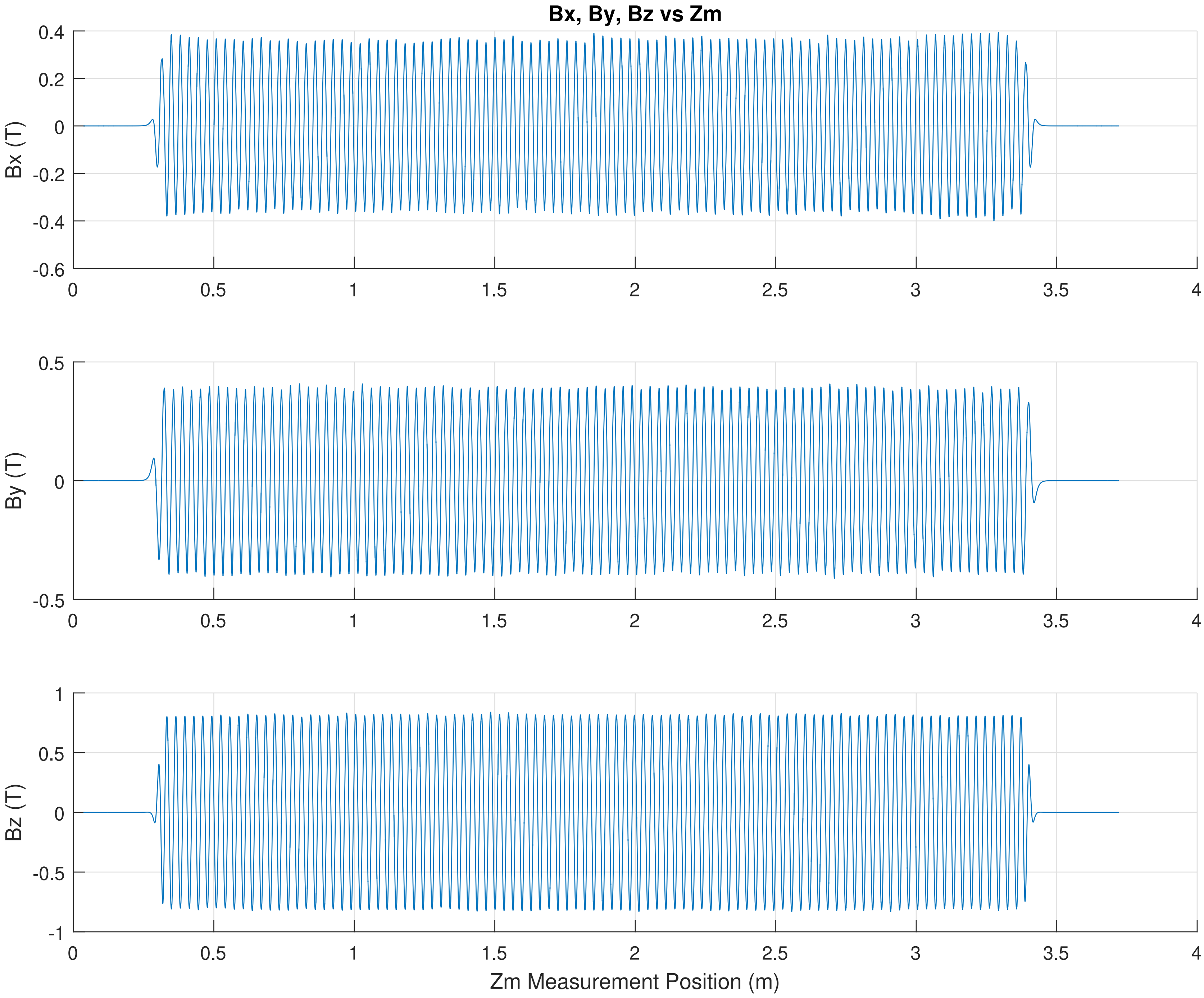
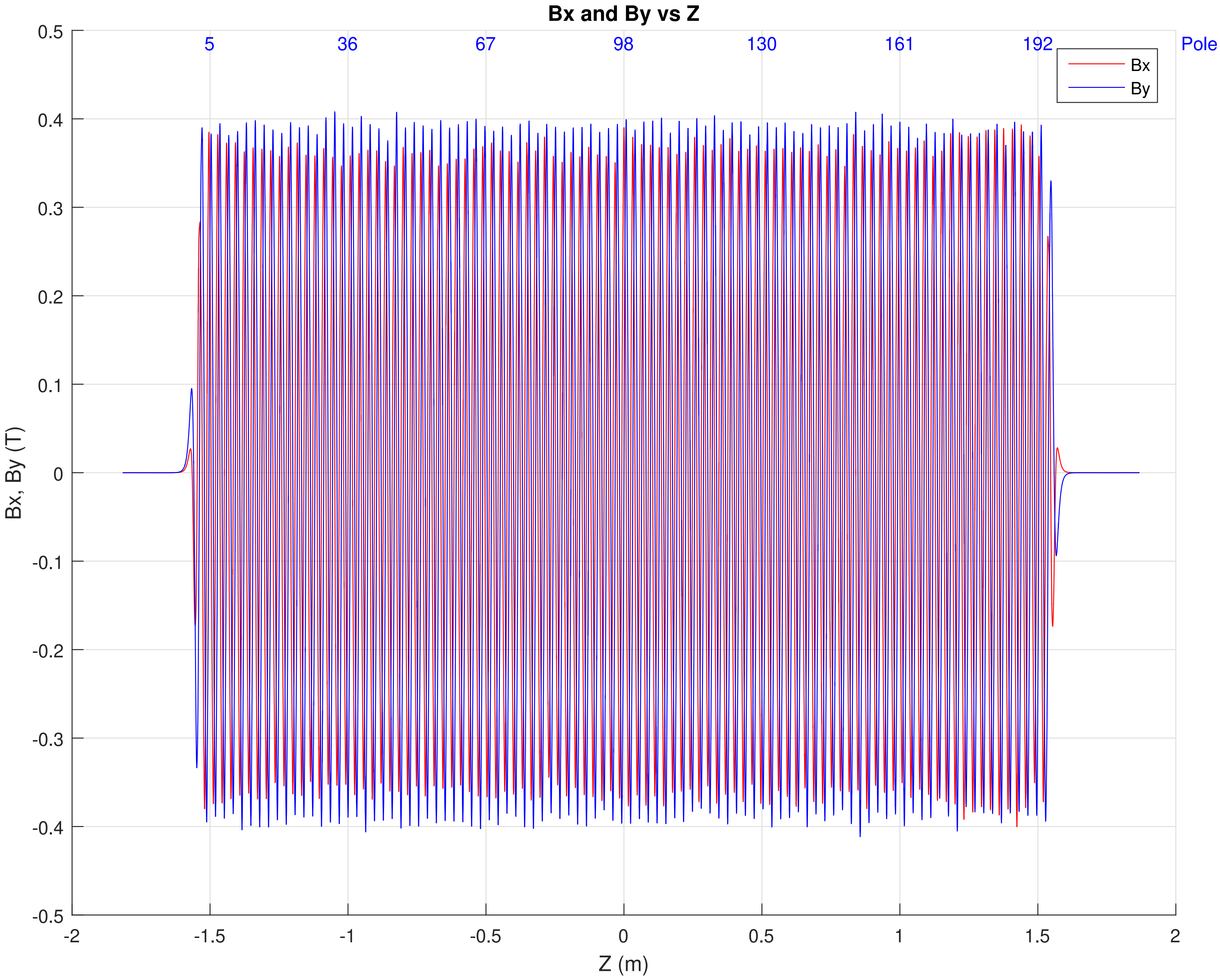
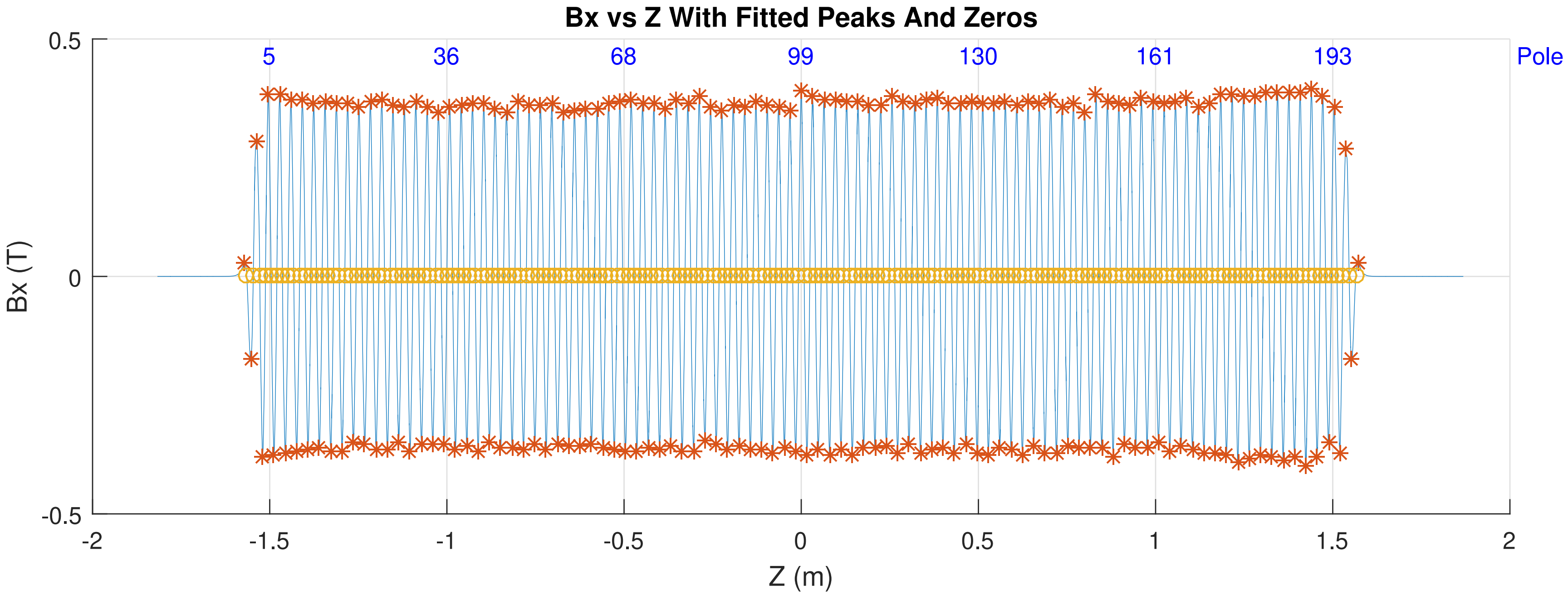
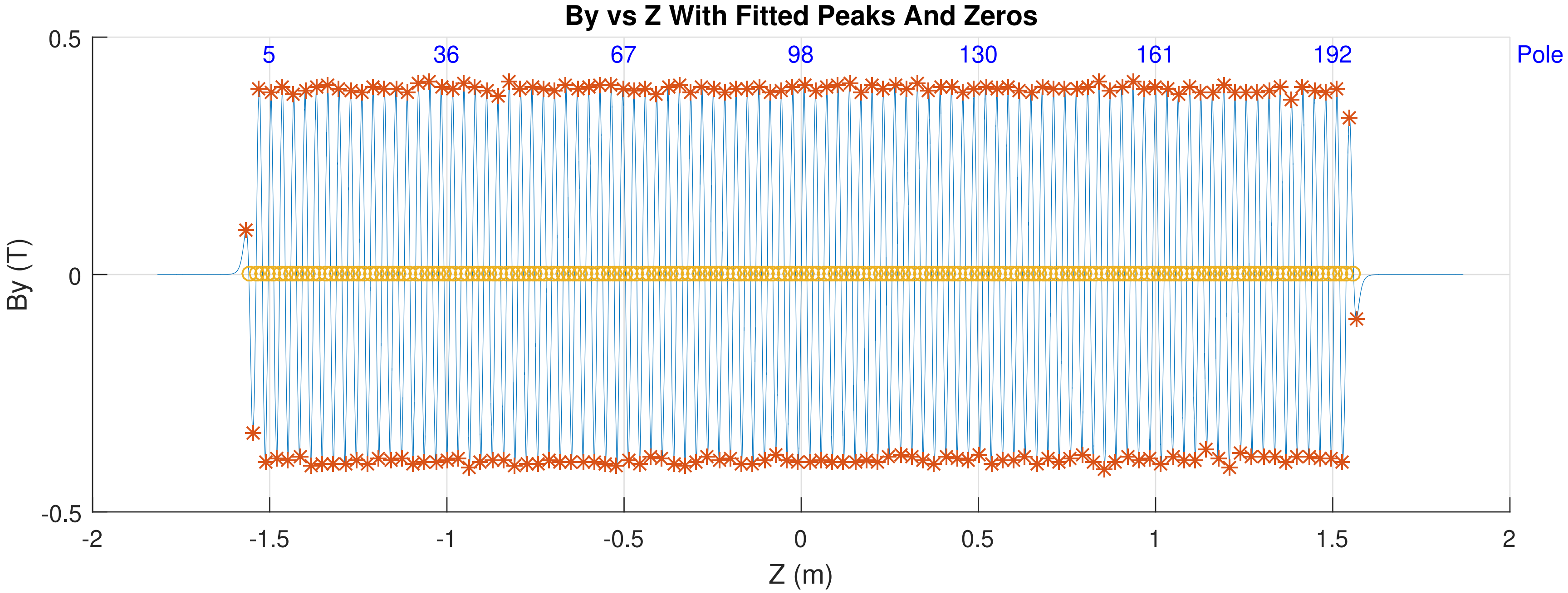
```
SLAC Magnetic Measurements

EPU Analysis
------------

Parameters:
INPUT-FILE-DIR =V:\MET\MagServe\MagData\DELTA\Delta Data 2015\New Measurements\Run 137 HD Spreadsheet 260 Meas\\
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)
0.4
0.2
0
-0.2
-0.4
-0.6
By (T)
0.5
0
-0.5
Bz (T)
1
0.5
0
-0.5
-1
0
0.5
1
1.5
2
2.5
3
3.5
4
Zm Measurement Position (m)

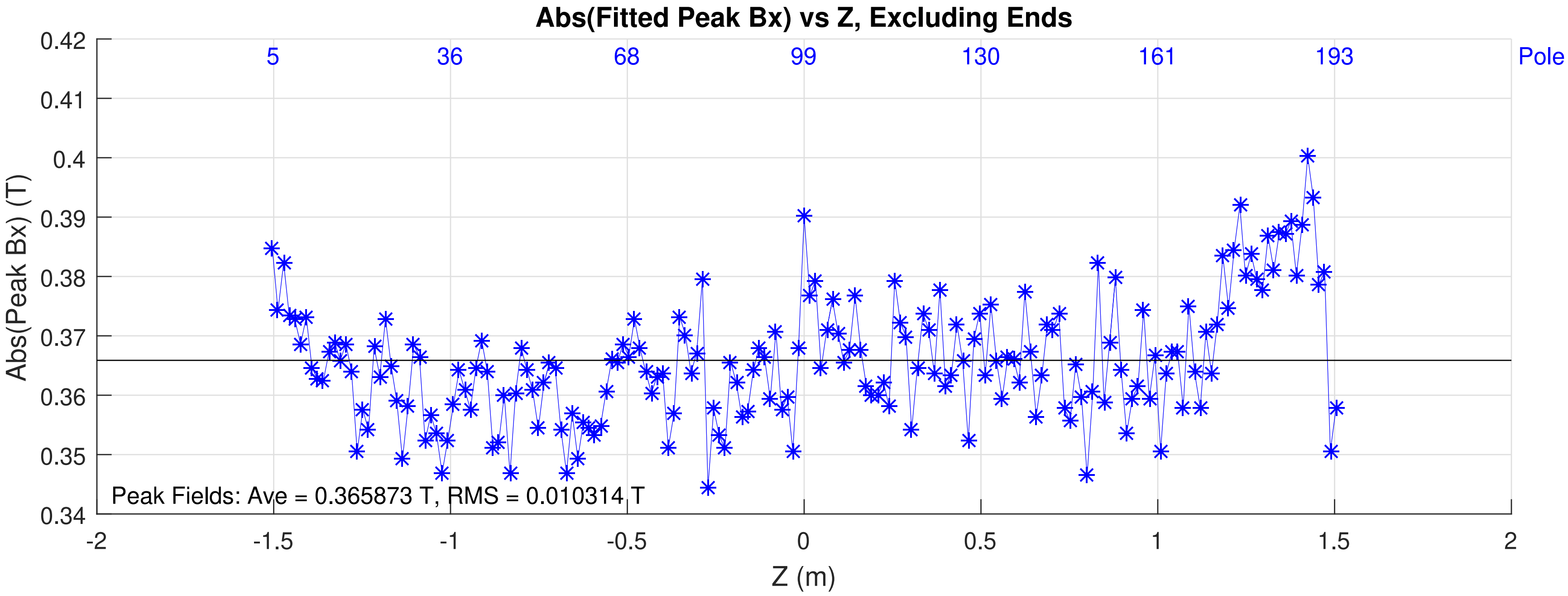

Bx and By vs Z
5
36
67
98
130
161
192
Pole
Bx
By
0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
-0.5
Bx, By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

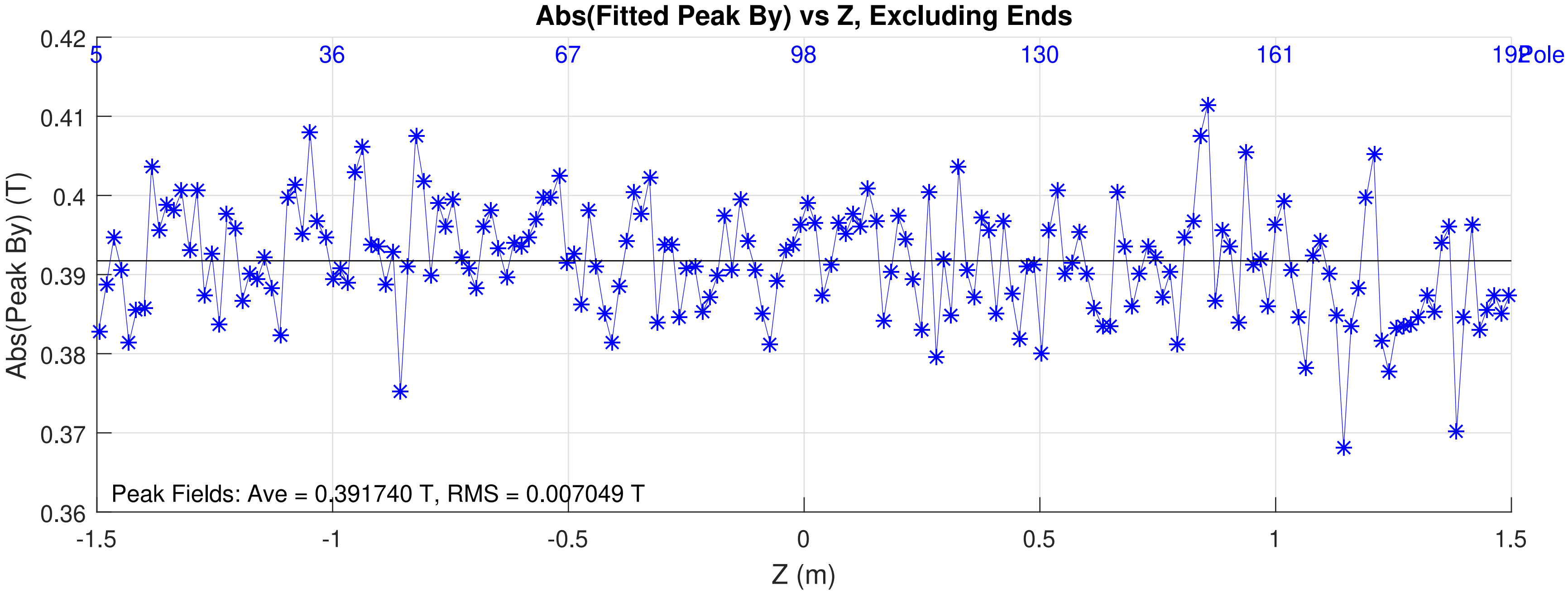


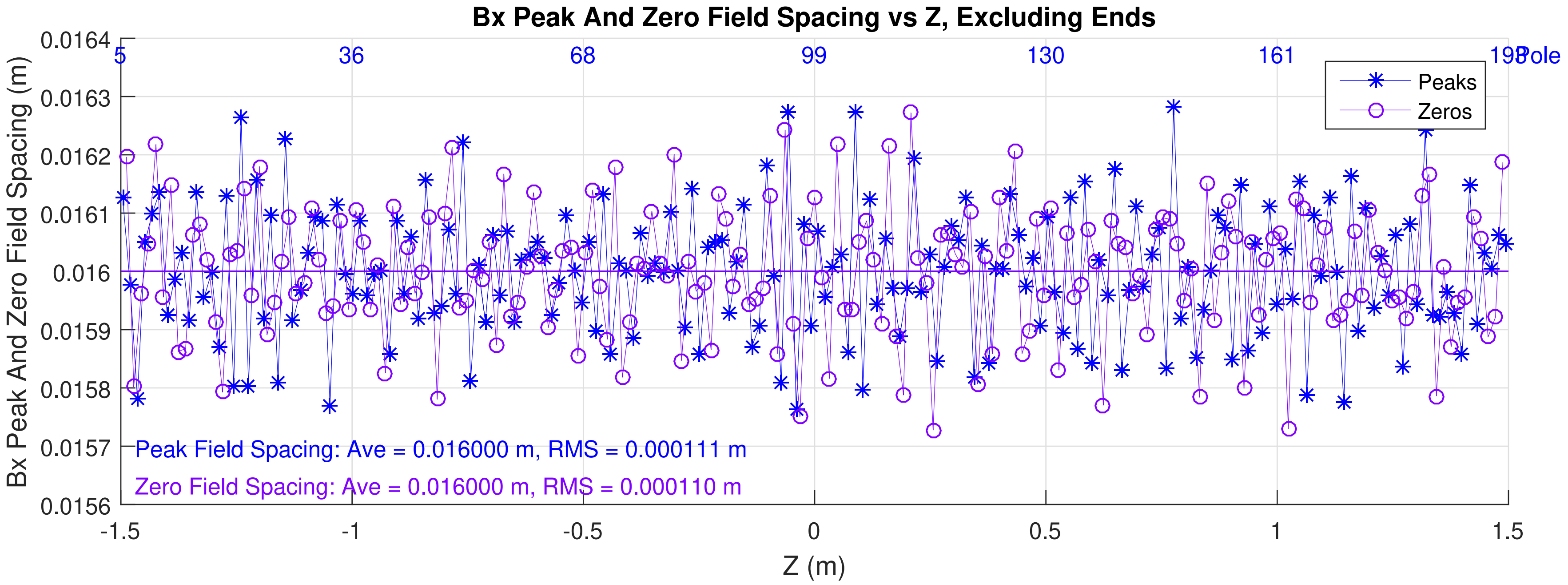
Bx vs Z With Fitted Peaks And Zeros



By vs Z With Fitted Peaks And Zeros


Abs(Fitted Peak Bx) vs Z, Excluding Ends
Abs(Peak Bx) (T)
0.42
0.41
0.4
0.39
0.38
0.37
0.36
0.35
0.34
5
36
68
99
130
161
193
Pole
Peak Fields: Ave = 0.365873 T, RMS = 0.010314 T
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

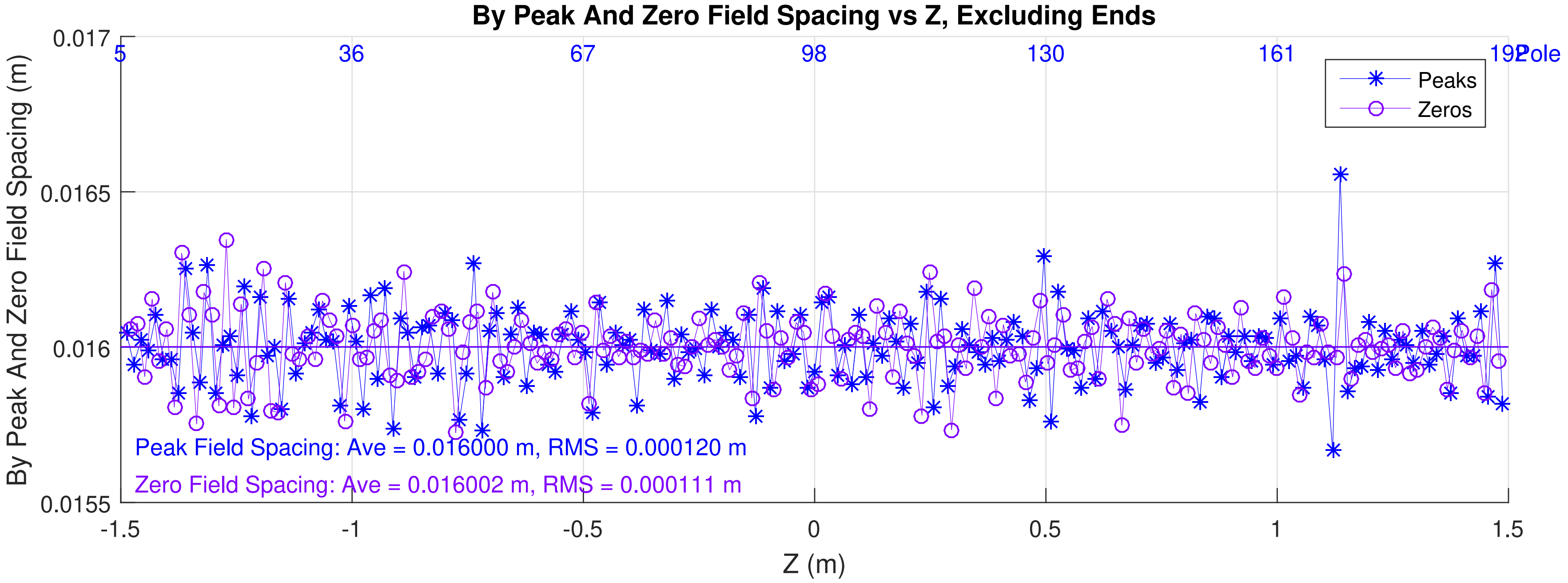

Abs(Fitted Peak By) vs Z, Excluding Ends
Abs(Peak By) (T)
0.42
0.41
0.4
0.39
0.38
0.37
0.36
5
36
67
98
130
161
192
Pole
Peak Fields: Ave = 0.391740 T, RMS = 0.007049 T
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)



Bx Peak And Zero Field Spacing vs Z, Excluding Ends

Peak Field Spacing: Ave = 0.016000 m, RMS = 0.000111 m

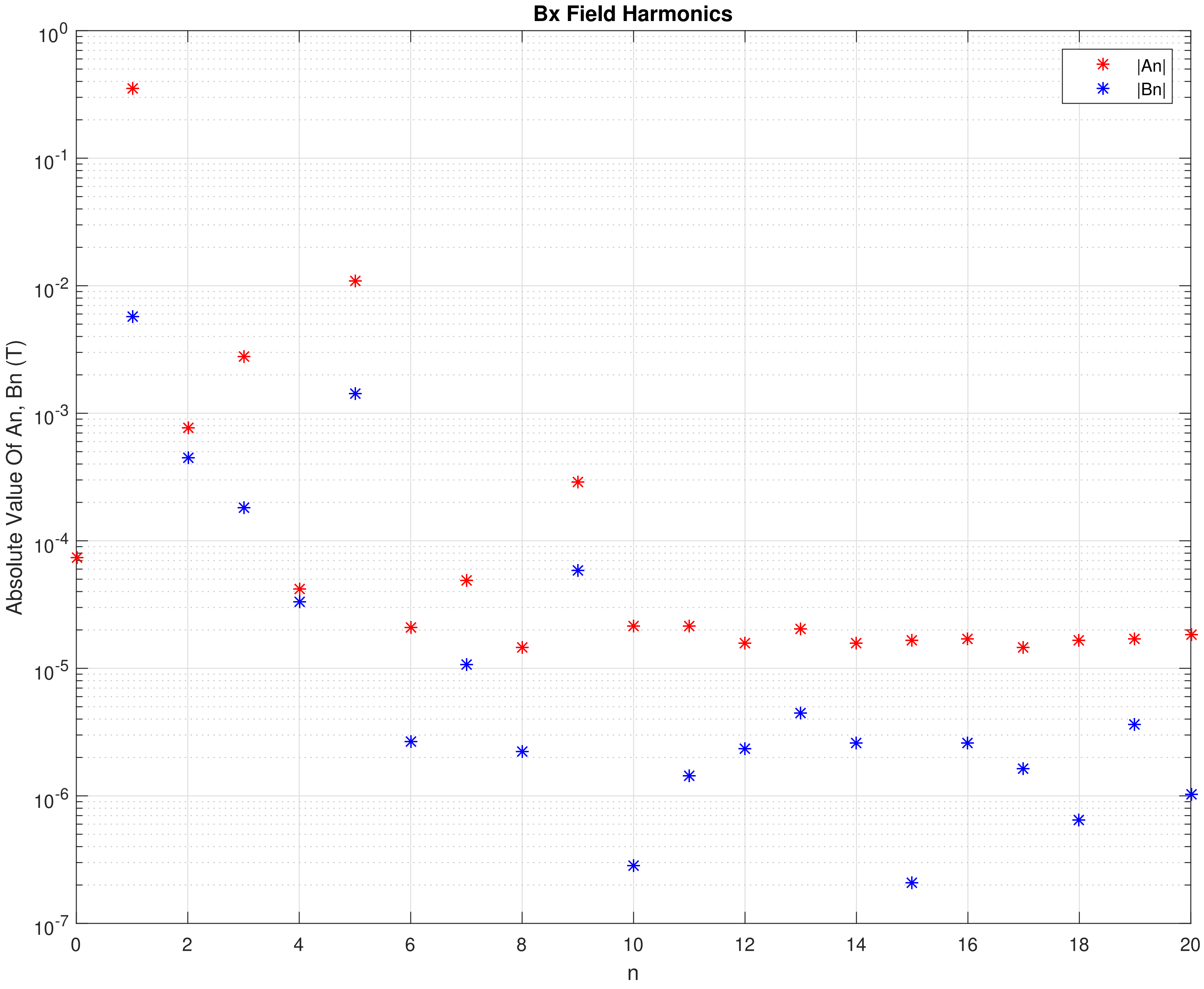
Zero Field Spacing: Ave = 0.016000 m, RMS = 0.000110 m

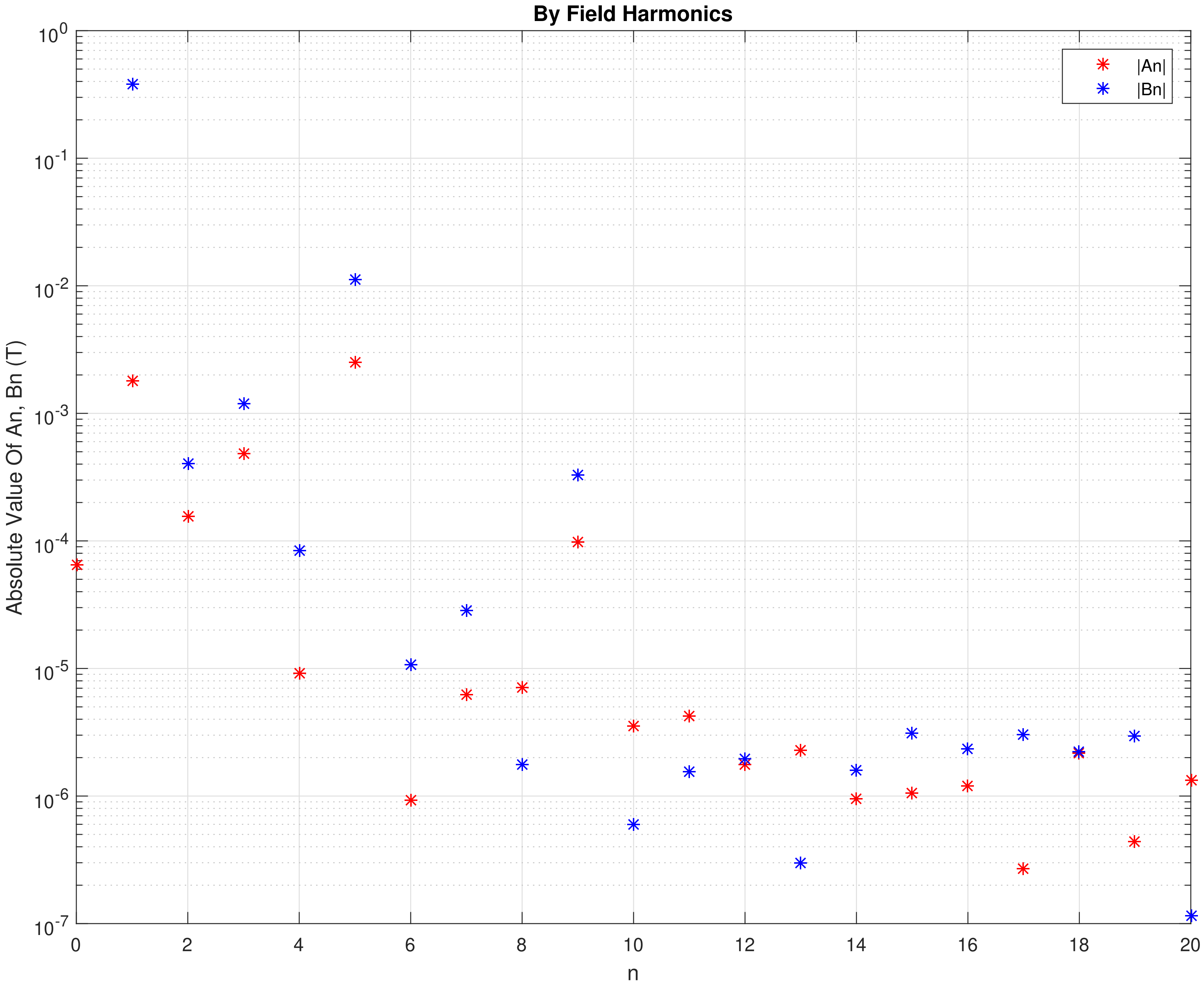


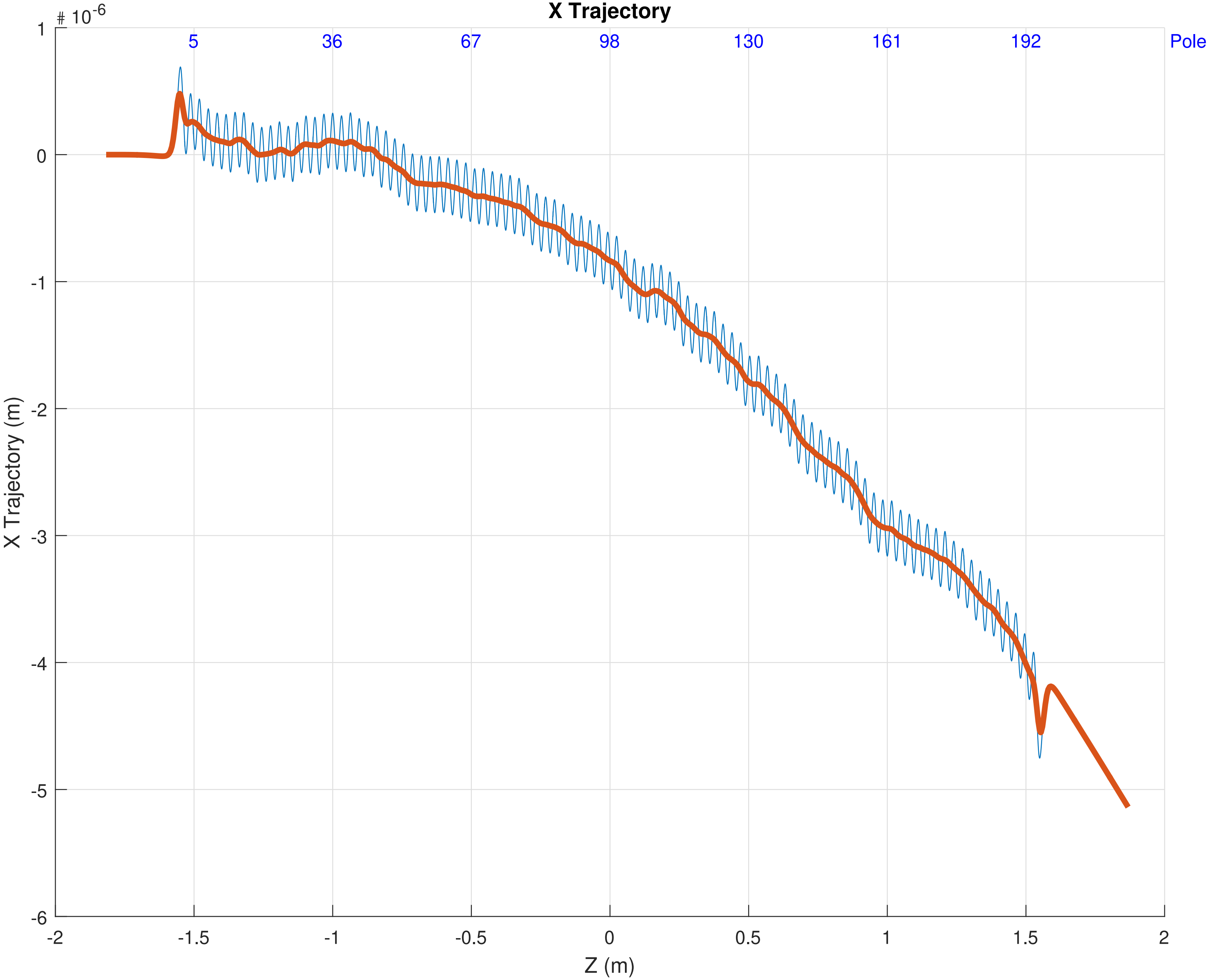
By Peak And Zero Field Spacing vs Z, Excluding Ends

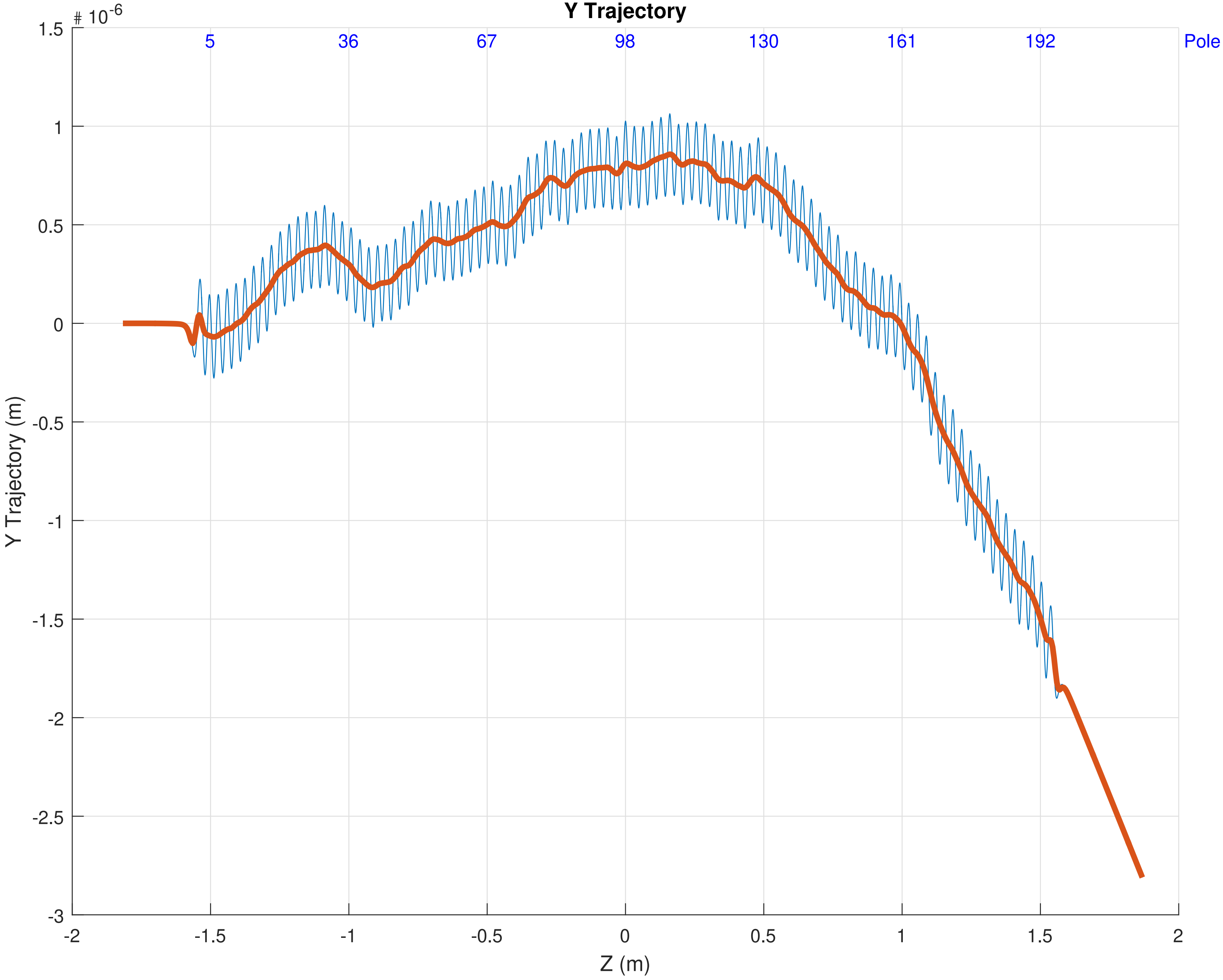
Peak Field Spacing: Ave = 0.016000 m, RMS = 0.000120 m

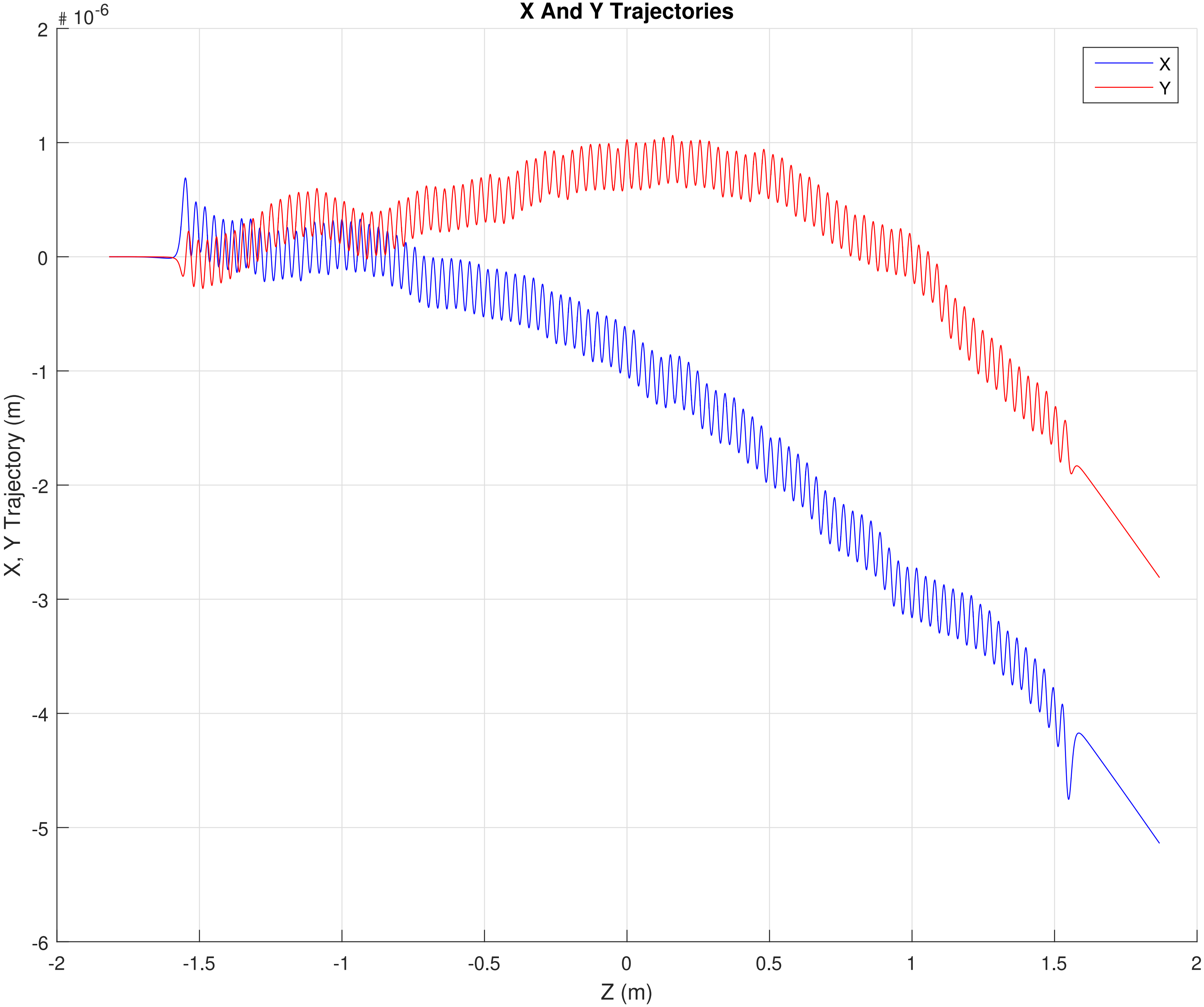
Zero Field Spacing: Ave = 0.016002 m, RMS = 0.000111 m

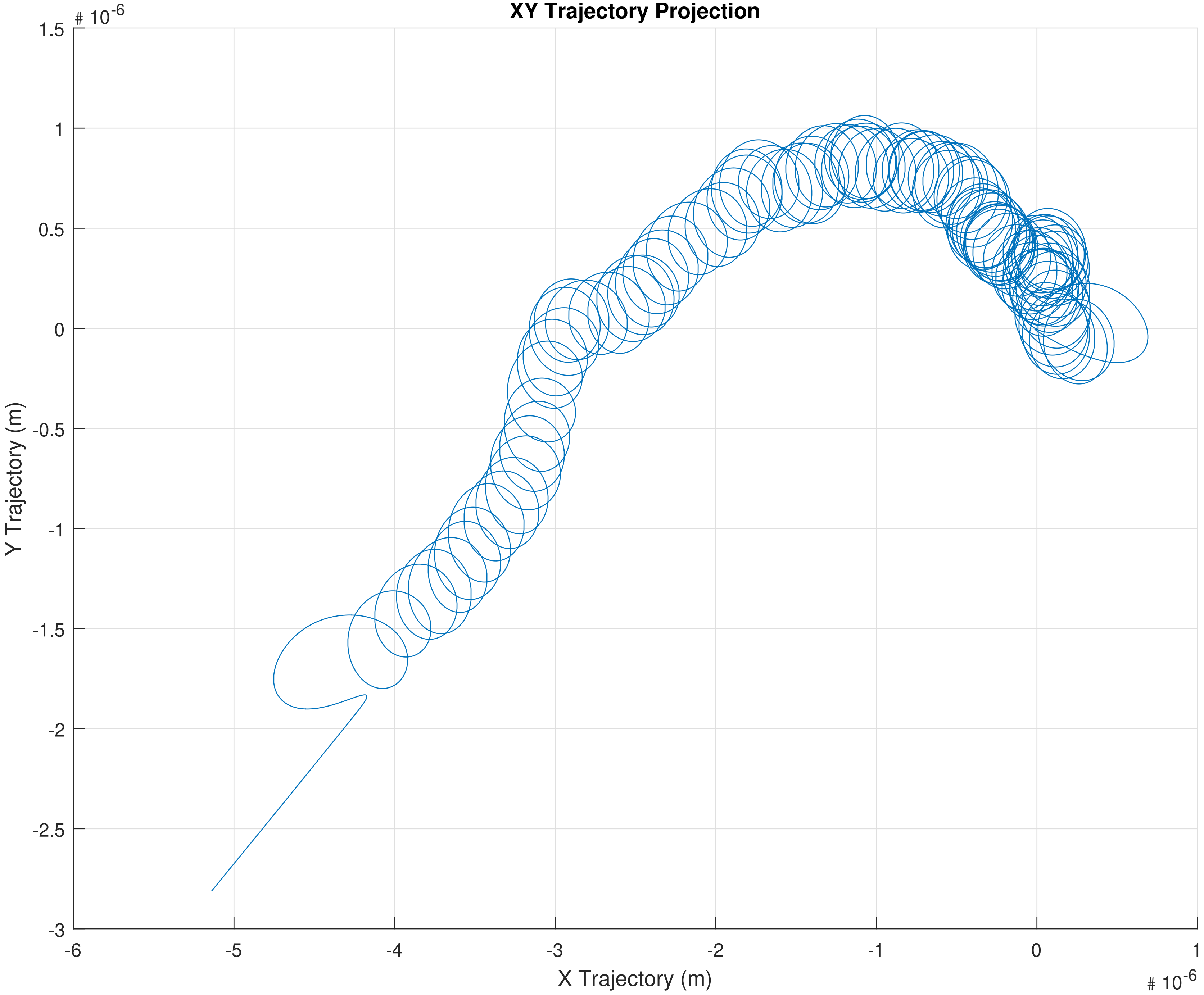

Bx Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
10^-7
0
2
4
6
8
10
12
14
16
18
20
n

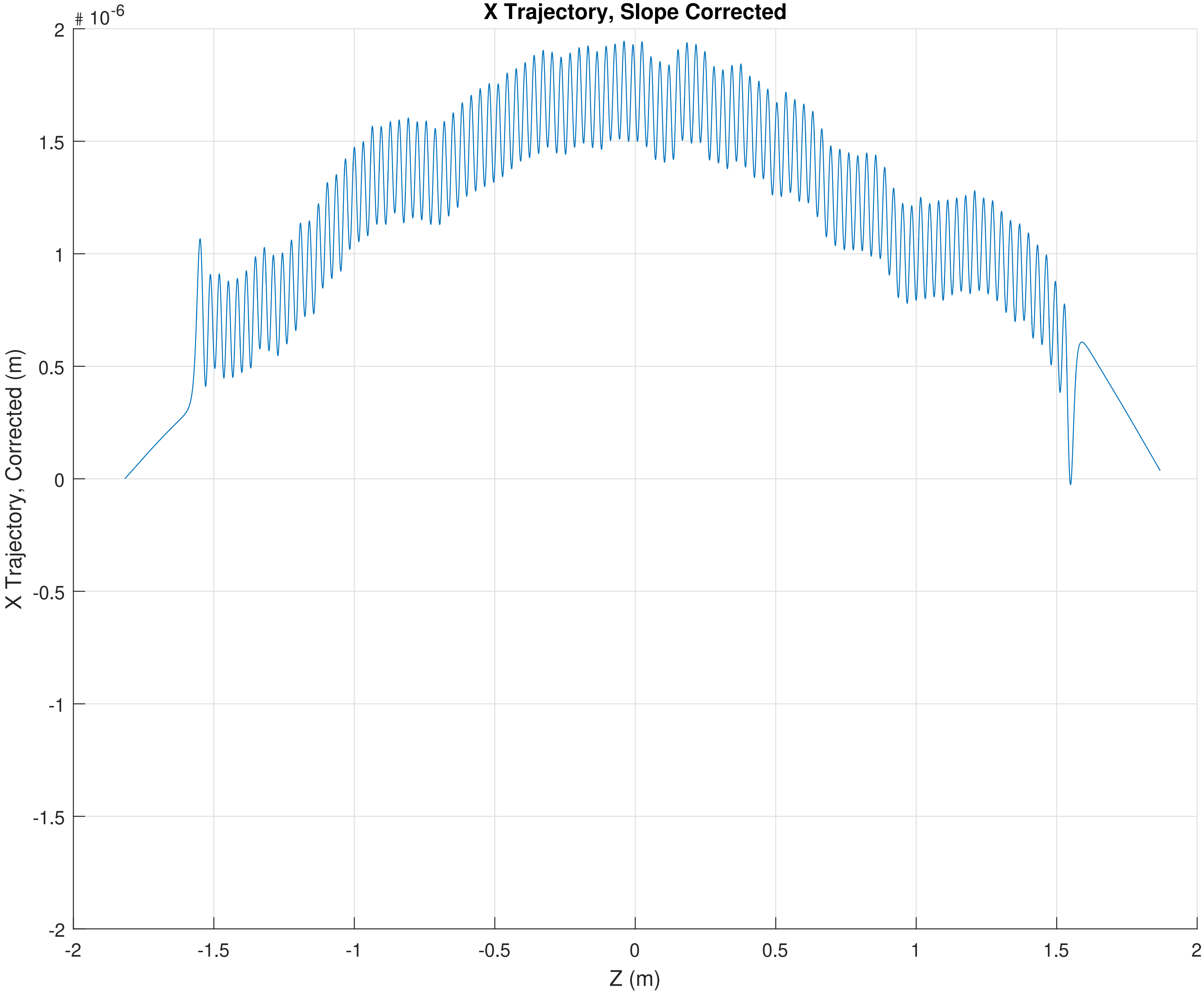

By Field Harmonics
Absolute Value Of An, Bn (T)
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
0
2
4
6
8
10
12
14
16
18
20
n
|An|
|Bn|

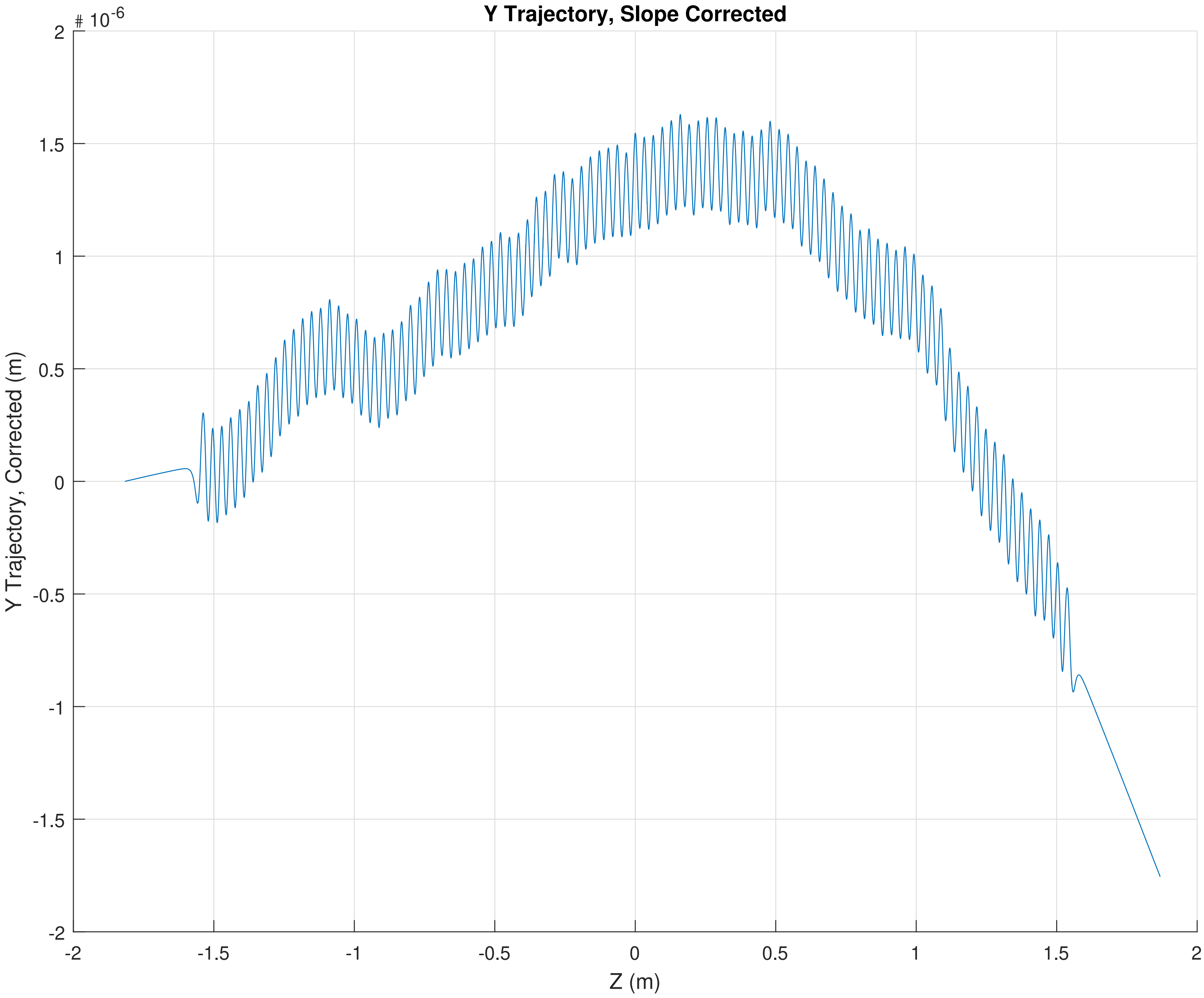

X Trajectory
10^-6
1
0
-1
-2
-3
-4
-5
-6
X Trajectory (m)
5
36
67
98
130
161
192
Pole
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

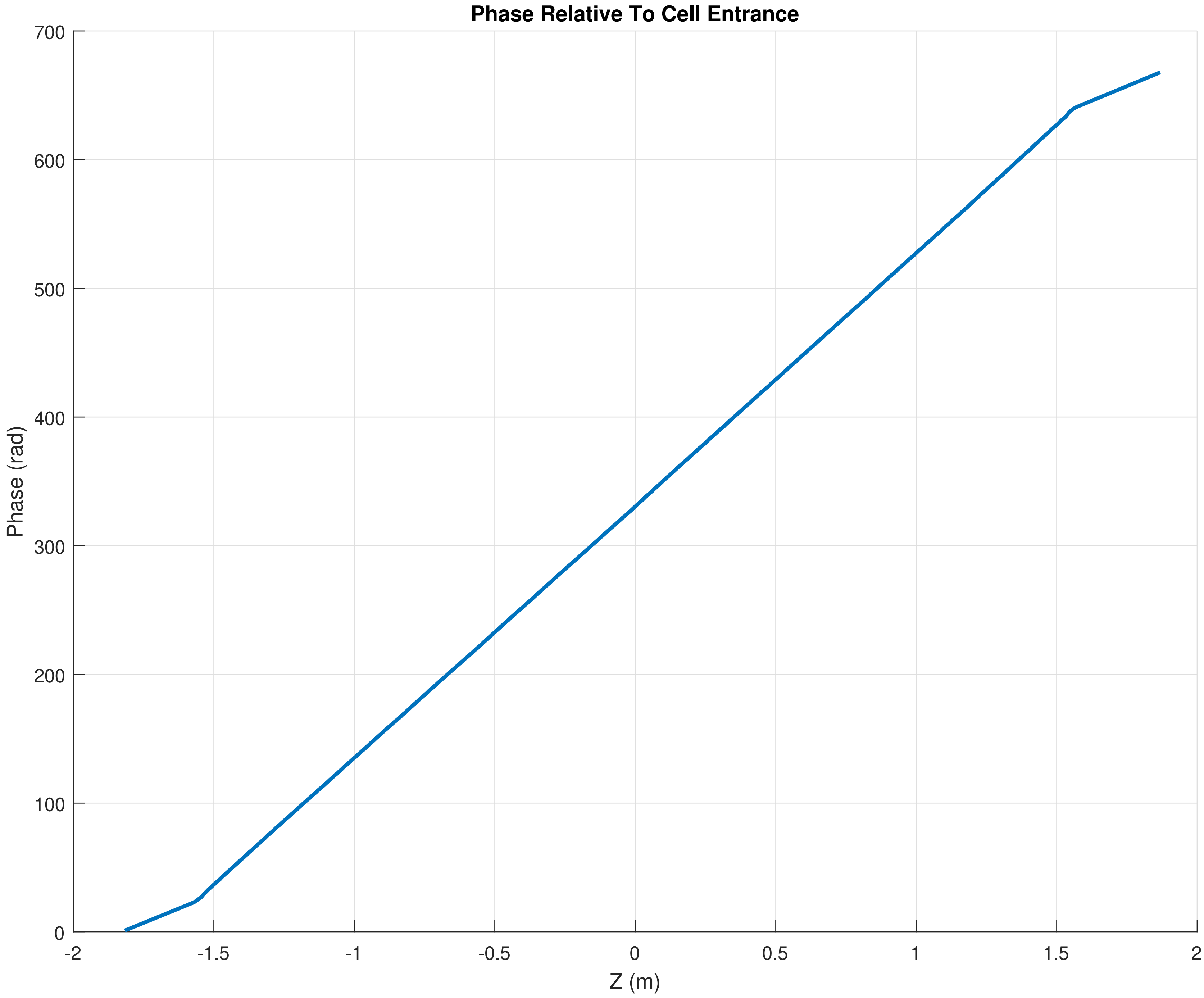

Y Trajectory
10^-6
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
Y Trajectory (m)
5
36
67
98
130
161
192
Pole
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

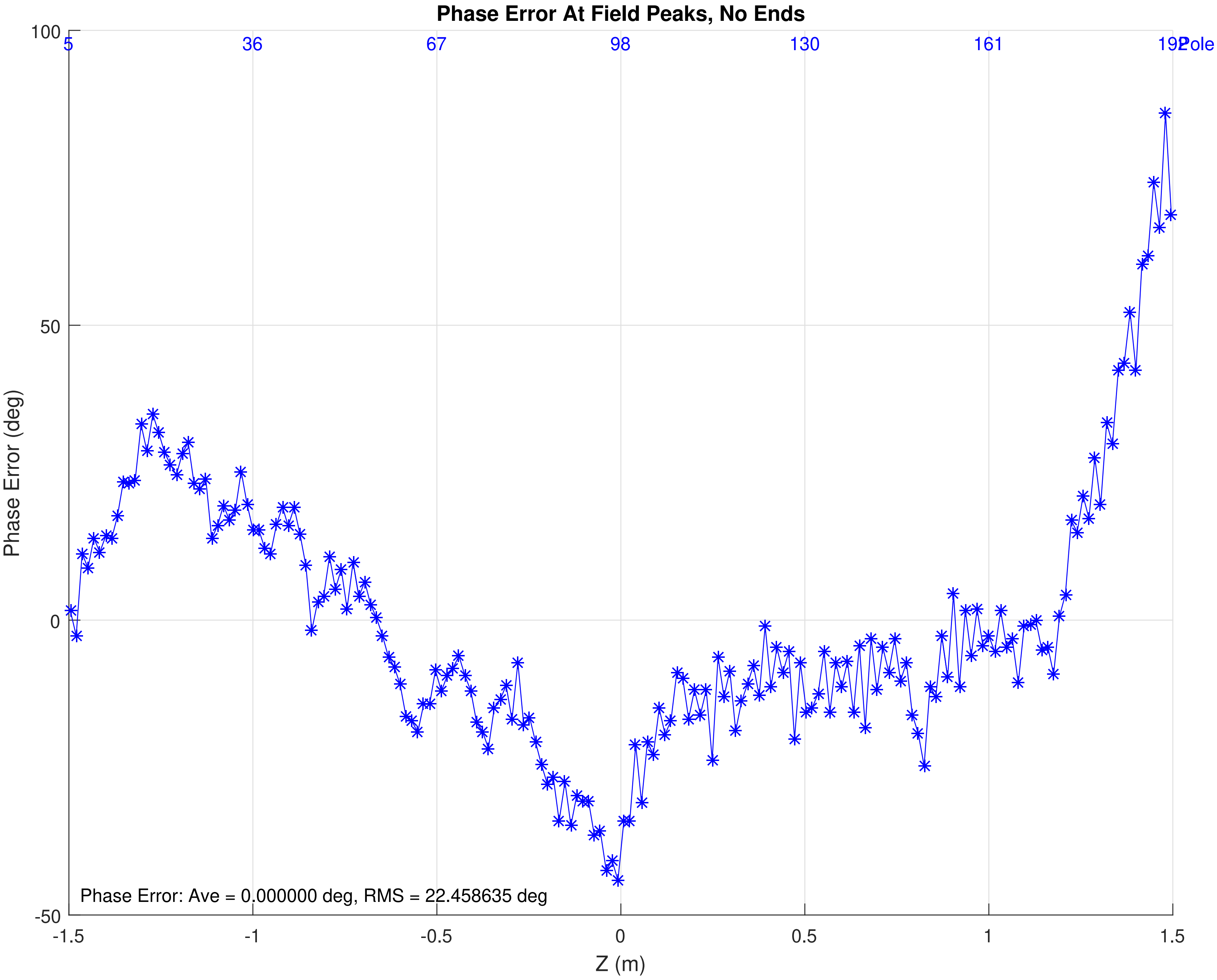

X And Y Trajectories
10^-6
2
1
0
-1
-2
-3
-4
-5
-6
X, Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
X
Y

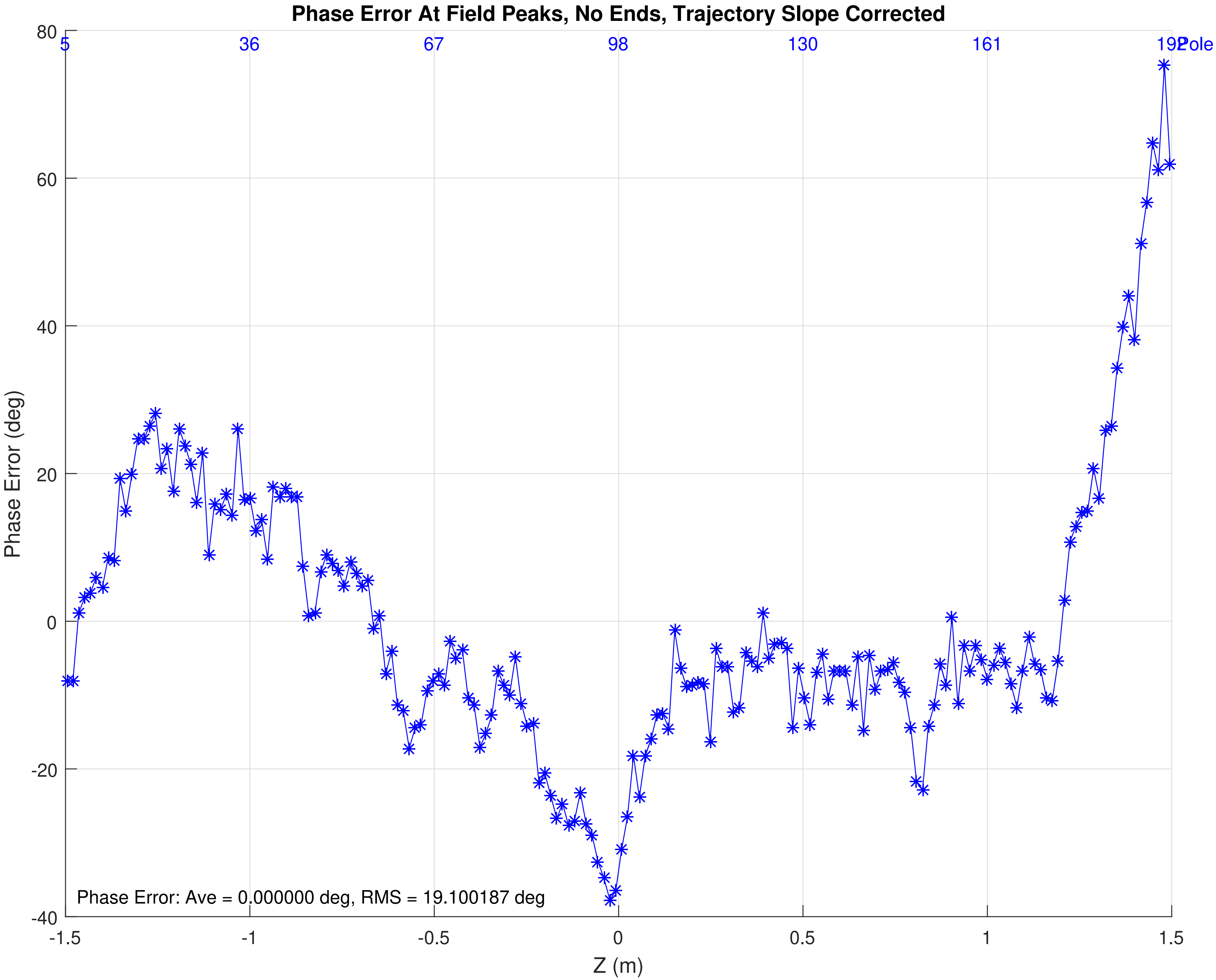

XY Trajectory Projection
10^{-6}
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
Y Trajectory (m)
-6
-5
-4
-3
-2
-1
0
1
X Trajectory (m)
10^{-6}

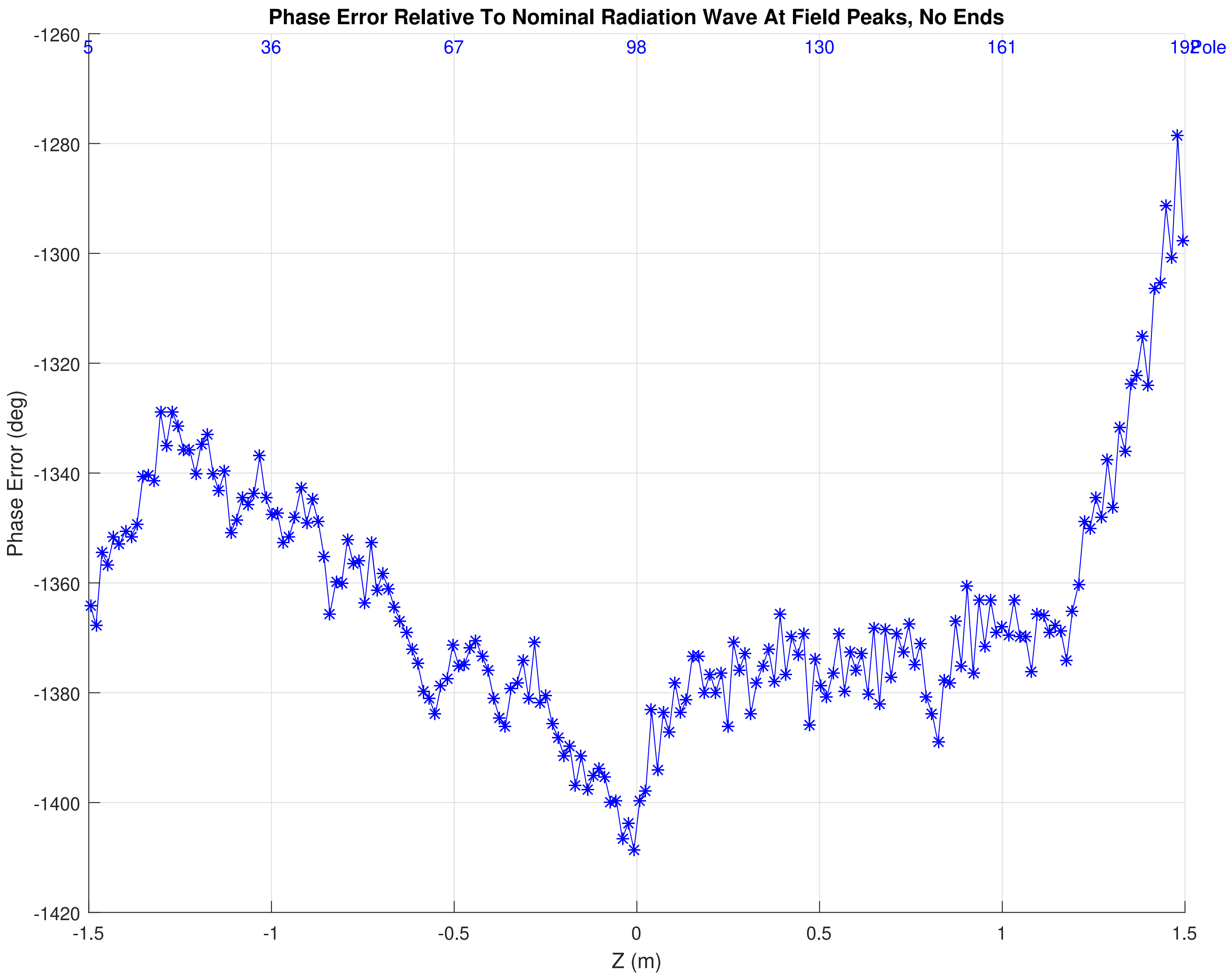

X Trajectory, Slope Corrected
10^-6
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
X Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)


Y Trajectory, Slope Corrected
10^-6
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)

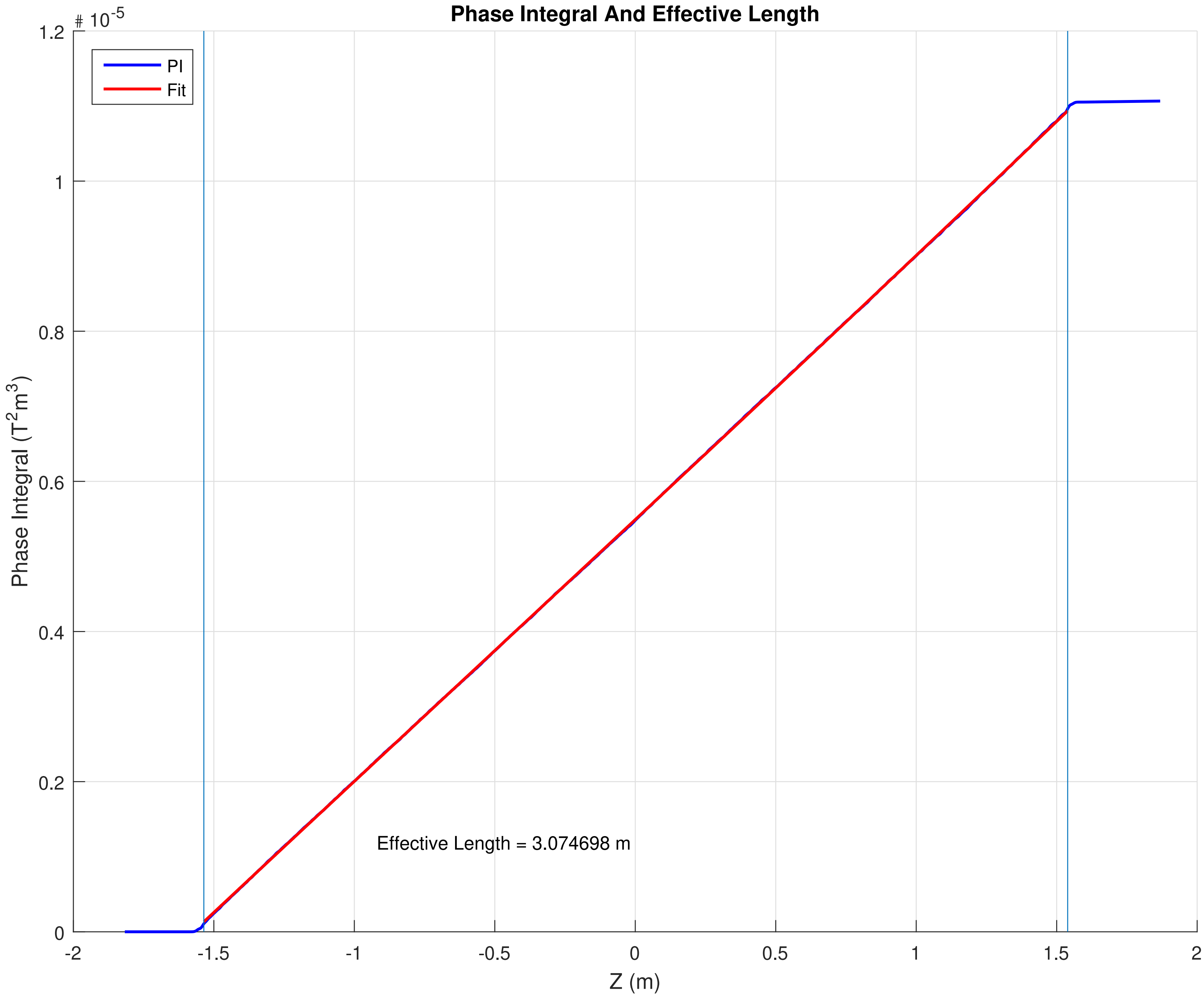

Phase Relative To Cell Entrance
Phase (rad)
Z (m)
0
100
200
300
400
500
600
700
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2

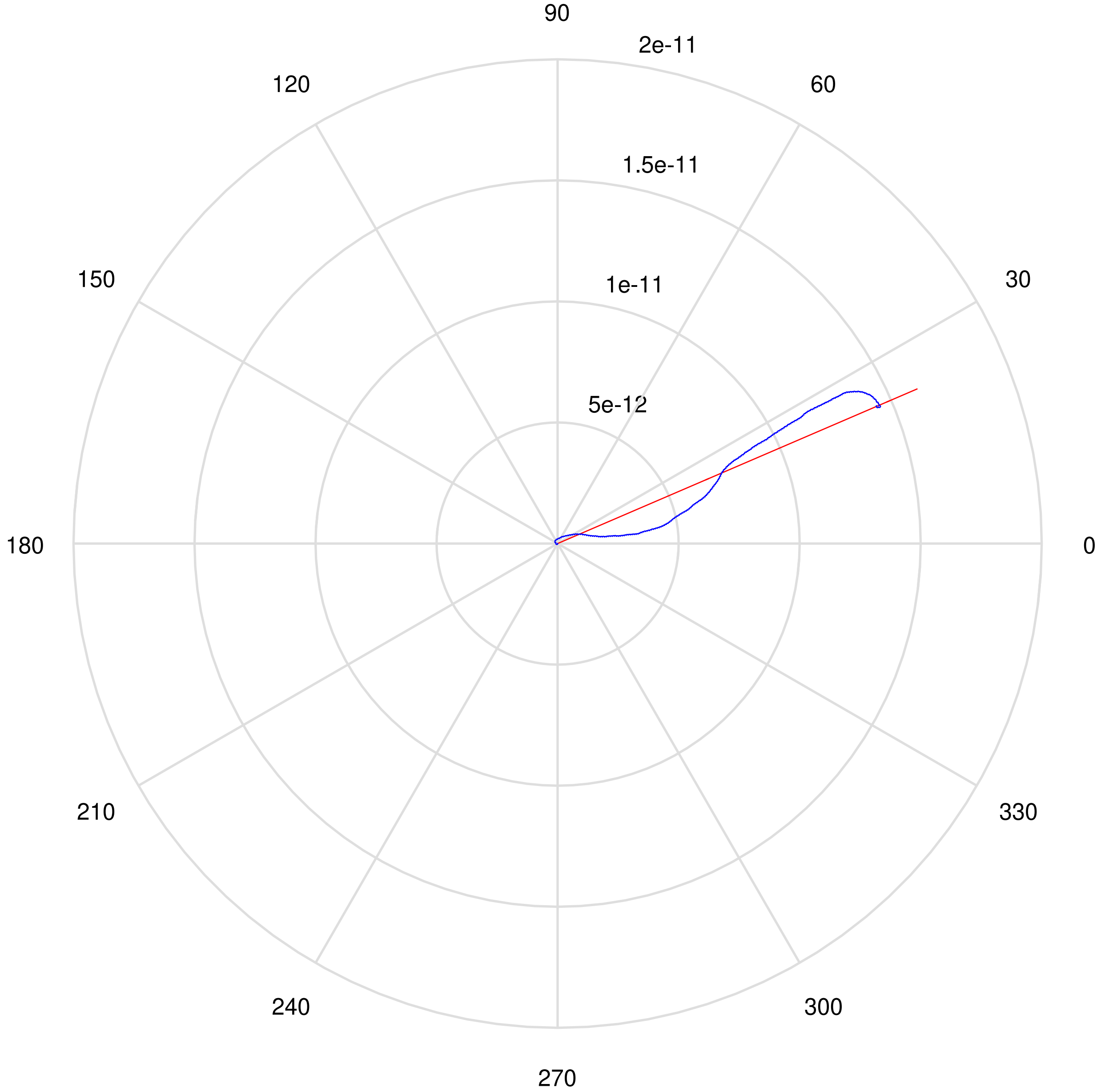

Phase Error At Field Peaks, No Ends
5
36
67
98
130
161
192
Pole
100
50
0
-50
Phase Error (deg)
Phase Error: Ave = 0.000000 deg, RMS = 22.458635 deg
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)


Phase Error At Field Peaks, No Ends, Trajectory Slope Corrected
5
36
67
98
130
161
192
Pole
80
60
40
20
0
-20
-40
Phase Error (deg)
Phase Error: Ave = 0.000000 deg, RMS = 19.100187 deg
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)



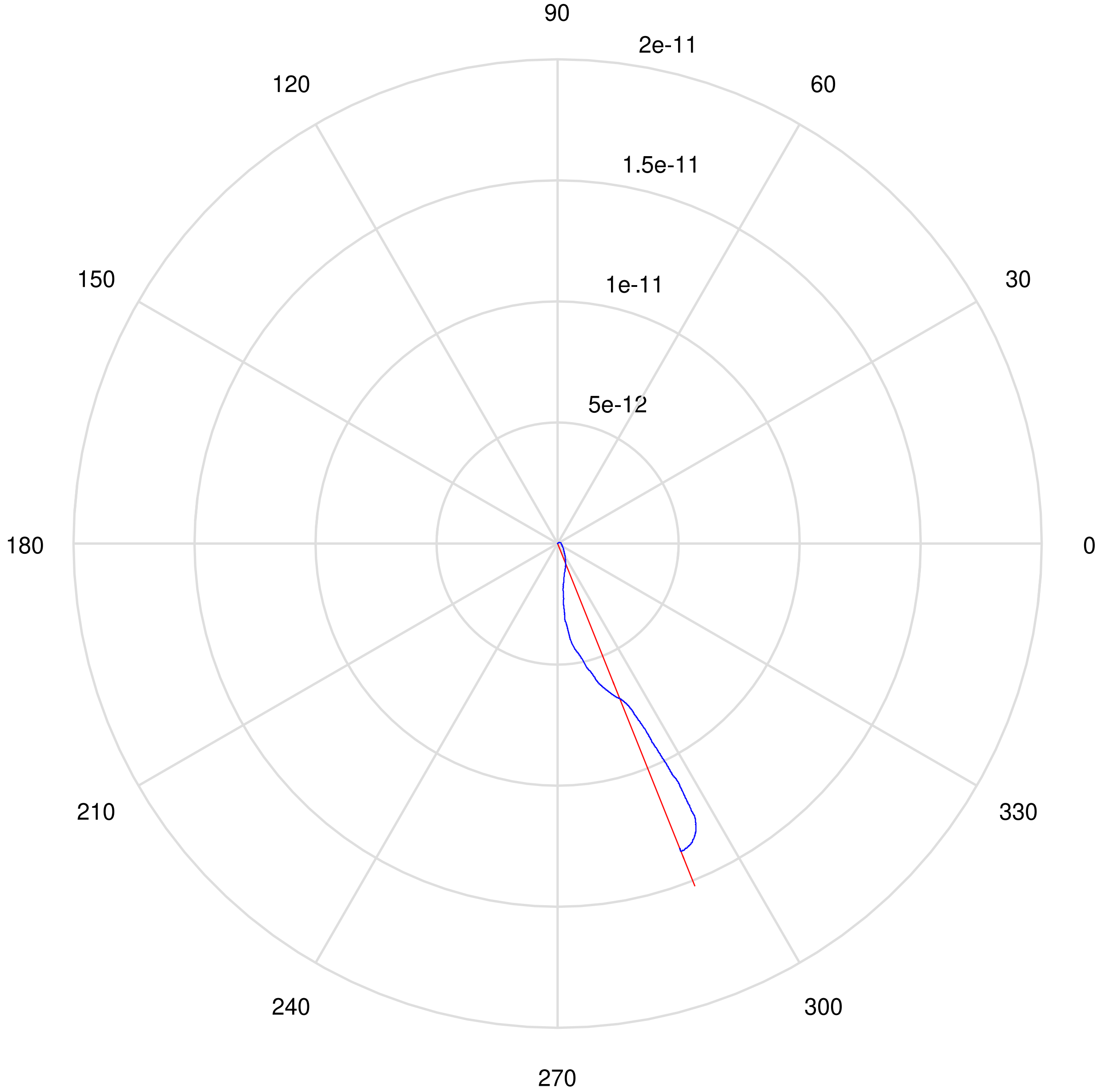
Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends

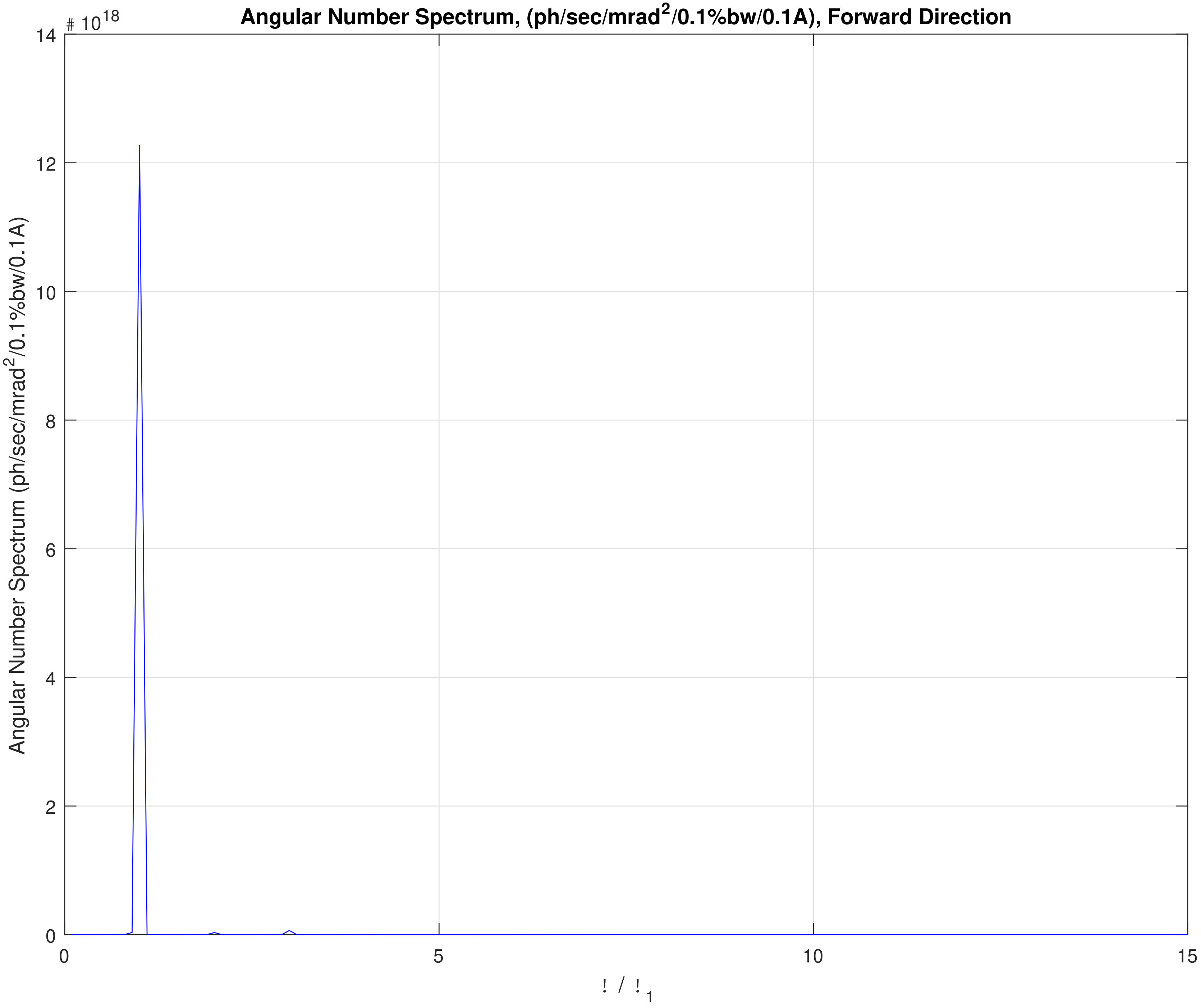

Phase Integral And Effective Length
10^-5
1.2
1
0.8
0.6
0.4
0.2
0
Phase Integral (T^2m^3)
PI
Fit
Effective Length = 3.074698 m
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

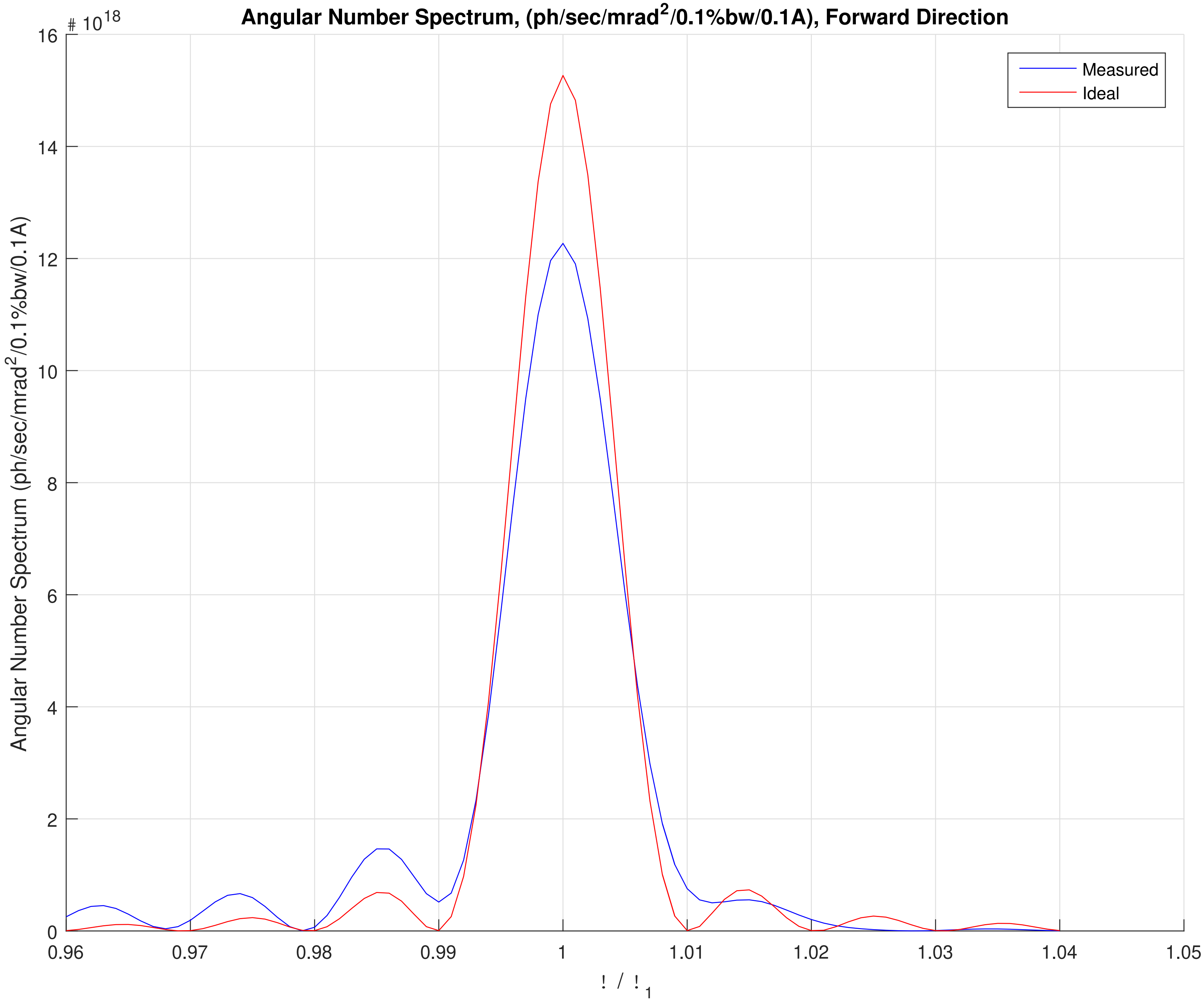


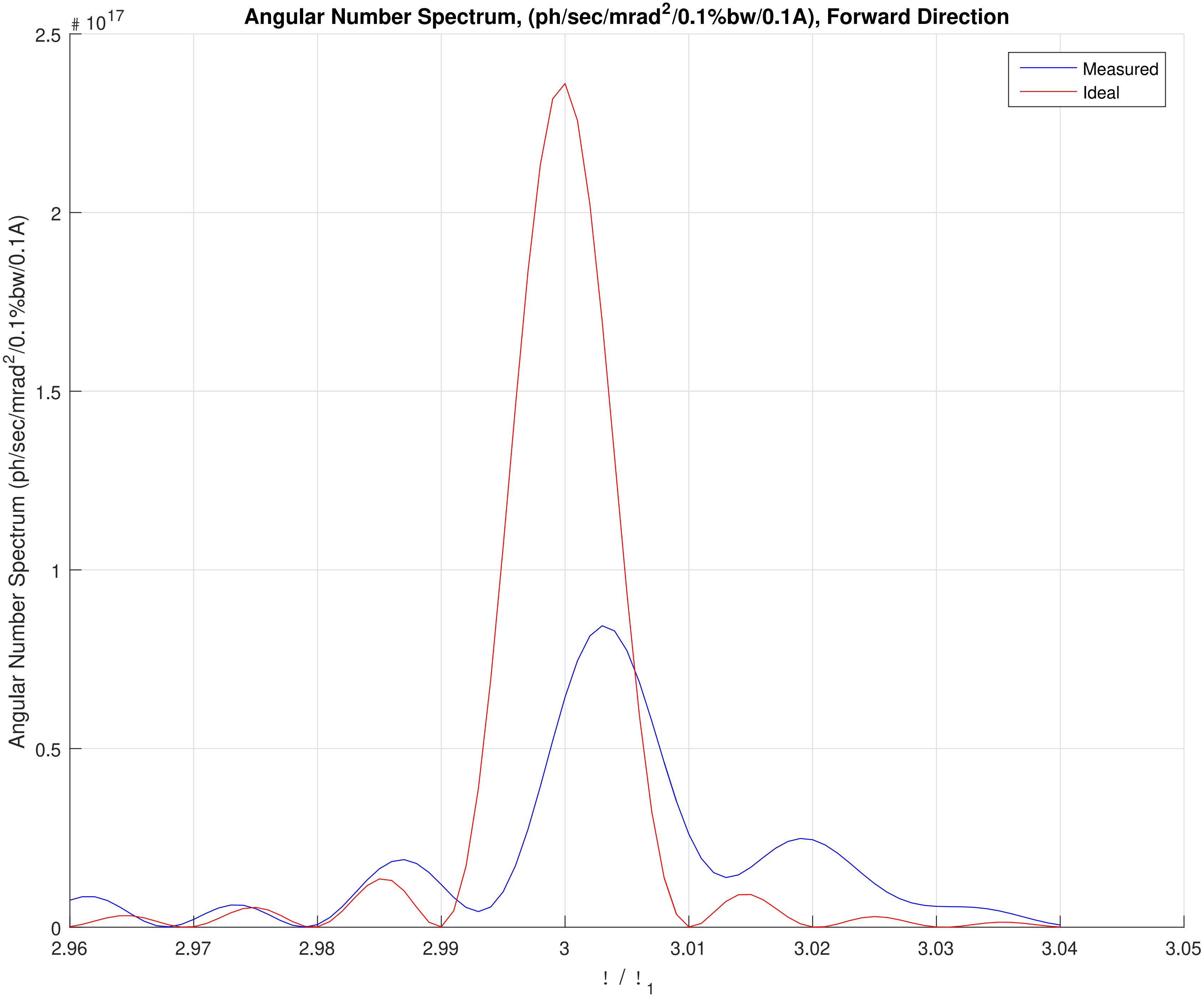
Re and Im Parts Of Ex(!), Forward Direction, ! = !$_1$

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

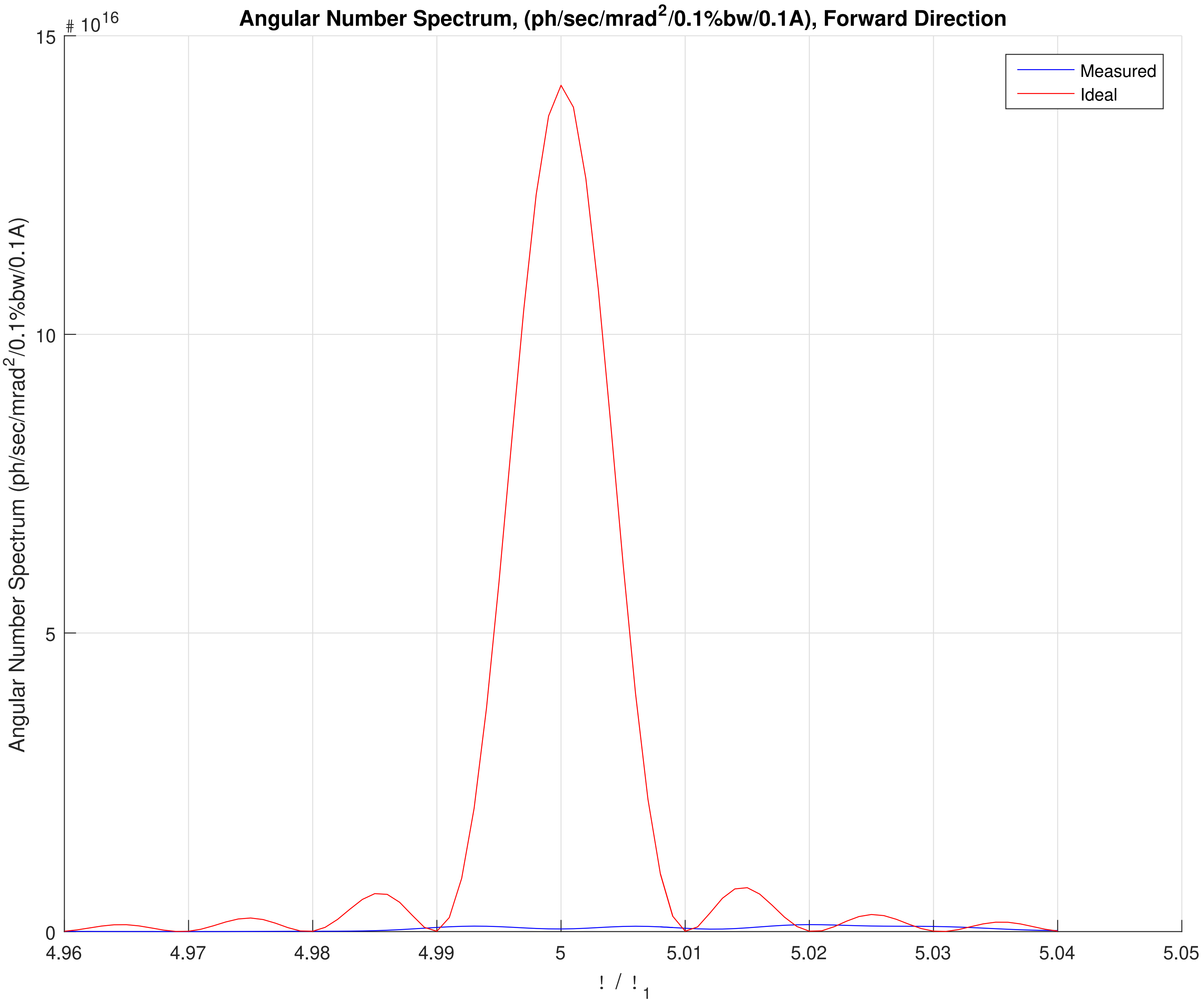



Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{18}
14
12
10
8
6
4
2
0
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
0
5
10
15
! / !$_1$


Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{18}
16
14
12
10
8
6
4
2
0
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
Measured
Ideal
0.96
0.97
0.98
0.99
1
1.01
1.02
1.03
1.04
1.05
! / !$_1$



Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{17}
2.5
2
1.5
1
0.5
0
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
Measured
Ideal
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^{16}
15
10
5
0
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
4.96
4.97
4.98
4.99
5
5.01
5.02
5.03
5.04
5.05
! / !$_1$
Measured
Ideal