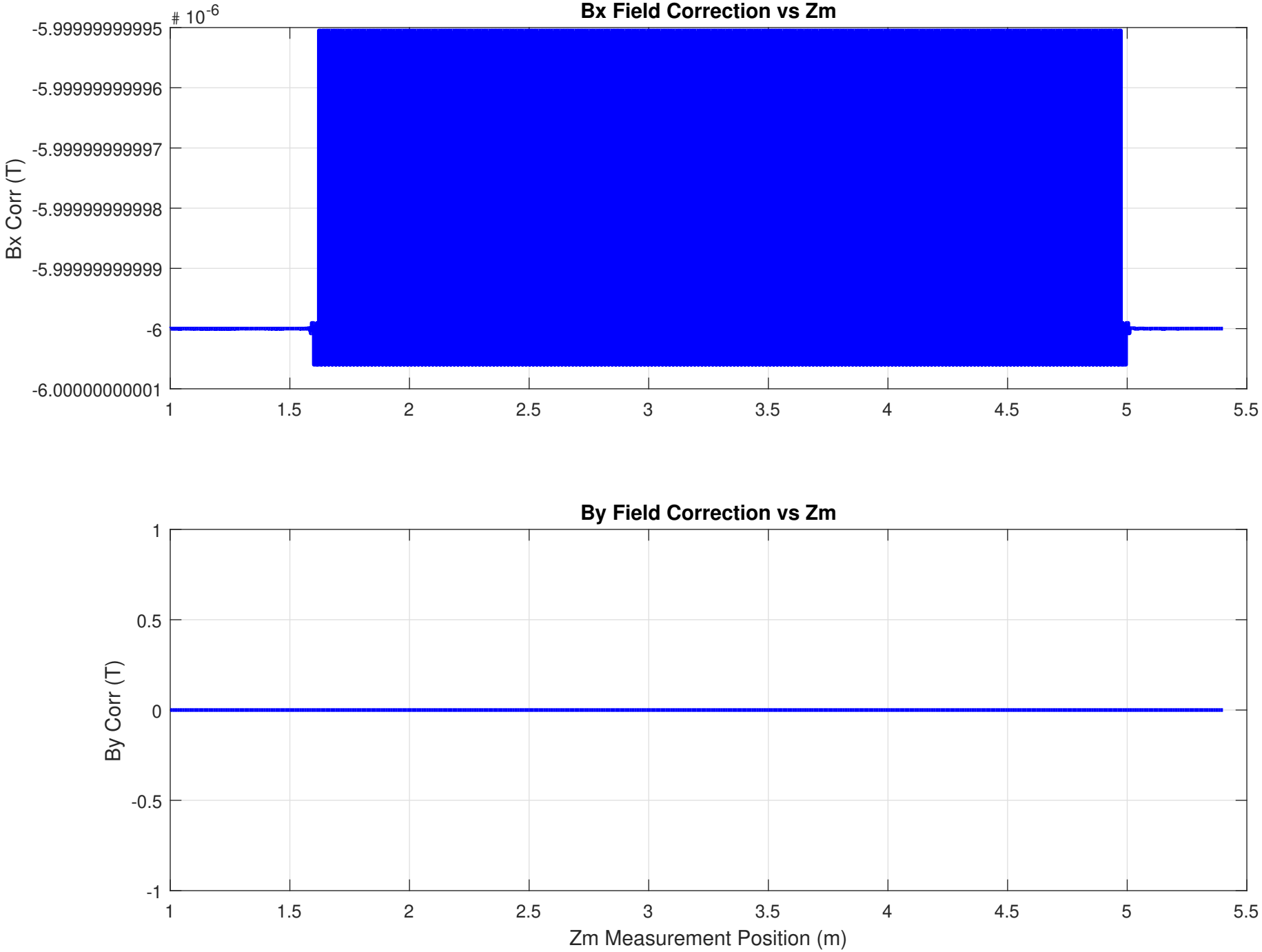
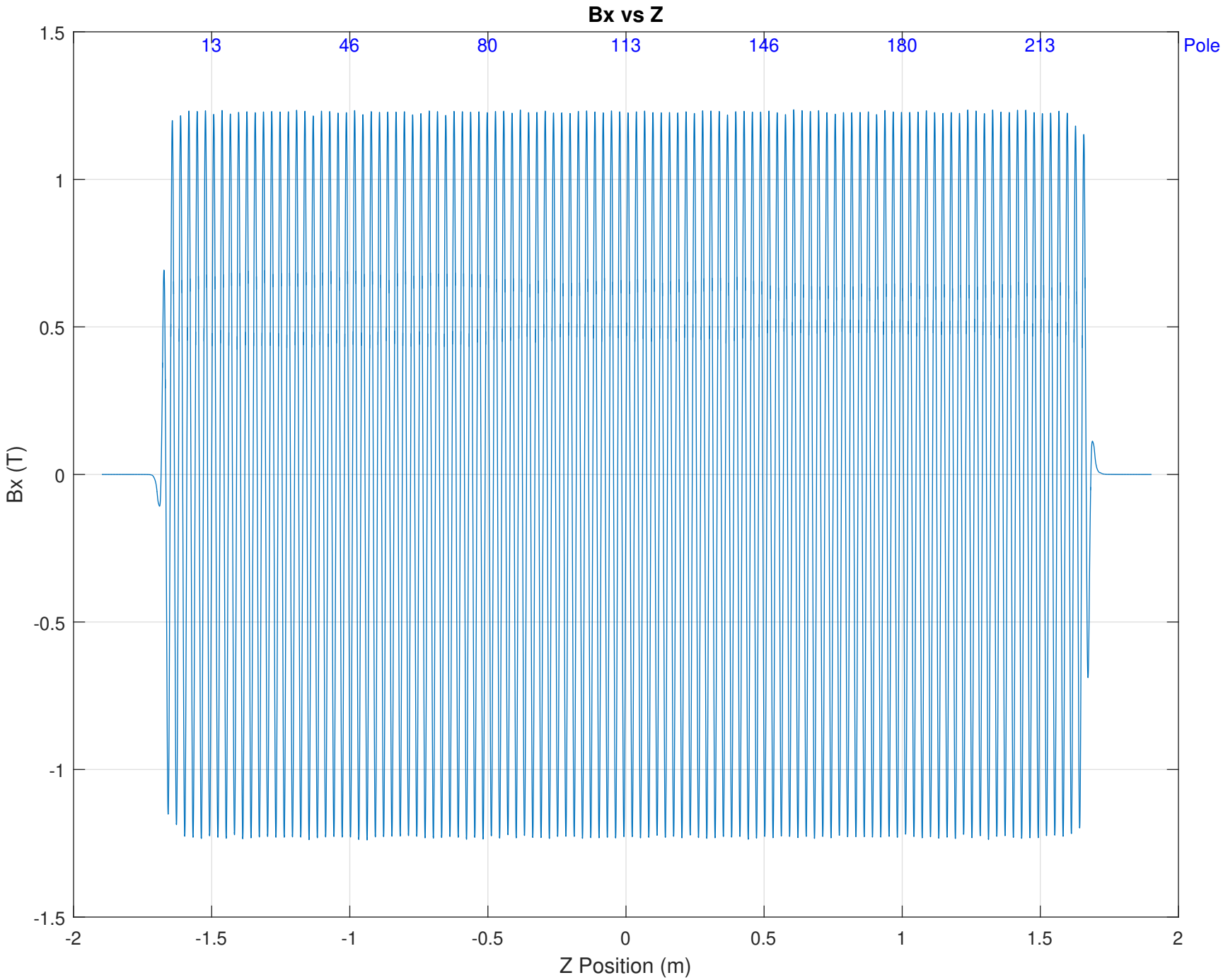
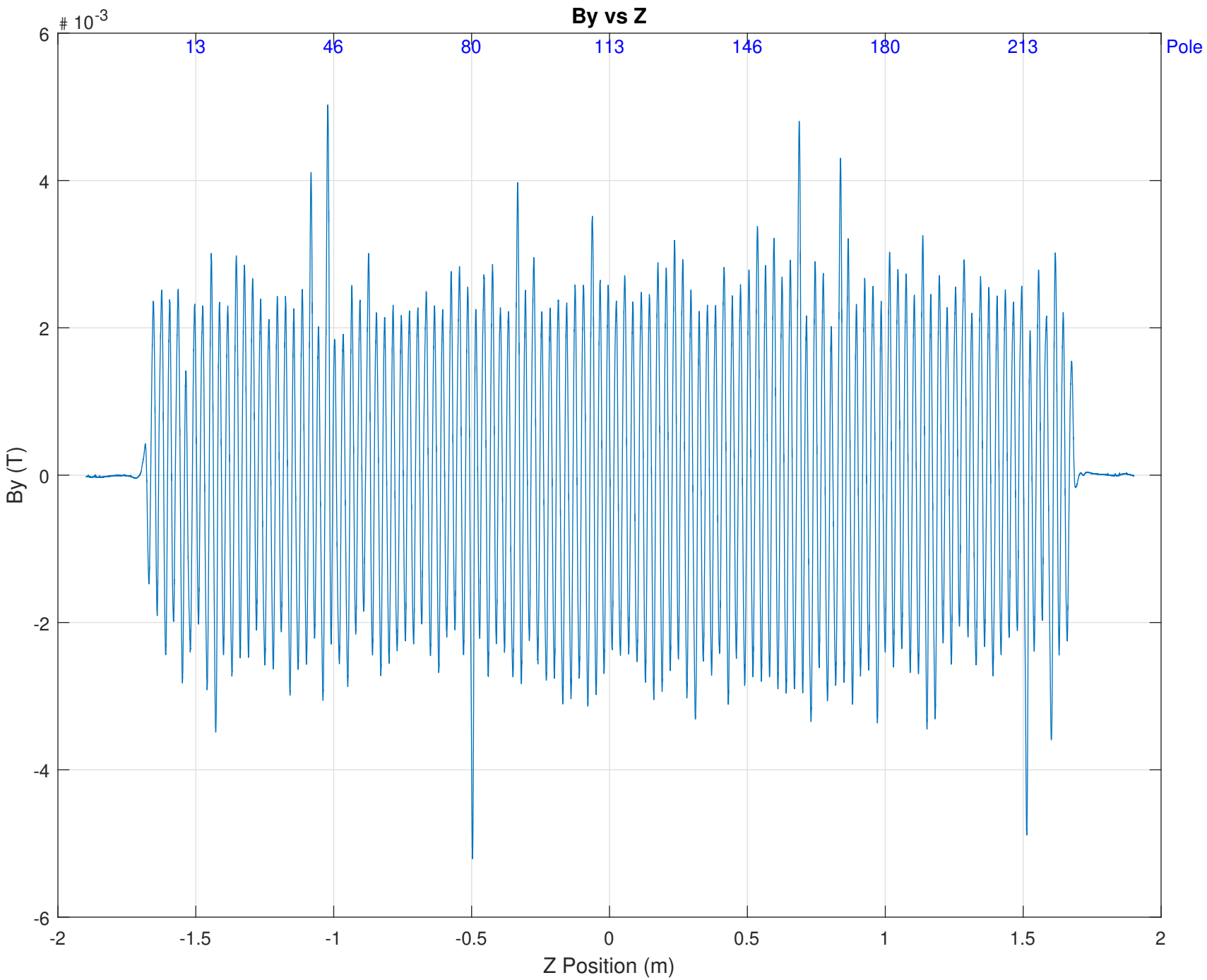
SLAC Magnetic Measurements

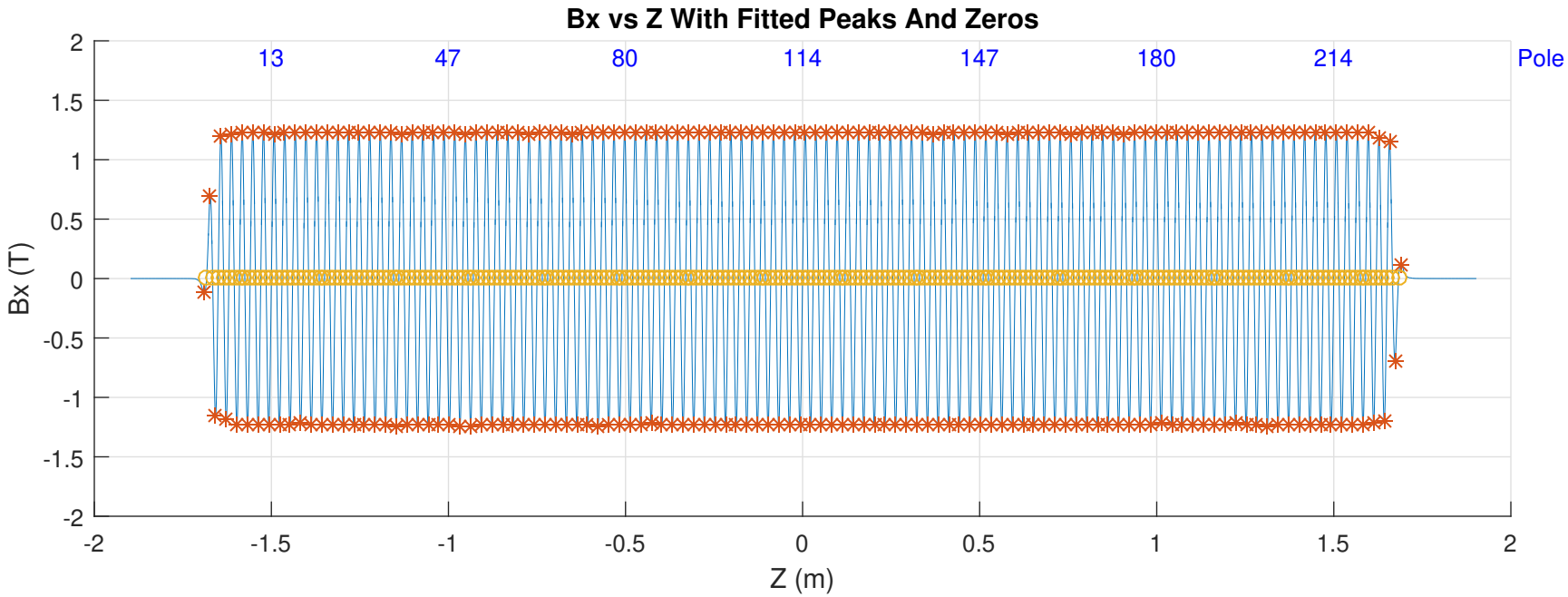
Planar Insertion Device Analysis

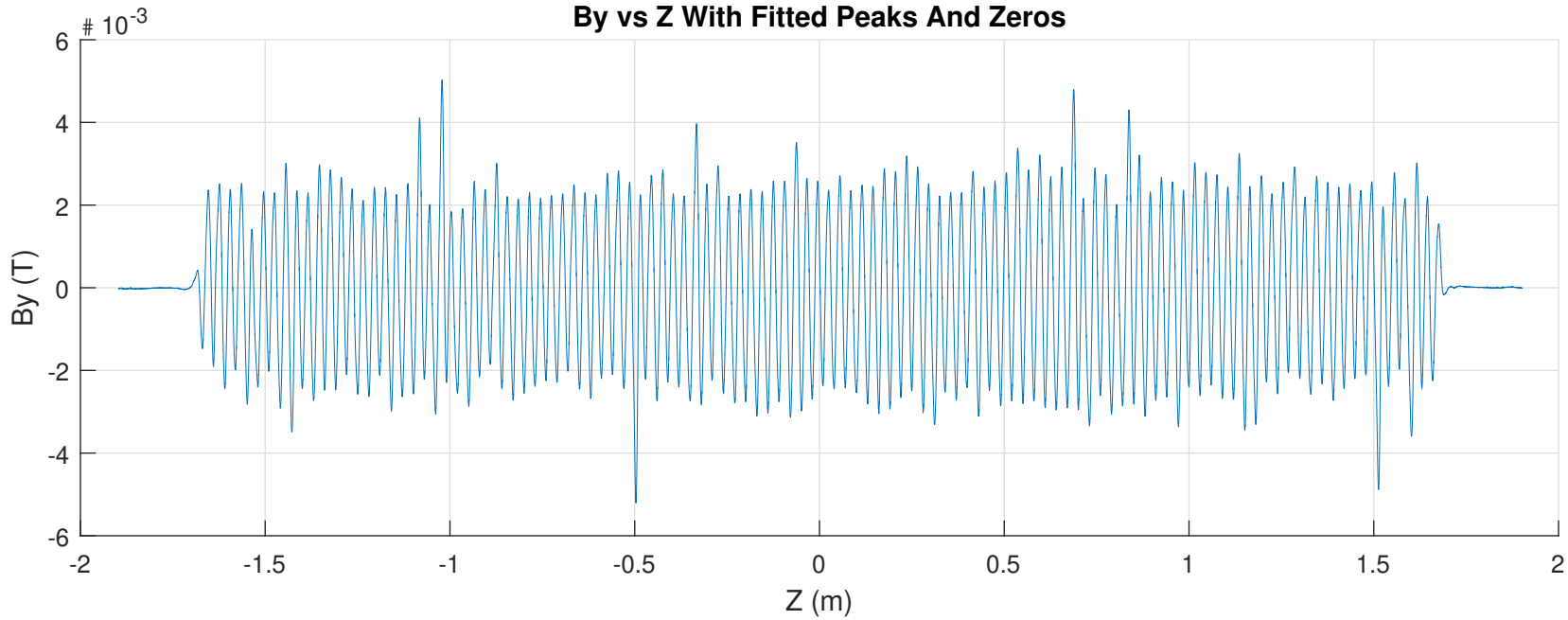
Parameters:
INPUT-FILE-DIR =S:\MagData\LCLS-II\Undulator\HXR-REFERENCE\DATASET0001\Tuning\Z Scans\Run 007\
INPUT-FILE-NAME =x+00000-y+000-bscanz.dat
INPUT-FILE-TYPE =ZVXYBXYH
CORR-REQUIRED =1
GAMMA =7827.79
NOM-LAMBDA-U =0.03
NOM-K-VALUE =3.0531
NOM-LAMBDA-R =1.3857e-09
NUM-POLES =226
NUM-END-POLES =6
CELL-LENGTH =3.656

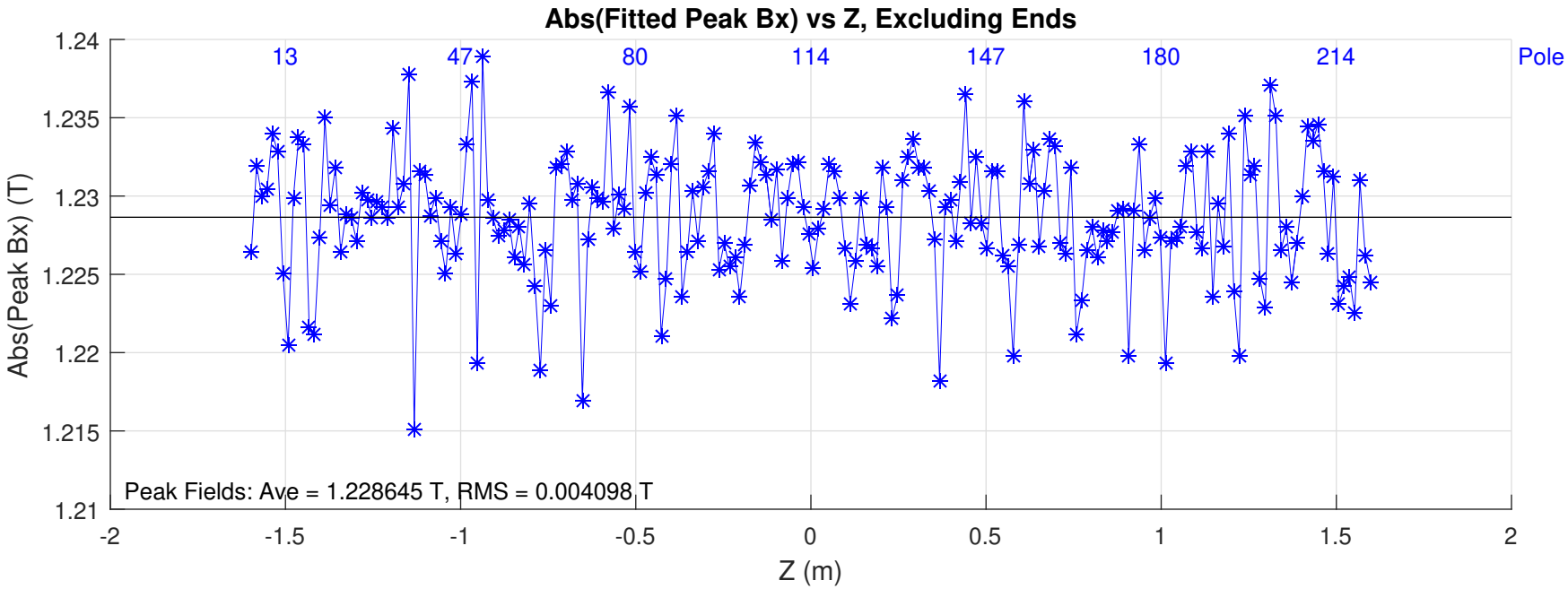

Bx Field Correction vs Zm
10^-6
-5.99999999995
-5.99999999996
-5.99999999997
-5.99999999998
-5.99999999999
-6
-6.00000000001
Bx Corr (T)
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
By Field Correction vs Zm
1
0.5
0
-0.5
-1
By Corr (T)
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
Zm Measurement Position (m)

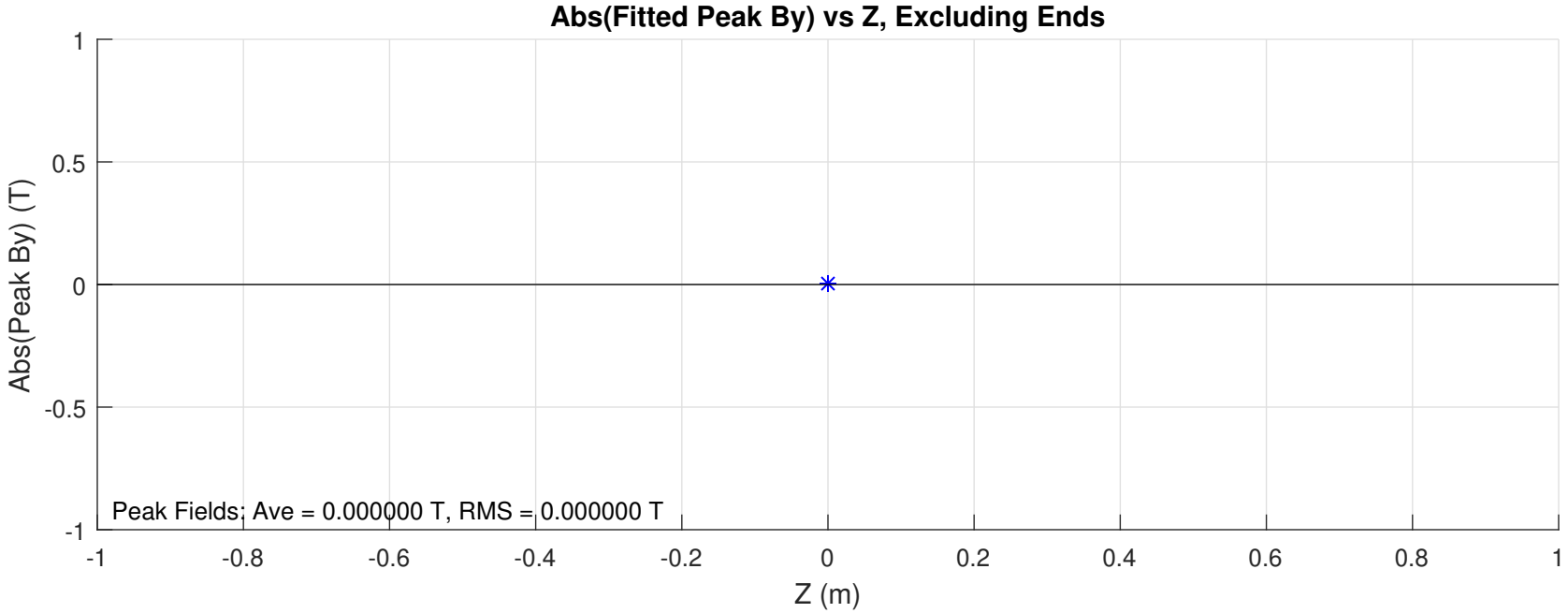

Bx vs Z
13
46
80
113
146
180
213
Pole
1.5
1
0.5
0
-0.5
-1
-1.5
Bx (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z Position (m)

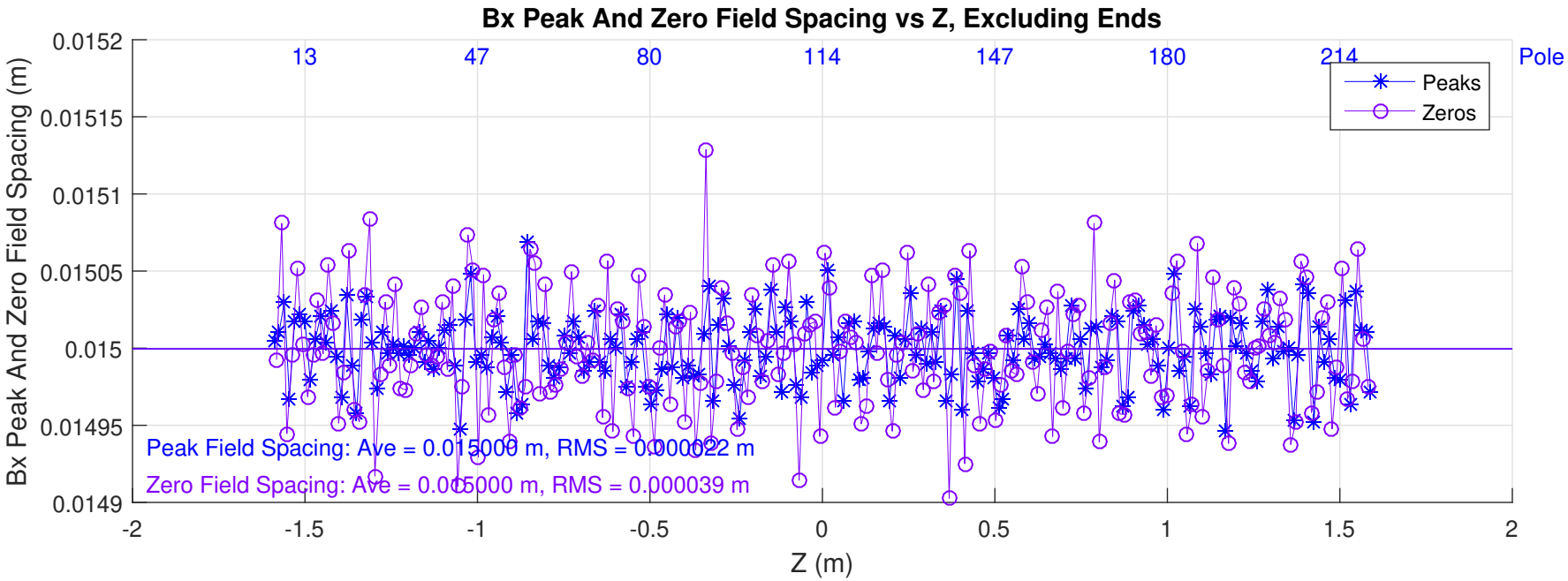

By vs Z
10^-3
6
4
2
0
-2
-4
-6
13
46
80
113
146
180
213
Pole
By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z Position (m)

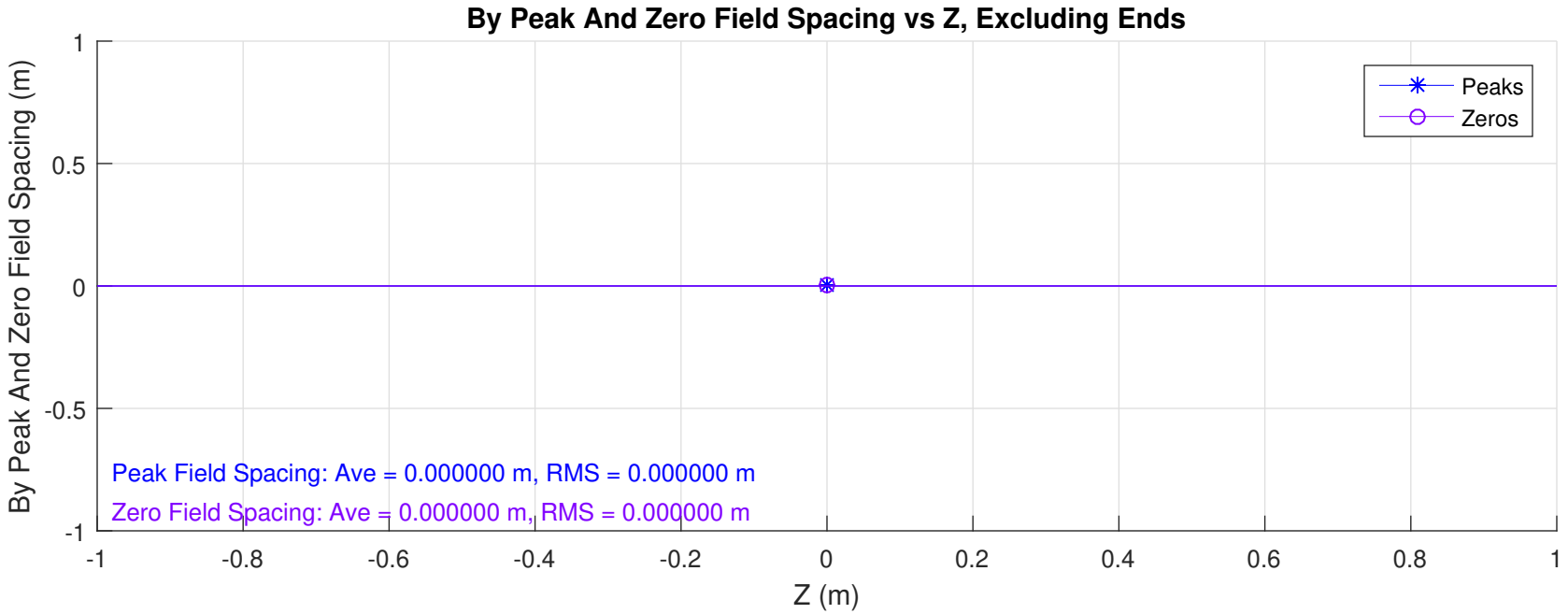

Bx vs Z With Fitted Peaks And Zeros
13
47
80
114
147
180
214
Pole
Bx (T)
Z (m)

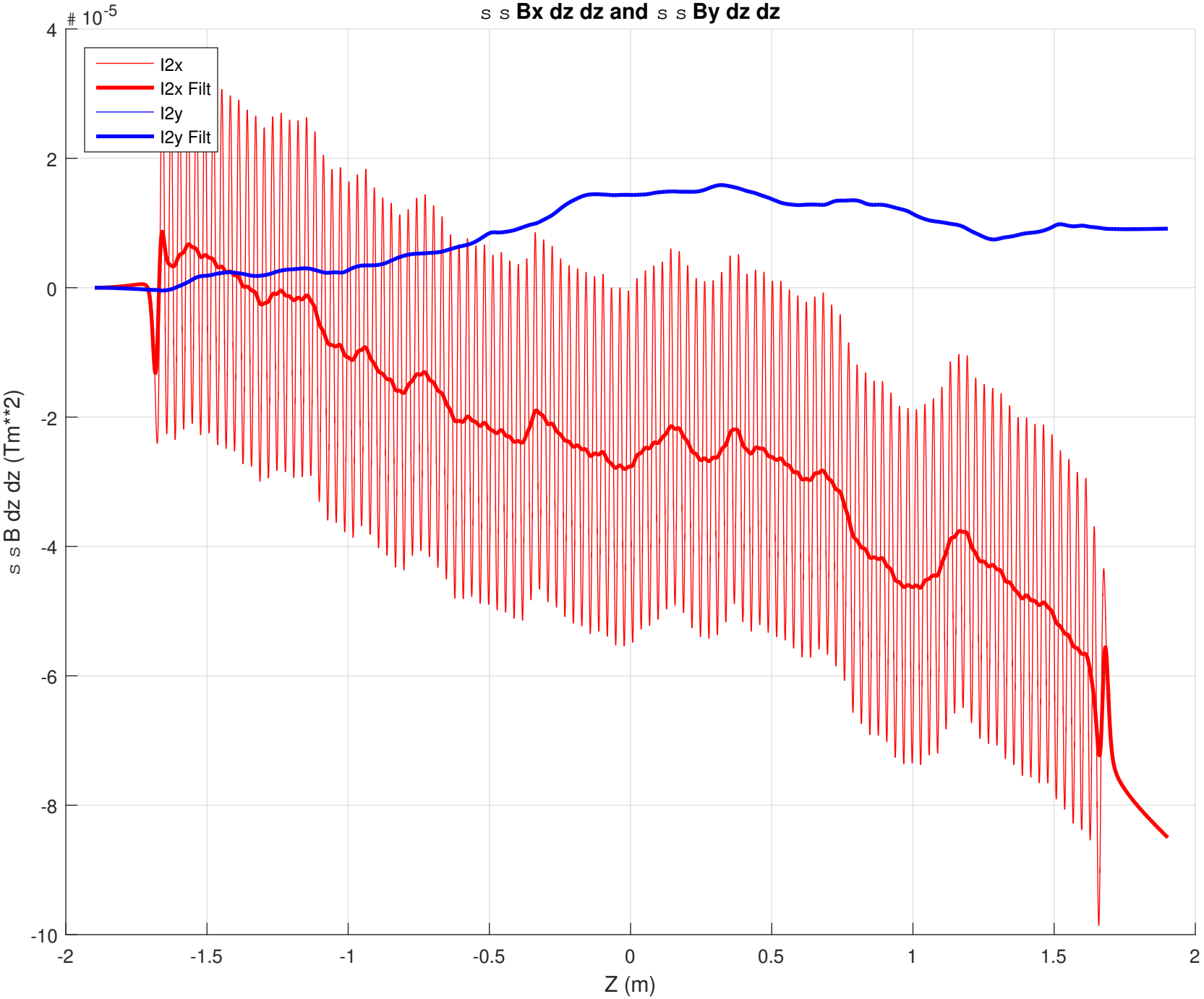

By vs Z With Fitted Peaks And Zeros
10^-3
By (T)
Z (m)

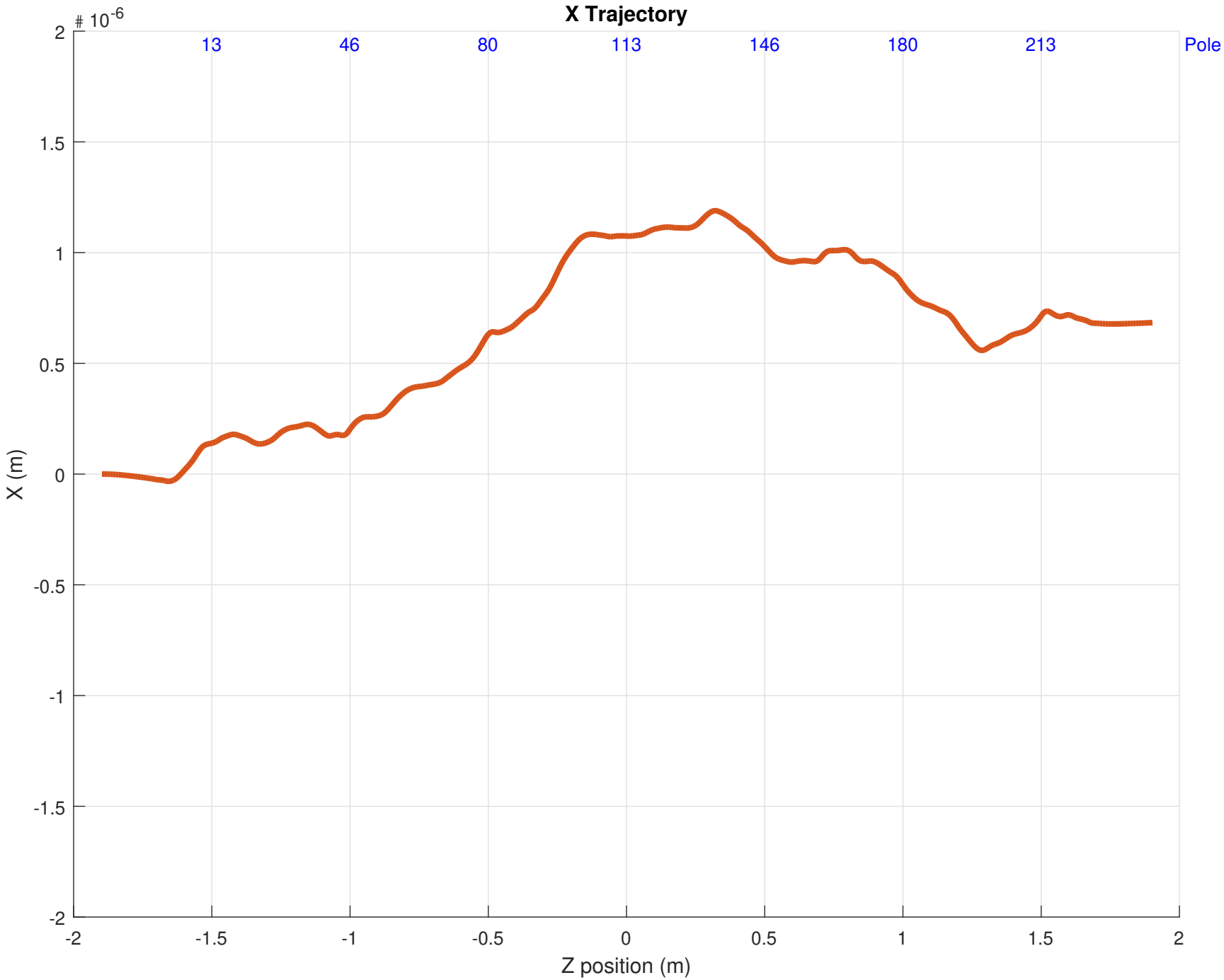

Abs(Fitted Peak Bx) vs Z, Excluding Ends
13
47
80
114
147
180
214
Pole
1.24
1.235
1.23
1.225
1.22
1.215
1.21
Abs(Peak Bx) (T)
Peak Fields: Ave = 1.228645 T, RMS = 0.004098 T
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

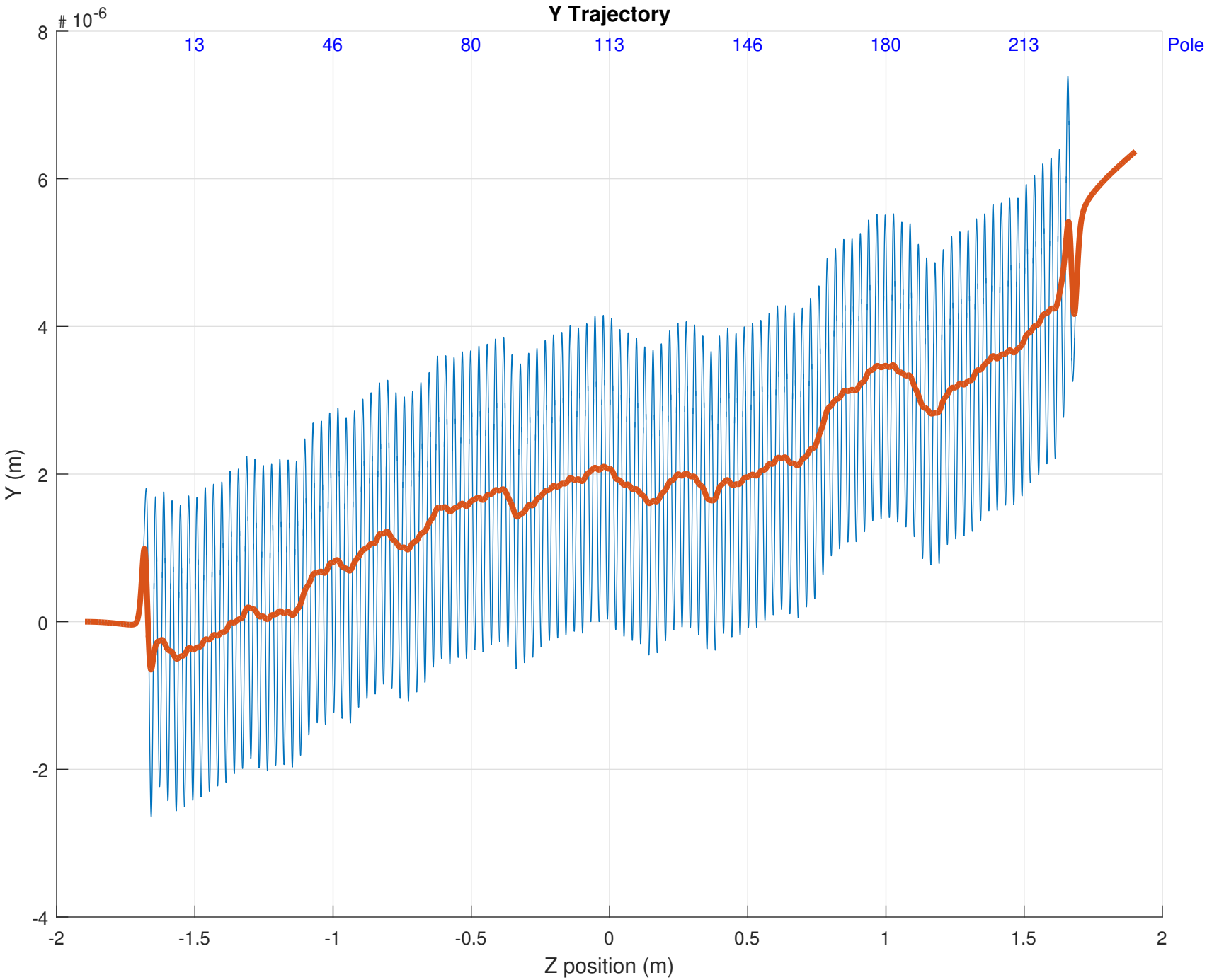

Abs(Fitted Peak By) vs Z, Excluding Ends
1
0.5
0
-0.5
-1
Abs(Peak By) (T)
Peak Fields: Ave = 0.000000 T, RMS = 0.000000 T
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
Z (m)

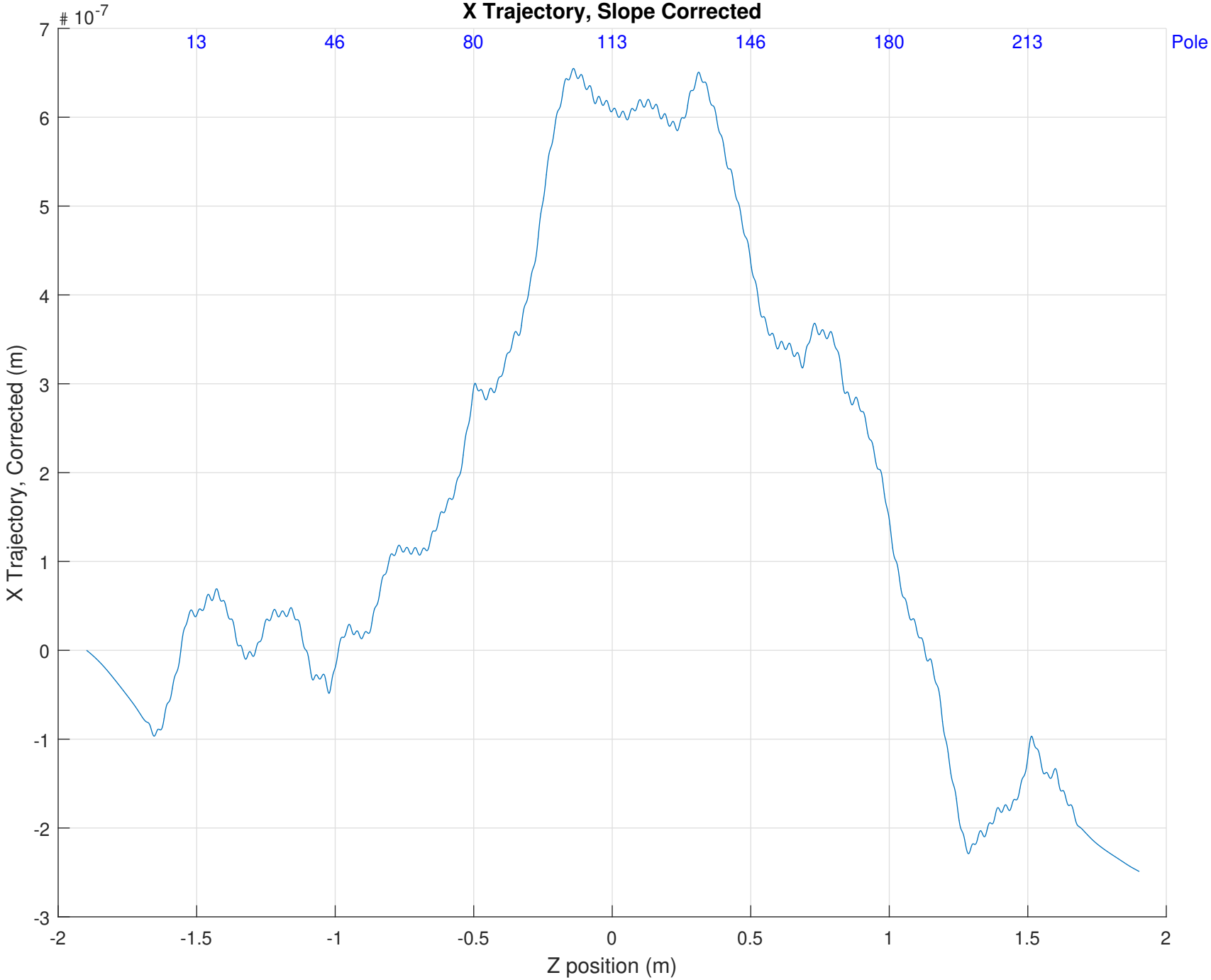

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
Z (m)
13
47
80
114
147
180
214
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.015000 m, RMS = 0.000022 m
Zero Field Spacing: Ave = 0.015000 m, RMS = 0.000039 m
0.0152
0.01515
0.0151
0.01505
0.015
0.01495
0.0149
-2
-1.5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

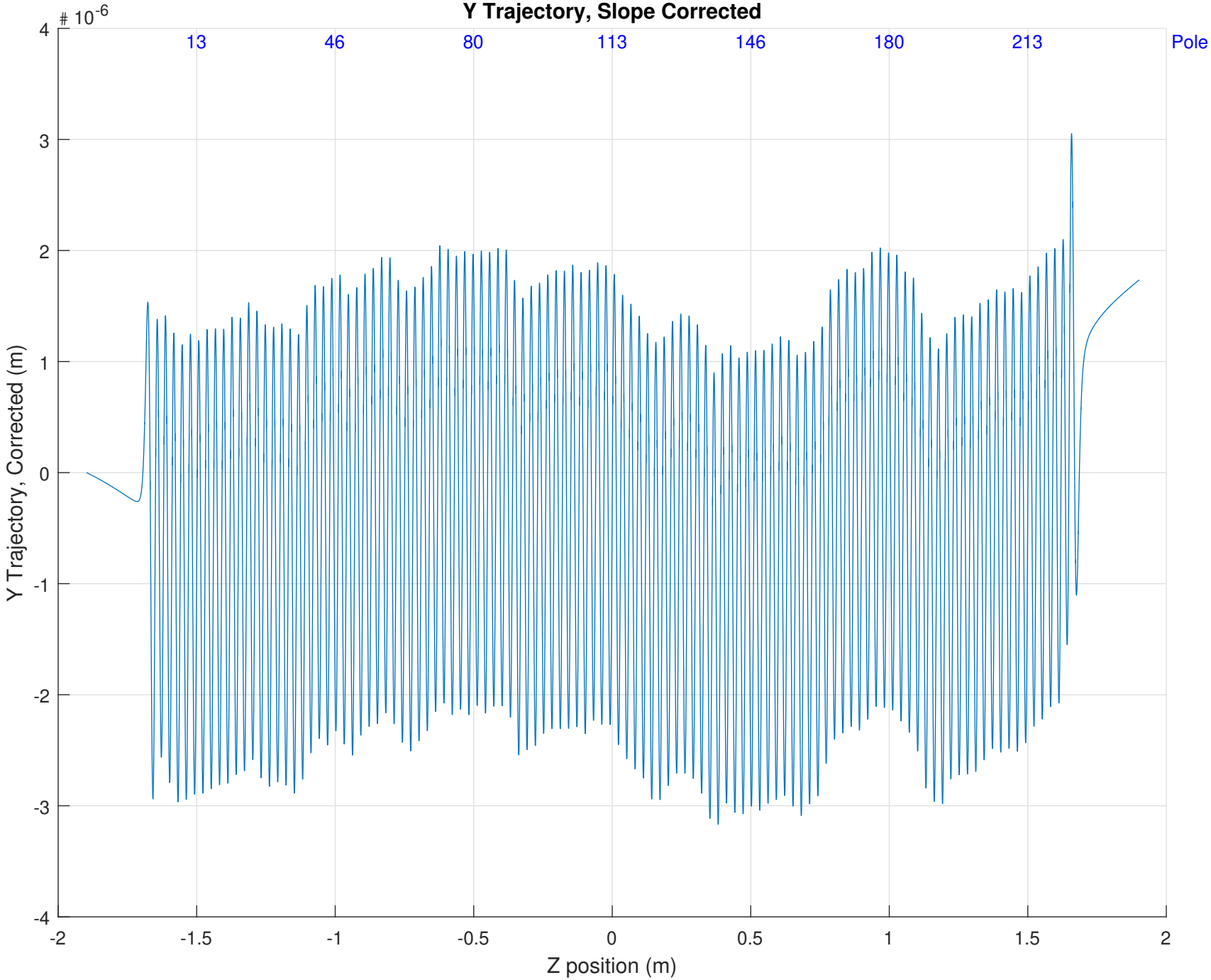

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
Z (m)
Peaks
Zeros
Peak Field Spacing: Ave = 0.000000 m, RMS = 0.000000 m
Zero Field Spacing: Ave = 0.000000 m, RMS = 0.000000 m
1
0.5
0
-0.5
-1
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1

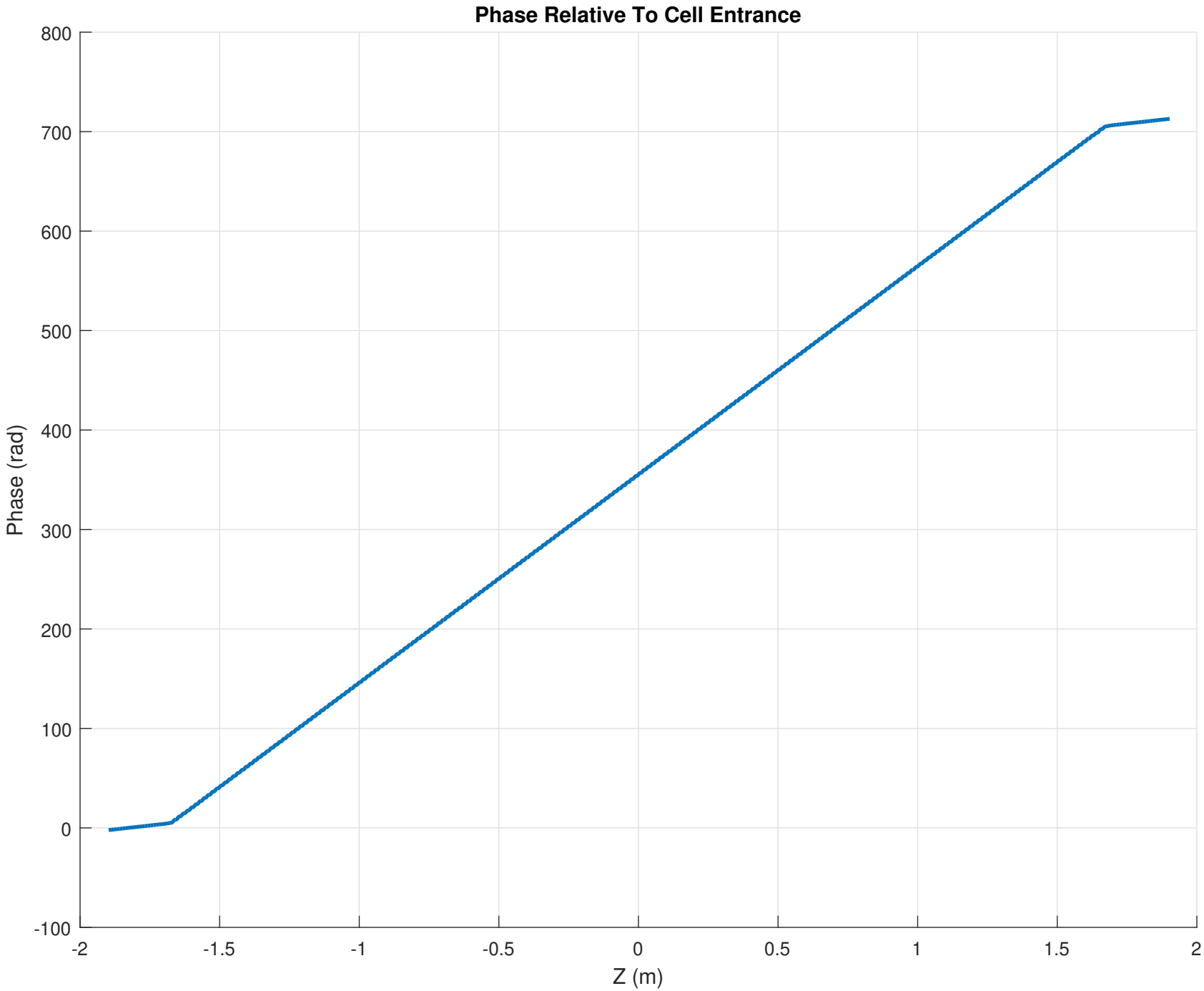

s s Bx dz dz and s s By dz dz
10^-5
I2x
I2x Filt
I2y
I2y Filt
s s B dz dz (Tm**2)
Z (m)
4
2
0
-2
-4
-6
-8
-10
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2

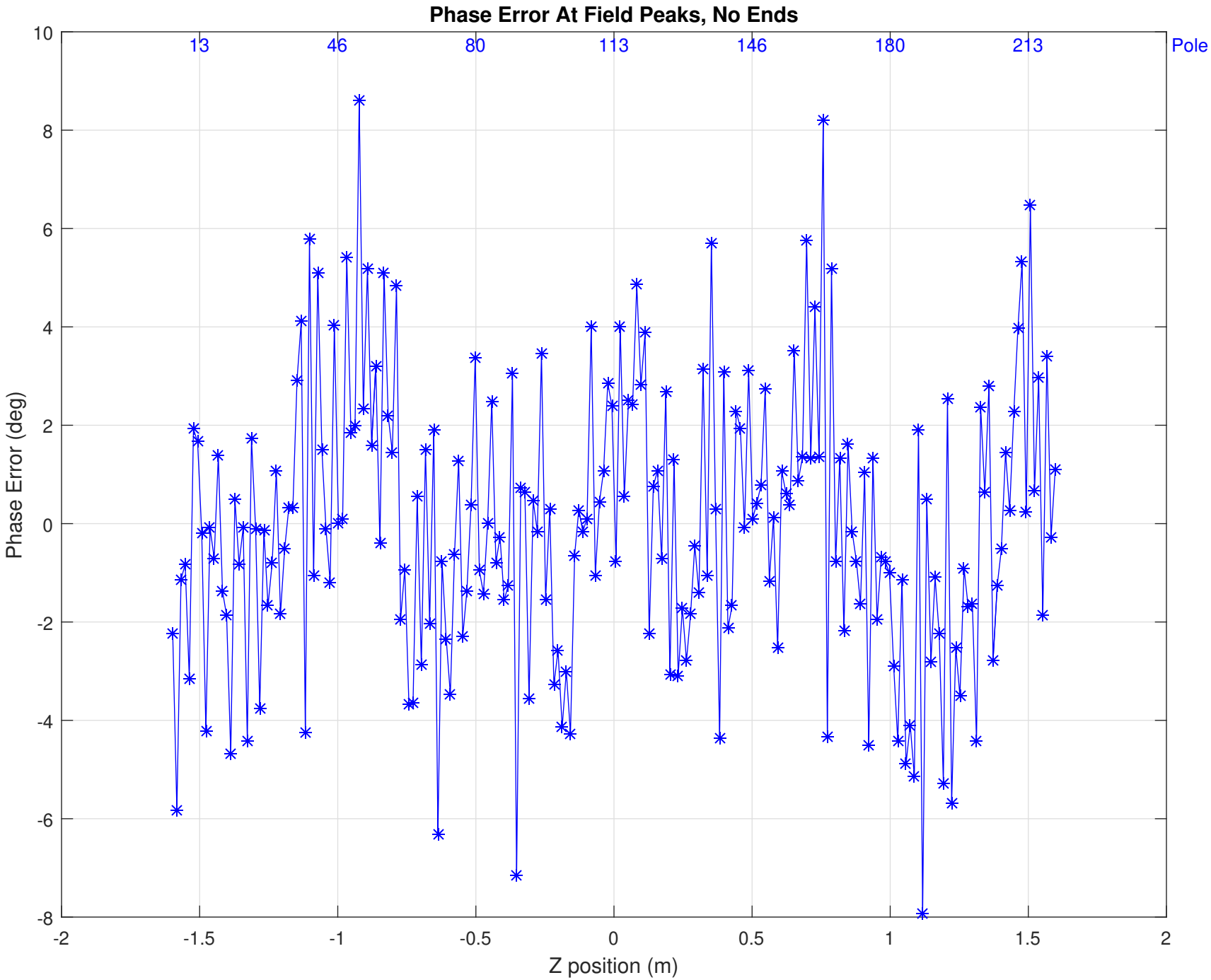

X Trajectory
10^-6
13
46
80
113
146
180
213
Pole
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
X (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z position (m)


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

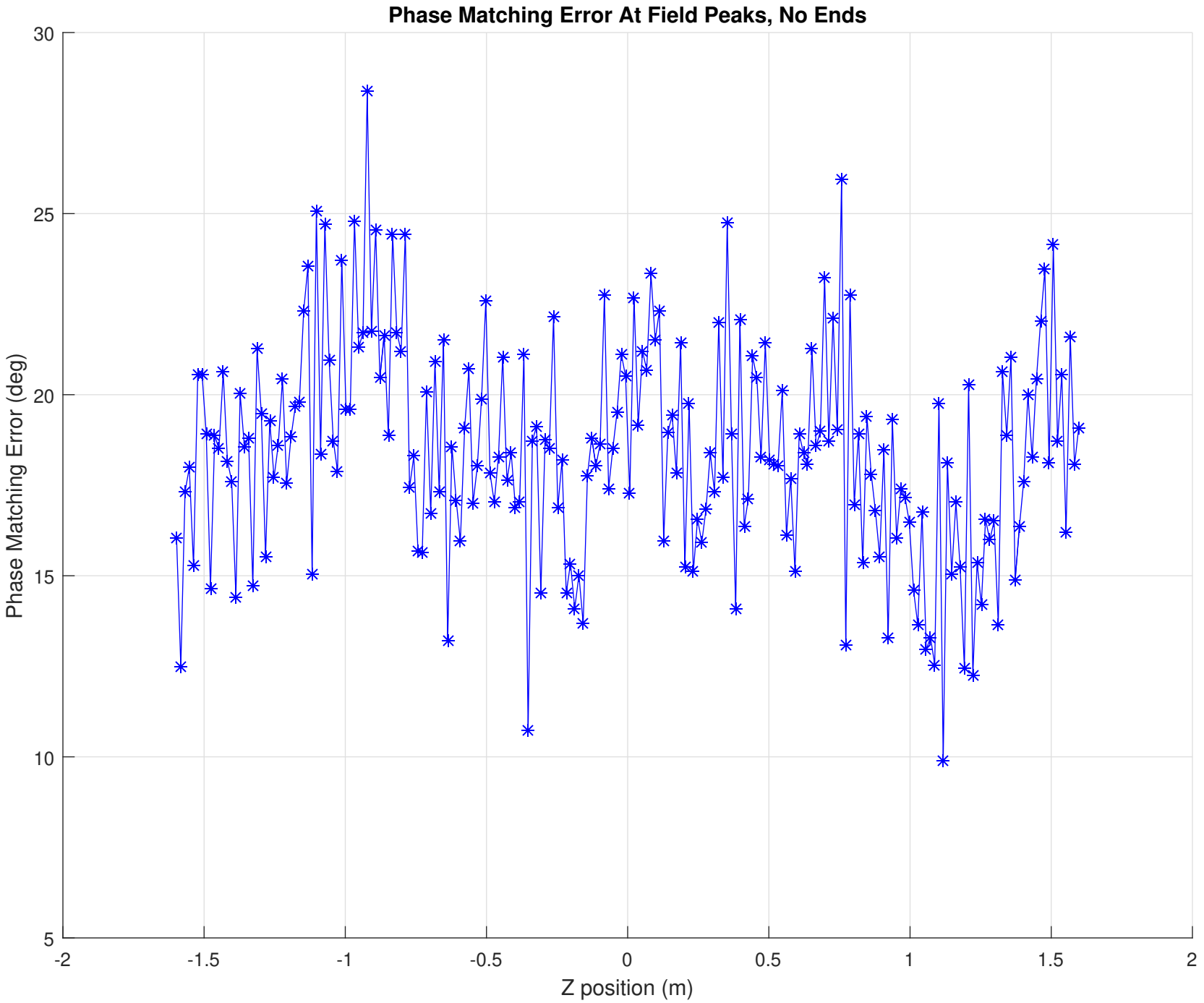

X Trajectory, Slope Corrected
10^-7
13
46
80
113
146
180
213
Pole
X Trajectory, Corrected (m)
Z position (m)
7
6
5
4
3
2
1
0
-1
-2
-3
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2


Y Trajectory, Slope Corrected
10^-6
13
46
80
113
146
180
213
Pole
4
3
2
1
0
-1
-2
-3
-4
Y Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z position (m)

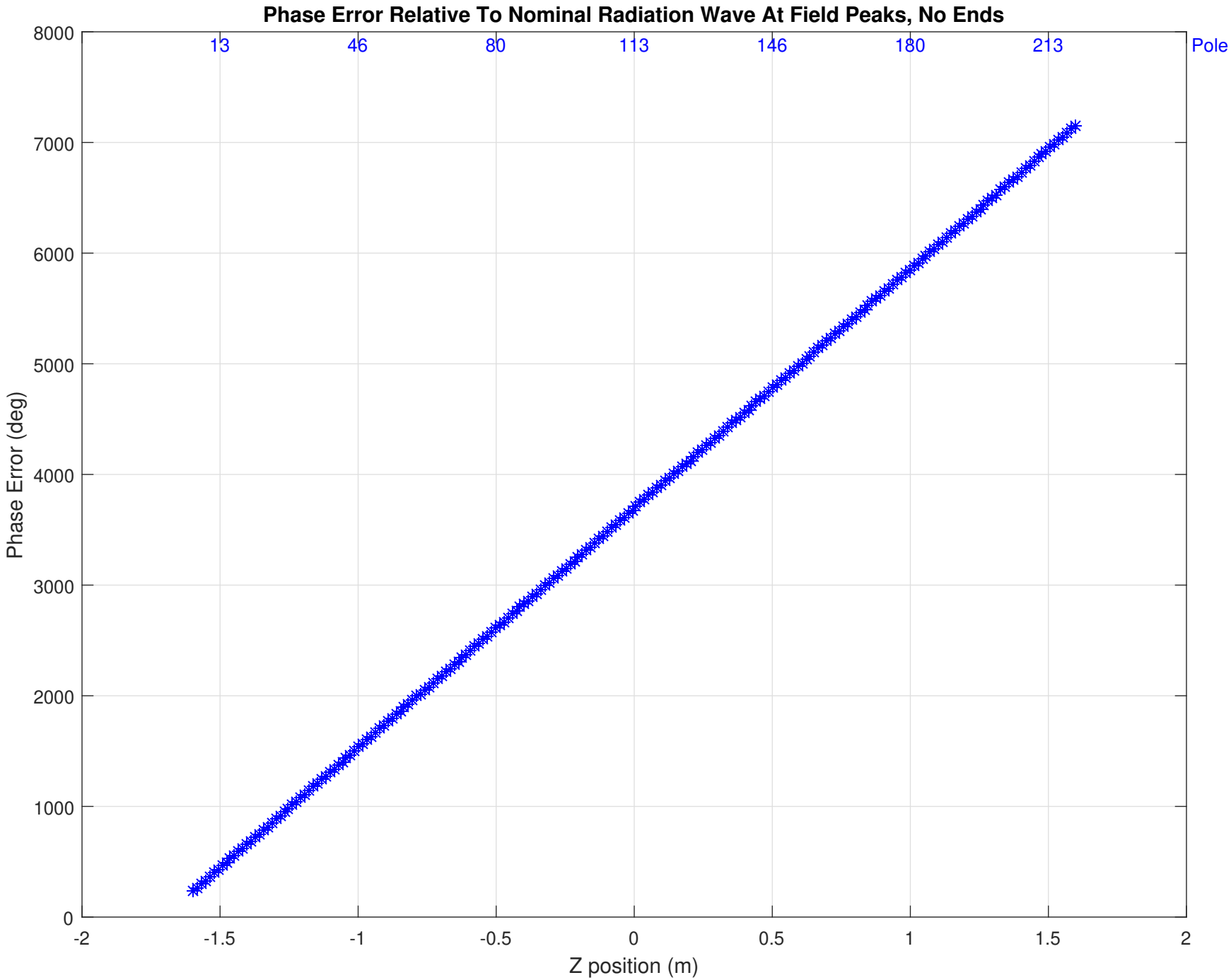

Phase Relative To Cell Entrance
800
700
600
500
400
300
200
100
0
-100
Phase (rad)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)



Phase Error: Ave = 0.000000 deg, RMS = 2.836301 deg



Phase Match Error: Ave = 18.505161 deg, RMS = 3.007979 deg


Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
13
46
80
113
146
180
213
Pole
8000
7000
6000
5000
4000
3000
2000
1000
0
Phase Error (deg)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z position (m)