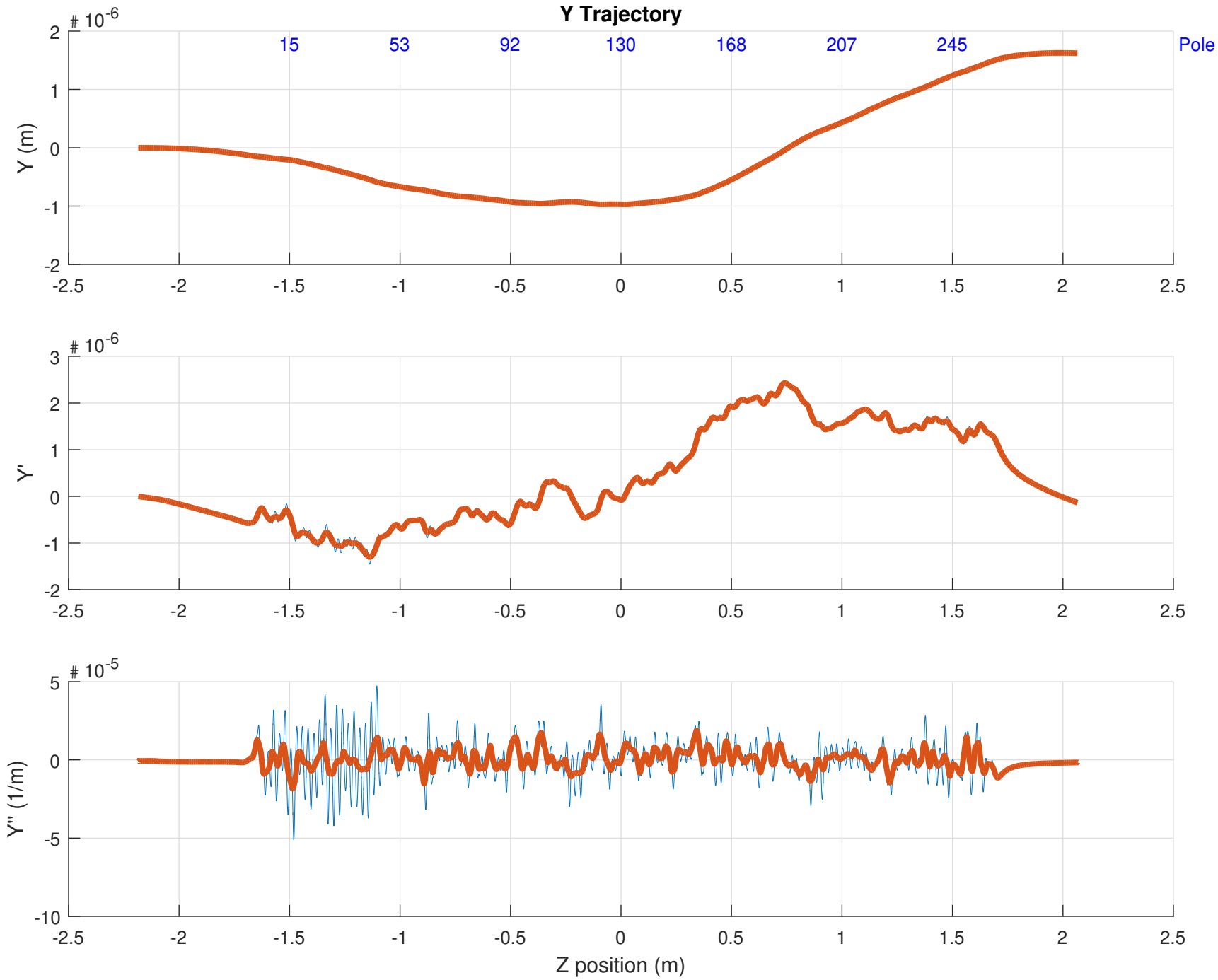


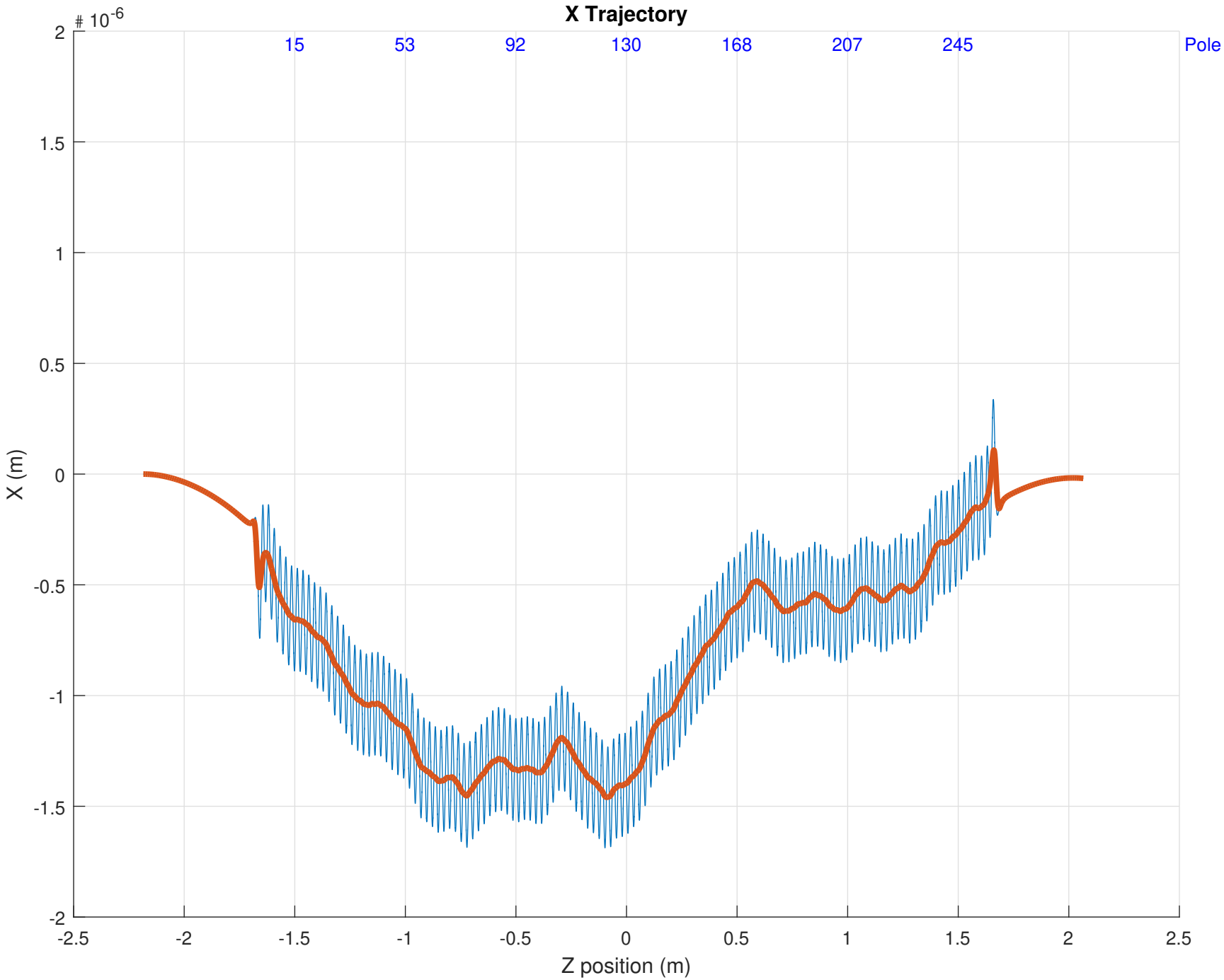
Peak Field Spacing: Ave = 0.012999 m, RMS = 0.000019 m

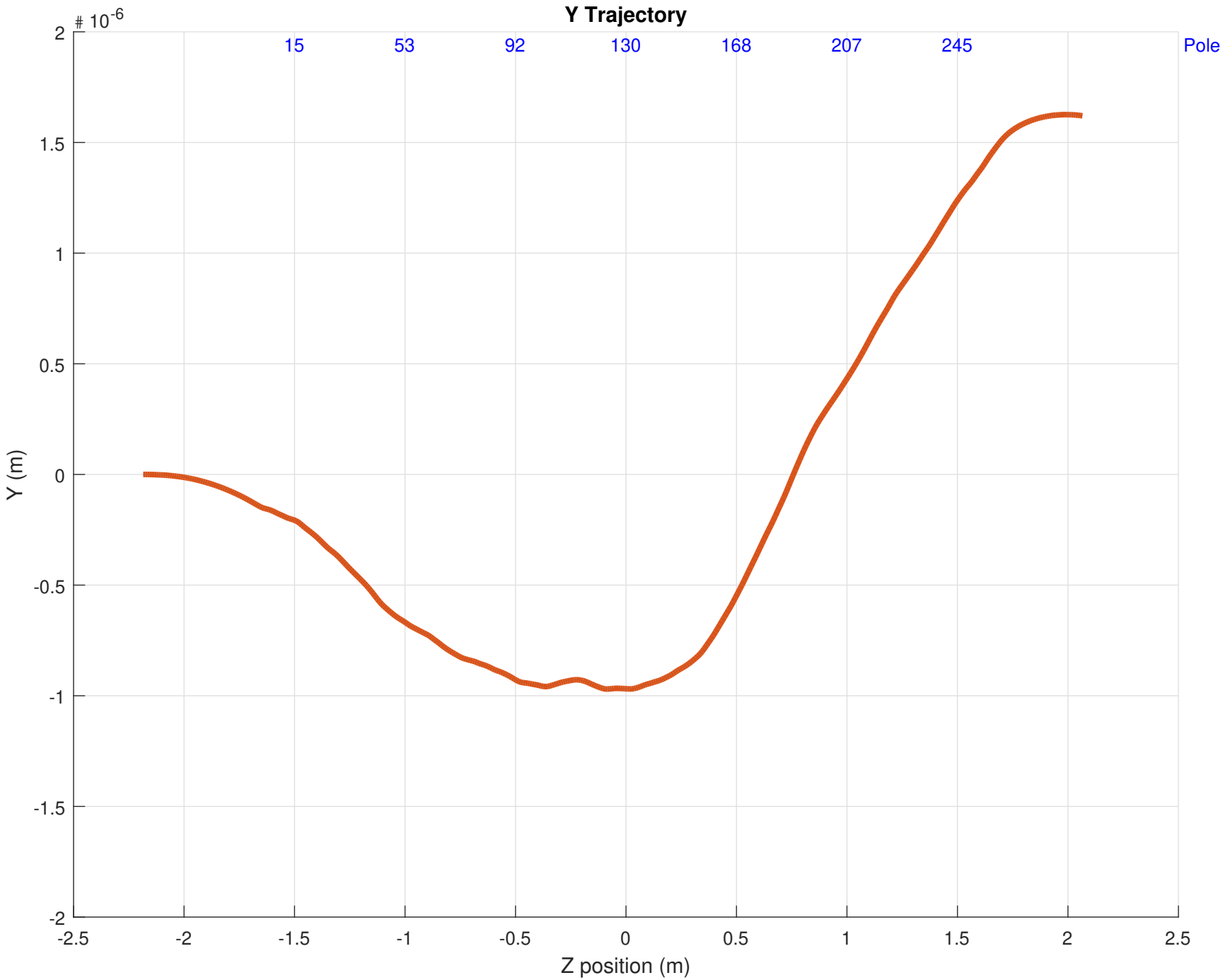


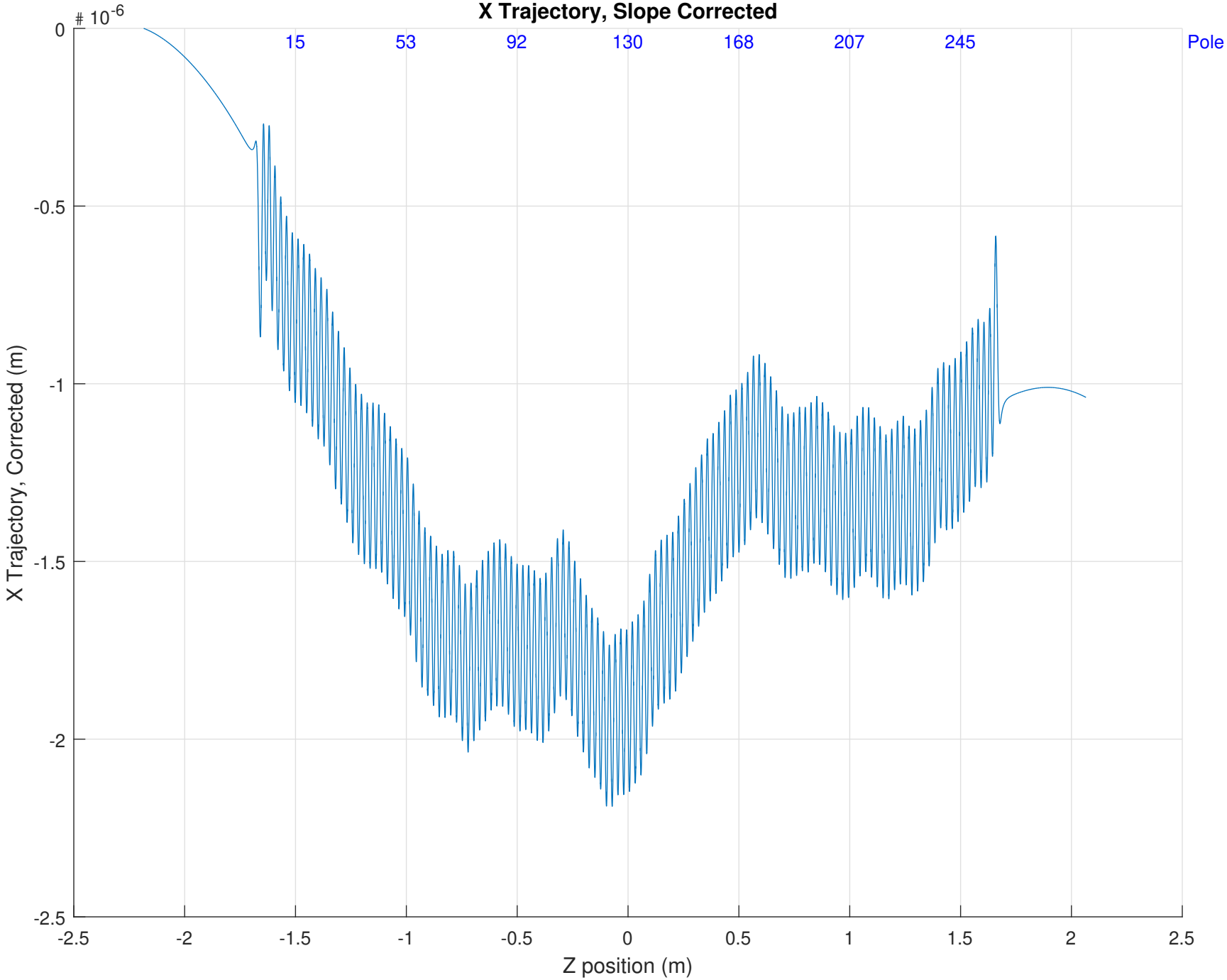
Zero Field Spacing: Ave = 0.012999 m, RMS = 0.000032 m

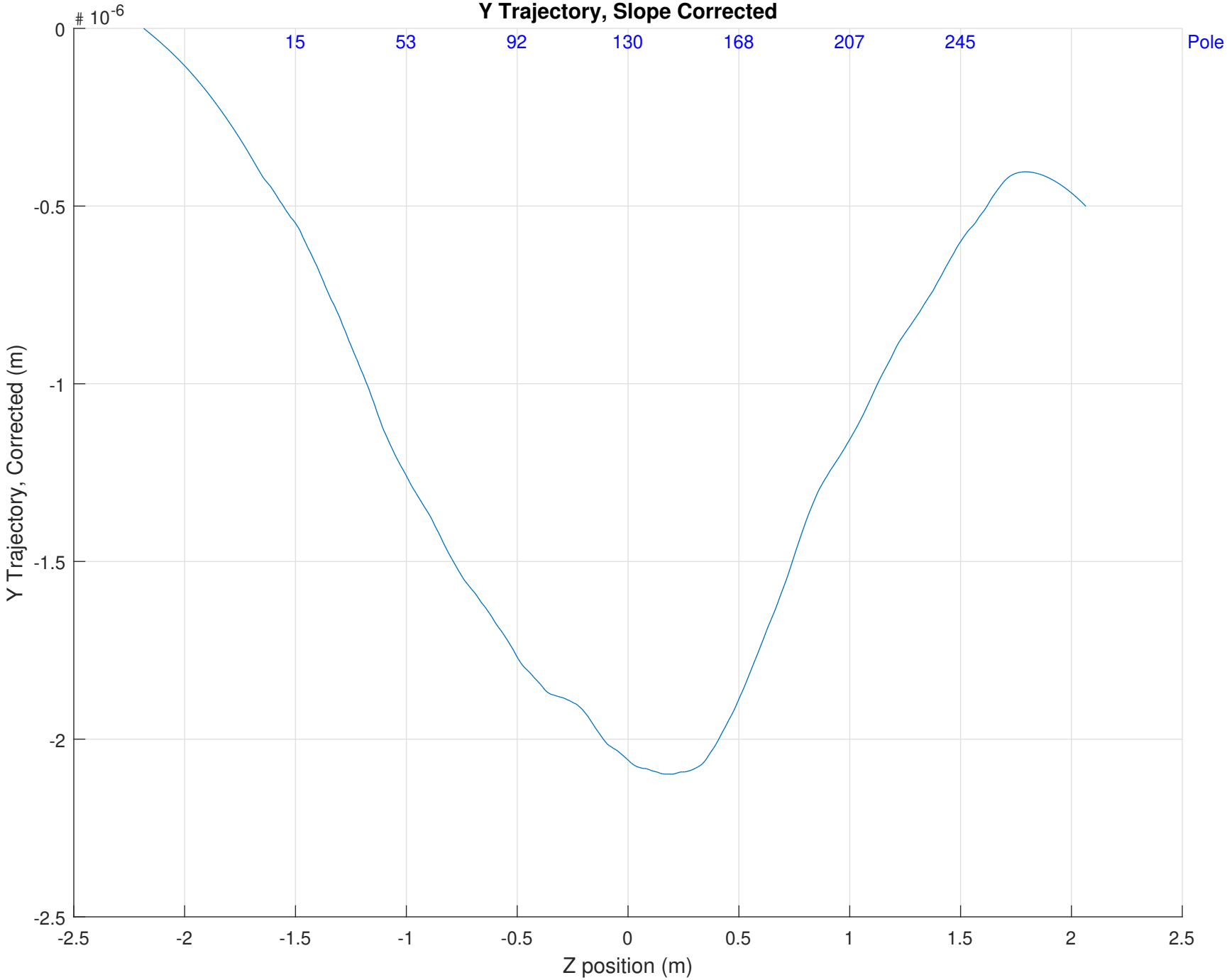

X Trajectory
10^-6
15
53
92
130
168
207
245
Pole
X (m)
10^-4
X'
X'' (1/m)
Z position (m)

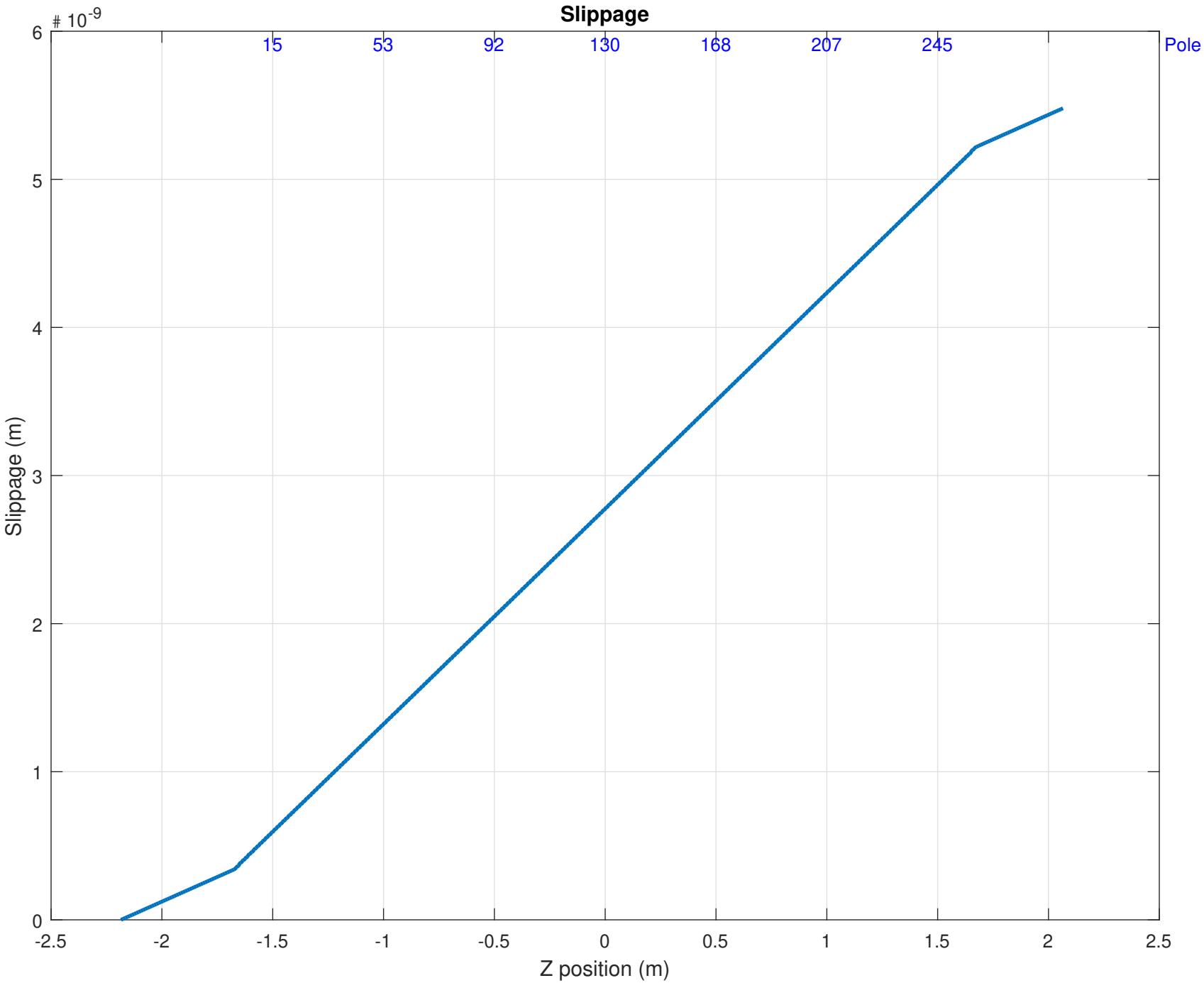

Y Trajectory
15
53
92
130
168
207
245
Pole
10^-6
Y (m)
10^-6
Y'
10^-5
Y'' (1/m)
Z position (m)

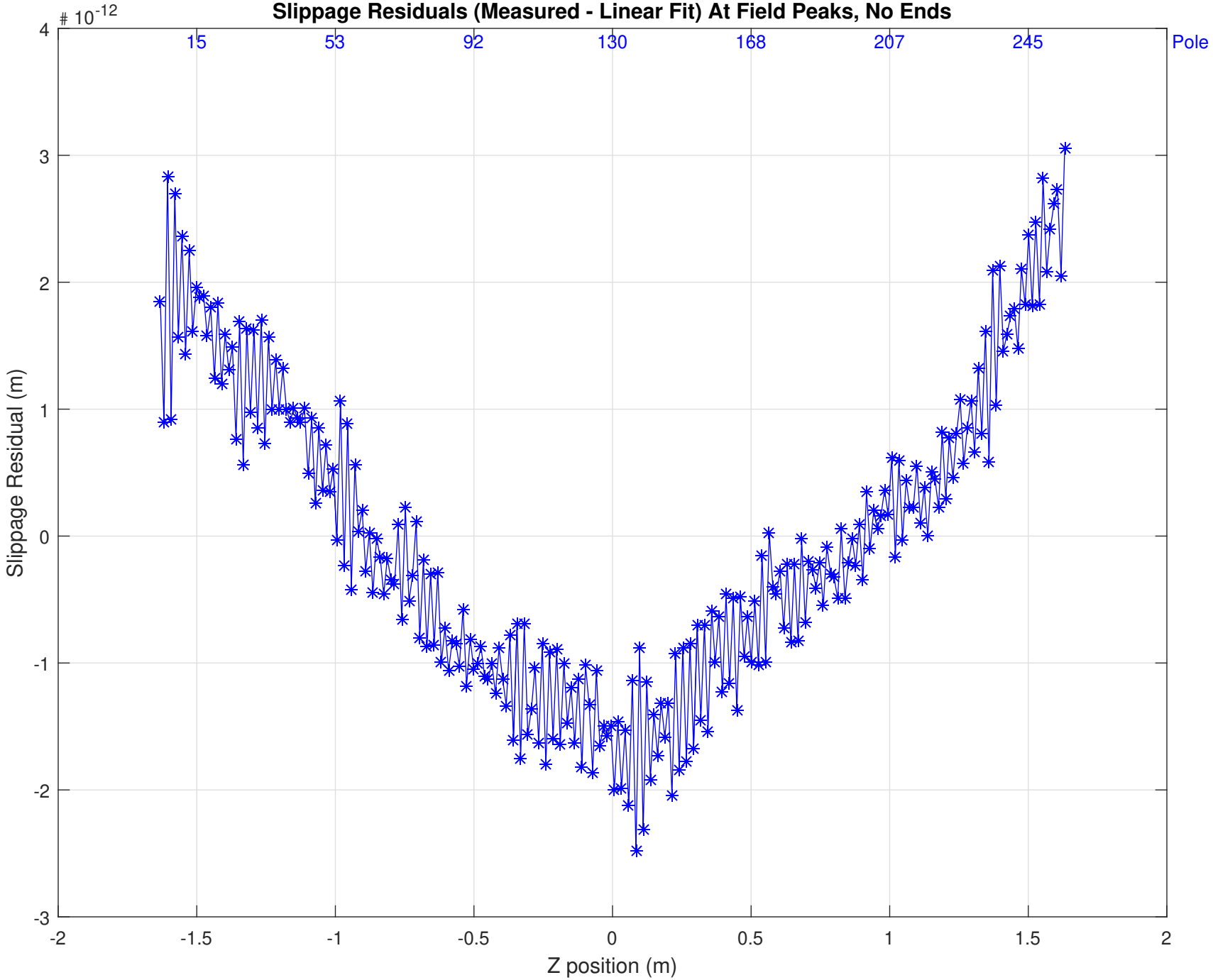

X Trajectory
10^-6
15
53
92
130
168
207
245
Pole
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
X (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)

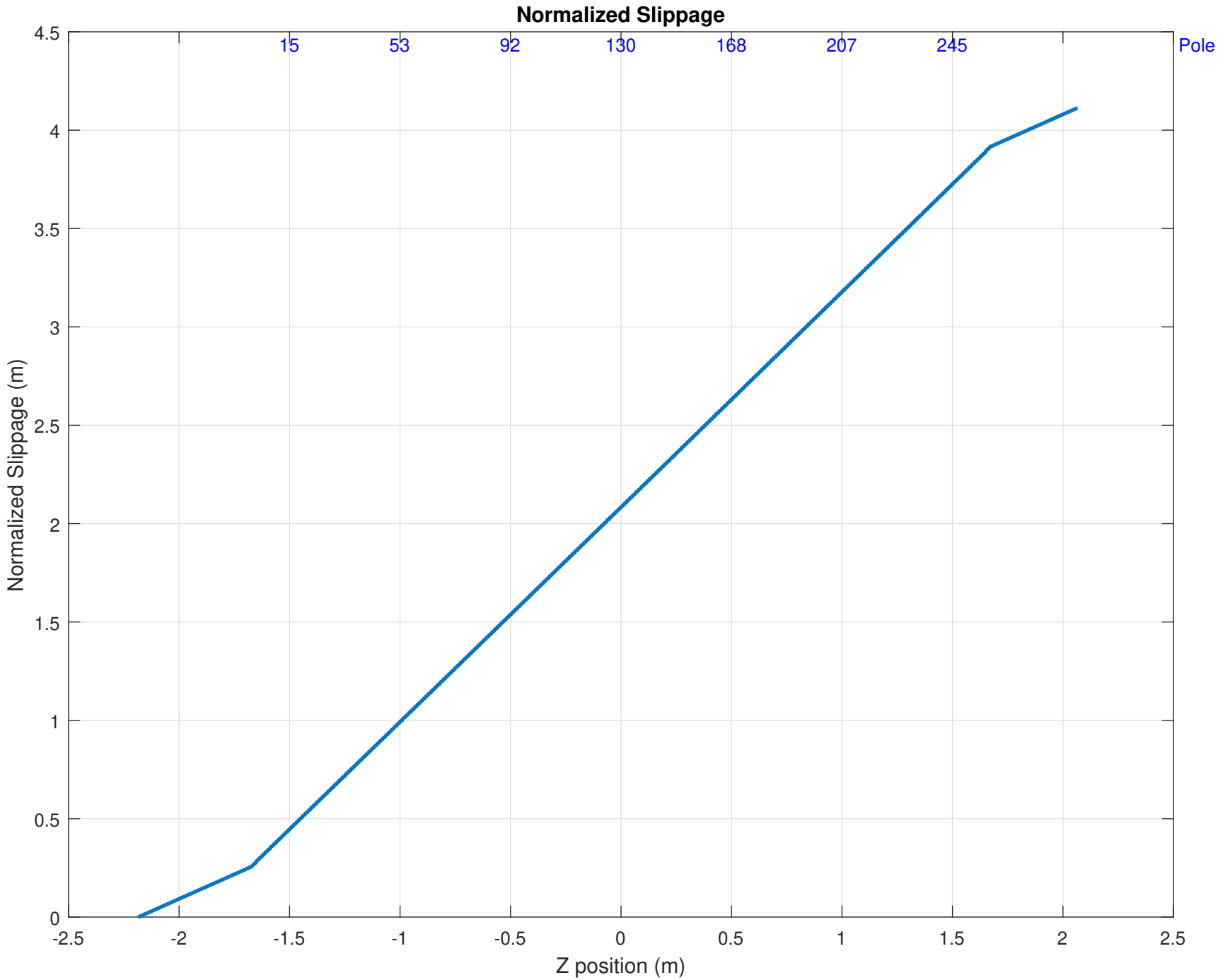

Y Trajectory
10^-6
15
53
92
130
168
207
245
Pole
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
Y (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)

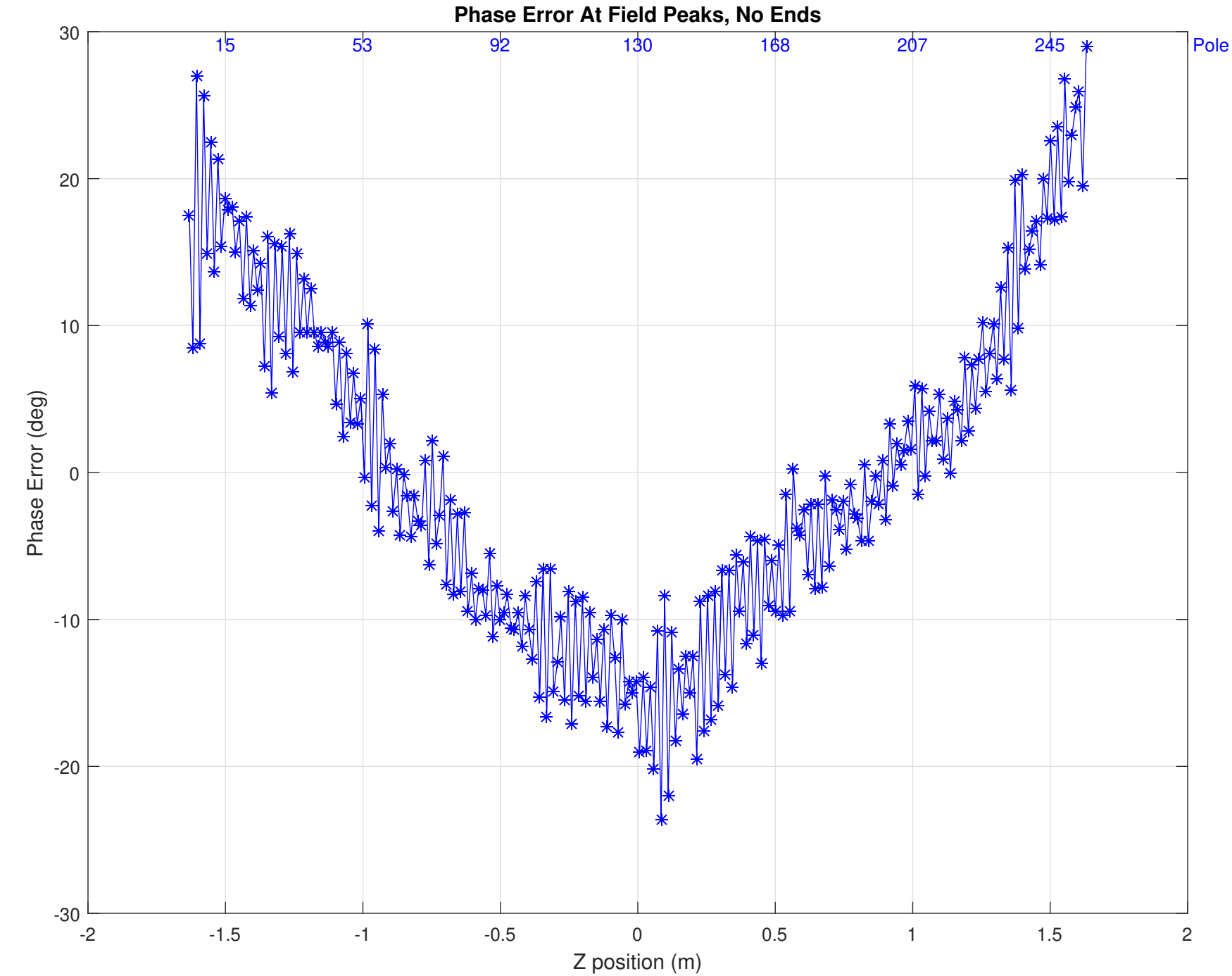

X Trajectory, Slope Corrected
10-6
0
-0.5
-1
-1.5
-2
-2.5
15
53
92
130
168
207
245
Pole
X Trajectory, Corrected (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)


Y Trajectory, Slope Corrected
10-6
0
-0.5
-1
-1.5
-2
-2.5
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)

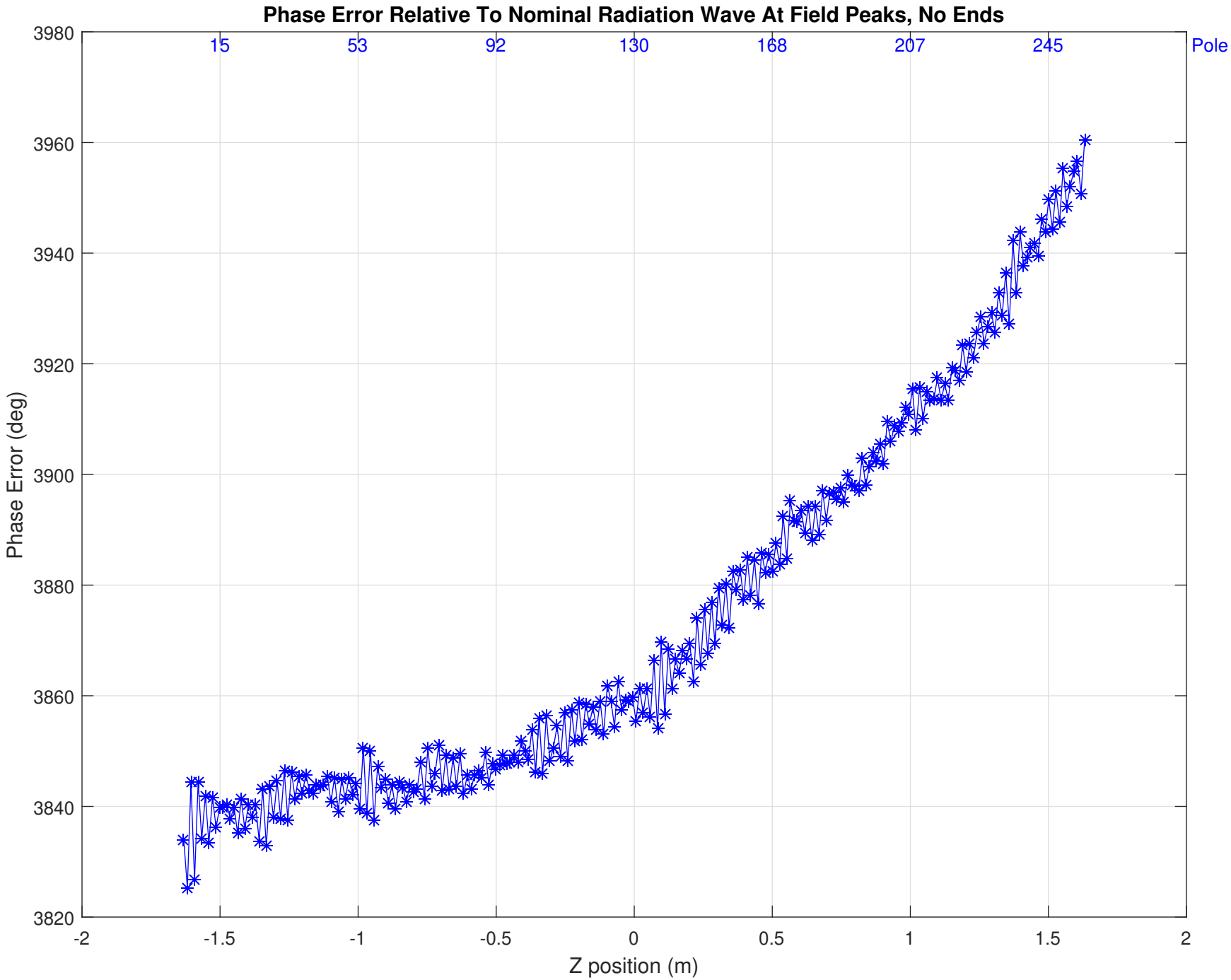

Slippage
10-9
6
5
4
3
2
1
0
15
53
92
130
168
207
245
Pole
Slippage (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)


Slippage Residuals (Measured - Linear Fit) At Field Peaks, No Ends
10^-12
15
53
92
130
168
207
245
Pole
4
3
2
1
0
-1
-2
-3
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)
-2.5
-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 = 11.575431 deg


Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
15
53
92
130
168
207
245
Pole
3980
3960
3940
3920
3900
3880
3860
3840
3820
Phase Error (deg)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z position (m)