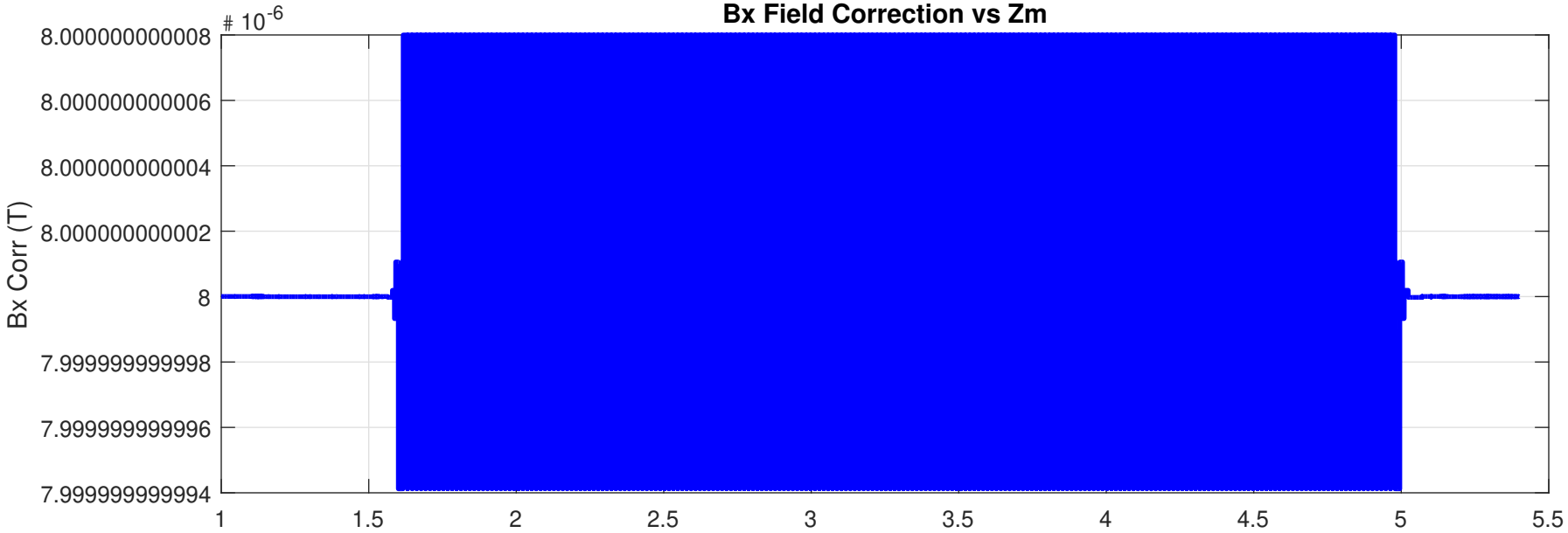
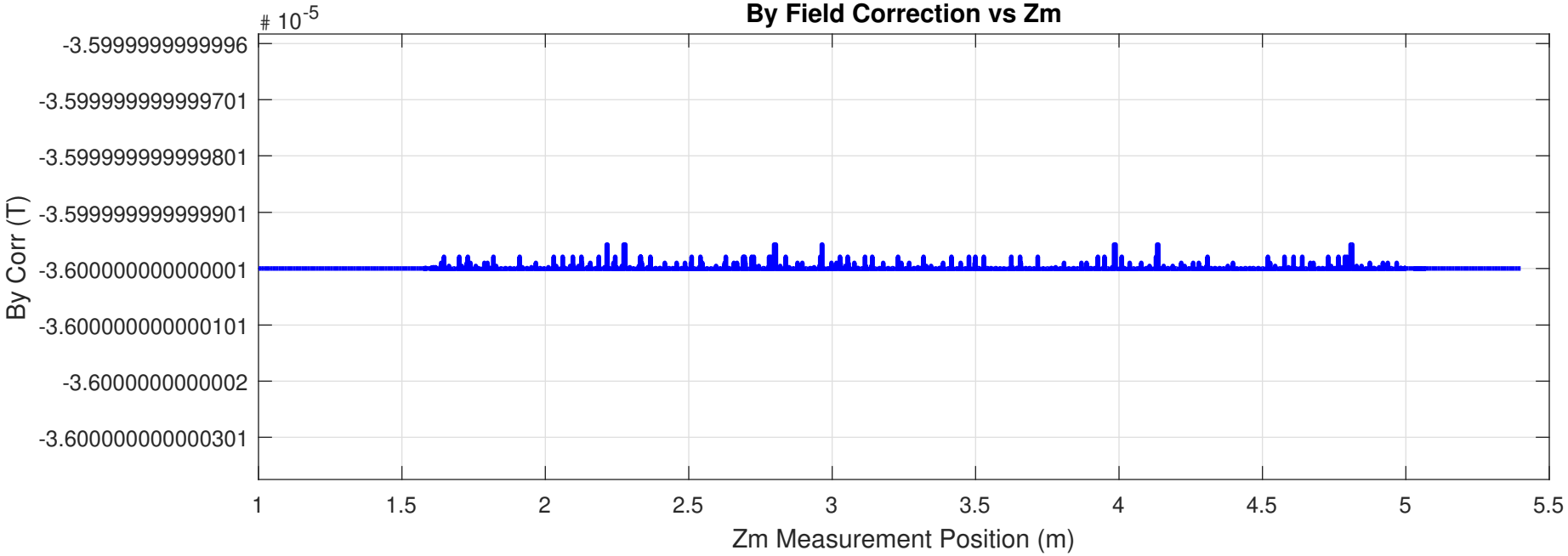
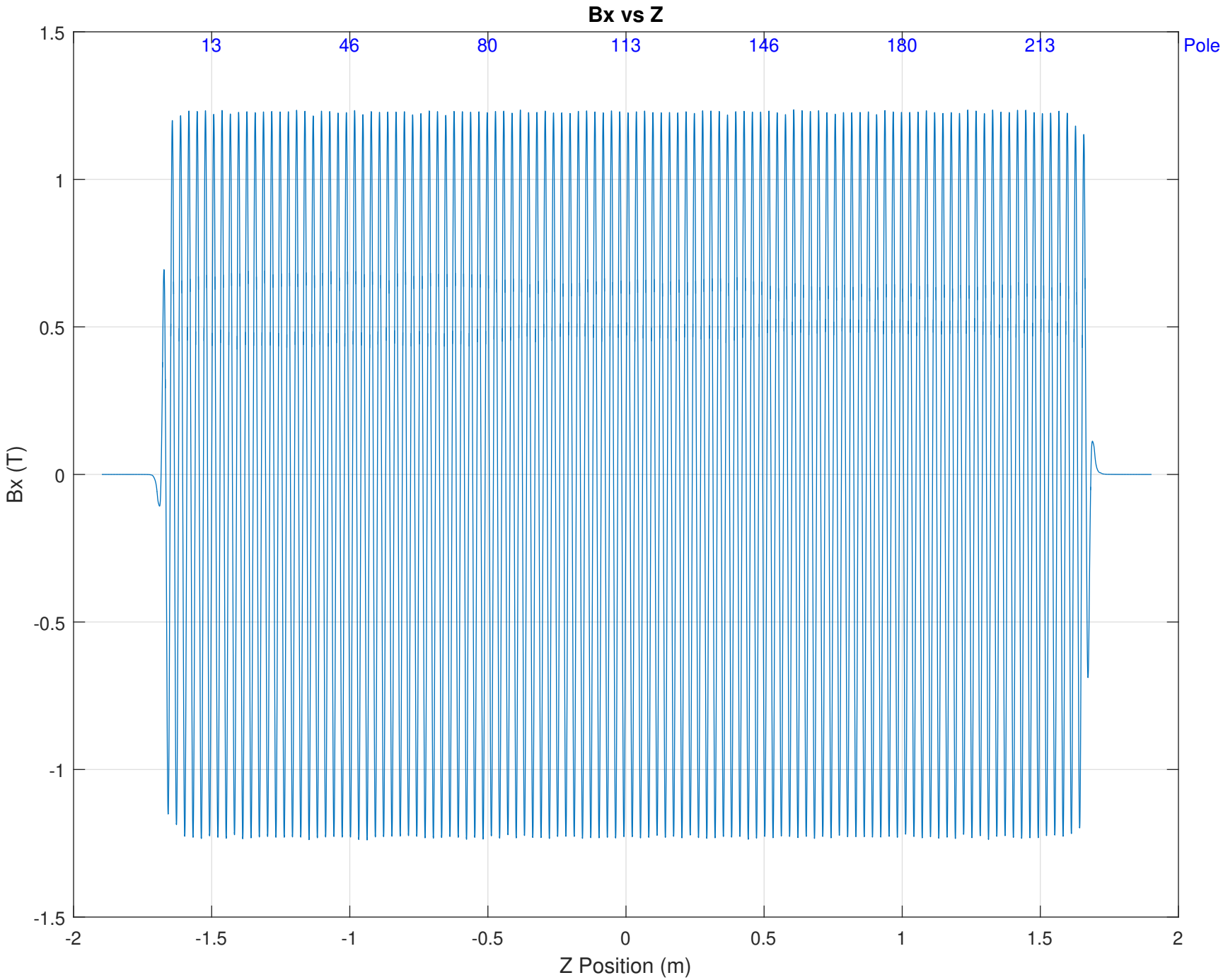
SLAC Magnetic Measurements

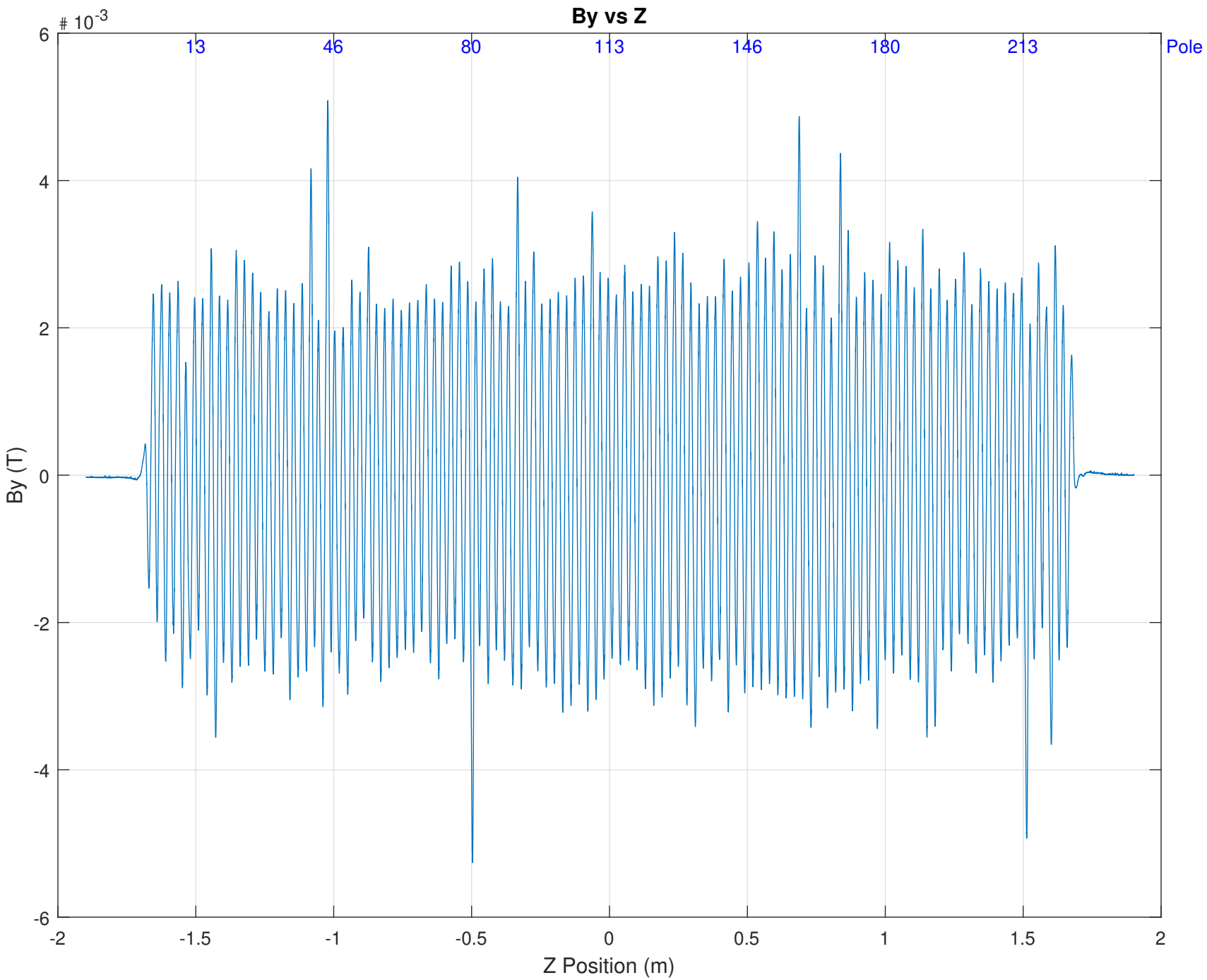
Planar Insertion Device Analysis

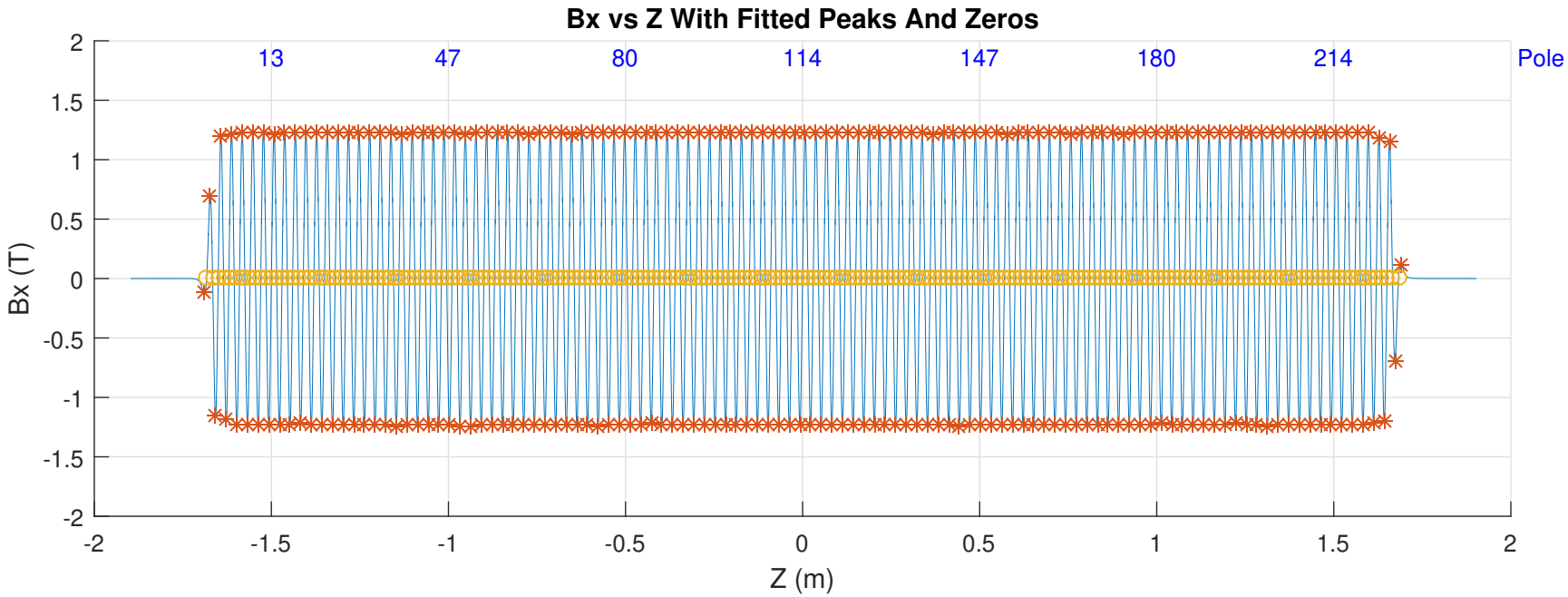
Parameters:
INPUT-FILE-DIR =s:\magdata\LCLS-II\Undulator\HXR-REFERENCE\DATASET0001\Tuning\Z Scans\Run 008\
INPUT-FILE-NAME =x+00000-y+000-bscanz.dat
INPUT-FILE-TYPE =ZVXYBXYH
CORR-REQUIRED =1
GAMMA =26398
NOM-LAMBDA-U =0.03
NOM-K-VALUE =3.4571
NOM-LAMBDA-R =1.3857e-09
NUM-POLES =226
NUM-END-POLES =6
CELL-LENGTH =3.656

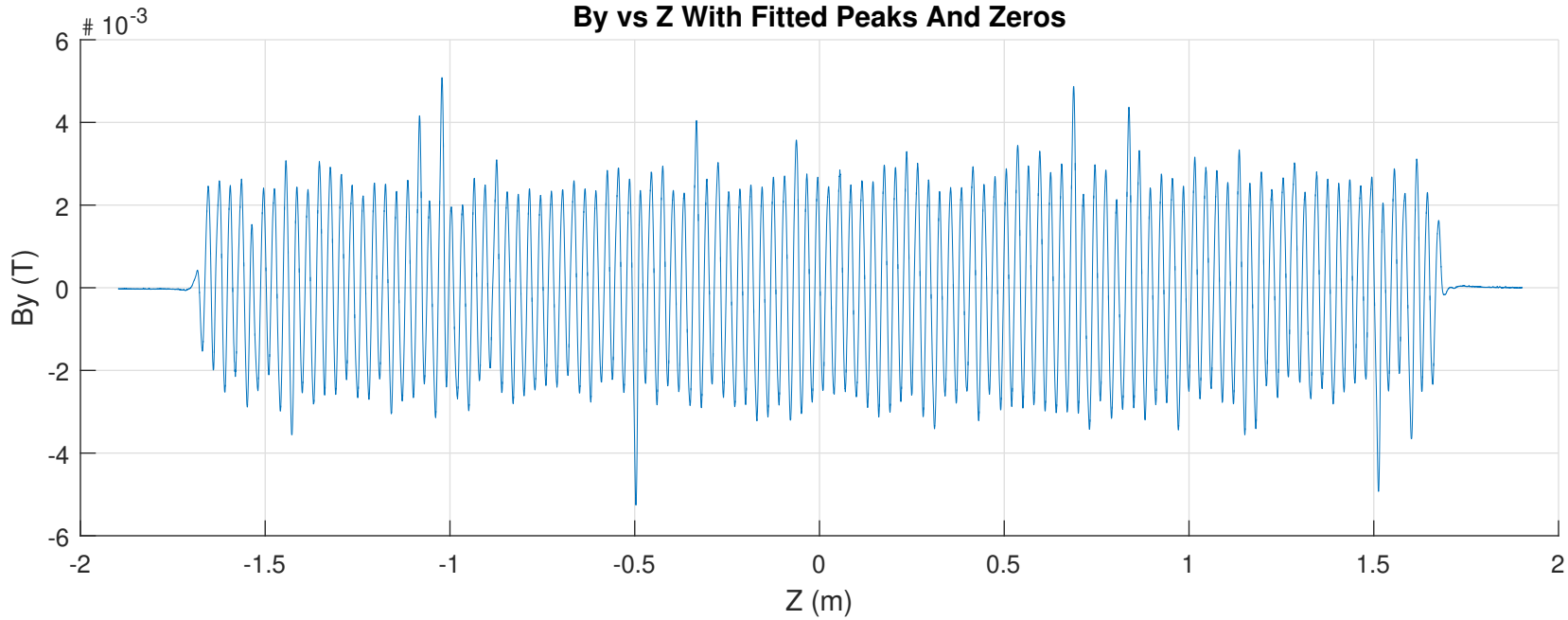

Bx Field Correction vs Zm
10^-6
8.000000000008
8.000000000006
8.000000000004
8.000000000002
8
7.999999999998
7.999999999996
7.999999999994
Bx Corr (T)
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5

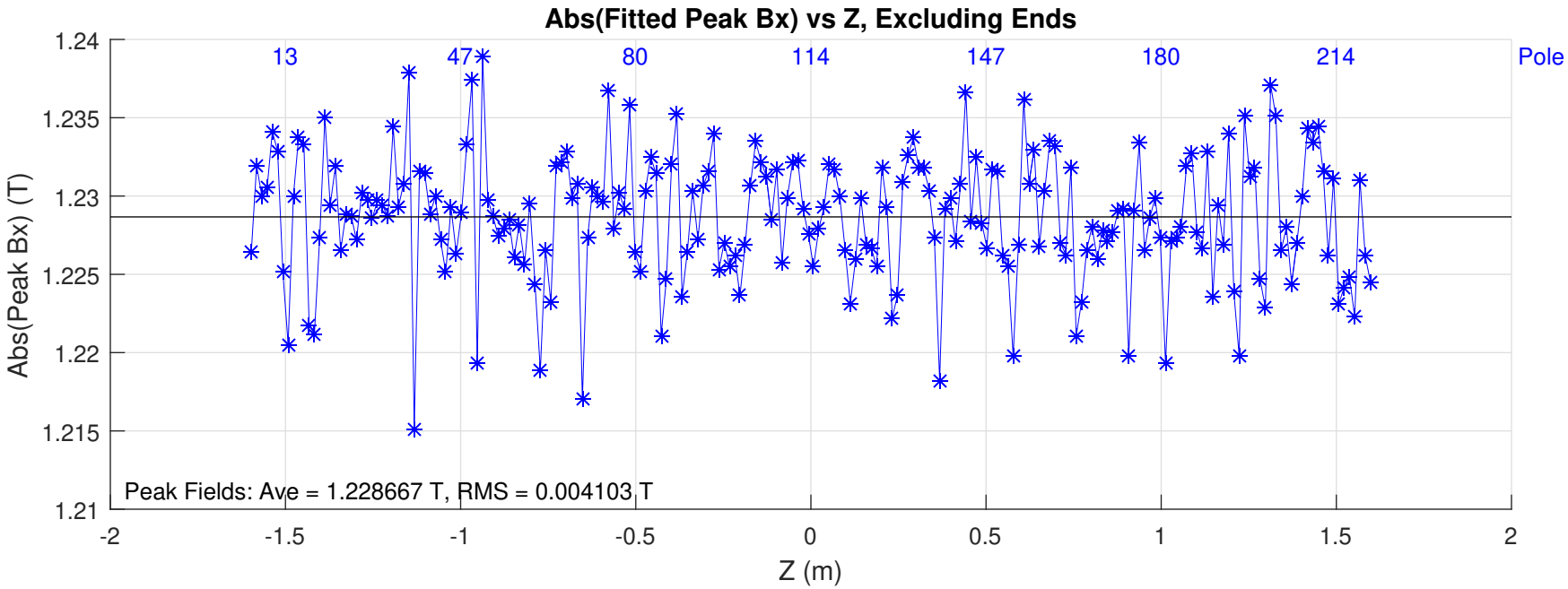

By Field Correction vs Zm
10^-5
-3.5999999999996
-3.599999999999701
-3.599999999999801
-3.599999999999901
-3.600000000000001
-3.600000000000101
-3.6000000000002
-3.600000000000301
By Corr (T)
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
Zm Measurement Position (m)

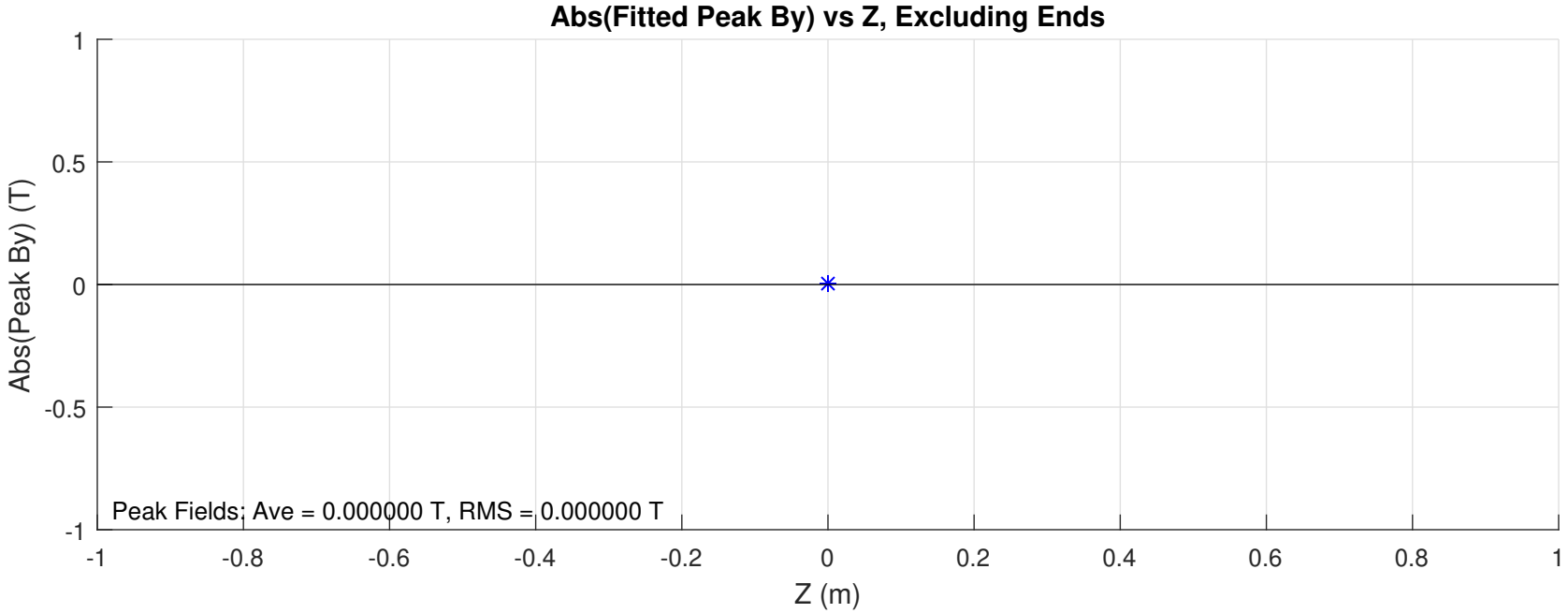

Bx vs Z
13
46
80
113
146
180
213
Pole
1.5
1
0.5
0
-0.5
-1
-1.5
Bx (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z Position (m)

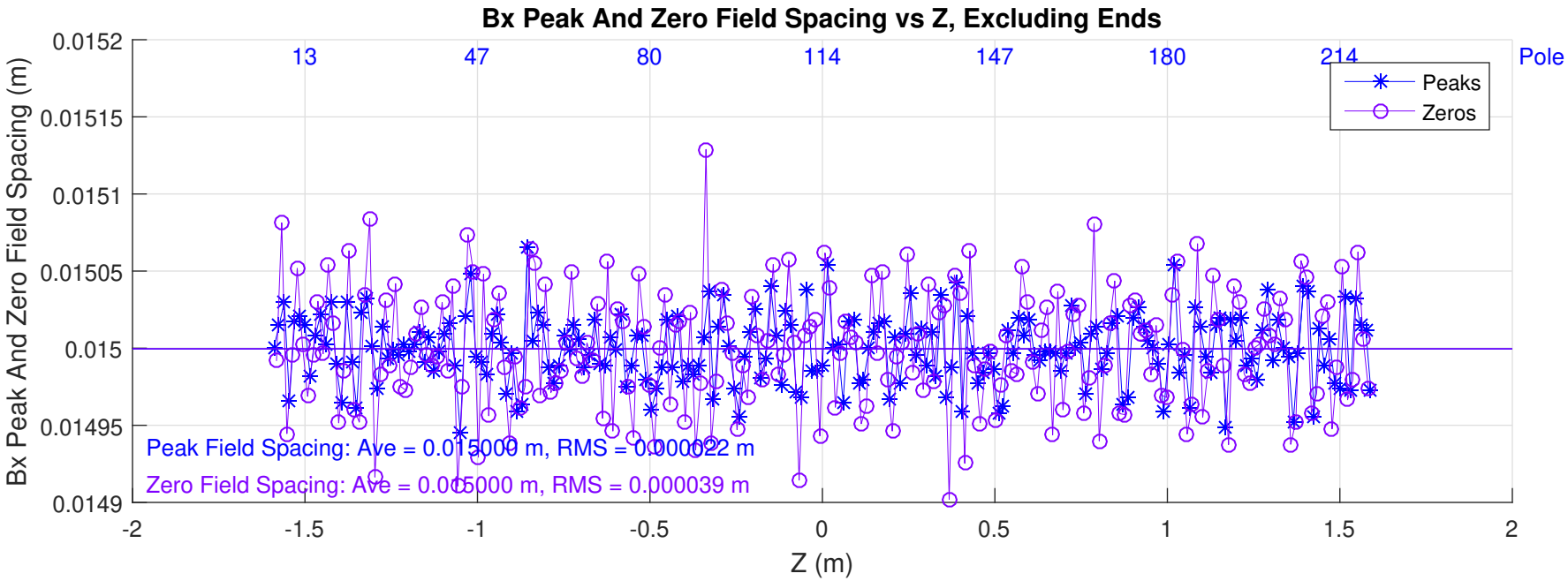

By vs Z
10^-3
6
4
2
0
-2
-4
-6
13
46
80
113
146
180
213
Pole
By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z Position (m)

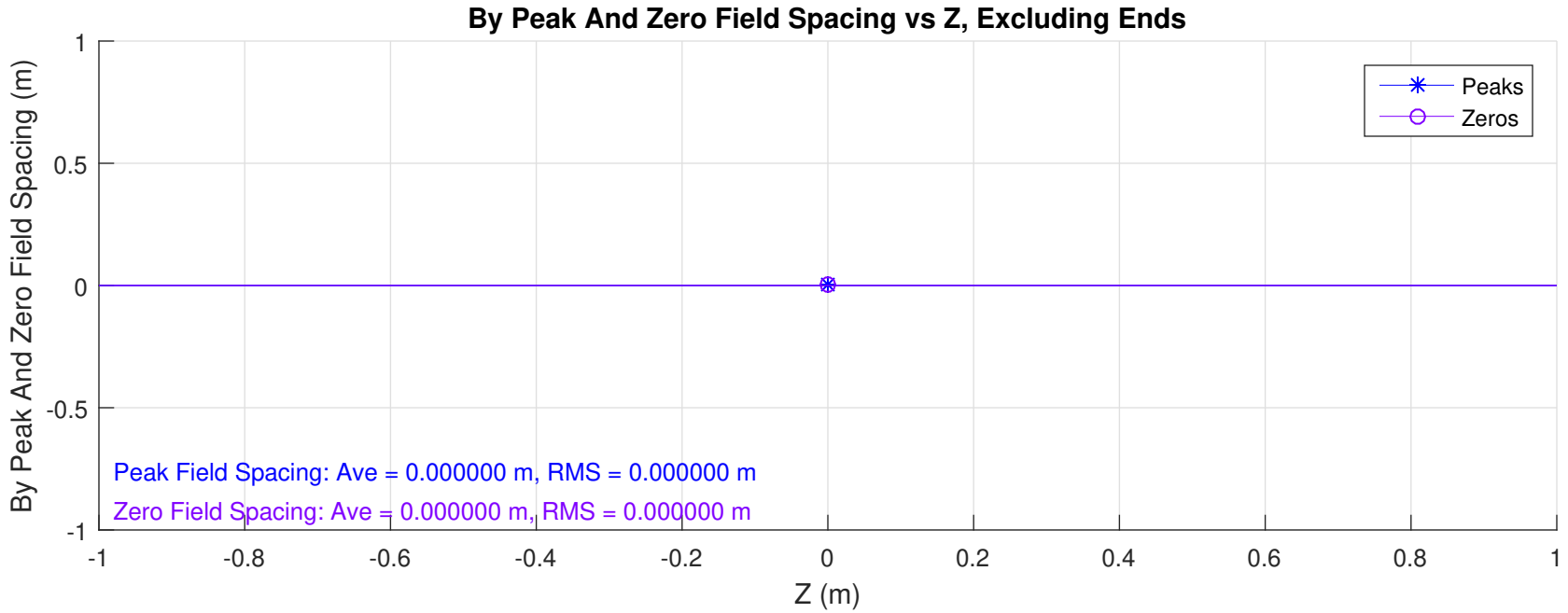

Bx vs Z With Fitted Peaks And Zeros
13
47
80
114
147
180
214
Pole
Bx (T)
Z (m)

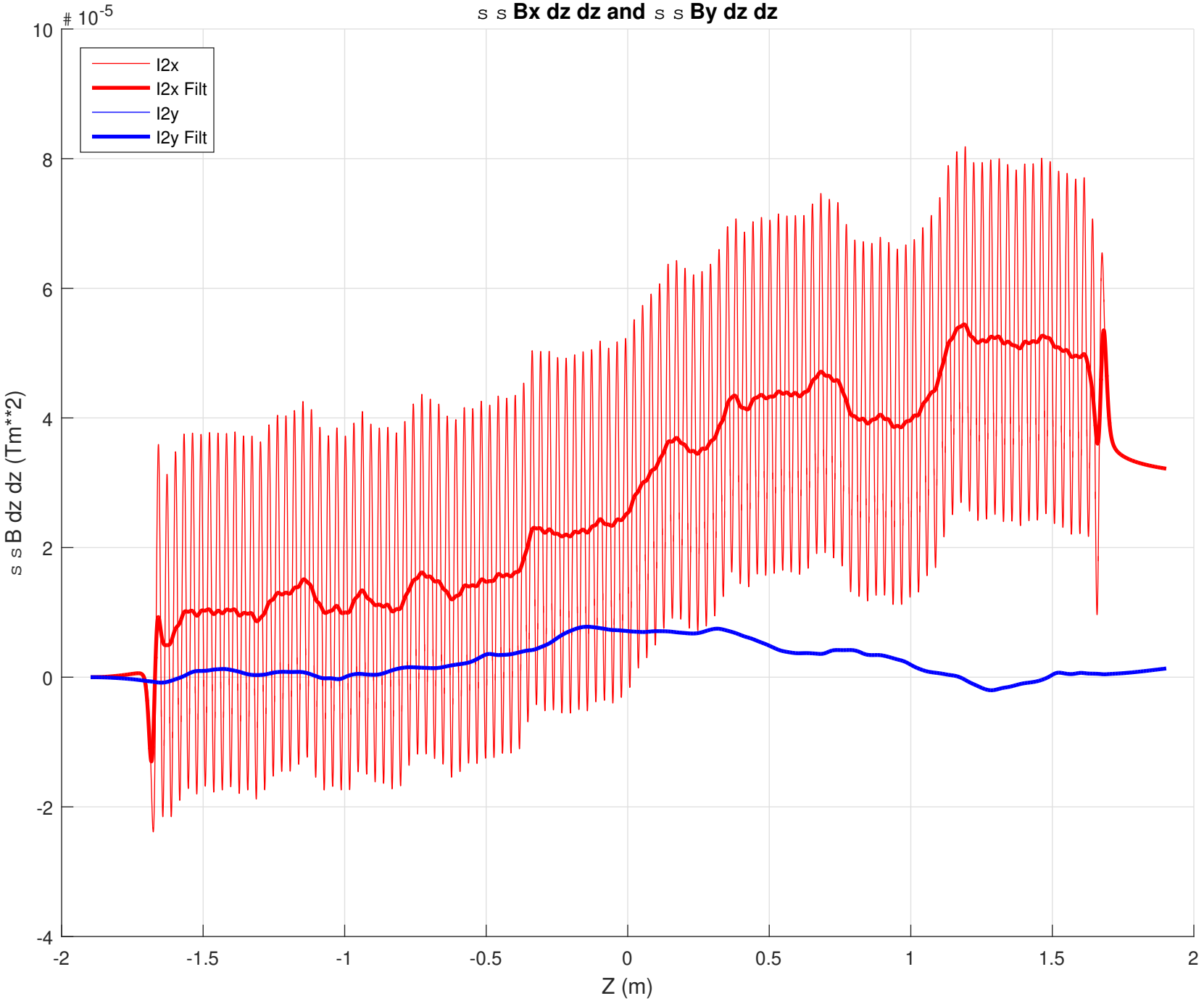

By vs Z With Fitted Peaks And Zeros
10^-3
By (T)
Z (m)

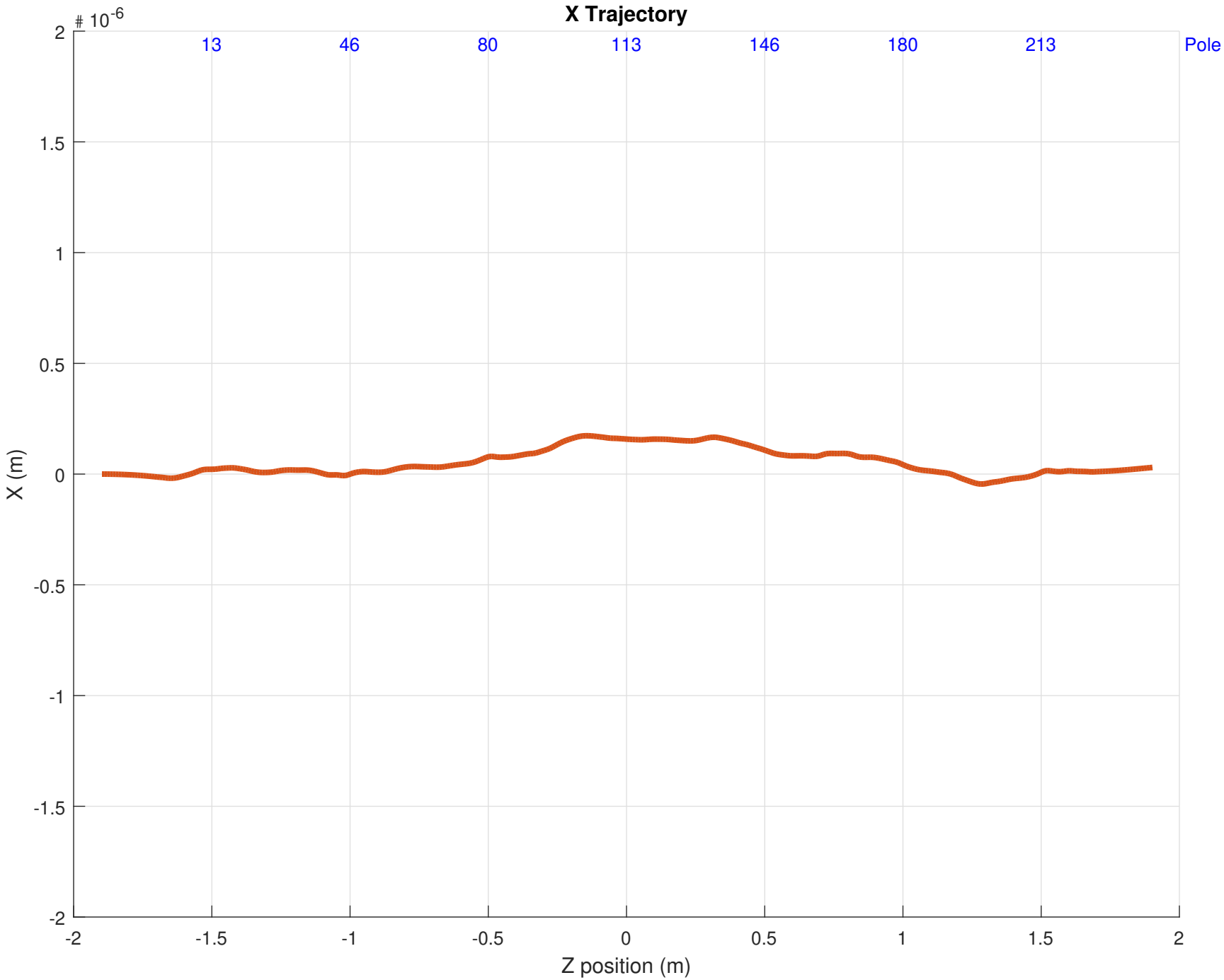

Abs(Fitted Peak Bx) vs Z, Excluding Ends
13
47
80
114
147
180
214
Pole
1.24
1.235
1.23
1.225
1.22
1.215
1.21
Abs(Peak Bx) (T)
Peak Fields: Ave = 1.228667 T, RMS = 0.004103 T
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

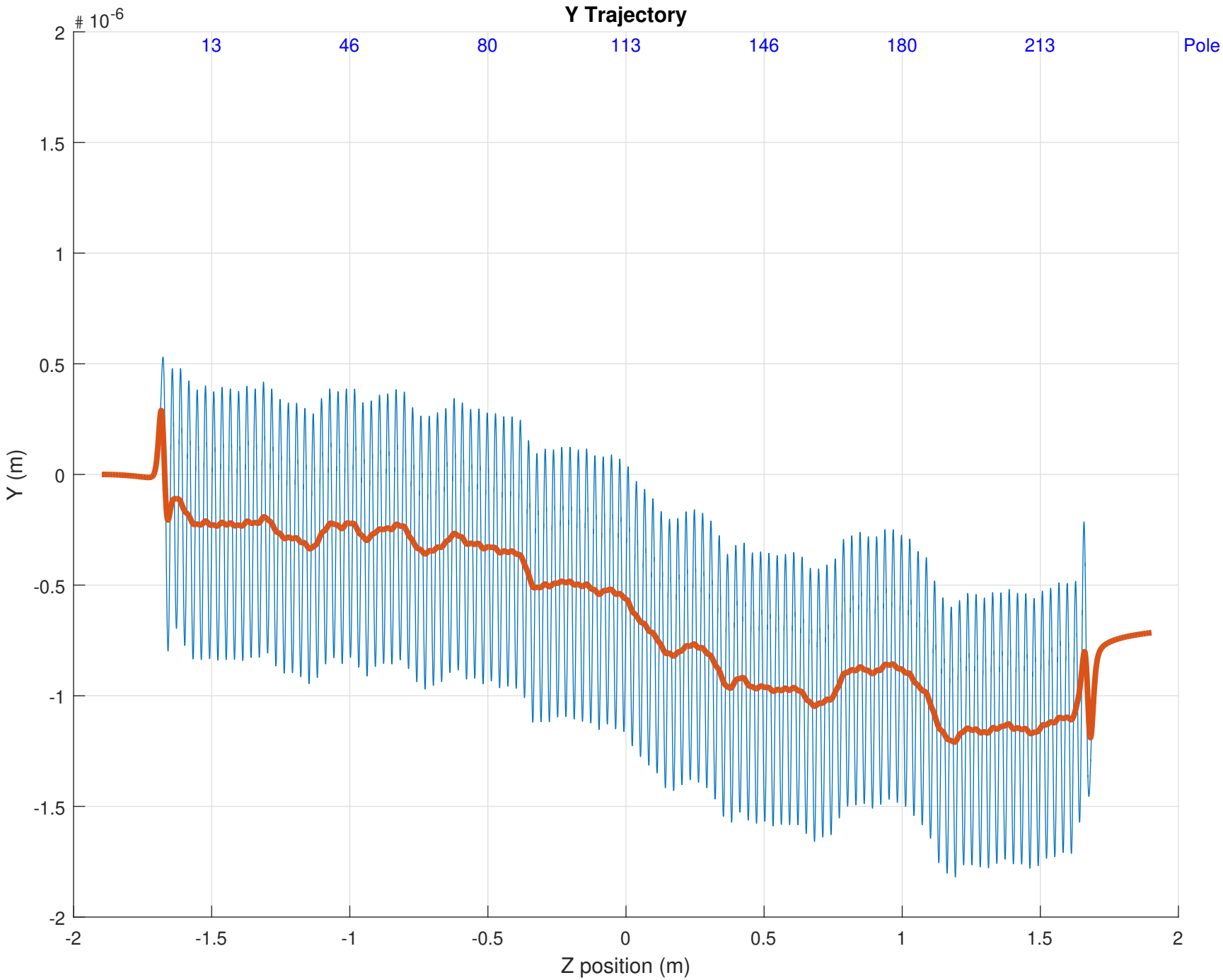

Abs(Fitted Peak By) vs Z, Excluding Ends
1
0.5
0
-0.5
-1
Abs(Peak By) (T)
Peak Fields: Ave = 0.000000 T, RMS = 0.000000 T
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
Z (m)

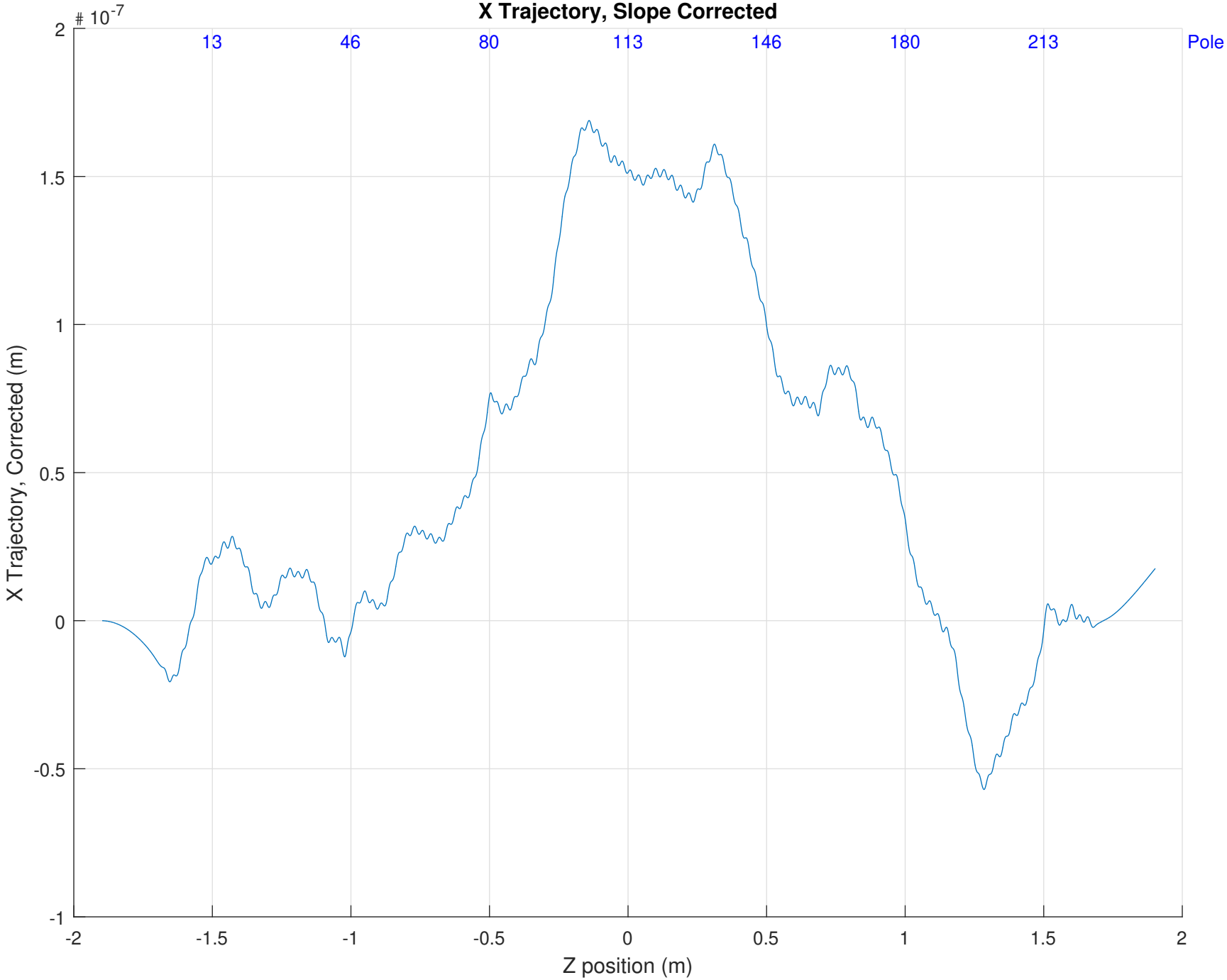

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
Z (m)
13
47
80
114
147
180
214
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.015000 m, RMS = 0.000022 m
Zero Field Spacing: Ave = 0.015000 m, RMS = 0.000039 m
0.0152
0.01515
0.0151
0.01505
0.015
0.01495
0.0149
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2

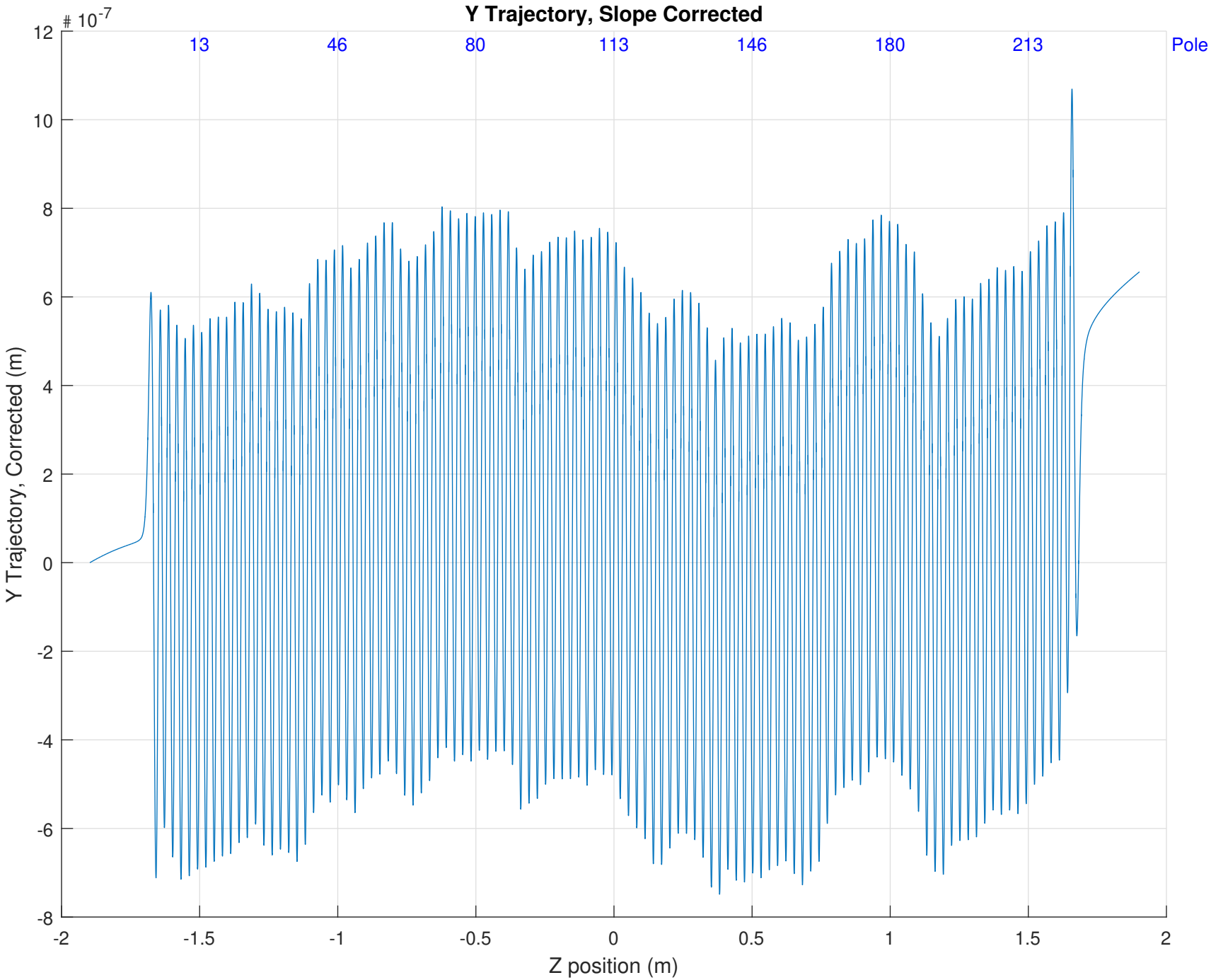

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
Z (m)
Peaks
Zeros
Peak Field Spacing: Ave = 0.000000 m, RMS = 0.000000 m
Zero Field Spacing: Ave = 0.000000 m, RMS = 0.000000 m
1
0.5
0
-0.5
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1

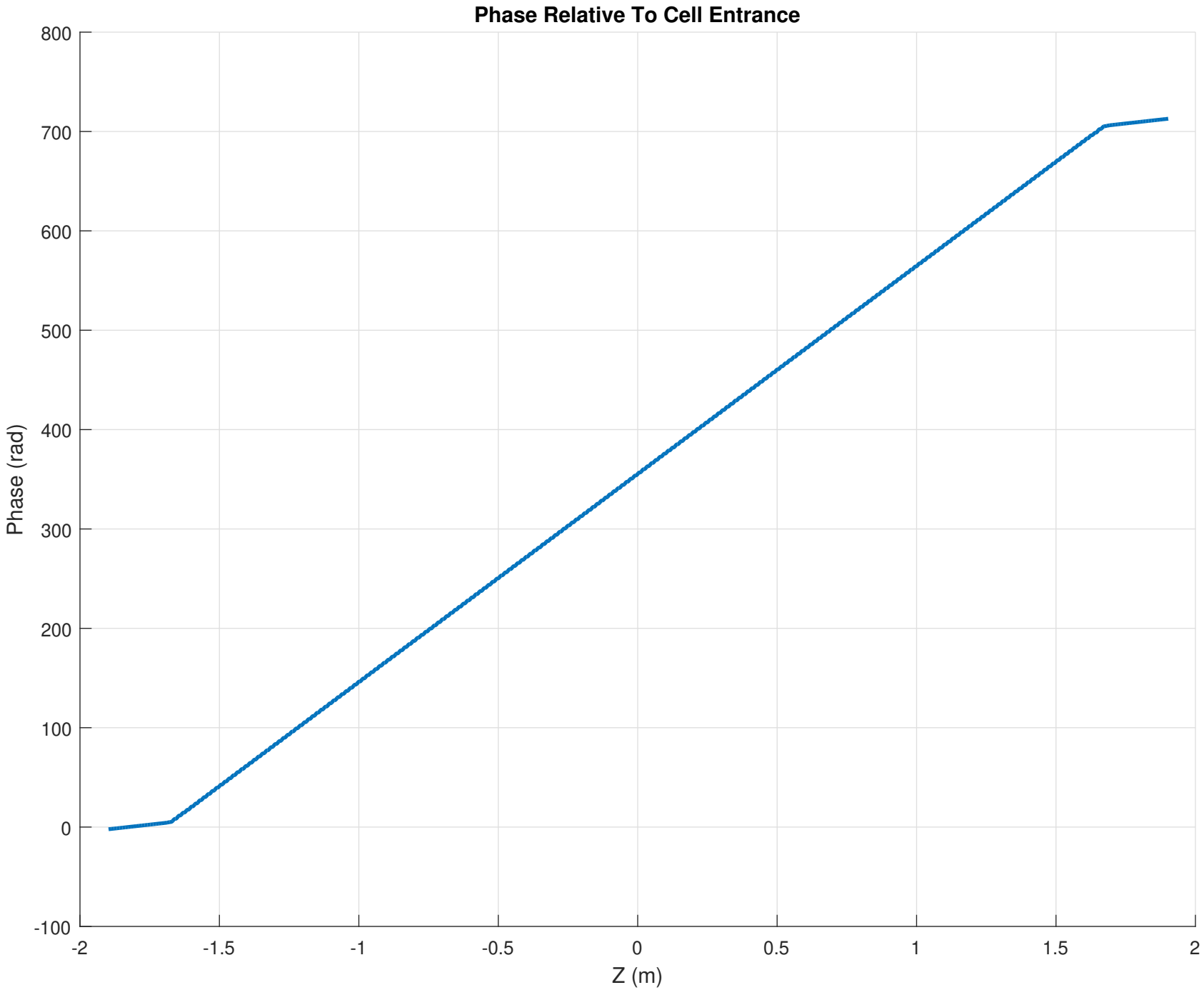

∫∫ Bx dz dz and ∫∫ By dz dz
10^-5
I2x
I2x Filt
I2y
I2y Filt
∫∫B dz dz (Tm**2)
Z (m)
10
8
6
4
2
0
-2
-4
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2

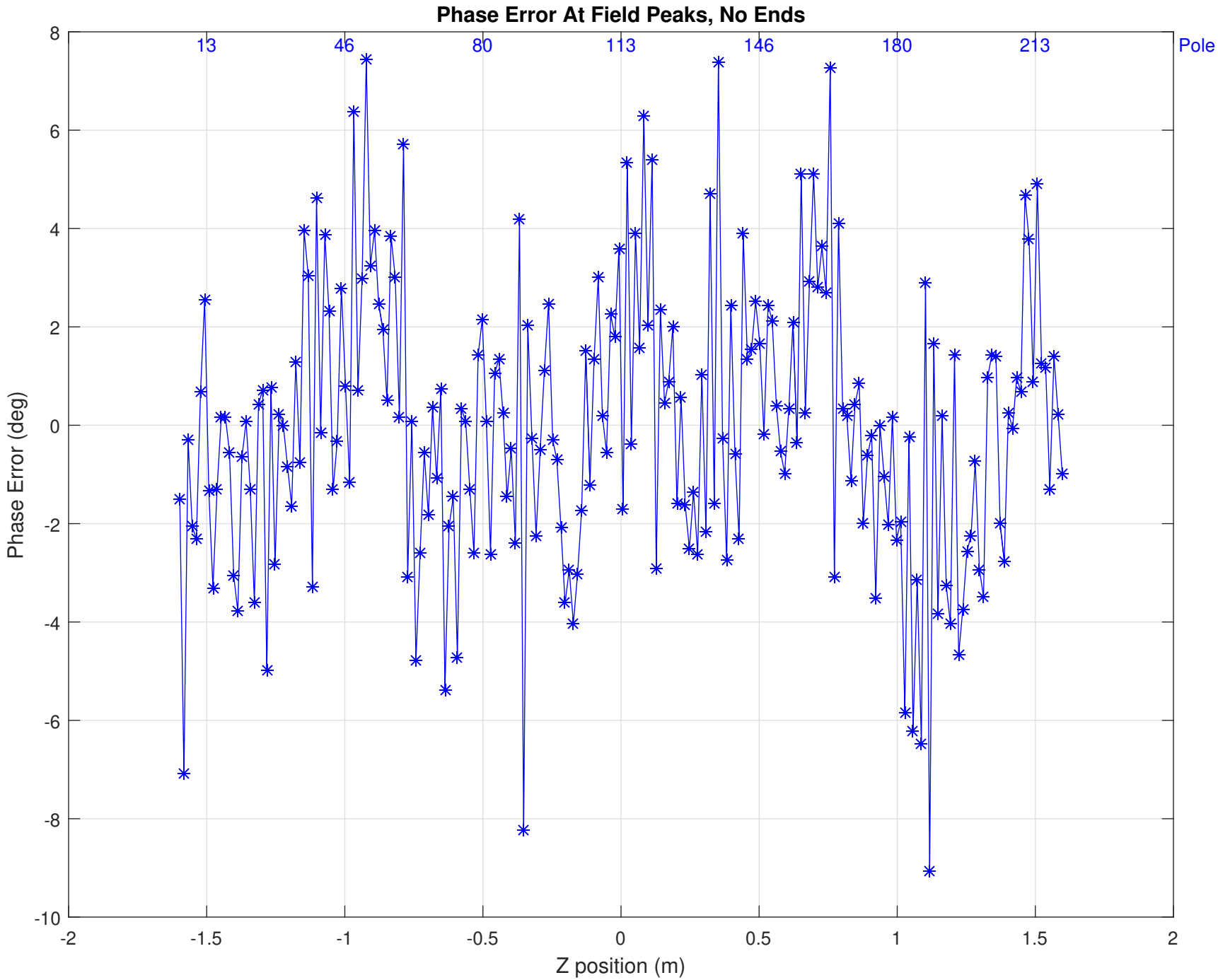

X Trajectory
10-6
13
46
80
113
146
180
213
Pole
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
X (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z position (m)


Y Trajectory
10^-6
13
46
80
113
146
180
213
Pole
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
Y (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z position (m)

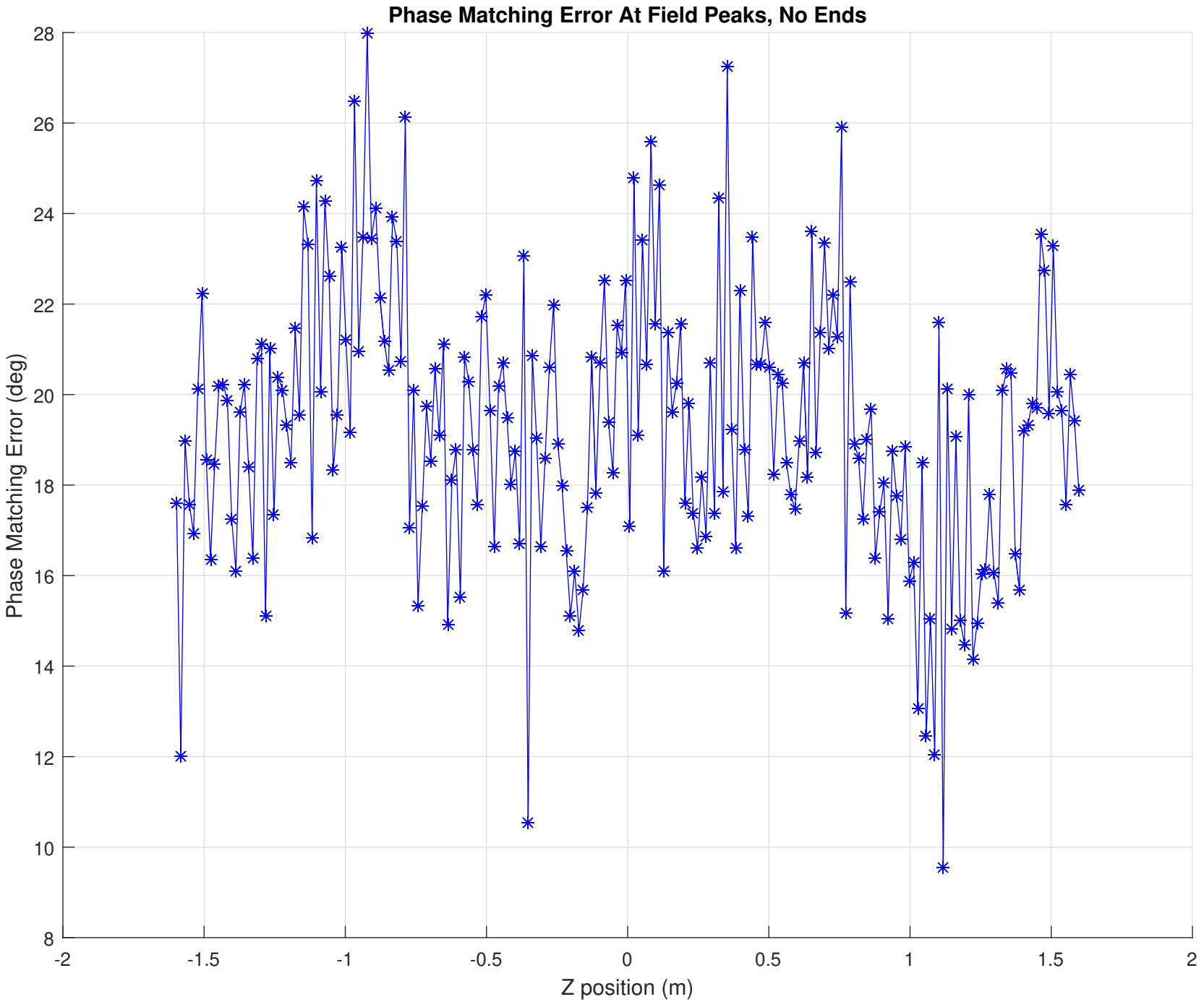

X Trajectory, Slope Corrected
10^-7
2
1.5
1
0.5
0
-0.5
-1
13
46
80
113
146
180
213
Pole
X Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z position (m)


Y Trajectory, Slope Corrected
10^-7
12
10
8
6
4
2
0
-2
-4
-6
-8
13
46
80
113
146
180
213
Pole
Y Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z position (m)

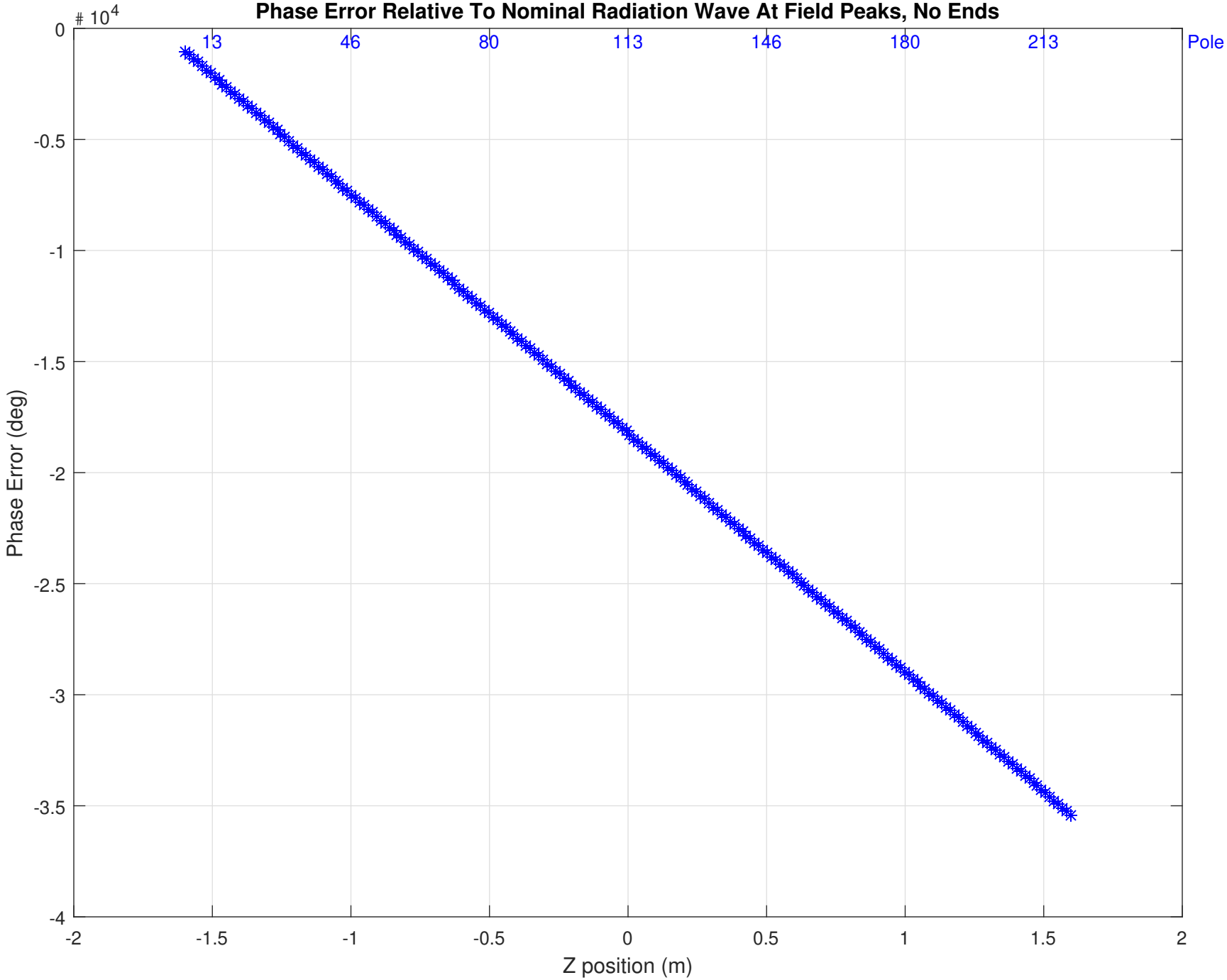

Phase Relative To Cell Entrance
800
700
600
500
400
300
200
100
0
-100
Phase (rad)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)



Phase Error: Ave = 0.000000 deg, RMS = 2.831114 deg



Phase Match Error: Ave = 19.314169 deg, RMS = 2.989054 deg


Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
10^4
0
-0.5
-1
-1.5
-2
-2.5
-3
-3.5
-4
13
46
80
113
146
180
213
Pole
Phase Error (deg)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z position (m)