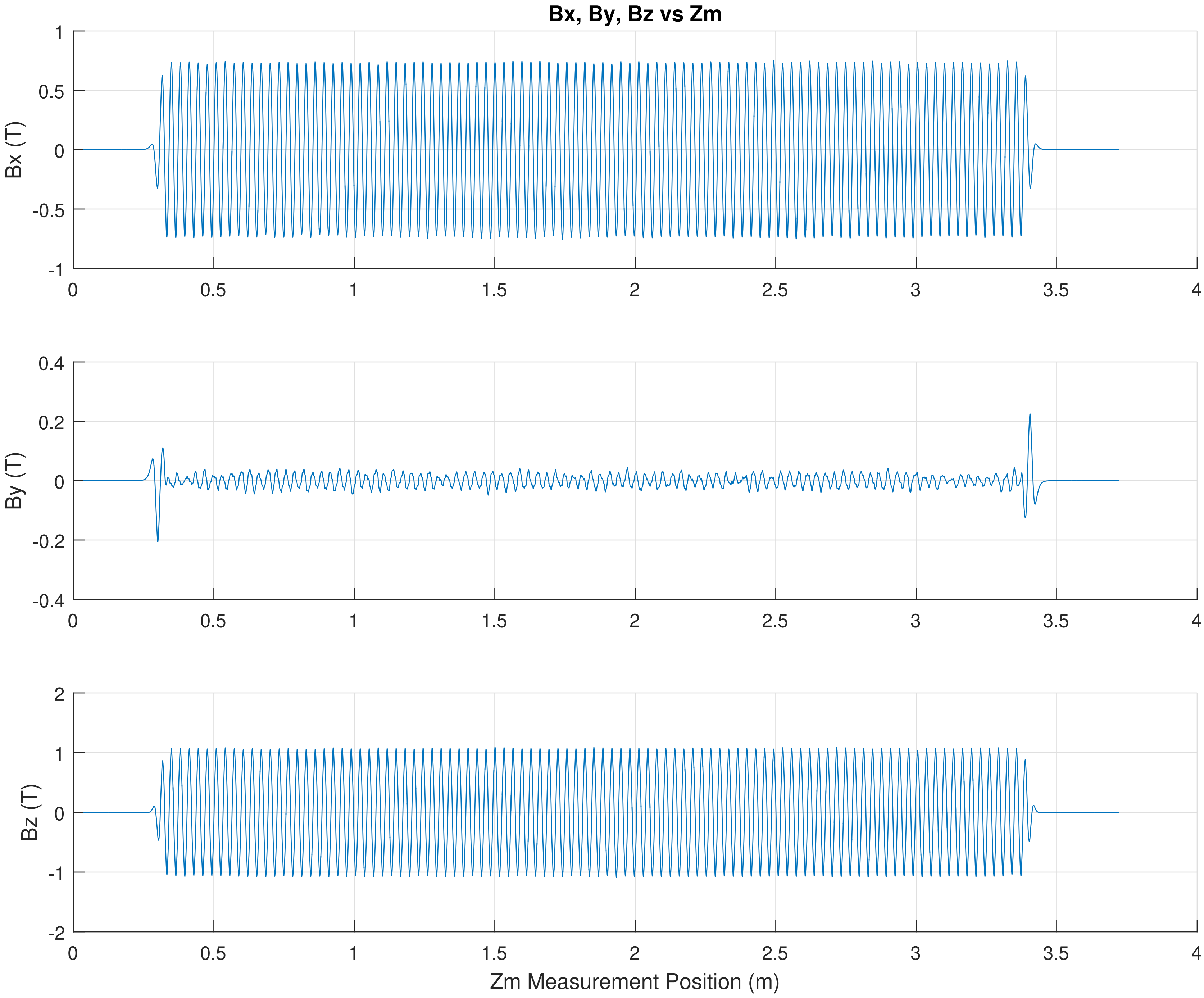
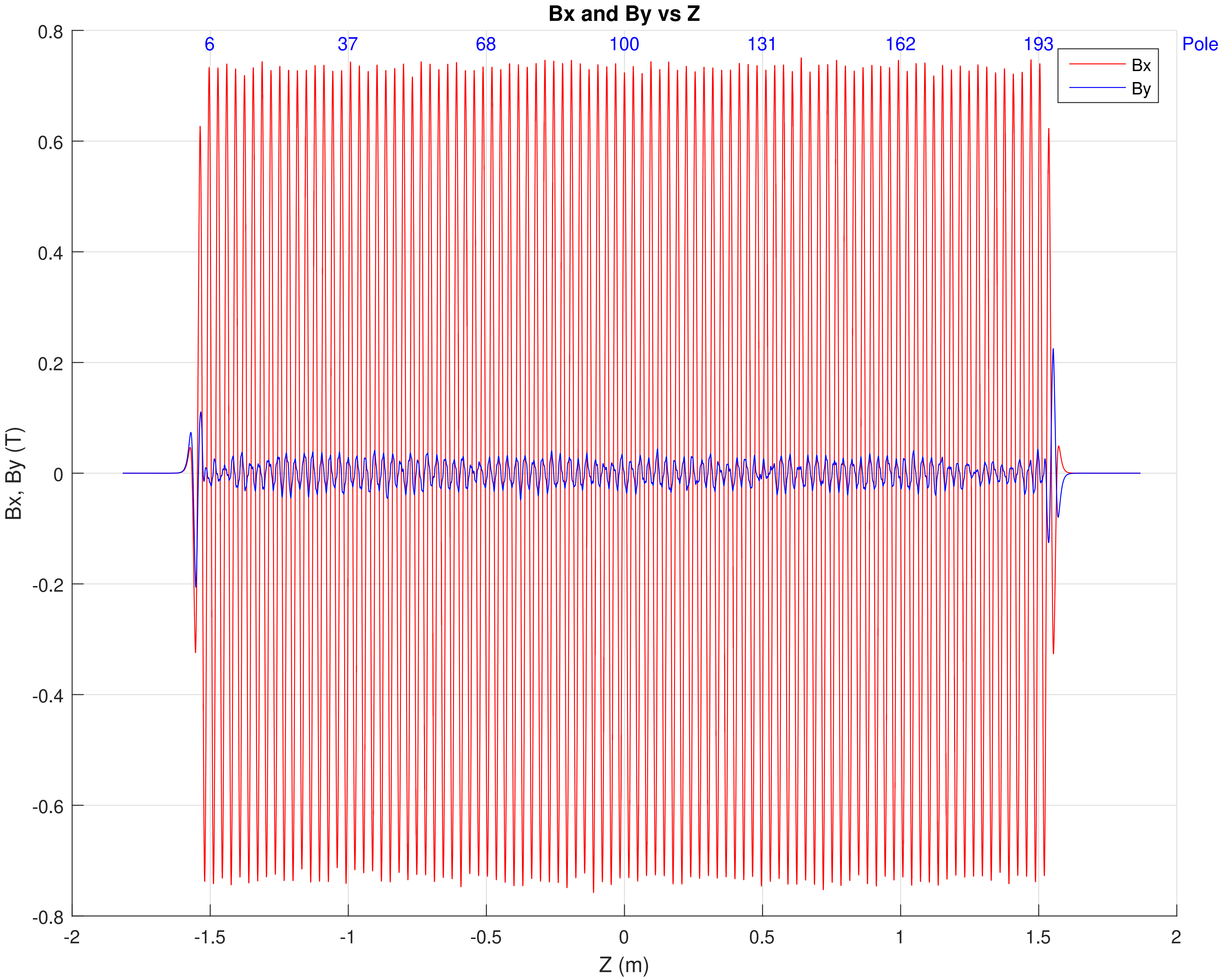
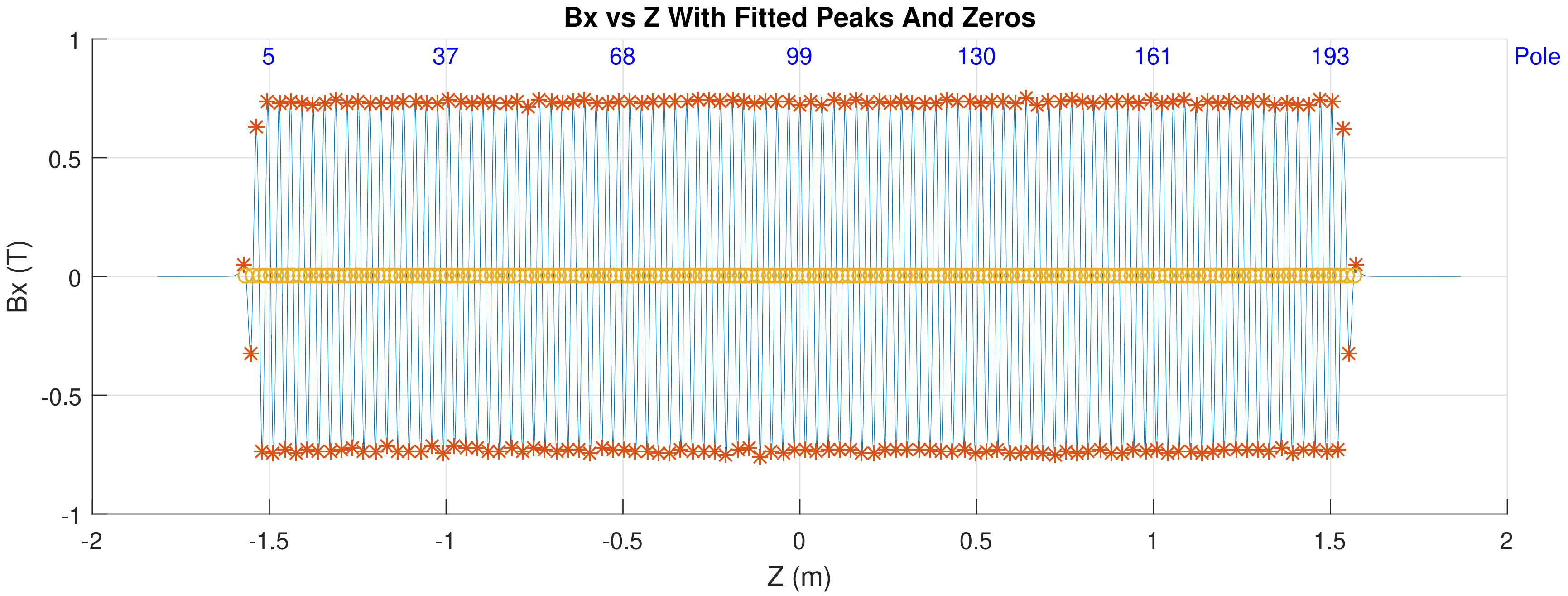
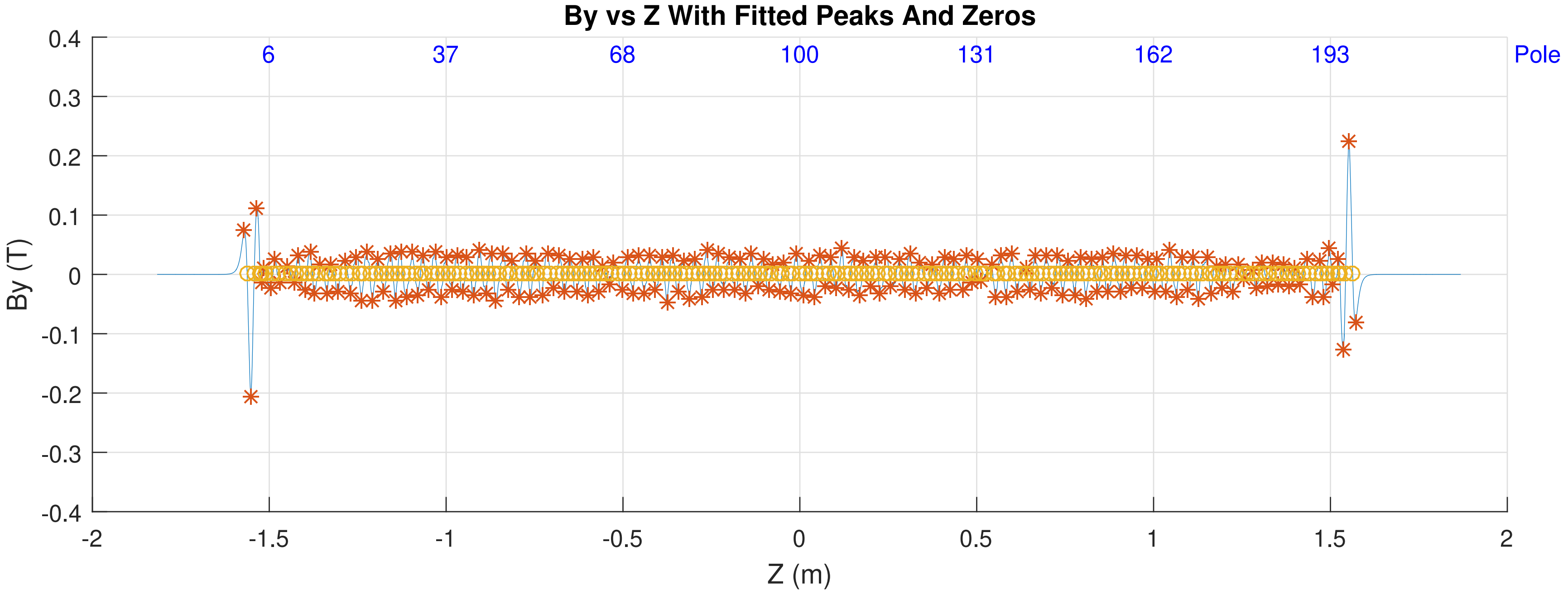
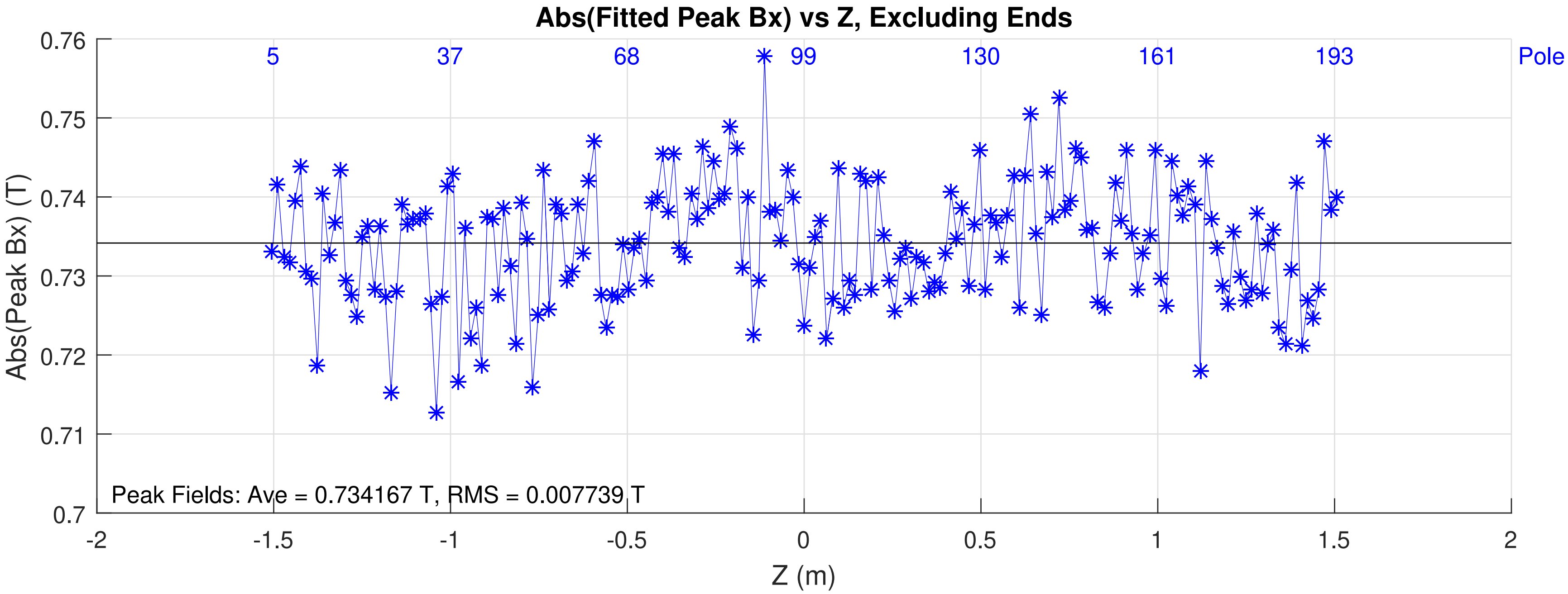
```
SLAC Magnetic Measurements

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-probe2-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
```

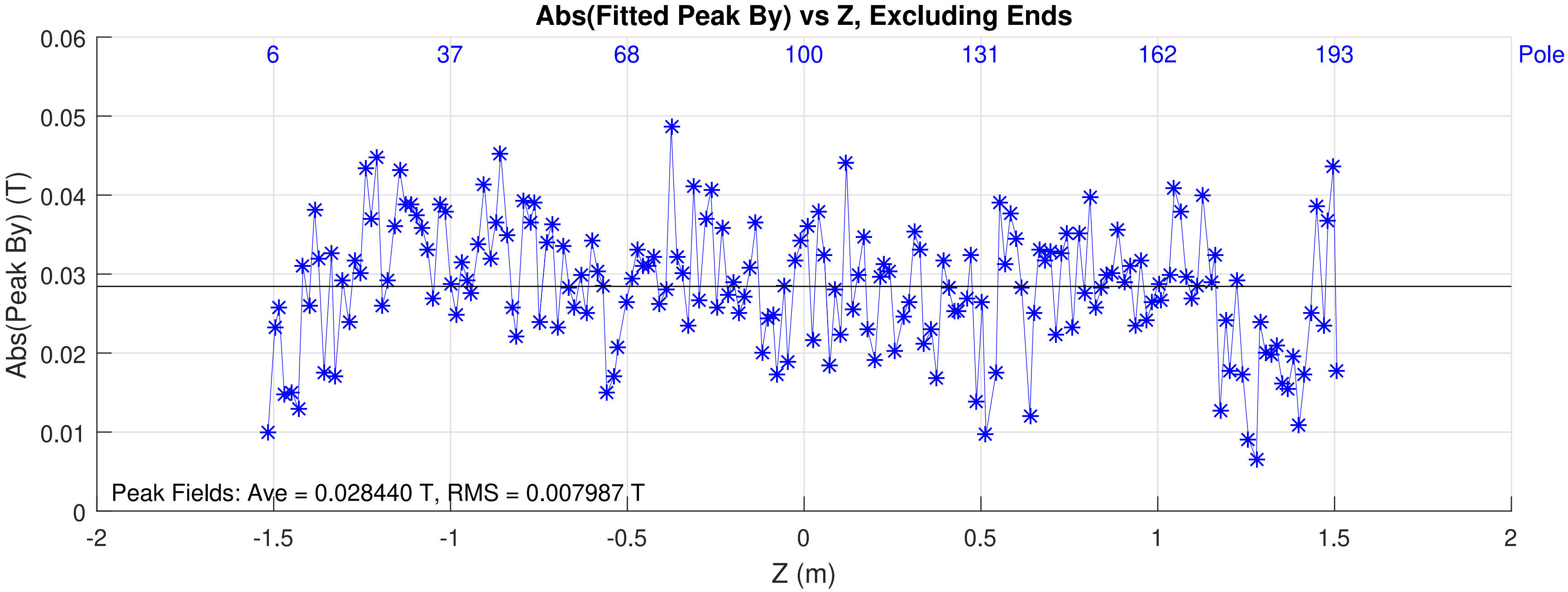

Bx, By, Bz vs Zm
Bx (T)
1
0.5
0
-0.5
-1
By (T)
0.4
0.2
0
-0.2
-0.4
Bz (T)
2
1
0
-1
-2
0
0.5
1
1.5
2
2.5
3
3.5
4
Zm Measurement Position (m)

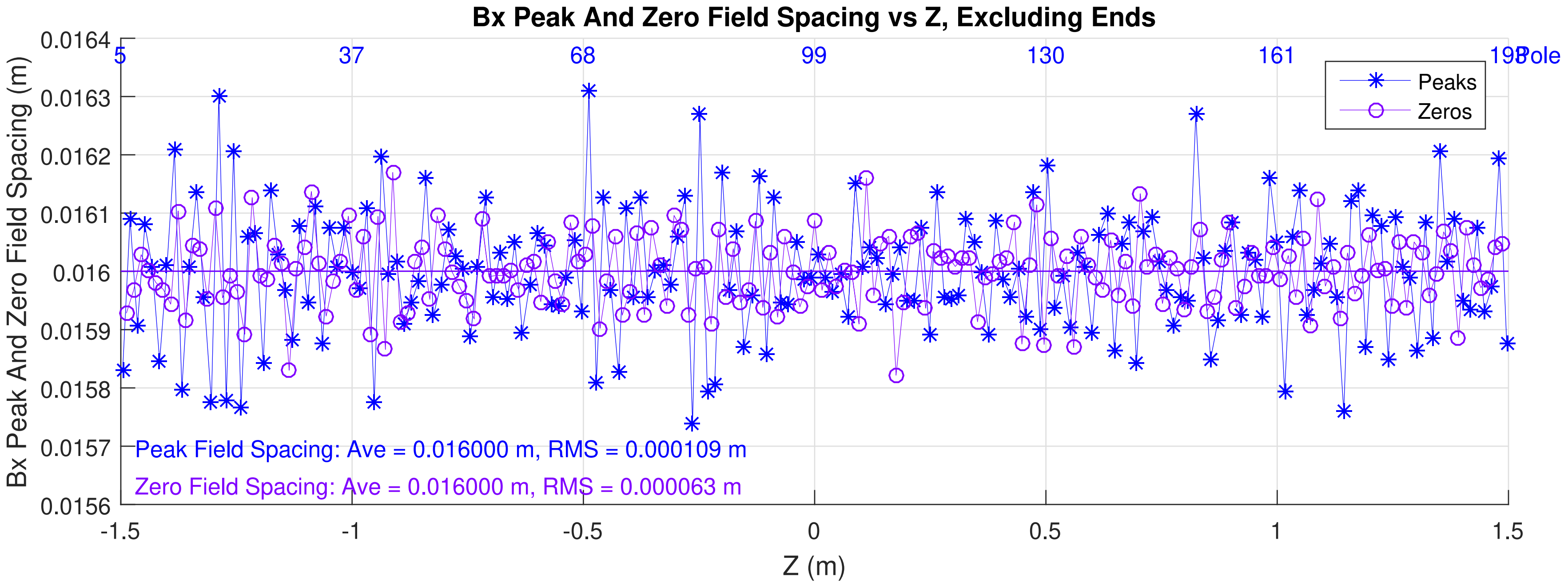

Bx and By vs Z
6
37
68
100
131
162
193
Pole
Bx
By
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
Bx, By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)


Bx vs Z With Fitted Peaks And Zeros


By vs Z With Fitted Peaks And Zeros

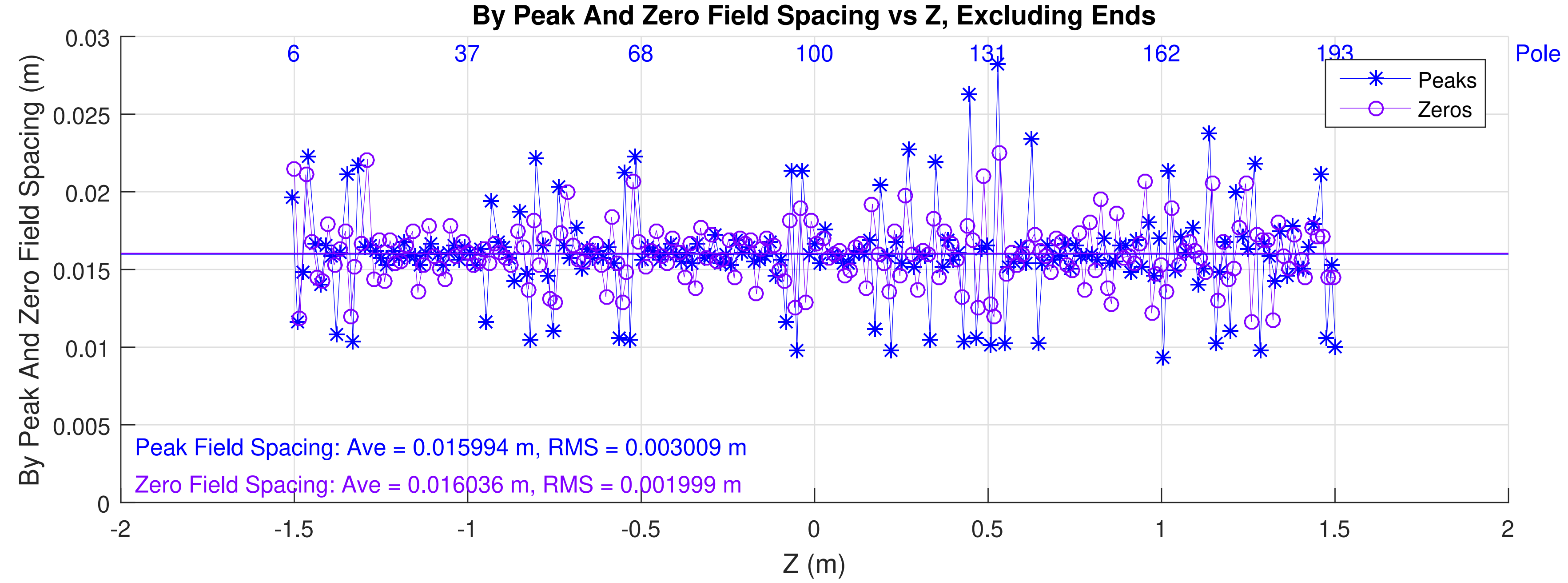

Abs(Fitted Peak Bx) vs Z, Excluding Ends
Abs(Peak Bx) (T)
0.76
0.75
0.74
0.73
0.72
0.71
0.7
5
37
68
99
130
161
193
Pole
Peak Fields: Ave = 0.734167 T, RMS = 0.007739 T
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)


Abs(Fitted Peak By) vs Z, Excluding Ends
Abs(Peak By) (T)
0.06
0.05
0.04
0.03
0.02
0.01
0
6
37
68
100
131
162
193
Pole
Peak Fields: Ave = 0.028440 T, RMS = 0.007987 T
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)


Bx Peak And Zero Field Spacing vs Z, Excluding Ends

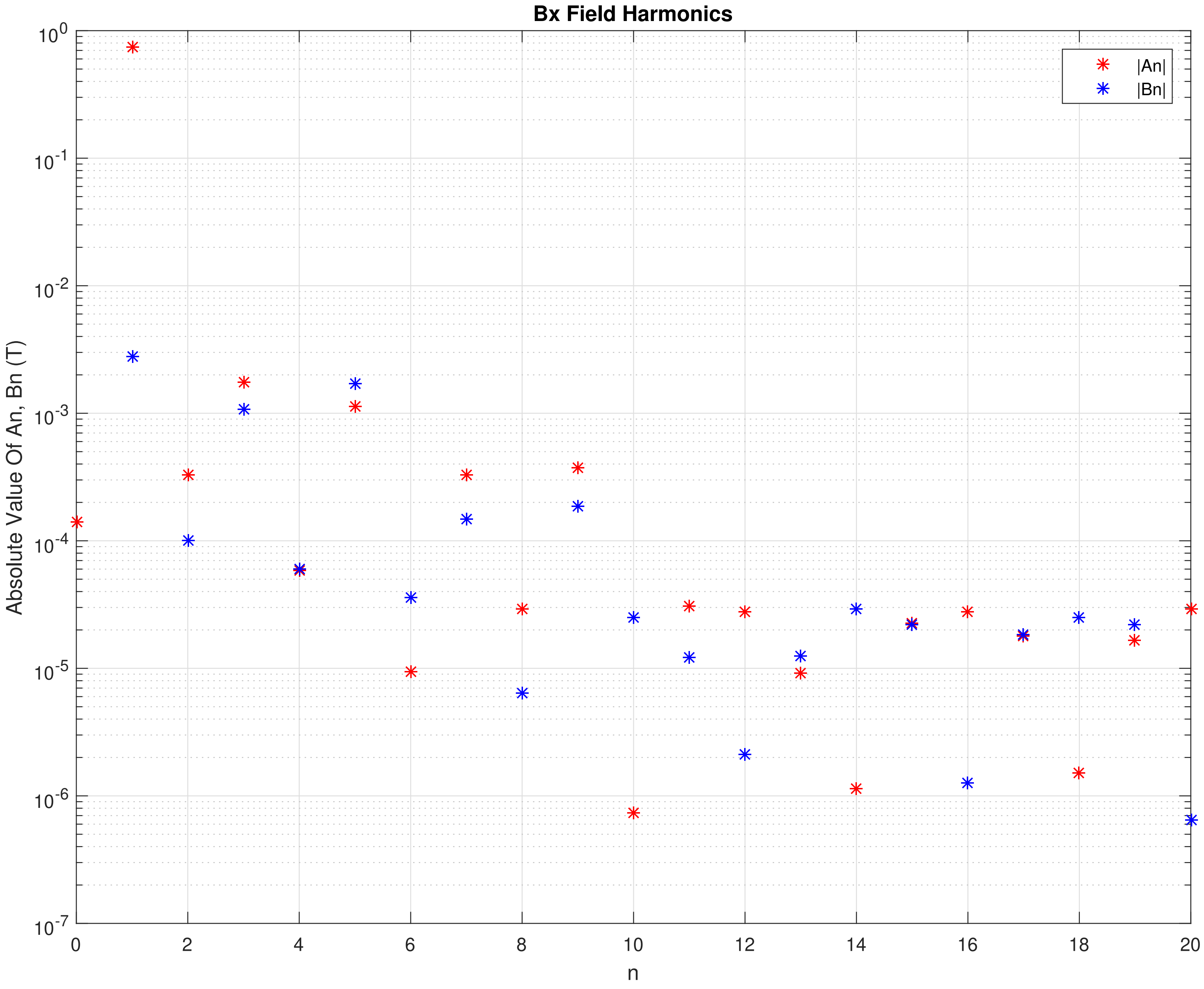
Peak Field Spacing: Ave = 0.016000 m, RMS = 0.000109 m

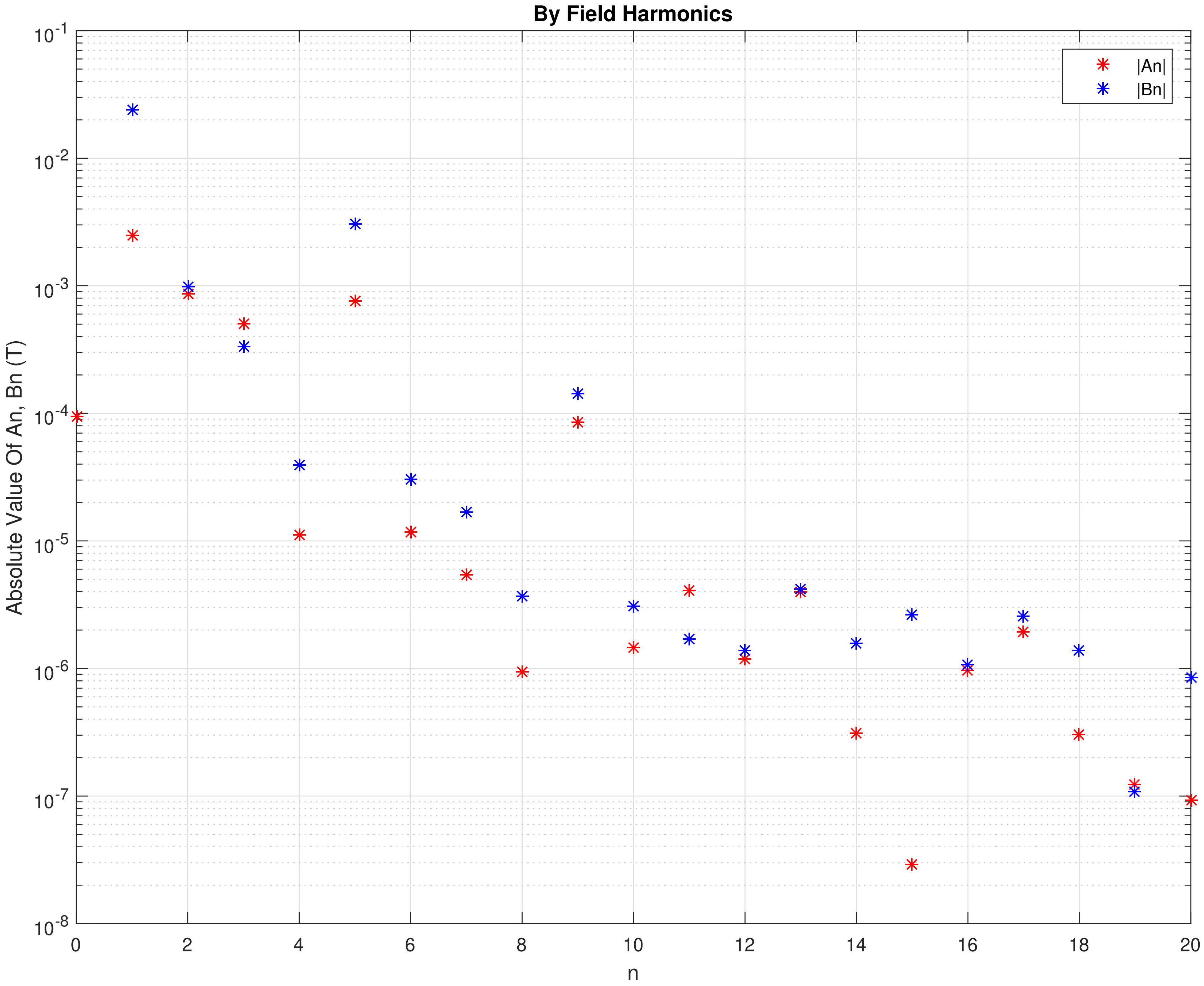
Zero Field Spacing: Ave = 0.016000 m, RMS = 0.000063 m

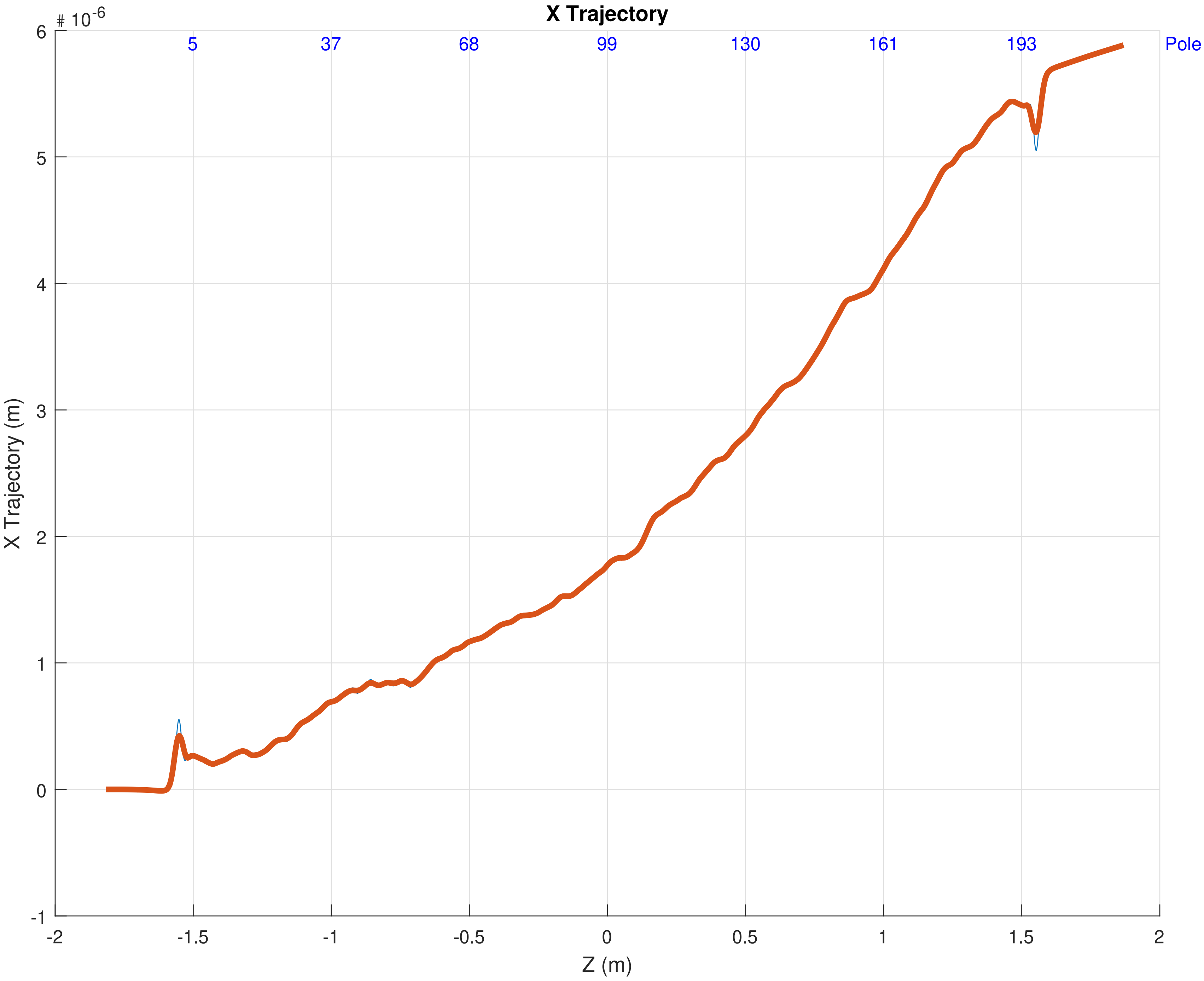

By Peak And Zero Field Spacing vs Z, Excluding Ends

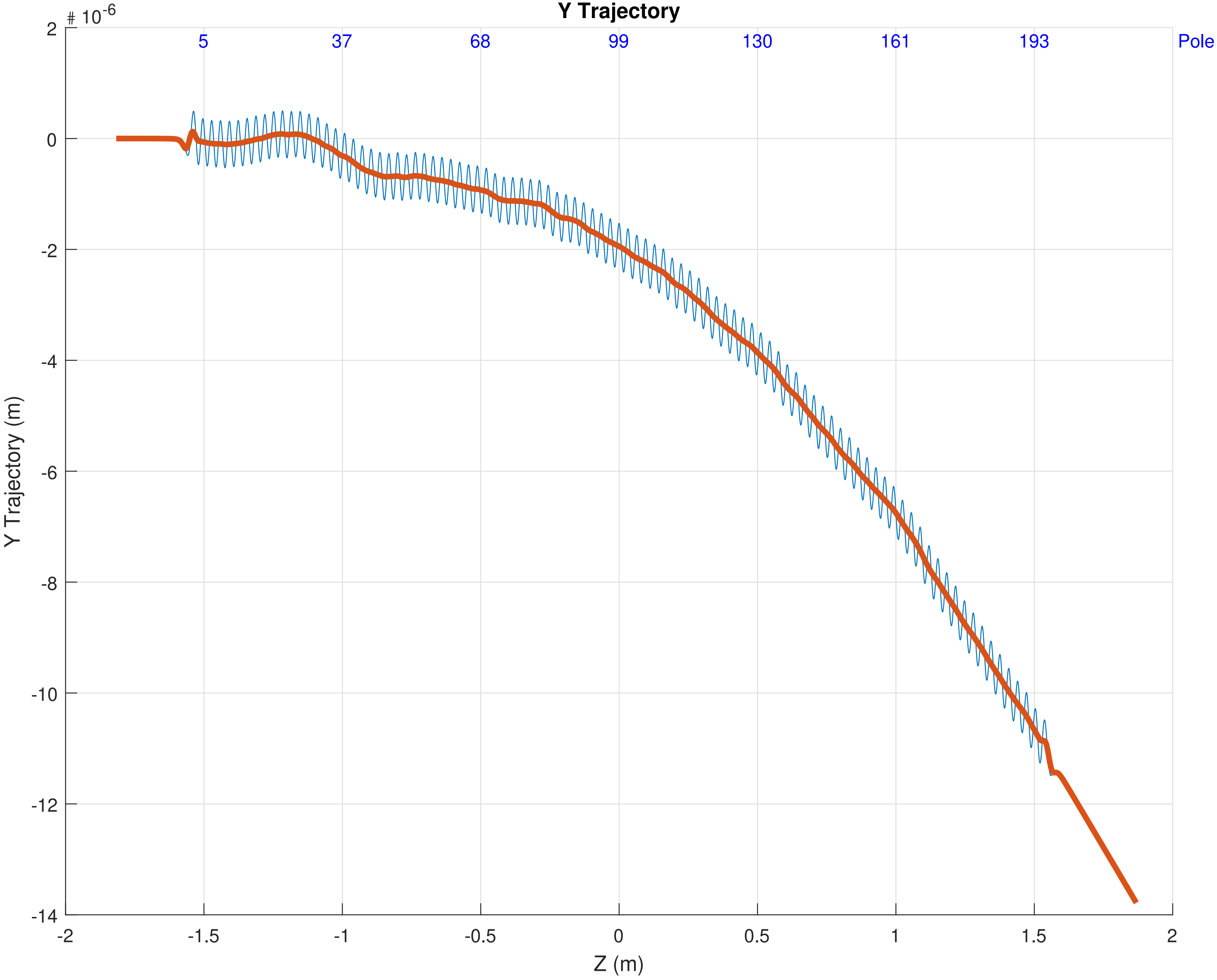
Peak Field Spacing: Ave = 0.015994 m, RMS = 0.003009 m

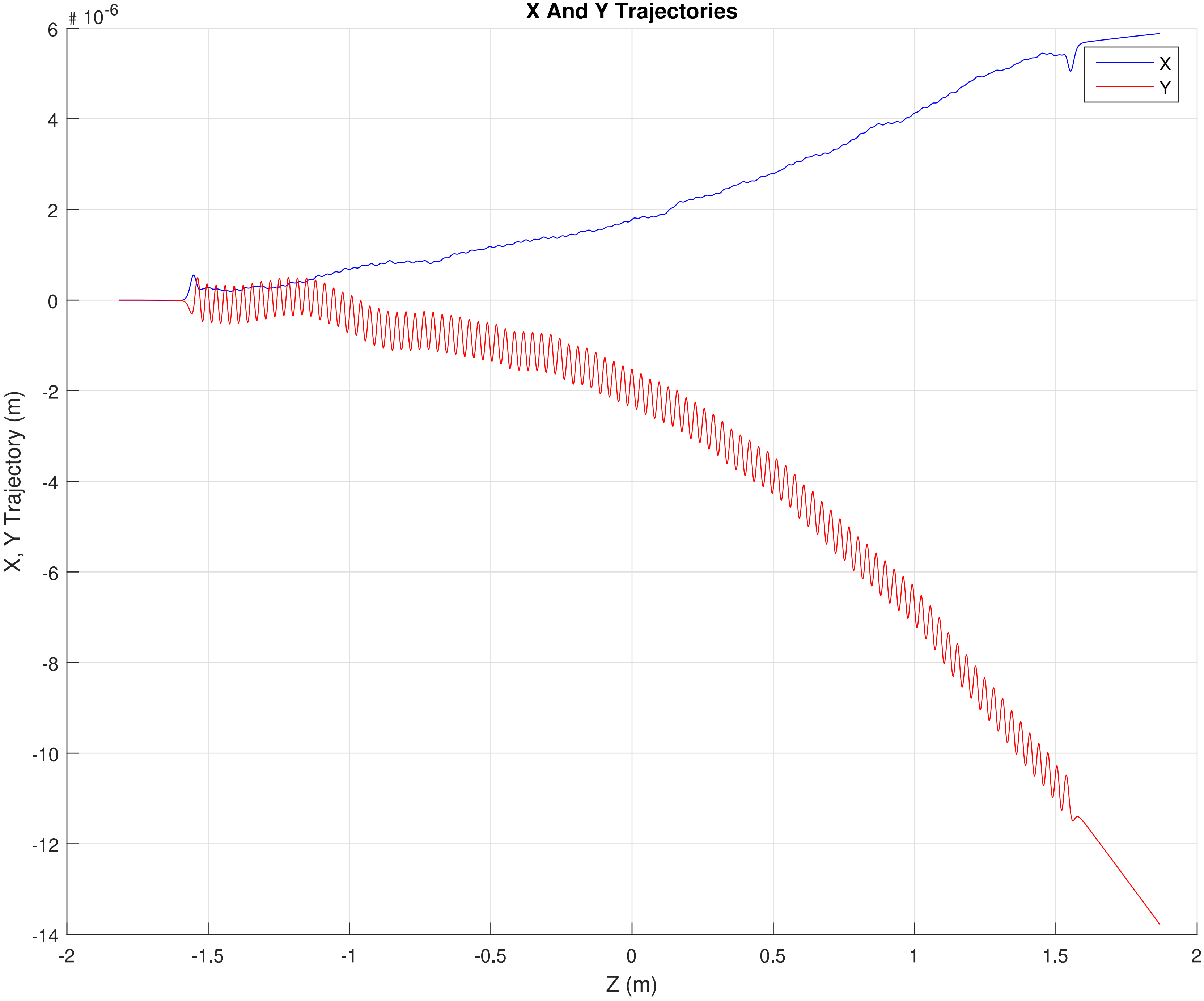
Zero Field Spacing: Ave = 0.016036 m, RMS = 0.001999 m

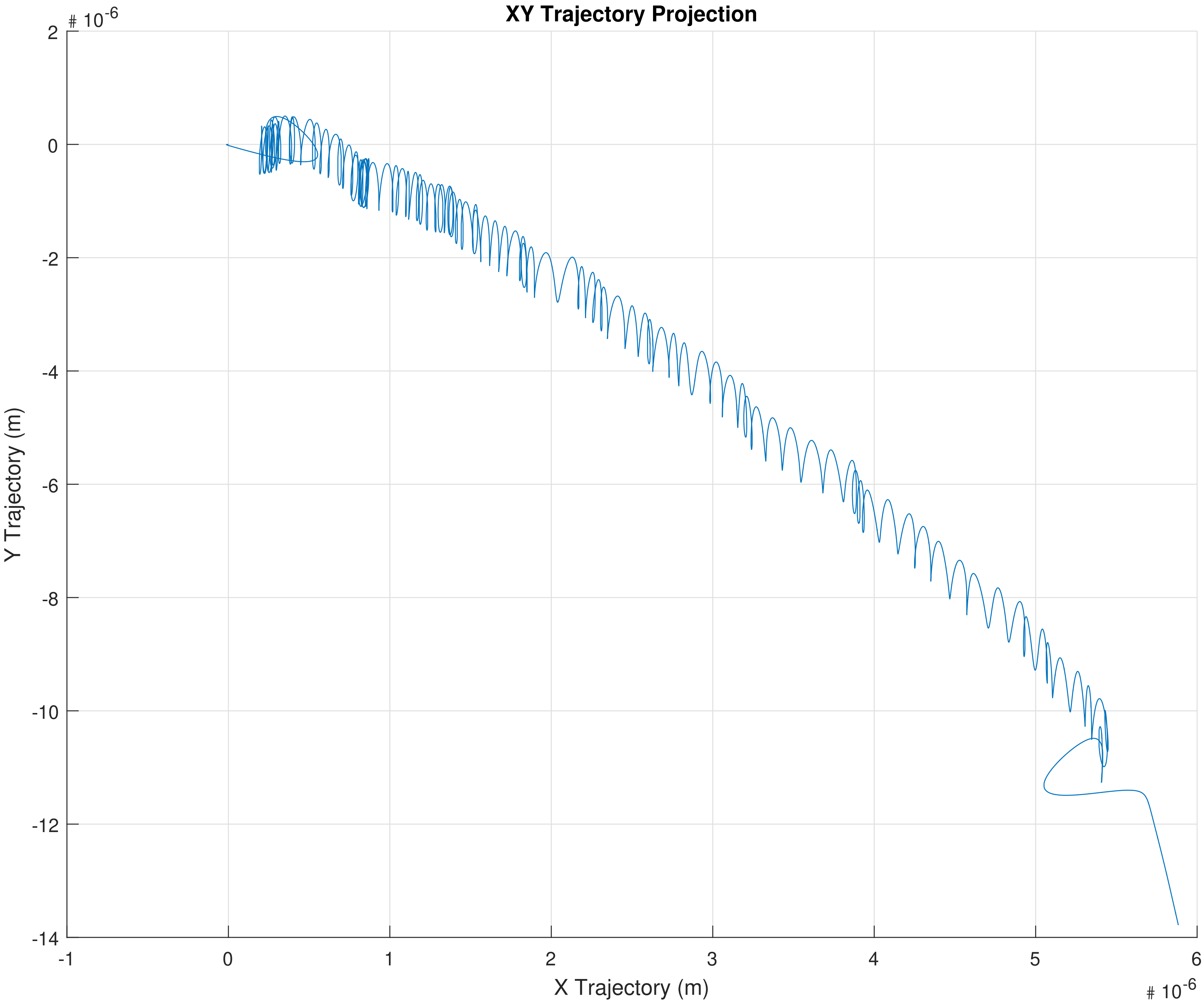

Bx Field Harmonics
Absolute Value Of An, Bn (T)
n
|An|
|Bn|
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
10^-7
0
2
4
6
8
10
12
14
16
18
20

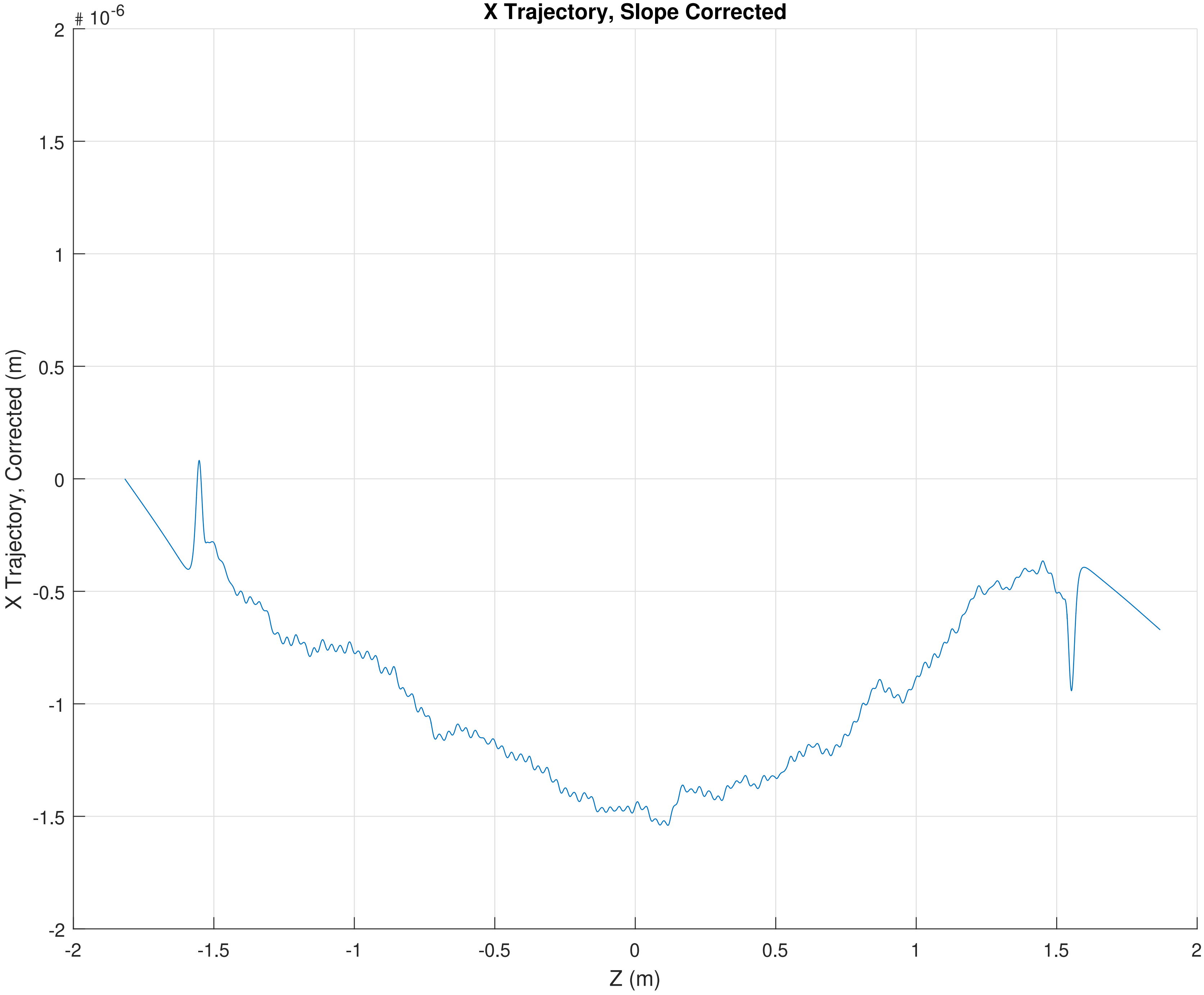

By Field Harmonics
Absolute Value Of An, Bn (T)
n
|An|
|Bn|
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
10^{-8}
0
2
4
6
8
10
12
14
16
18
20

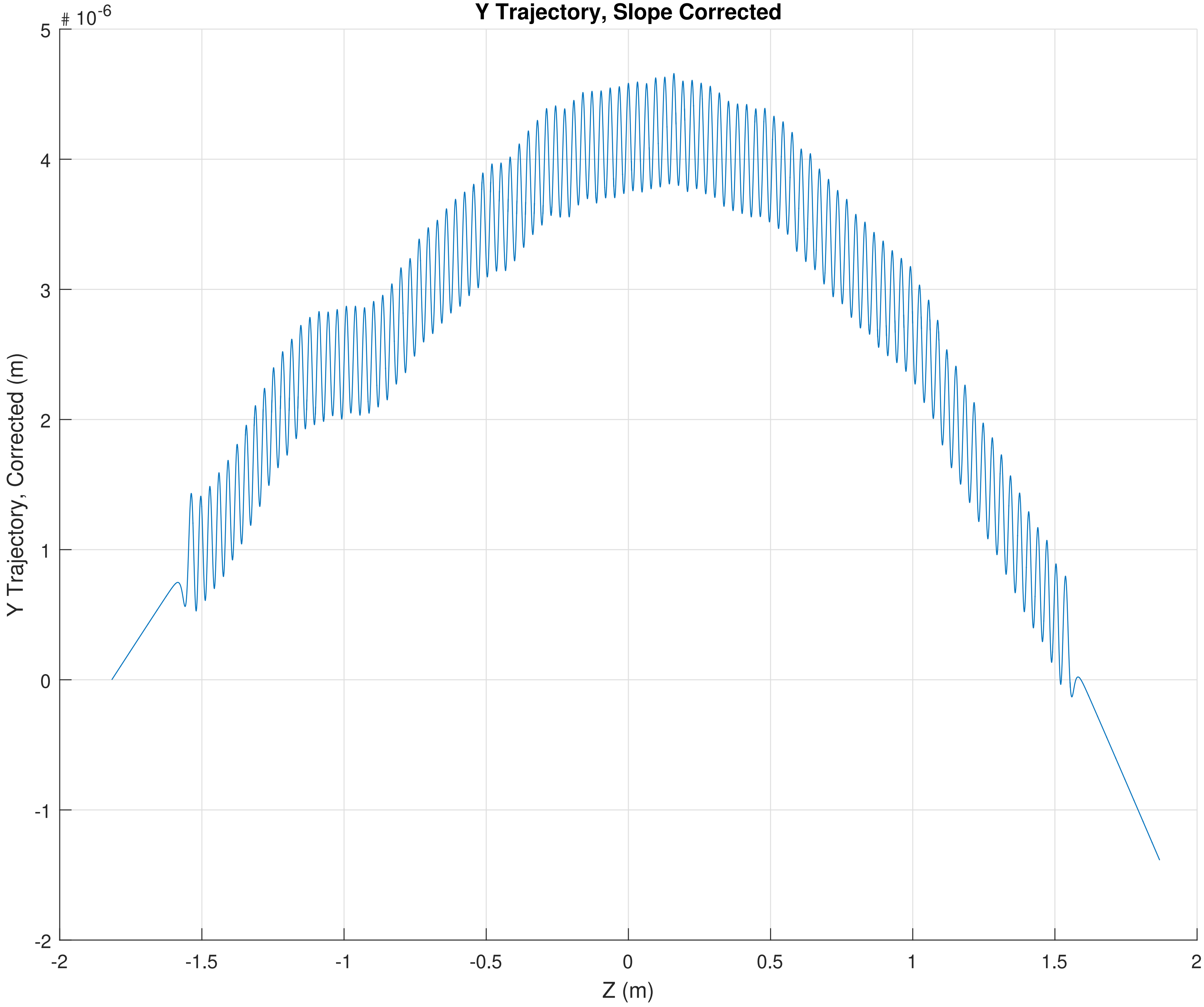

X Trajectory
10^-6
6
5
4
3
2
1
0
-1
X Trajectory (m)
5
37
68
99
130
161
193
Pole
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

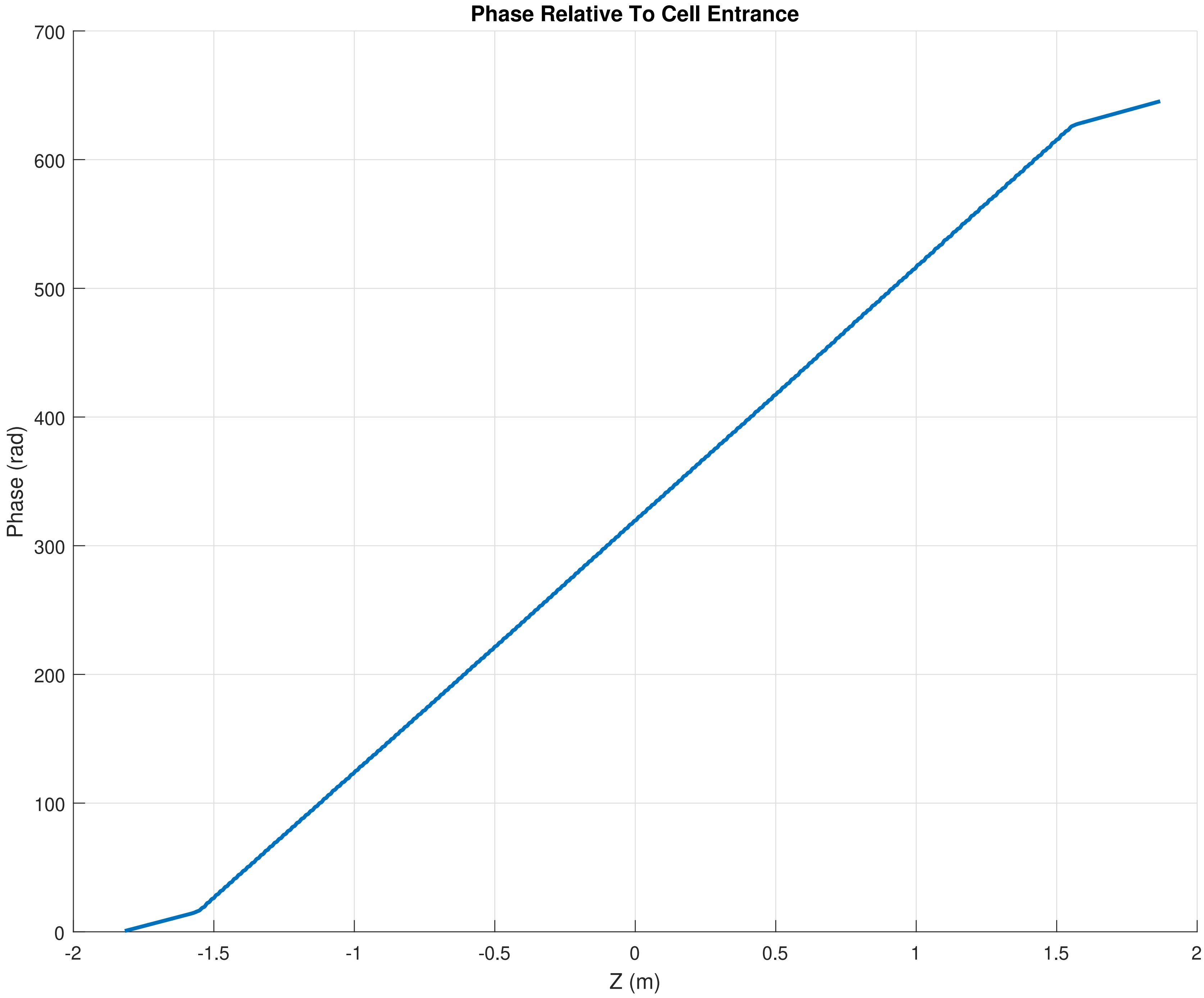

Y Trajectory
10-6
5
37
68
99
130
161
193
Pole
2
0
-2
-4
-6
-8
-10
-12
-14
Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

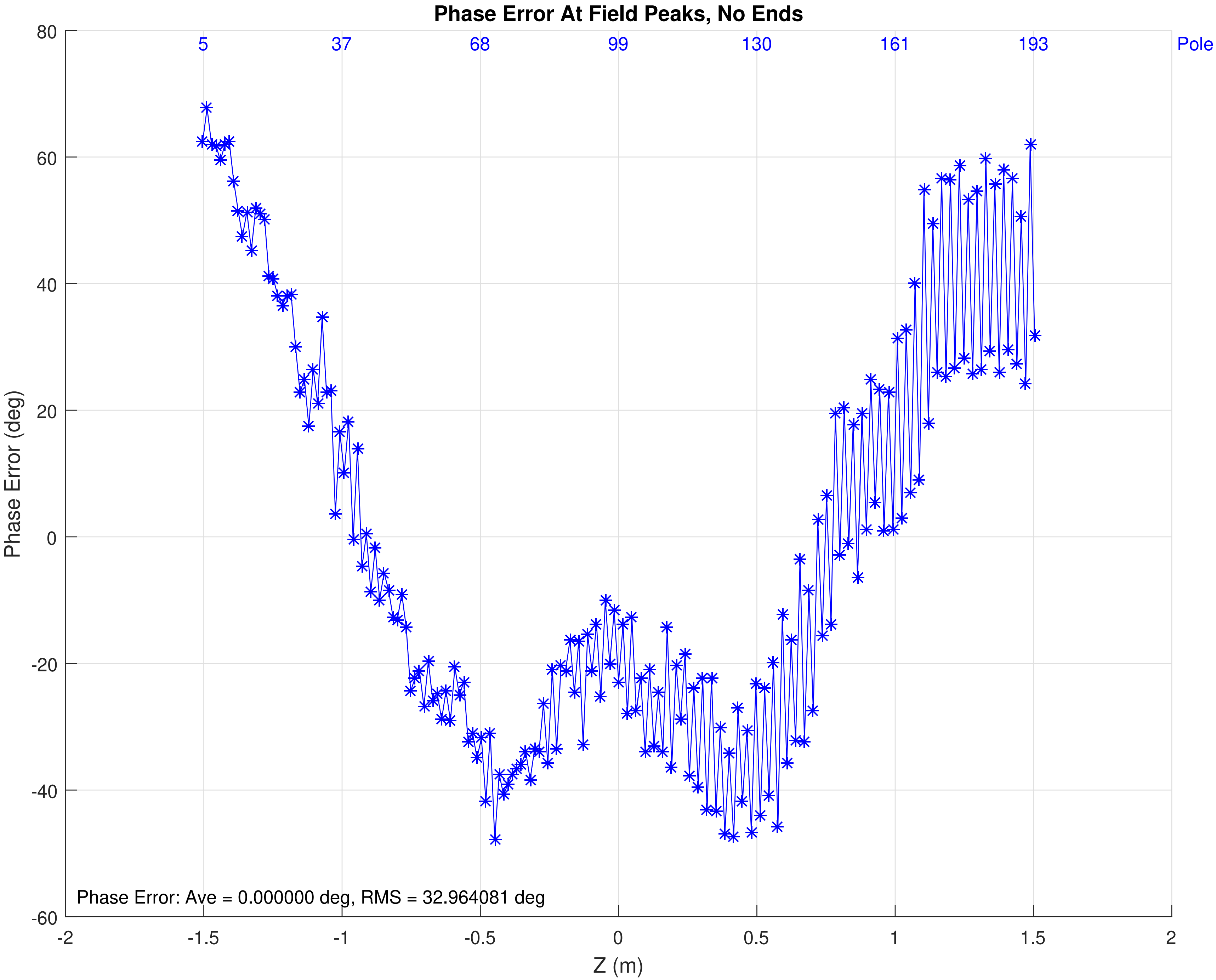

X And Y Trajectories
10^-6
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
X, Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
X
Y


XY Trajectory Projection
10-6
2
0
-2
-4
-6
-8
-10
-12
-14
Y Trajectory (m)
-1
0
1
2
3
4
5
6
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)

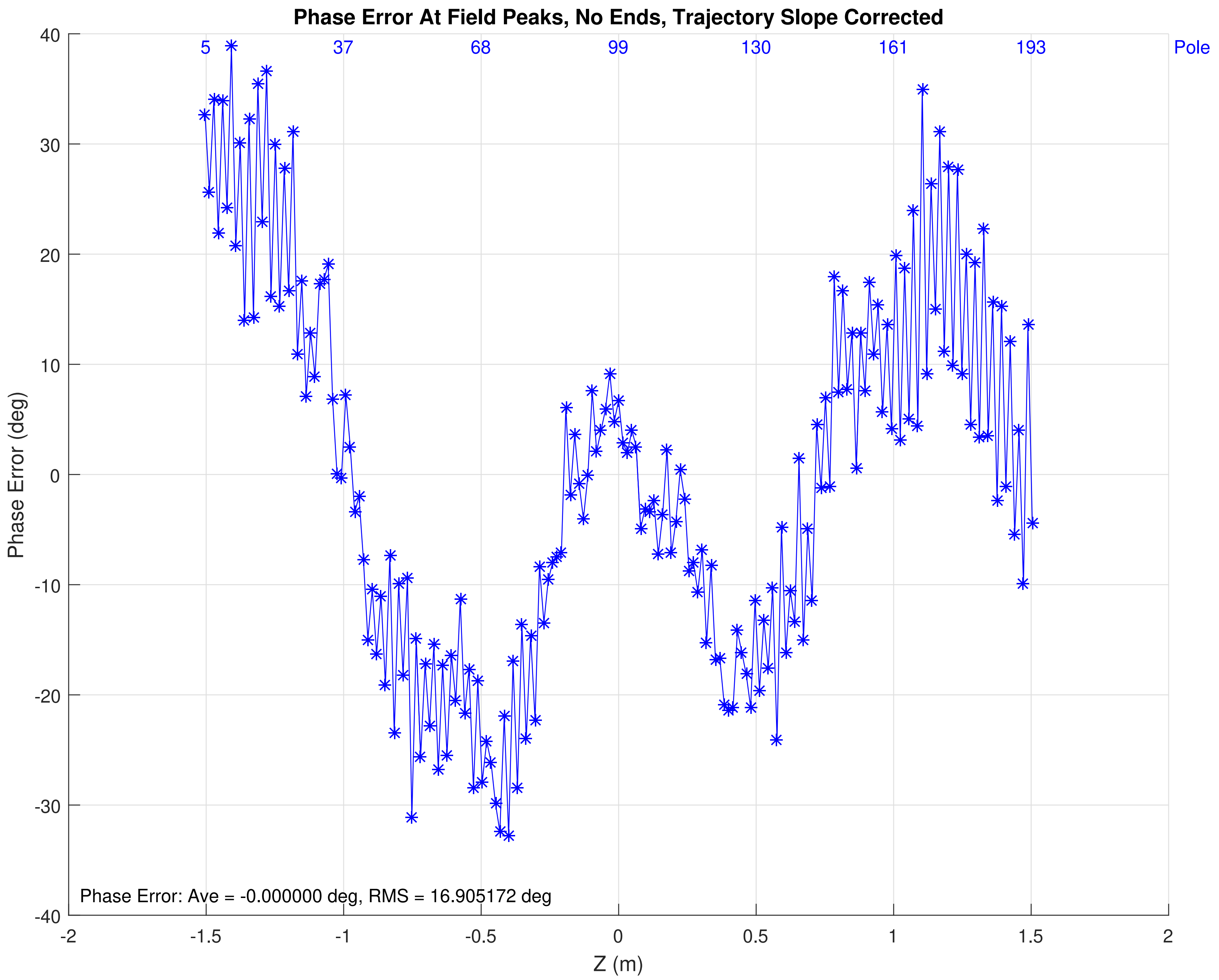

Y Trajectory, Slope Corrected
10-6
5
4
3
2
1
0
-1
-2
Y Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)


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

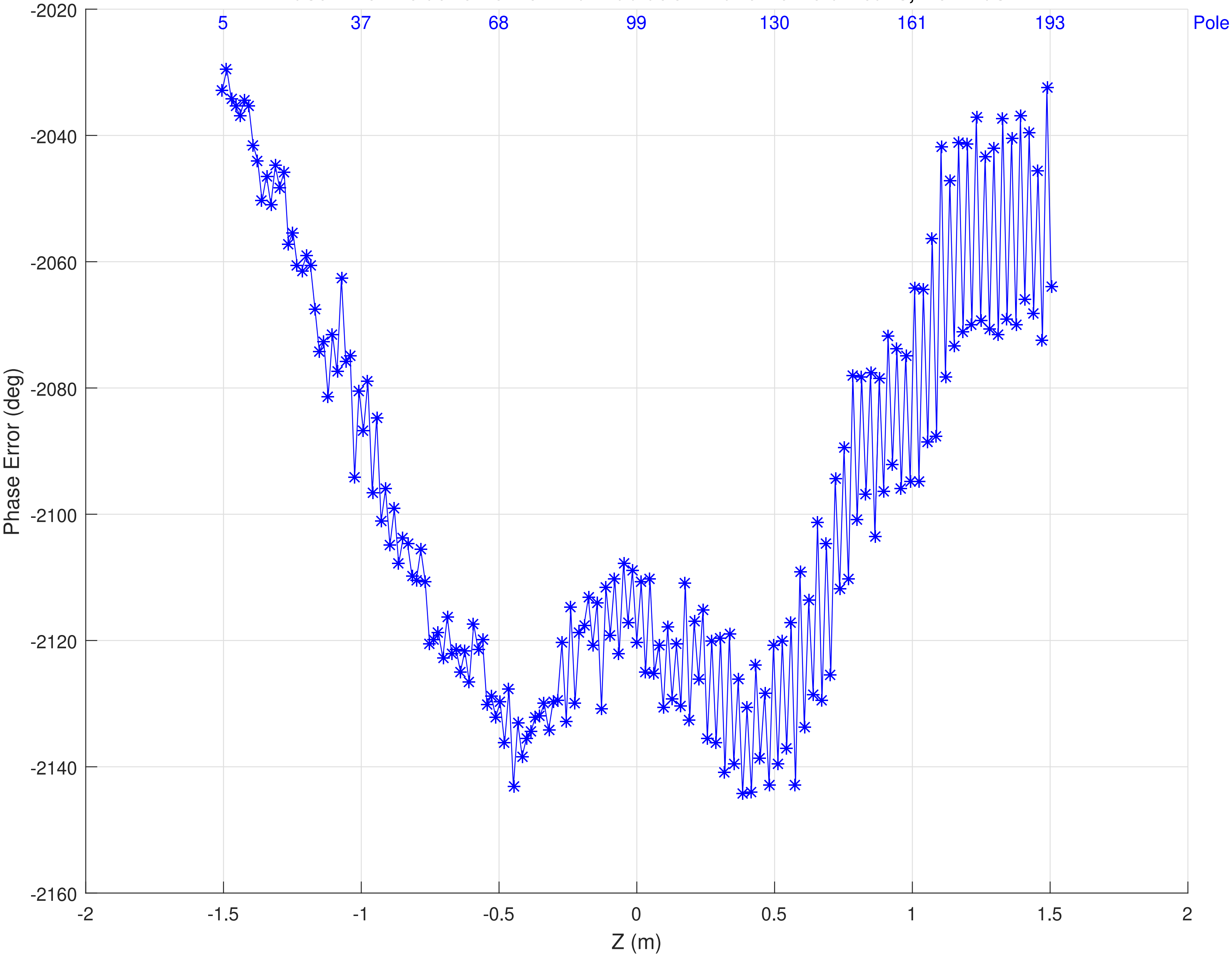


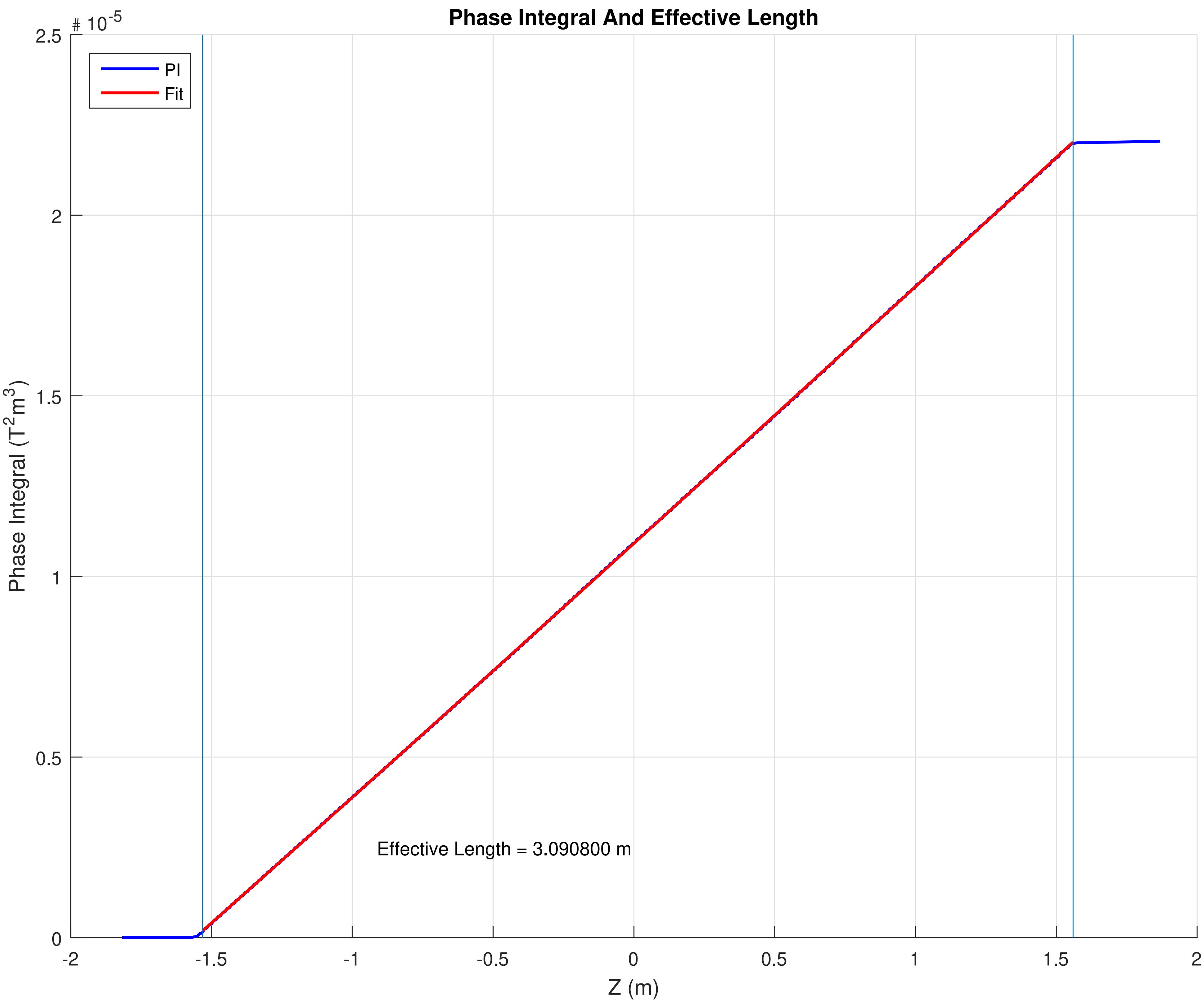
Phase Error At Field Peaks, No Ends

Phase Error: Ave = 0.000000 deg, RMS = 32.964081 deg

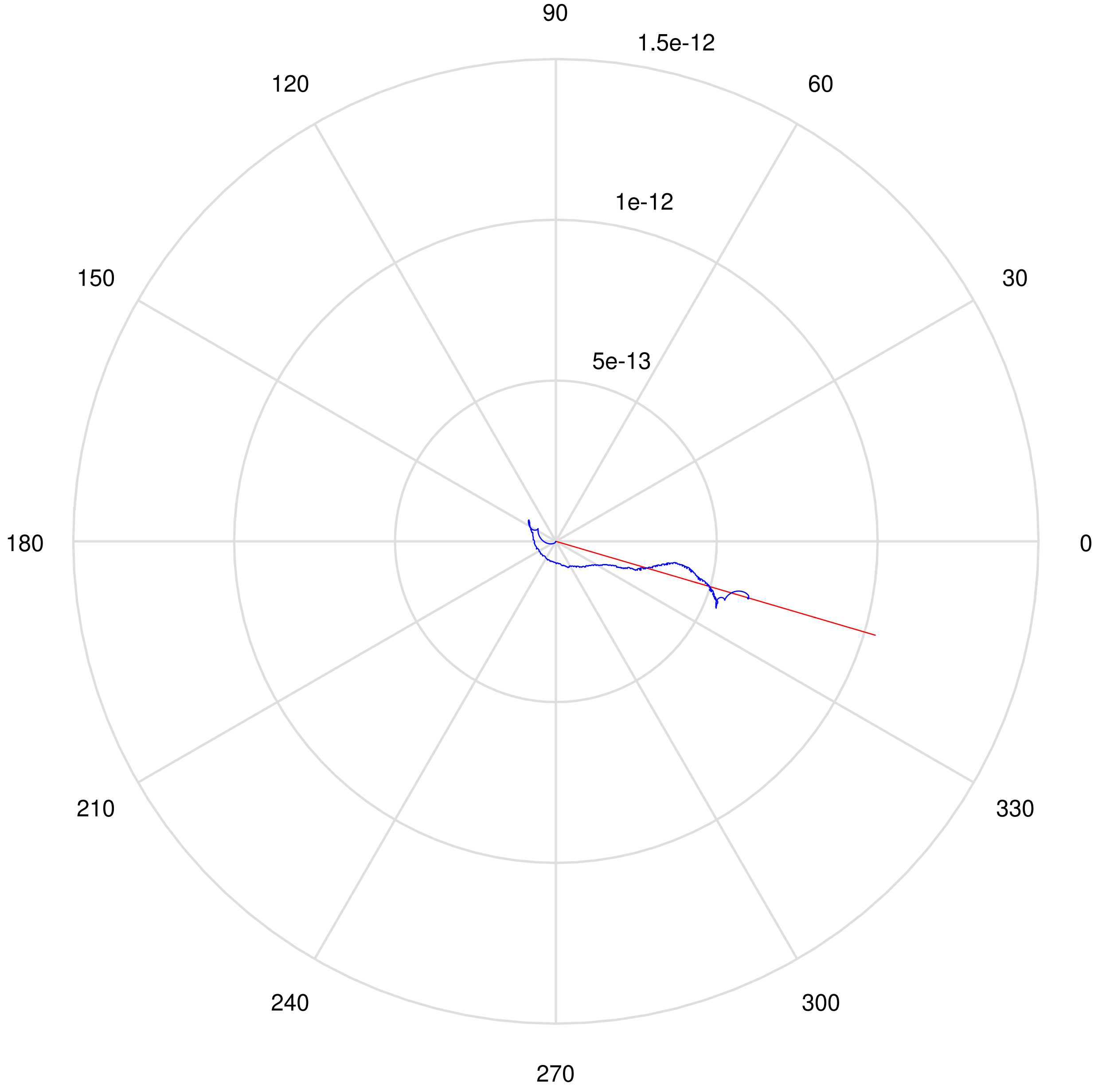

Phase Error At Field Peaks, No Ends, Trajectory Slope Corrected
5
37
68
99
130
161
193
Pole
Phase Error (deg)
40
30
20
10
0
-10
-20
-30
-40
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
Phase Error: Ave = -0.000000 deg, RMS = 16.905172 deg

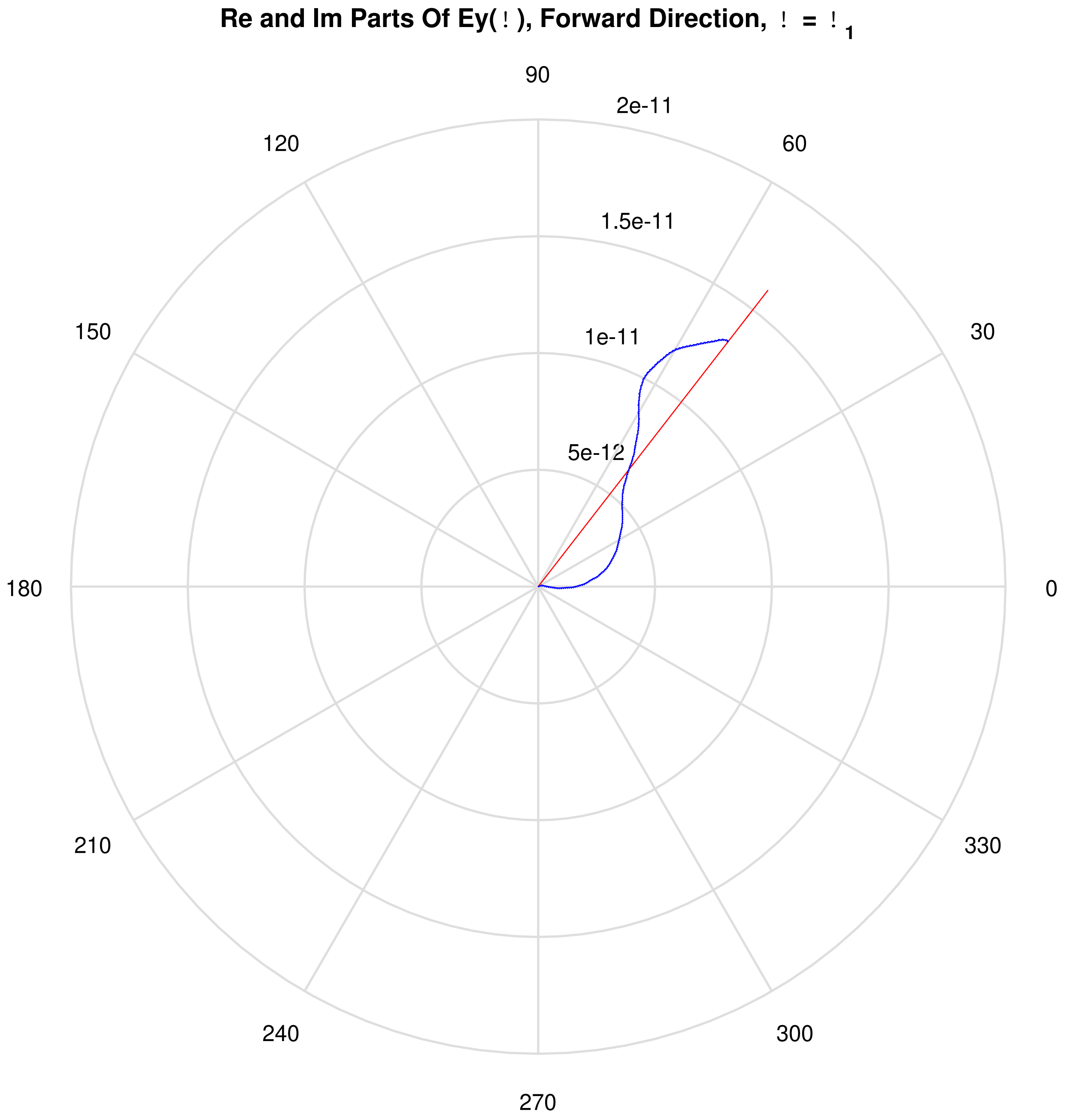
Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends

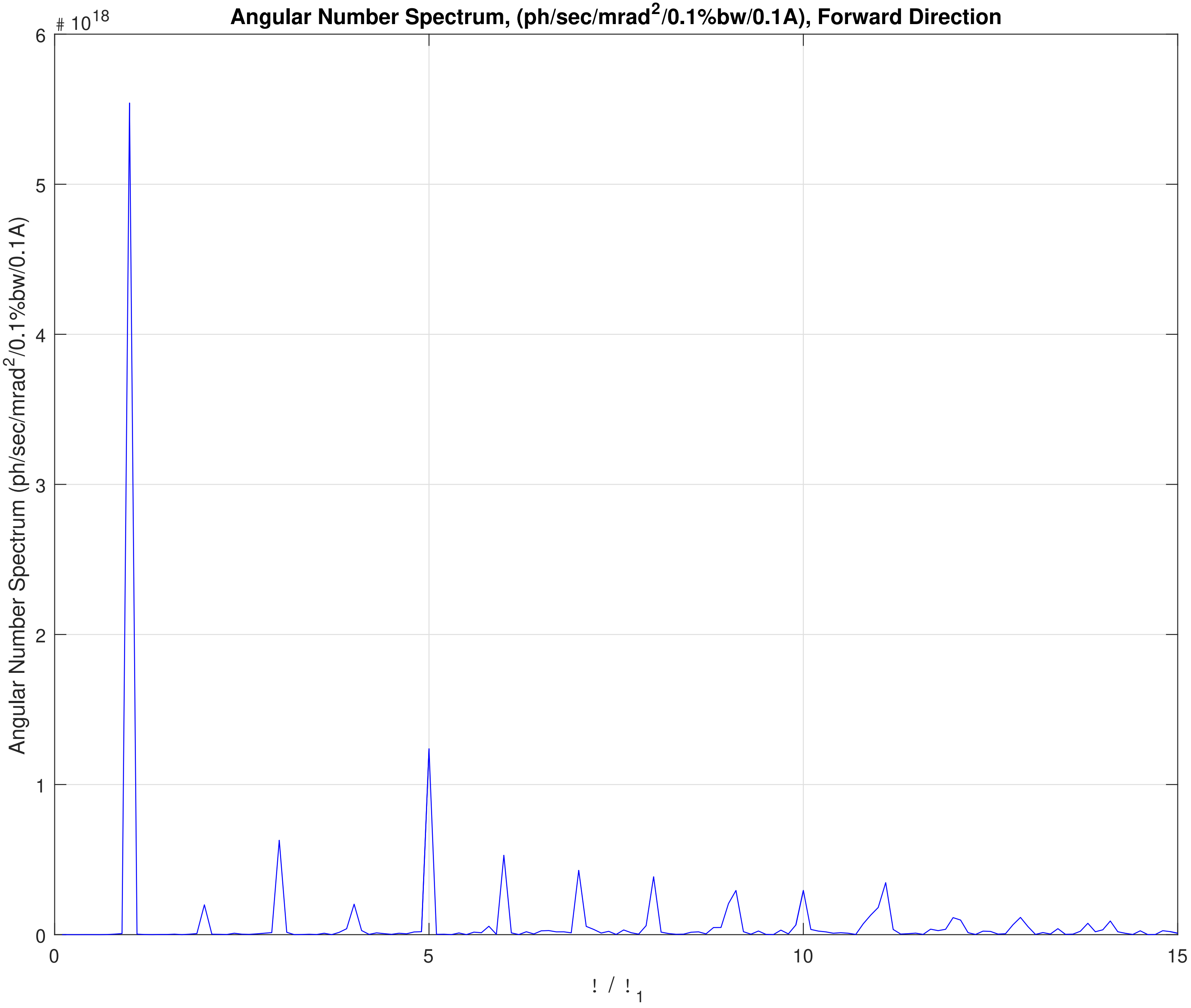



Phase Integral And Effective Length
10^-5
2.5
2
1.5
1
0.5
0
Phase Integral (T^2 m^3)
PI
Fit
Effective Length = 3.090800 m
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

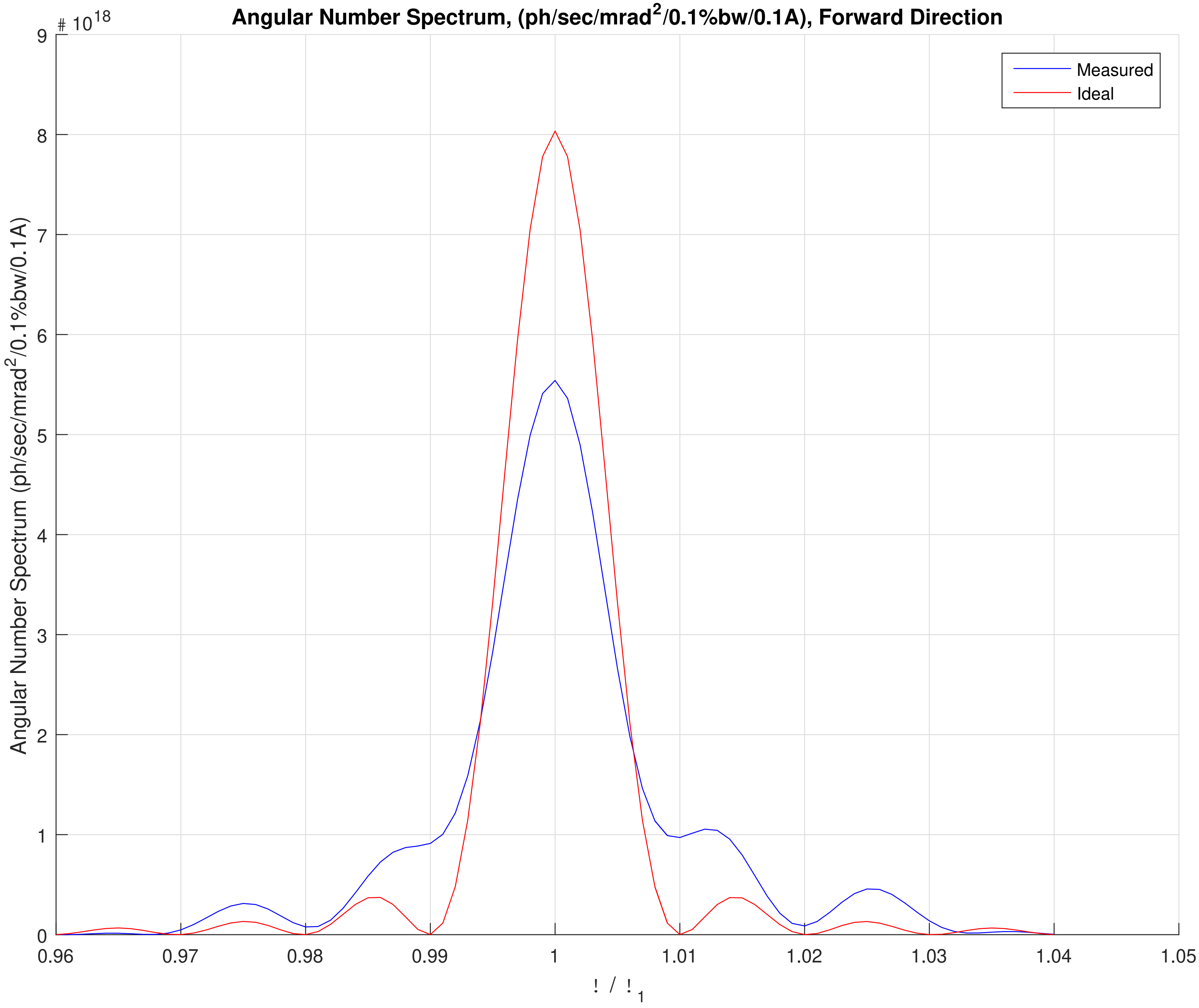
Re and Im Parts Of Ex(!), Forward Direction, ! = !$_1$



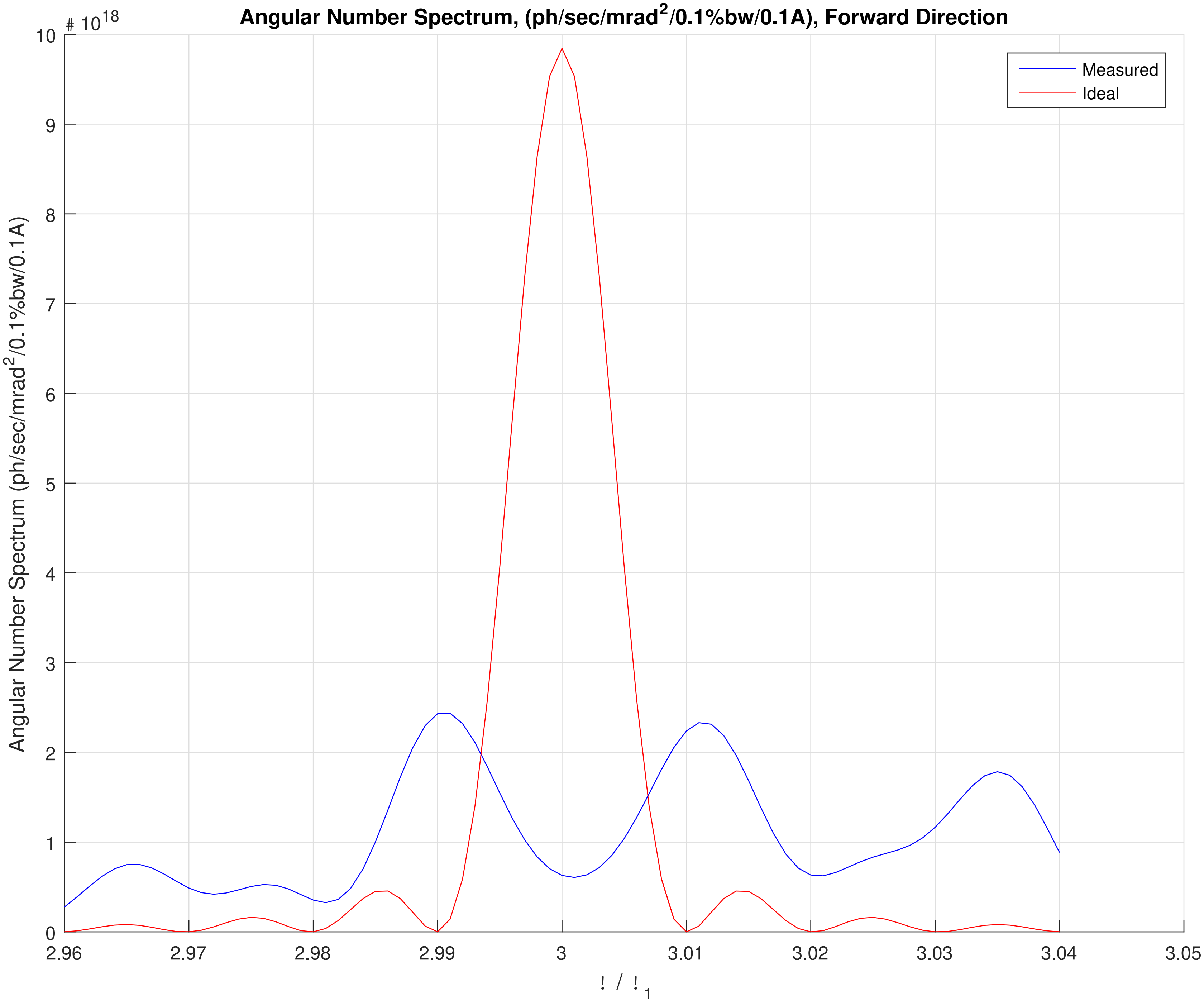

Re and Im Parts Of Ey(!), Forward Direction, ! = ! 1
90
2e-11
60
120
1.5e-11
150
1e-11
30
5e-12
180
0
210
330
240
300
270

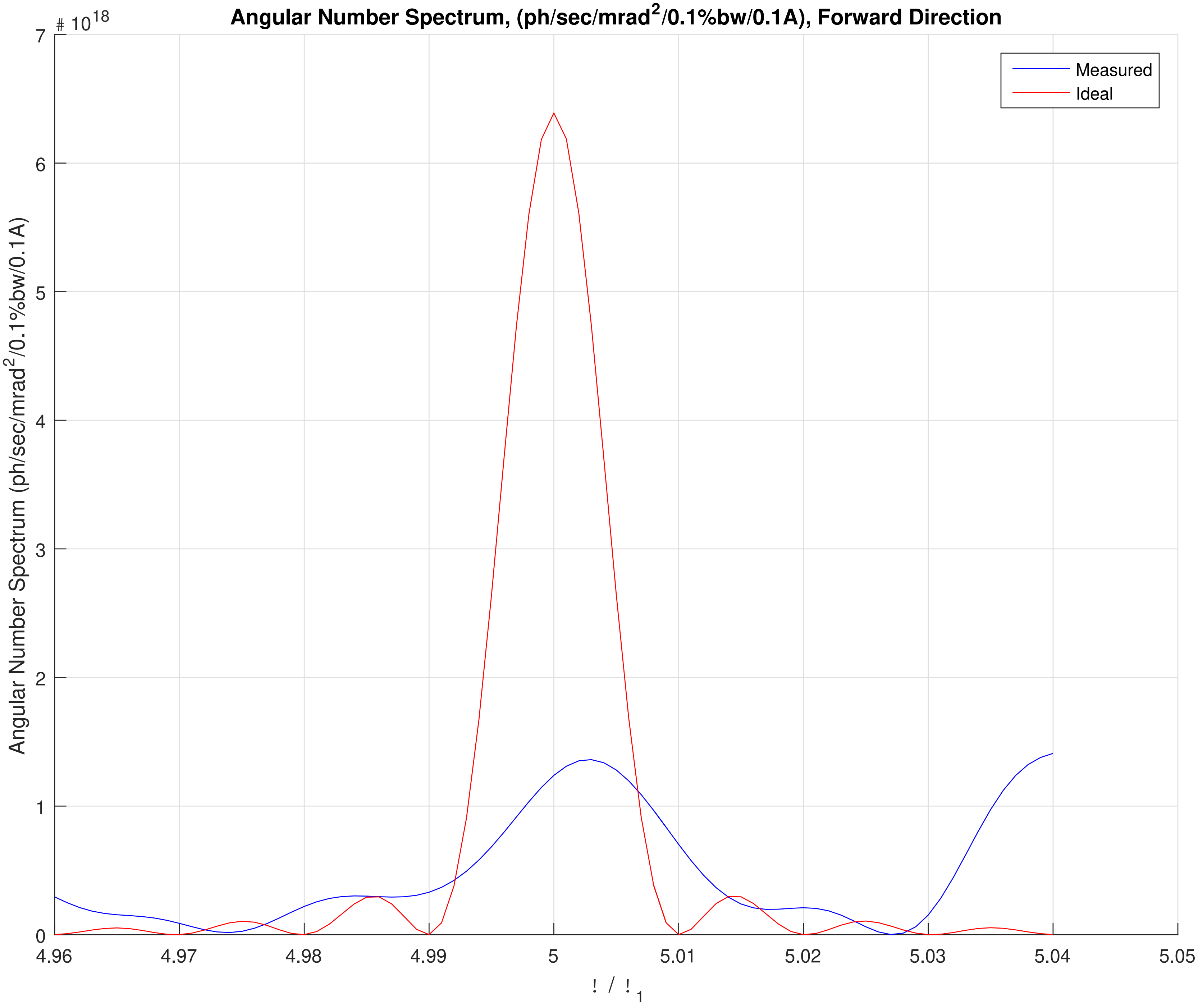


Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{18}
6
5
4
3
2
1
0
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
0
5
10
15
! / !$_1$



Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{18}
9
8
7
6
5
4
3
2
1
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^{18}
10
9
8
7
6
5
4
3
2
1
0
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
2.96
2.97
2.98
2.99
3
3.01
3.02
3.03
3.04
3.05
! / !$_1$
Measured
Ideal


Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{18}
7
6
5
4
3
2
1
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