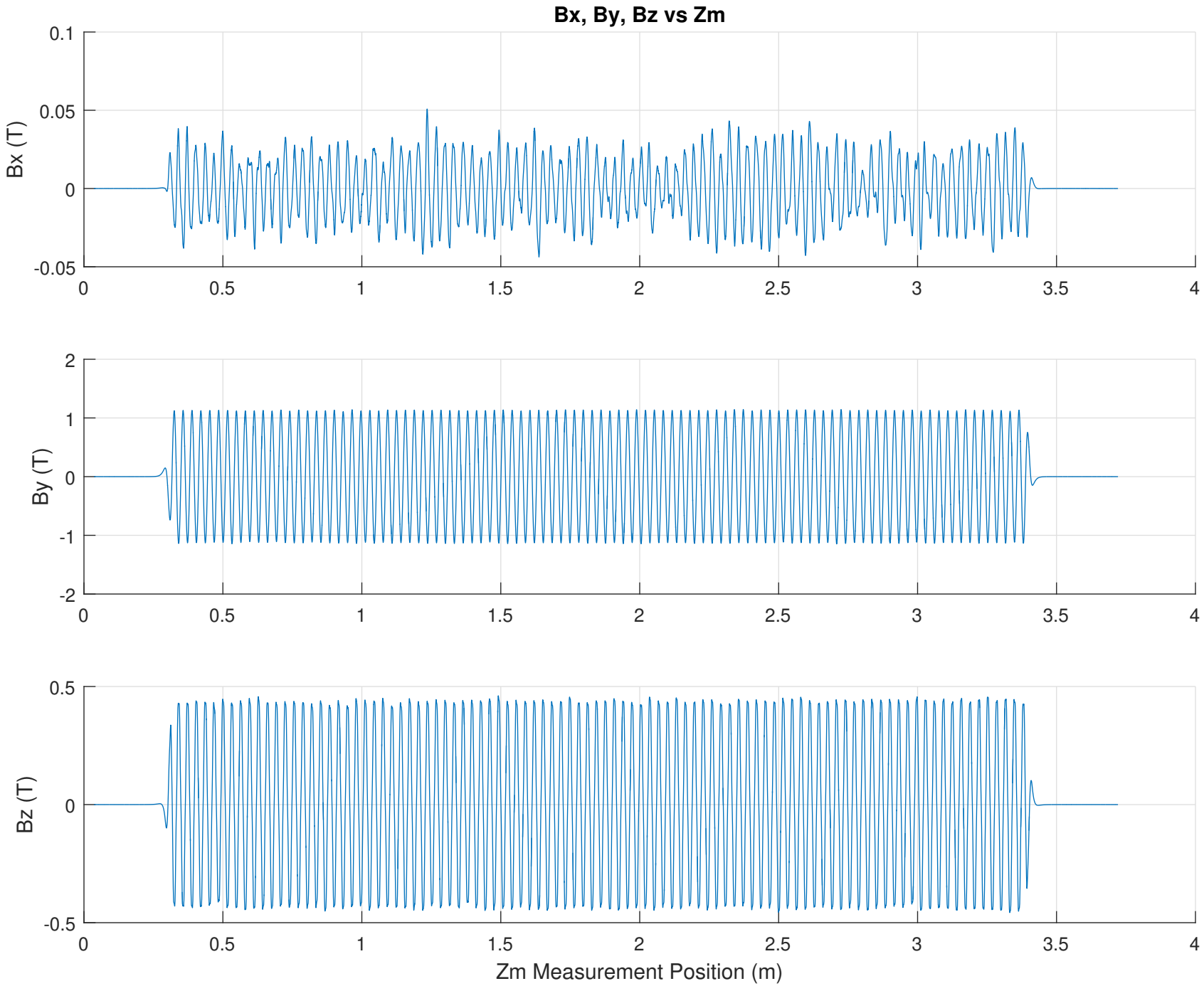
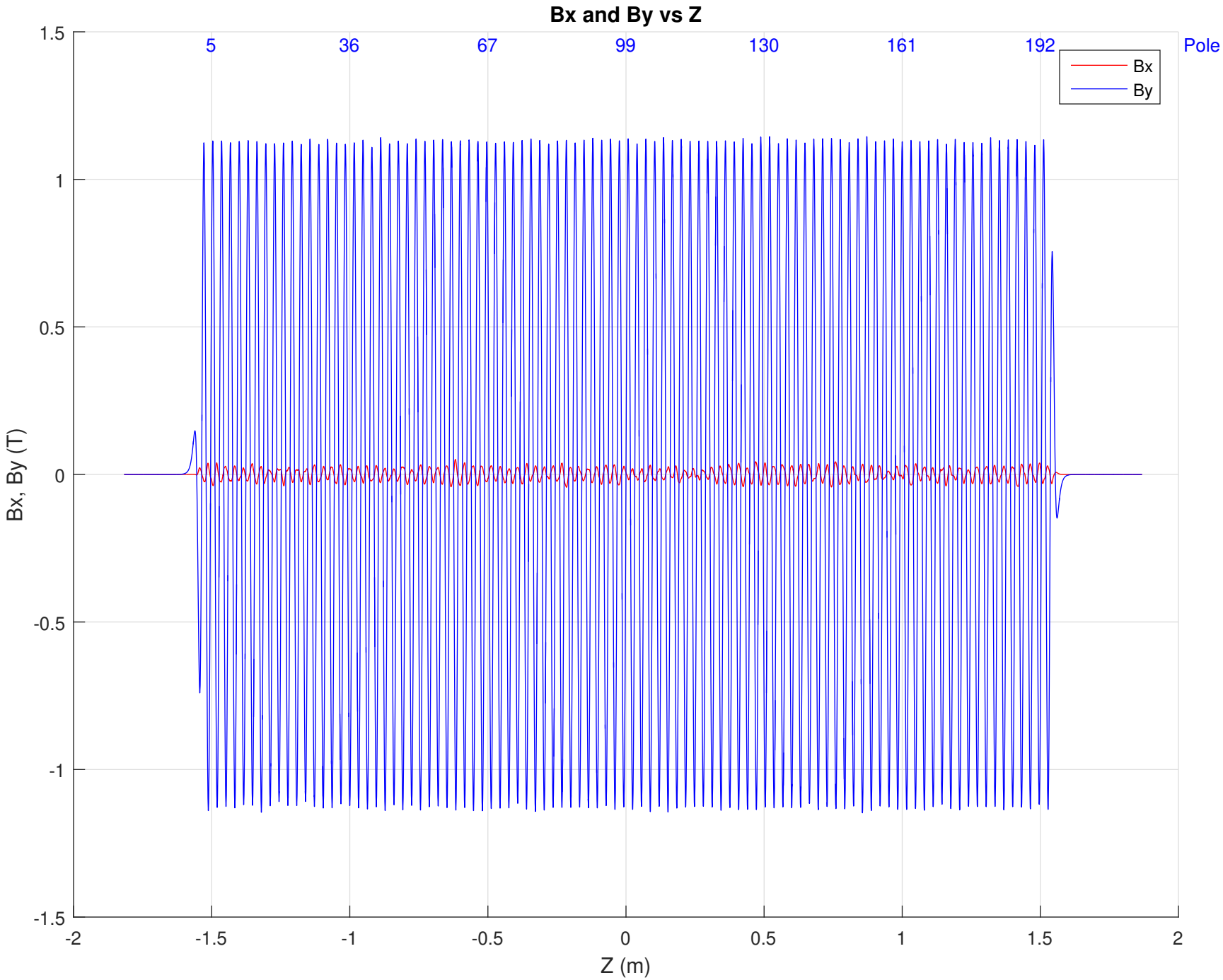
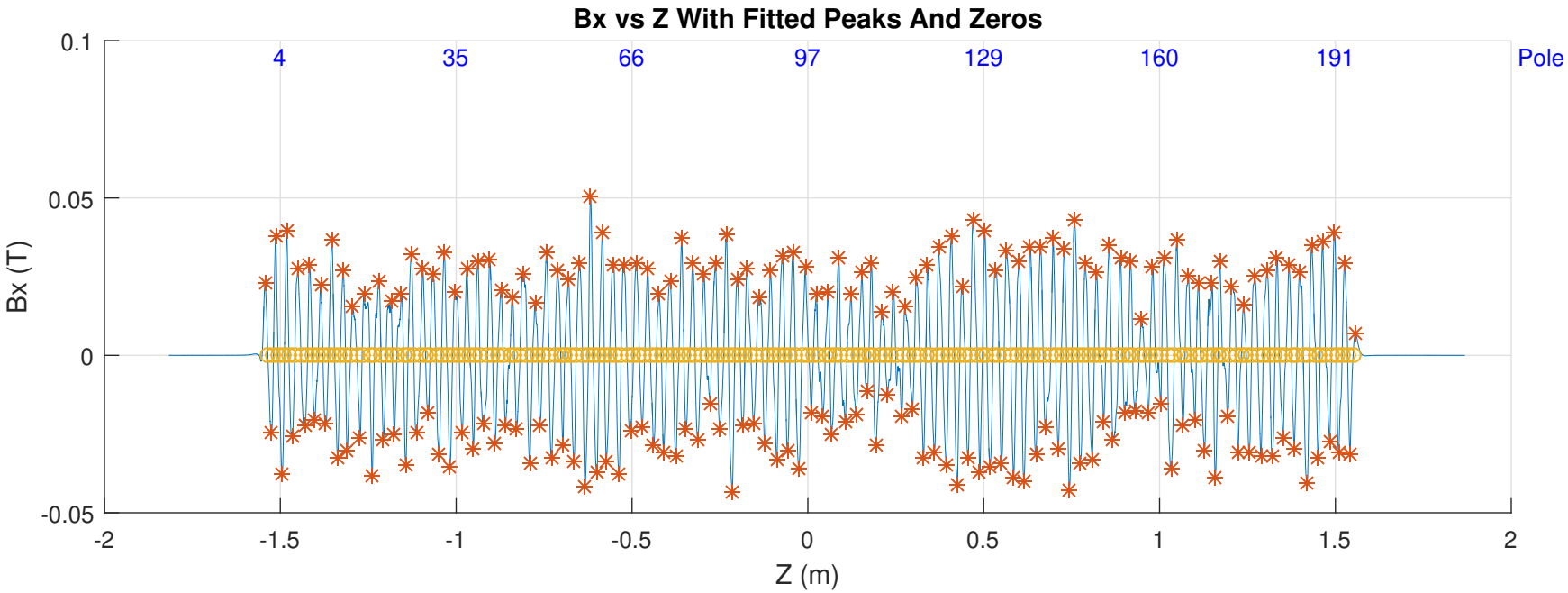
SLAC Magnetic Measurements

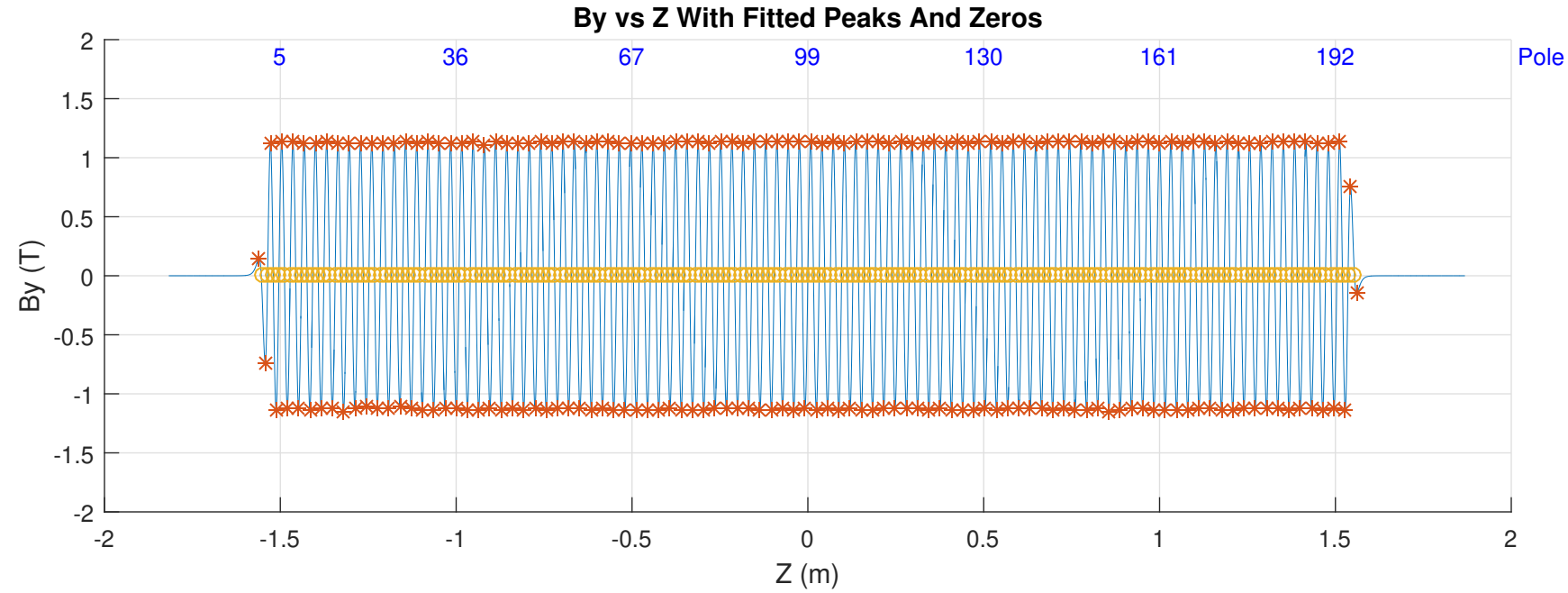
EPU Analysis

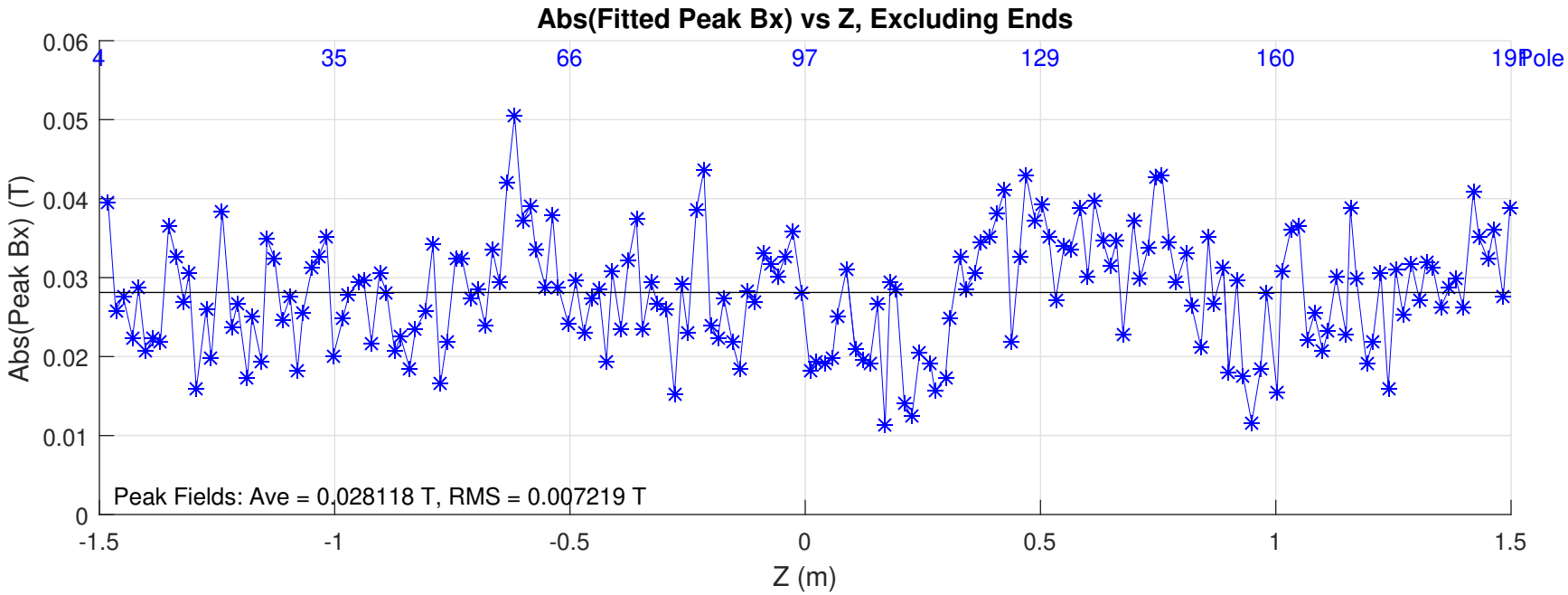
Parameters:
INPUT-FILE-DIR =V:\MET\MagServe\MagData\DELTA\Delta Data 2015\New Measurements\Run 137 HD Spreadsheet 260 Meas\\I
INPUT-FILE-NAME =hall2-anal-probe1-field.dat
INPUT-FILE-TYPE =ZBXYZH
CORR-REQUIRED =0
GAMMA =26671.59
NOM-LAMBDA-U =0
NOM-K-VALUE =0
NOM-LAMBDA-R =0
NUM-POLES =196
NUM-END-POLES =4
CELL-LENGTH =3.656

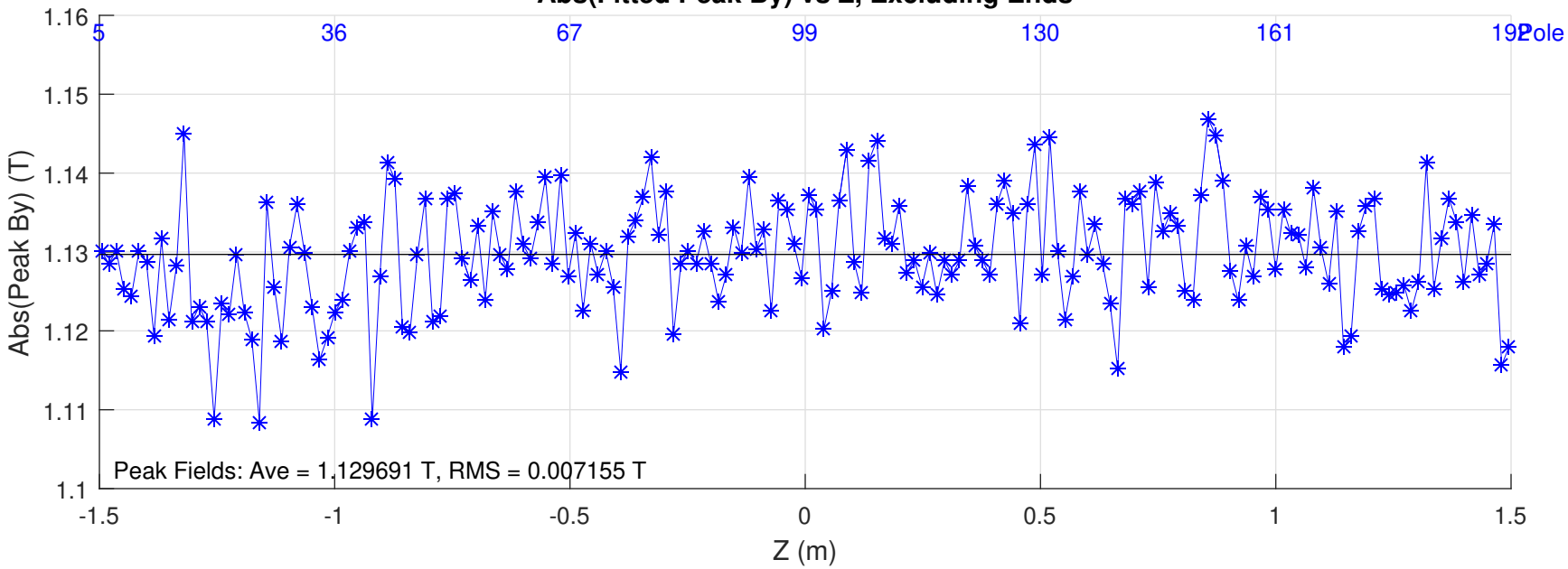

Bx, By, Bz vs Zm
Bx (T)
0.1
0.05
0
-0.05
By (T)
2
1
0
-1
-2
Bz (T)
0.5
0
-0.5
0
0.5
1
1.5
2
2.5
3
3.5
4
Zm Measurement Position (m)

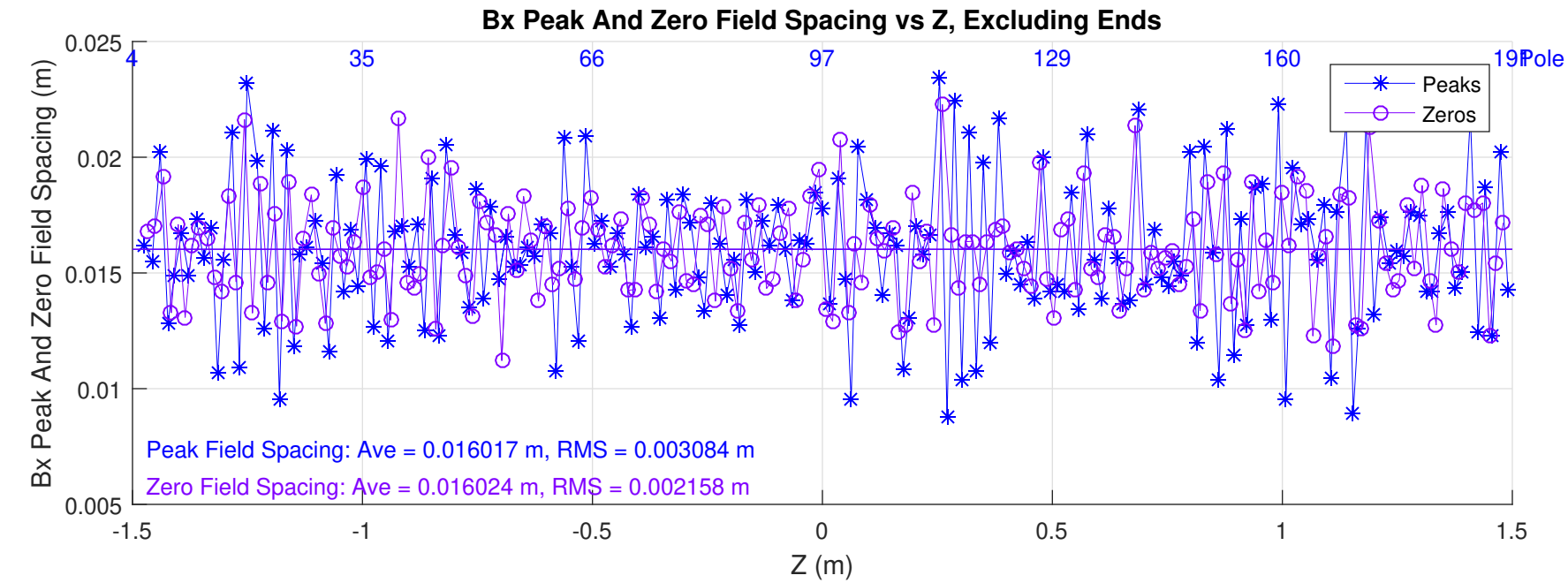

Bx and By vs Z
5
36
67
99
130
161
192
Pole
Bx
By
1.5
1
0.5
0
-0.5
-1
-1.5
Bx, By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

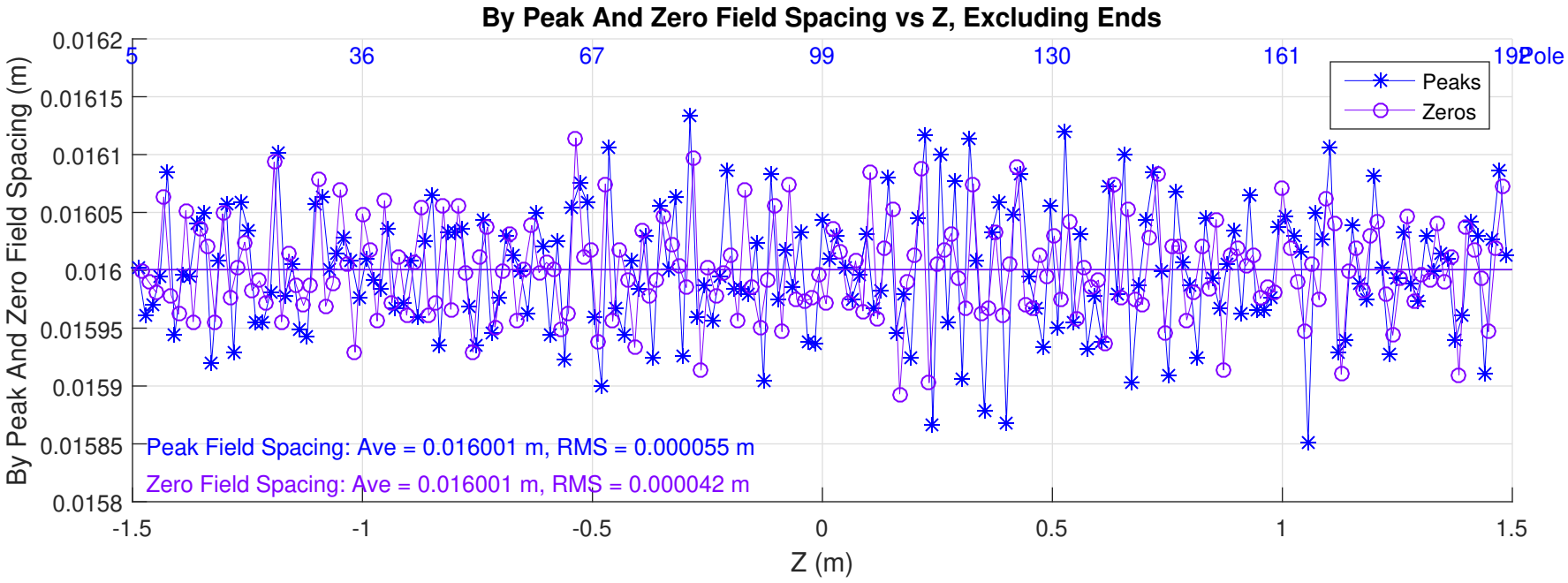

Bx vs Z With Fitted Peaks And Zeros
4
35
66
97
129
160
191
Pole
0.1
0.05
0
-0.05
Bx (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

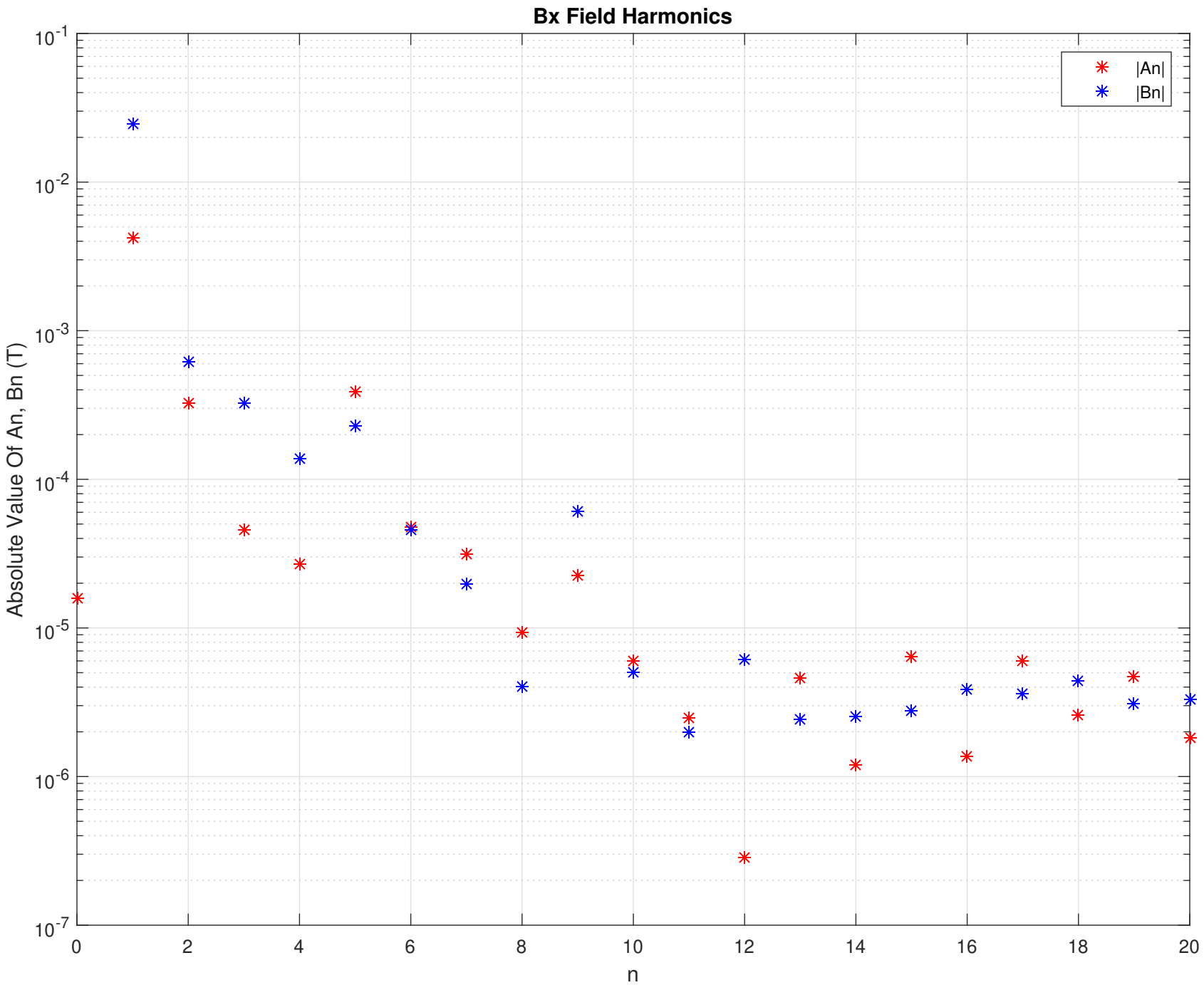

By vs Z With Fitted Peaks And Zeros
5
36
67
99
130
161
192
Pole
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

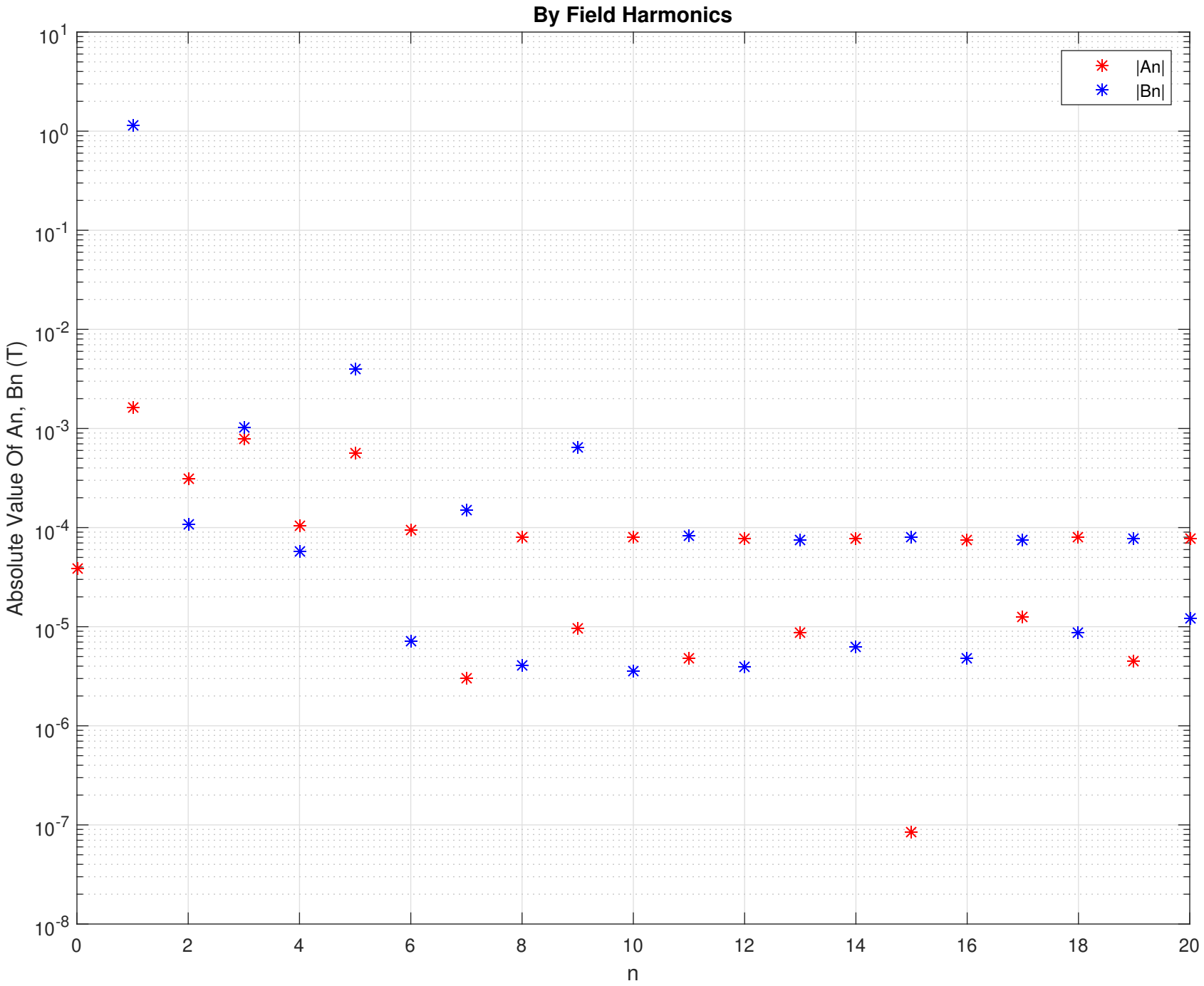

Abs(Fitted Peak Bx) vs Z, Excluding Ends
Abs(Peak Bx) (T)
Z (m)
Pole
Peak Fields: Ave = 0.028118 T, RMS = 0.007219 T

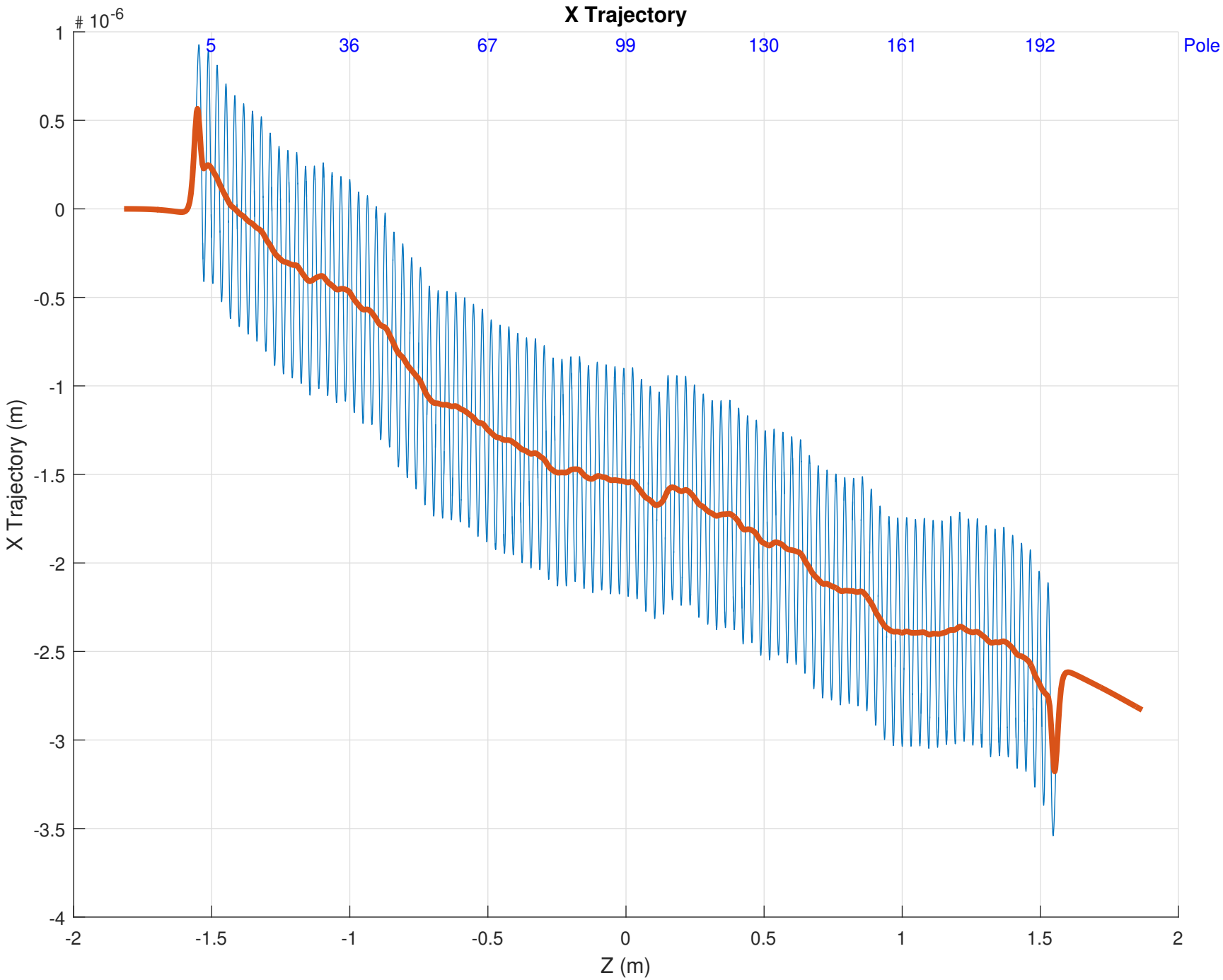

Abs(Fitted Peak By) vs Z, Excluding Ends
Abs(Peak By) (T)
Z (m)
Pole
Peak Fields: Ave = 1.129691 T, RMS = 0.007155 T

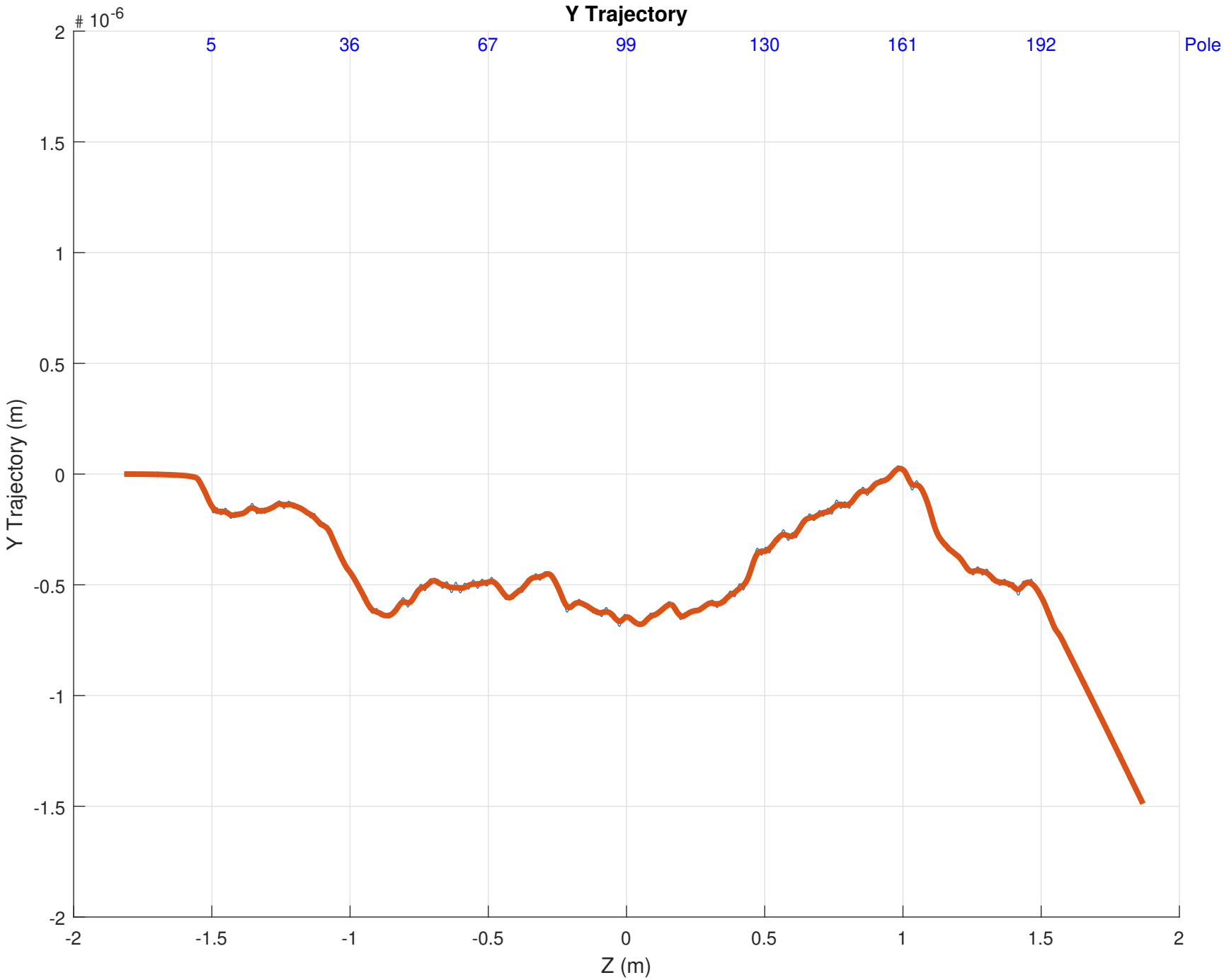

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
0.025
0.02
0.015
0.01
0.005
4
35
66
97
129
160
191
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016017 m, RMS = 0.003084 m
Zero Field Spacing: Ave = 0.016024 m, RMS = 0.002158 m
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)

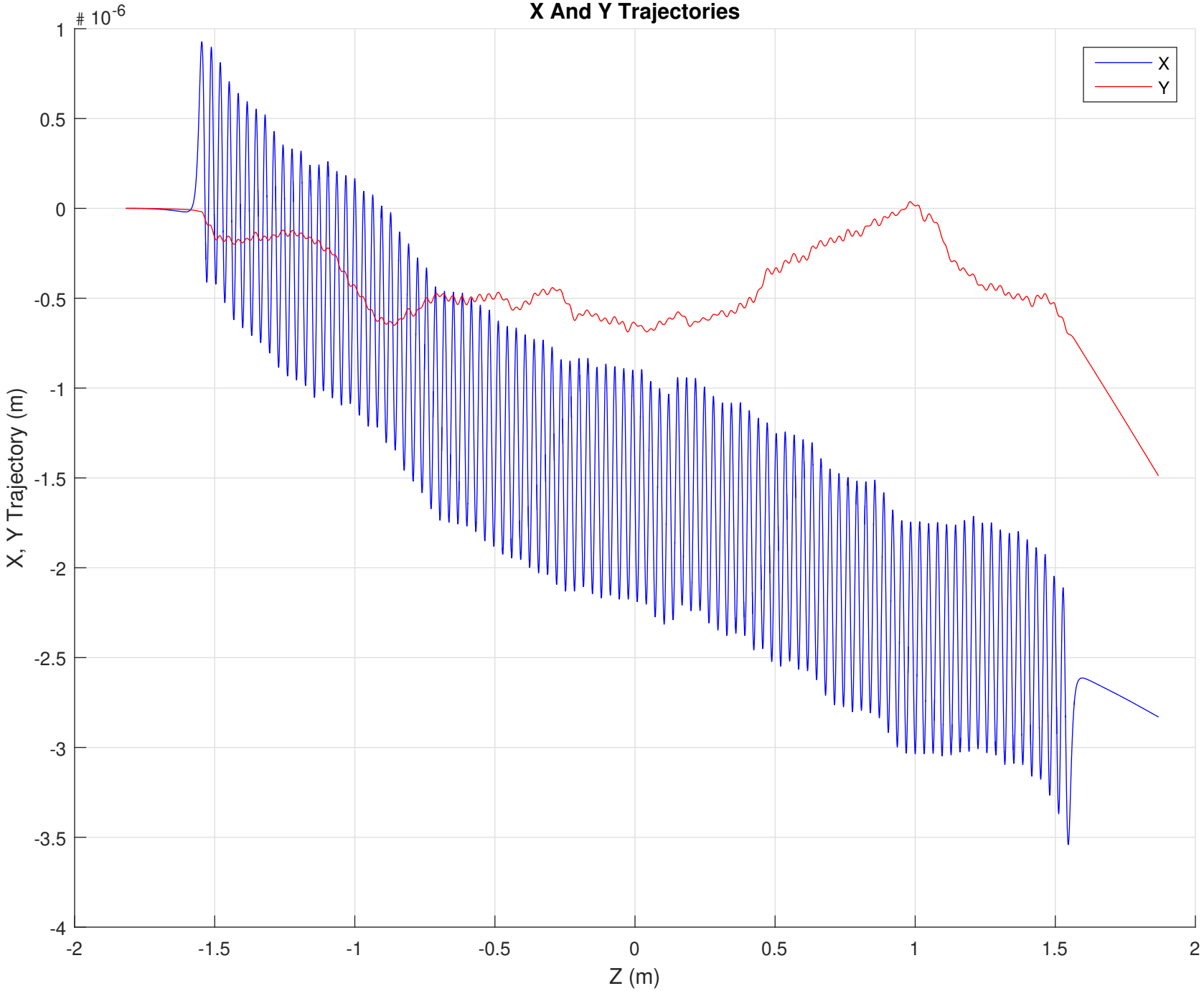

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
0.0162
0.01615
0.0161
0.01605
0.016
0.01595
0.0159
0.01585
0.0158
5
36
67
99
130
161
192
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016001 m, RMS = 0.000055 m
Zero Field Spacing: Ave = 0.016001 m, RMS = 0.000042 m
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)

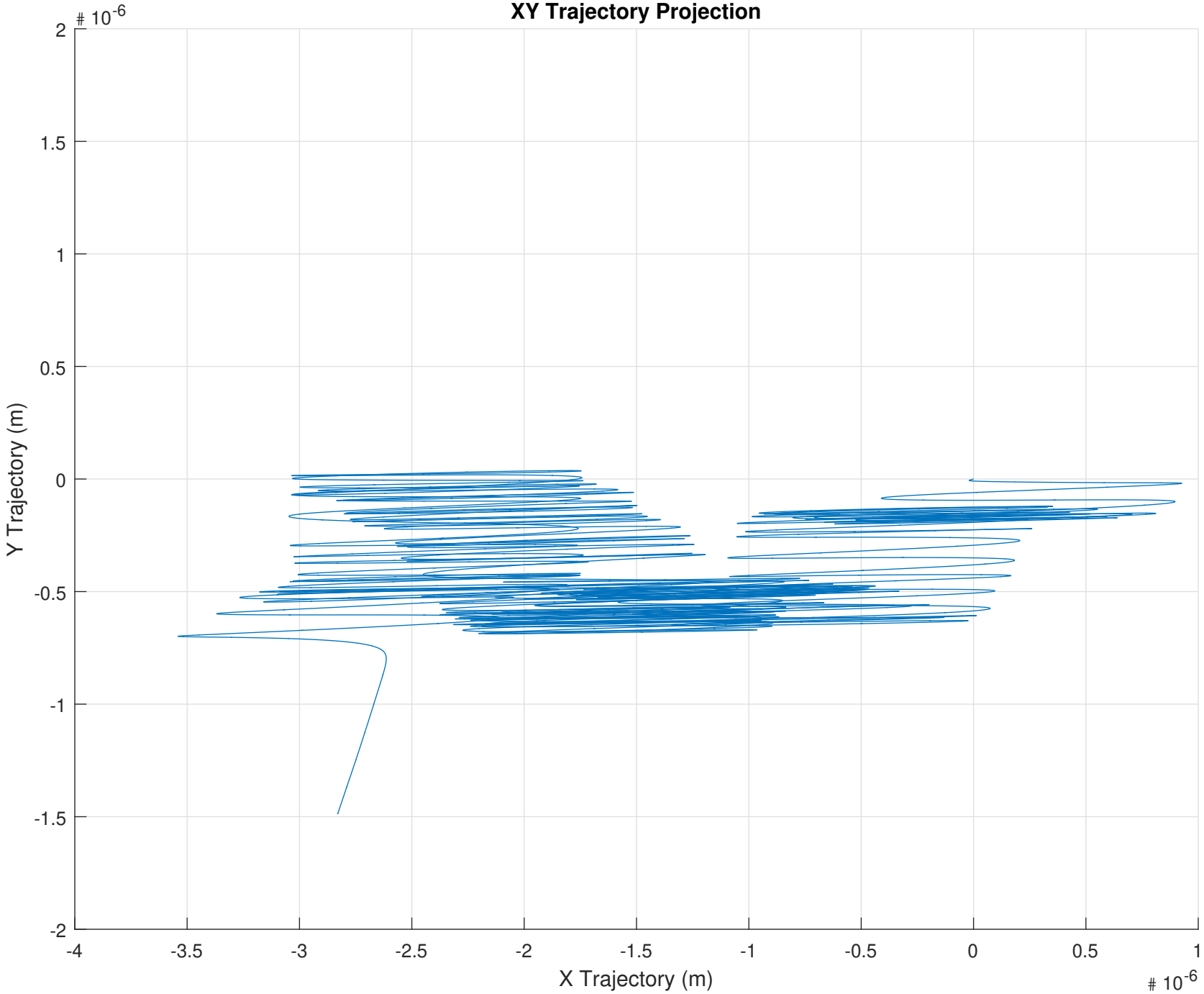

Bx Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
10^-7
0
2
4
6
8
10
12
14
16
18
20

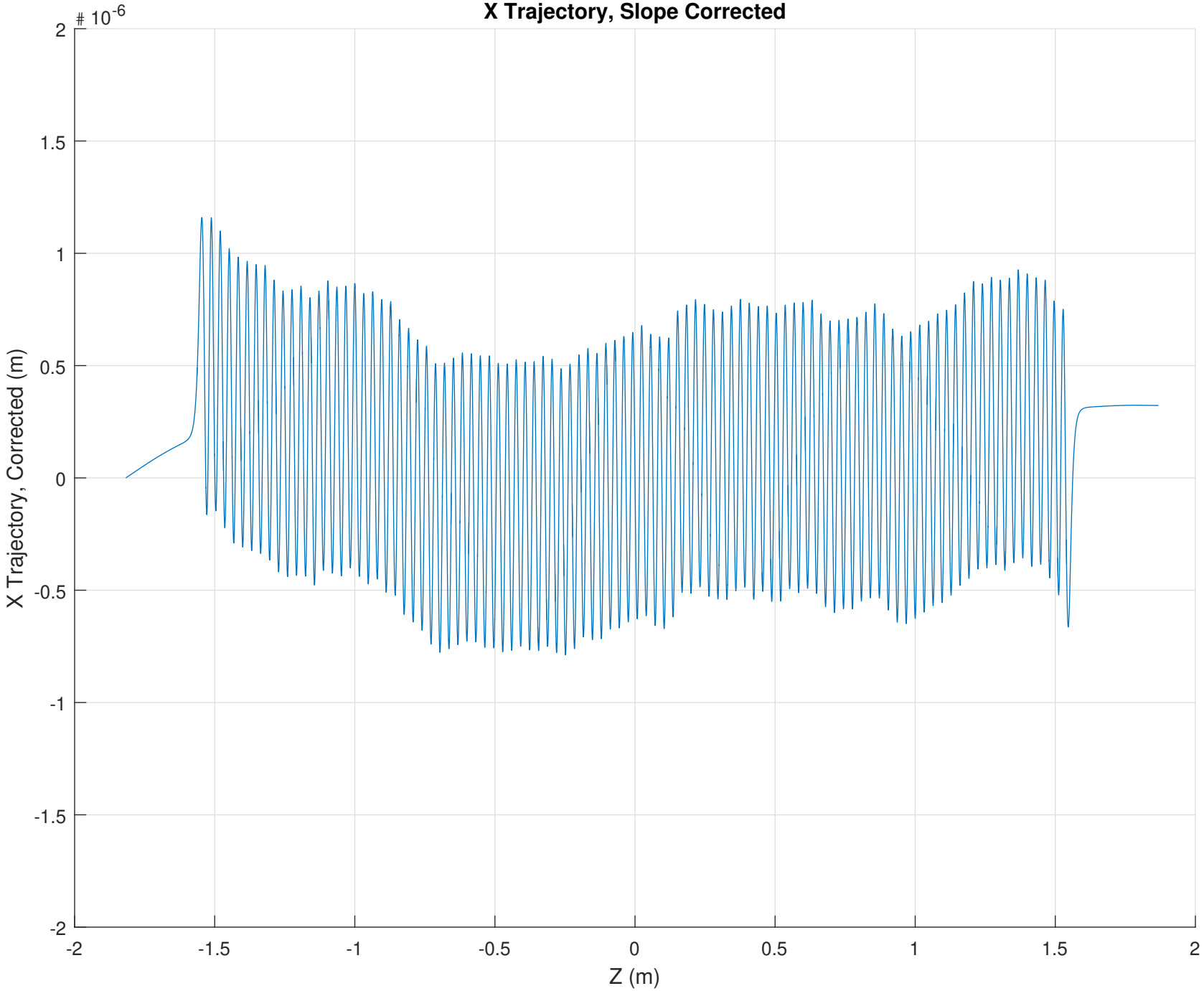

By Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
10^{-8}
0
2
4
6
8
10
12
14
16
18
20

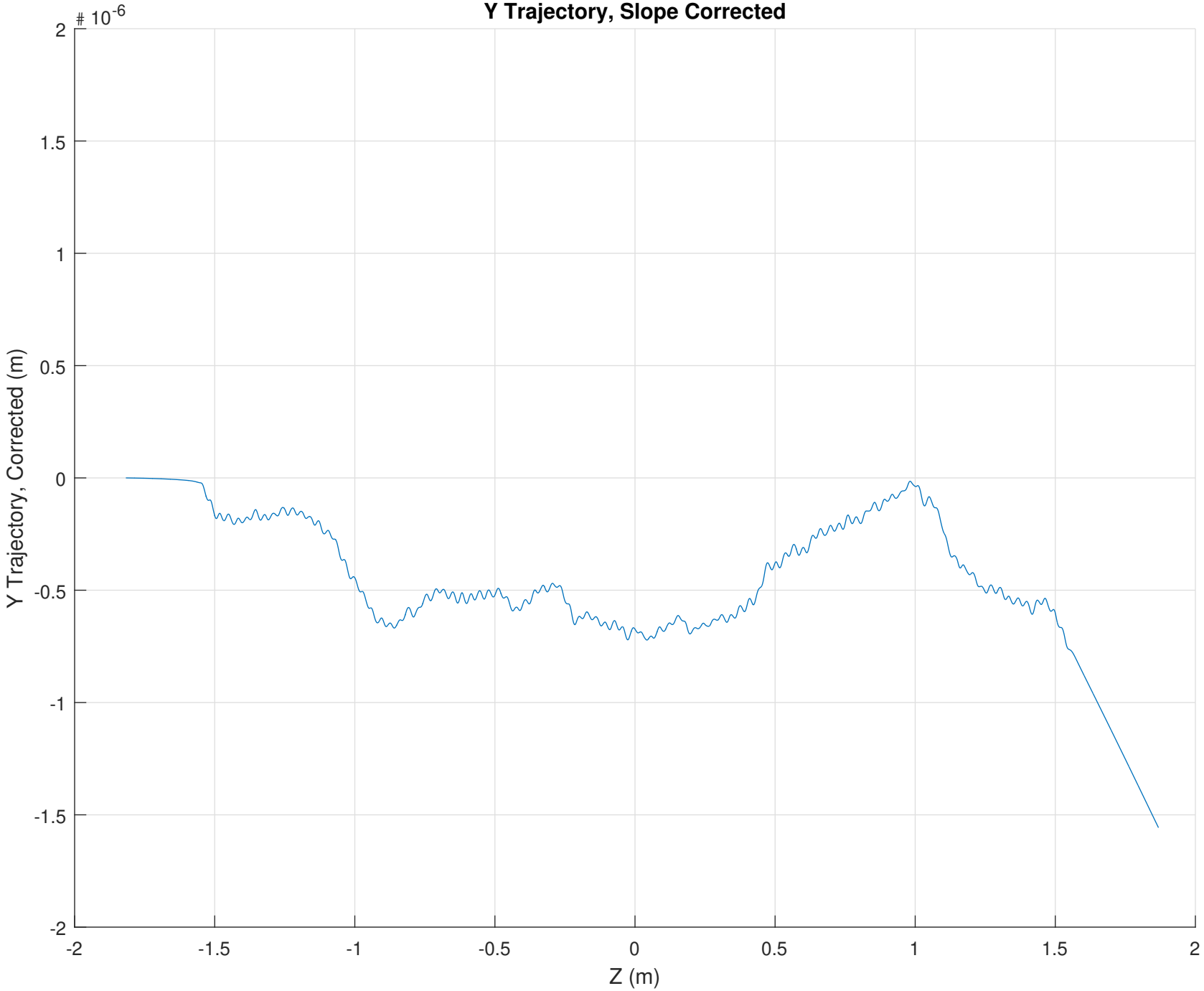

X Trajectory
10^-6
5
36
67
99
130
161
192
Pole
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
-3.5
-4
X Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

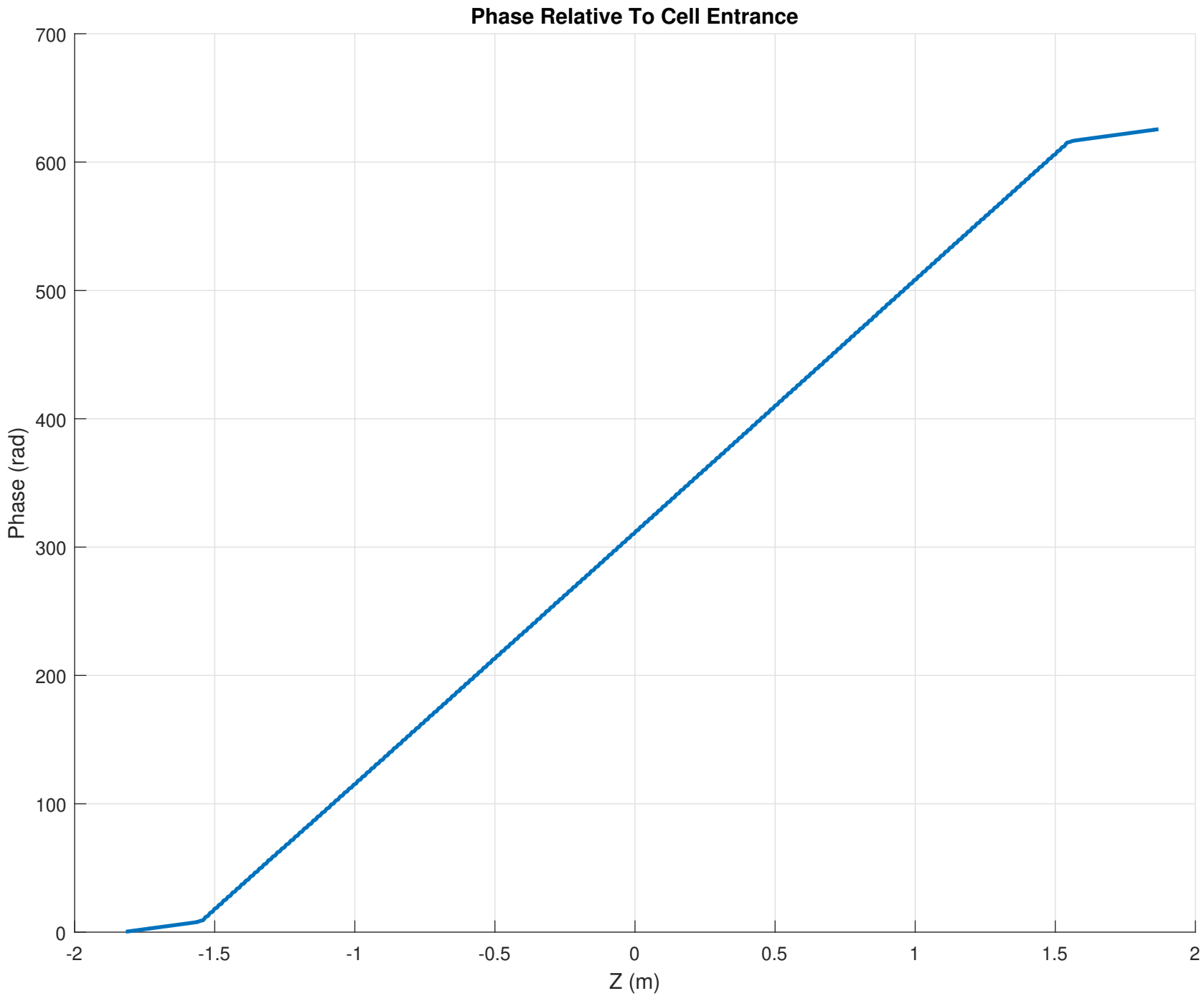

Y Trajectory
10-6
5
36
67
99
130
161
192
Pole
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

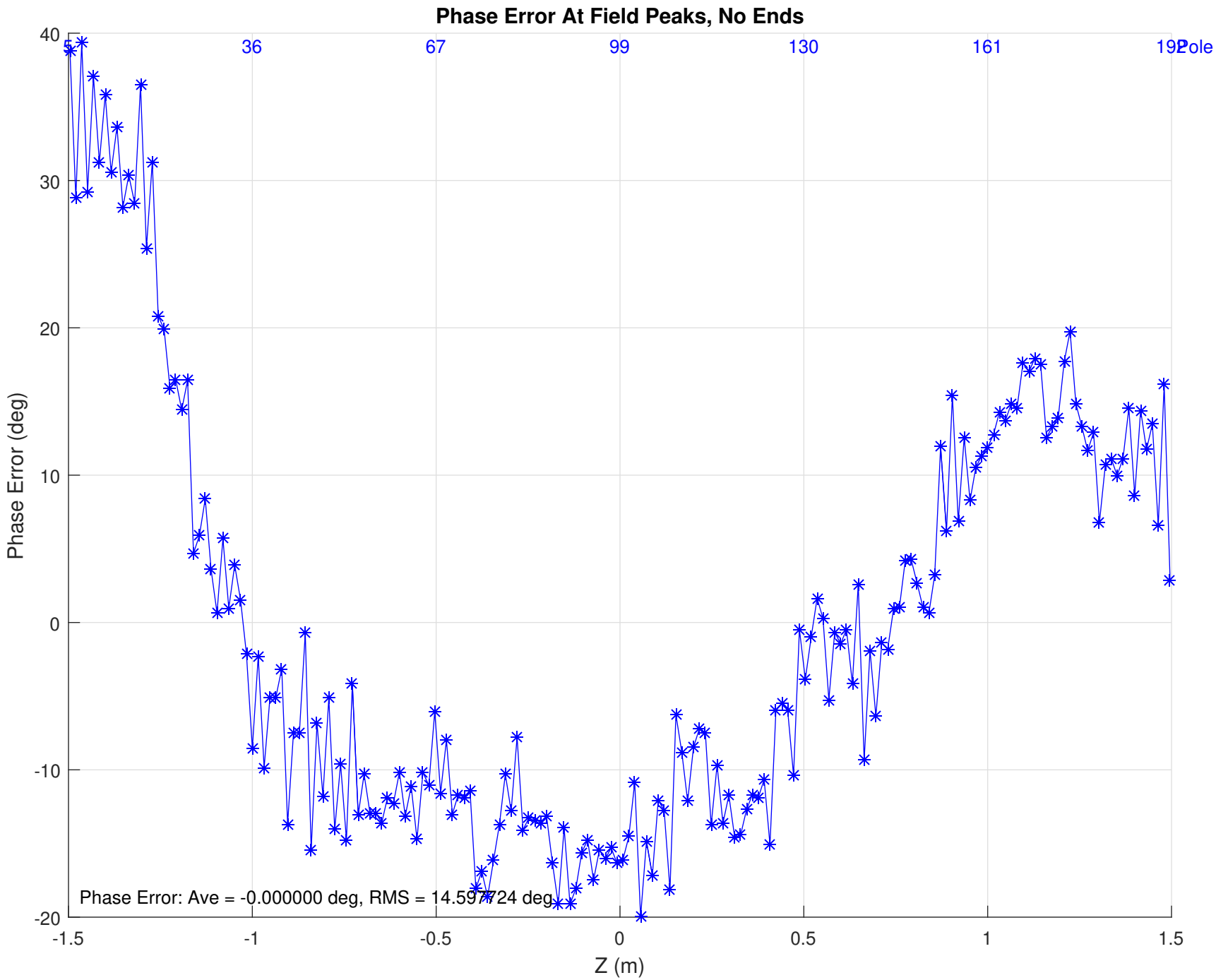

X And Y Trajectories
10^-6
X
Y
X, Y Trajectory (m)
Z (m)
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
-3.5
-4
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2

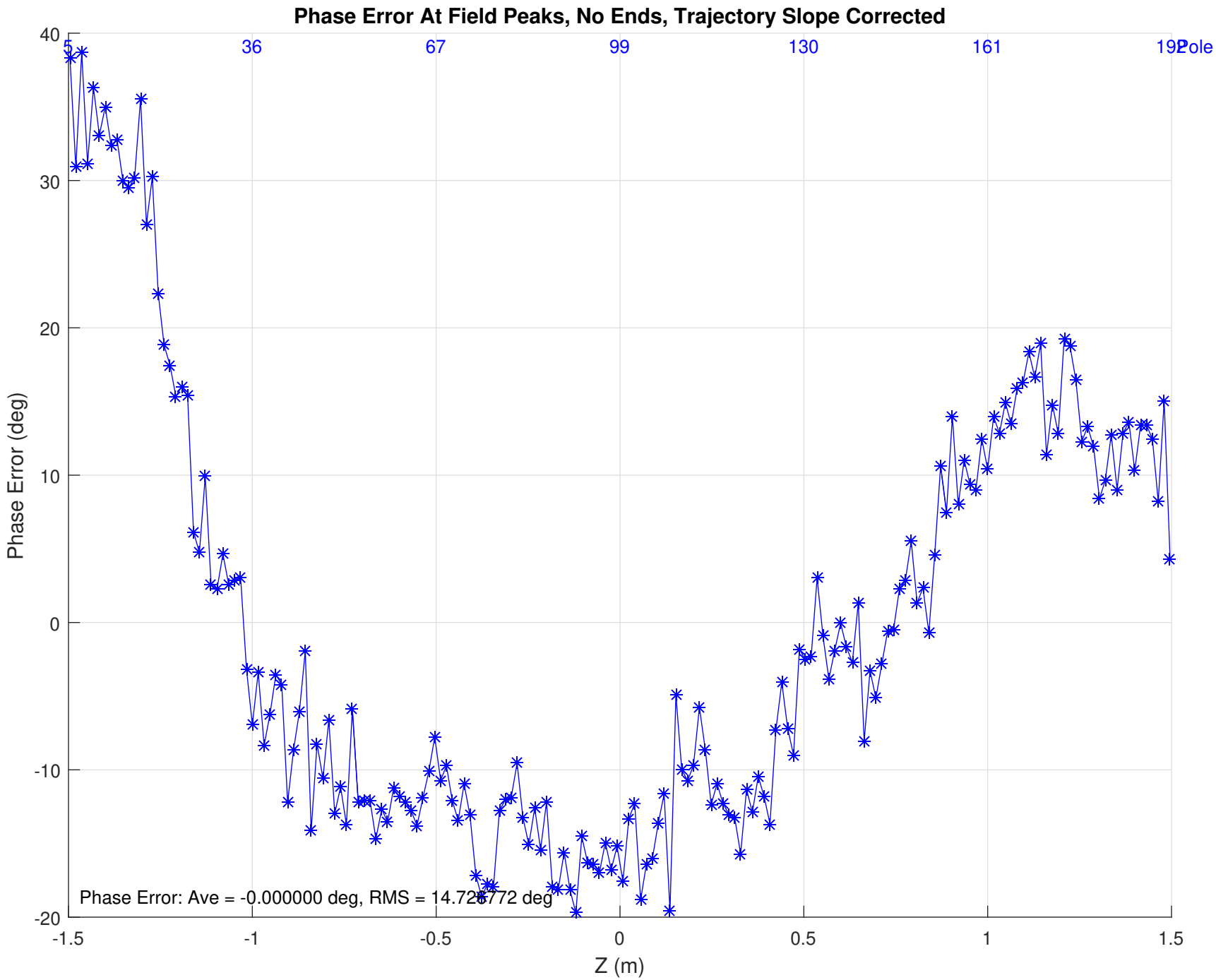

XY Trajectory Projection
10^-6
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
Y Trajectory (m)
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
X Trajectory (m)
10^-6

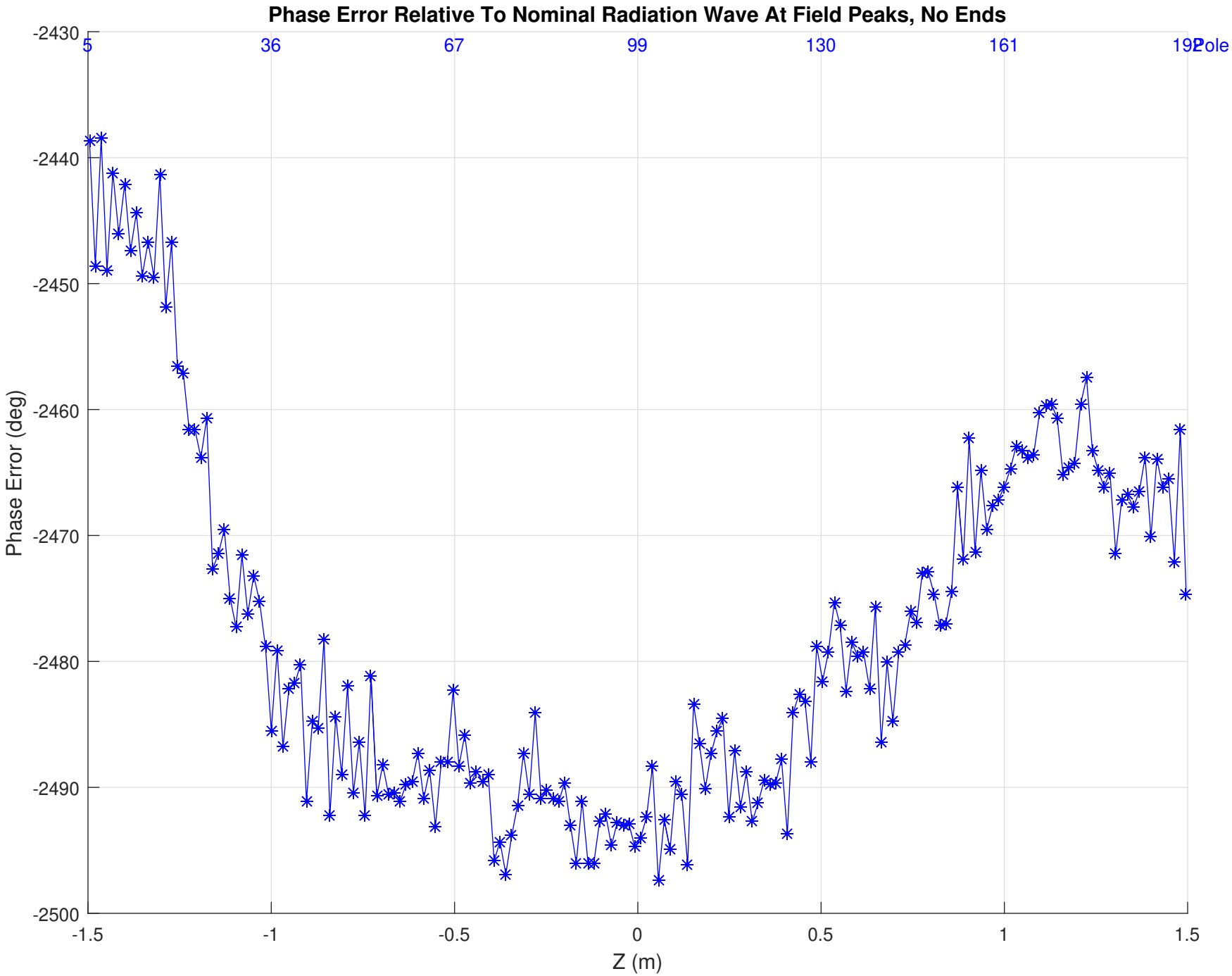

X Trajectory, Slope Corrected
10^-6
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
X Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

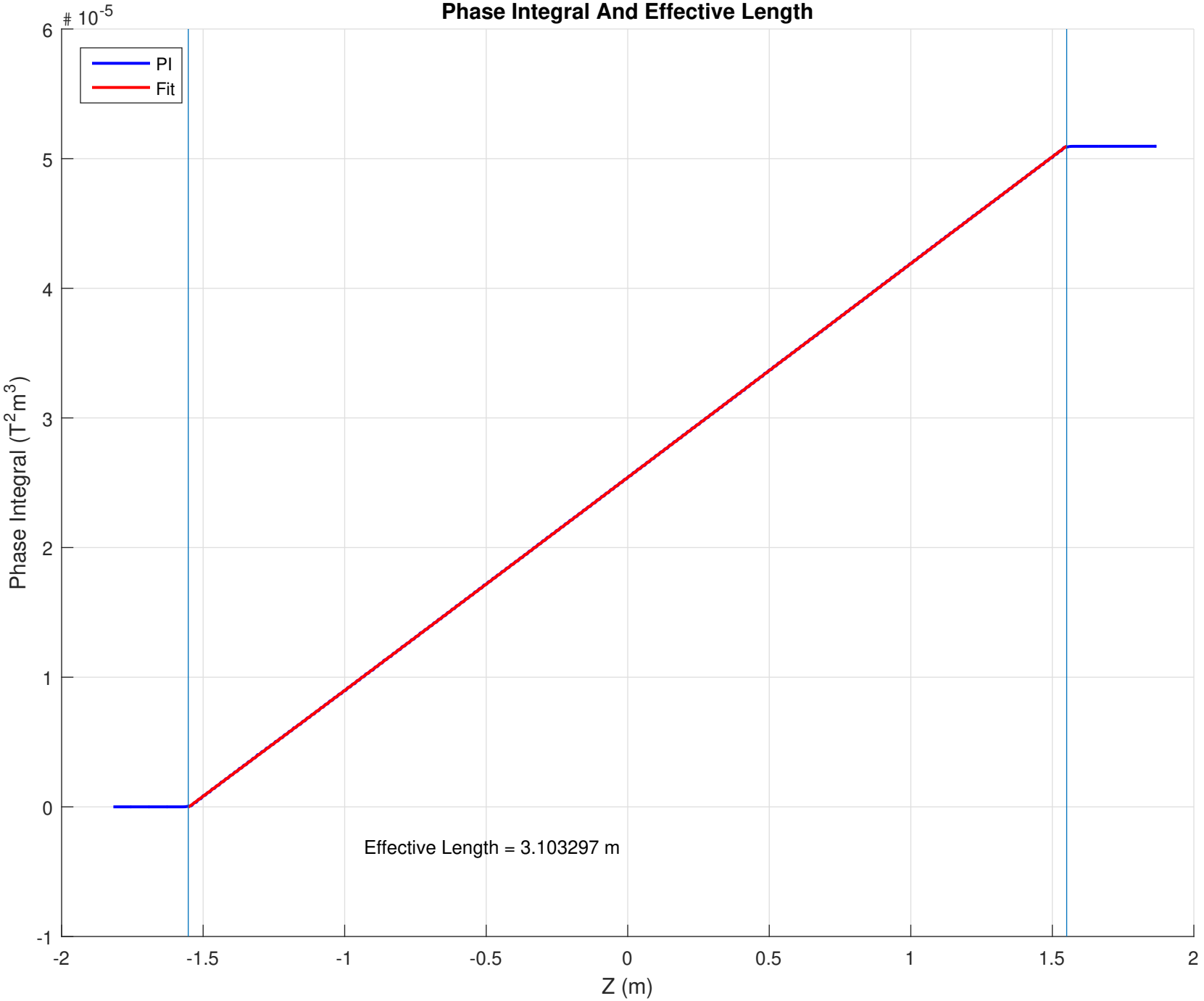

Y Trajectory, Slope Corrected
10^-6
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
Y Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

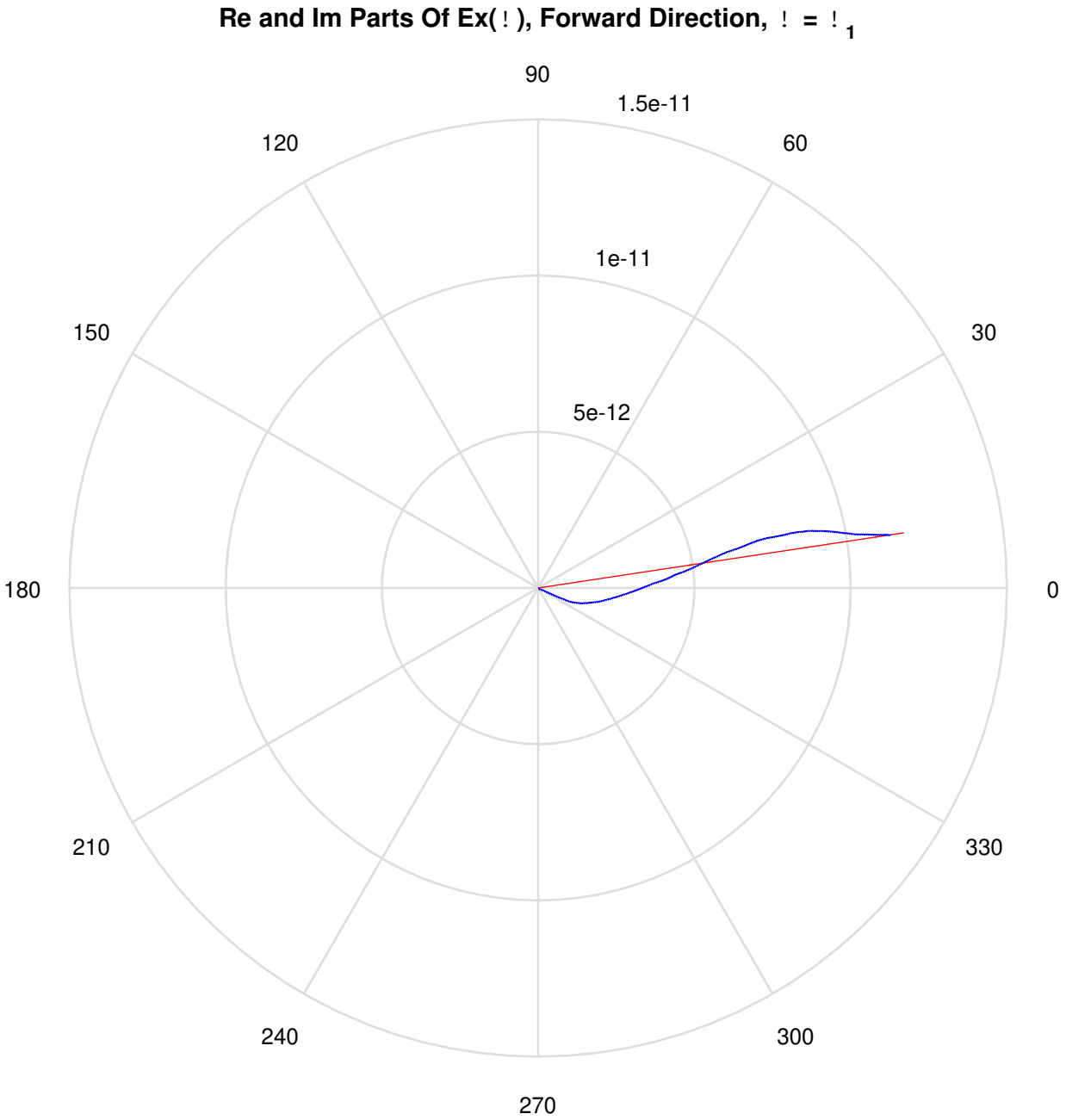

Phase Relative To Cell Entrance
Phase (rad)
Z (m)
700
600
500
400
300
200
100
0
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2

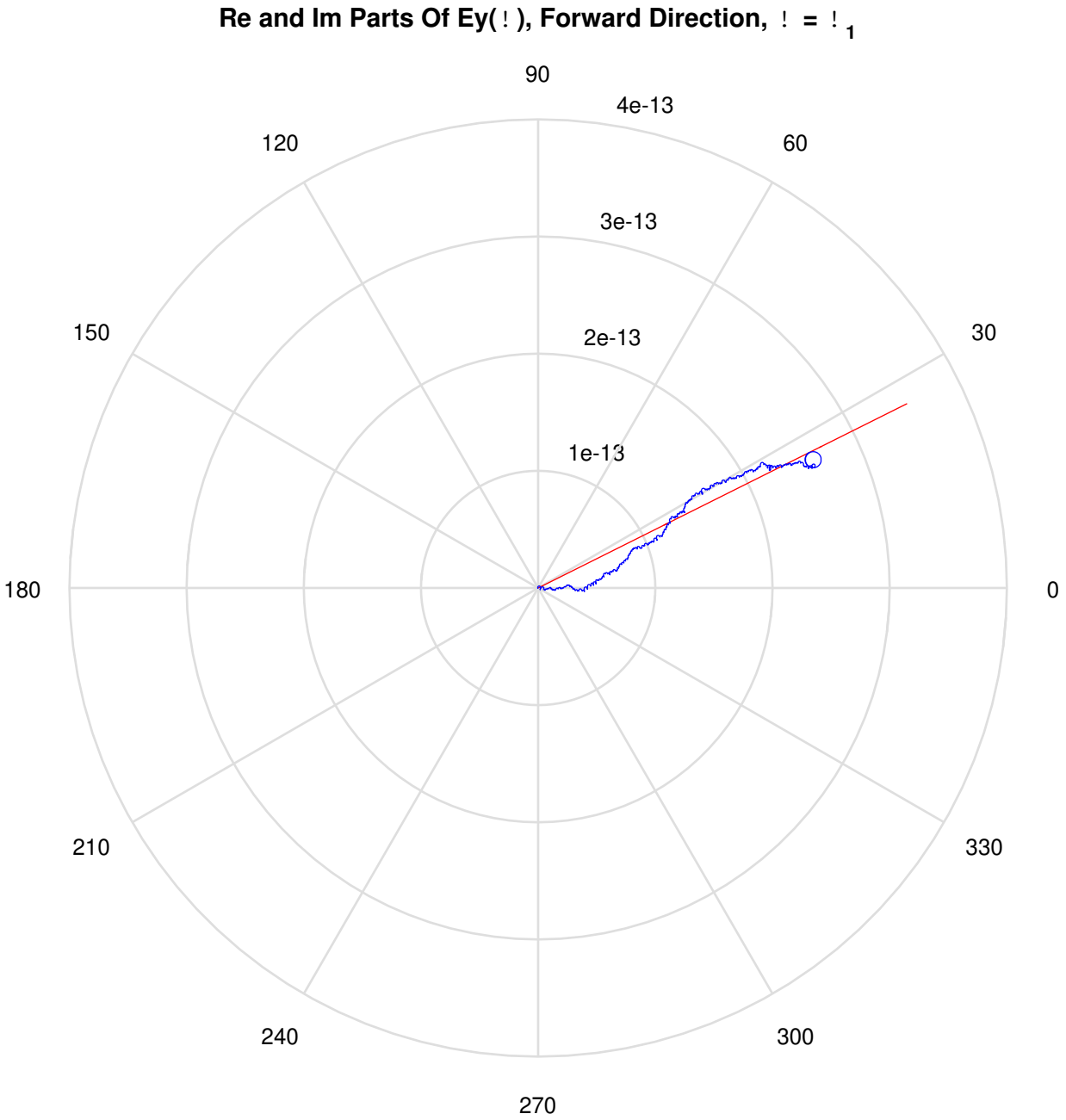

Phase Error At Field Peaks, No Ends
5
36
67
99
130
161
192
Pole
40
30
20
10
0
-10
-20
Phase Error (deg)
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)
Phase Error: Ave = -0.000000 deg, RMS = 14.597724 deg

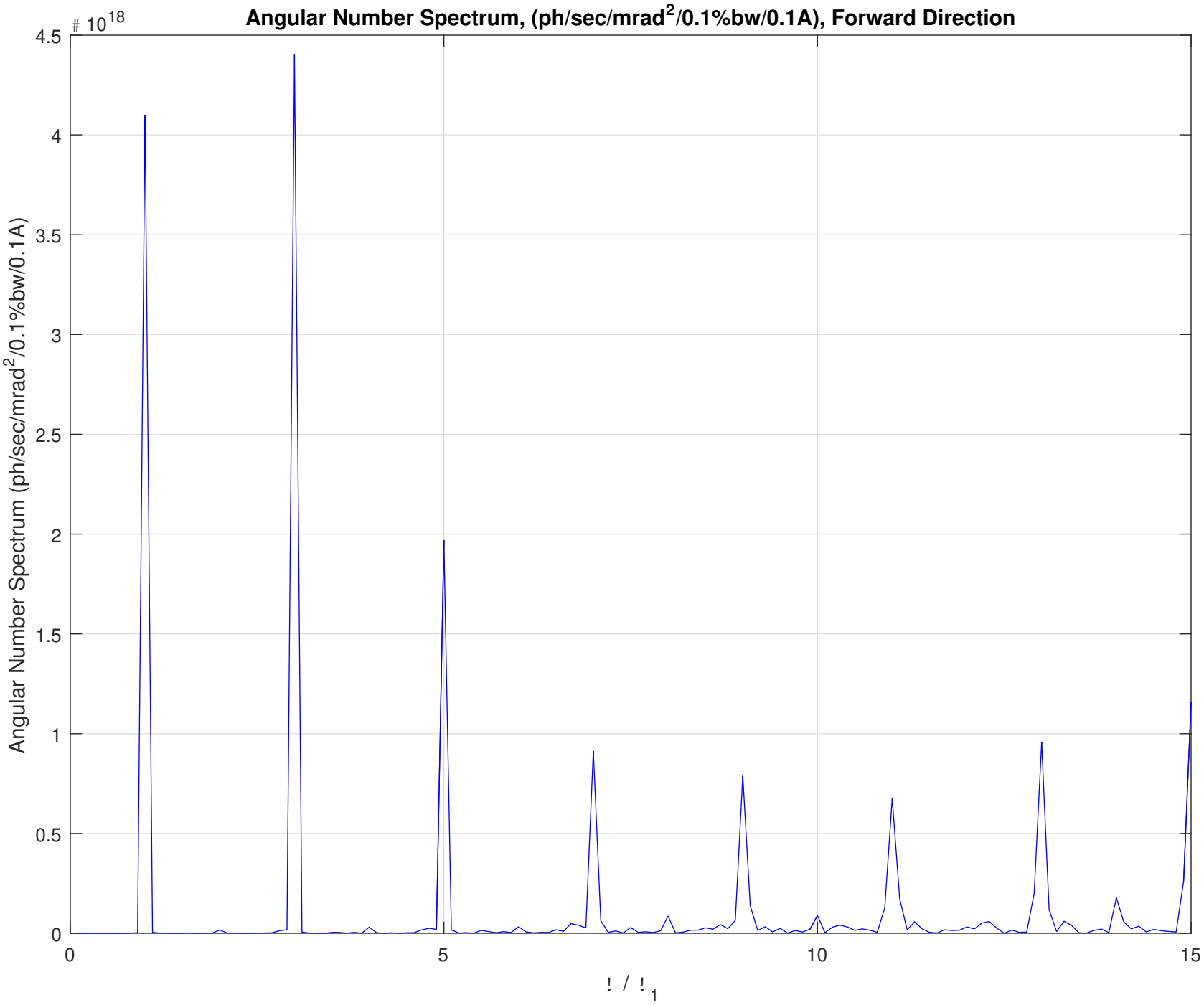

Phase Error At Field Peaks, No Ends, Trajectory Slope Corrected
5
36
67
99
130
161
192
Pole
40
30
20
10
0
-10
-20
Phase Error (deg)
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)
Phase Error: Ave = -0.000000 deg, RMS = 14.7286772 deg

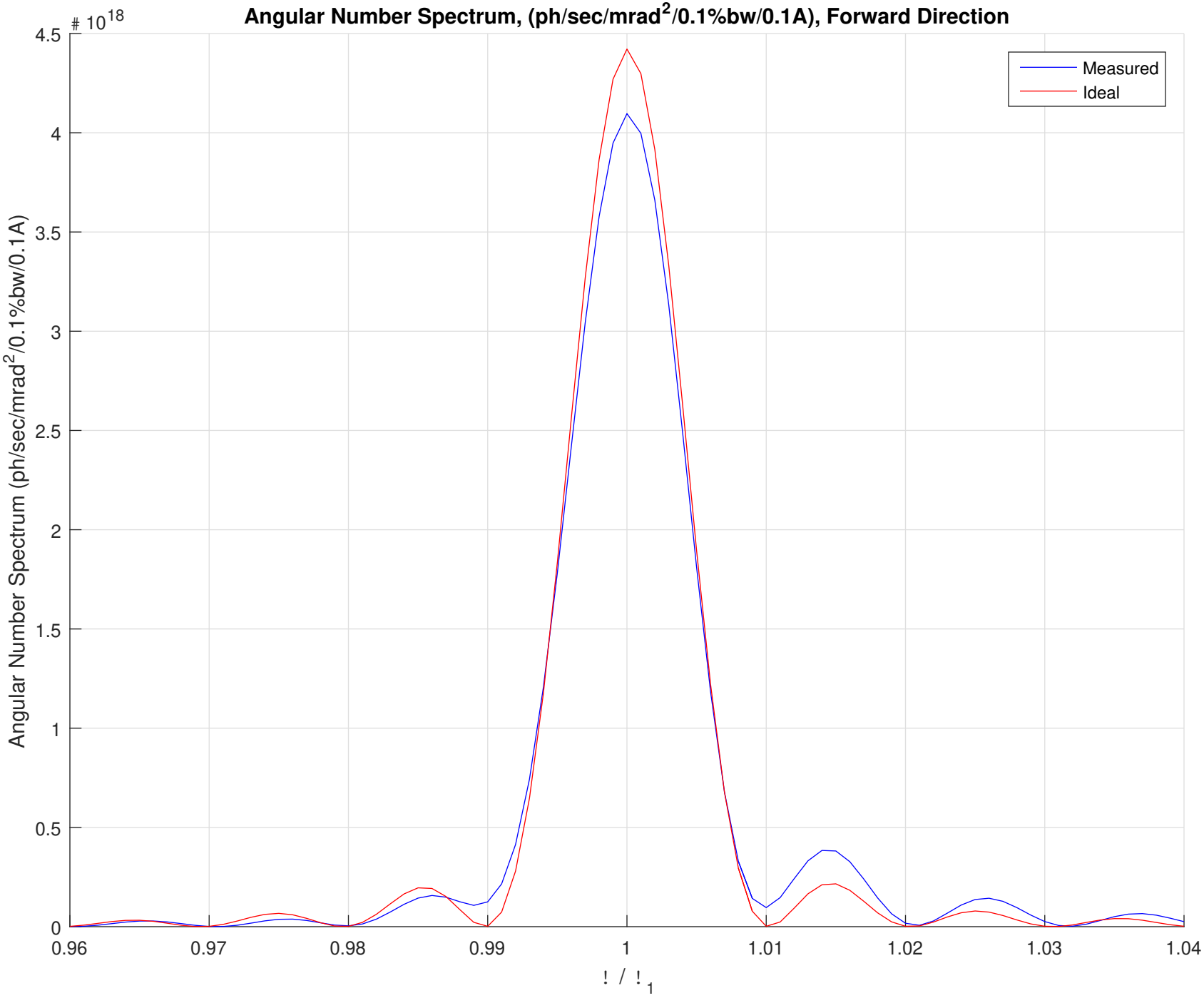

Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
5
36
67
99
130
161
192
Pole
-2430
-2440
-2450
-2460
-2470
-2480
-2490
-2500
Phase Error (deg)
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)

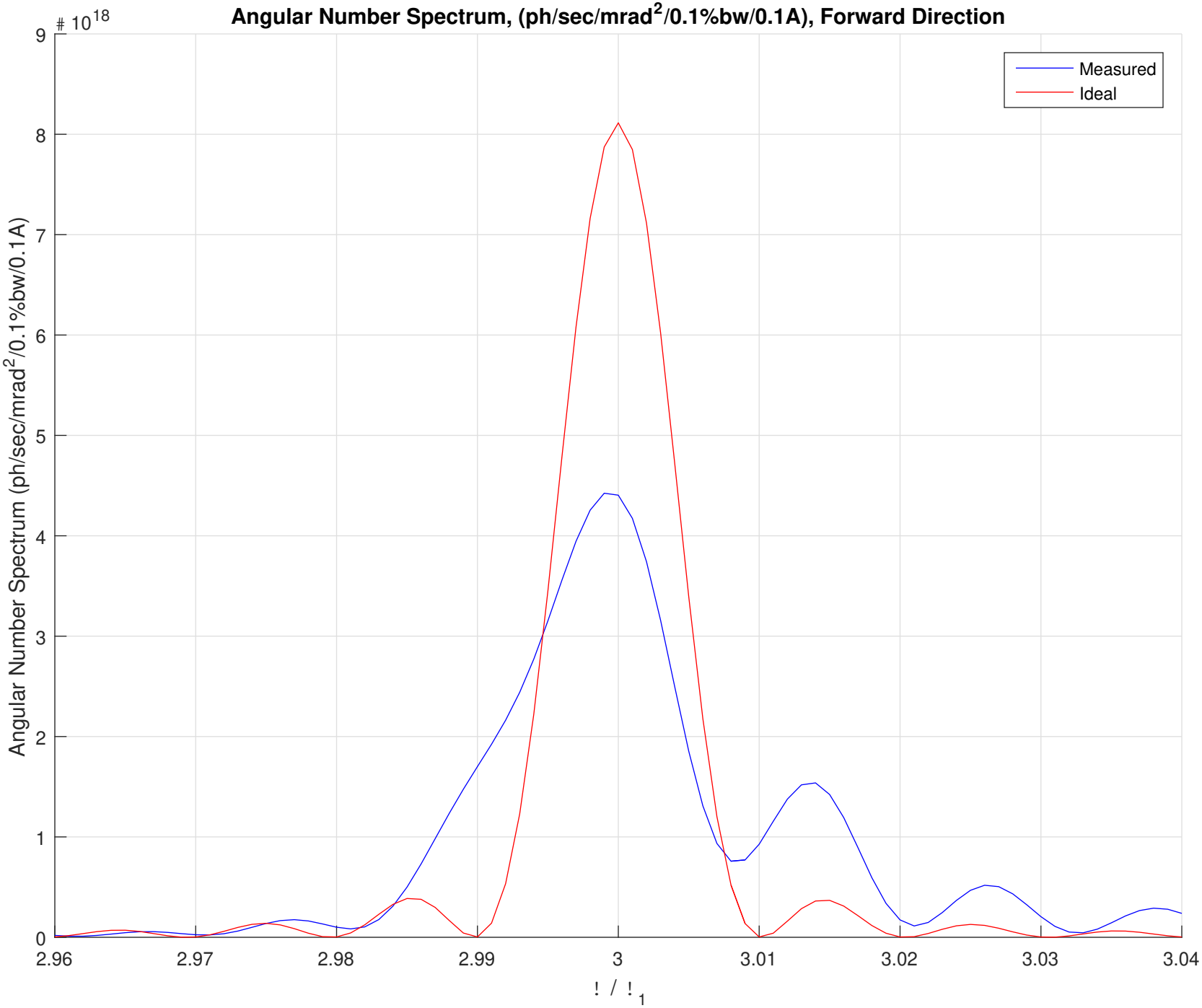

Phase Integral And Effective Length
10^-5
PI
Fit
Phase Integral (T^2m^3)
Z (m)
Effective Length = 3.103297 m
6
5
4
3
2
1
0
-1
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2

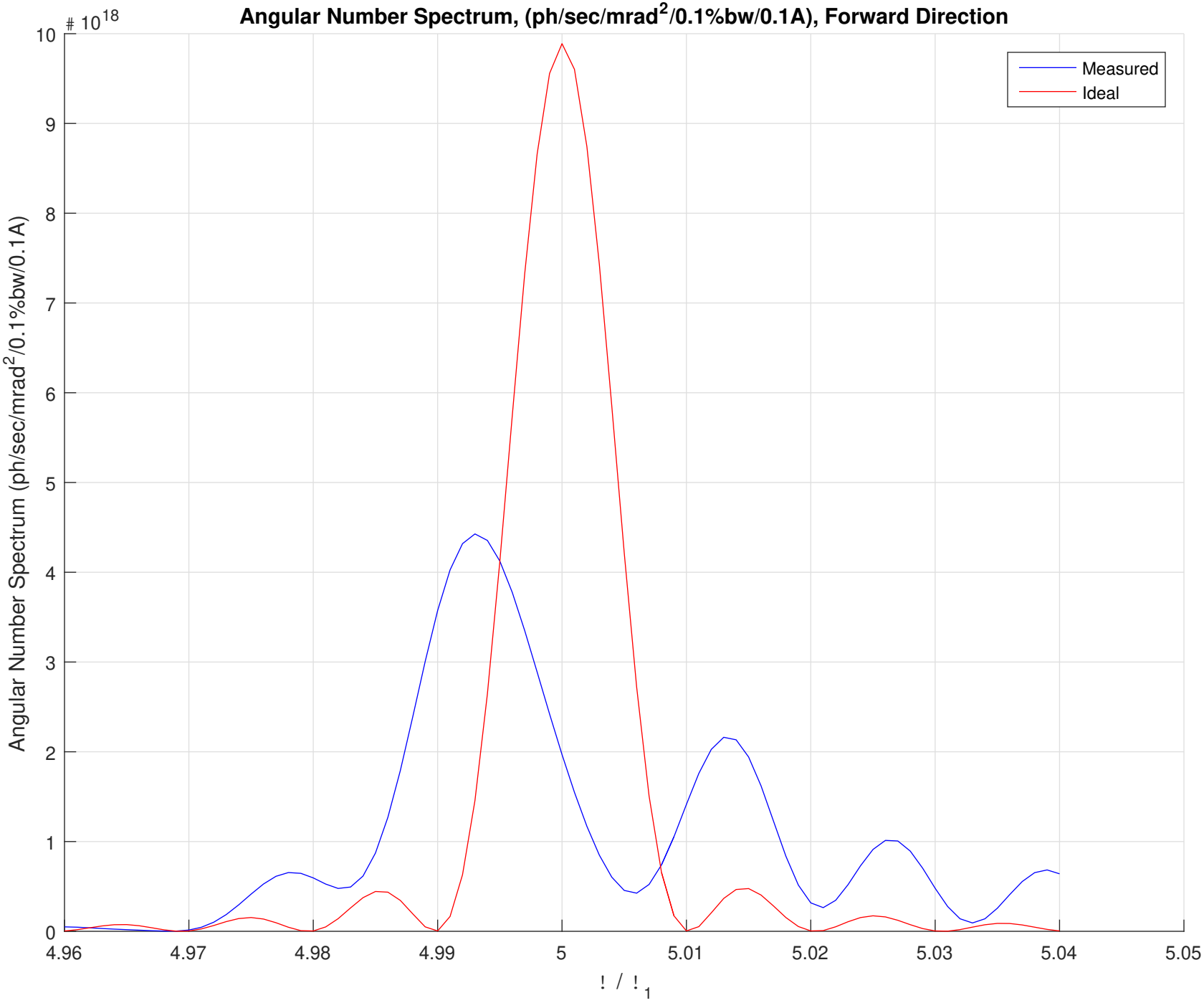

Re and Im Parts Of Ex(!), Forward Direction, ! = !1
90
1.5e-11
120
60
1e-11
150
30
5e-12
180
0
210
330
240
300
270


Re and Im Parts Of Ey(!), Forward Direction, ! = !1
90
4e-13
120
60
3e-13
150
30
2e-13
1e-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)
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}
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
0.96
0.97
0.98
0.99
1
1.01
1.02
1.03
1.04
! / !$_1$
Measured
Ideal


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
9
8
7
6
5
4
3
2
1
0
2.96
2.97
2.98
2.99
3
3.01
3.02
3.03
3.04
! / !$_1$


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)
10
9
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
! / $!_1$
Measured
Ideal