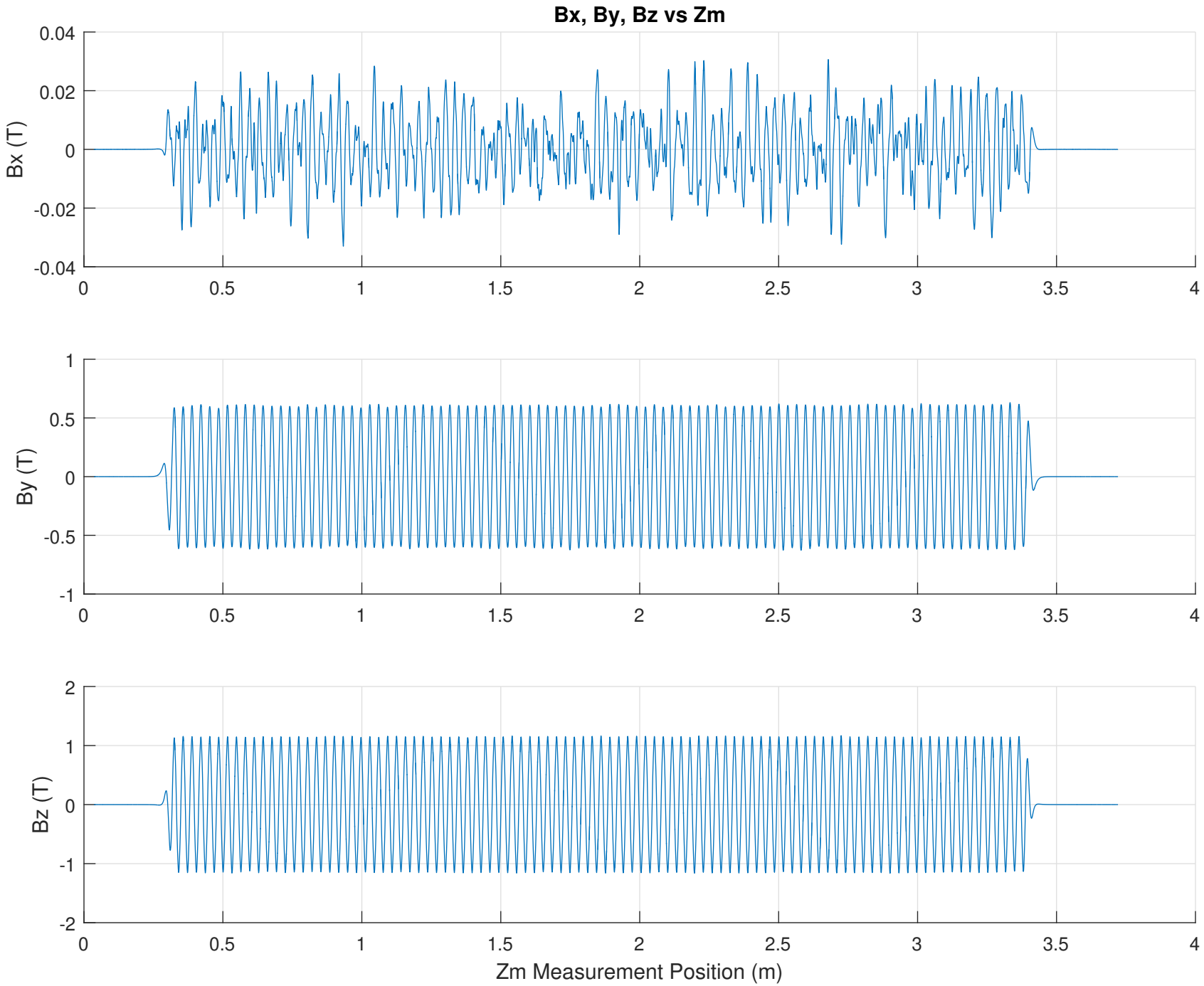
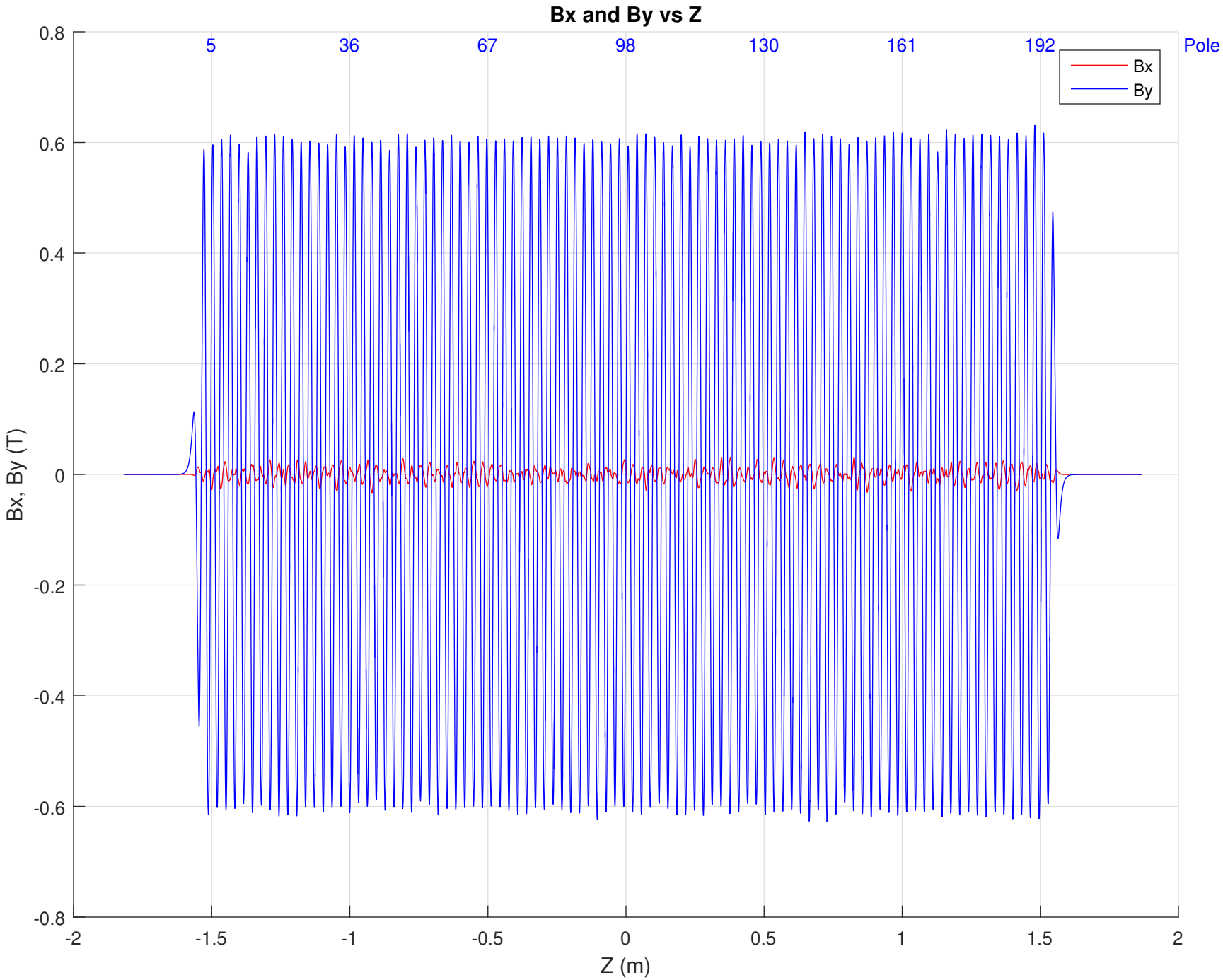
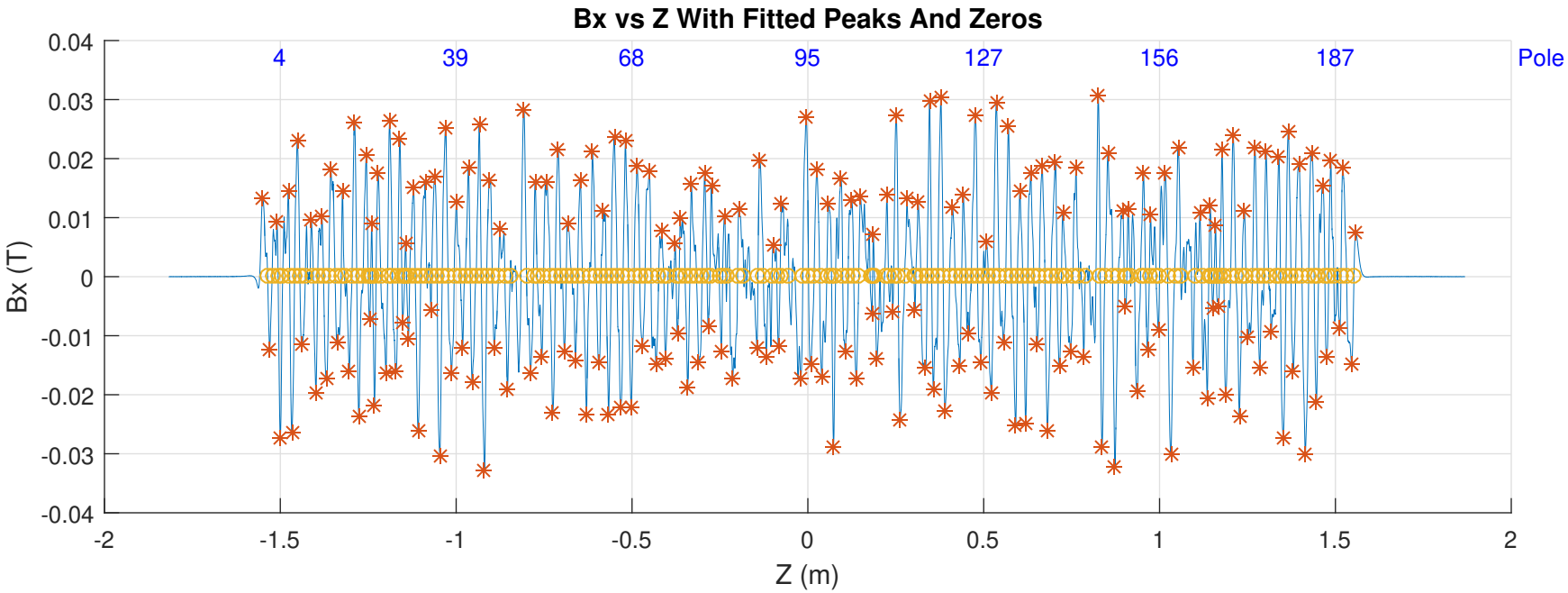
SLAC Magnetic Measurements

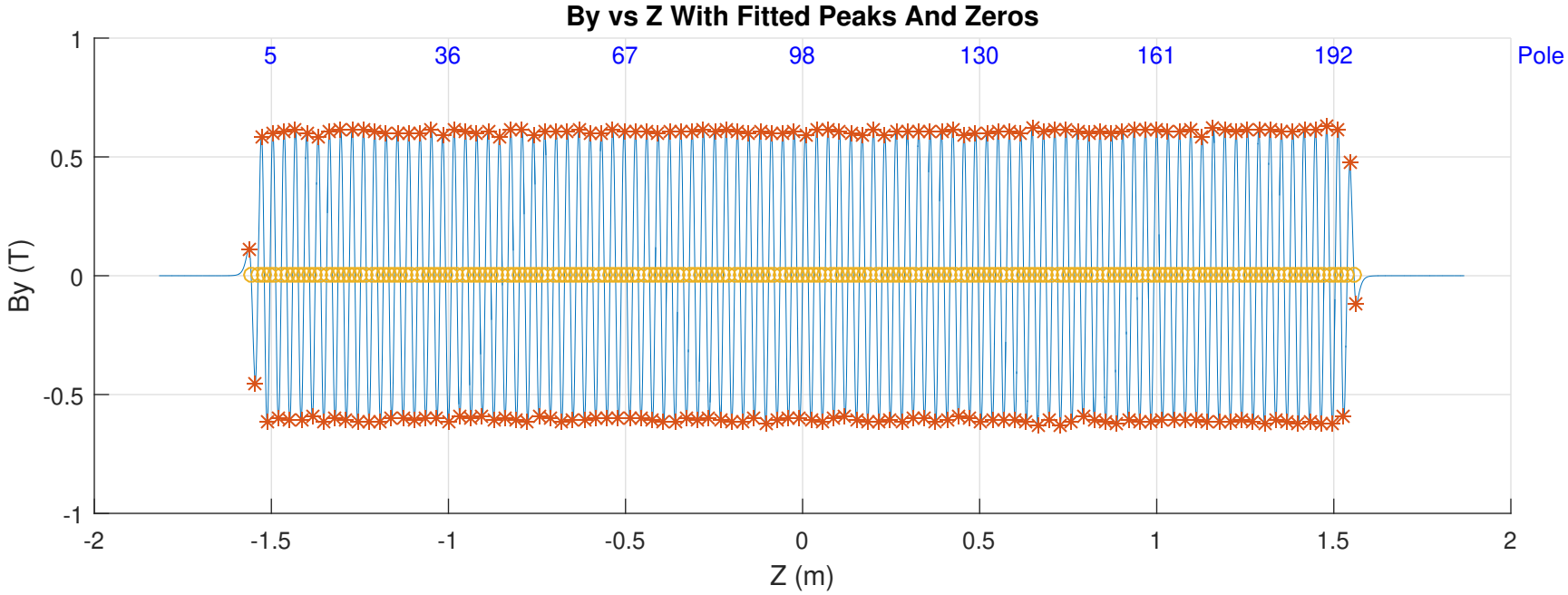
EPU Analysis

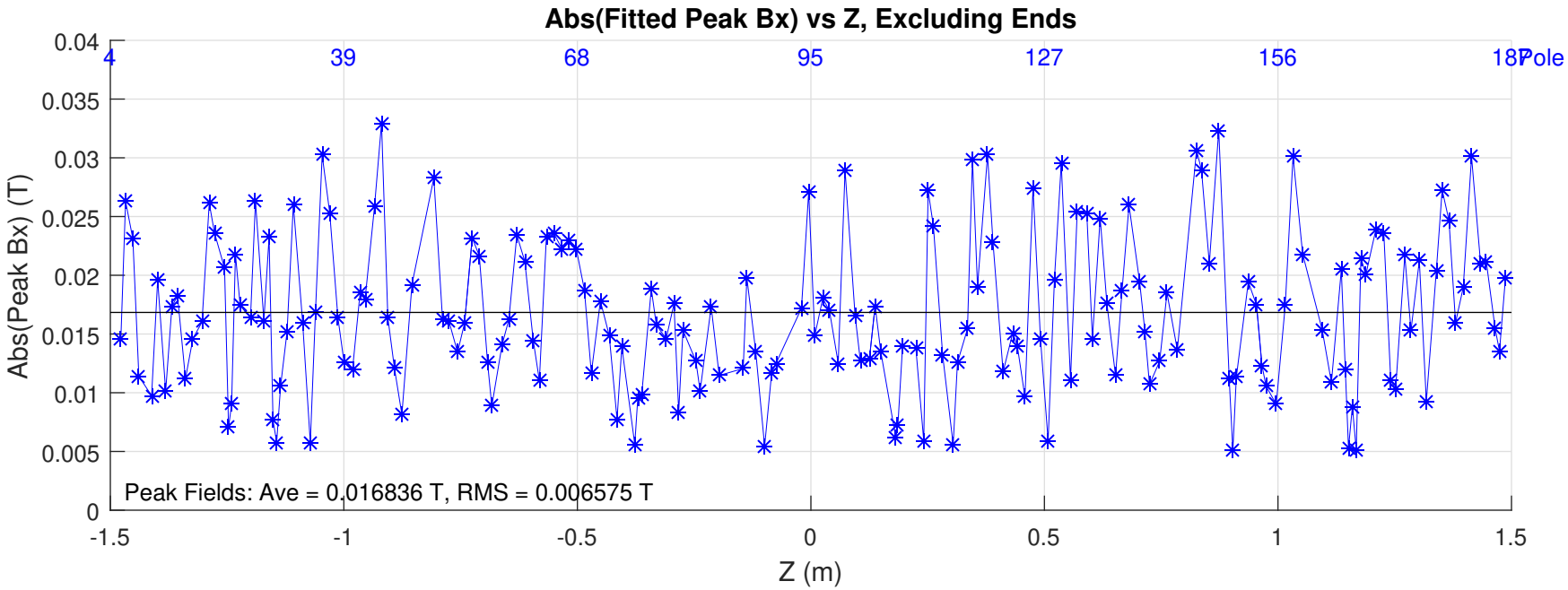
Parameters:
INPUT-FILE-DIR =V:\MET\MagServe\MagData\DELTA\Delta Data 2015\New Measurements\Run 142 Repeat 2014 Meas With New
INPUT-FILE-NAME =hall2-anal-probe1-field.dat
INPUT-FILE-TYPE =ZBXYZH
CORR-REQUIRED =0
GAMMA =26671.59
NOM-LAMBDA-U =0
NOM-K-VALUE =0
NOM-LAMBDA-R =0
NUM-POLES =196
NUM-END-POLES =4
CELL-LENGTH =3.656

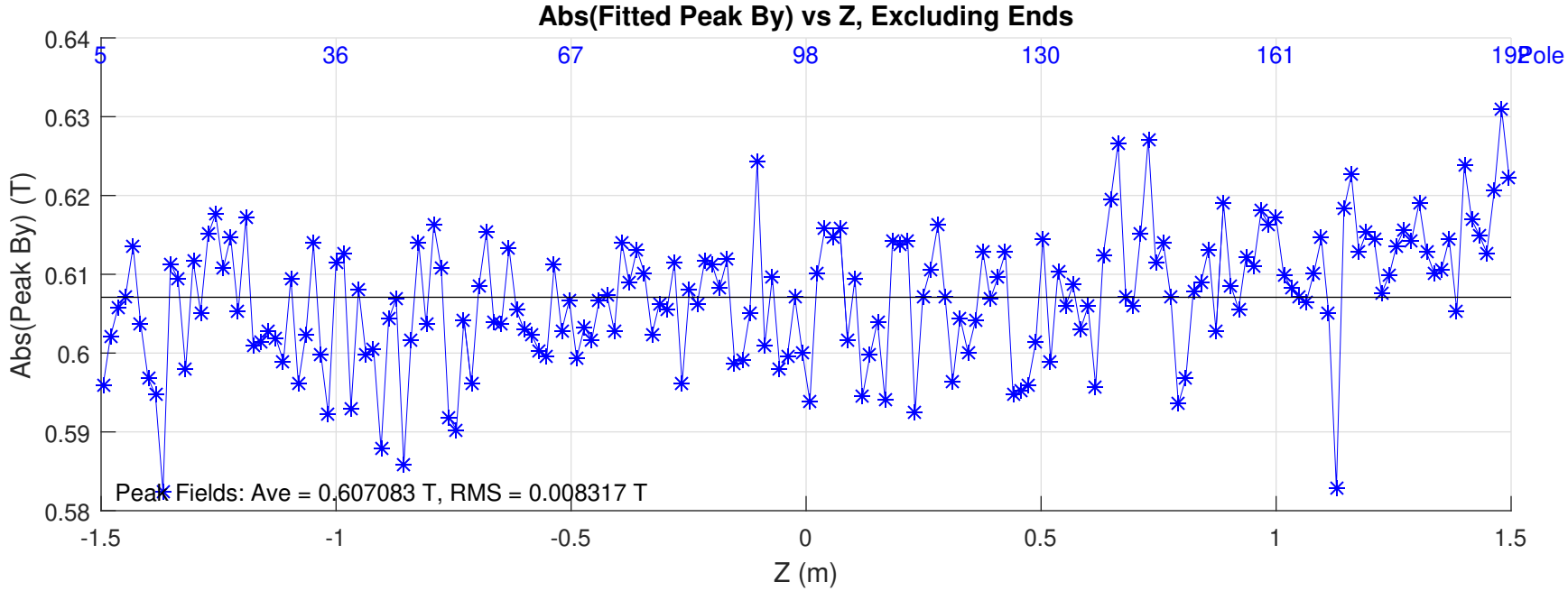

Bx, By, Bz vs Zm
Bx (T)
0.04
0.02
0
-0.02
-0.04
By (T)
1
0.5
0
-0.5
-1
Bz (T)
2
1
0
-1
-2
0
0.5
1
1.5
2
2.5
3
3.5
4
Zm Measurement Position (m)

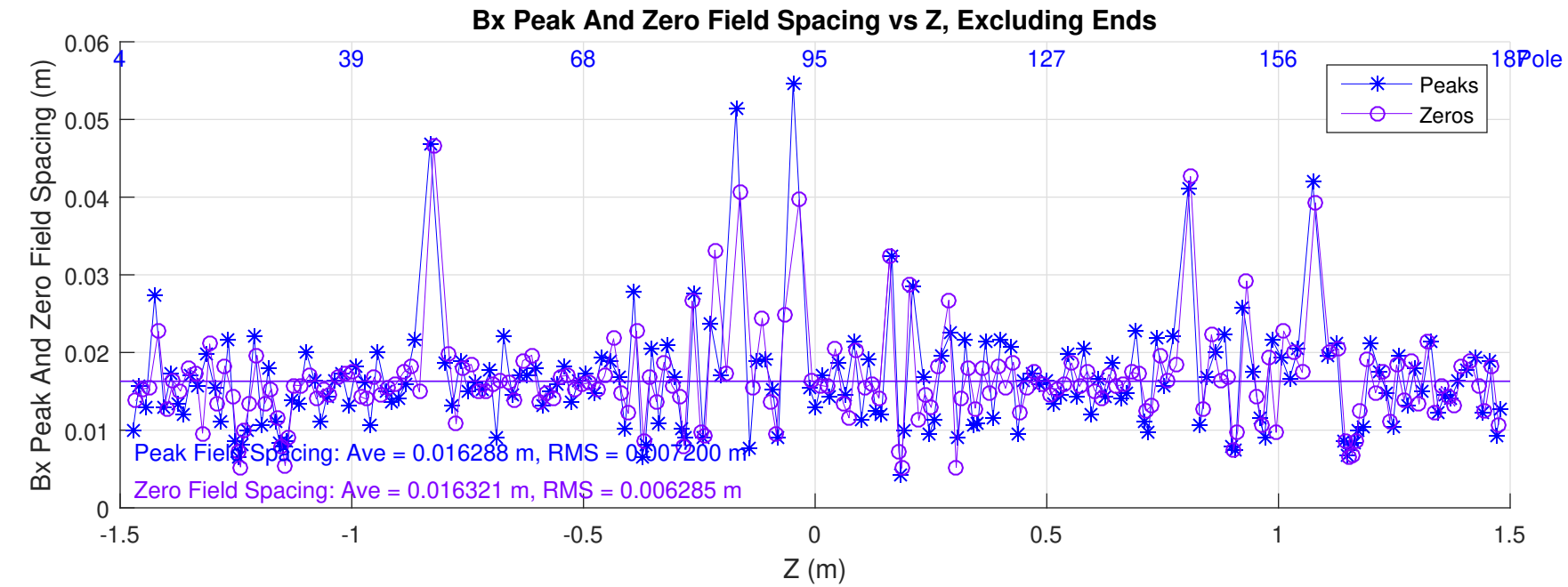

Bx and By vs Z
5
36
67
98
130
161
192
Pole
Bx
By
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
Bx, By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

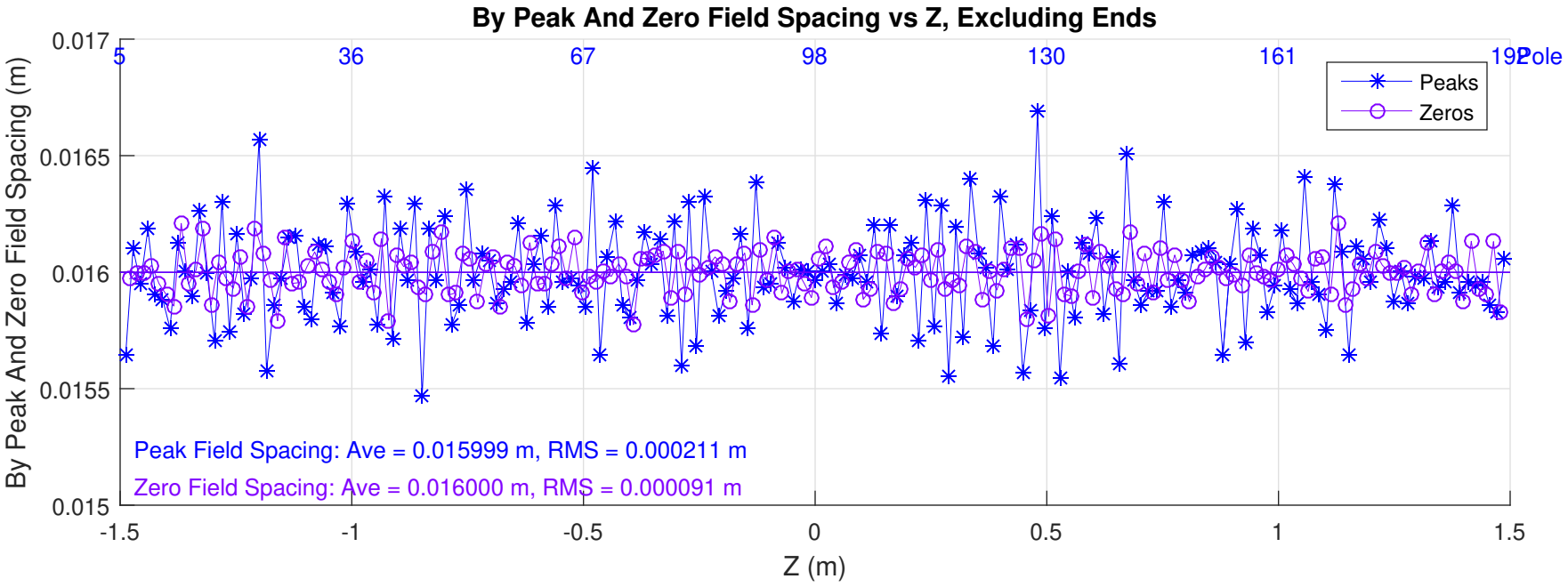

Bx vs Z With Fitted Peaks And Zeros
4
39
68
95
127
156
187
Pole
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-0.03
-0.04
Bx (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

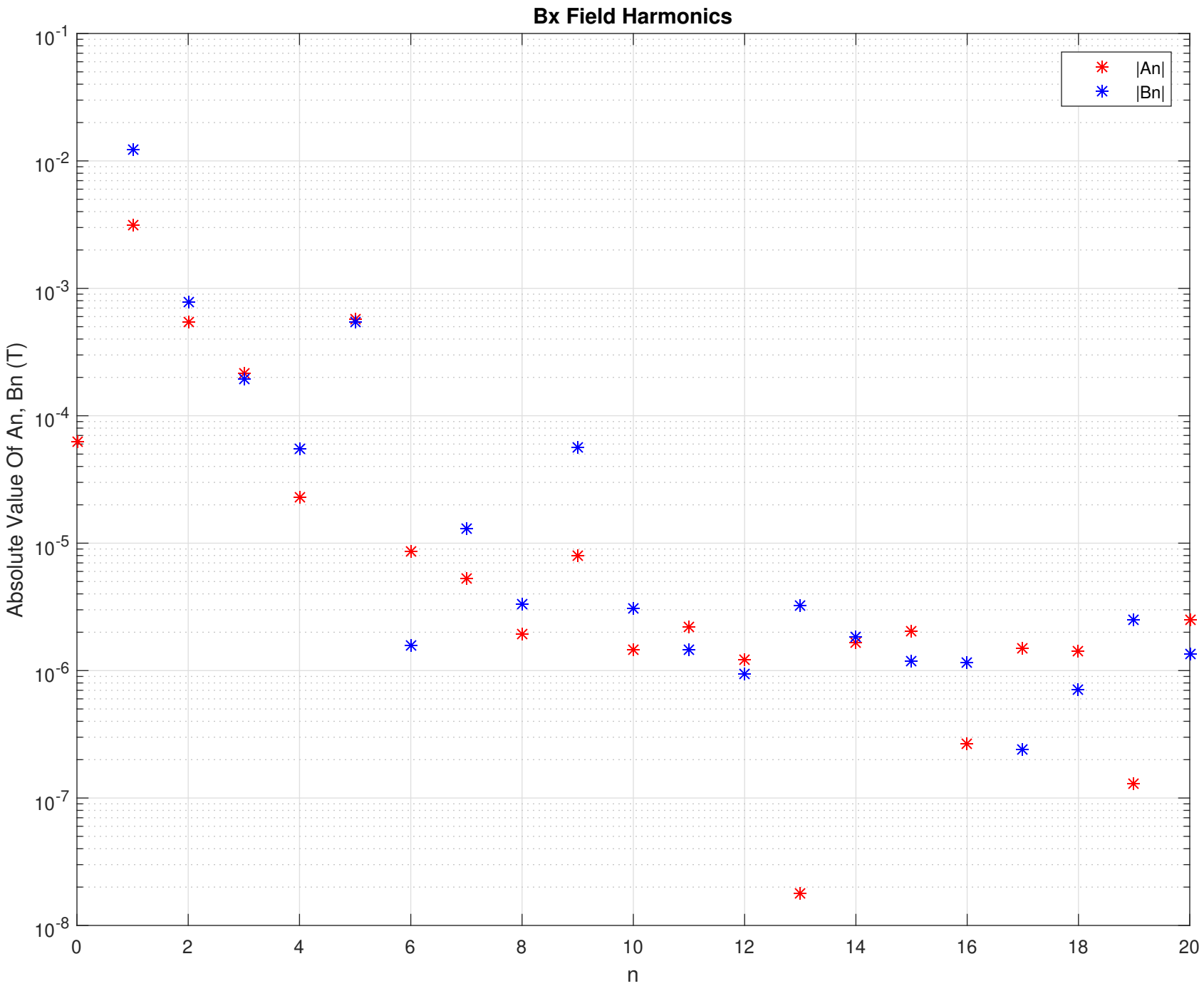

By vs Z With Fitted Peaks And Zeros
5
36
67
98
130
161
192
Pole
1
0.5
0
-0.5
-1
By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

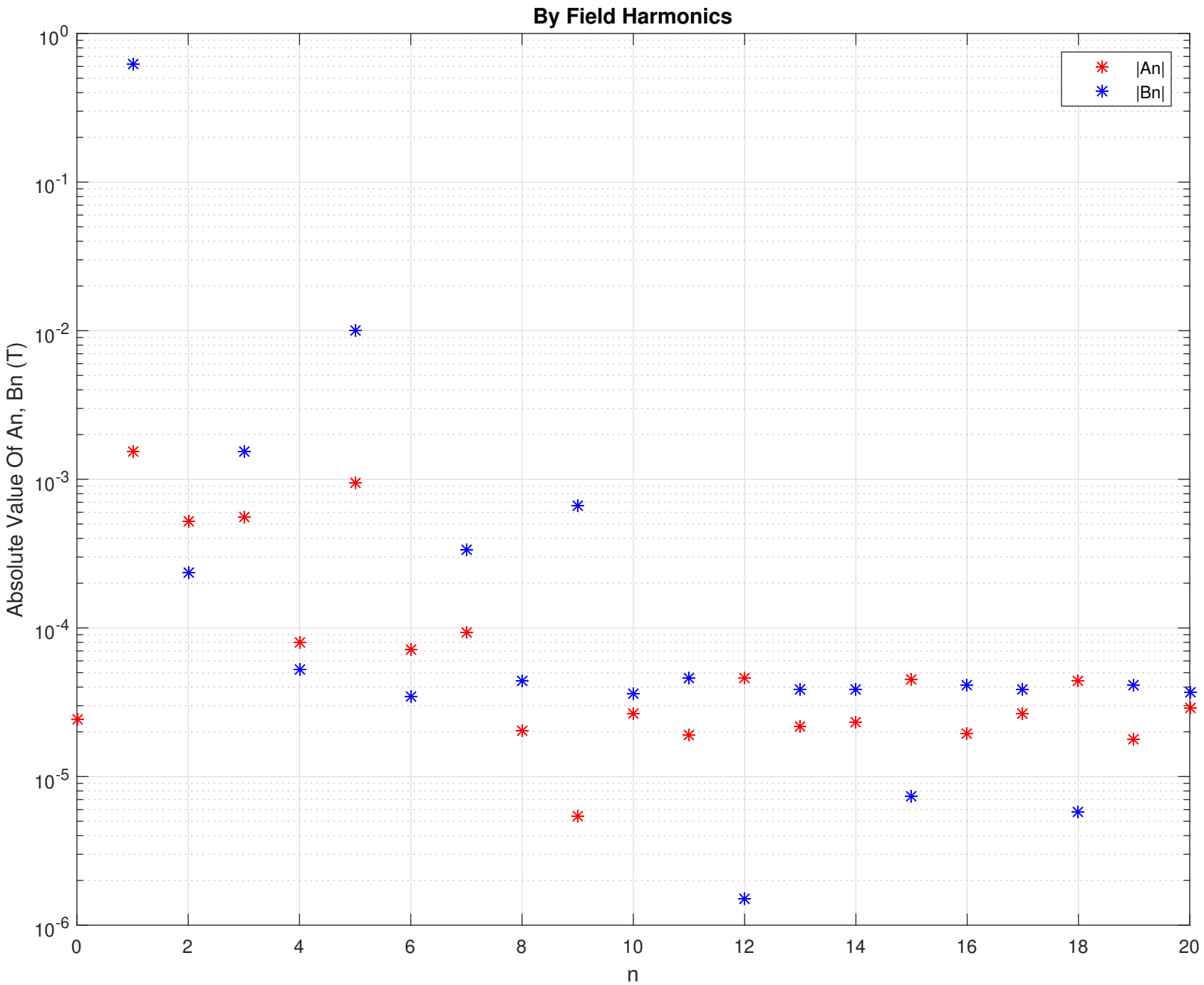

Abs(Fitted Peak Bx) vs Z, Excluding Ends
Abs(Peak Bx) (T)
Z (m)
Pole
4
39
68
95
127
156
187
Peak Fields: Ave = 0.016836 T, RMS = 0.006575 T

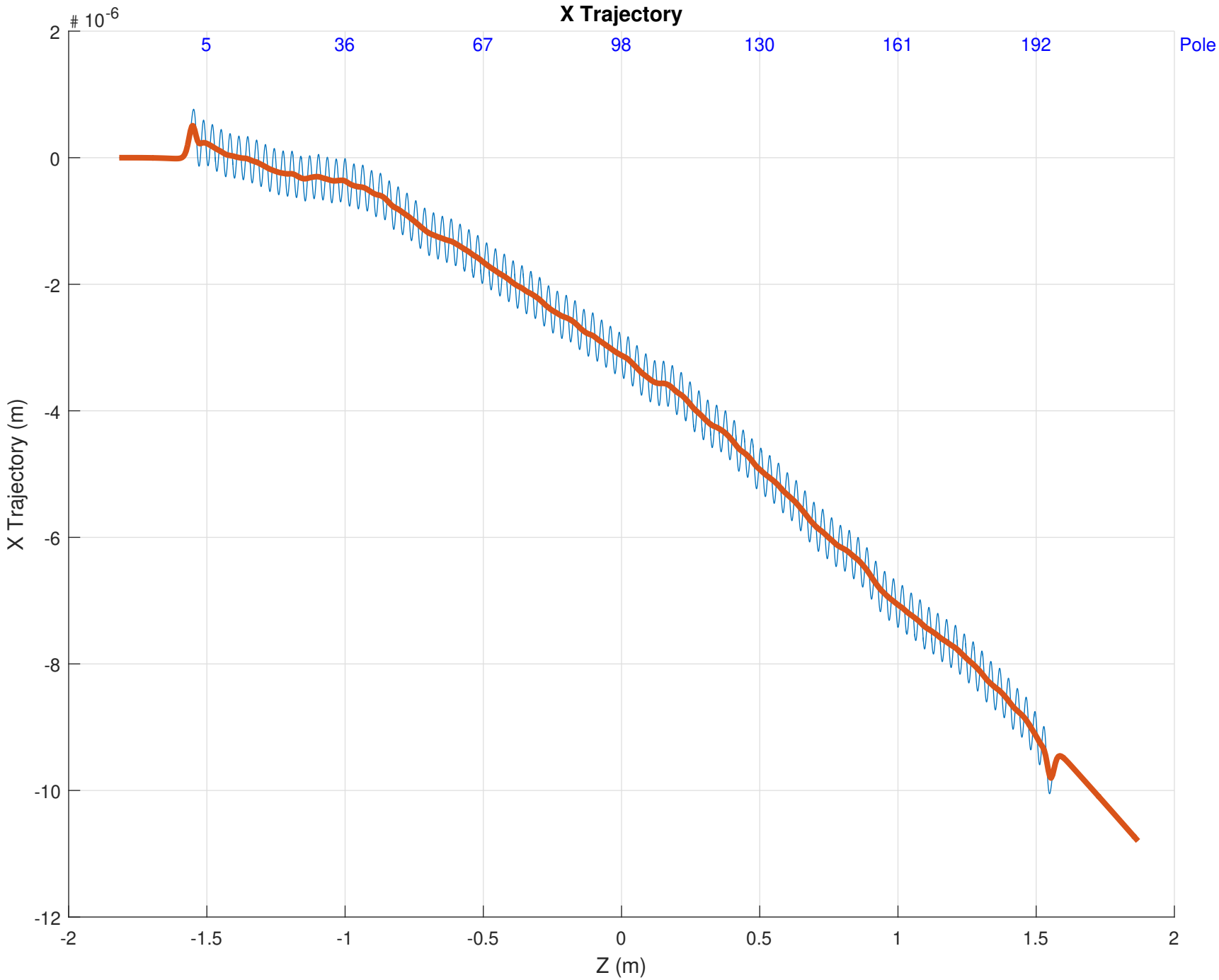

Abs(Fitted Peak By) vs Z, Excluding Ends
Abs(Peak By) (T)
Z (m)
Pole
5
36
67
98
130
161
192
Peak Fields: Ave = 0.607083 T, RMS = 0.008317 T

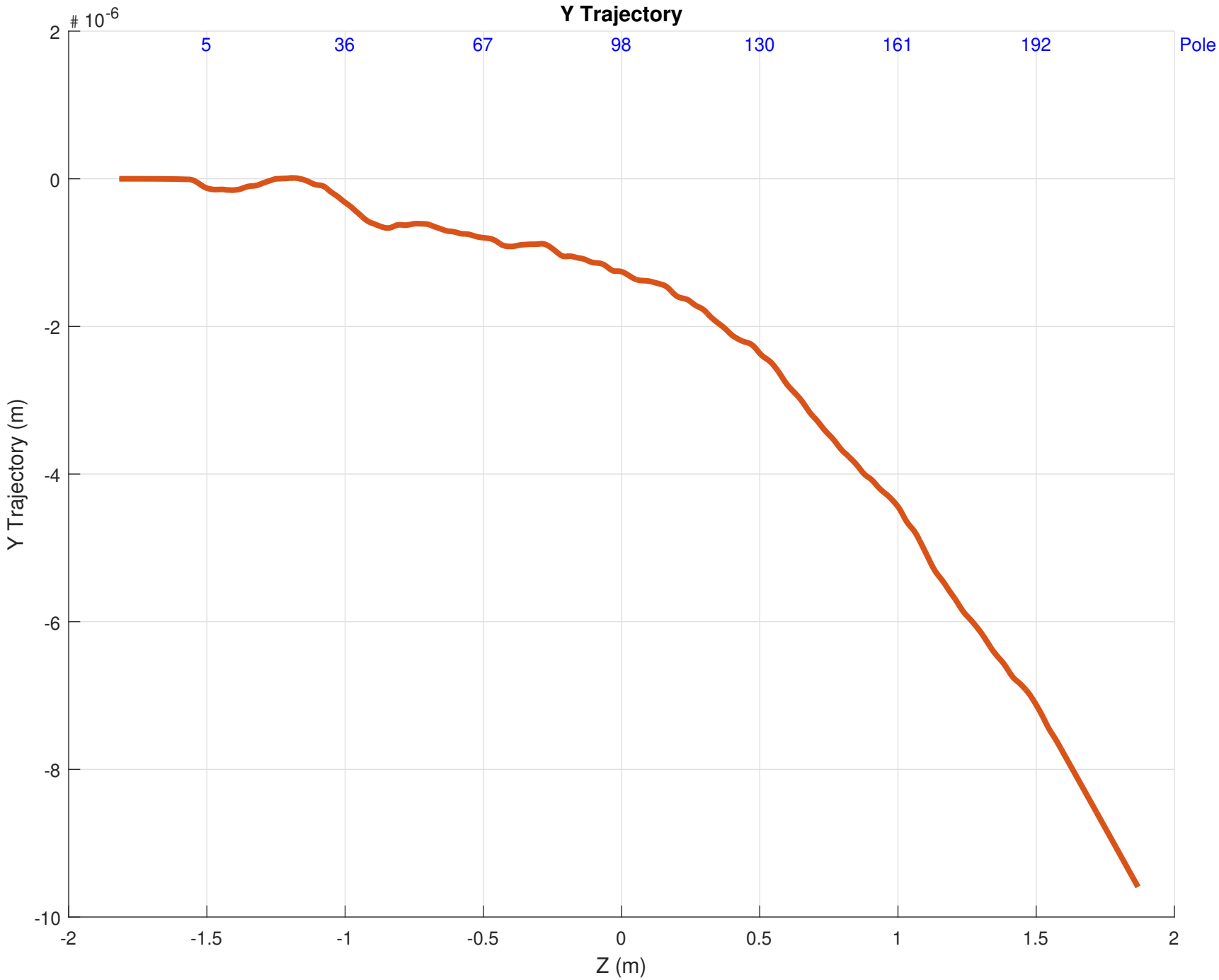

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
Z (m)
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016288 m, RMS = 0.007200 m
Zero Field Spacing: Ave = 0.016321 m, RMS = 0.006285 m

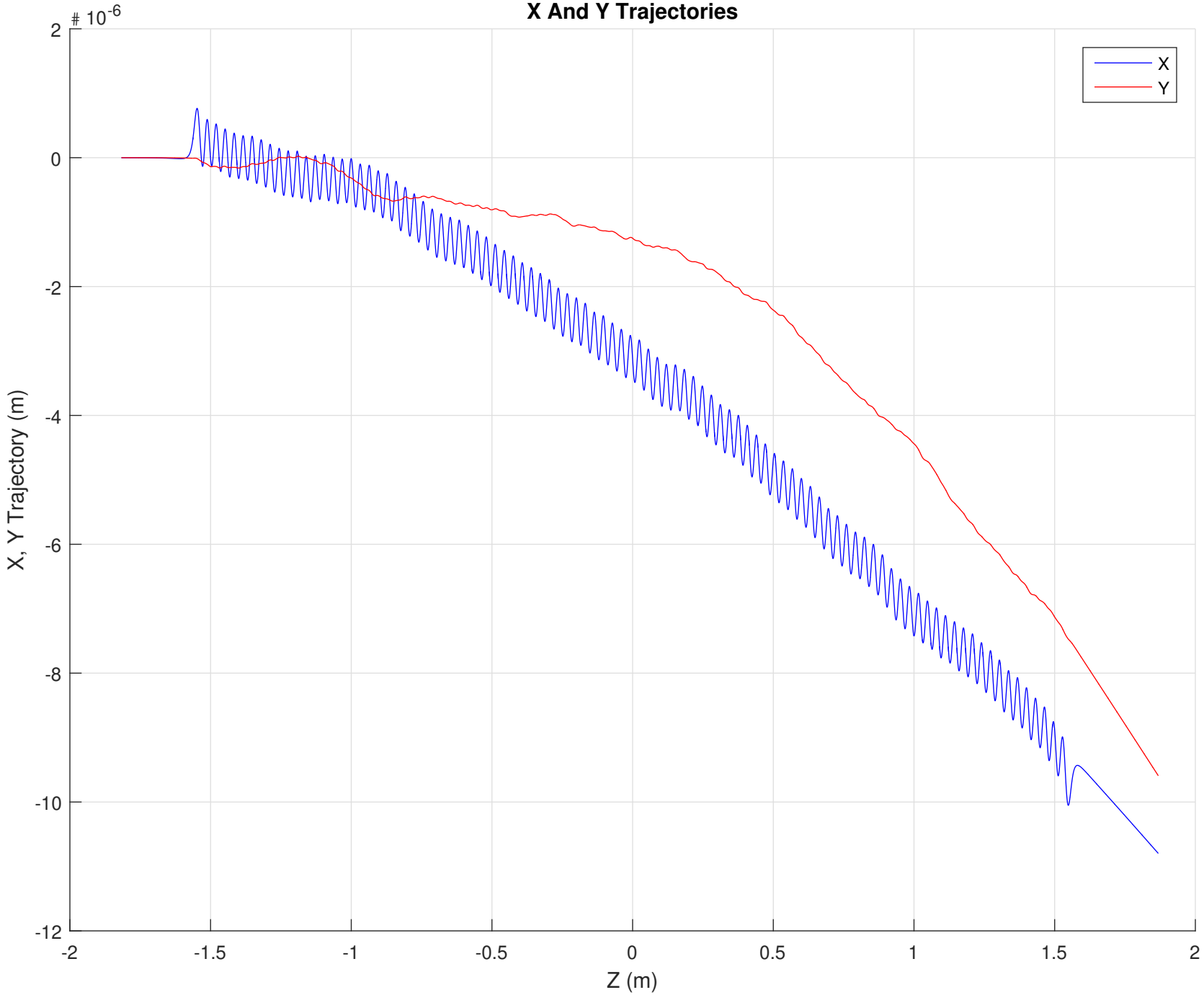

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
Z (m)
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.015999 m, RMS = 0.000211 m
Zero Field Spacing: Ave = 0.016000 m, RMS = 0.000091 m

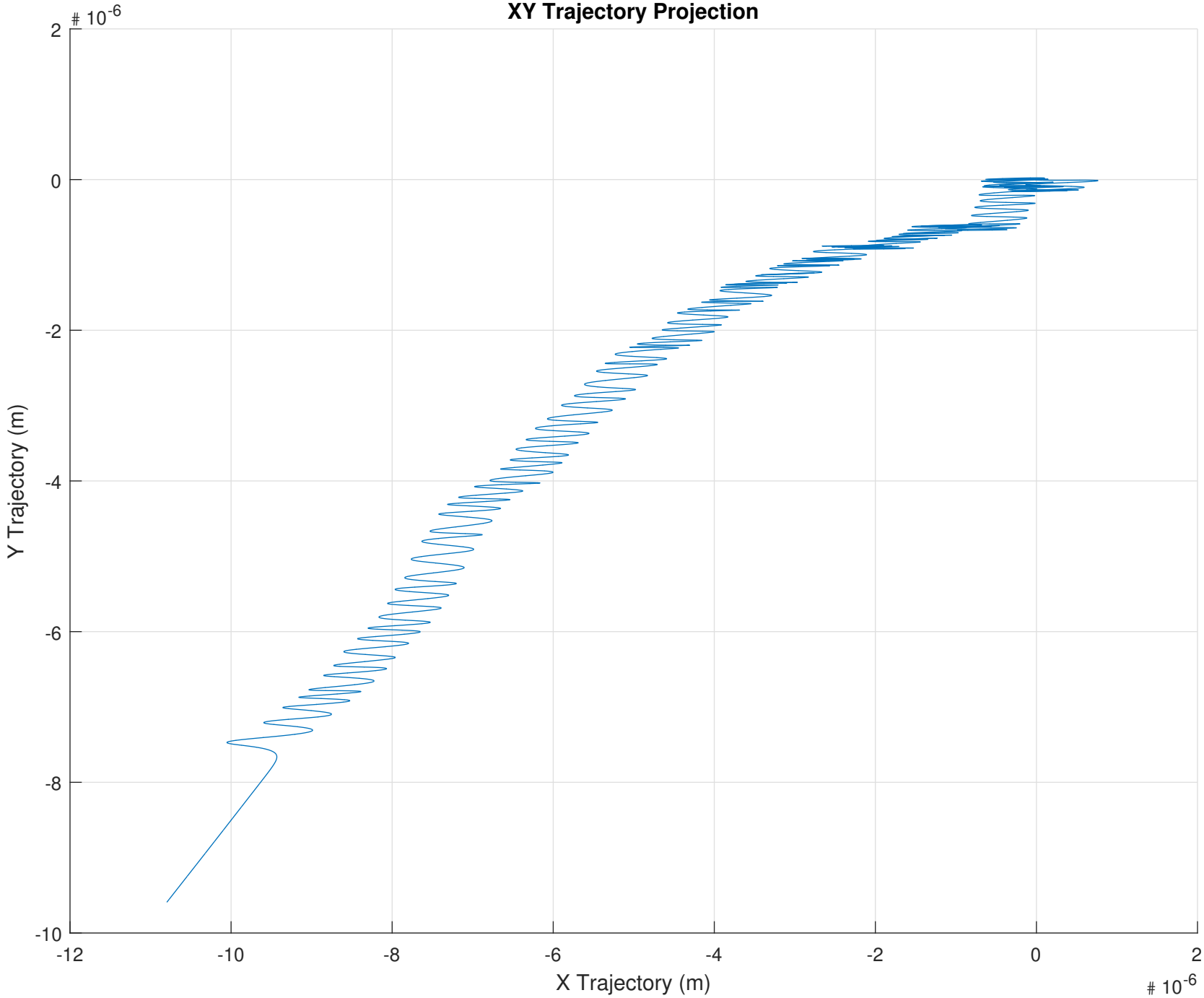

Bx Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
10^-7
10^-8
0
2
4
6
8
10
12
14
16
18
20

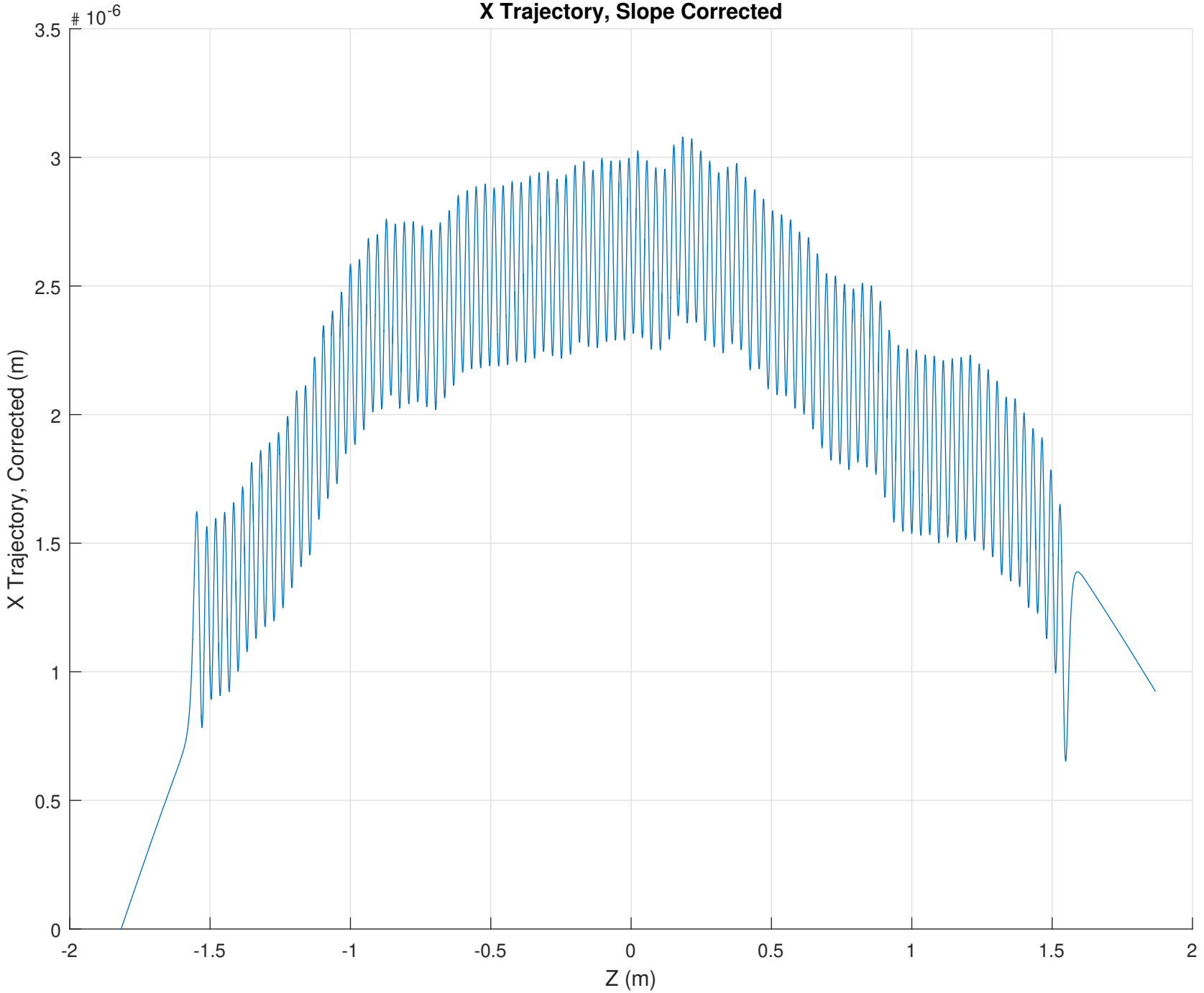

By Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
0
2
4
6
8
10
12
14
16
18
20

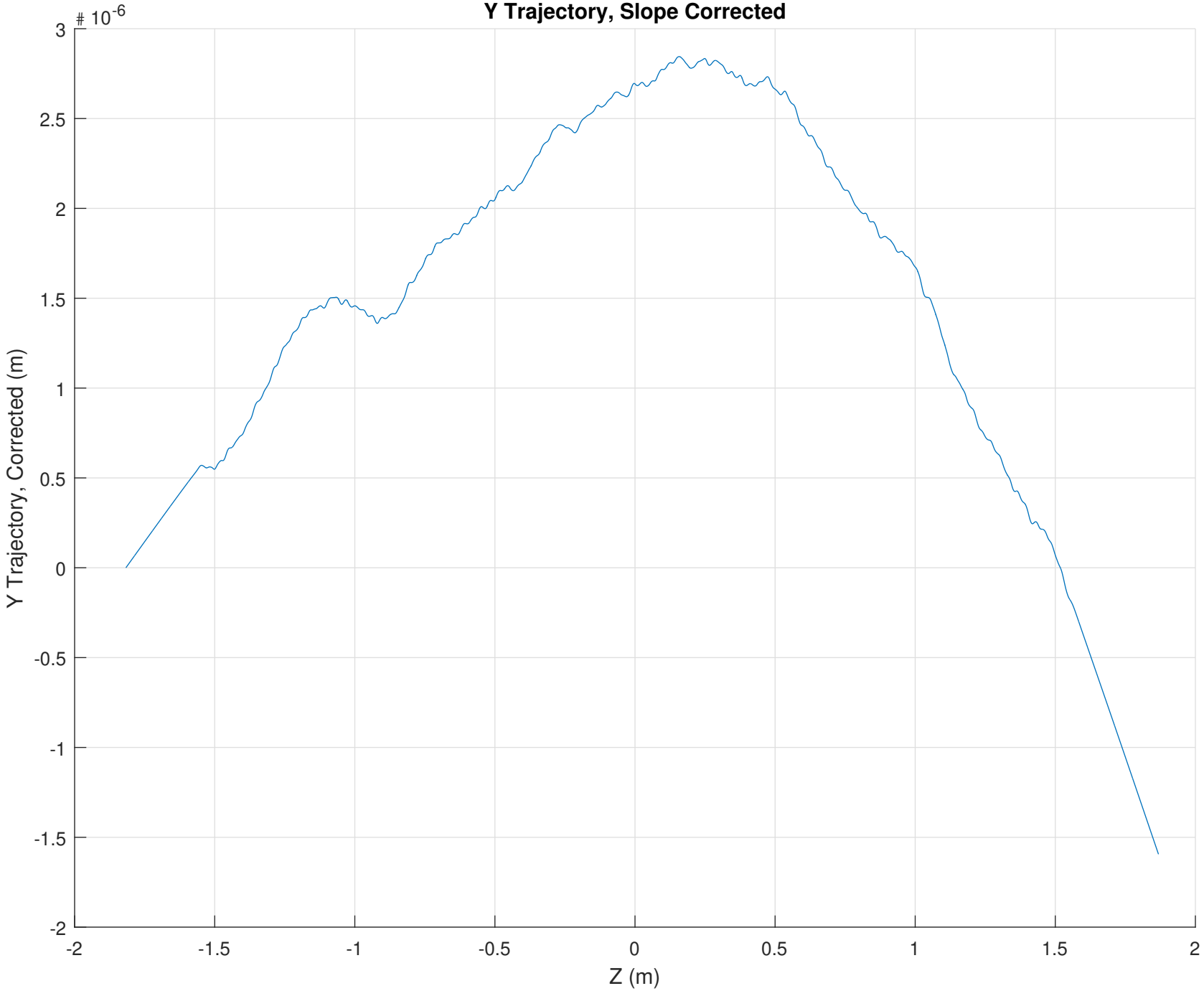

X Trajectory
10^-6
5
36
67
98
130
161
192
Pole
2
0
-2
-4
-6
-8
-10
-12
X Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

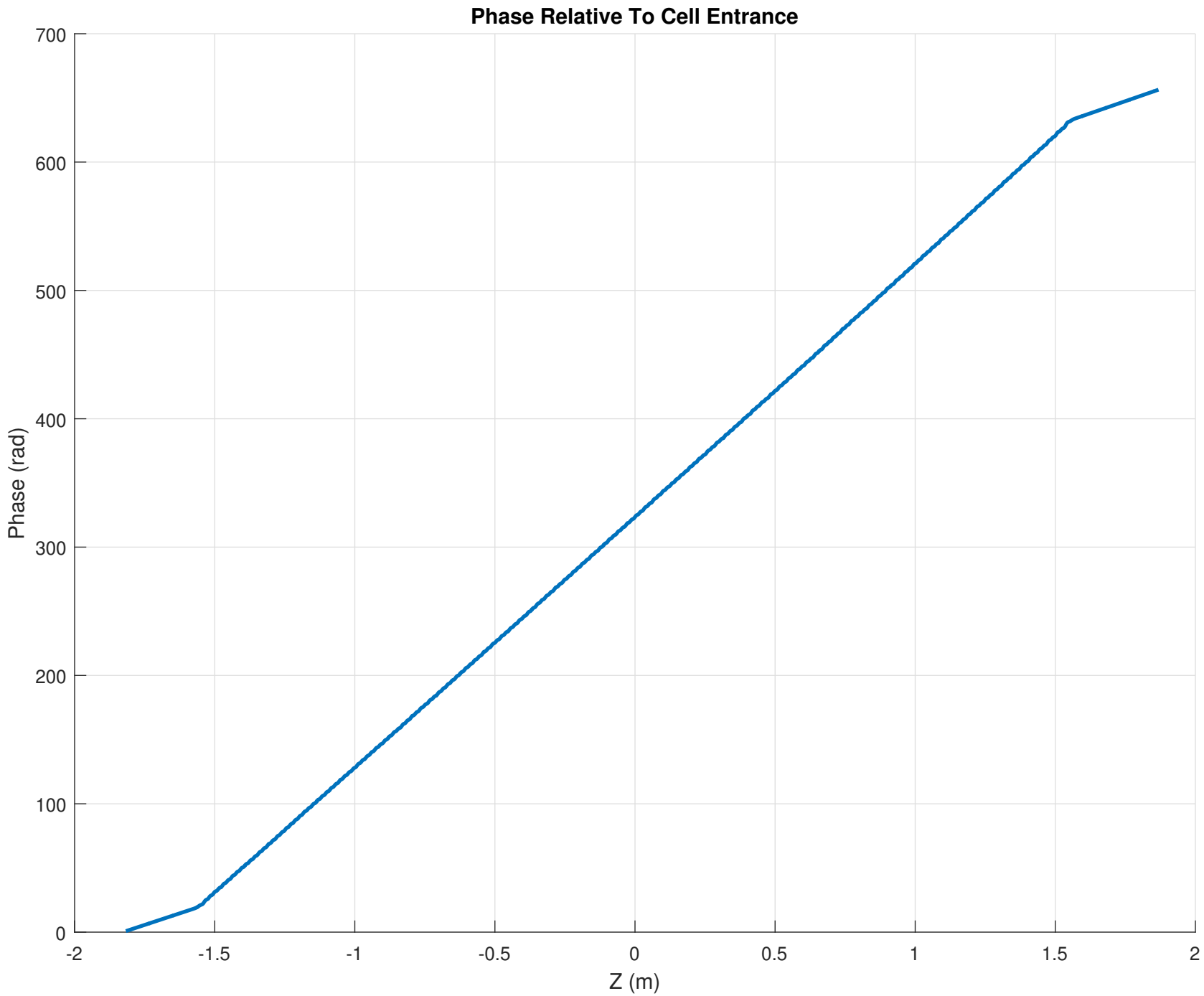

Y Trajectory
10-6
5
36
67
98
130
161
192
Pole
2
0
-2
-4
-6
-8
-10
Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

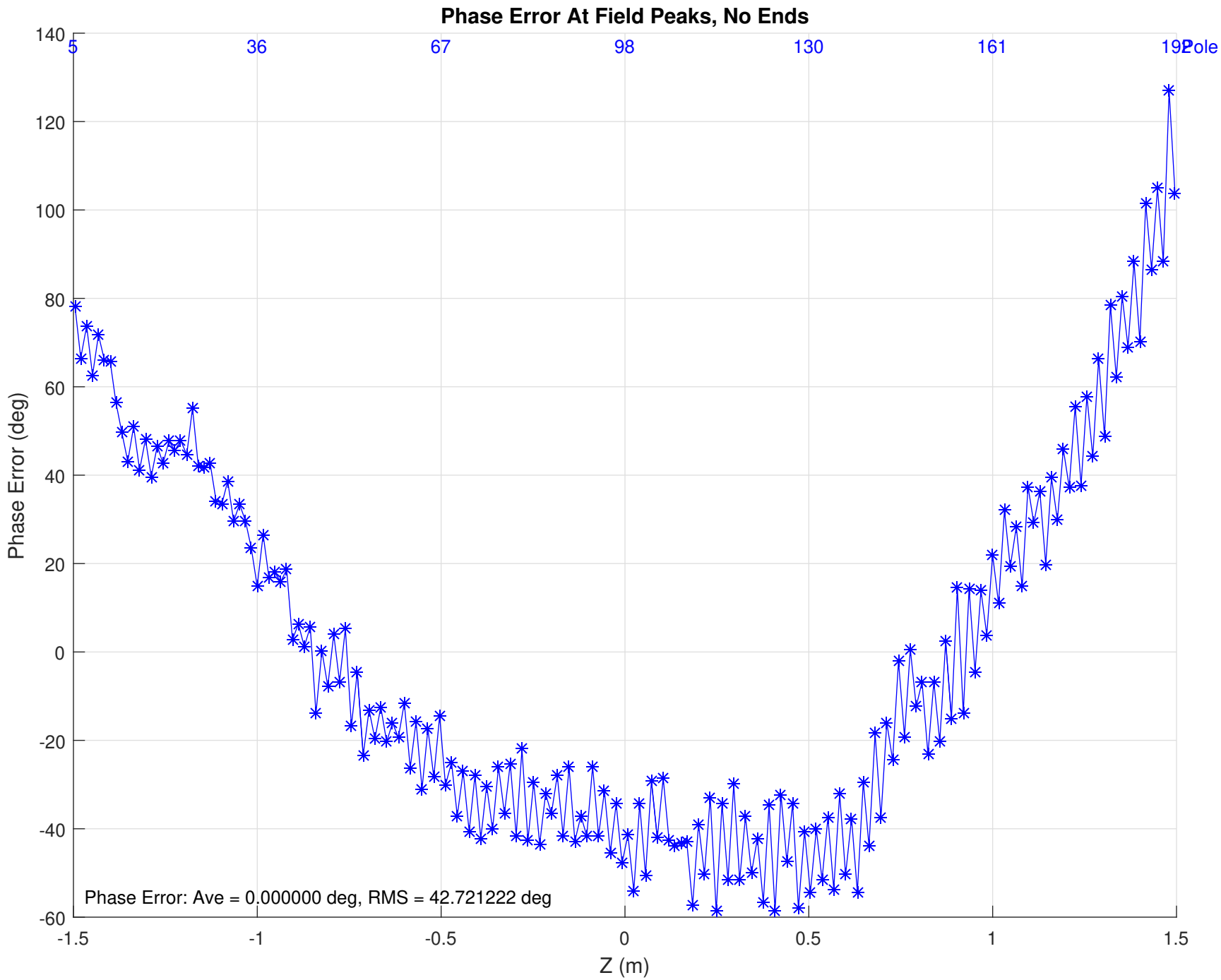

X And Y Trajectories
10^-6
2
0
-2
-4
-6
-8
-10
-12
X, Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
X
Y

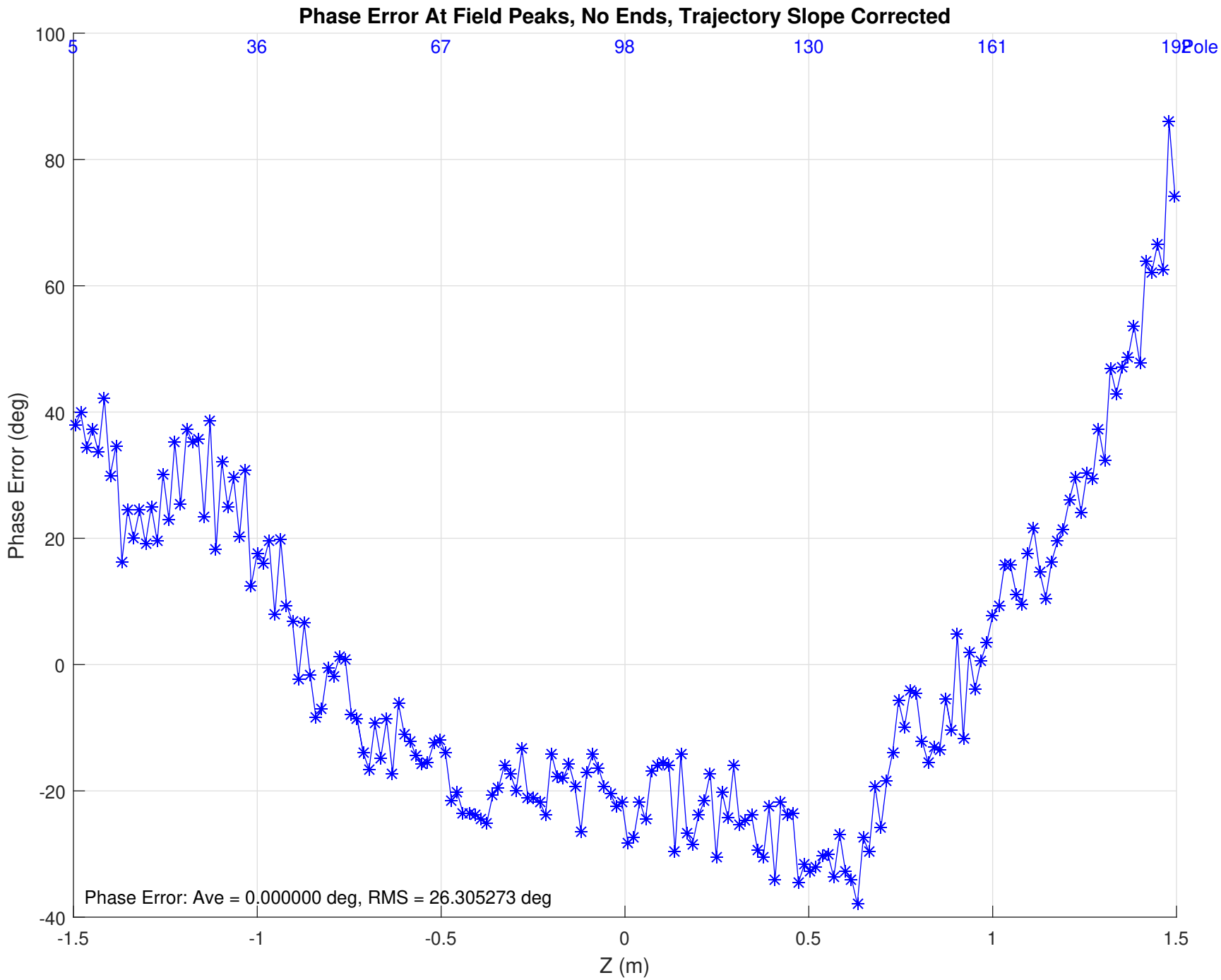

XY Trajectory Projection
10^-6
2
0
-2
-4
-6
-8
-10
Y Trajectory (m)
-12
-10
-8
-6
-4
-2
0
2
X Trajectory (m)
10^-6

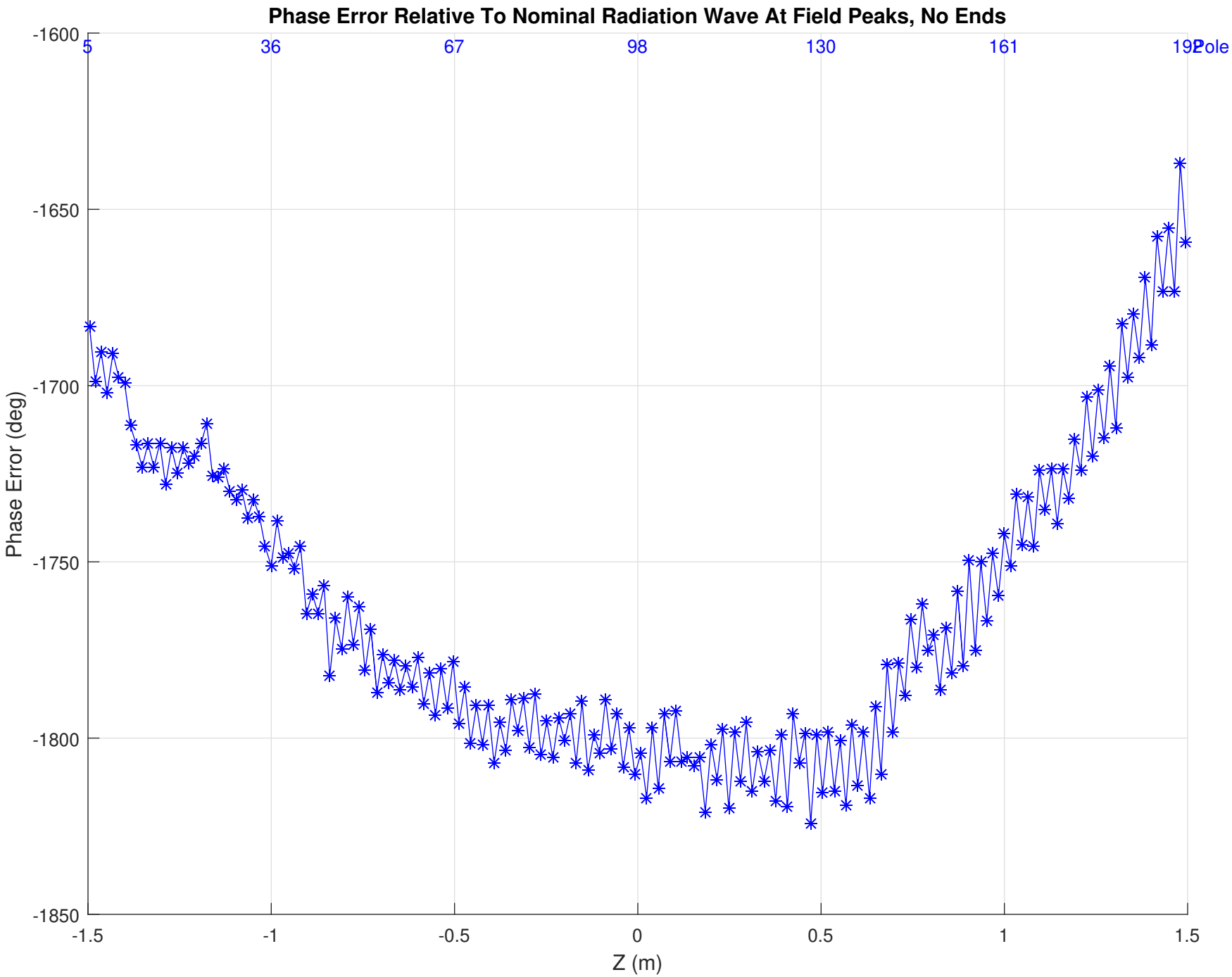

X Trajectory, Slope Corrected
10^-6
3.5
3
2.5
2
1.5
1
0.5
0
X Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

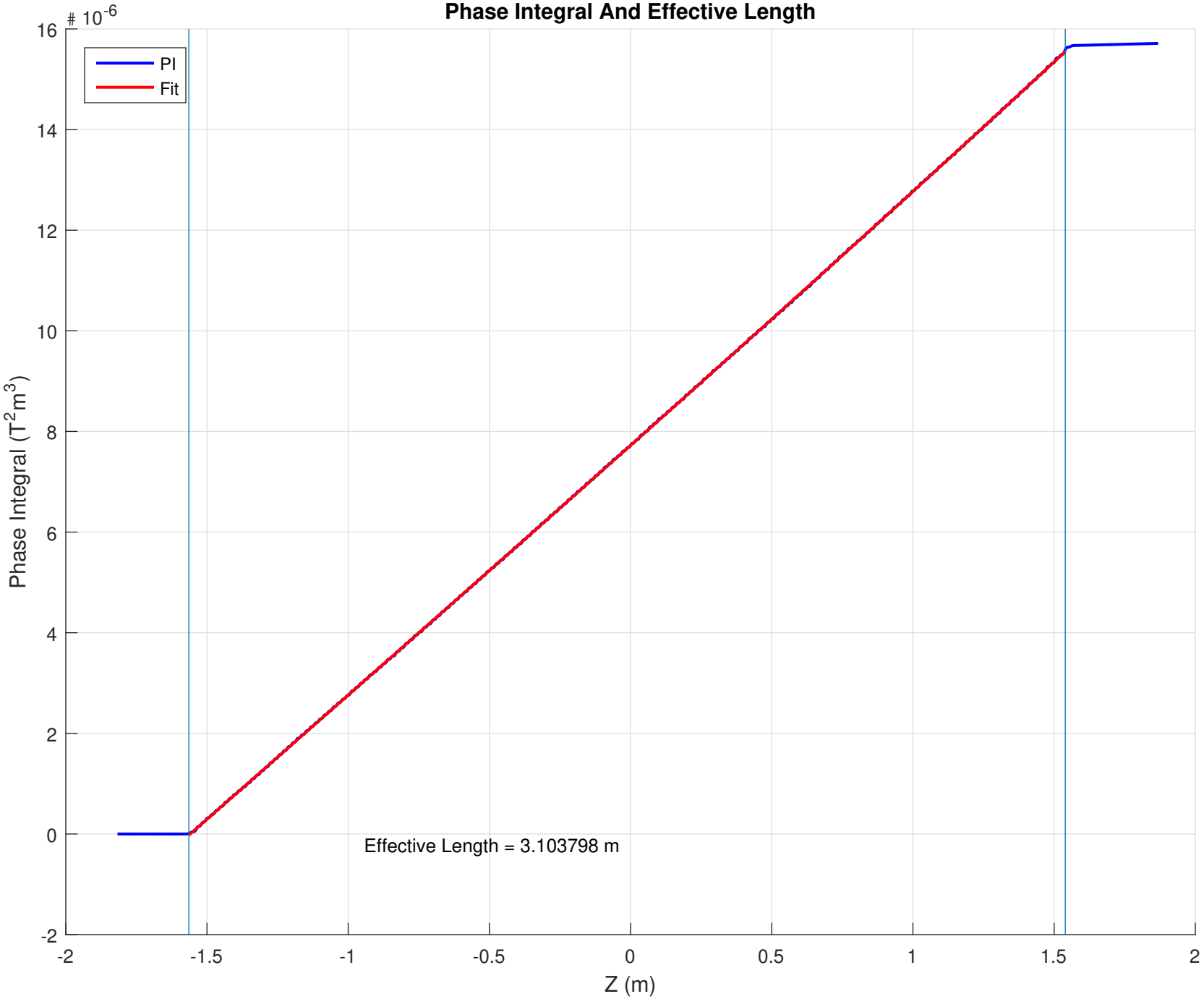

Y Trajectory, Slope Corrected
10^-6
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
Y Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

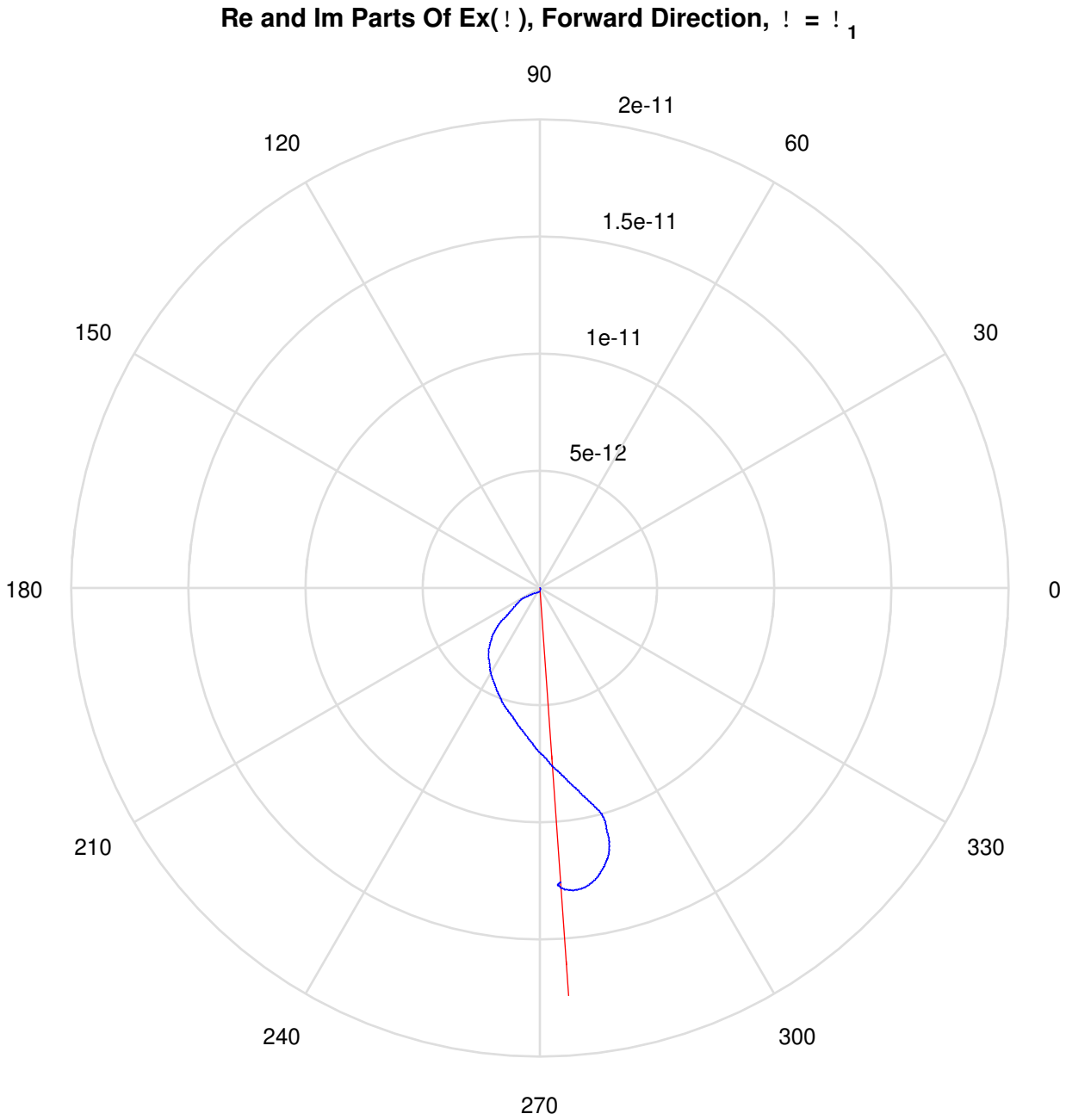

Phase Relative To Cell Entrance
700
600
500
400
300
200
100
0
Phase (rad)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

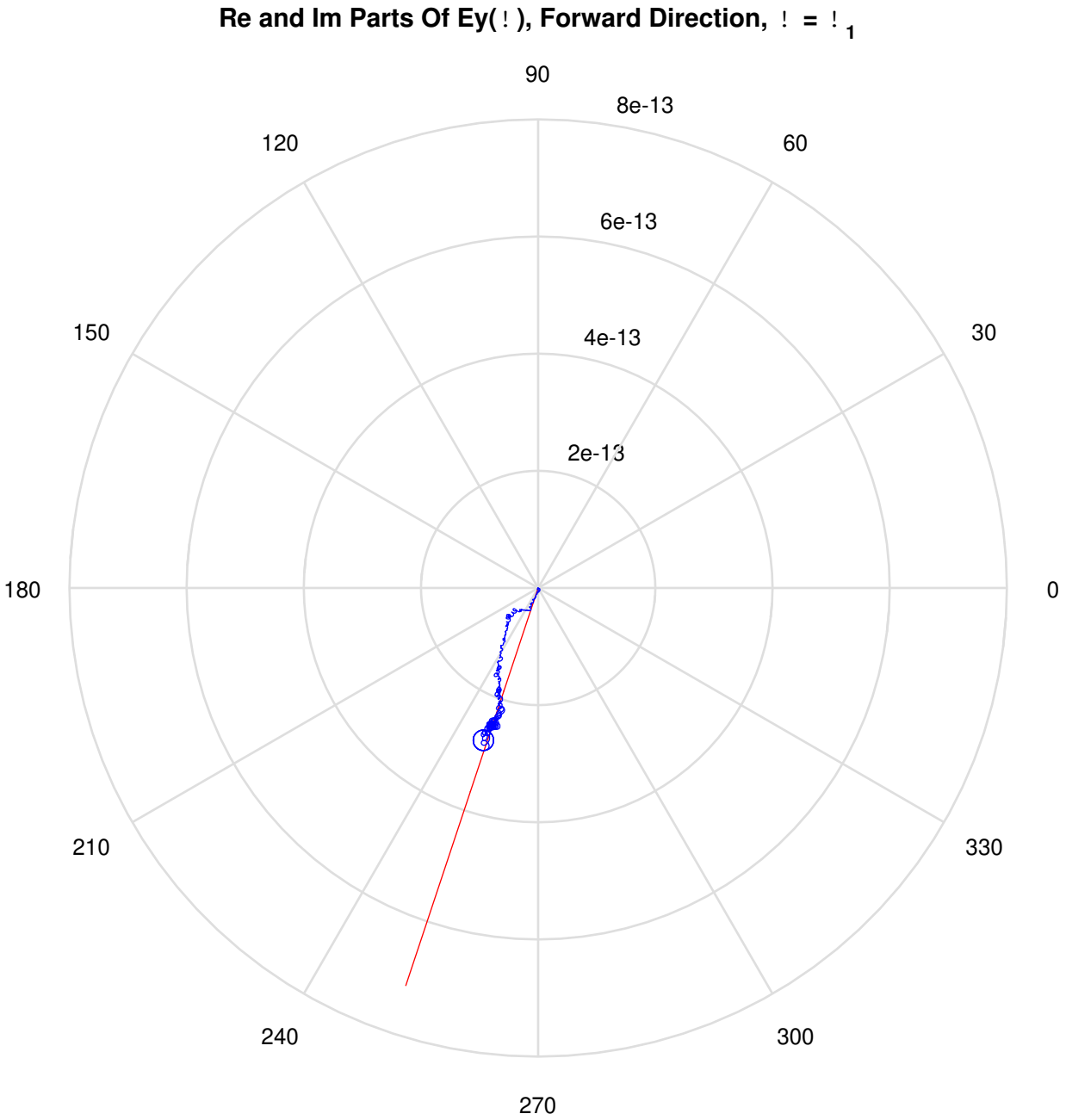

Phase Error At Field Peaks, No Ends
5
36
67
98
130
161
192
Pole
140
120
100
80
60
40
20
0
-20
-40
-60
Phase Error (deg)
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)
Phase Error: Ave = 0.000000 deg, RMS = 42.721222 deg

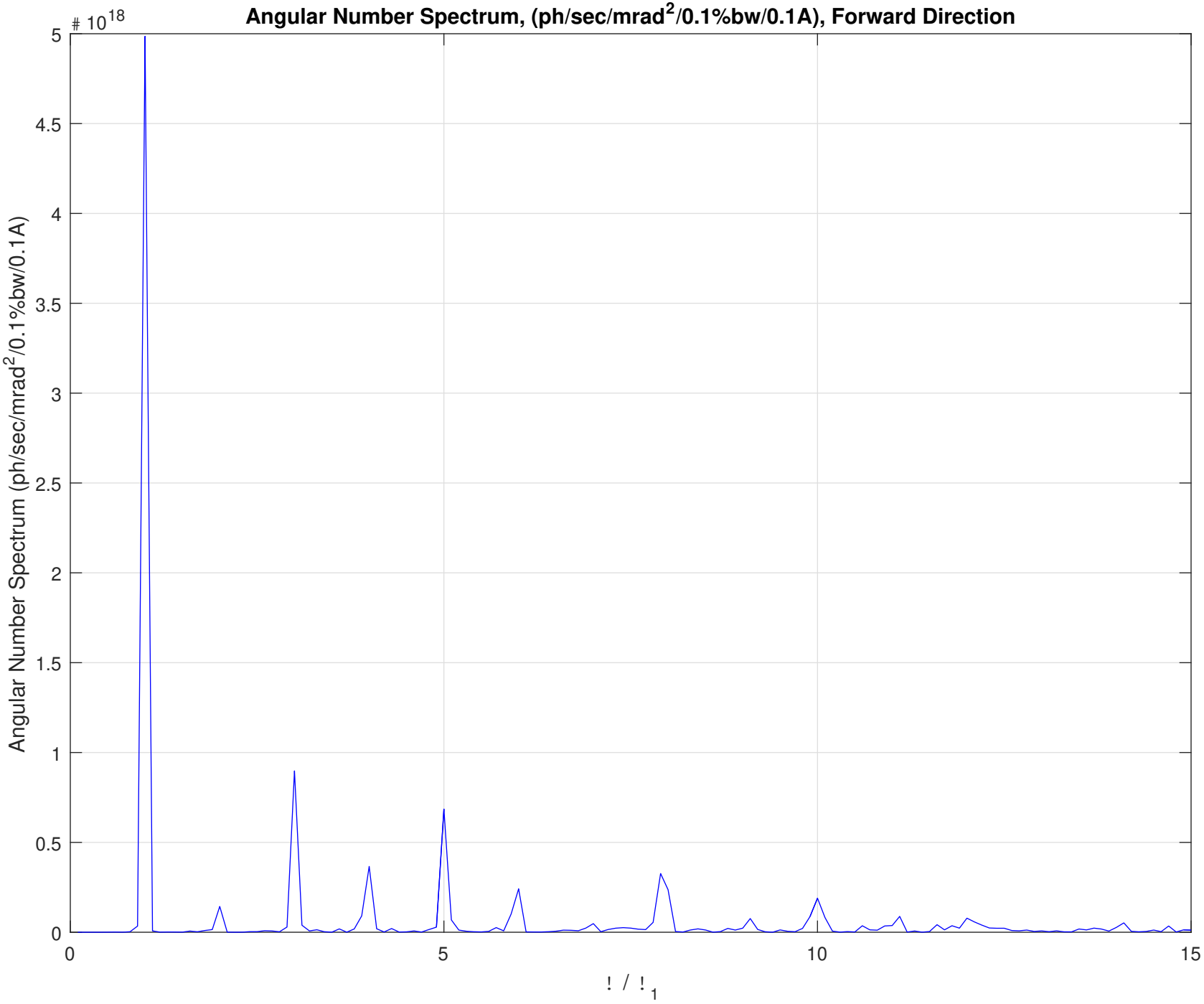

Phase Error At Field Peaks, No Ends, Trajectory Slope Corrected
5
36
67
98
130
161
192
Pole
100
80
60
40
20
0
-20
-40
Phase Error (deg)
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)
Phase Error: Ave = 0.000000 deg, RMS = 26.305273 deg

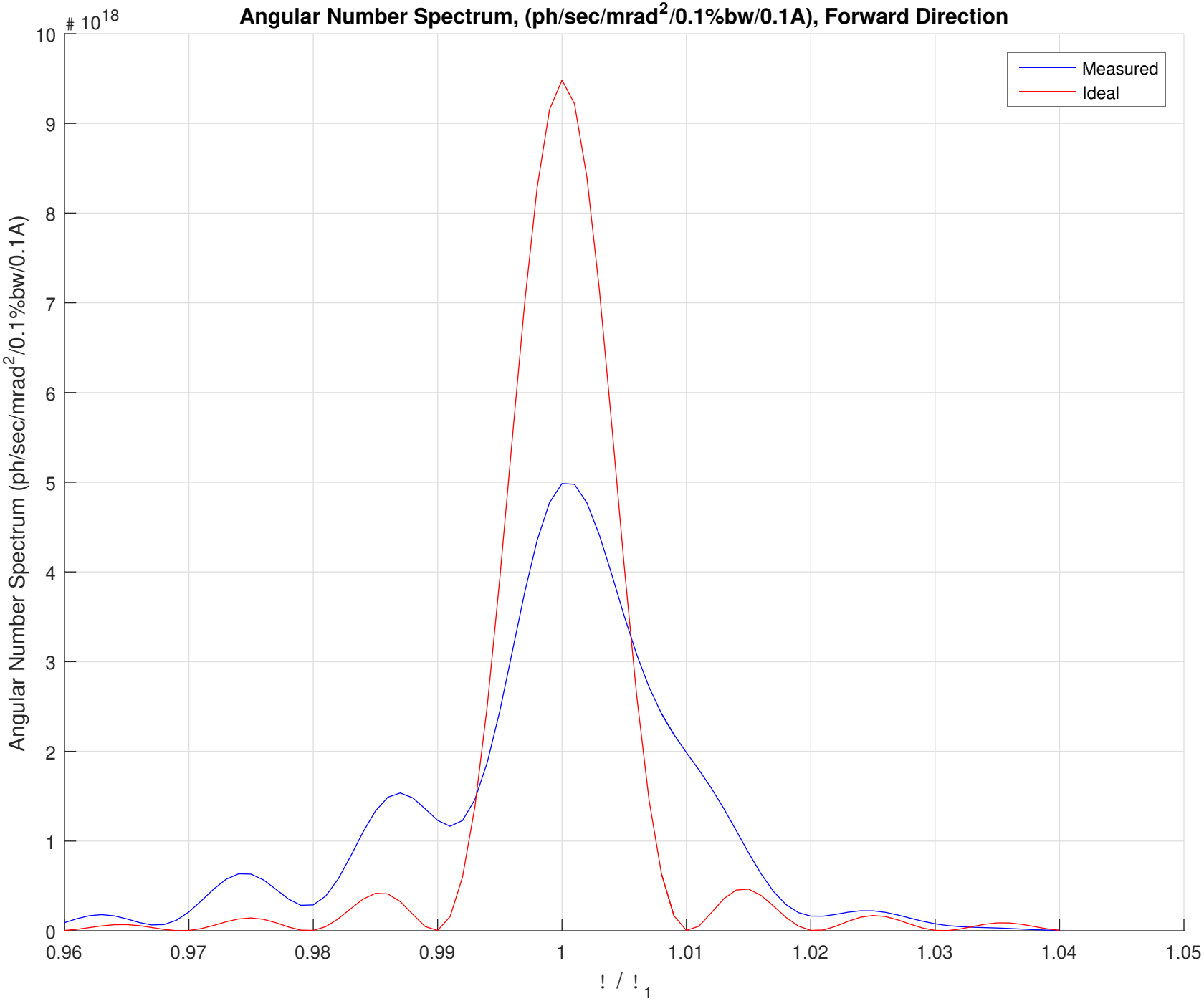

Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
-1600
-1650
-1700
-1750
-1800
-1850
Phase Error (deg)
5
36
67
98
130
161
192
Pole
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)

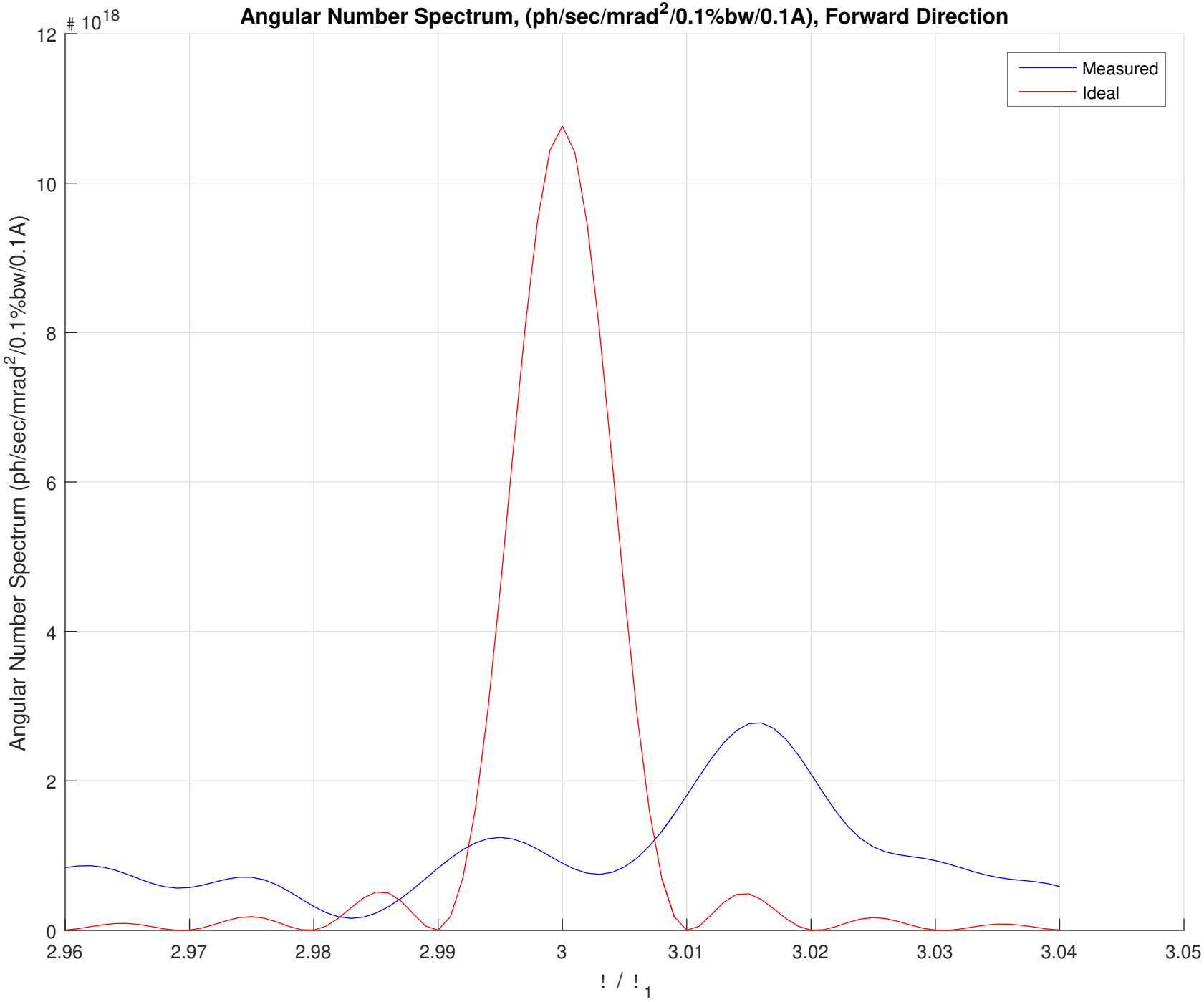

Phase Integral And Effective Length
10^-6
PI
Fit
Phase Integral (T^2m^3)
Z (m)
Effective Length = 3.103798 m
16
14
12
10
8
6
4
2
0
-2
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2

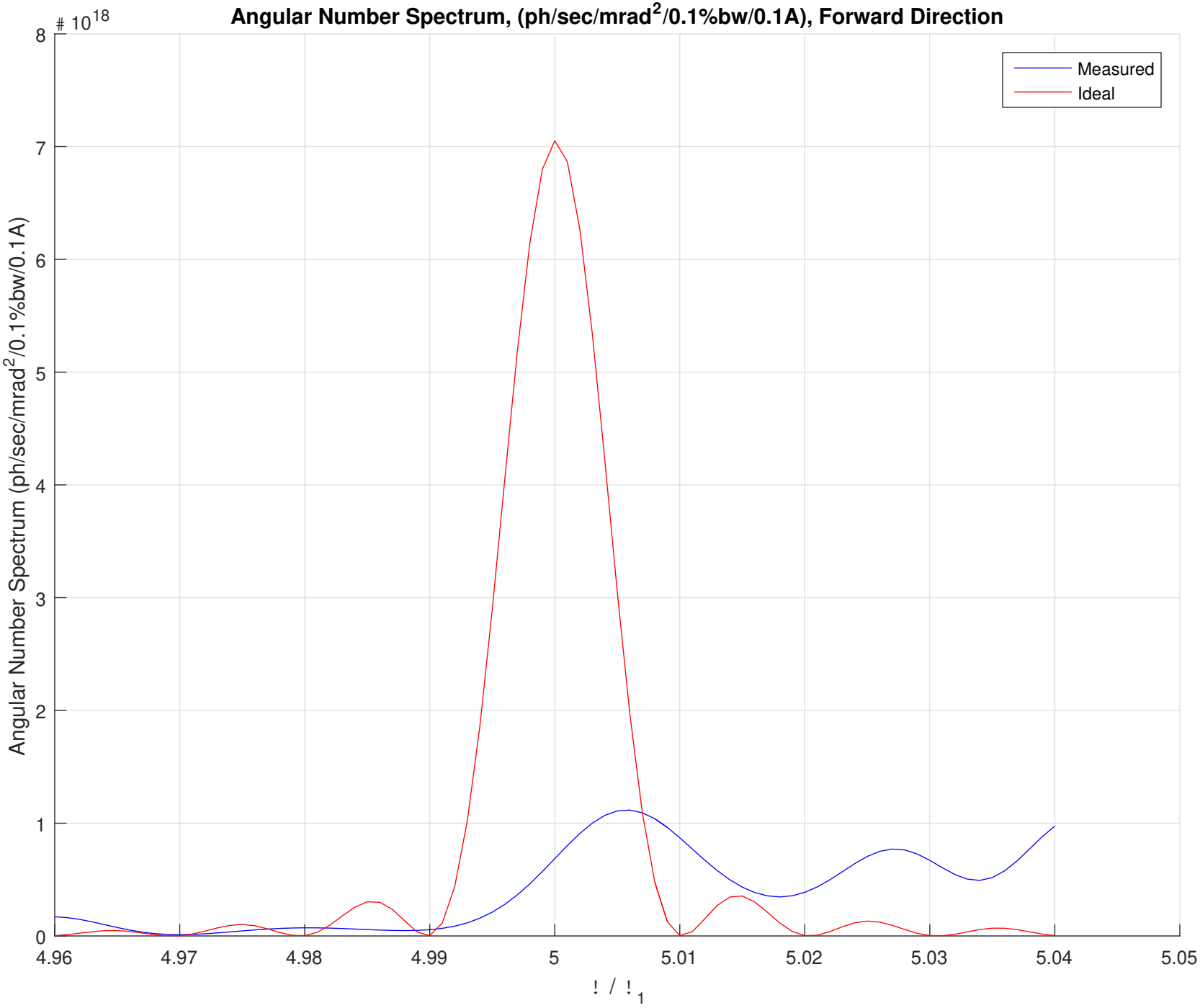

Re and Im Parts Of Ex(!), Forward Direction, ! = !1
90
2e-11
120
60
1.5e-11
150
30
1e-11
5e-12
180
0
210
330
240
300
270


Re and Im Parts Of Ey(!), Forward Direction, ! = !1
90
8e-13
120
60
6e-13
150
30
4e-13
2e-13
180
0
210
330
240
300
270


Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{18}
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
0
5
10
15
! / !$_1$


Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{18}
Measured
Ideal
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
! / $!_1$
10
9
8
7
6
5
4
3
2
1
0
0.96
0.97
0.98
0.99
1
1.01
1.02
1.03
1.04
1.05


Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{18}
Measured
Ideal
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
12
10
8
6
4
2
0
2.96
2.97
2.98
2.99
3
3.01
3.02
3.03
3.04
3.05
! / !$_1$


Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{18}
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
Measured
Ideal
8
7
6
5
4
3
2
1
0
4.96
4.97
4.98
4.99
5
5.01
5.02
5.03
5.04
5.05
! / !$_1$