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SLAC Magnetic Measurements

EPU Analysis
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Parameters:
INPUT-FILE-DIR =V:\MET\MagServe\MagData\DELTA\Delta Data 2015\New Measurements\Run 137 HD Spreadsheet 260 Meas\\
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
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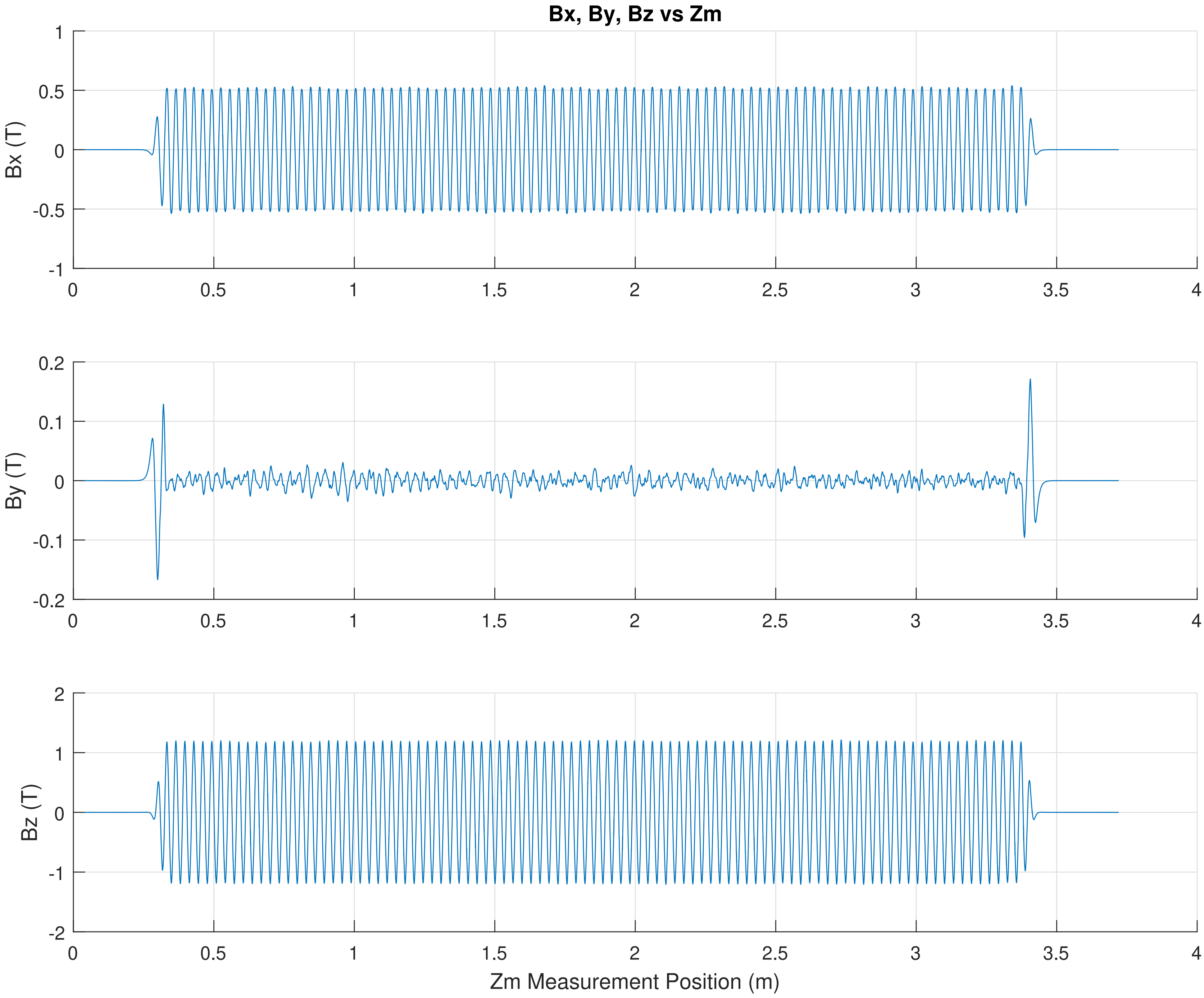
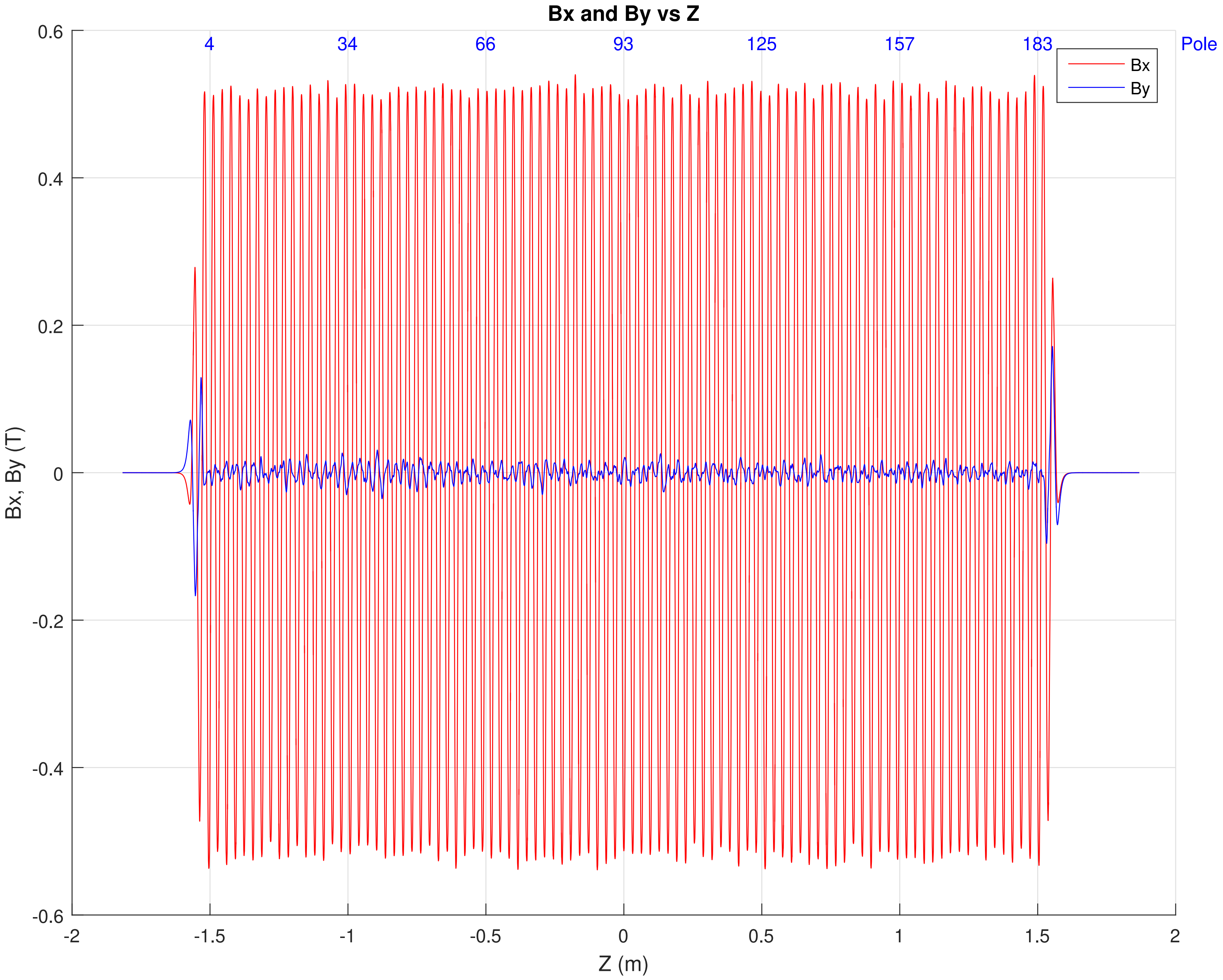
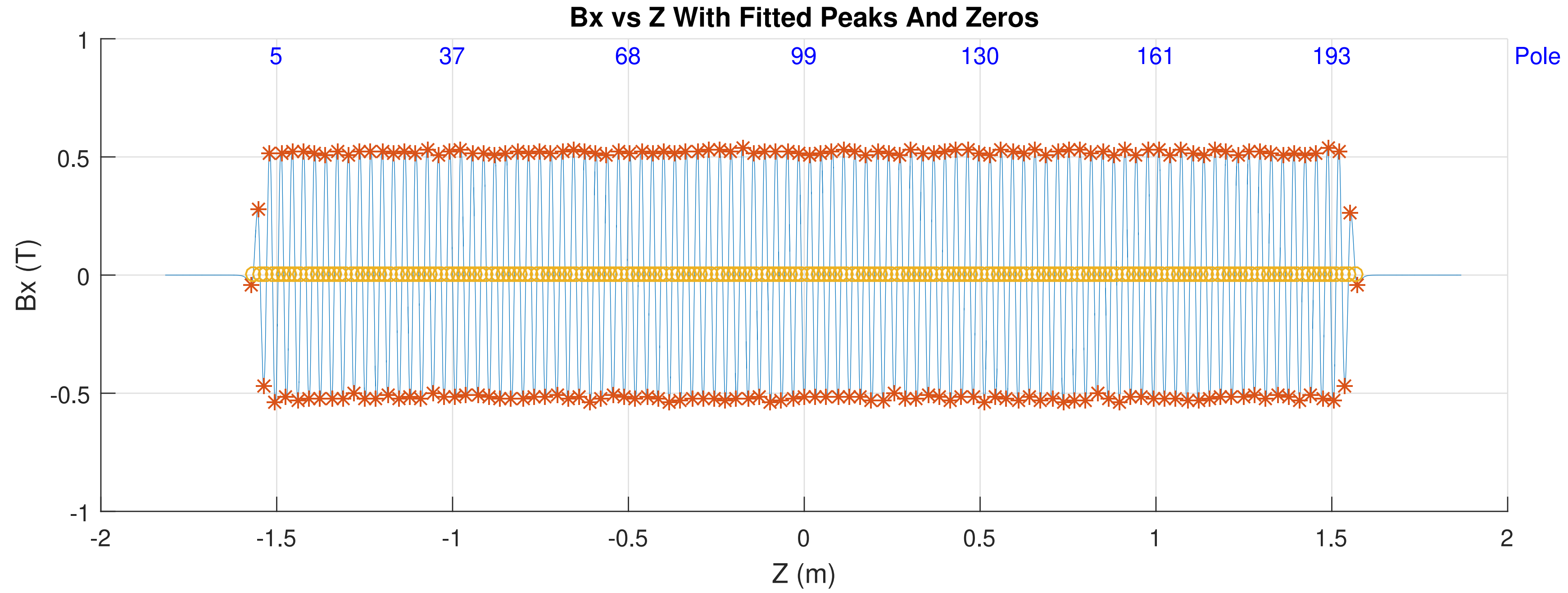
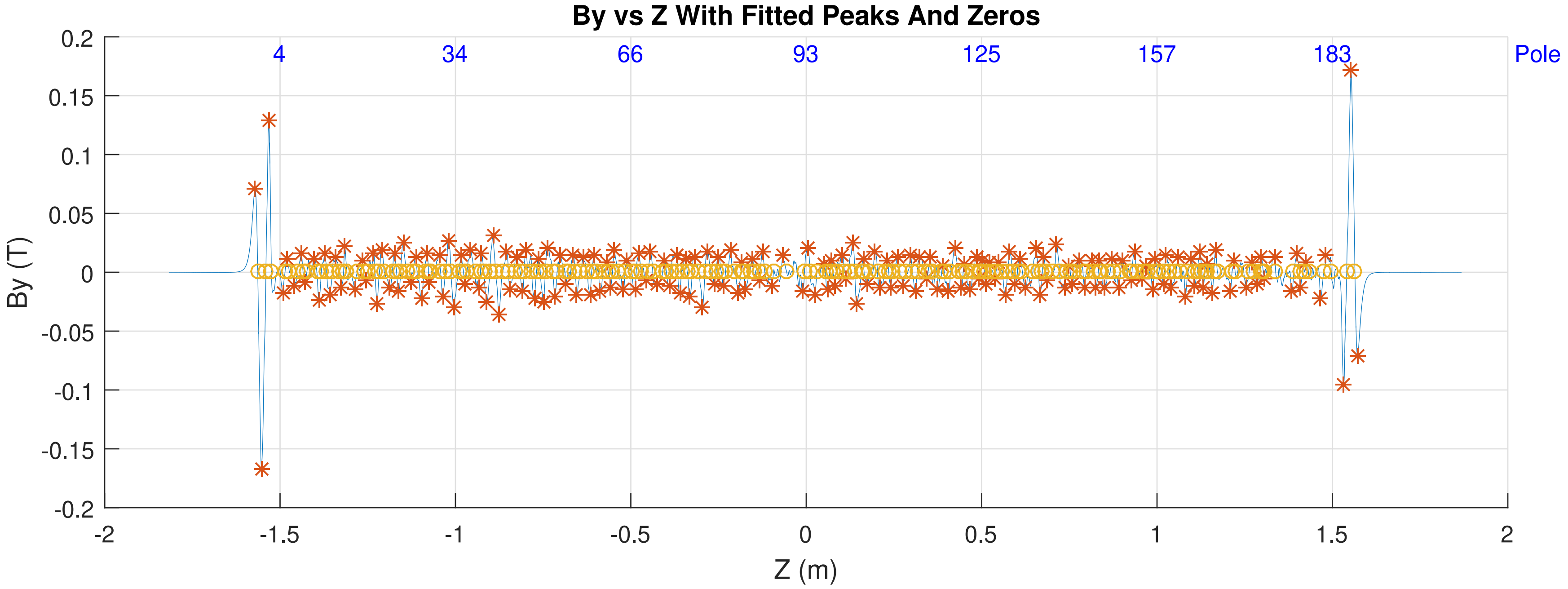

Bx, By, Bz vs Zm
Bx (T)
1
0.5
0
-0.5
-1
By (T)
0.2
0.1
0
-0.1
-0.2
Bz (T)
2
1
0
-1
-2
0
0.5
1
1.5
2
2.5
3
3.5
4
Zm Measurement Position (m)

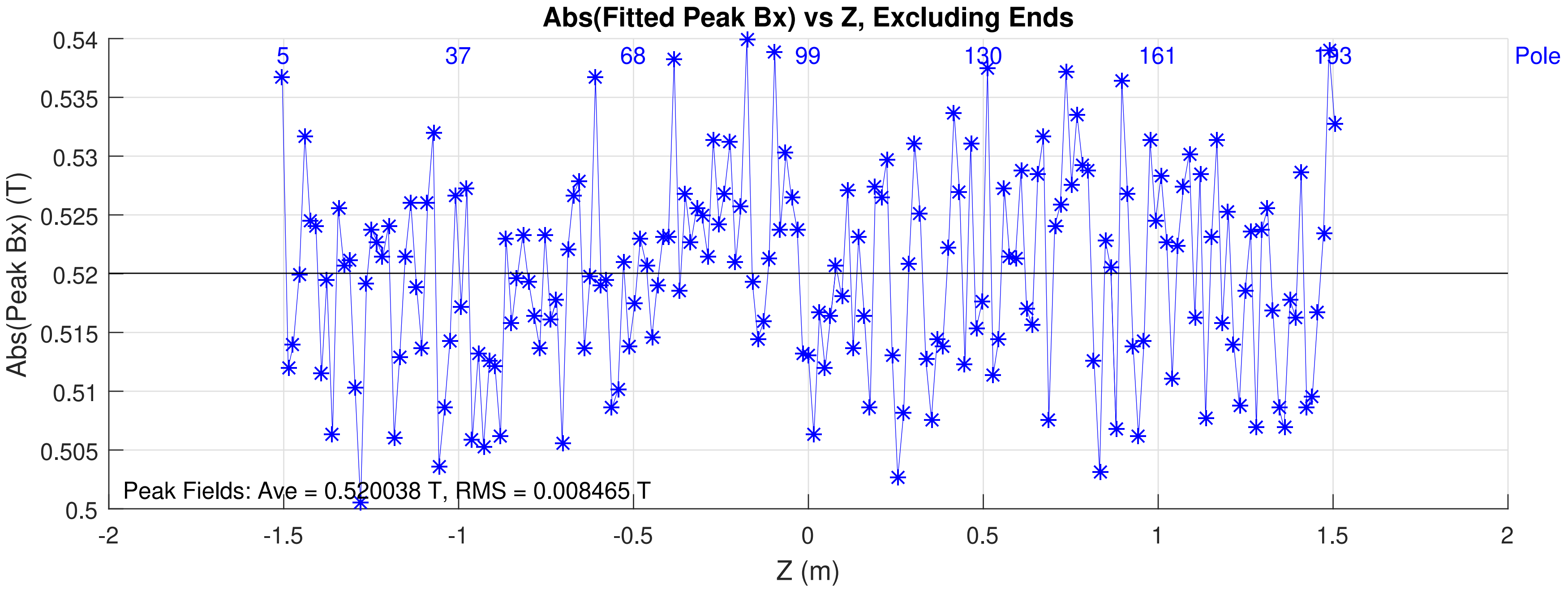

Bx and By vs Z
4
34
66
93
125
157
183
Pole
Bx
By
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
Bx, By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)



Bx vs Z With Fitted Peaks And Zeros

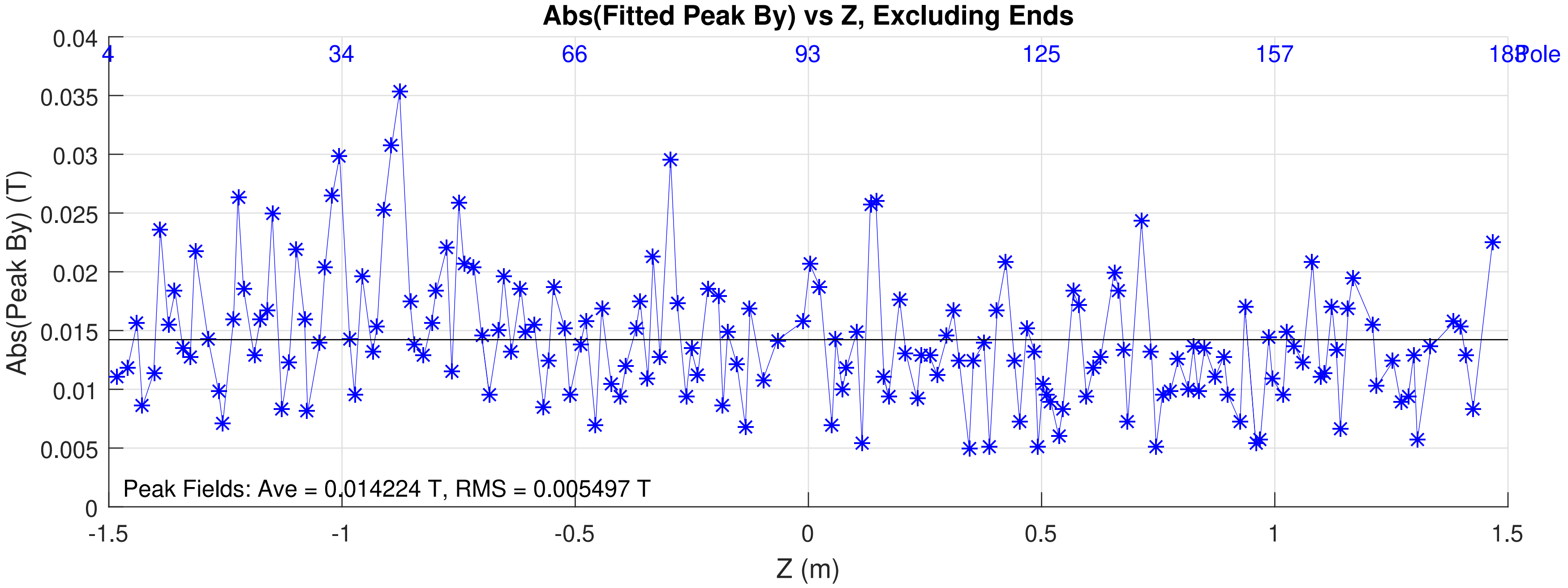


By vs Z With Fitted Peaks And Zeros



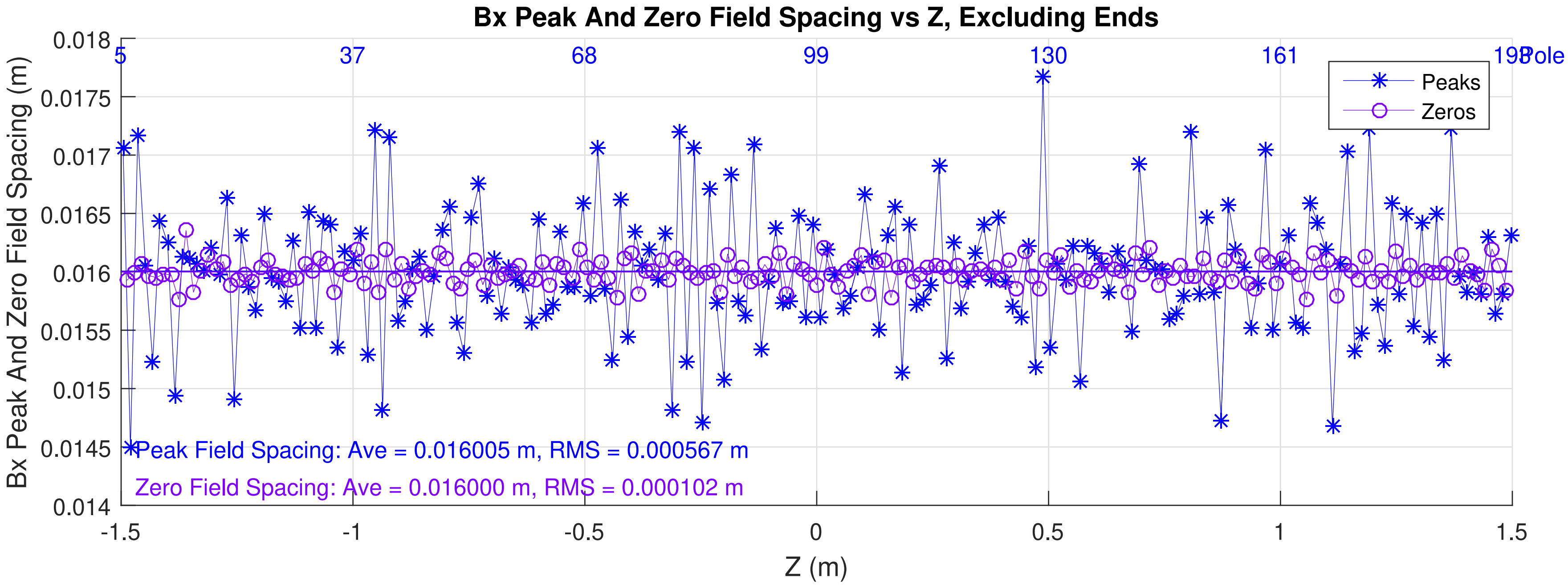
Abs(Fitted Peak Bx) vs Z, Excluding Ends

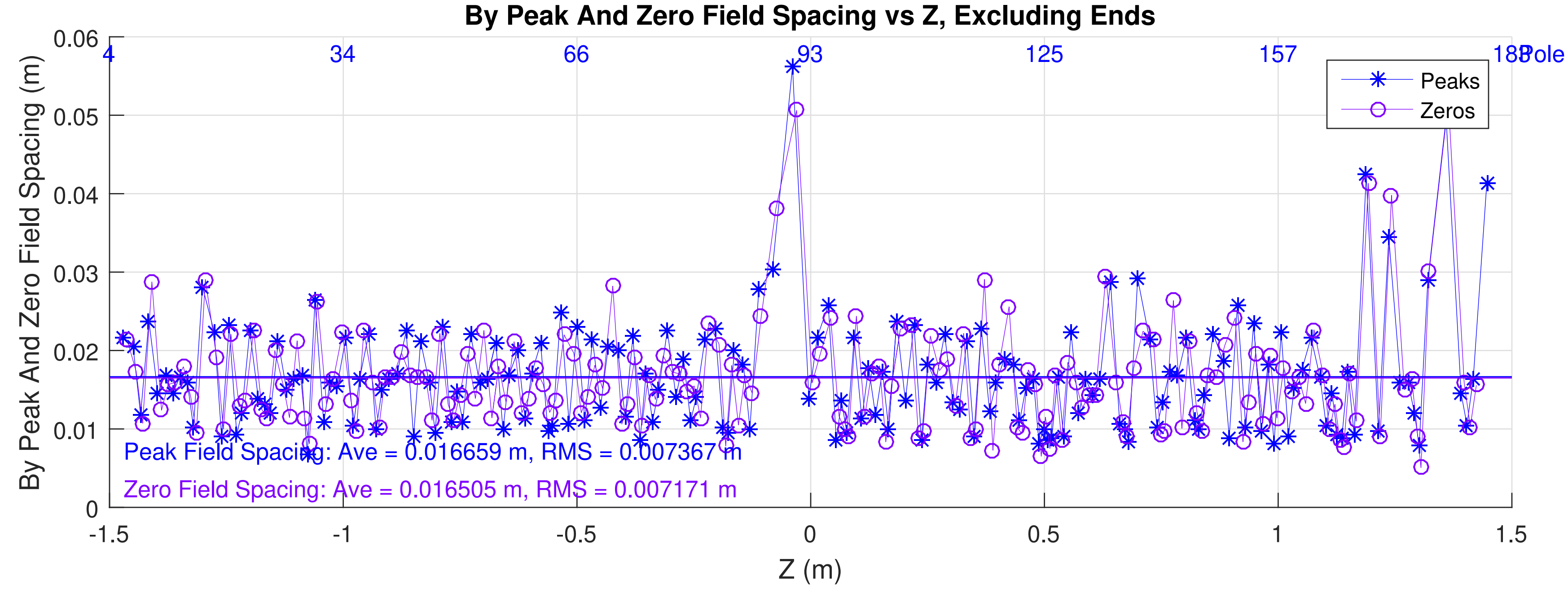
Peak Fields: Ave = 0.520038 T, RMS = 0.008465 T

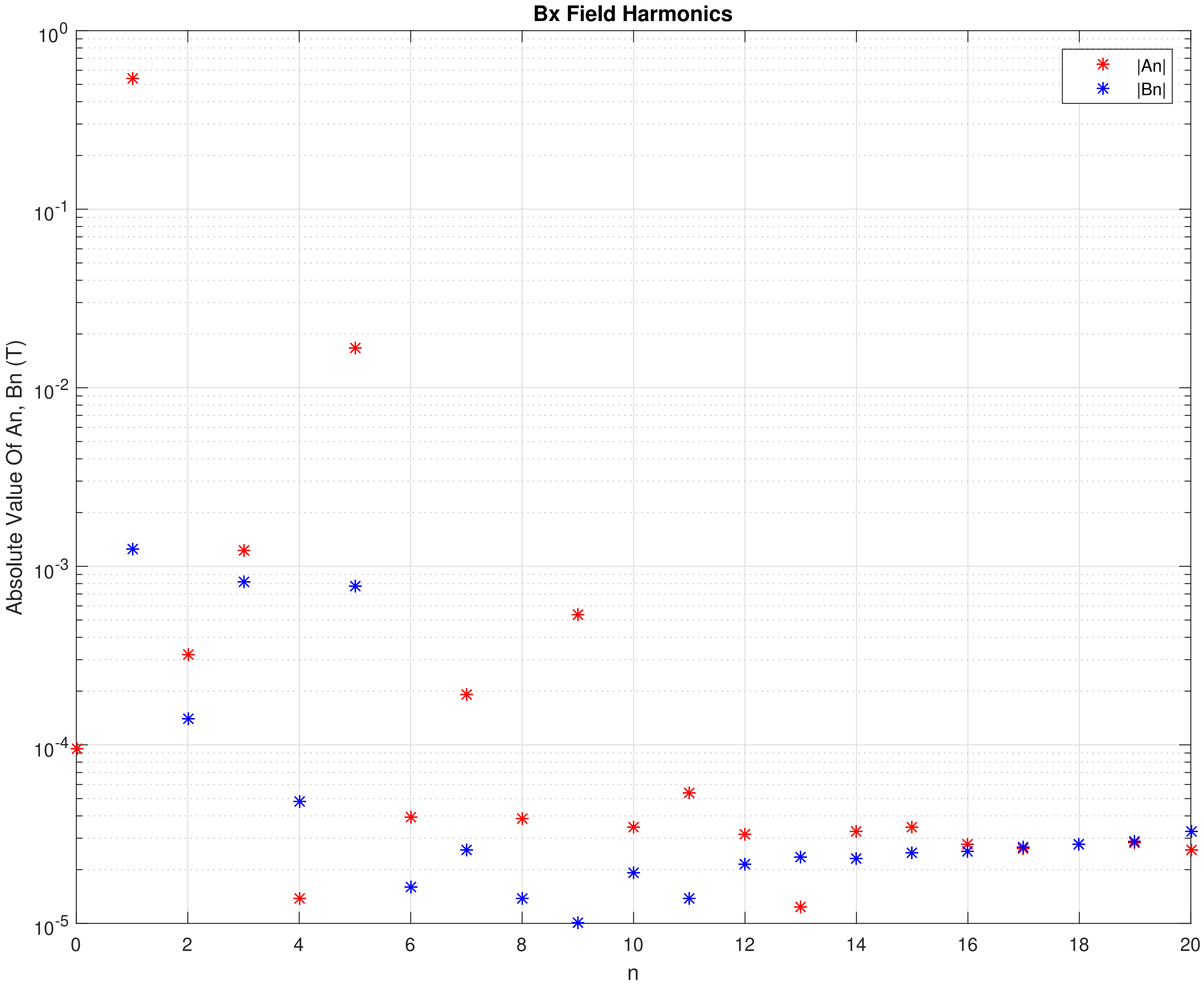


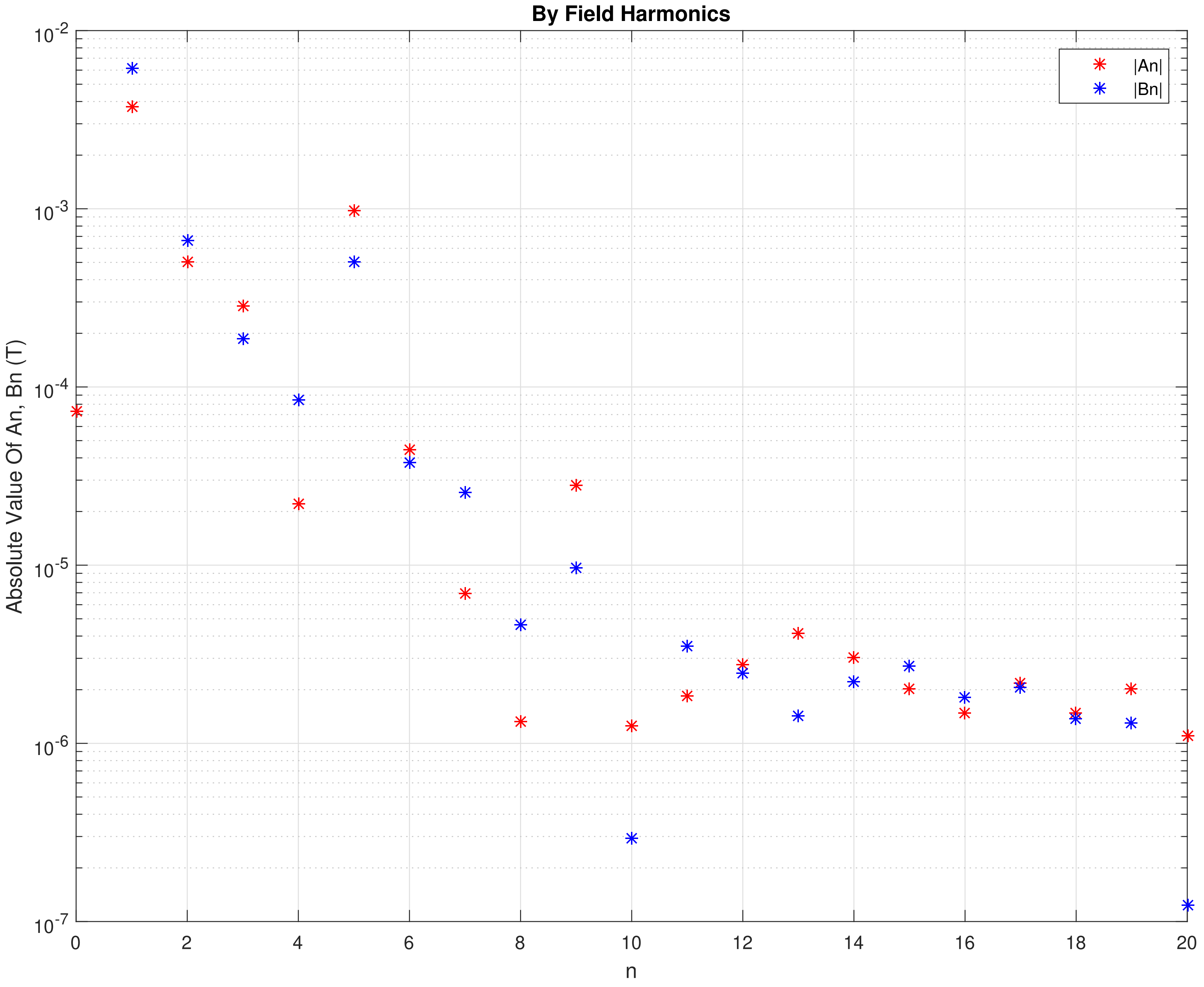
Abs(Fitted Peak By) vs Z, Excluding Ends

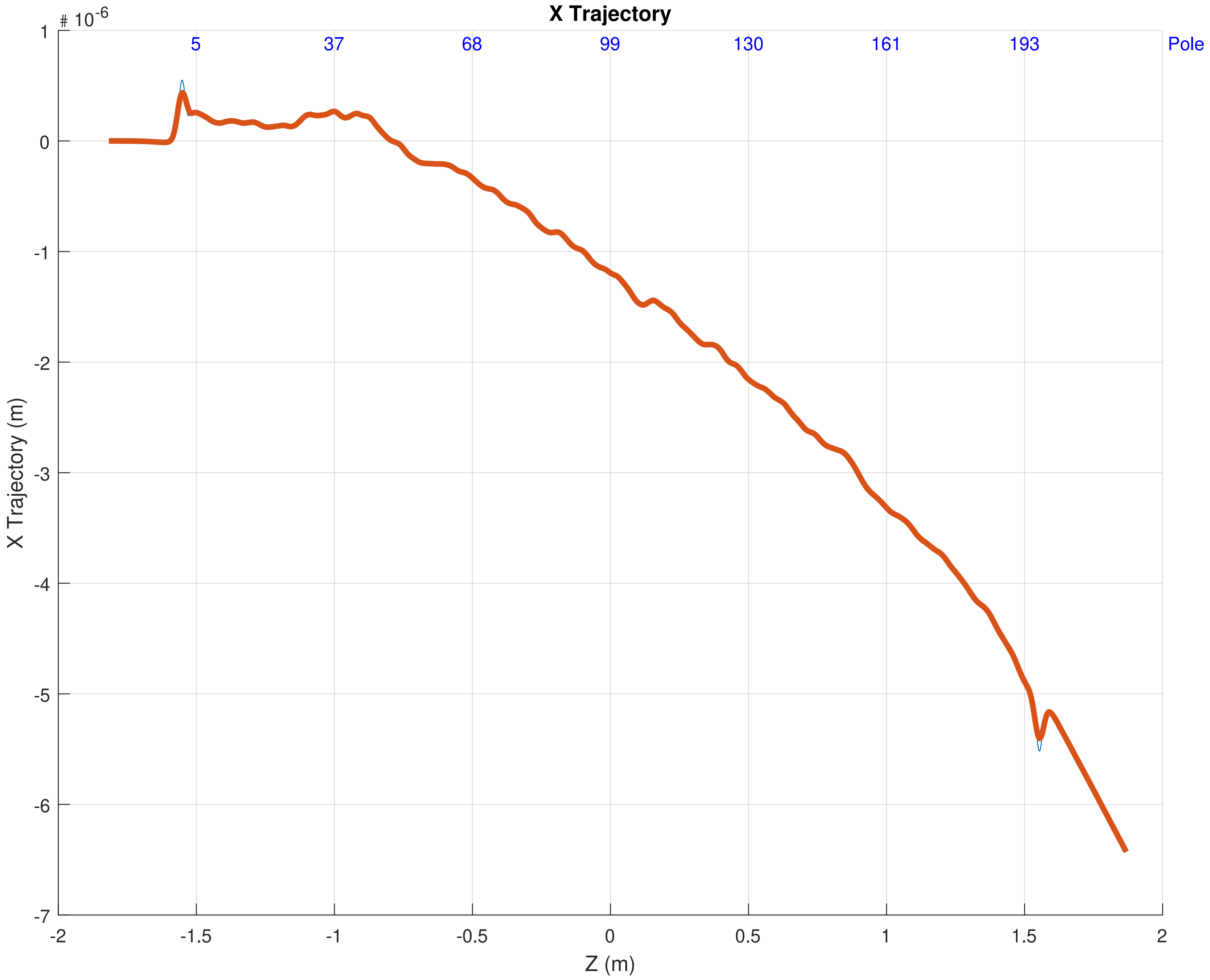
Peak Fields: Ave = 0.014224 T, RMS = 0.005497 T

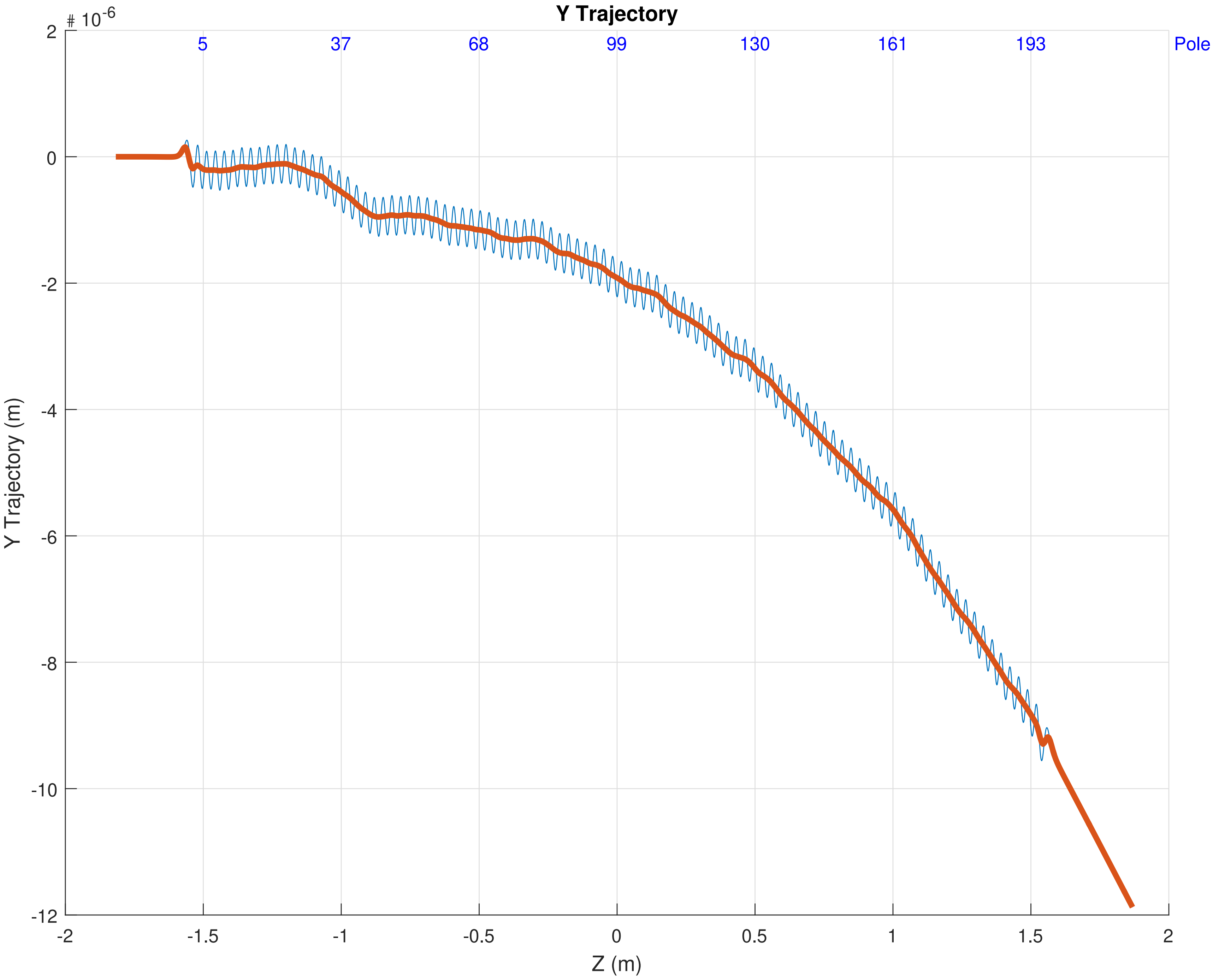

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
0.018
0.0175
0.017
0.0165
0.016
0.0155
0.015
0.0145
0.014
5
37
68
99
130
161
19
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016005 m, RMS = 0.000567 m
Zero Field Spacing: Ave = 0.016000 m, RMS = 0.000102 m
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)

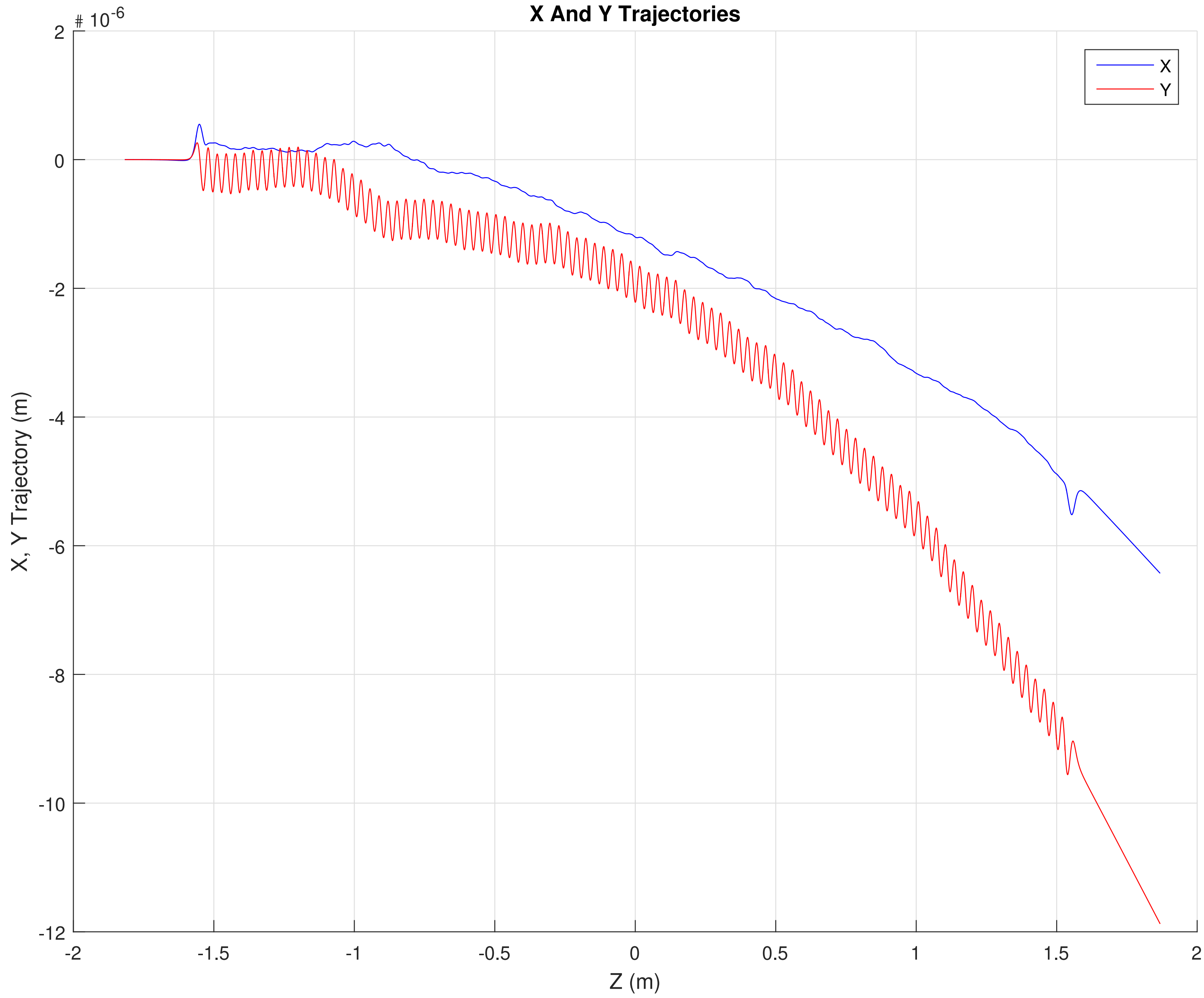

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
0.06
0.05
0.04
0.03
0.02
0.01
0
4
34
66
93
125
157
18
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016659 m, RMS = 0.007367 m
Zero Field Spacing: Ave = 0.016505 m, RMS = 0.007171 m
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)

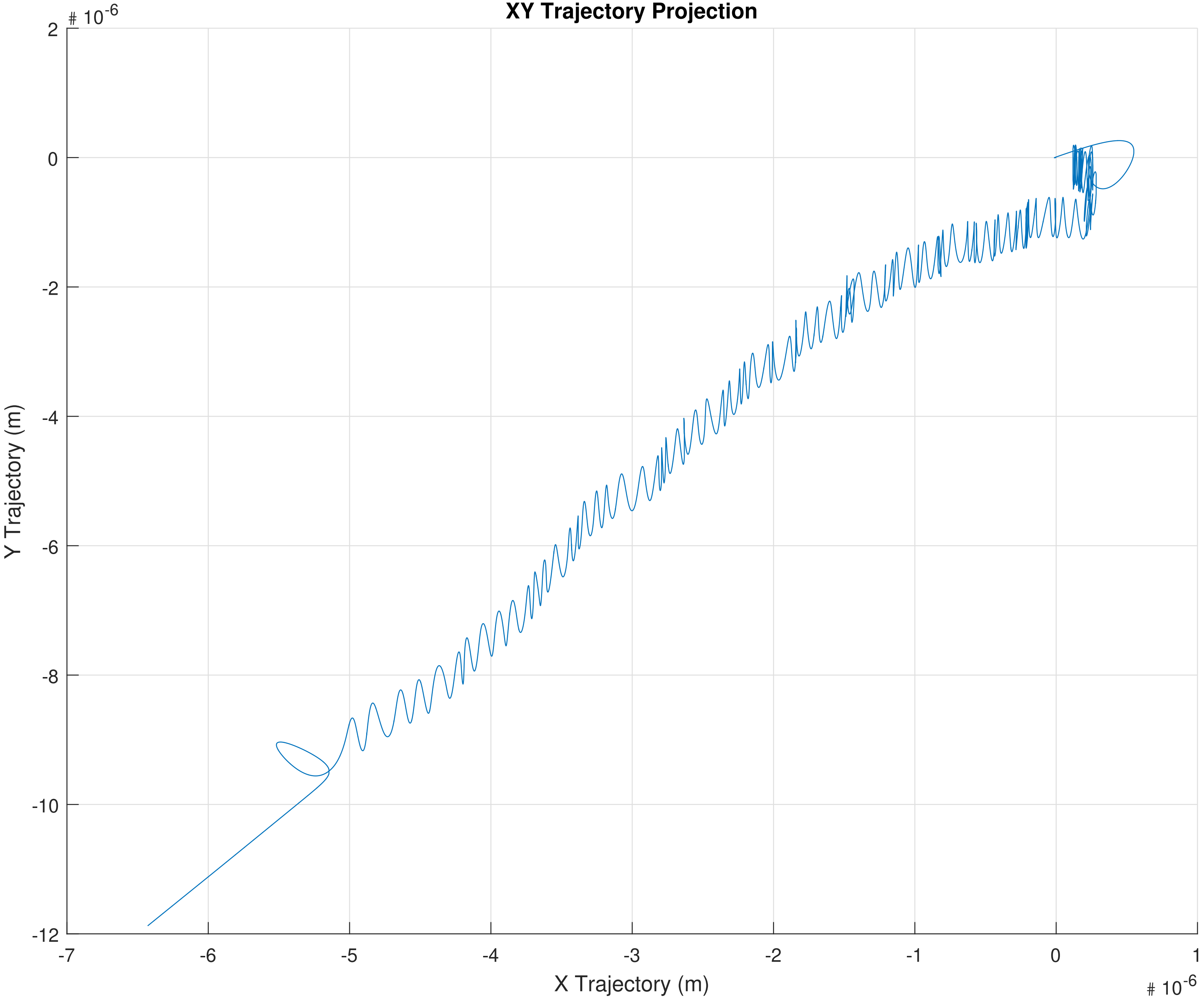

Bx Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
10^0
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
0
2
4
6
8
10
12
14
16
18
20
n

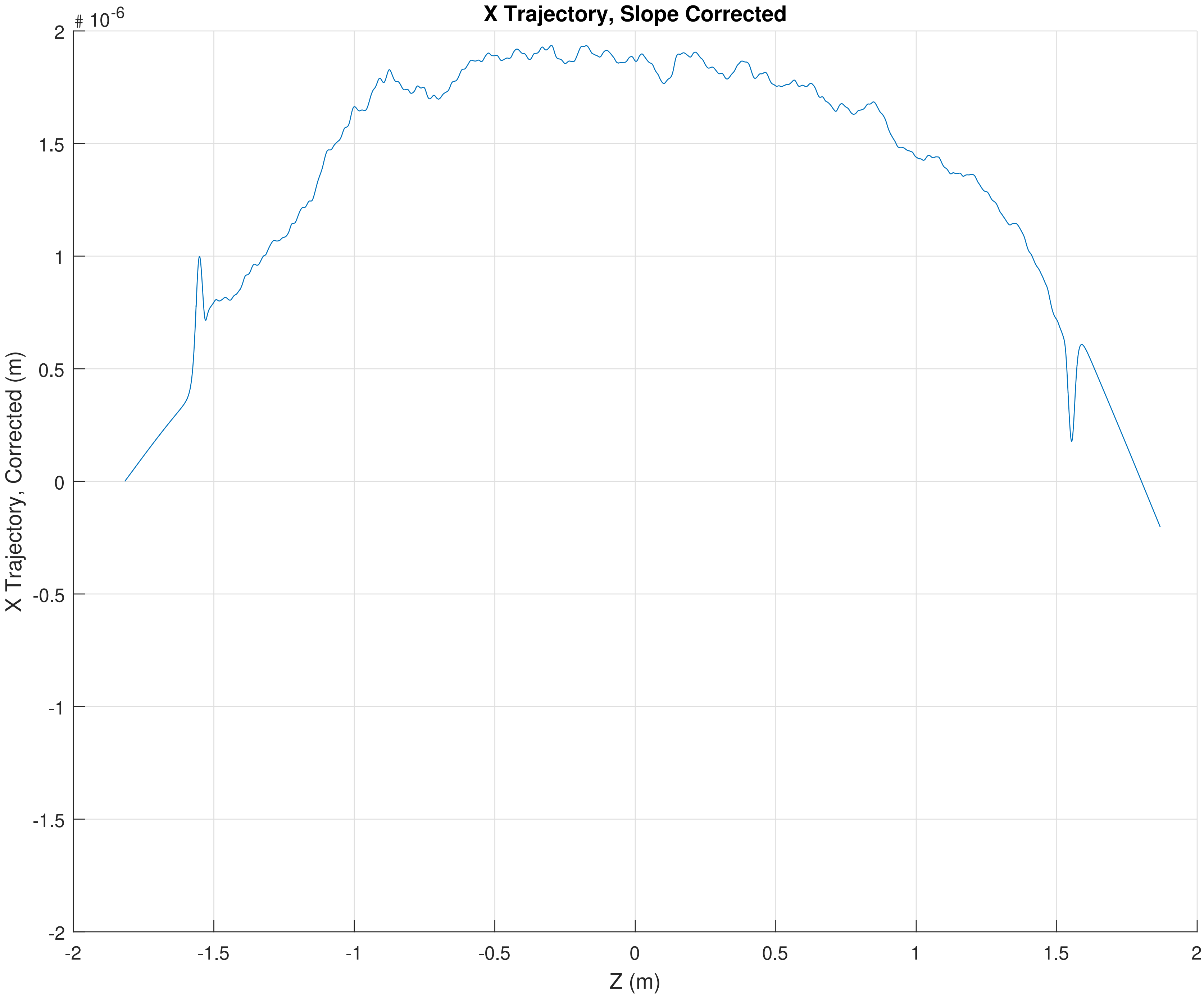

By Field Harmonics
Absolute Value Of An, Bn (T)
n
10^-2
10^-3
10^-4
10^-5
10^-6
10^-7
0
2
4
6
8
10
12
14
16
18
20
|An|
|Bn|

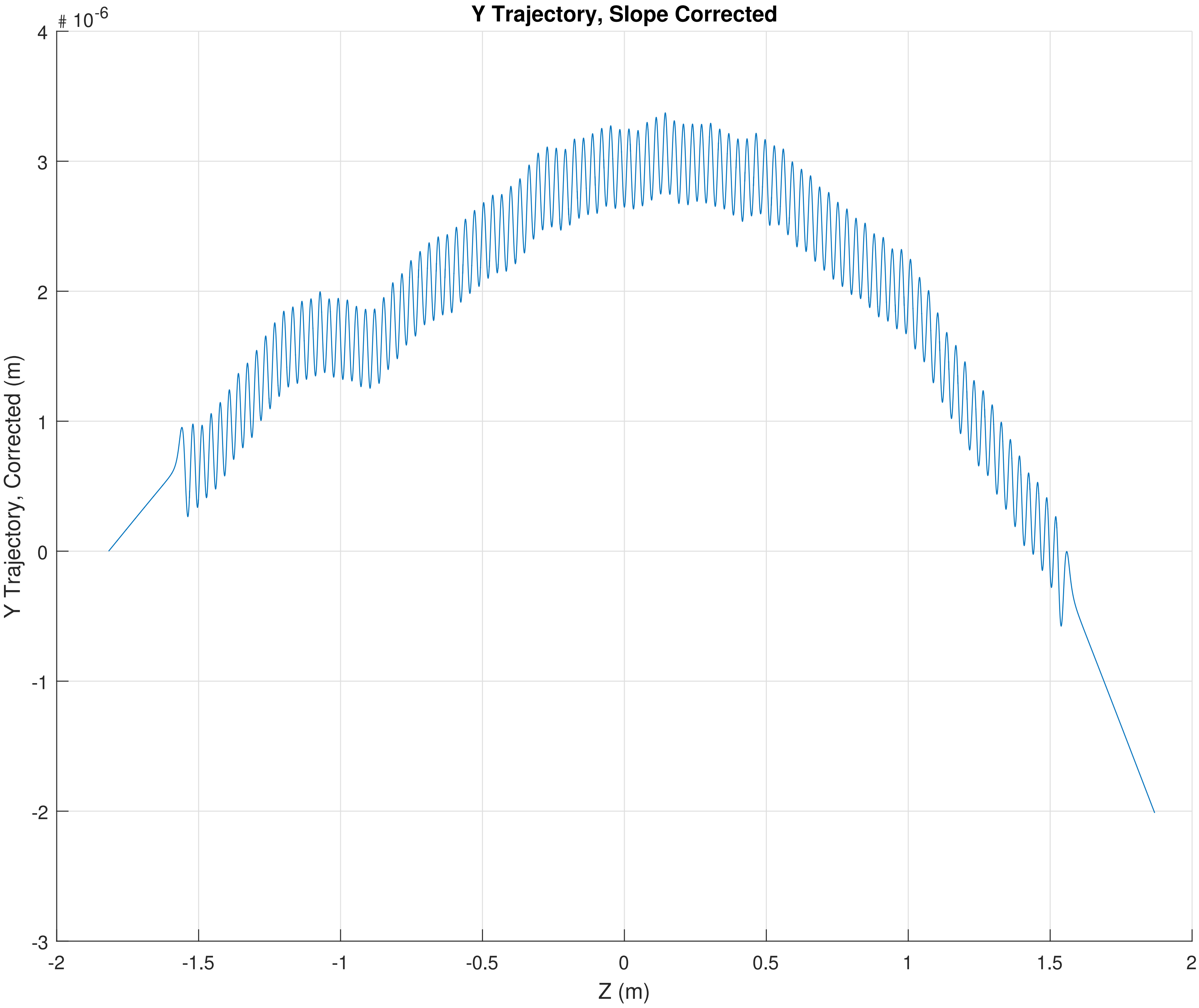

X Trajectory
10-6
1
0
-1
-2
-3
-4
-5
-6
-7
X Trajectory (m)
5
37
68
99
130
161
193
Pole
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

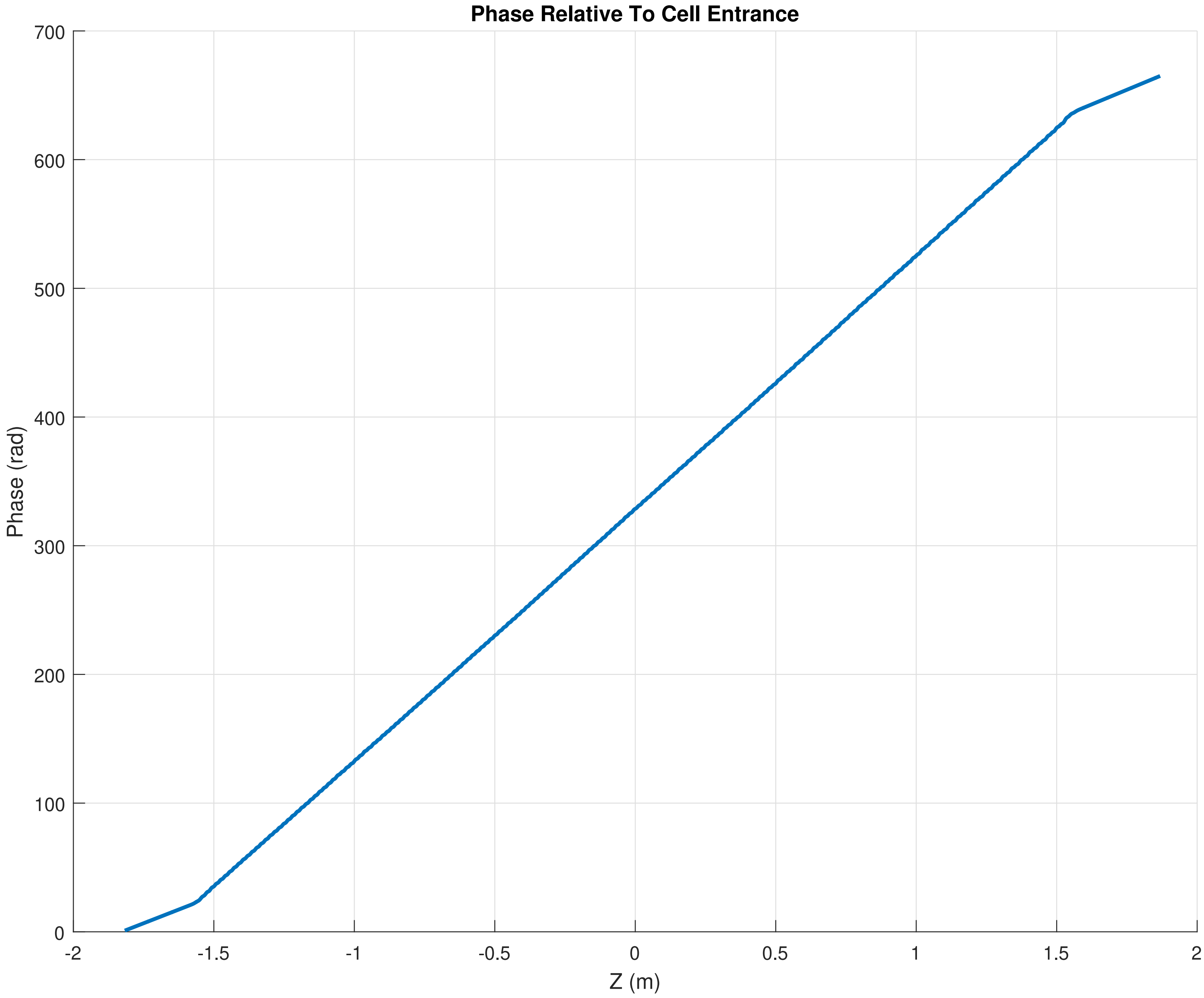

Y Trajectory
10-6
5
37
68
99
130
161
193
Pole
2
0
-2
-4
-6
-8
-10
-12
Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

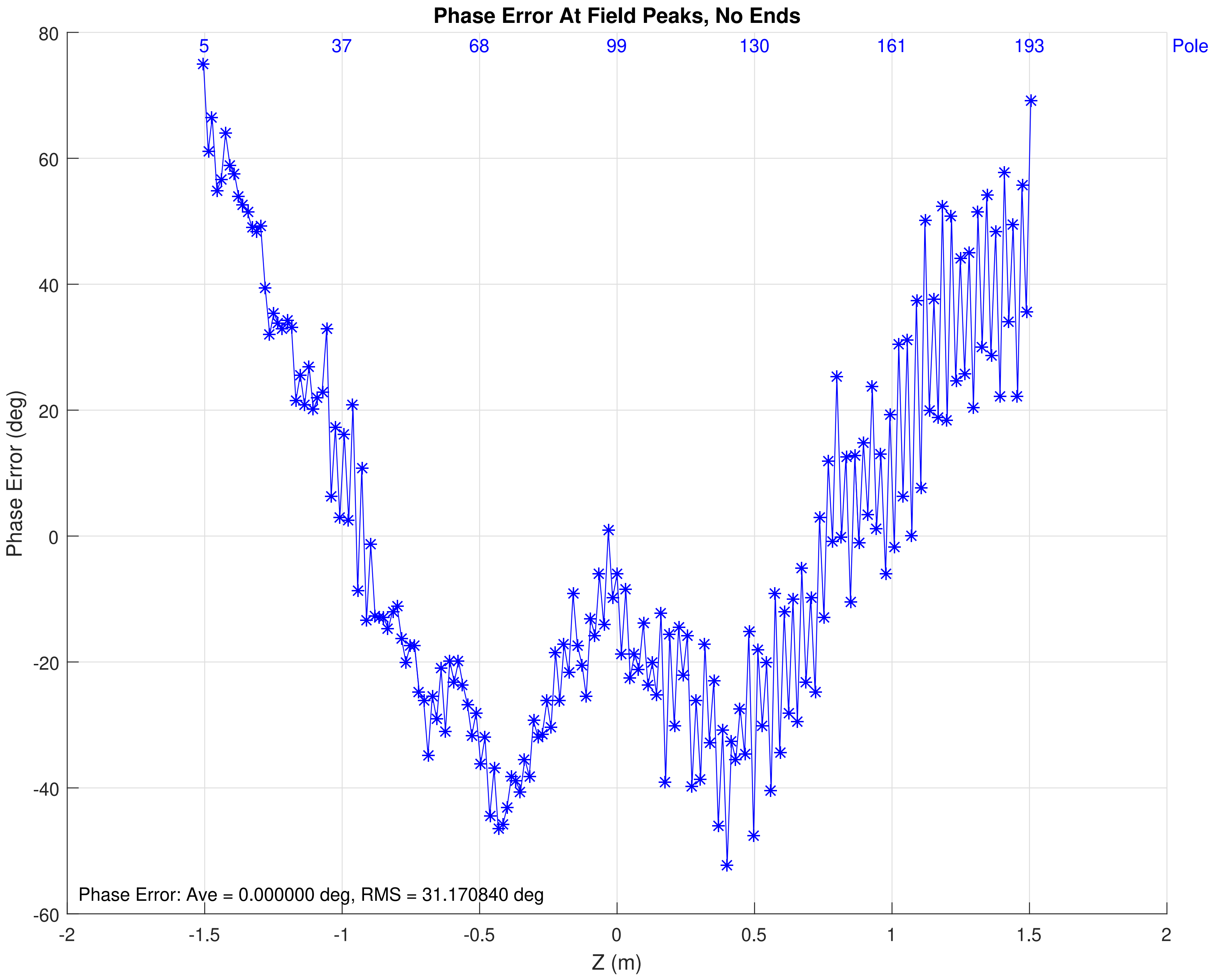

X And Y Trajectories
10-6
2
0
-2
-4
-6
-8
-10
-12
X, Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
X
Y

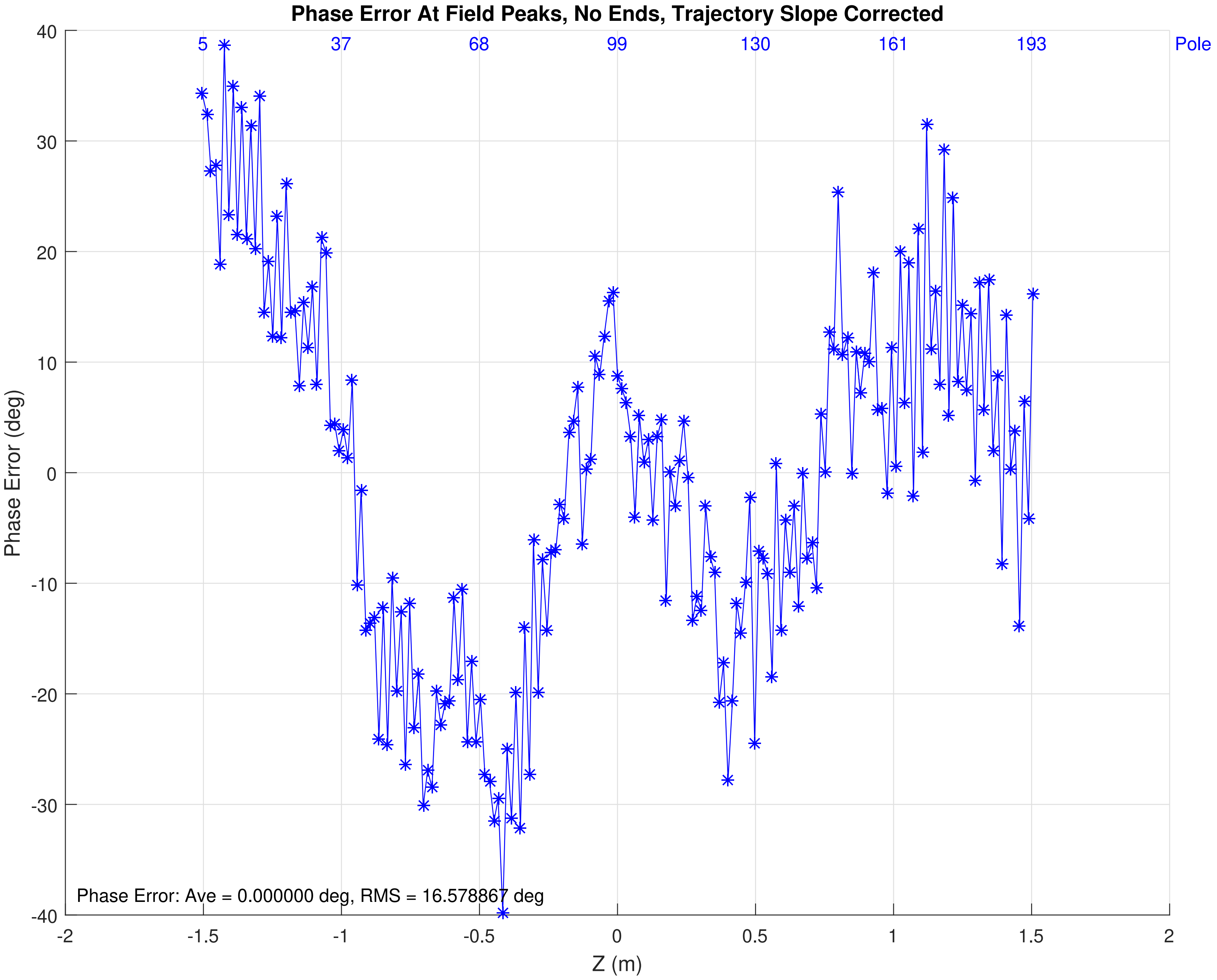

XY Trajectory Projection
10^-6
2
0
-2
-4
-6
-8
-10
-12
Y Trajectory (m)
-7
-6
-5
-4
-3
-2
-1
0
1
X Trajectory (m)
10^-6


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

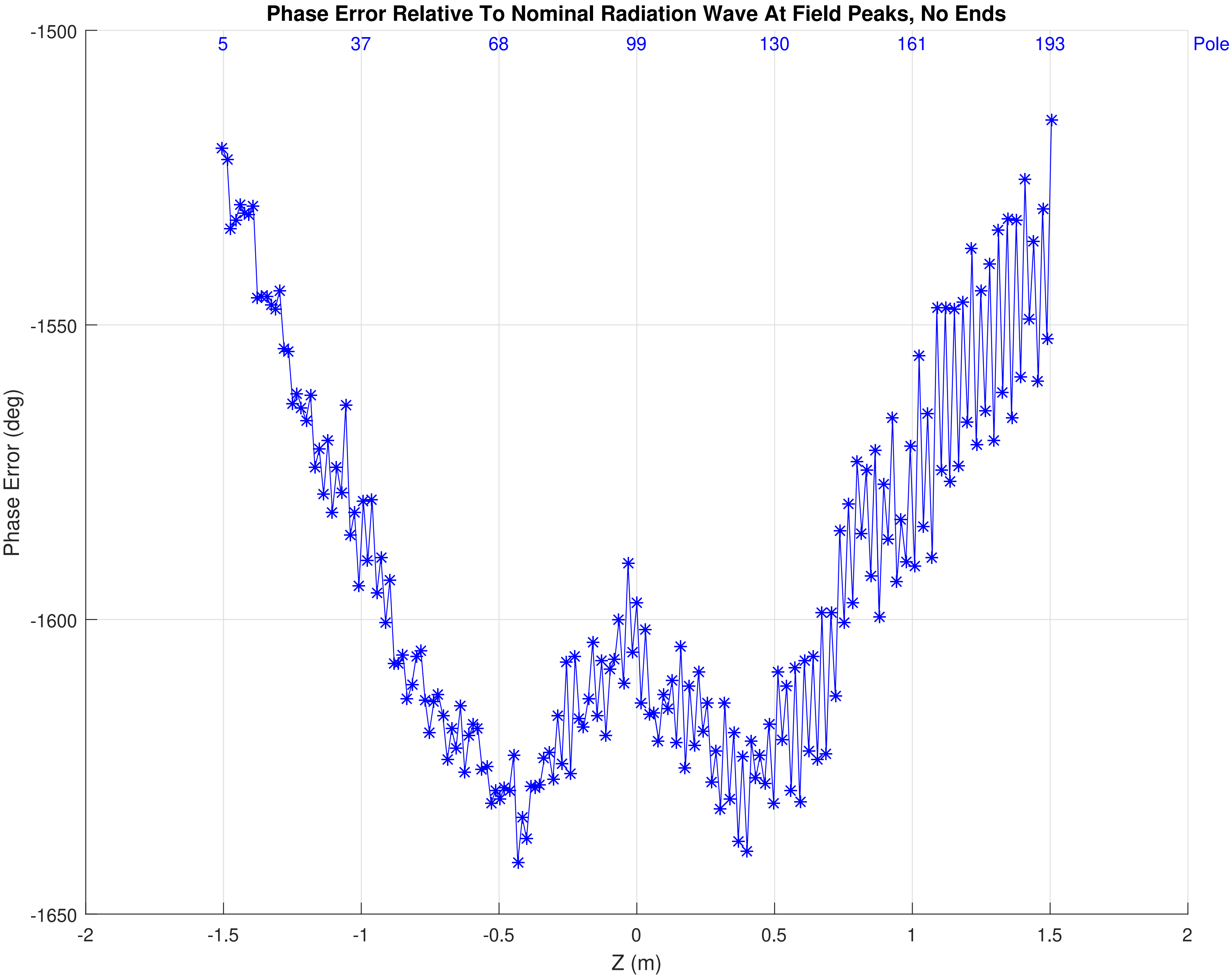

Y Trajectory, Slope Corrected
10^-6
4
3
2
1
0
-1
-2
-3
Y Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

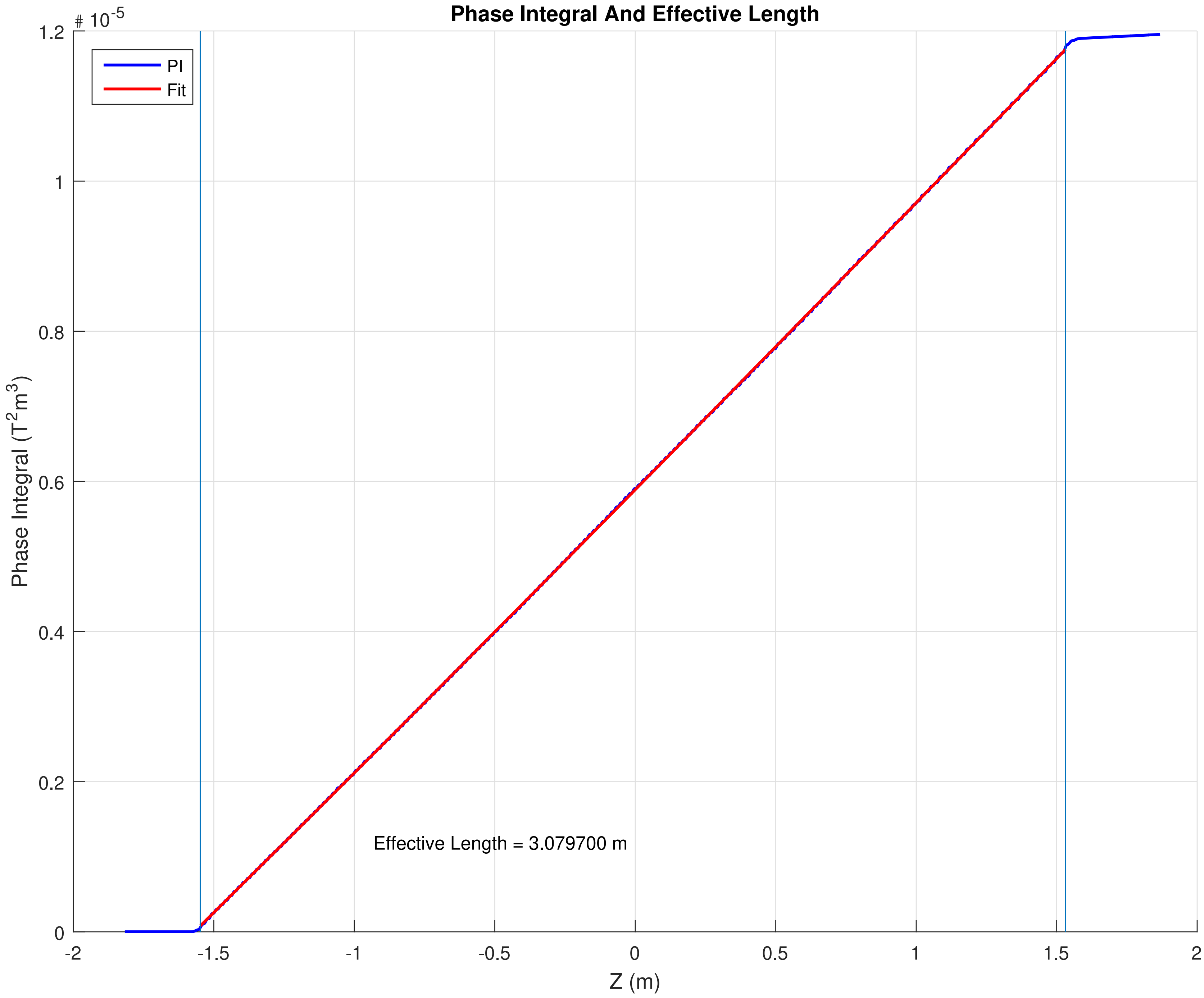

Phase Relative To Cell Entrance
Phase (rad)
700
600
500
400
300
200
100
0
Z (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2

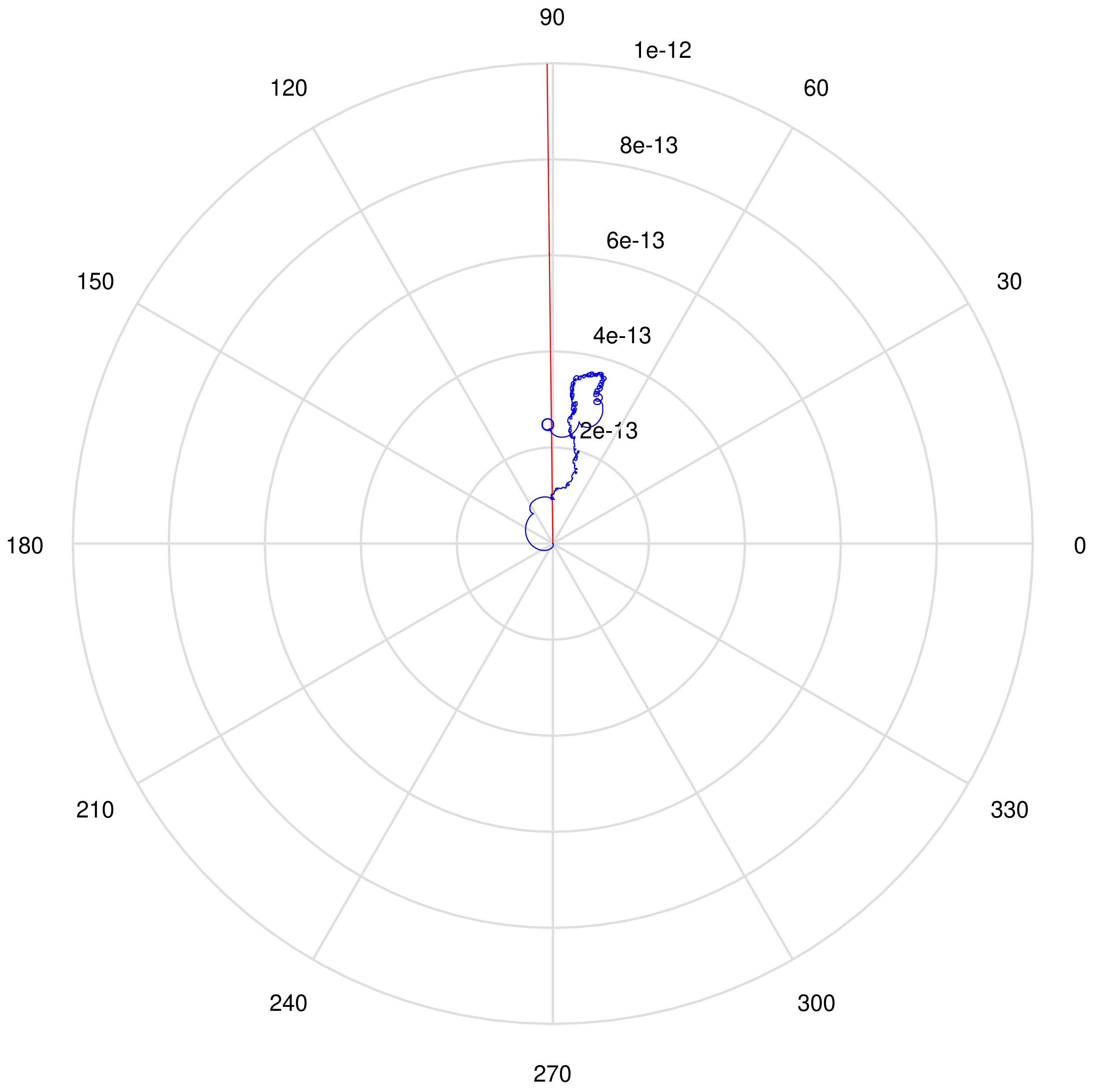

Phase Error At Field Peaks, No Ends
5
37
68
99
130
161
193
Pole
80
60
40
20
0
-20
-40
-60
Phase Error (deg)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
Phase Error: Ave = 0.000000 deg, RMS = 31.170840 deg



Phase Error At Field Peaks, No Ends, Trajectory Slope Corrected
5
37
68
99
130
161
193
Pole
Phase Error (deg)
40
30
20
10
0
-10
-20
-30
-40
Z (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Phase Error: Ave = 0.000000 deg, RMS = 16.578867 deg

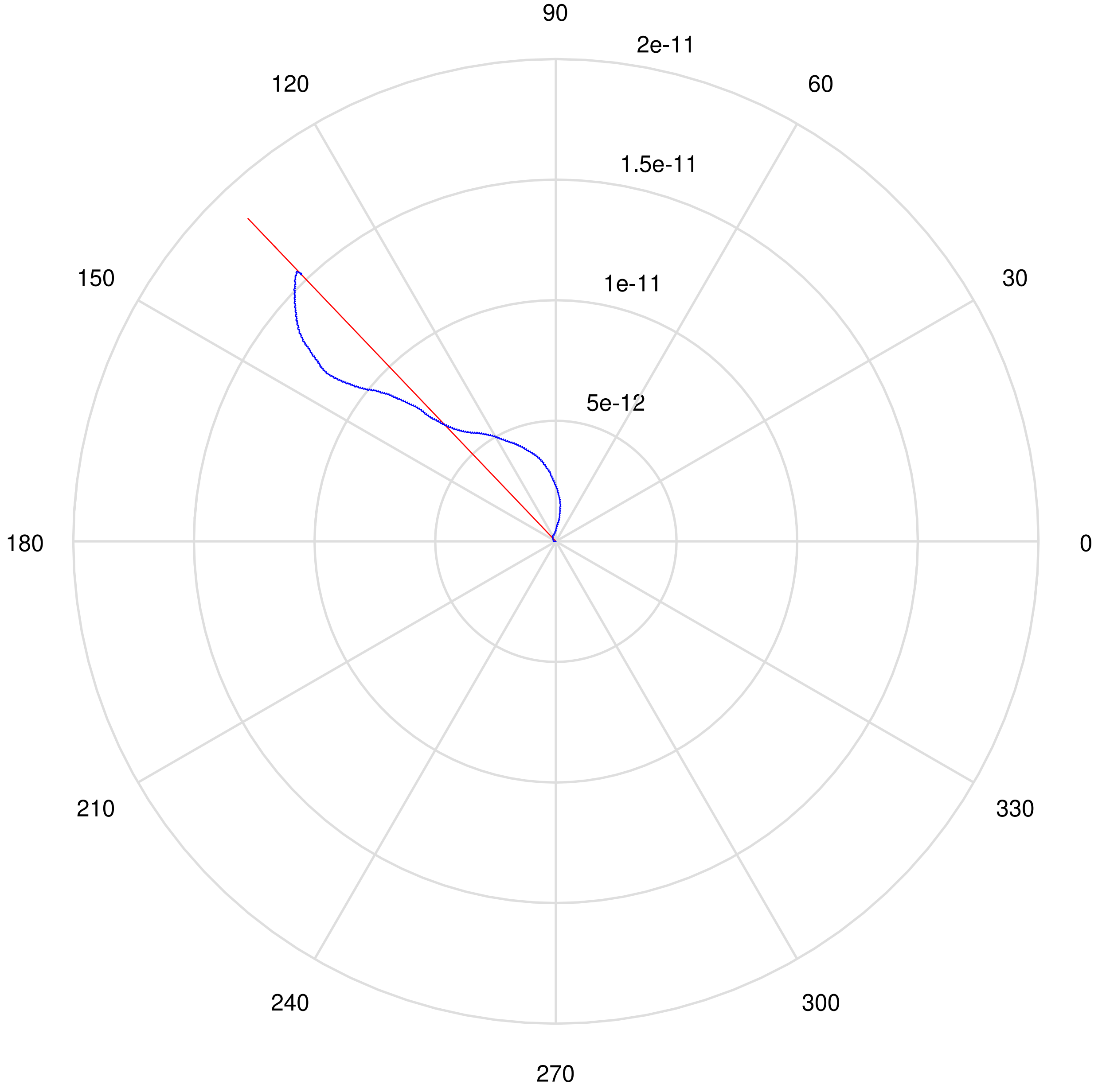

Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
Phase Error (deg)
-1500
-1550
-1600
-1650
Z (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
5
37
68
99
130
161
193
Pole

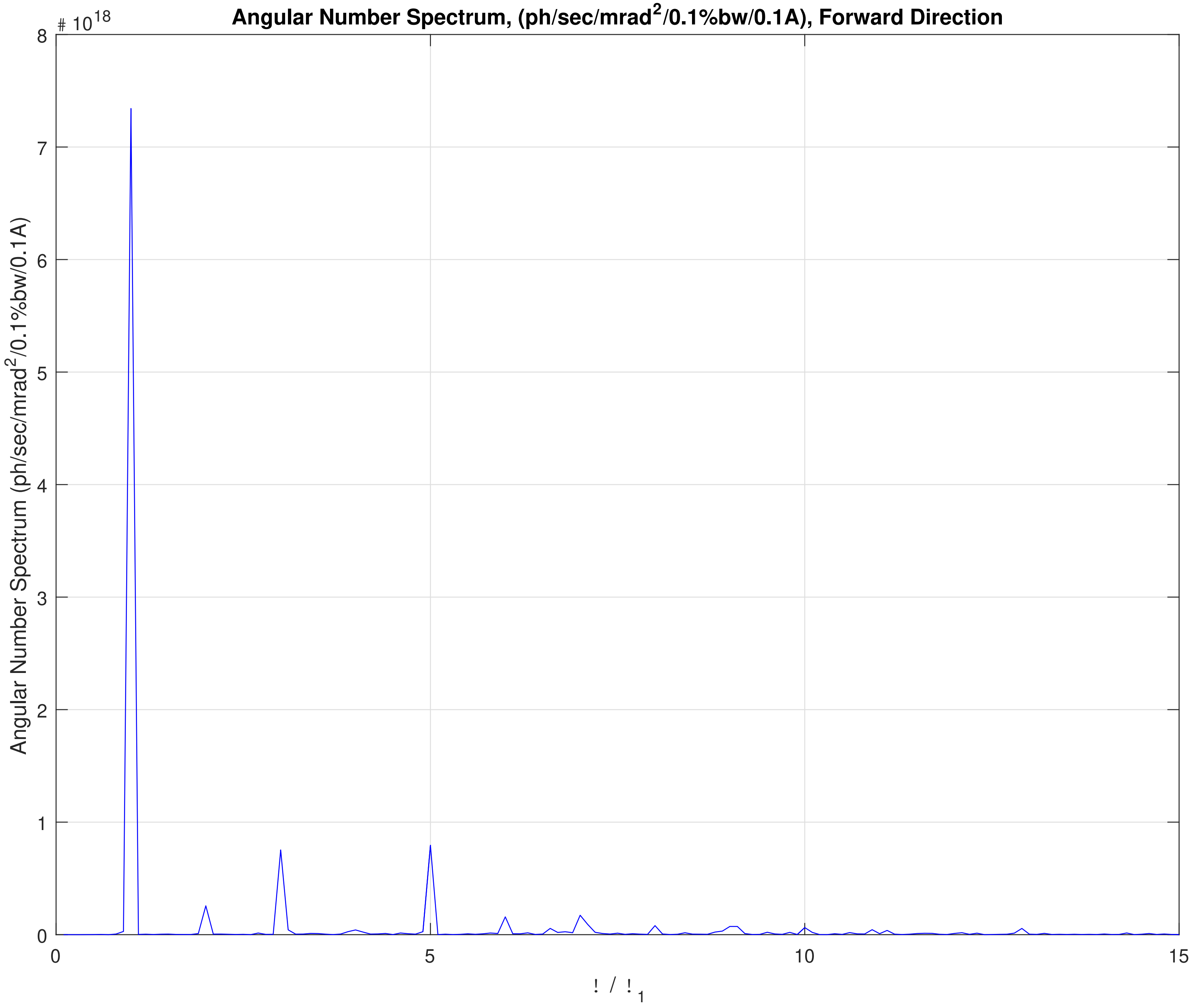

Phase Integral And Effective Length
10-5
1.2
1
0.8
0.6
0.4
0.2
0
Phase Integral (T2m3)
PI
Fit
Effective Length = 3.079700 m
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

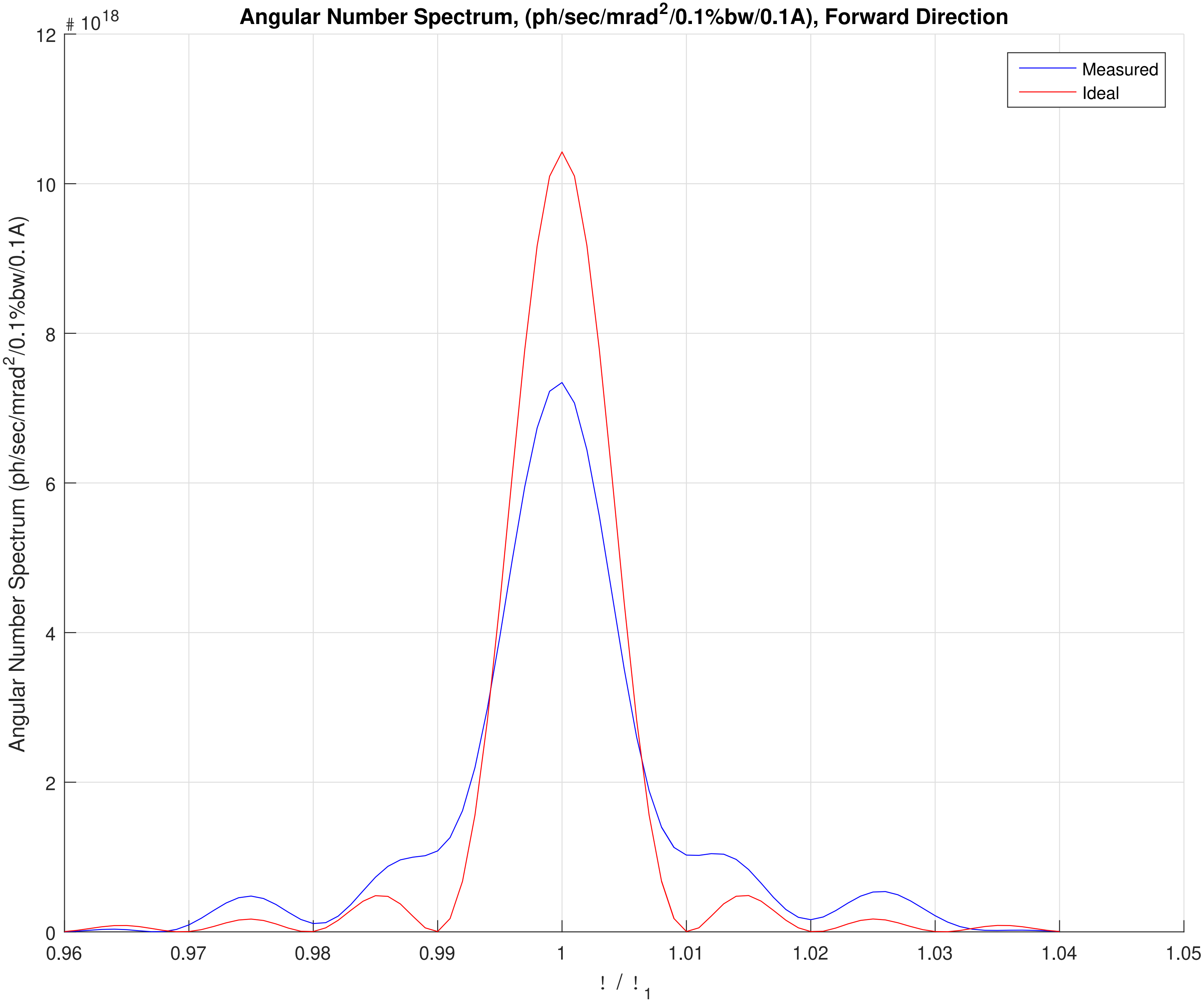


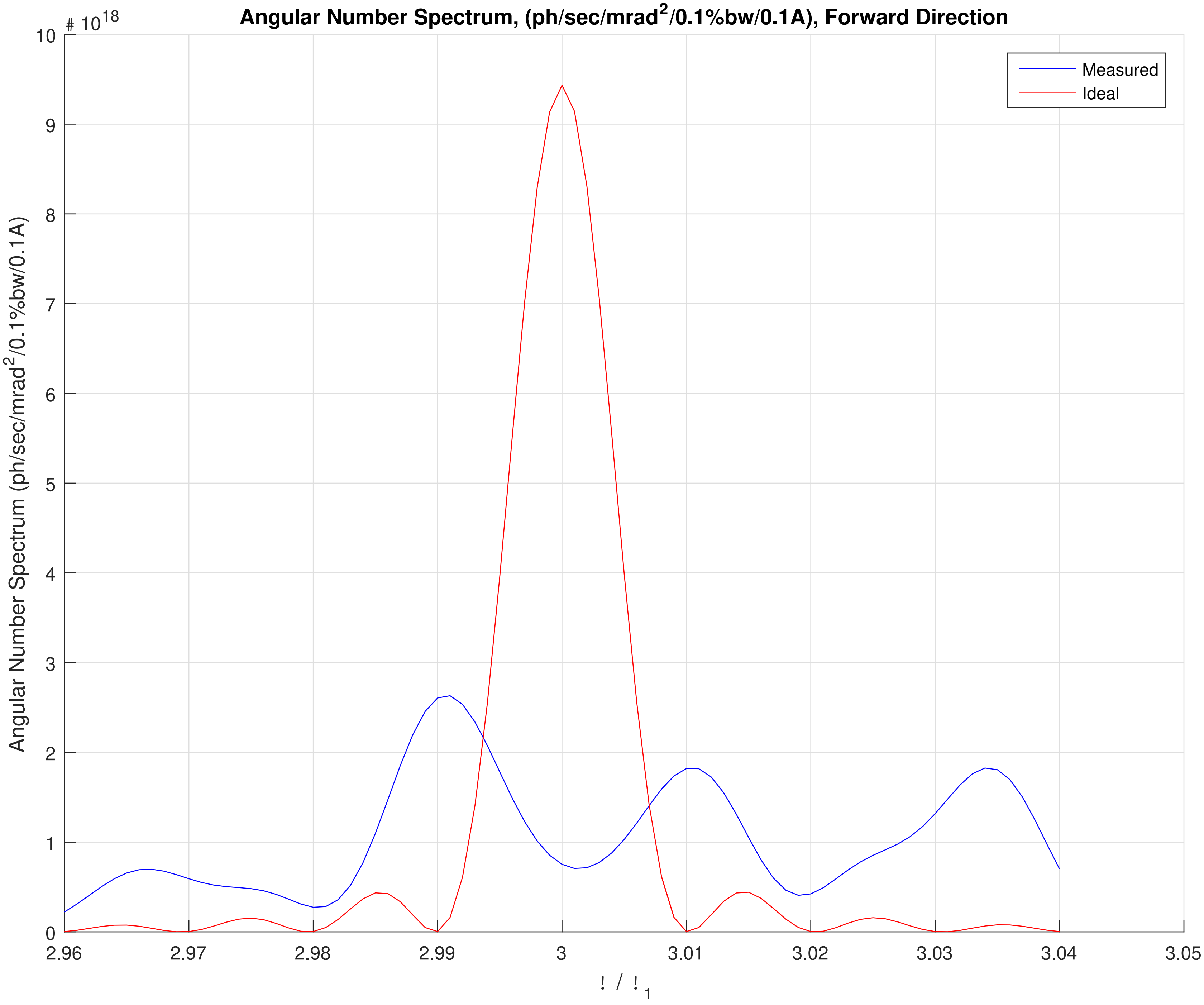
Re and Im Parts Of Ex(ω), Forward Direction, $\omega = \omega_1$

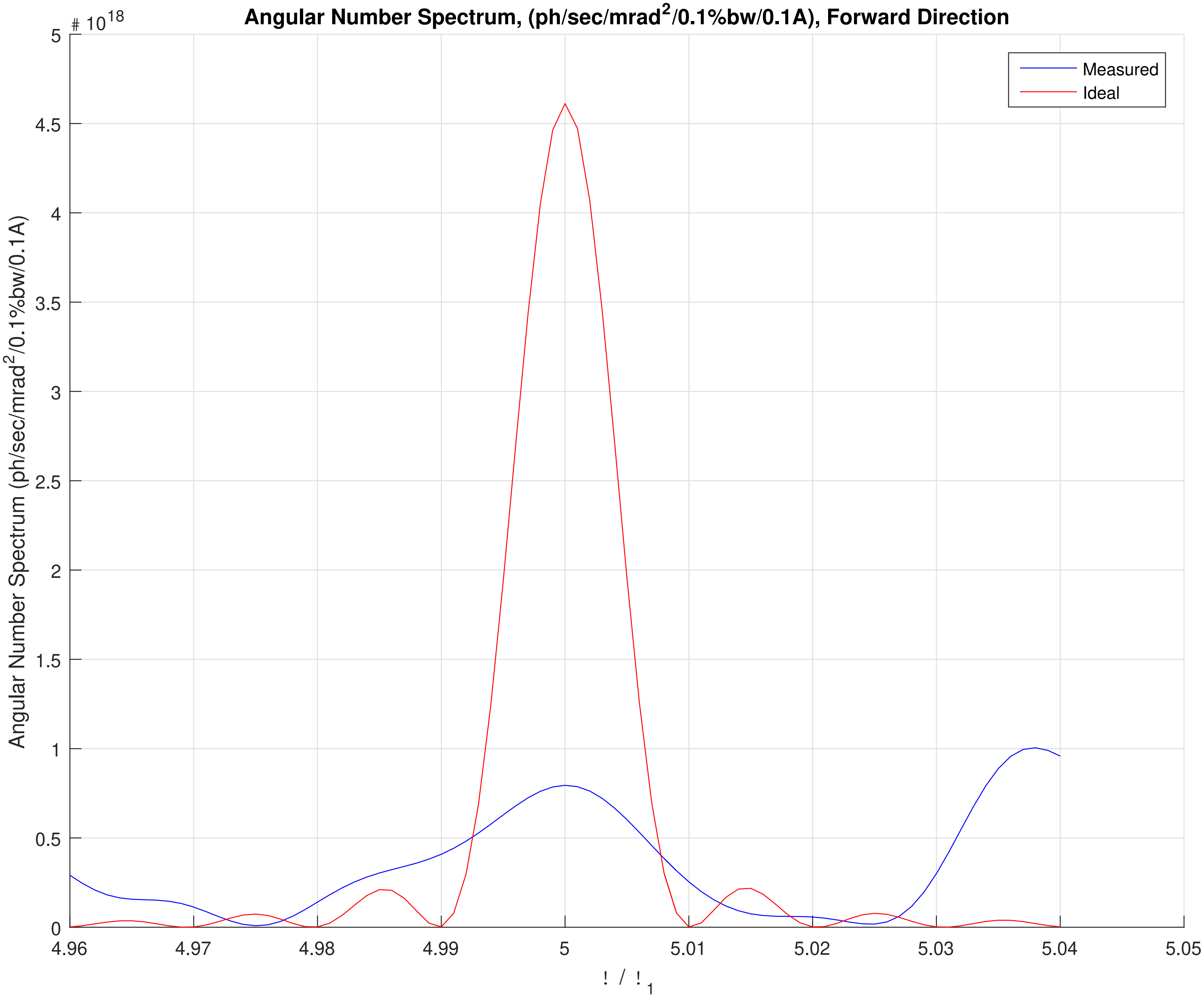
Re and Im Parts Of Ey(!), Forward Direction, ! = $!_1$




Angular Number Spectrum, (ph/sec/mrad2/0.1%bw/0.1A), Forward Direction
1018
8
7
6
5
4
3
2
1
0
Angular Number Spectrum (ph/sec/mrad2/0.1%bw/0.1A)
0
5
10
15
! / !1


Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{18}
12
10
8
6
4
2
0
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
0.96
0.97
0.98
0.99
1
1.01
1.02
1.03
1.04
1.05
! / !$_1$
Measured
Ideal




Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{18}
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
Measured
Ideal
4.96
4.97
4.98
4.99
5
5.01
5.02
5.03
5.04
5.05
! / !$_1$