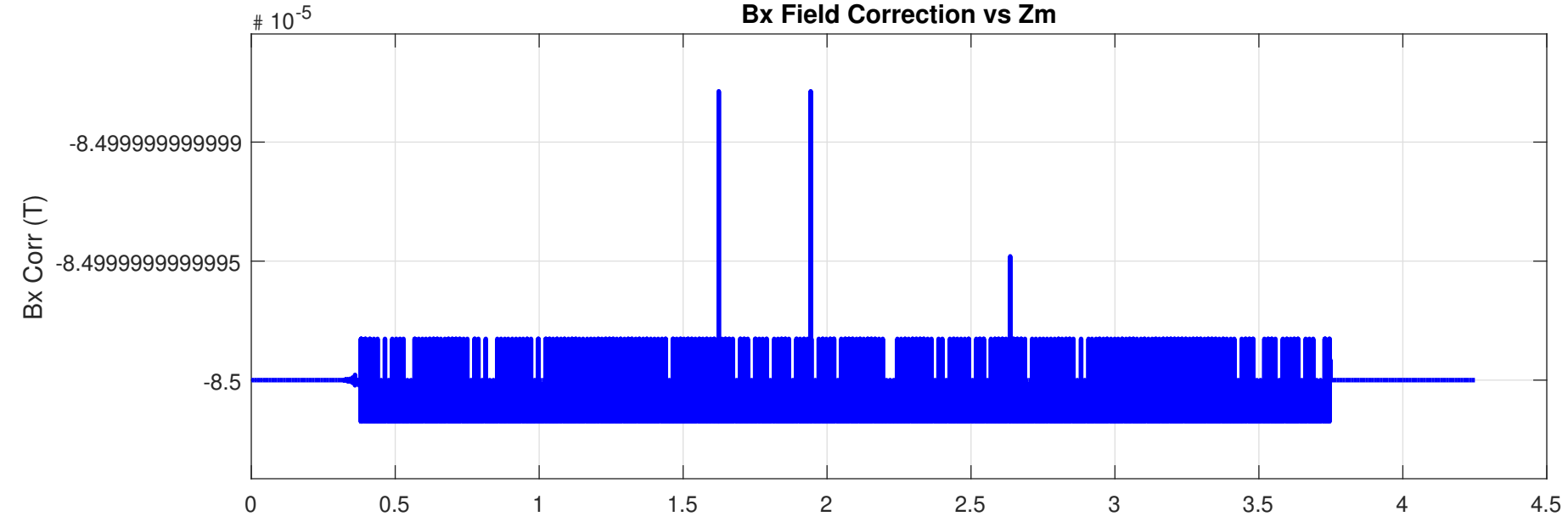
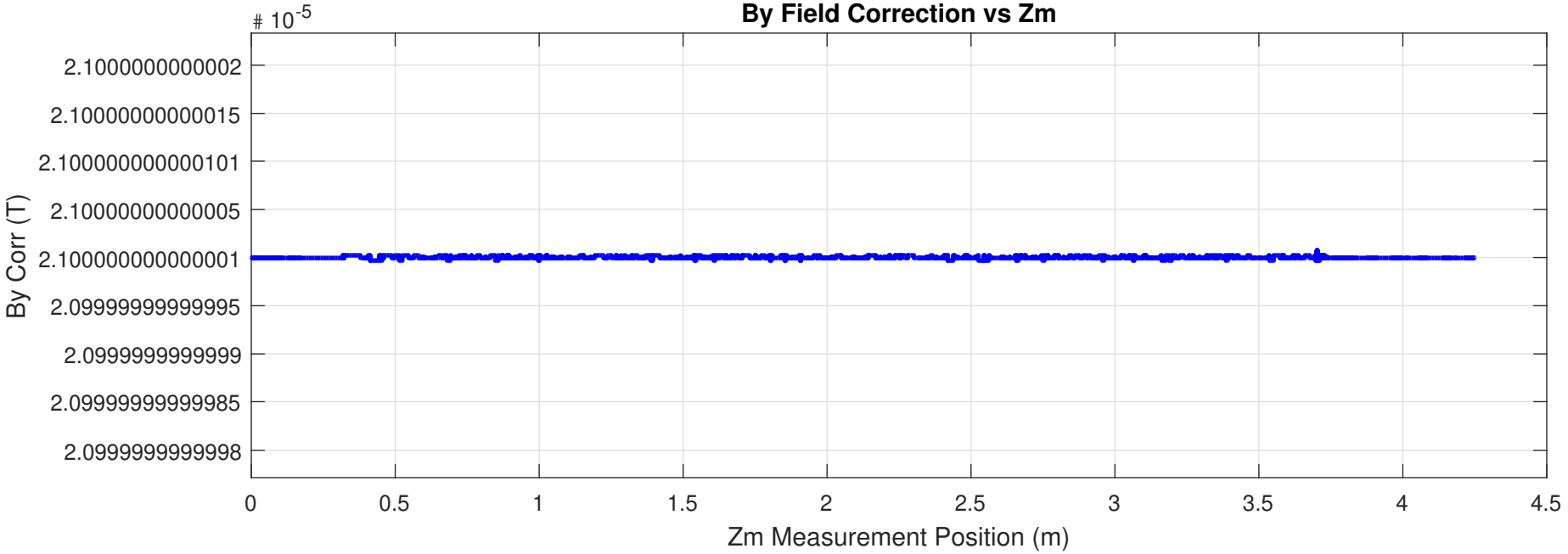
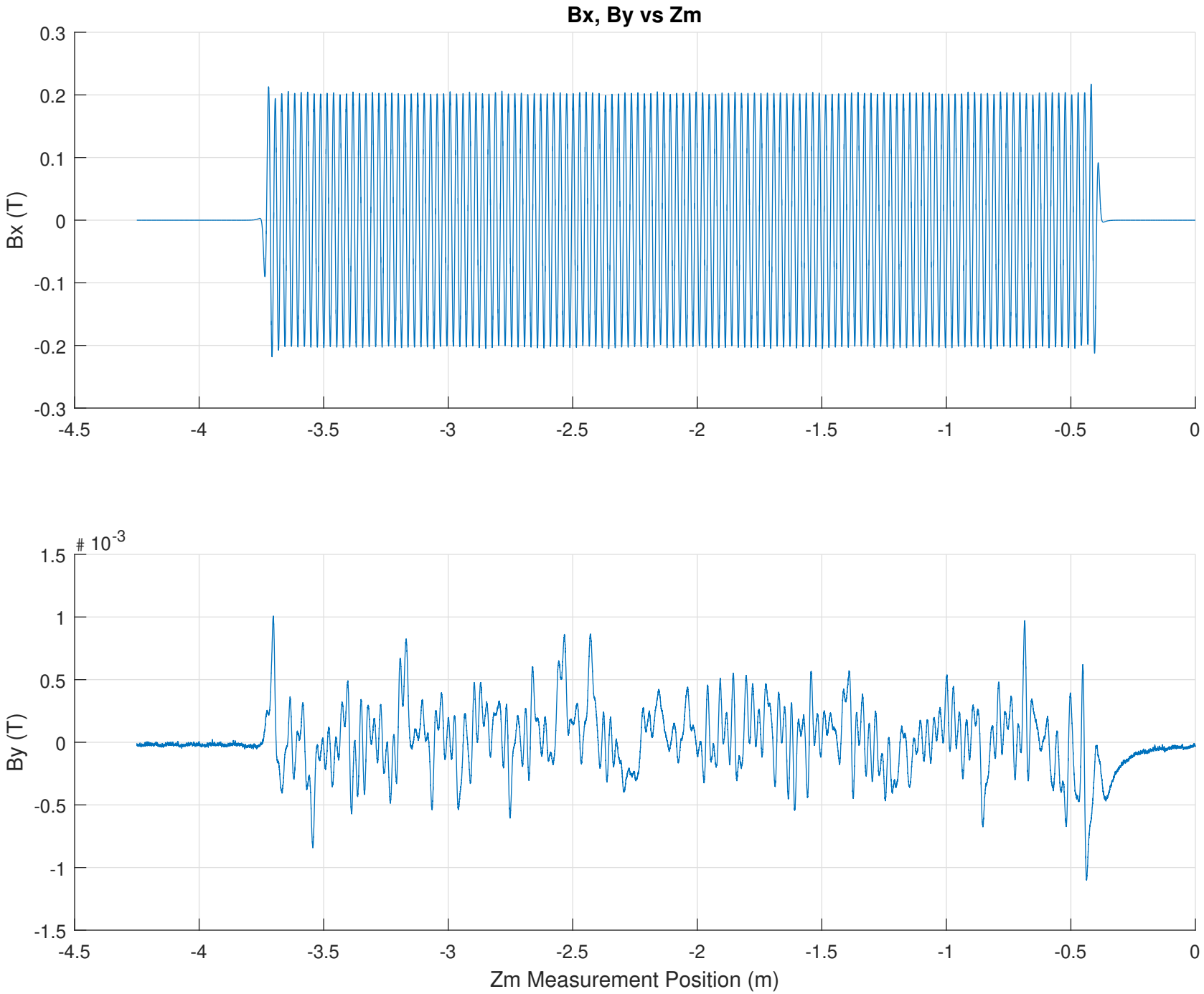
SLAC Magnetic Measurements

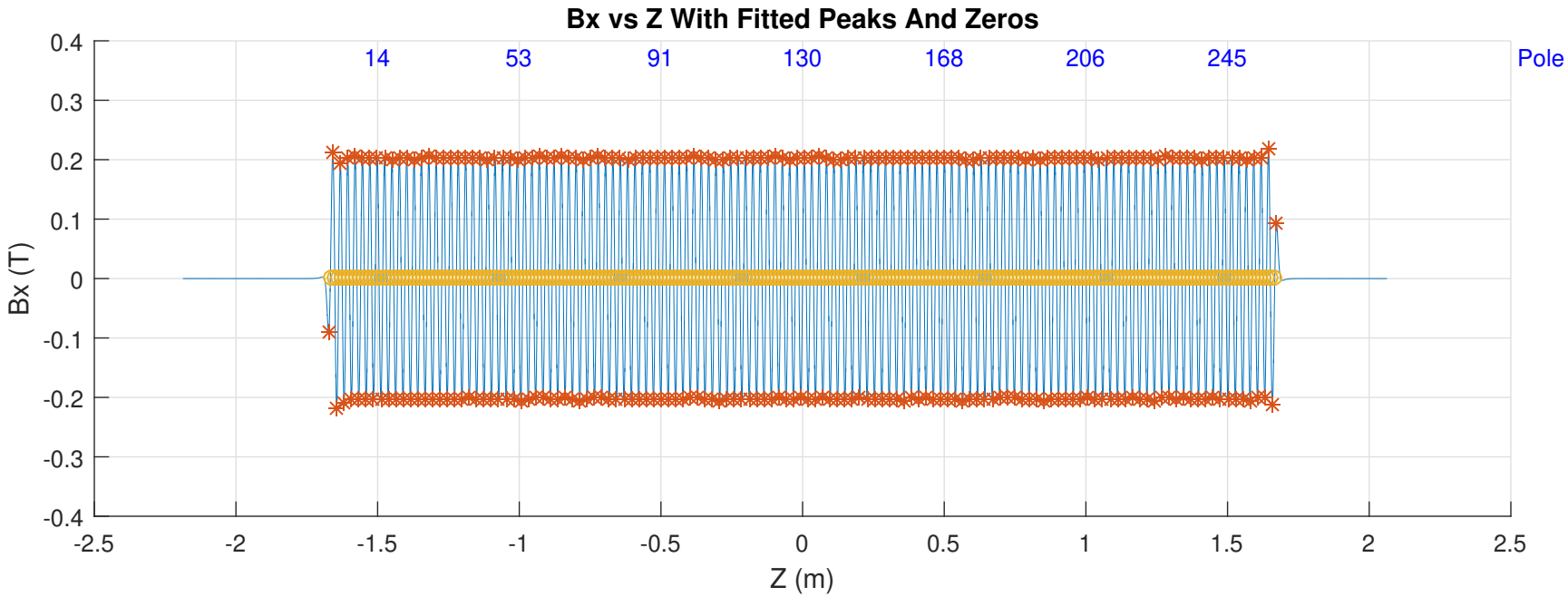
Planar Insertion Device Analysis

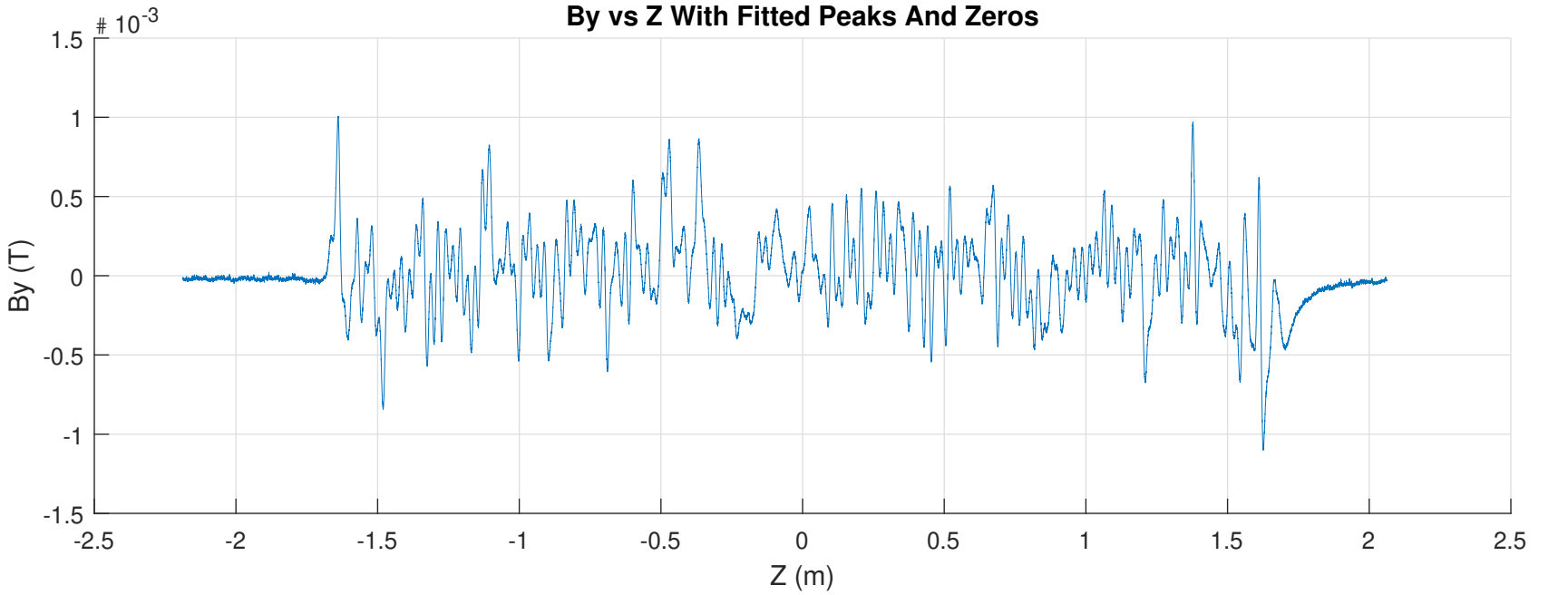
Parameters:
INPUT-FILE-DIR =s:\magdata\LCLS2\Undulator\HGVPU\DATASET0001\Fine Tuning\Z Scans\Run 094\
INPUT-FILE-NAME =x+00000-y+000-bscanz.dat
INPUT-FILE-TYPE =ZVXYBXYH
CORR-REQUIRED =1
GAMMA =26692.7
NOM-LAMBDA-U =0.032
NOM-K-VALUE =3.5
NOM-LAMBDA-R =1.4781e-09
NUM-POLES =258
NUM-END-POLES =6
CELL-LENGTH =4.4

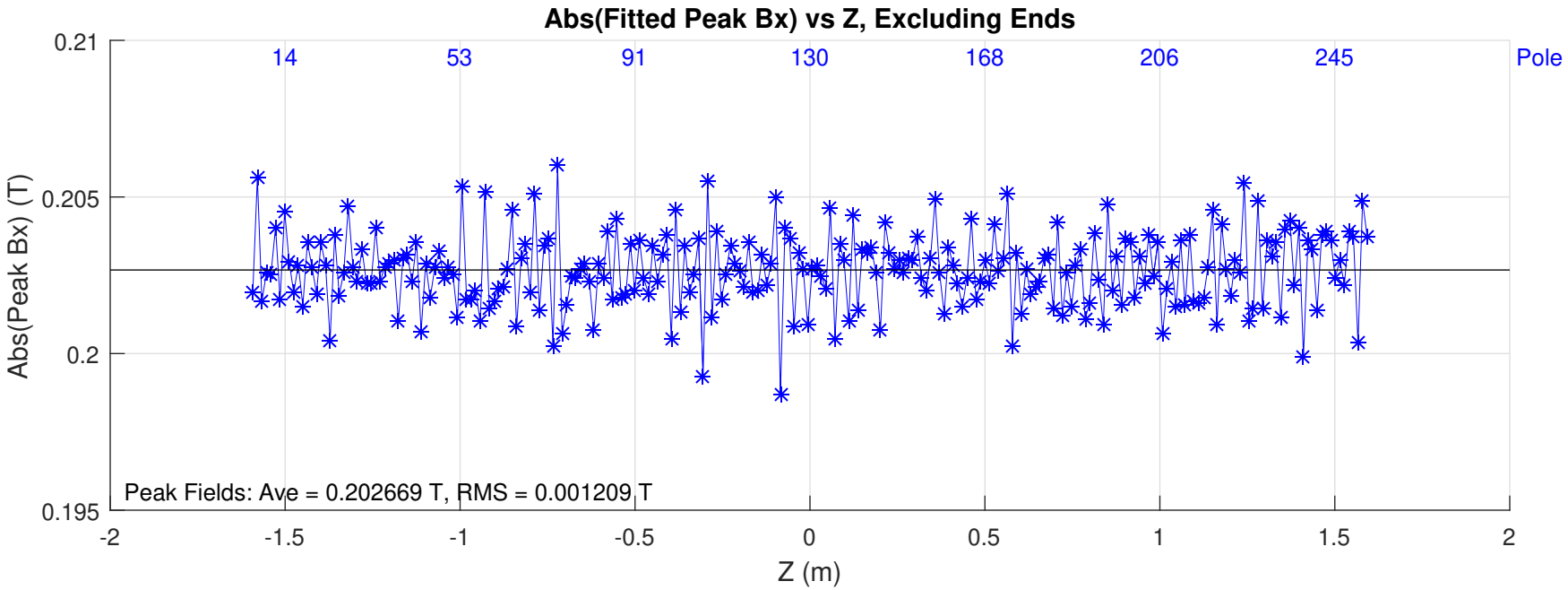

Bx Field Correction vs Zm
10^-5
-8.499999999999
-8.4999999999995
-8.5
Bx Corr (T)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5

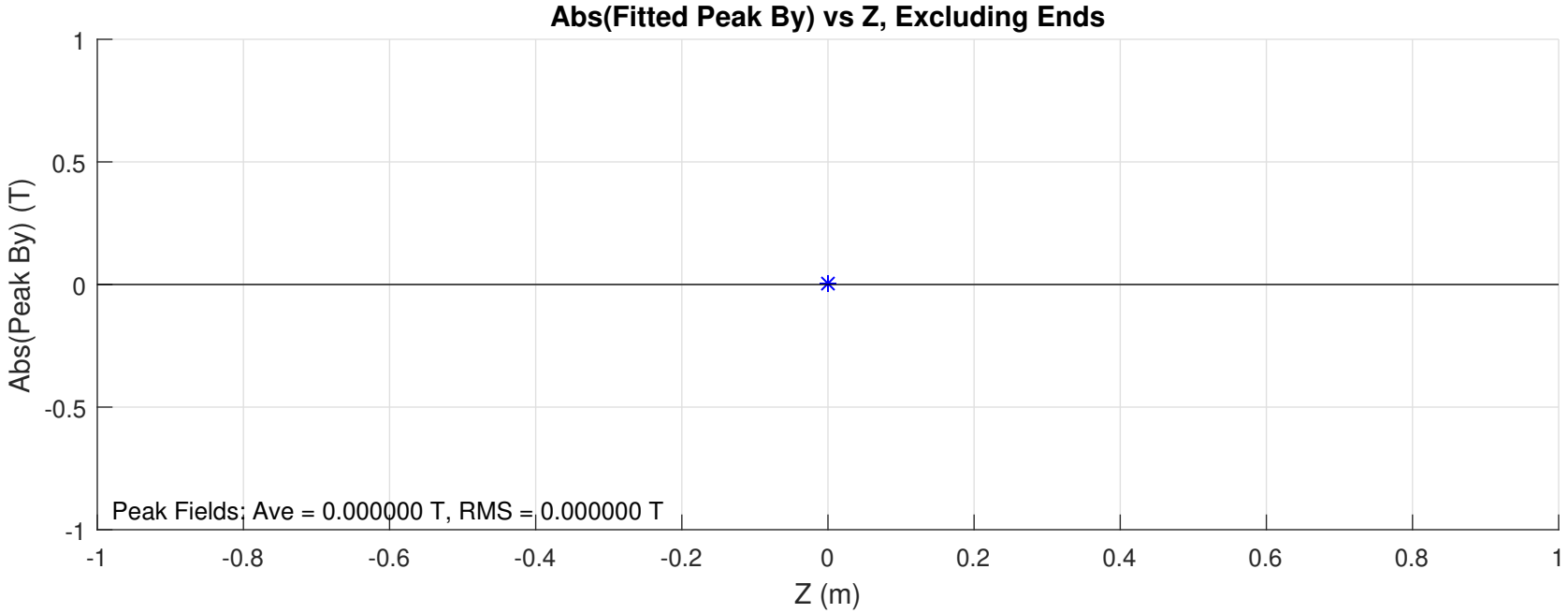

By Field Correction vs Zm
10^-5
2.1000000000002
2.10000000000015
2.100000000000101
2.10000000000005
2.100000000000001
2.09999999999995
2.0999999999999
2.09999999999985
2.0999999999998
By Corr (T)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
Zm Measurement Position (m)

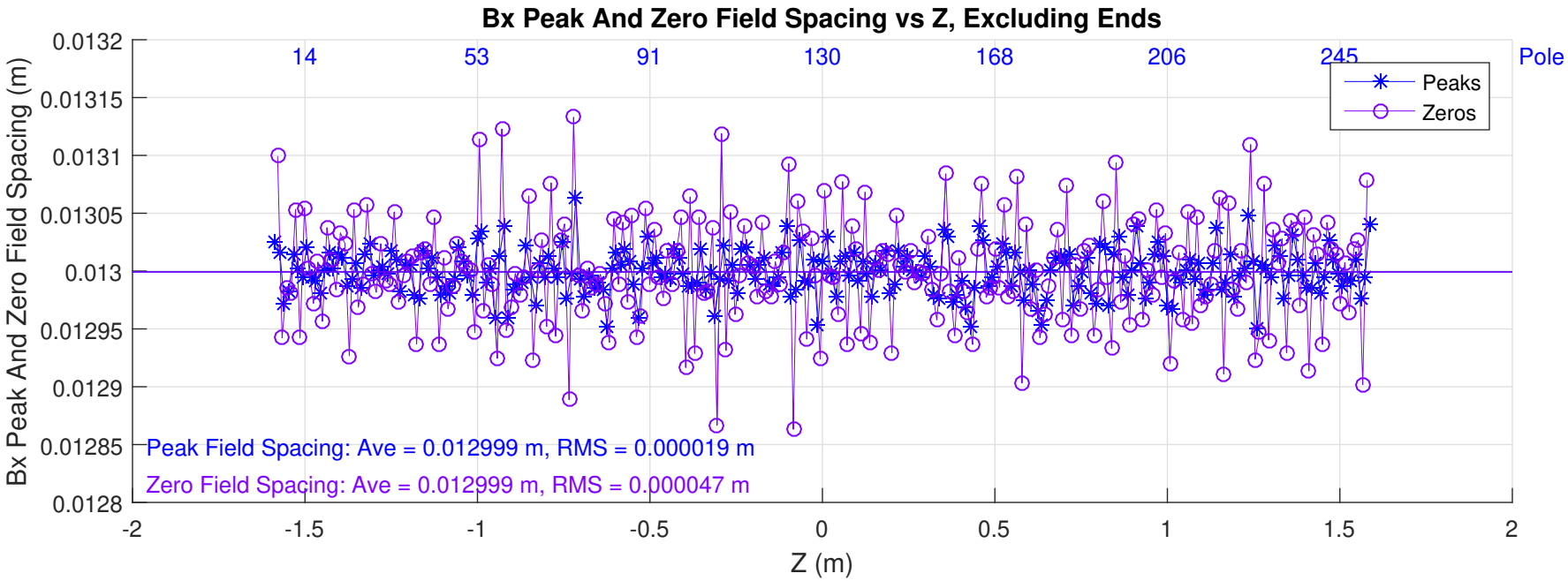

Bx, By vs Zm
Bx (T)
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
10^-3
By (T)
1.5
1
0.5
0
-0.5
-1
-1.5
Zm Measurement Position (m)

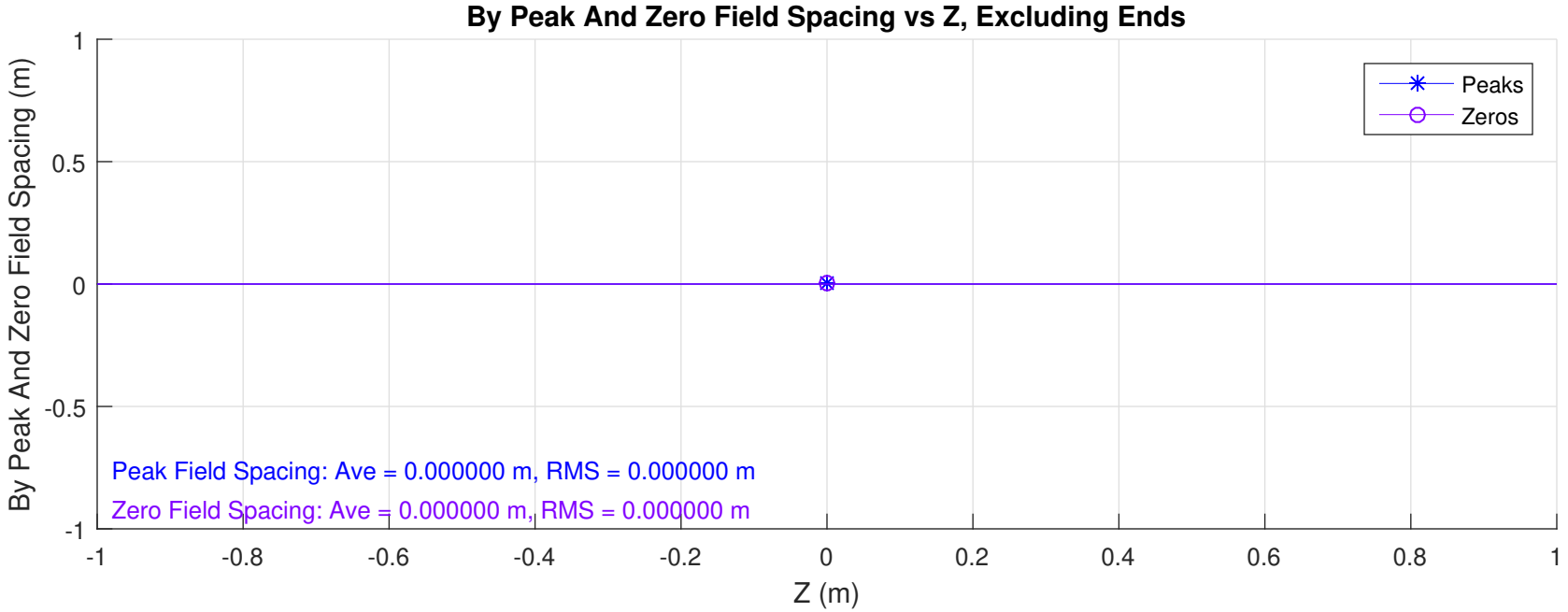

Bx vs Z With Fitted Peaks And Zeros
14
53
91
130
168
206
245
Pole
Bx (T)
Z (m)

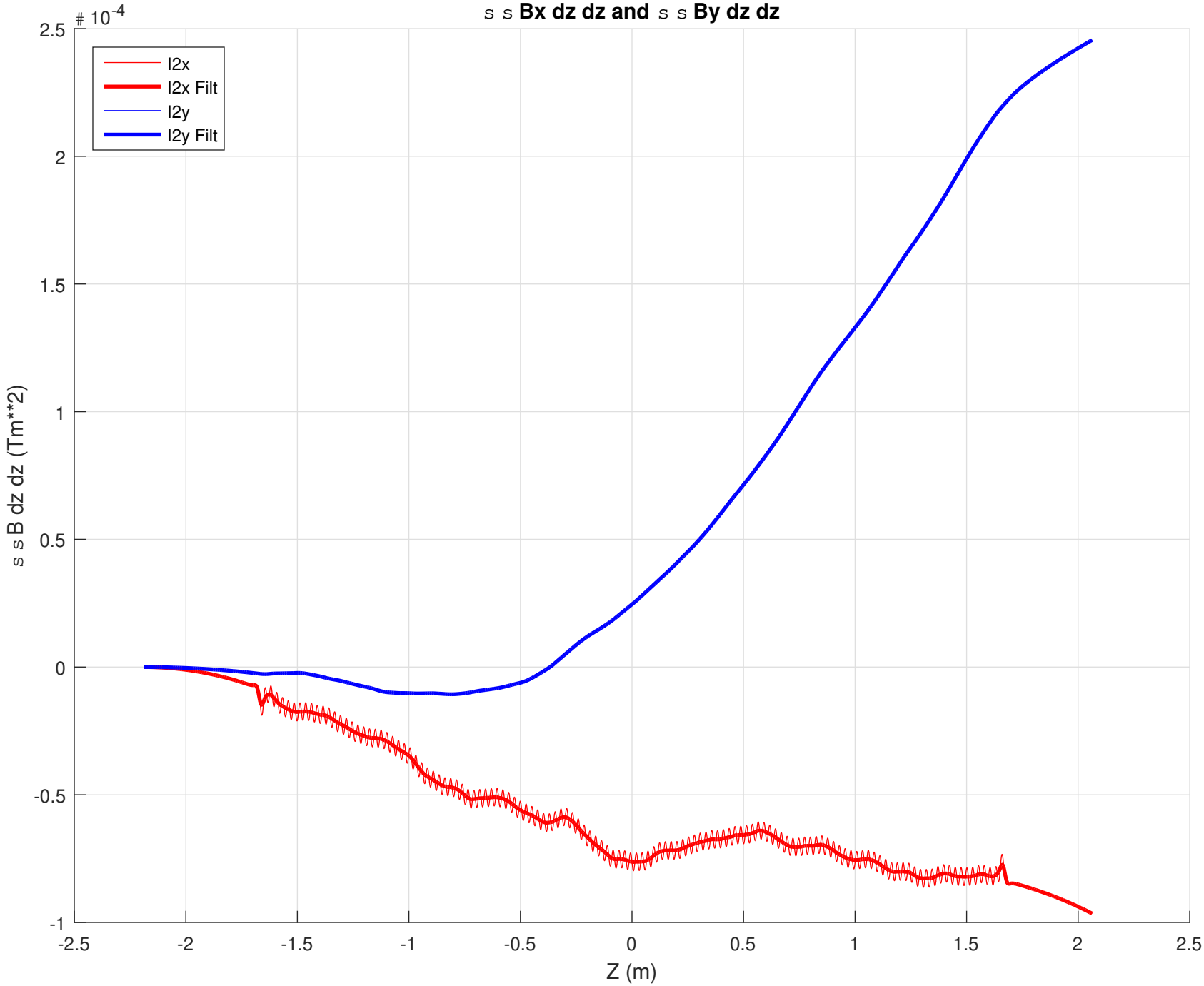

By vs Z With Fitted Peaks And Zeros
10-3
By (T)
Z (m)

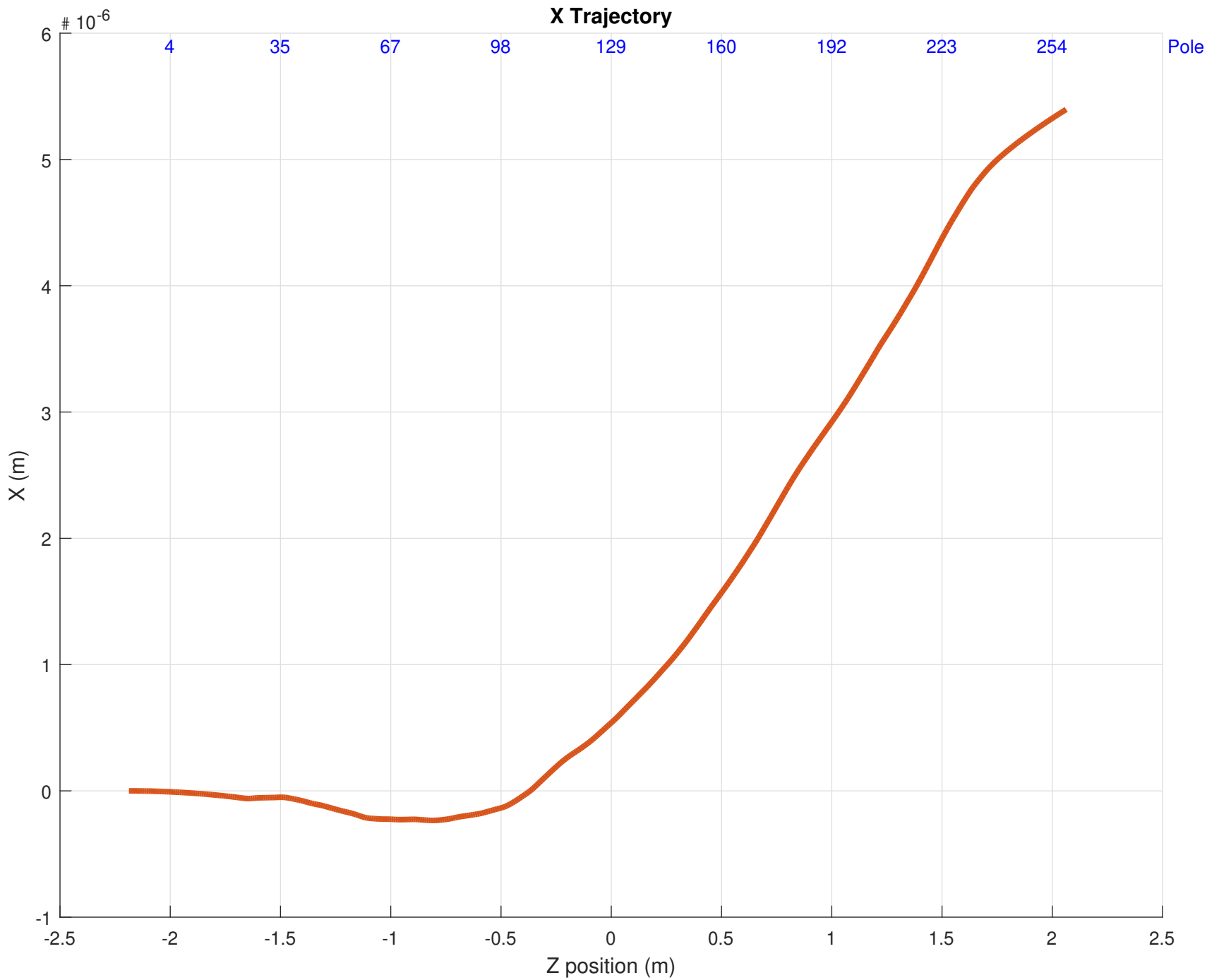

Abs(Fitted Peak Bx) vs Z, Excluding Ends
14
53
91
130
168
206
245
Pole
0.21
0.205
0.2
0.195
Abs(Peak Bx) (T)
Peak Fields: Ave = 0.202669 T, RMS = 0.001209 T
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

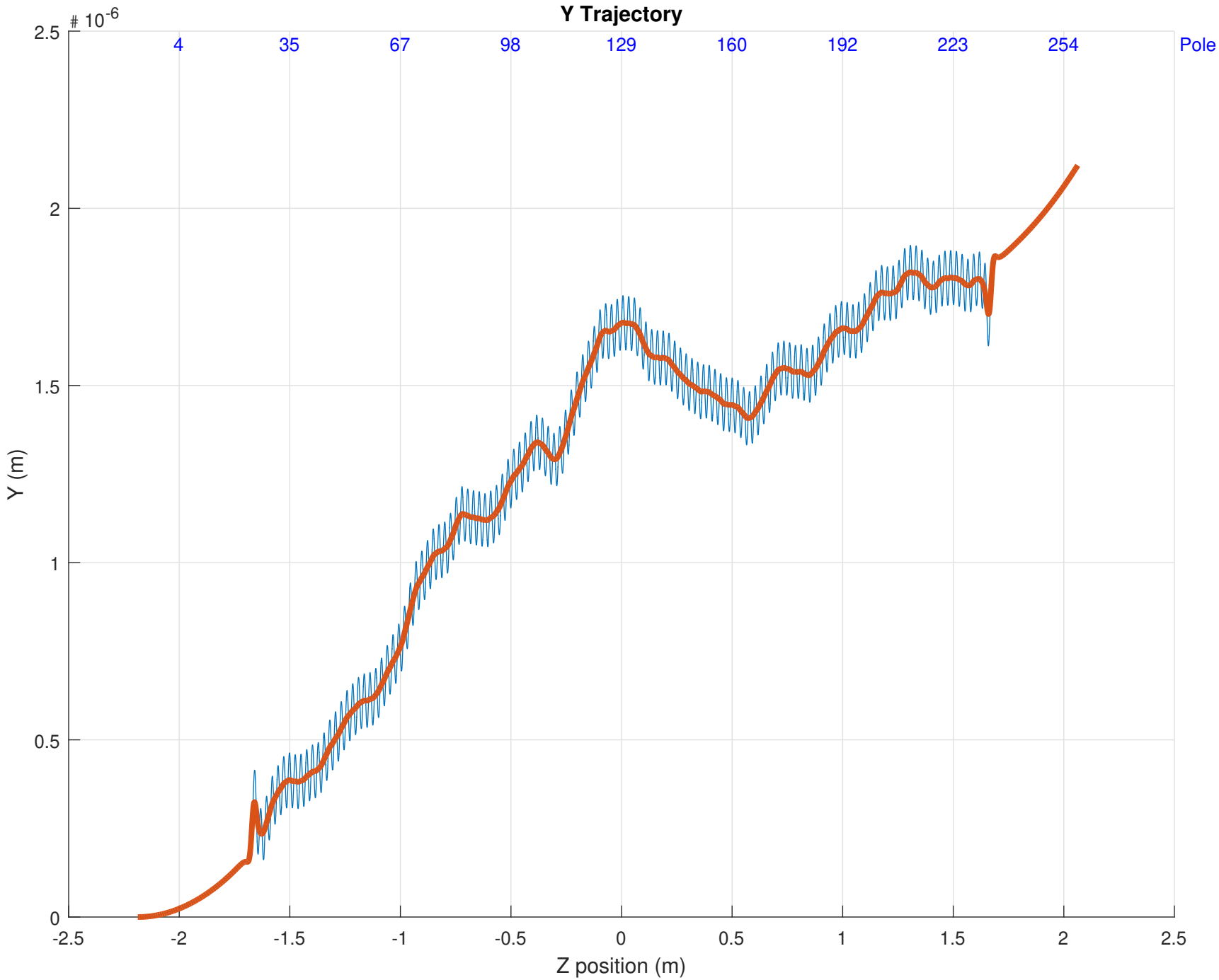

Abs(Fitted Peak By) vs Z, Excluding Ends
1
0.5
0
-0.5
-1
Abs(Peak By) (T)
Peak Fields: Ave = 0.000000 T, RMS = 0.000000 T
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
Z (m)

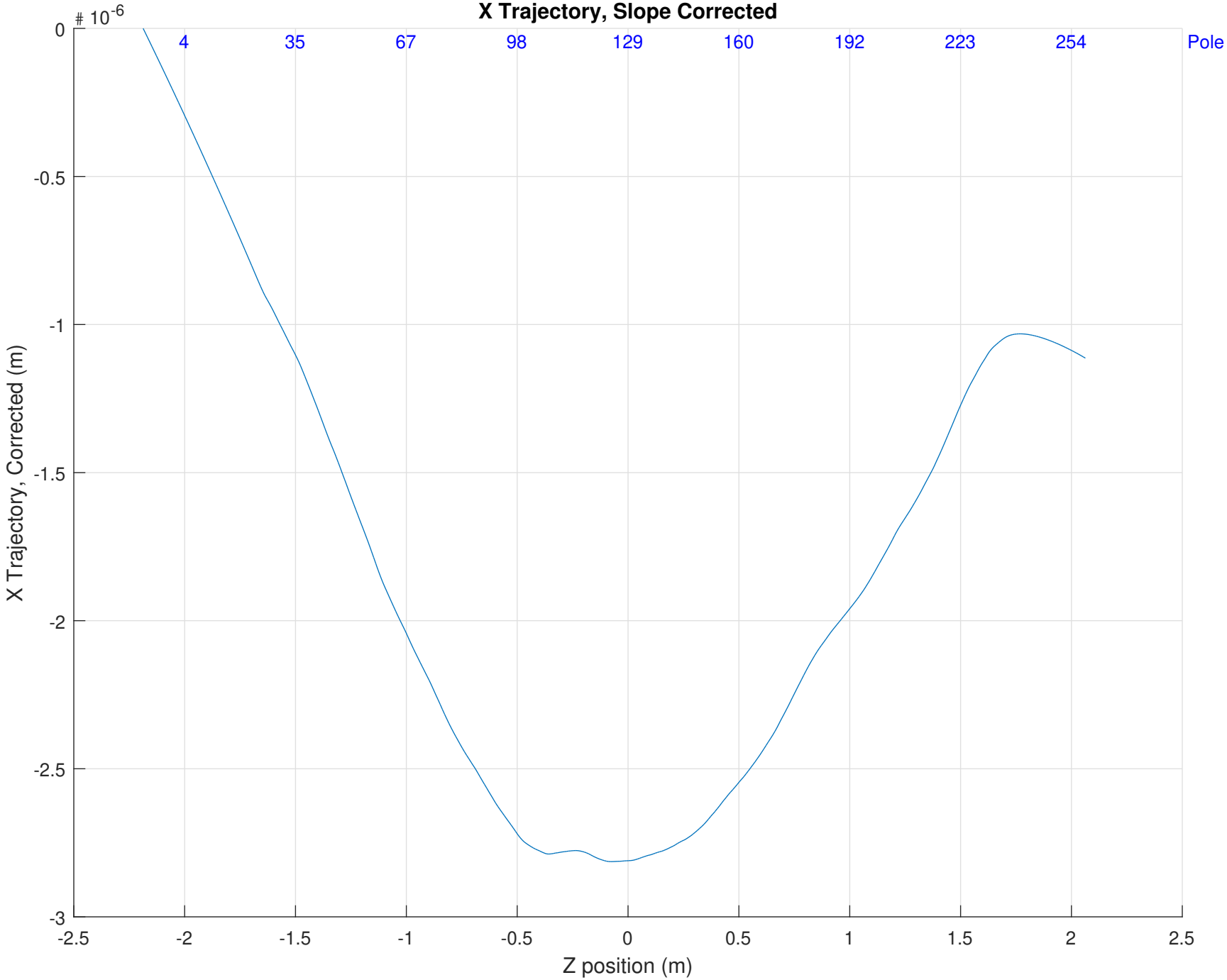

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
0.0132
0.01315
0.0131
0.01305
0.013
0.01295
0.0129
0.01285
0.0128
14
53
91
130
168
206
245
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.012999 m, RMS = 0.000019 m
Zero Field Spacing: Ave = 0.012999 m, RMS = 0.000047 m
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

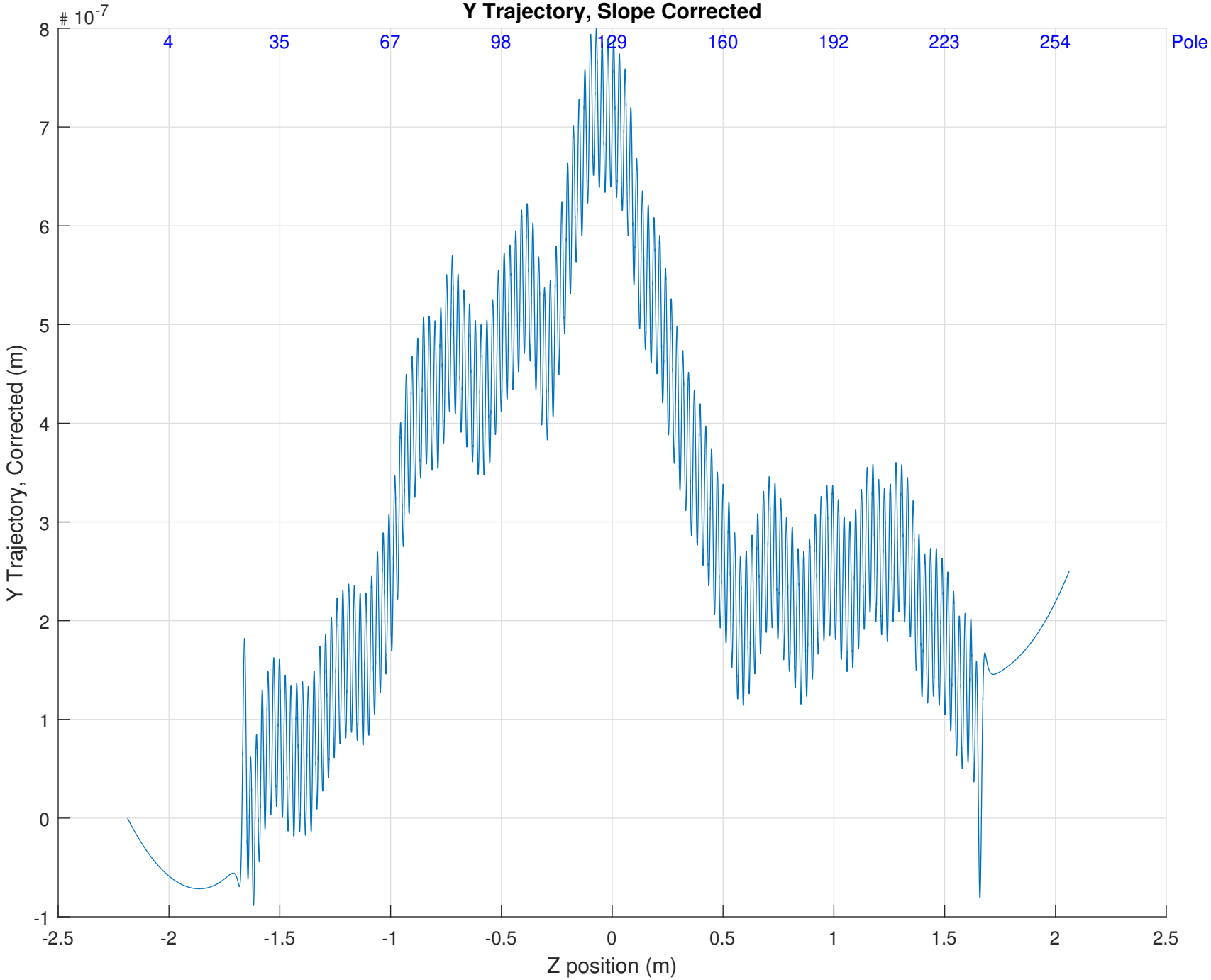

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
1
0.5
0
-0.5
-1
Peaks
Zeros
Peak Field Spacing: Ave = 0.000000 m, RMS = 0.000000 m
Zero Field Spacing: Ave = 0.000000 m, RMS = 0.000000 m
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
Z (m)

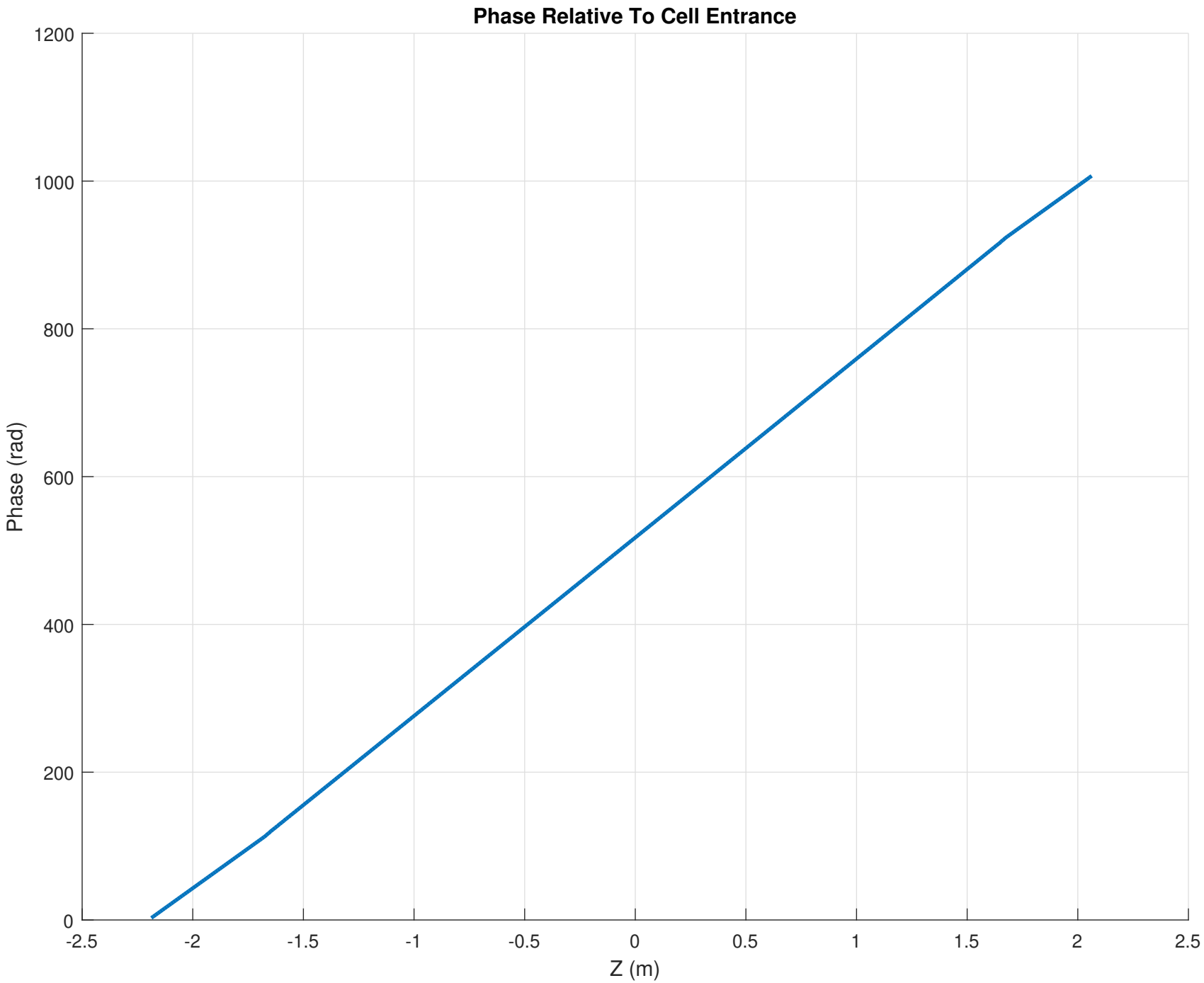

∫∫ Bx dz dz and ∫∫ By dz dz
10^-4
I2x
I2x Filt
I2y
I2y Filt
∫∫B dz dz (Tm**2)
Z (m)
2.5
2
1.5
1
0.5
0
-0.5
-1
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5

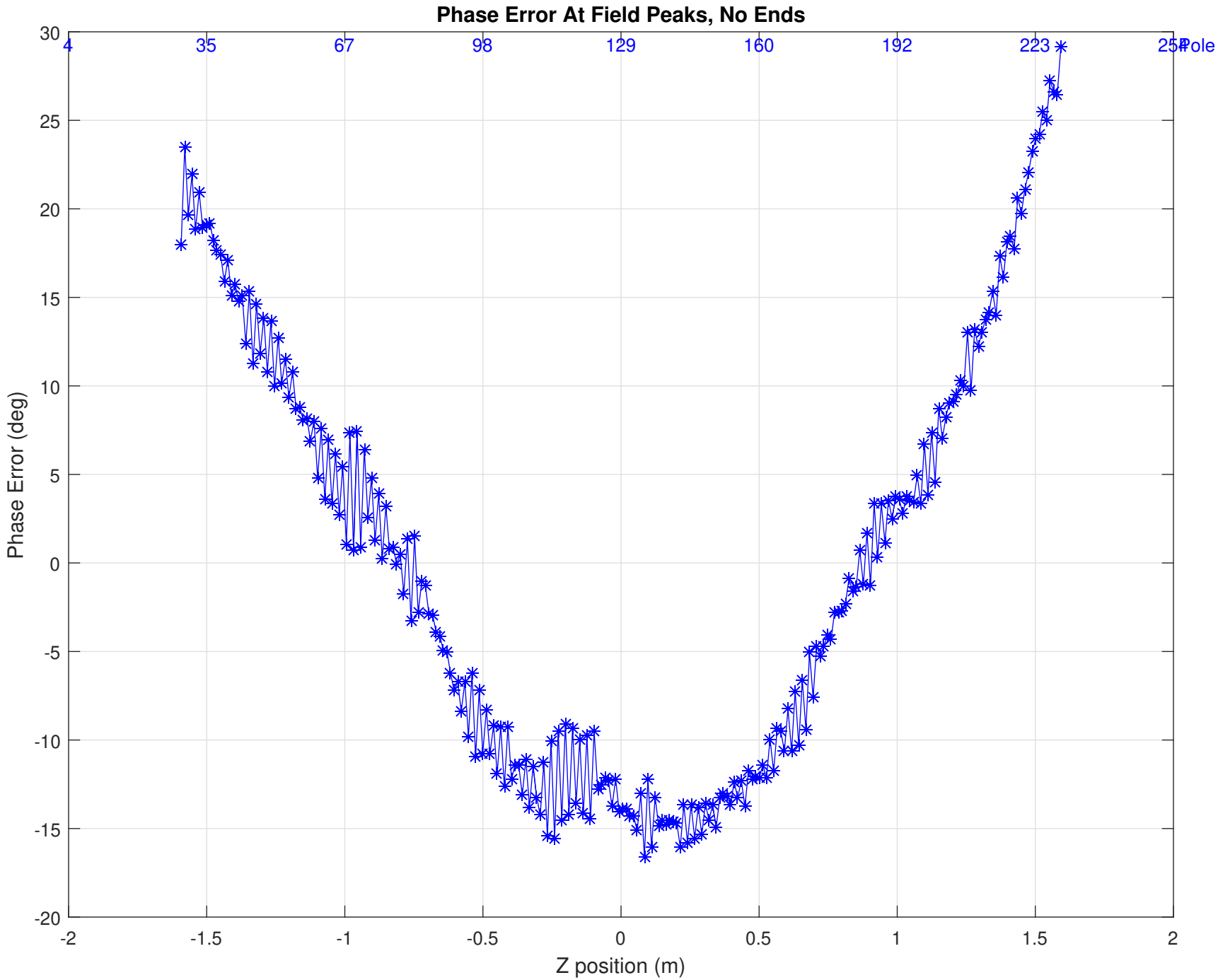

X Trajectory
10^-6
6
5
4
3
2
1
0
-1
4
35
67
98
129
160
192
223
254
Pole
X (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)


Y Trajectory
10^-6
2.5
2
1.5
1
0.5
0
4
35
67
98
129
160
192
223
254
Pole
Y (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)

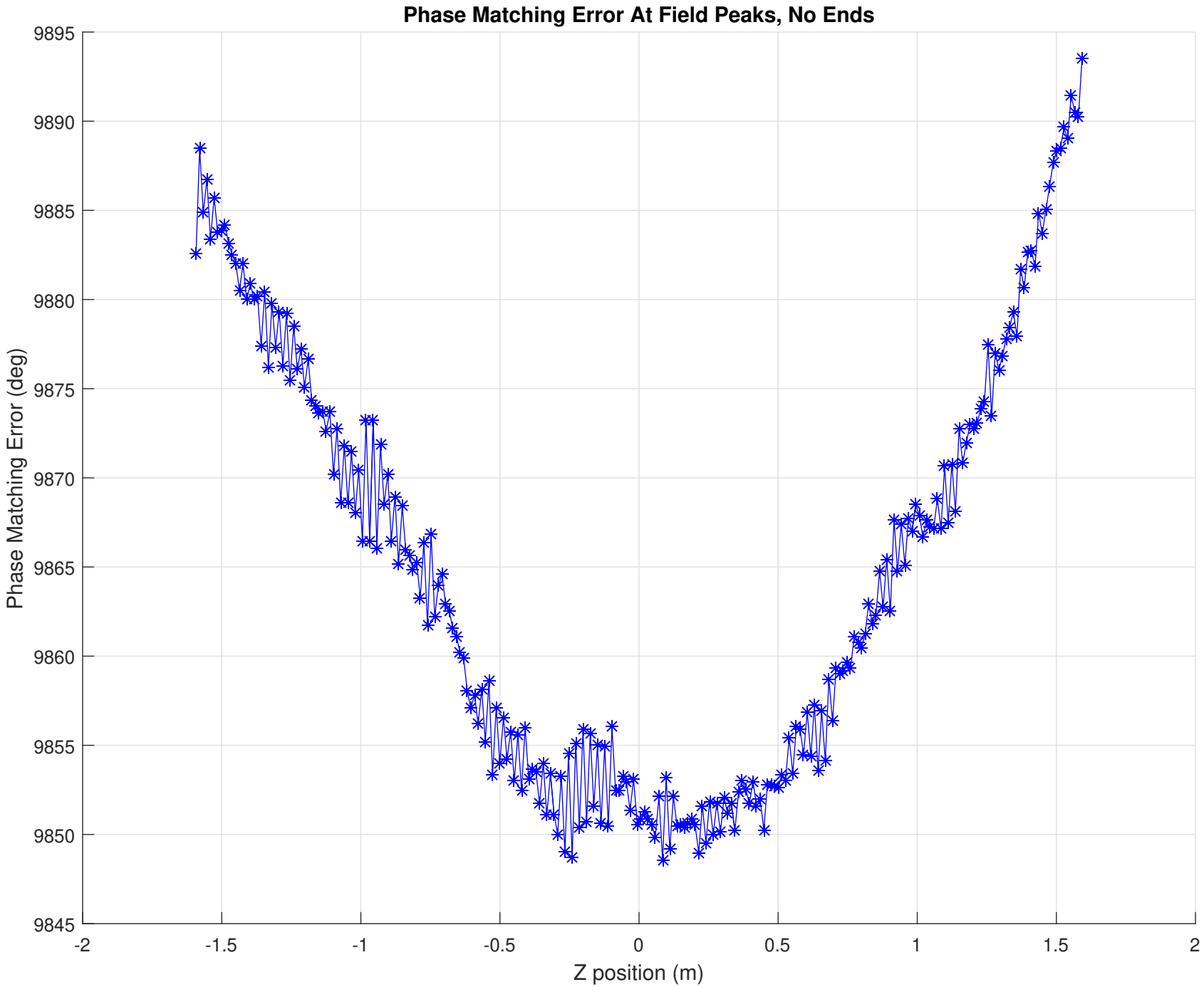

X Trajectory, Slope Corrected
10^-6
0
-0.5
-1
-1.5
-2
-2.5
-3
4
35
67
98
129
160
192
223
254
Pole
X Trajectory, Corrected (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)


Y Trajectory, Slope Corrected
10^-7
8
7
6
5
4
3
2
1
0
-1
4
35
67
98
129
160
192
223
254
Pole
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Y Trajectory, Corrected (m)
Z position (m)

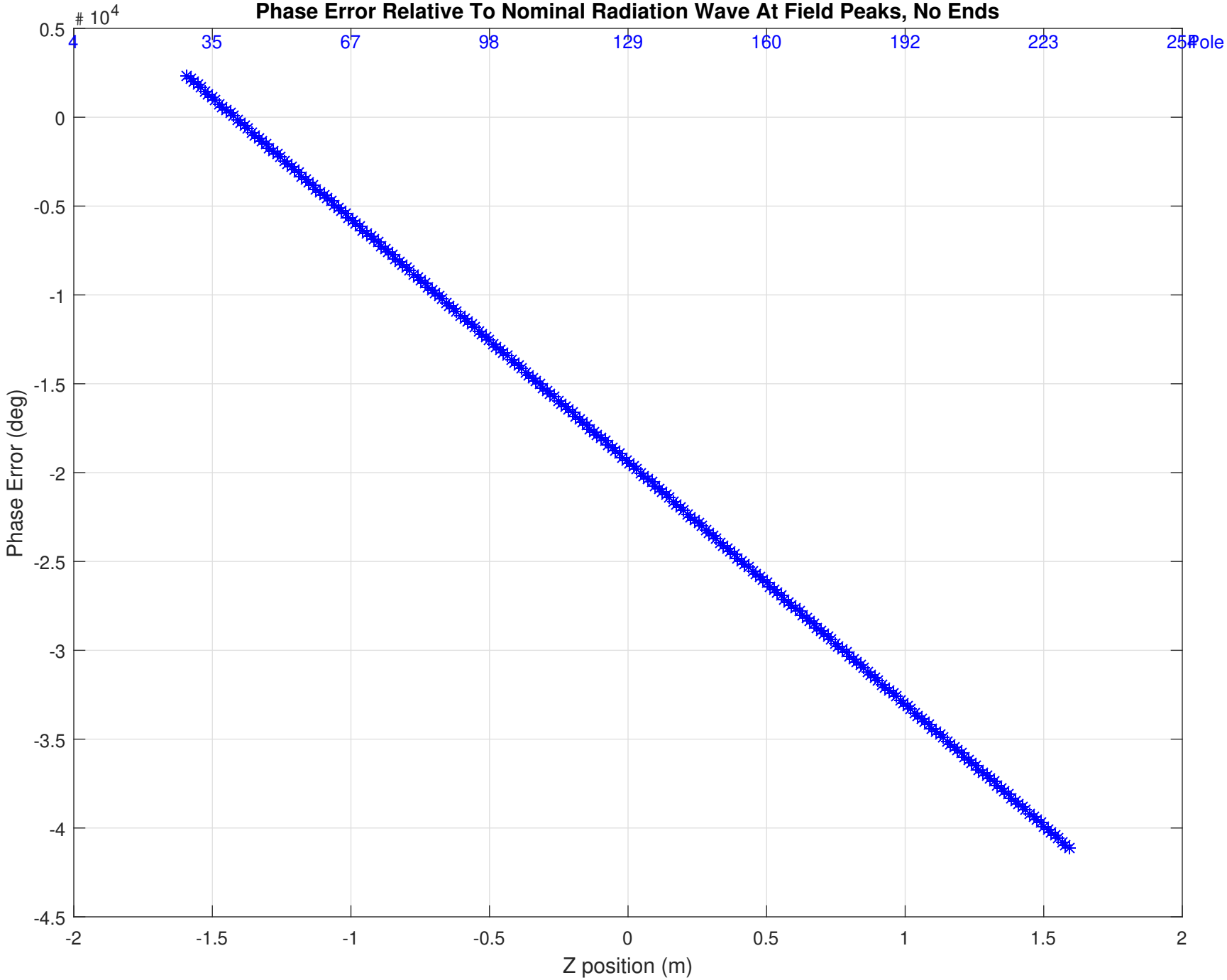

Phase Relative To Cell Entrance
Phase (rad)
Z (m)
1200
1000
800
600
400
200
0
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5



Phase Error: Ave = -0.000000 deg, RMS = 12.162265 deg



Phase Match Error: Ave = 9864.758852 deg, RMS = 12.024124 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
-3.5
-4
-4.5
Phase Error (deg)
4
35
67
98
129
160
192
223
254
Pole
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z position (m)