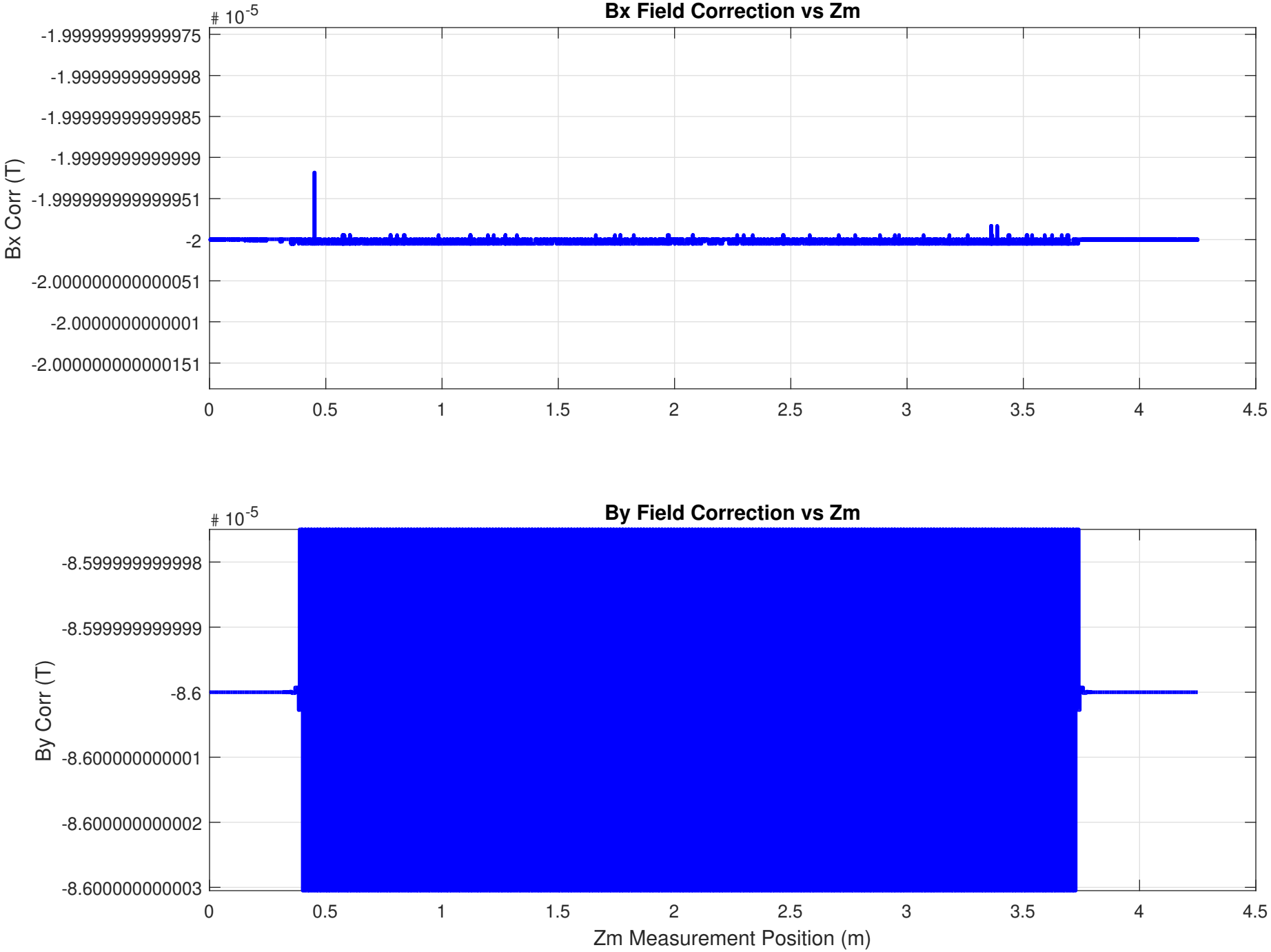
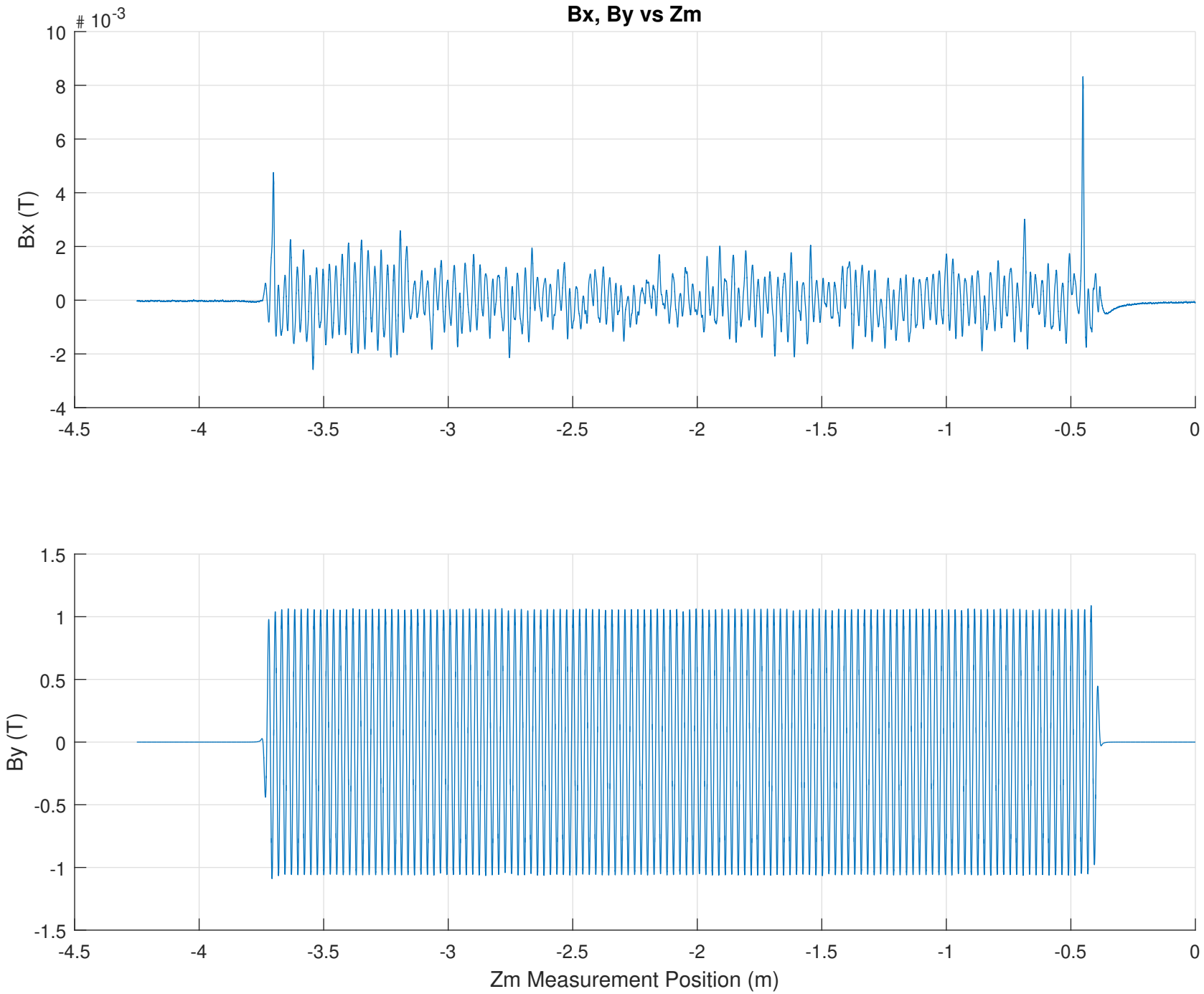
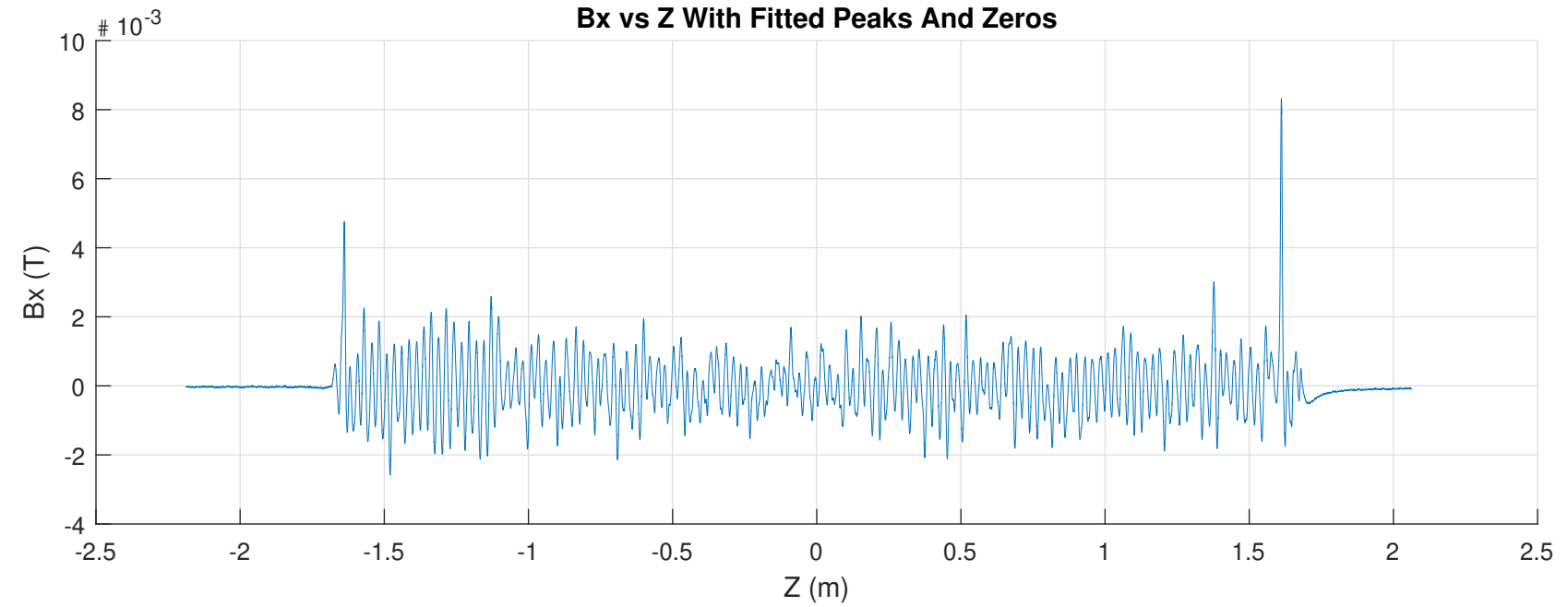
SLAC Magnetic Measurements

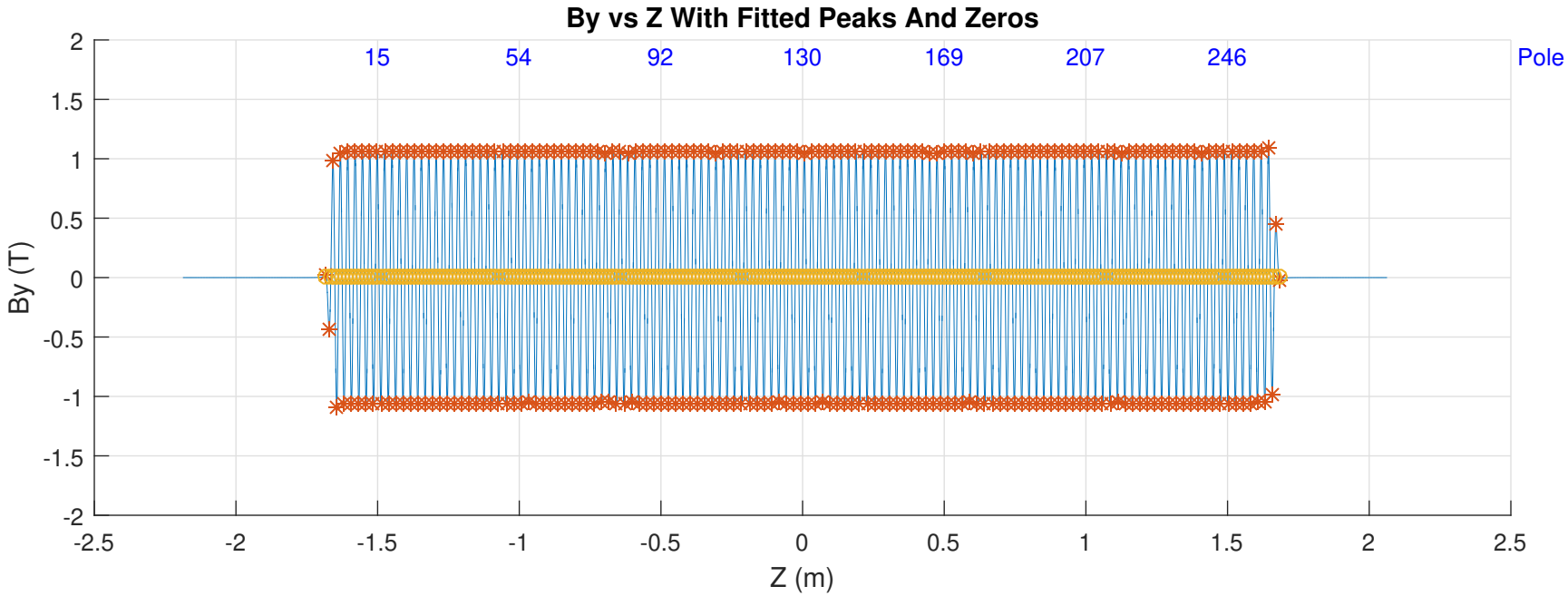
Planar Insertion Device Analysis

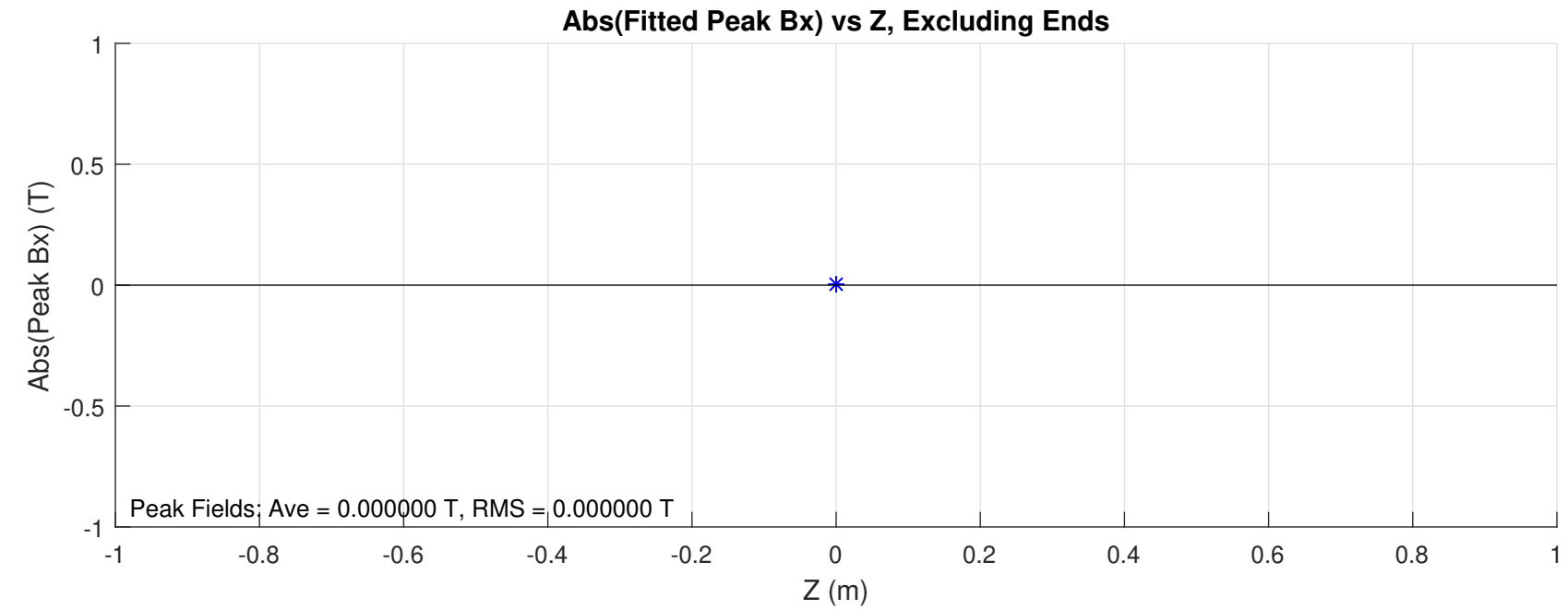
Parameters:
INPUT-FILE-DIR =S:\MagData\LCLS2\Undulator\HGVPU\DATASET0001\Fine Tuning\Z Scans\Run 082\
INPUT-FILE-NAME =x+00000-y+000-bscanz.dat
INPUT-FILE-TYPE =ZVXYBXYH
CORR-REQUIRED =1
GAMMA =26689
NOM-LAMBDA-U =0.026
NOM-K-VALUE =3.5
NOM-LAMBDA-R =1.3004e-10
NUM-POLES =260
NUM-END-POLES =6
CELL-LENGTH =3.656

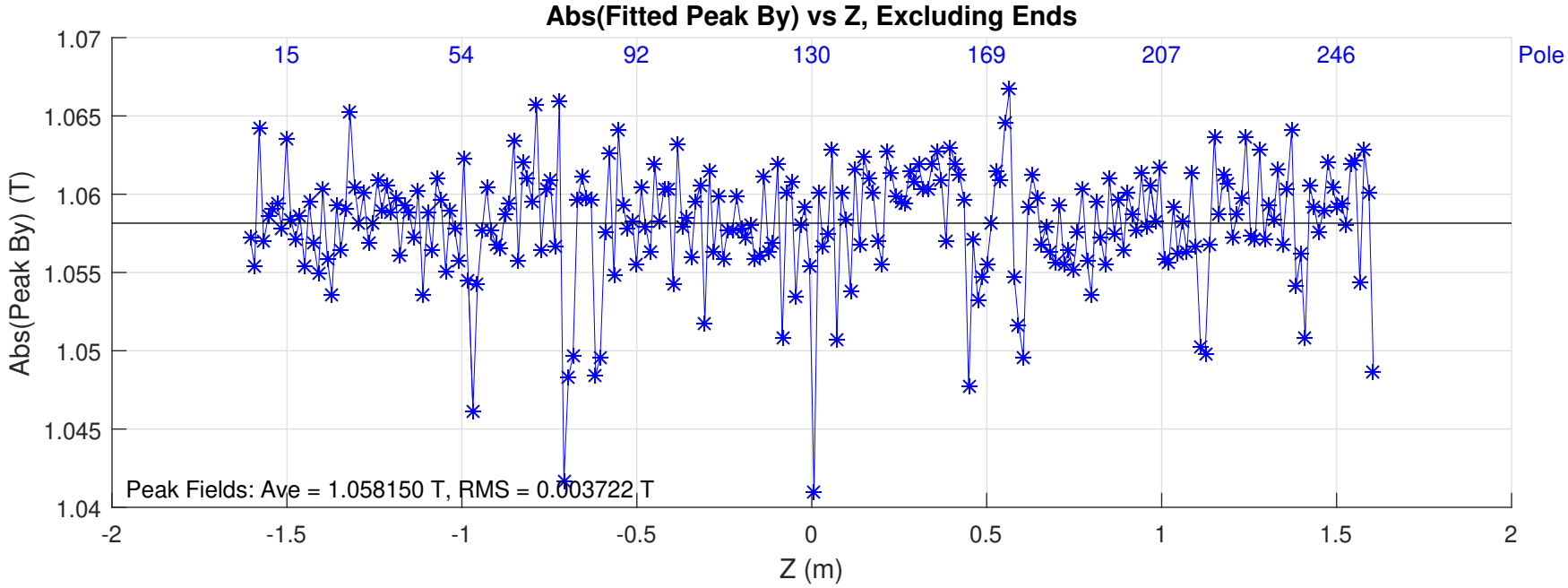

Bx Field Correction vs Zm
10^-5
-1.99999999999975
-1.9999999999998
-1.99999999999985
-1.9999999999999
-1.999999999999951
-2
-2.000000000000051
-2.0000000000001
-2.000000000000151
Bx Corr (T)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
By Field Correction vs Zm
10^-5
-8.599999999998
-8.599999999999
-8.6
-8.600000000001
-8.600000000002
-8.600000000003
By Corr (T)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Zm Measurement Position (m)

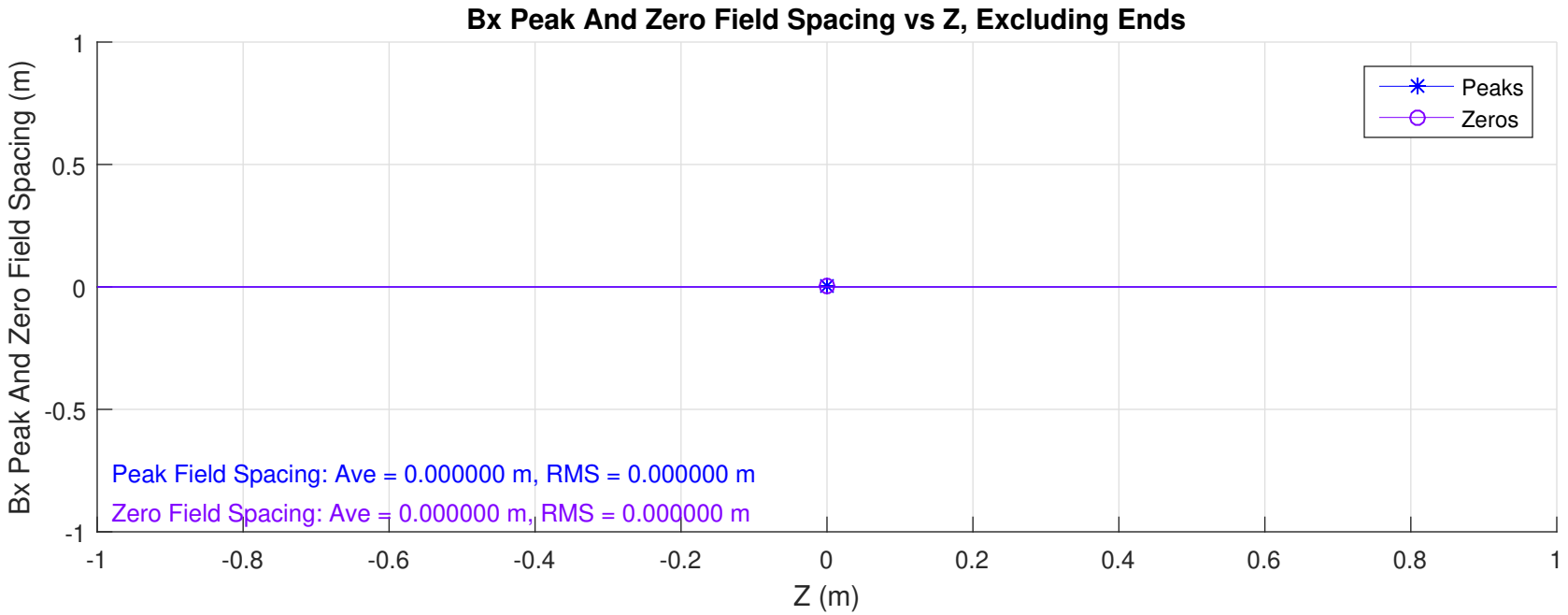

Bx, By vs Zm
10^-3
10
8
6
4
2
0
-2
-4
Bx (T)
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
1.5
1
0.5
0
-0.5
-1
-1.5
By (T)
Zm Measurement Position (m)

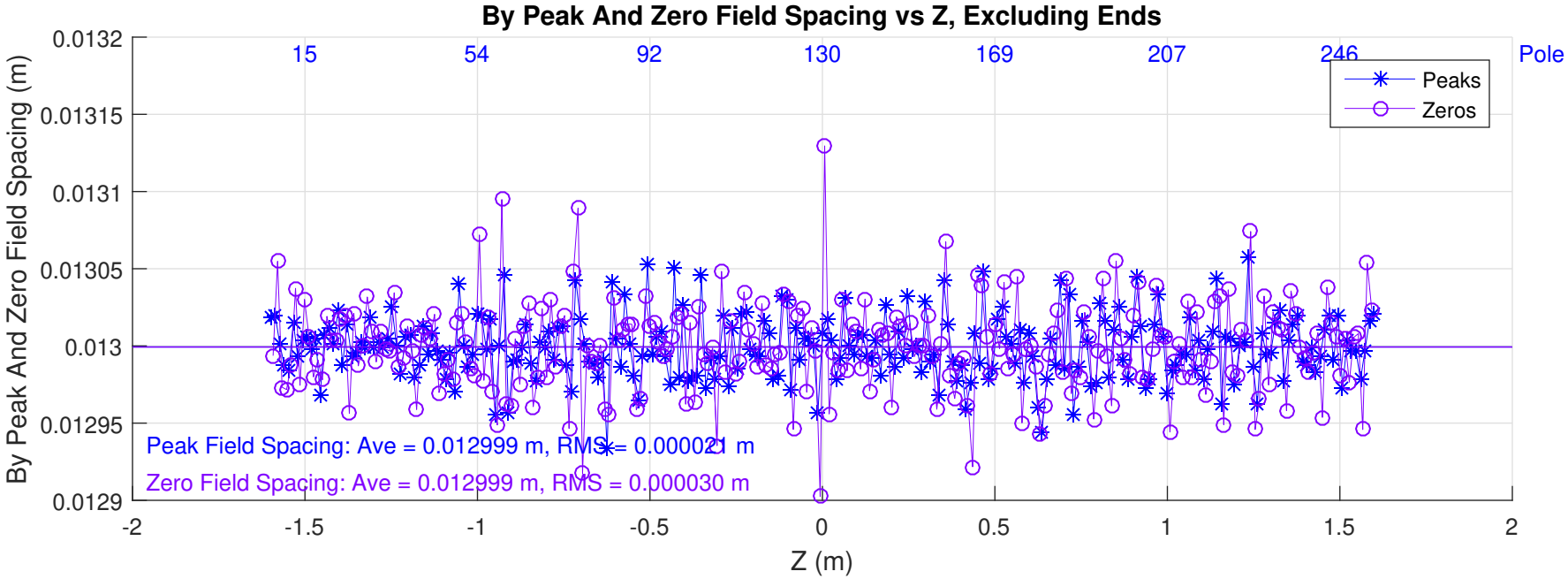

Bx vs Z With Fitted Peaks And Zeros
10^-3
10
8
6
4
2
0
-2
-4
Bx (T)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z (m)

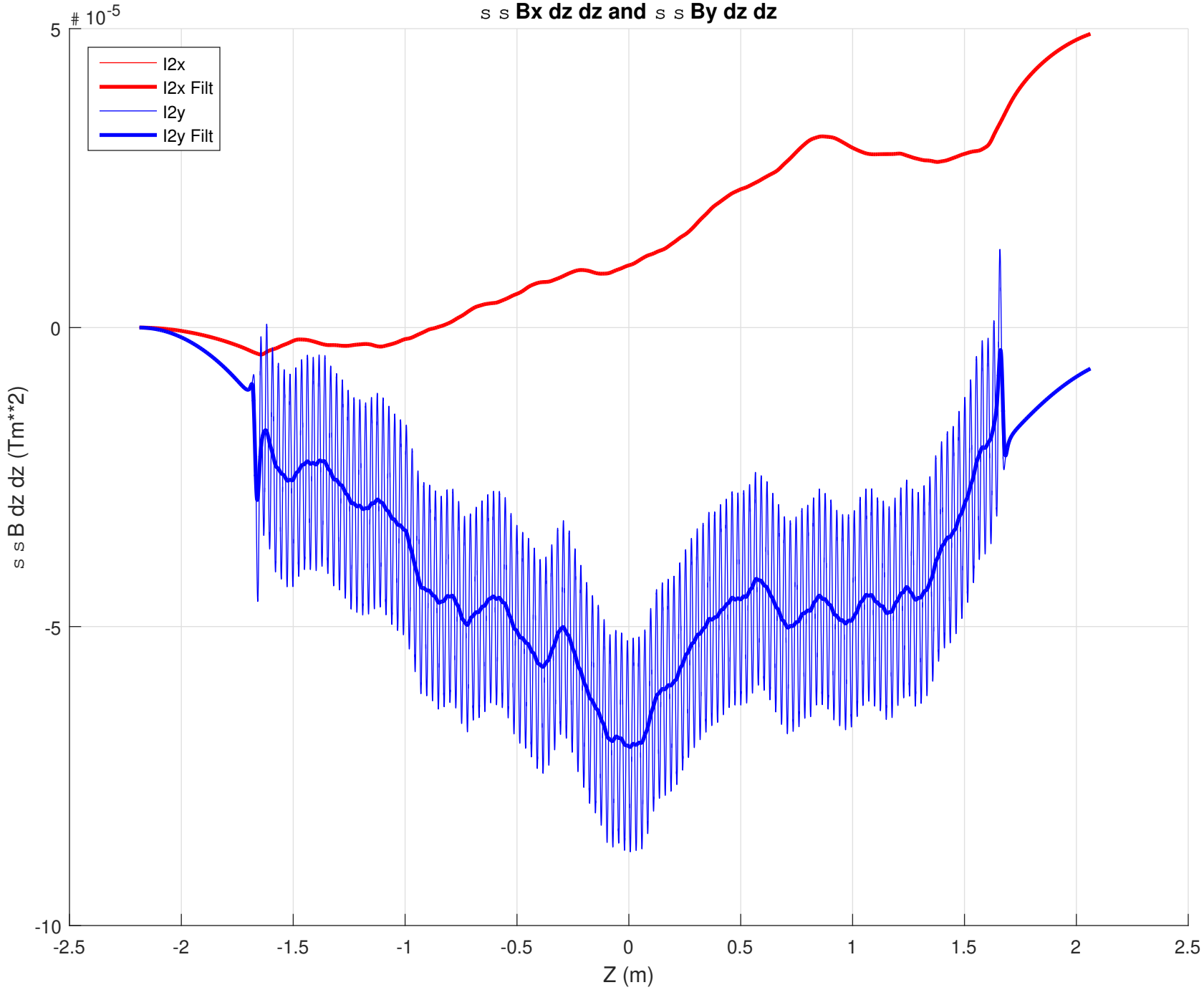

By vs Z With Fitted Peaks And Zeros
15
54
92
130
169
207
246
Pole
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
By (T)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z (m)

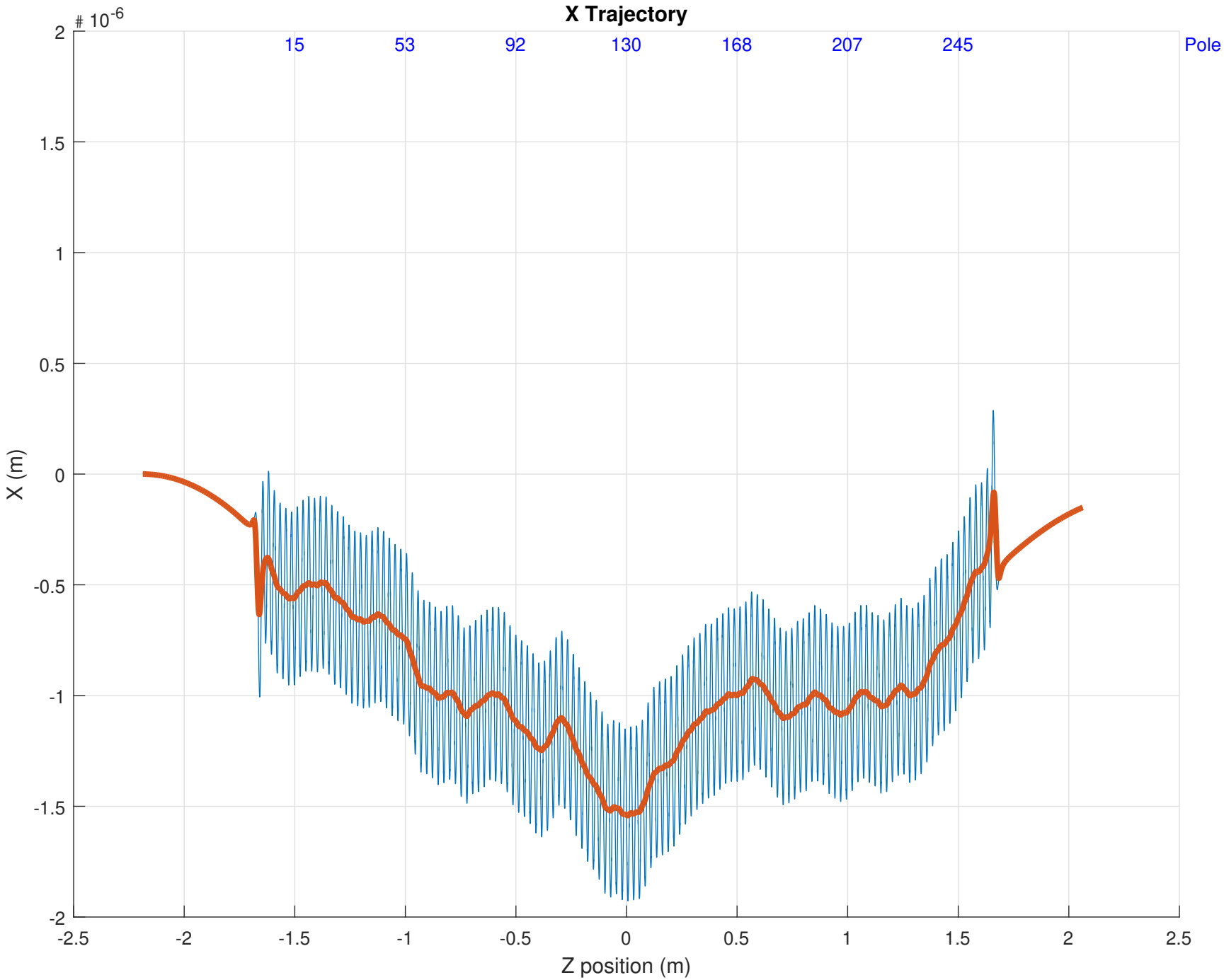

Abs(Fitted Peak Bx) vs Z, Excluding Ends
Abs(Peak Bx) (T)
Z (m)
Peak Fields: Ave = 0.000000 T, RMS = 0.000000 T
1
0.5
0
-0.5
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1

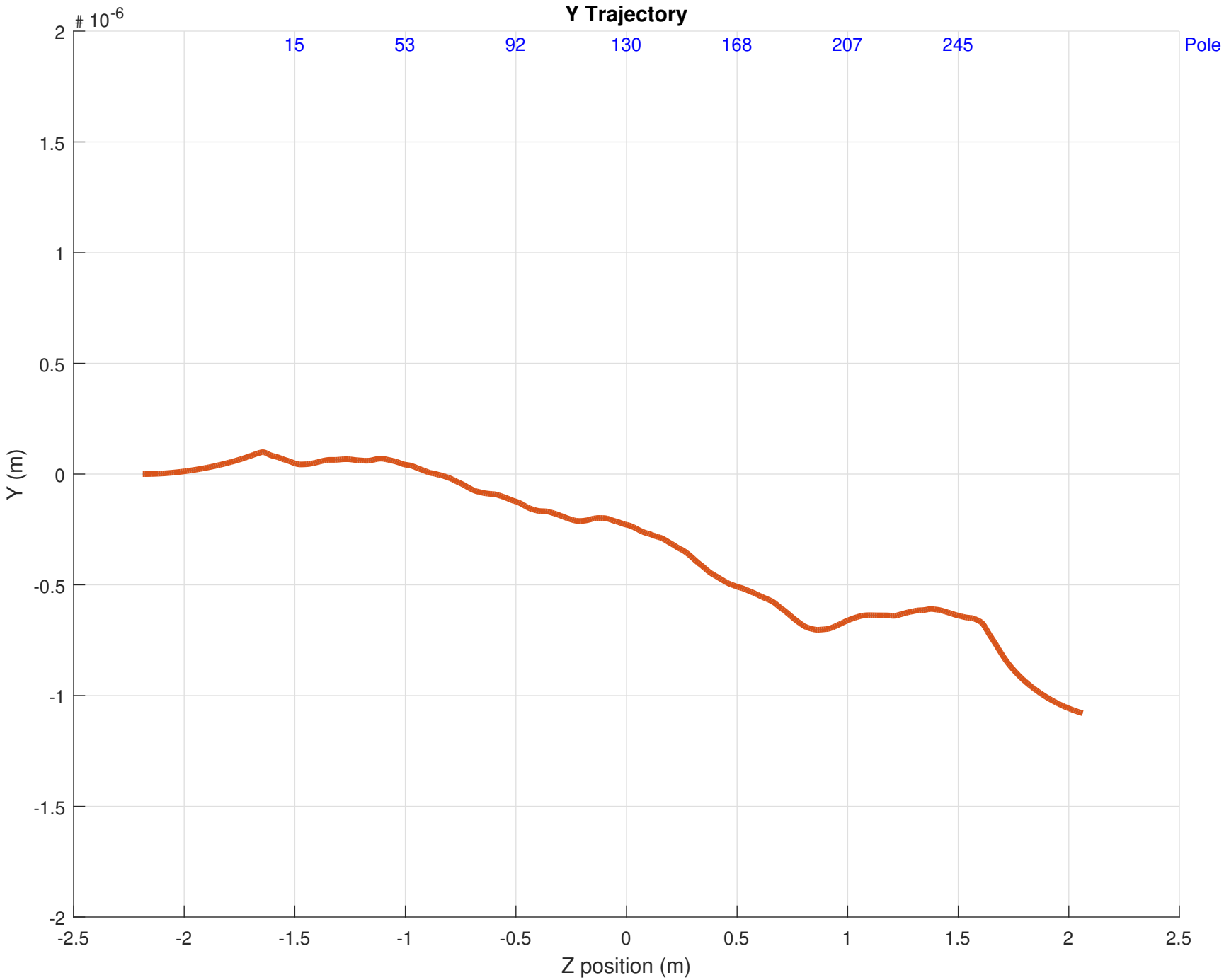

Abs(Fitted Peak By) vs Z, Excluding Ends
Abs(Peak By) (T)
Z (m)
Peak Fields: Ave = 1.058150 T, RMS = 0.003722 T
15
54
92
130
169
207
246
Pole
1.07
1.065
1.06
1.055
1.05
1.045
1.04
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2

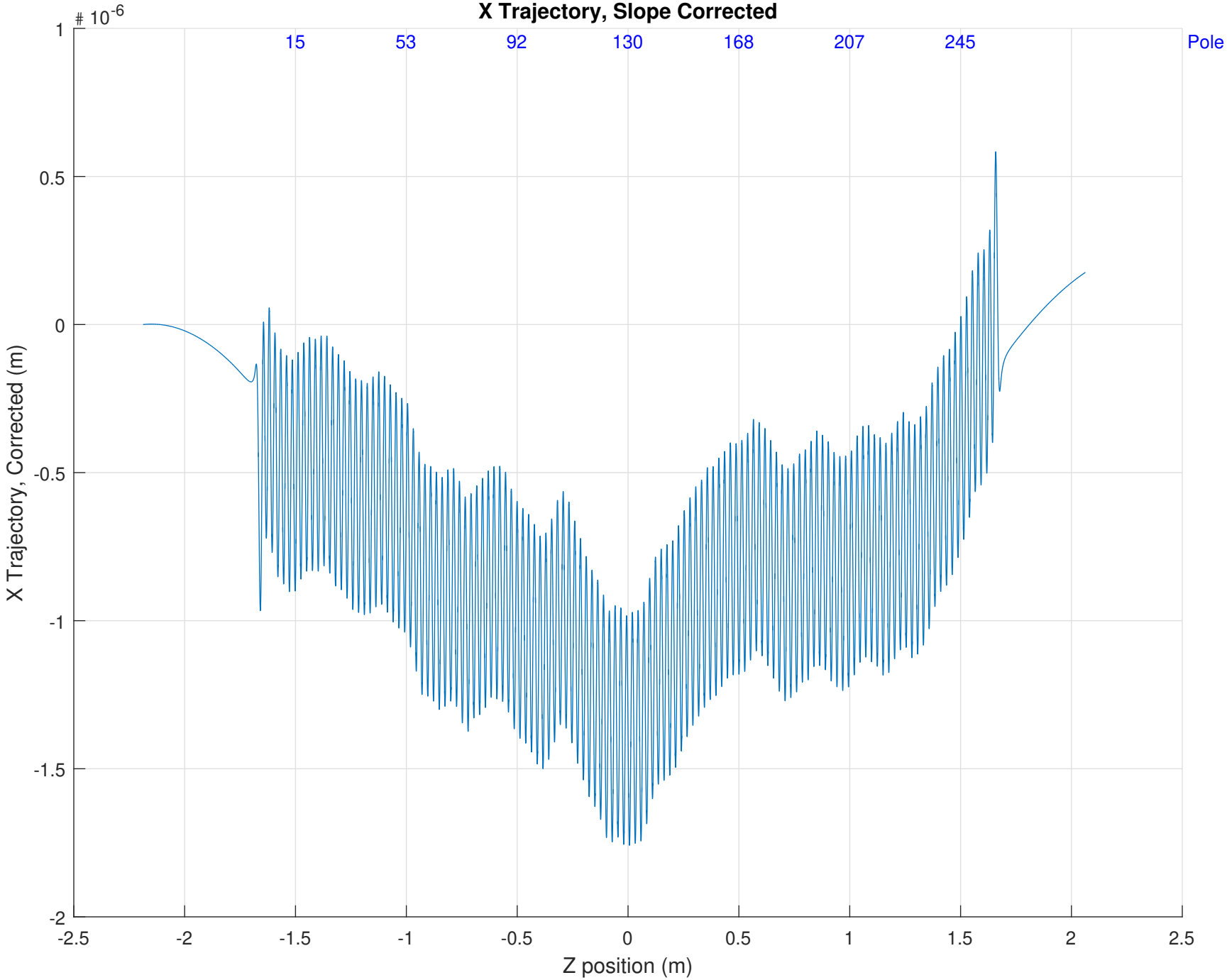

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
Z (m)
Peaks
Zeros
Peak Field Spacing: Ave = 0.000000 m, RMS = 0.000000 m
Zero Field Spacing: Ave = 0.000000 m, RMS = 0.000000 m

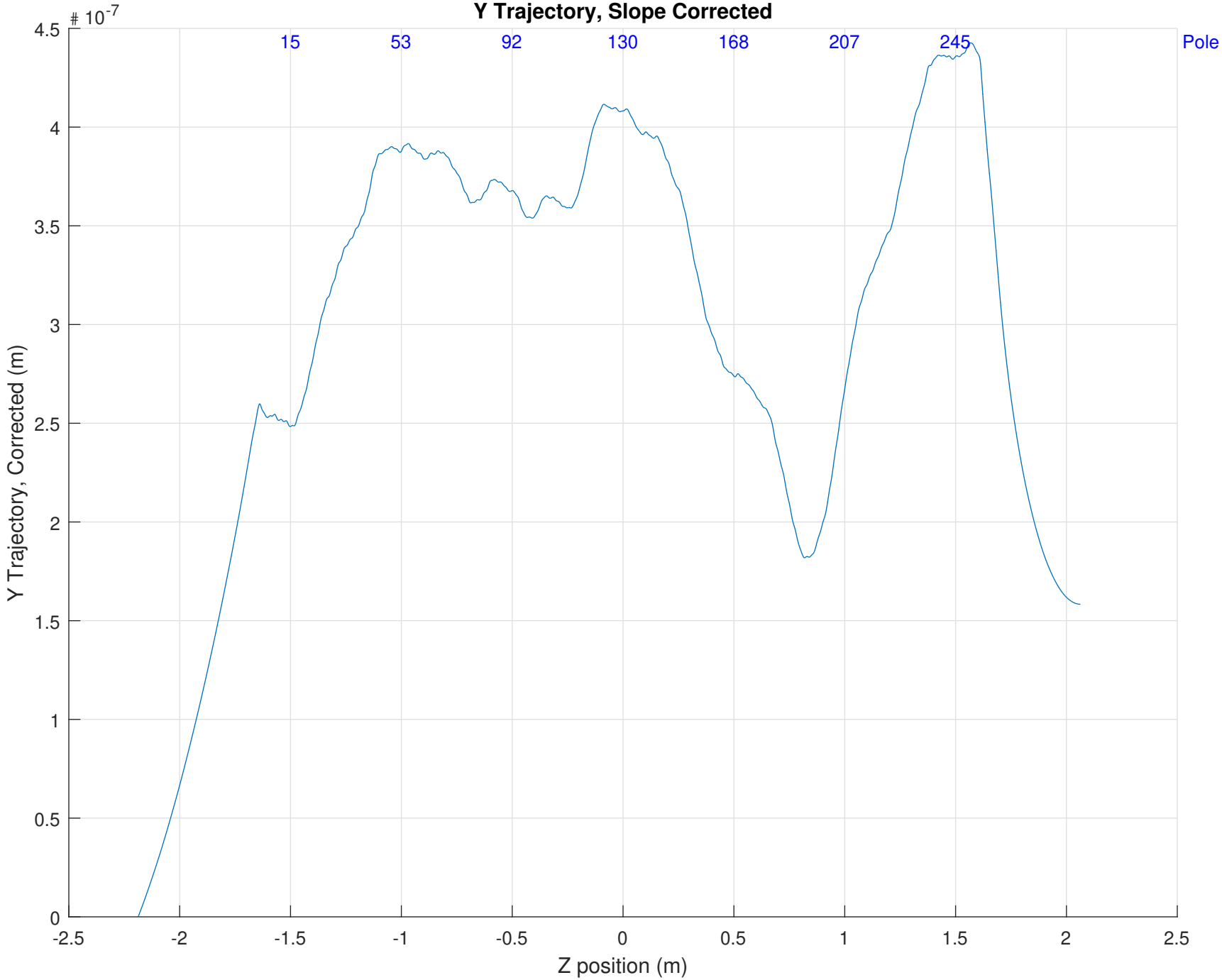

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
Z (m)
15
54
92
130
169
207
246
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.012999 m, RMS = 0.000021 m
Zero Field Spacing: Ave = 0.012999 m, RMS = 0.000030 m

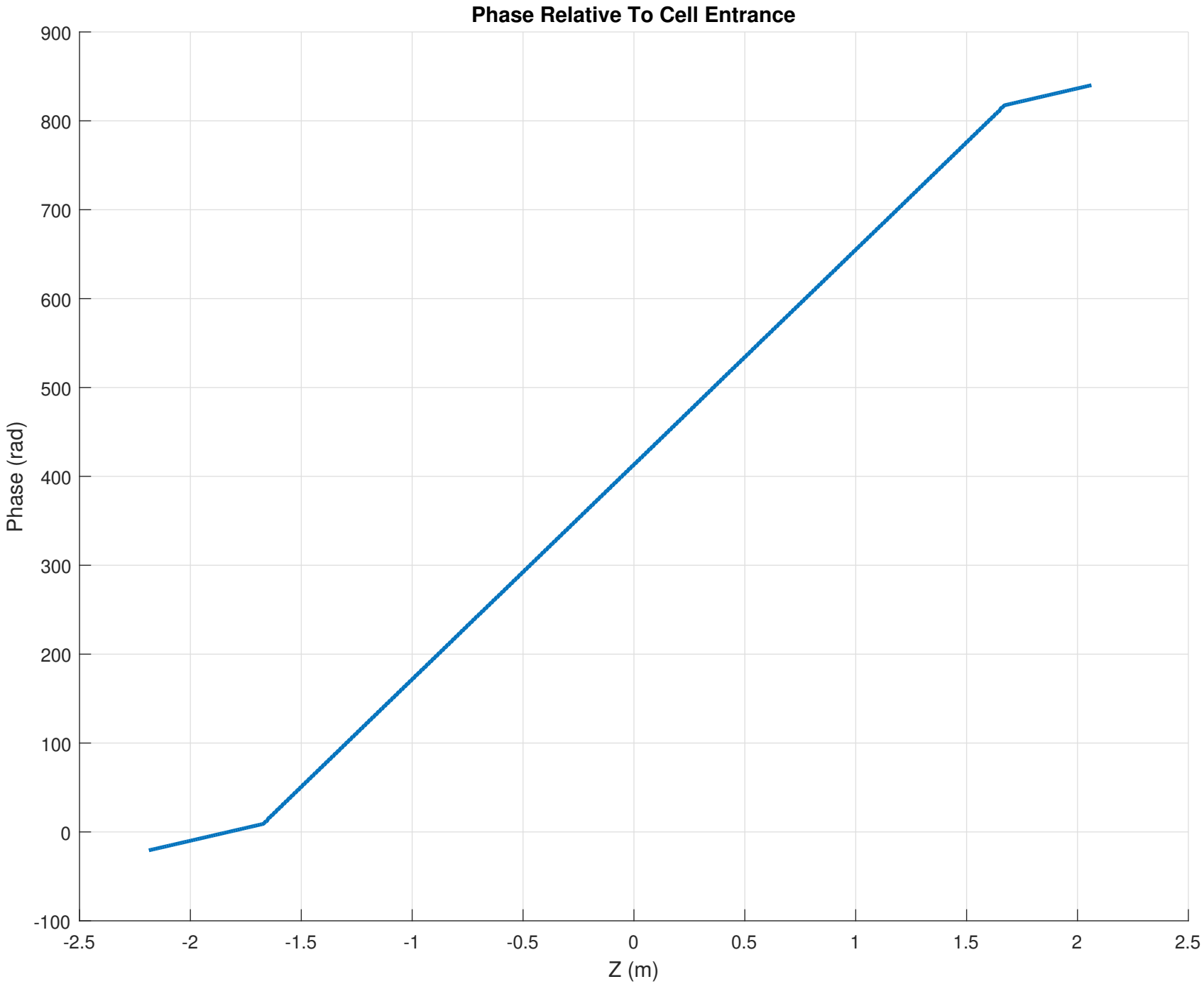

∫∫ Bx dz dz and ∫∫ By dz dz
10^-5
I2x
I2x Filt
I2y
I2y Filt
∫∫B dz dz (Tm**2)
Z (m)
5
0
-5
-10
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5

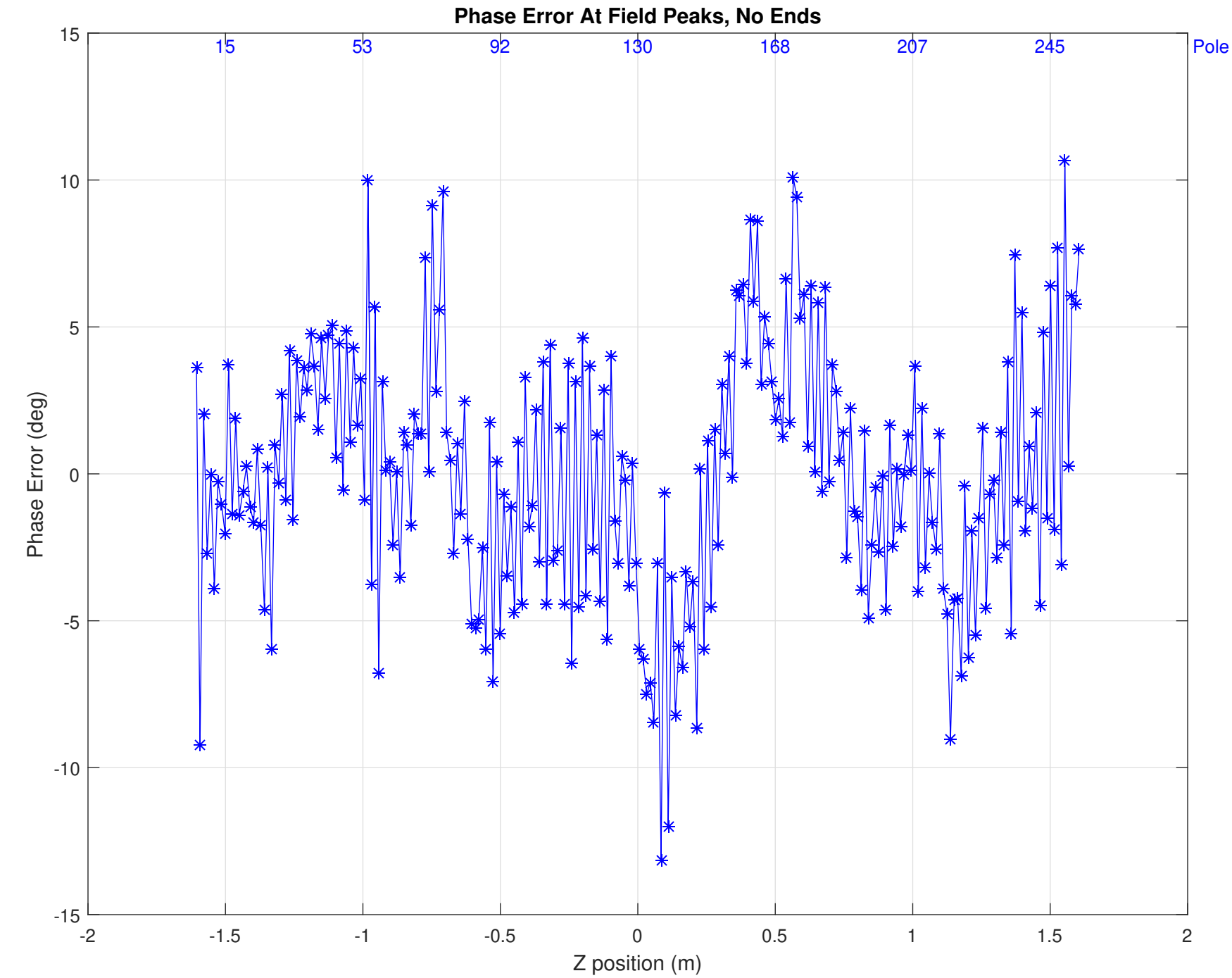

X Trajectory
10^-6
15
53
92
130
168
207
245
Pole
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
X (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)


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)

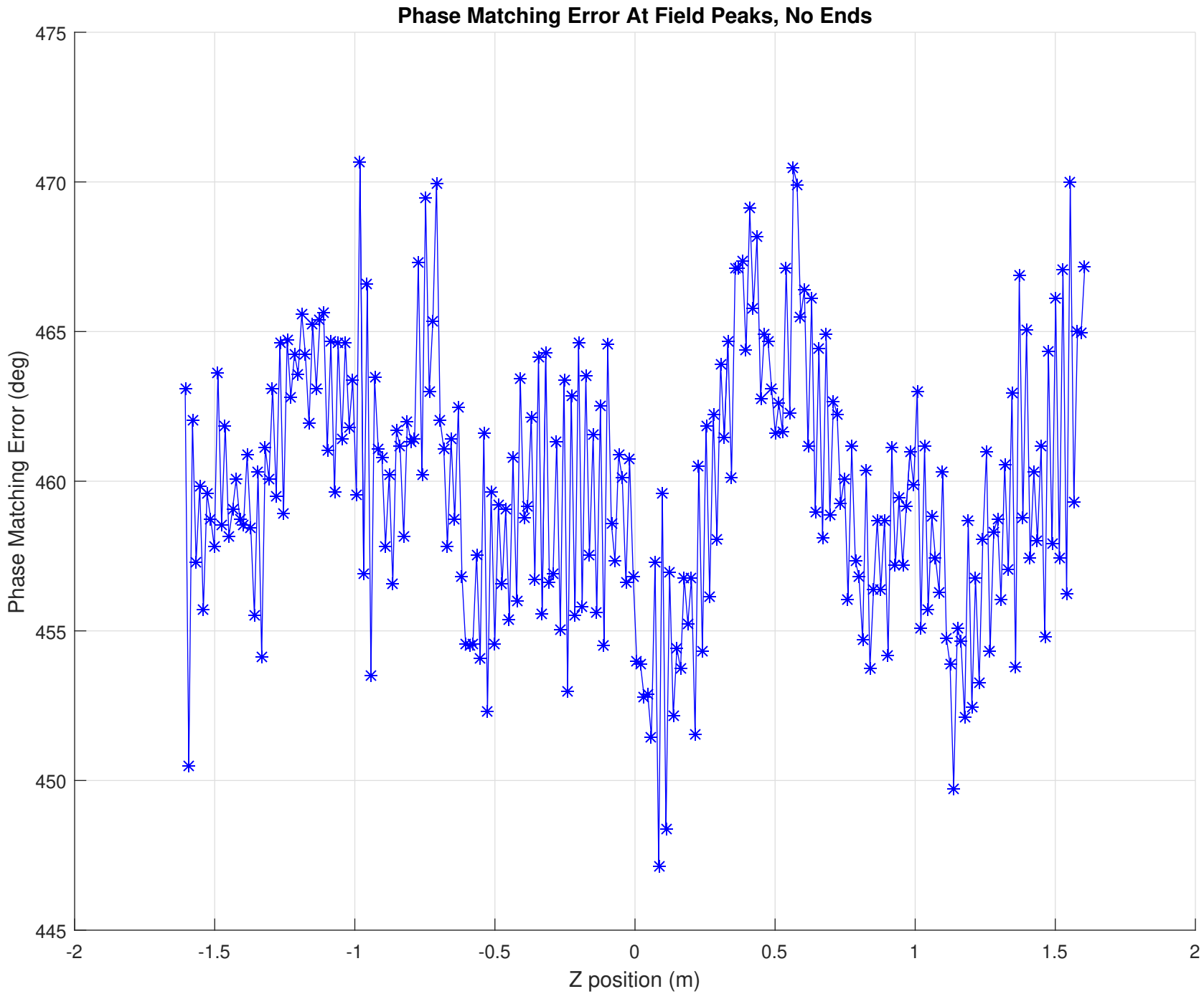

X Trajectory, Slope Corrected
10-6
15
53
92
130
168
207
245
Pole
1
0.5
0
-0.5
-1
-1.5
-2
X Trajectory, Corrected (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)


Y Trajectory, Slope Corrected
10^-7
15
53
92
130
168
207
245
Pole
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Y Trajectory, Corrected (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)

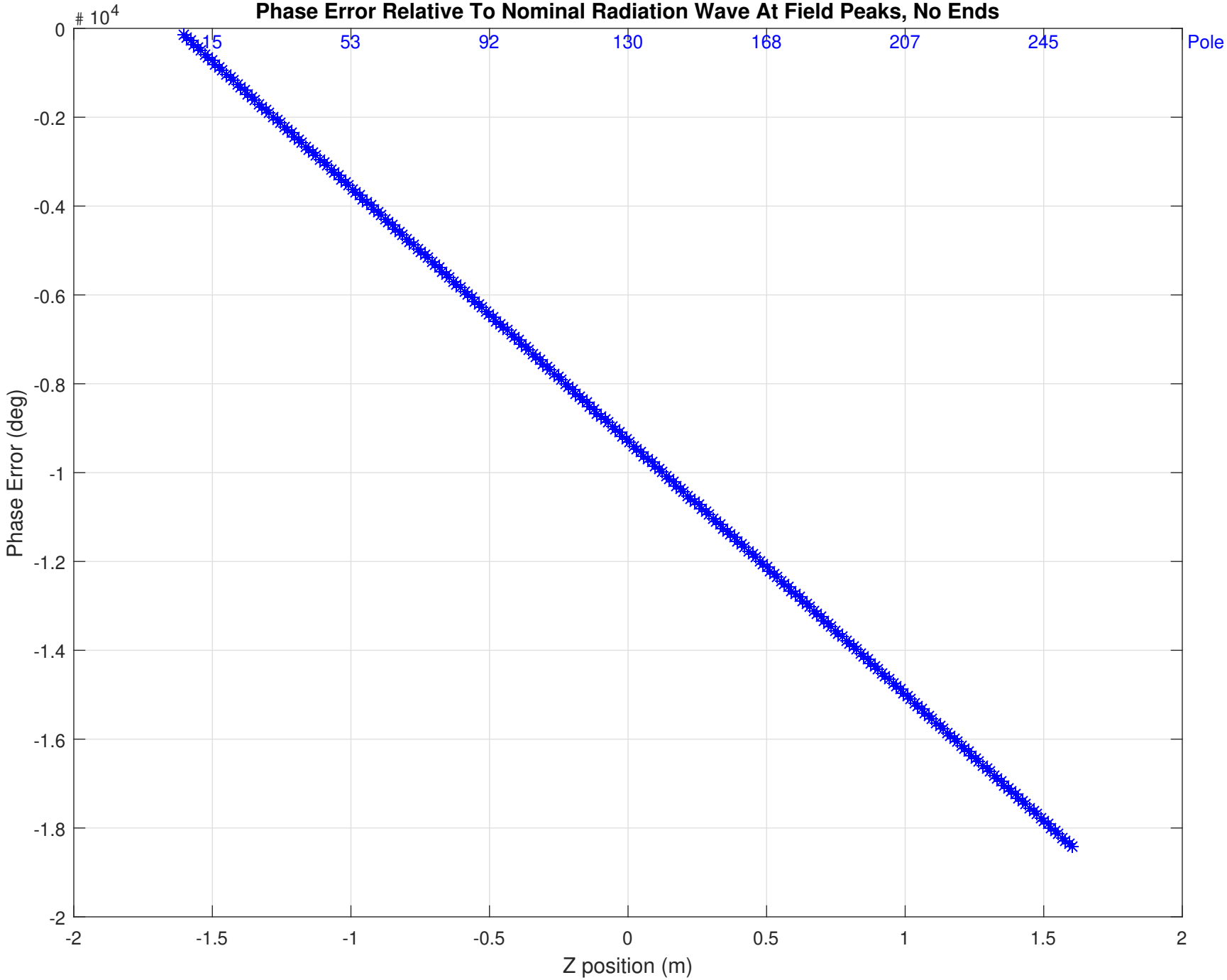

Phase Relative To Cell Entrance
900
800
700
600
500
400
300
200
100
0
-100
Phase (rad)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z (m)



Phase Error: Ave = 0.000000 deg, RMS = 4.248644 deg



Phase Match Error: Ave = 459.843255 deg, RMS = 4.394886 deg


Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
10^4
0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
-1.4
-1.6
-1.8
-2
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)