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SLAC Magnetic Measurements

EPU Analysis
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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
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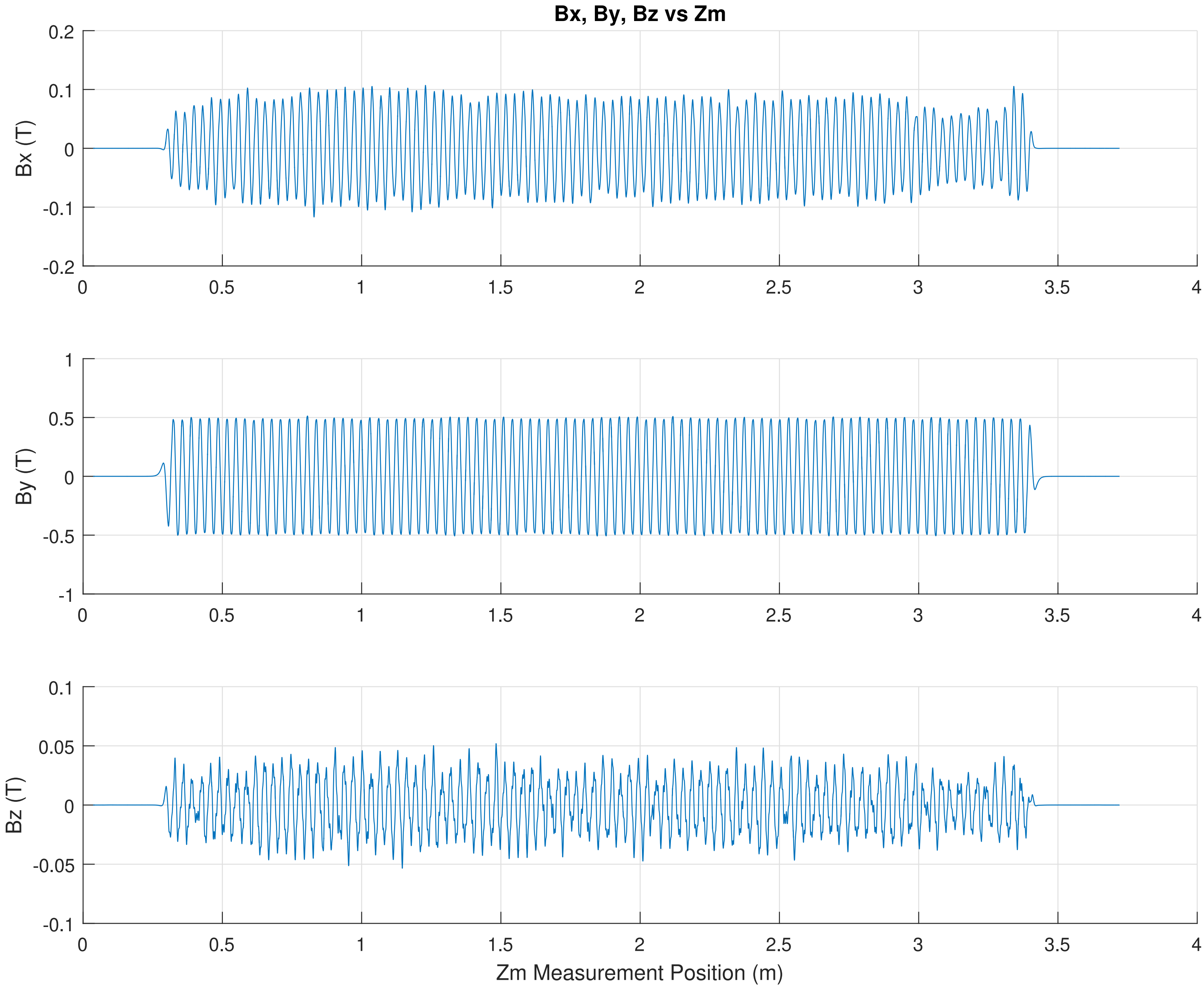
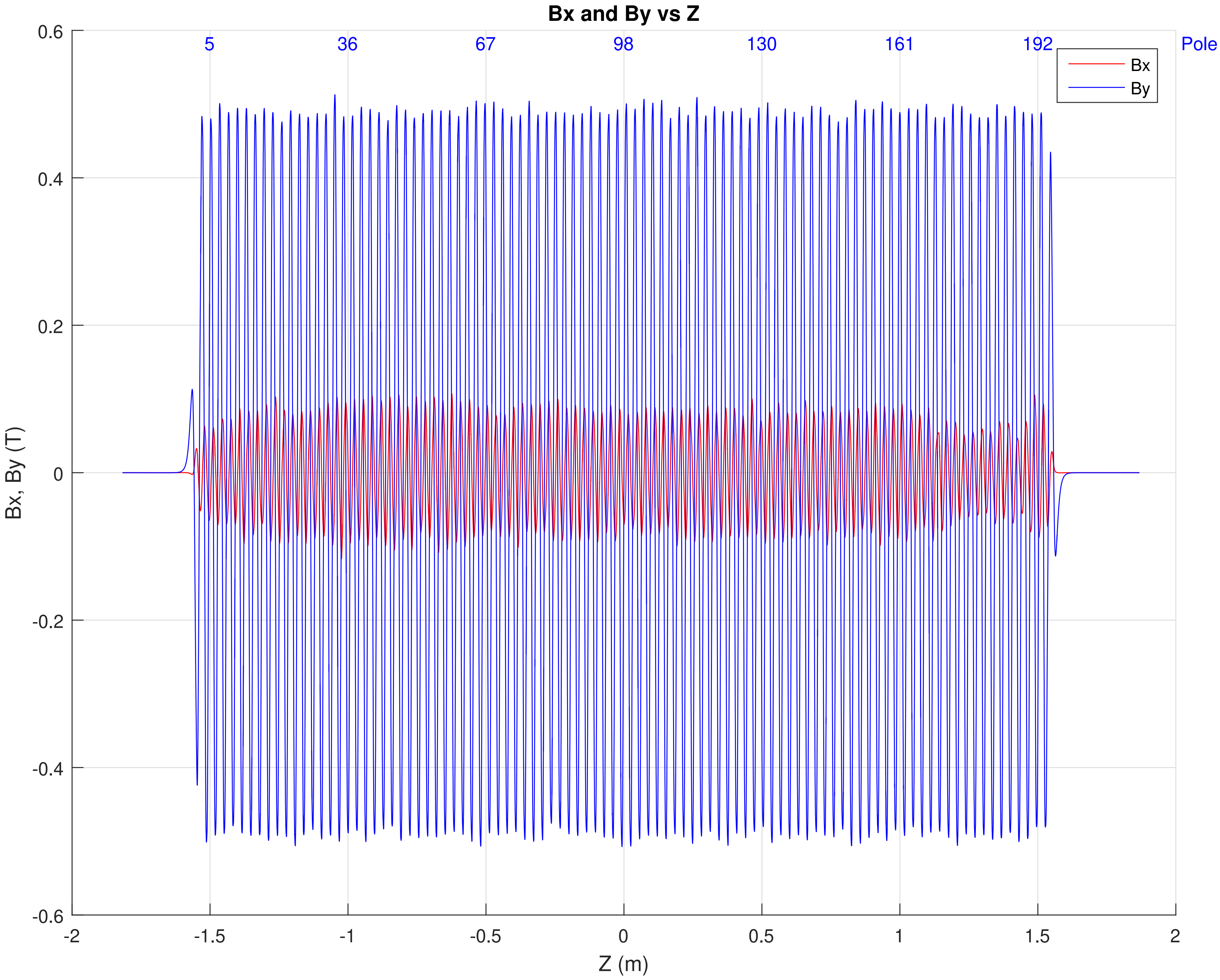
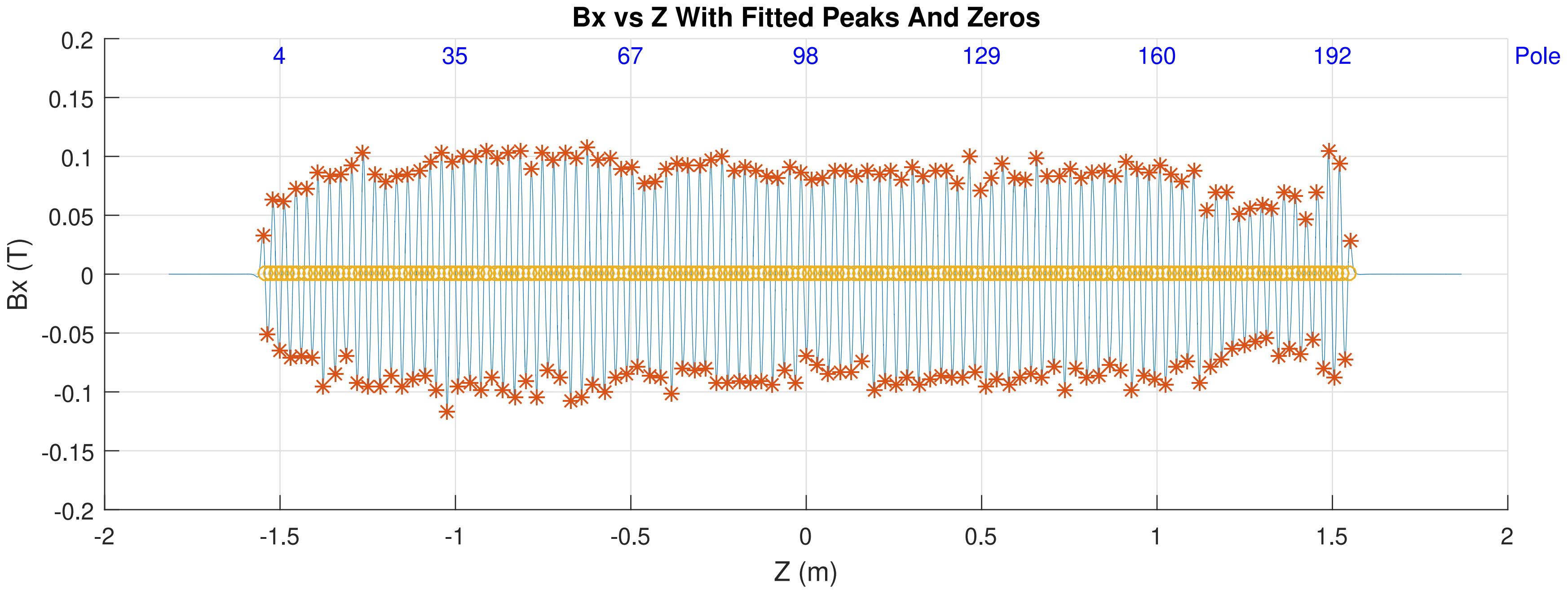


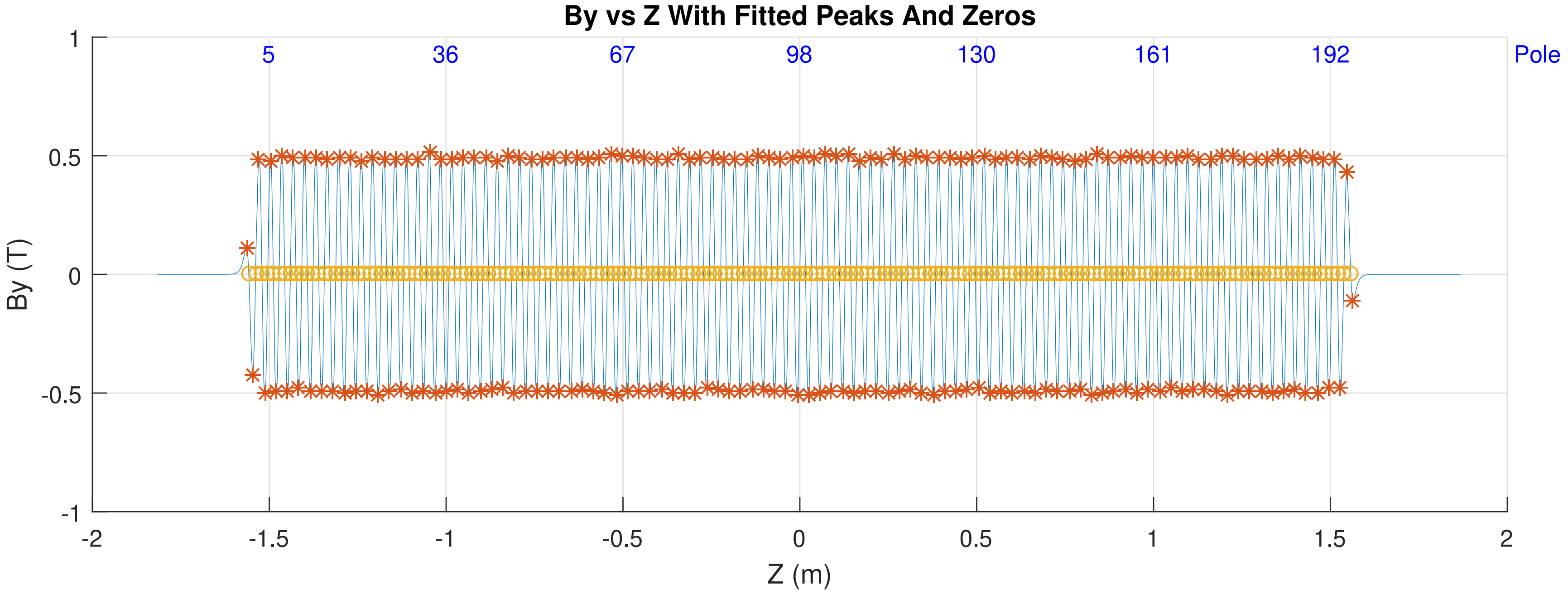
Bx, By, Bz vs Zm
Bx (T)
0.2
0.1
0
-0.1
-0.2
By (T)
1
0.5
0
-0.5
-1
Bz (T)
0.1
0.05
0
-0.05
-0.1
0
0.5
1
1.5
2
2.5
3
3.5
4
Zm Measurement Position (m)

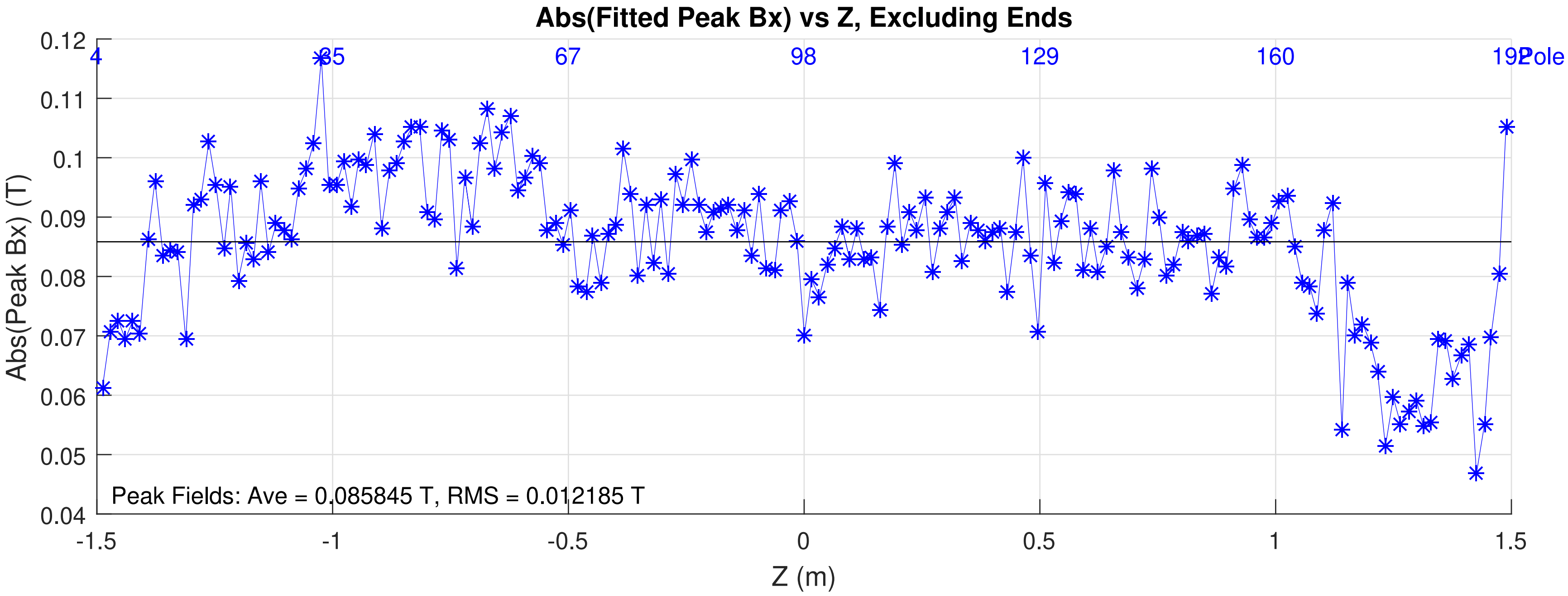


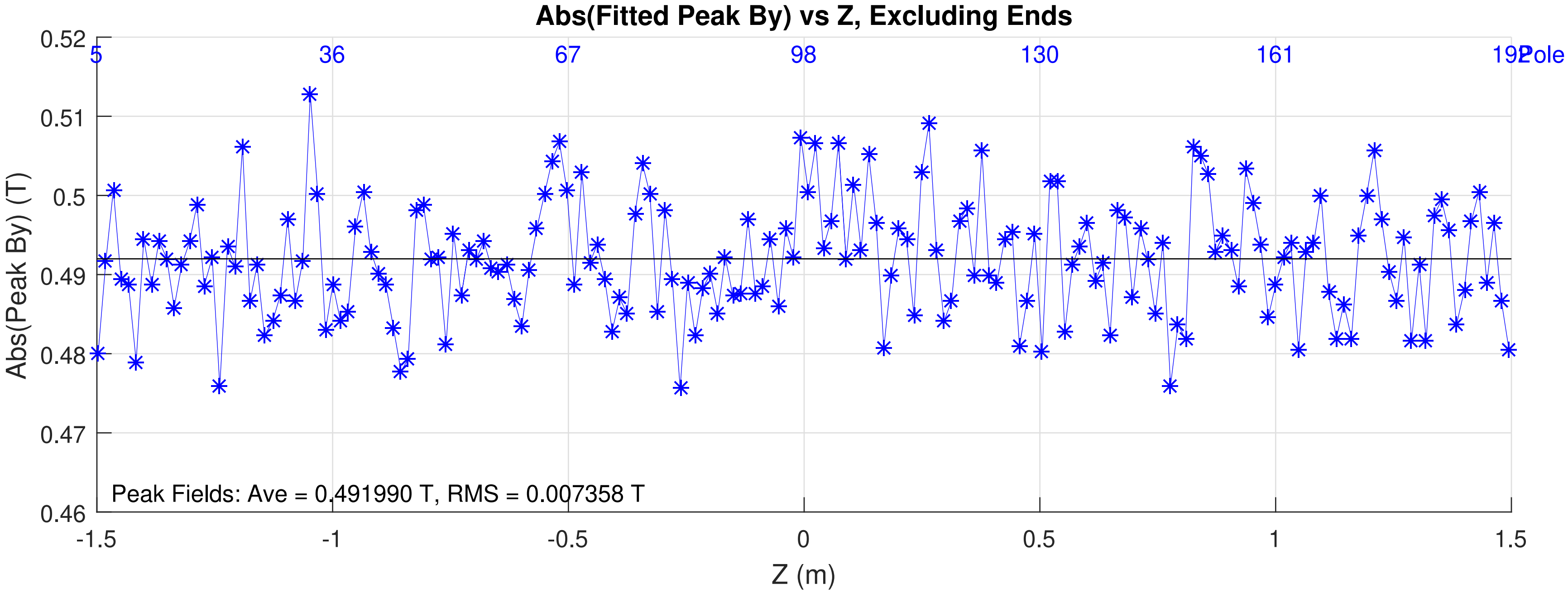
Bx and By vs Z

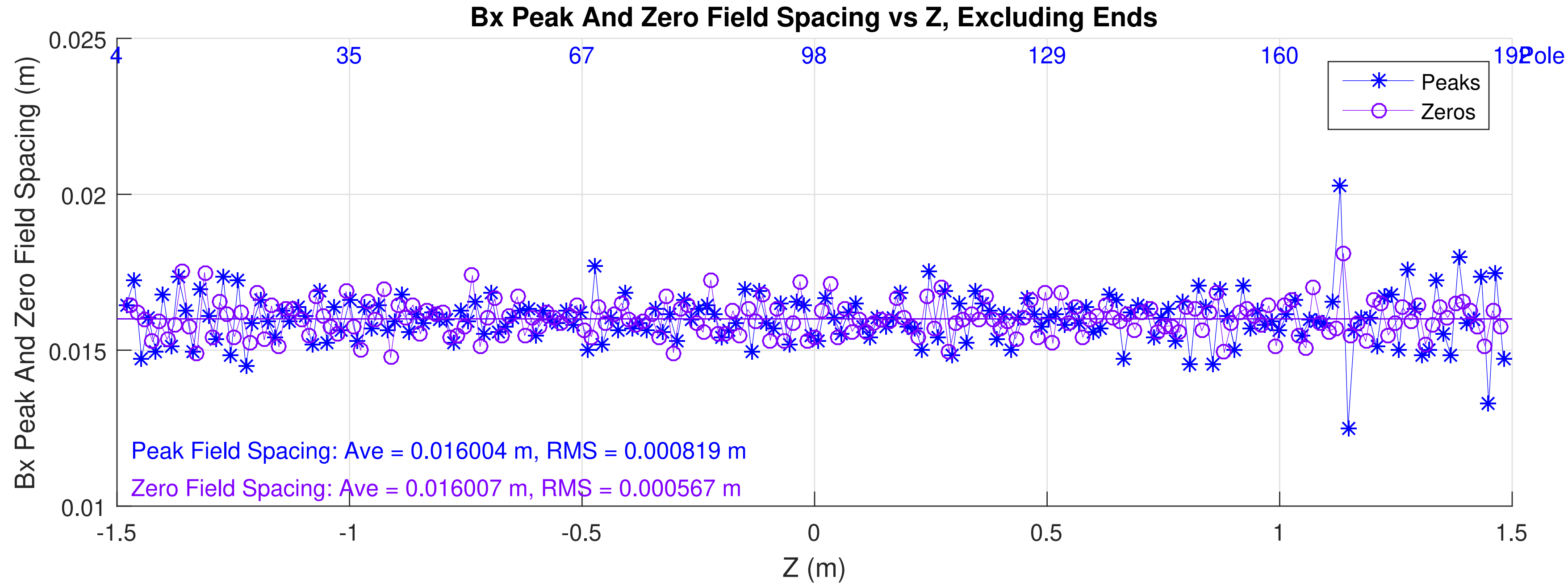
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
Bx, By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
5
36
67
98
130
161
192
Pole
Bx
By


Bx vs Z With Fitted Peaks And Zeros
4
35
67
98
129
160
192
Pole
Bx (T)
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
-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
By (T)
1
0.5
0
-0.5
-1
-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)
0.12
0.11
0.1
0.09
0.08
0.07
0.06
0.05
0.04
4
35
67
98
129
160
192
Pole
Peak Fields: Ave = 0.085845 T, RMS = 0.012185 T
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)

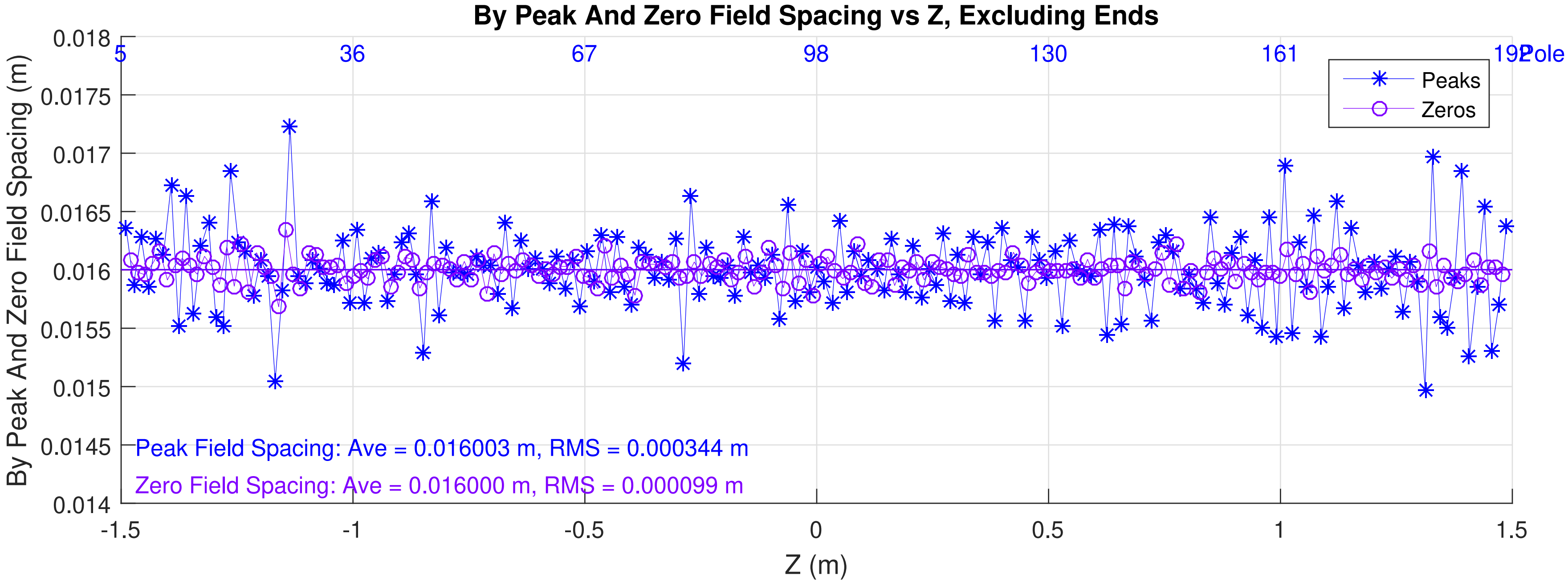

Abs(Fitted Peak By) vs Z, Excluding Ends
Abs(Peak By) (T)
0.52
0.51
0.5
0.49
0.48
0.47
0.46
5
36
67
98
130
161
192
Pole
Peak Fields: Ave = 0.491990 T, RMS = 0.007358 T
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)



Bx Peak And Zero Field Spacing vs Z, Excluding Ends

Peak Field Spacing: Ave = 0.016004 m, RMS = 0.000819 m

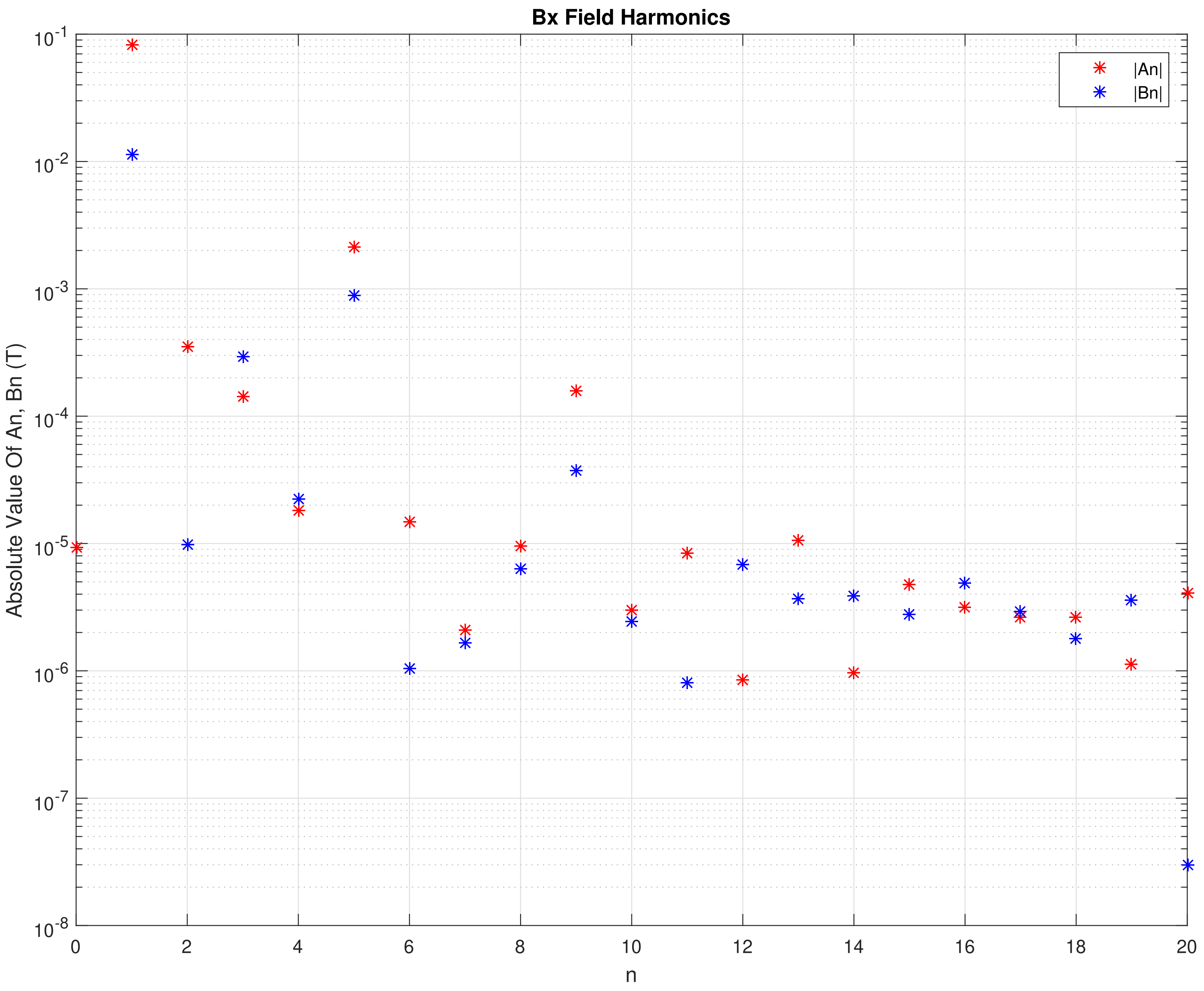
Zero Field Spacing: Ave = 0.016007 m, RMS = 0.000567 m

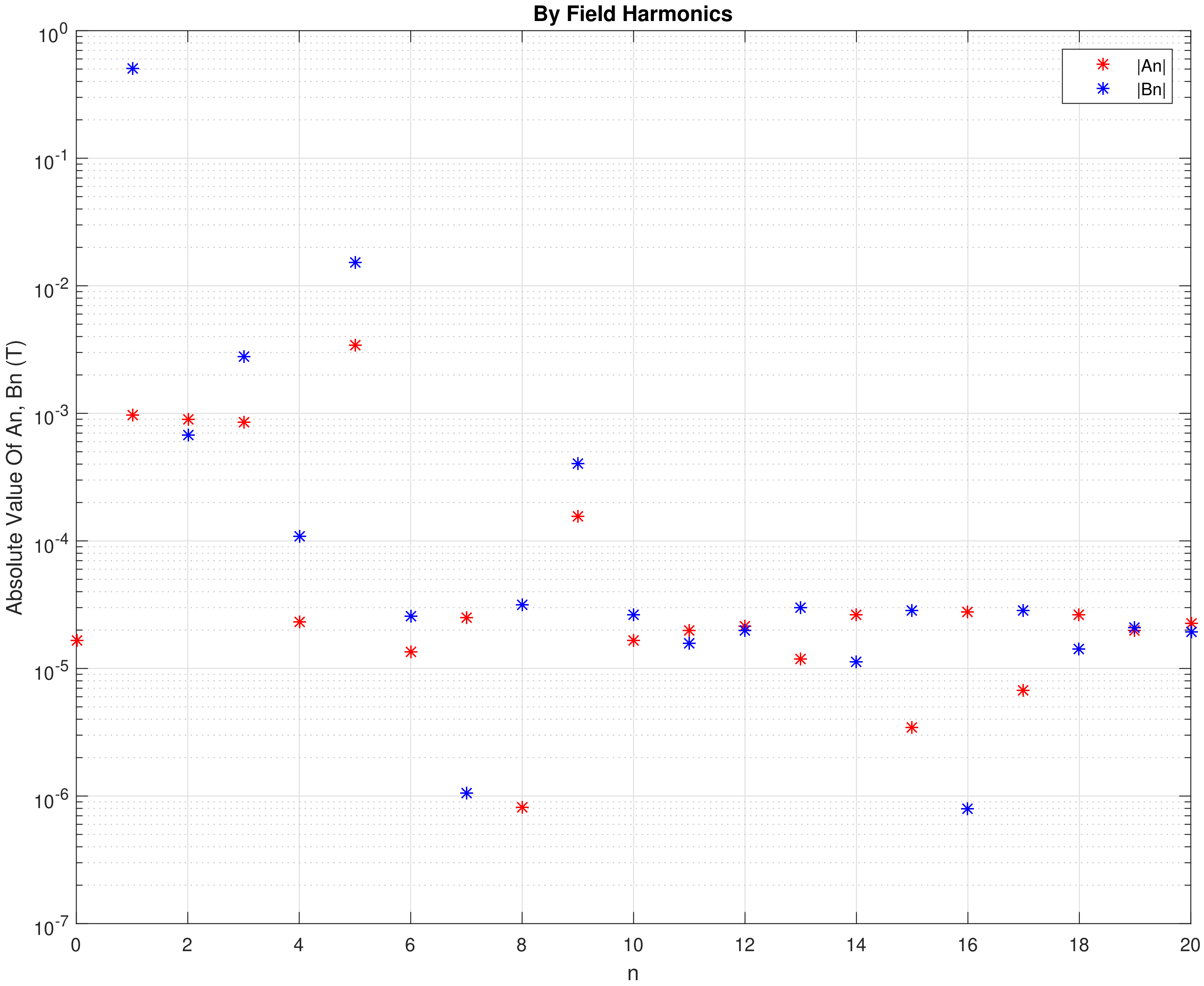


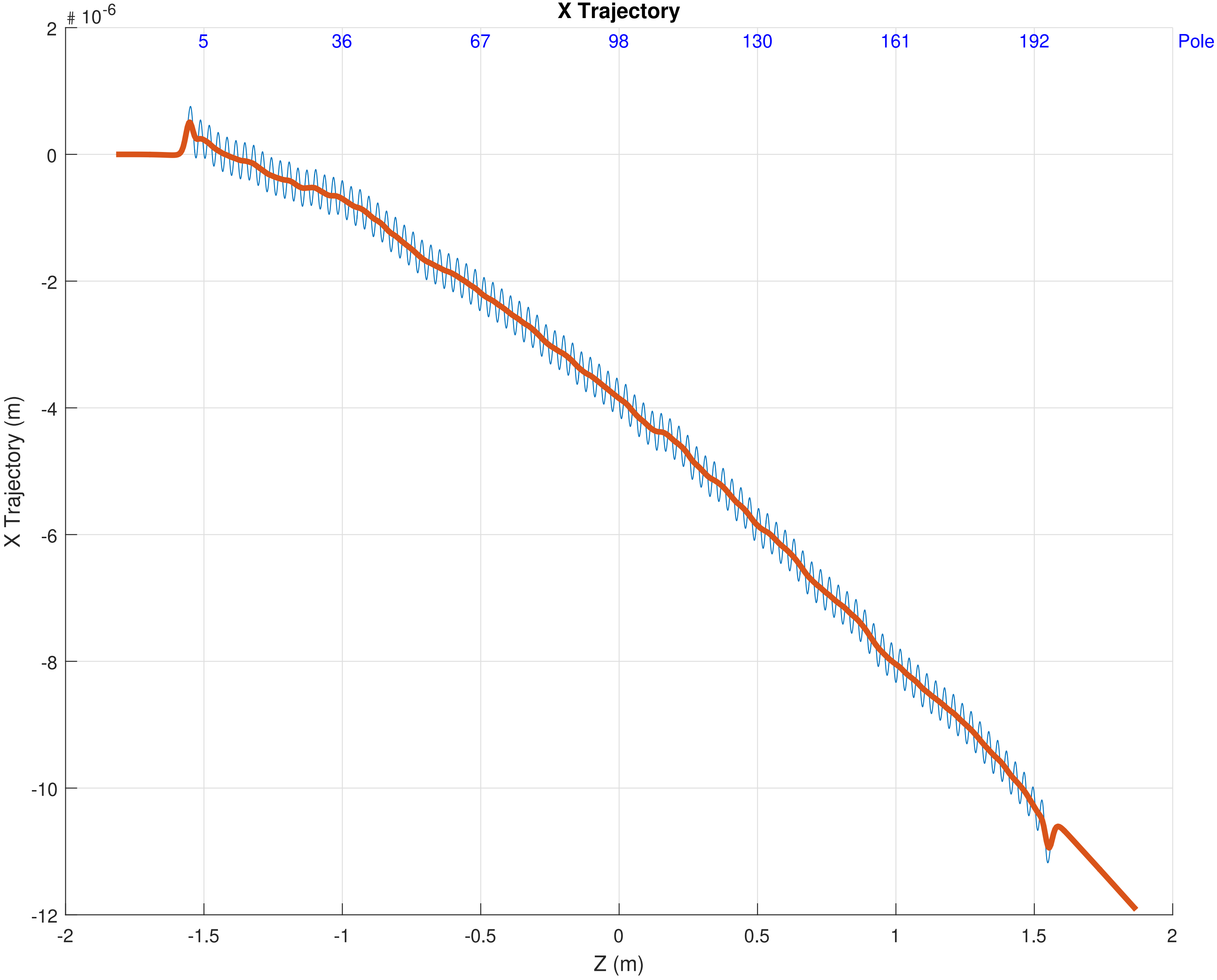
By Peak And Zero Field Spacing vs Z, Excluding Ends

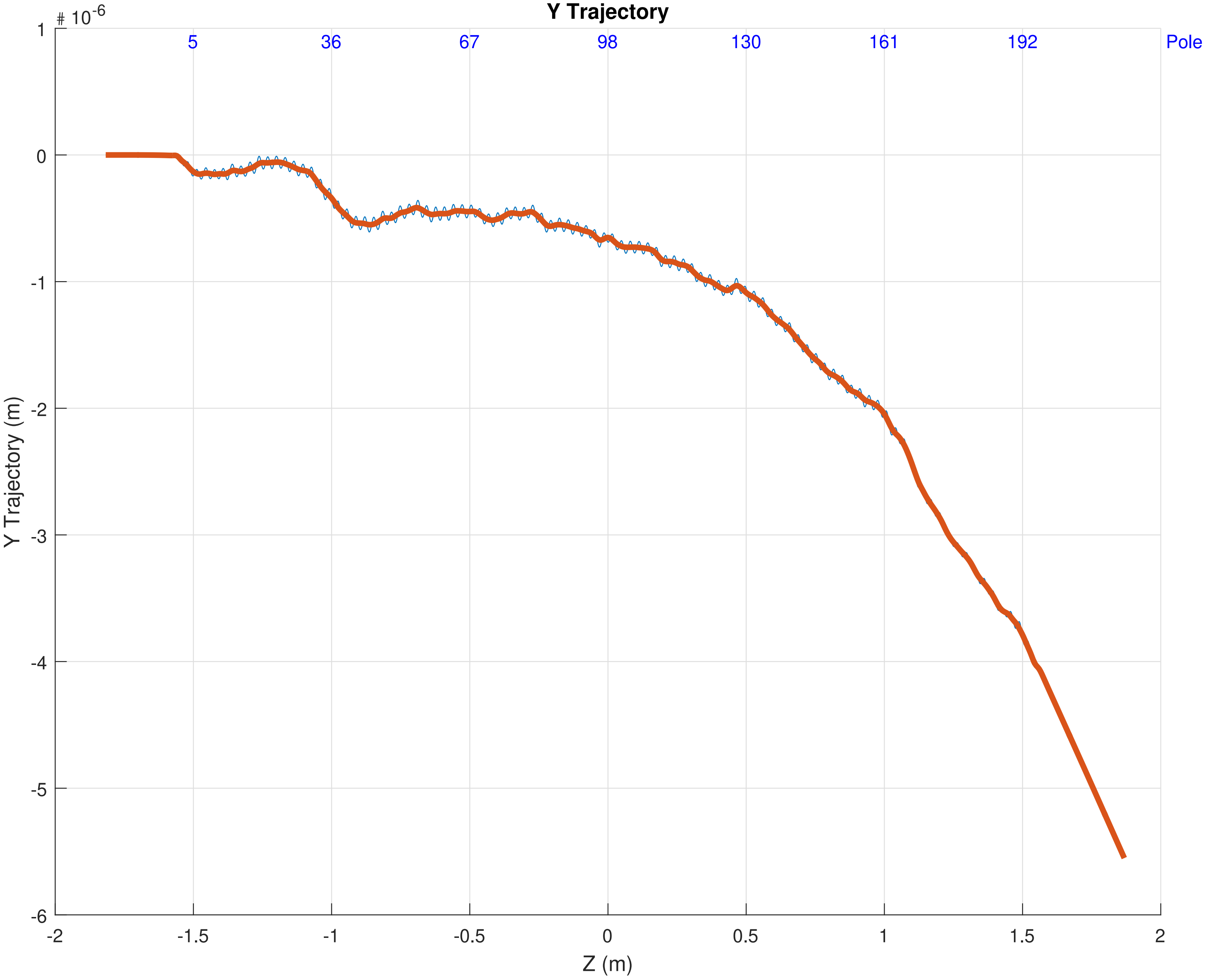
Peak Field Spacing: Ave = 0.016003 m, RMS = 0.000344 m

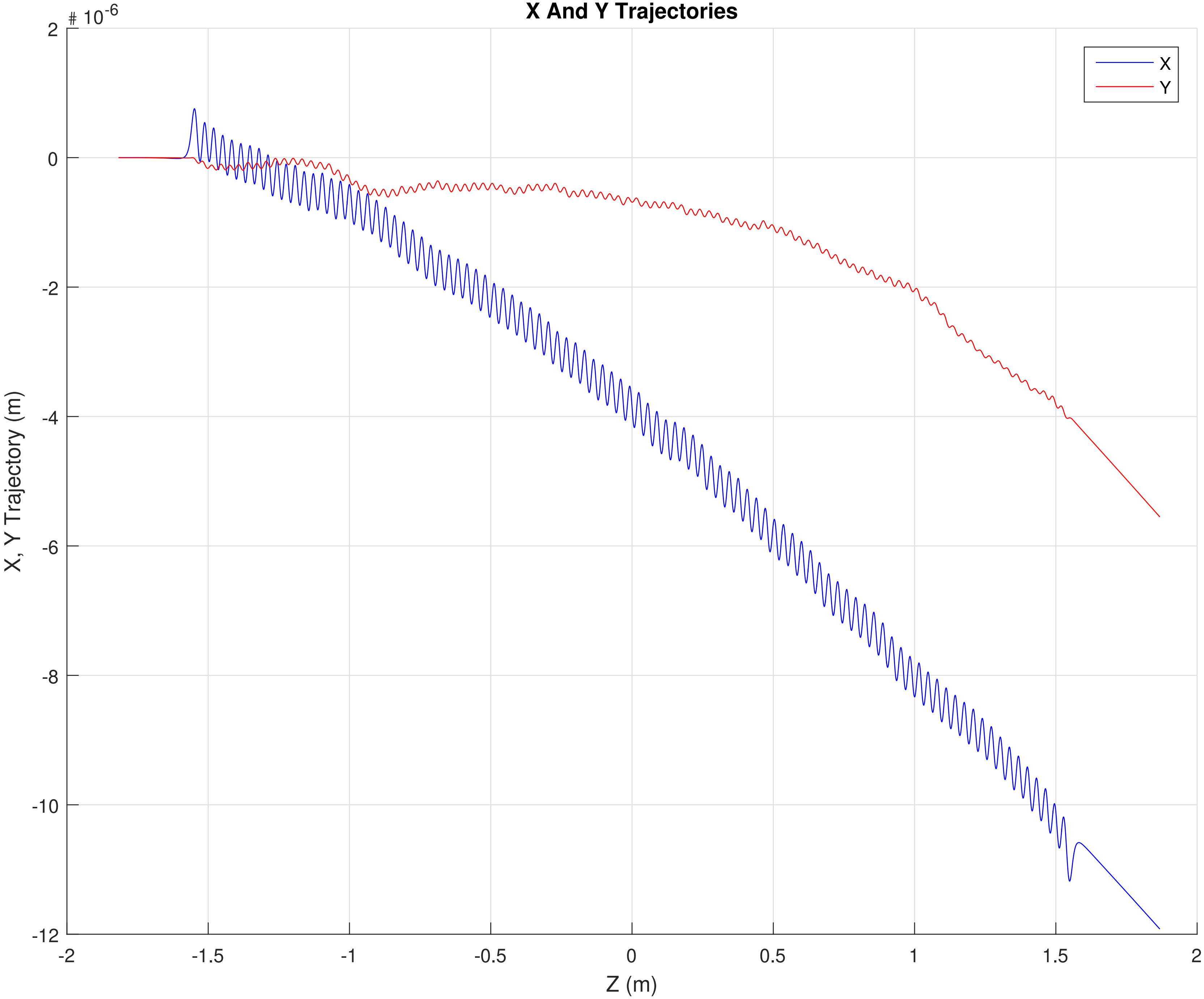
Zero Field Spacing: Ave = 0.016000 m, RMS = 0.000099 m

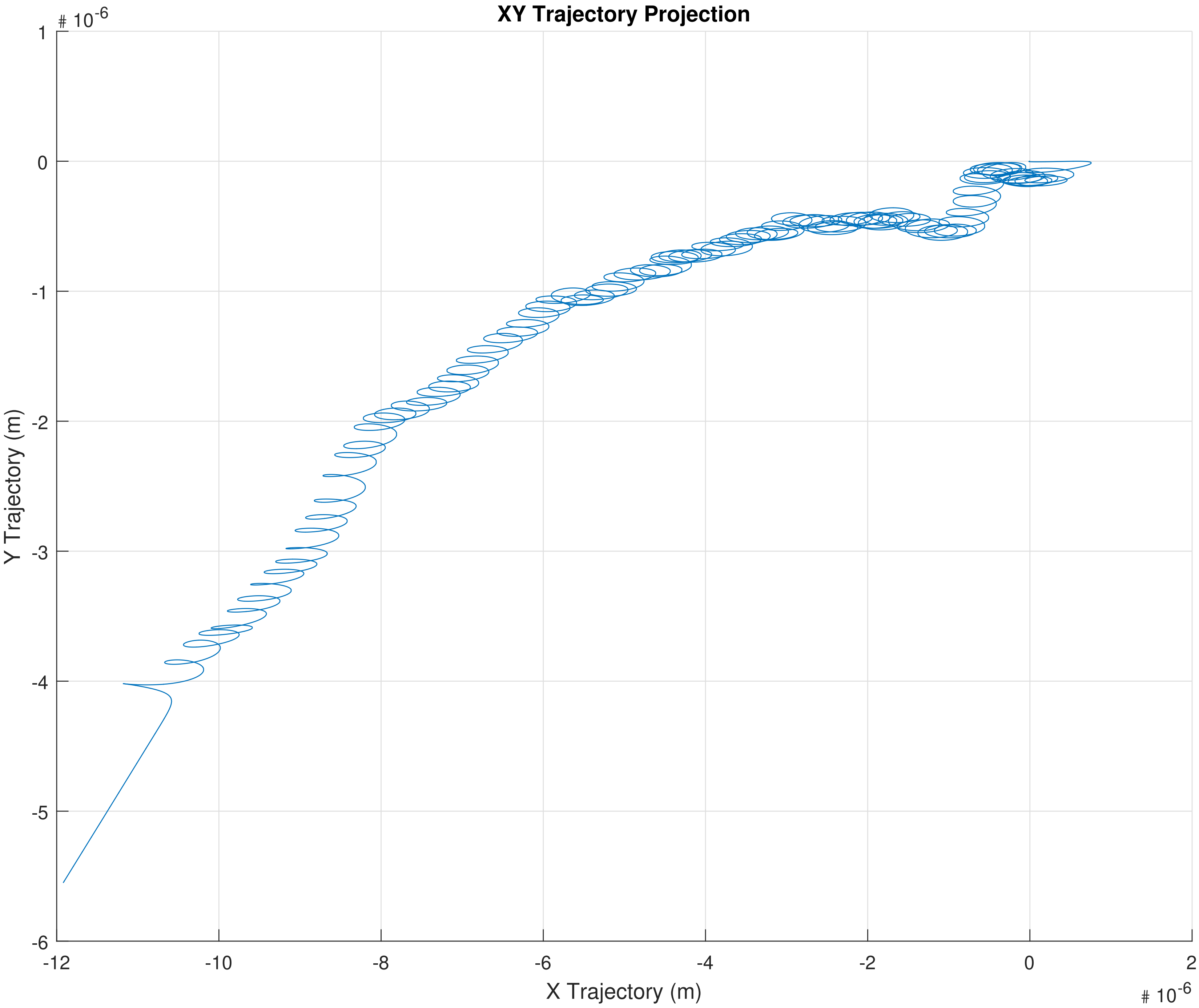

Bx Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
10^{-8}
0
2
4
6
8
10
12
14
16
18
20

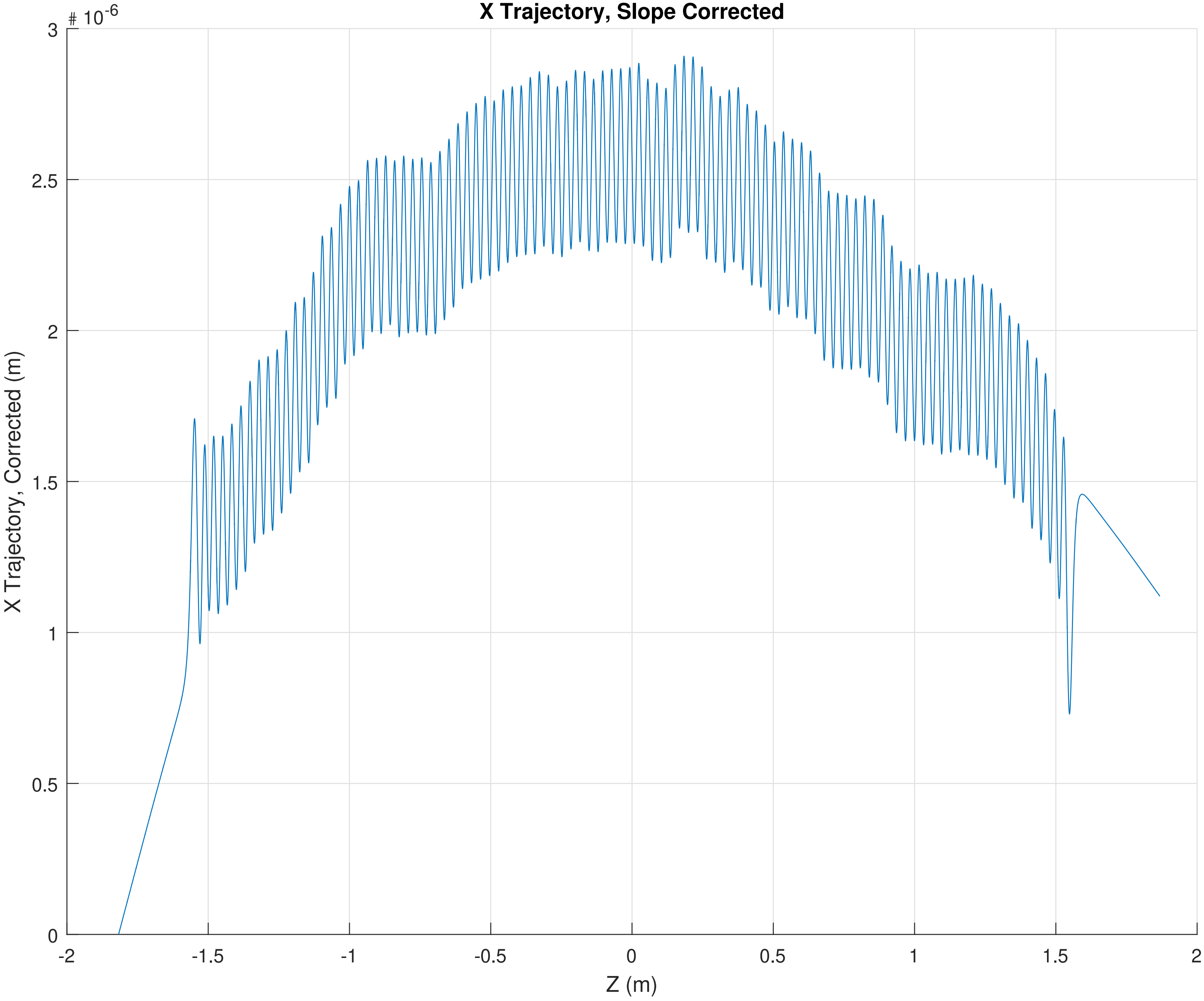

By Field Harmonics
Absolute Value Of An, Bn (T)
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
0
2
4
6
8
10
12
14
16
18
20
n
|An|
|Bn|

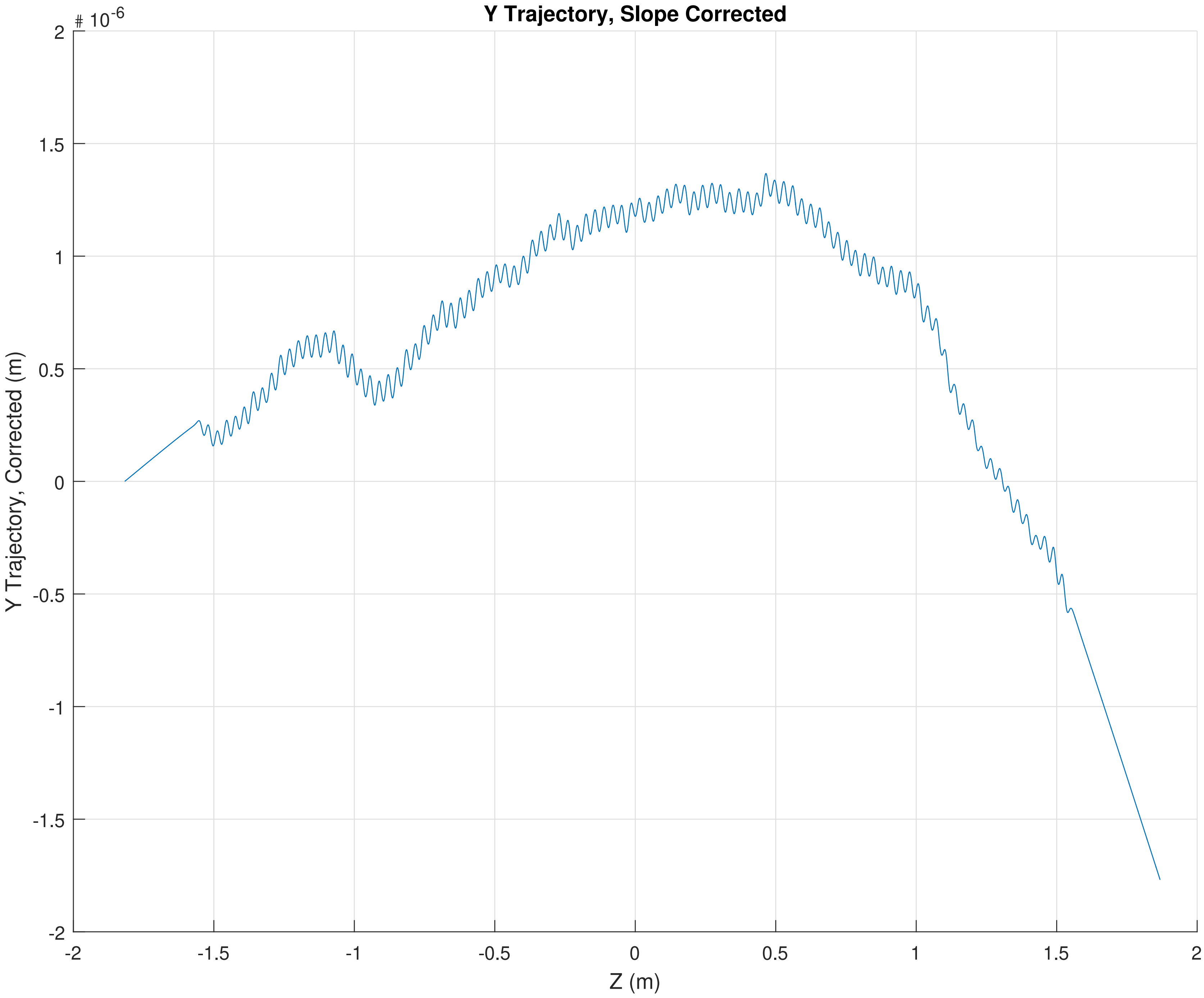

X Trajectory
10-6
2
0
-2
-4
-6
-8
-10
-12
X Trajectory (m)
5
36
67
98
130
161
192
Pole
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

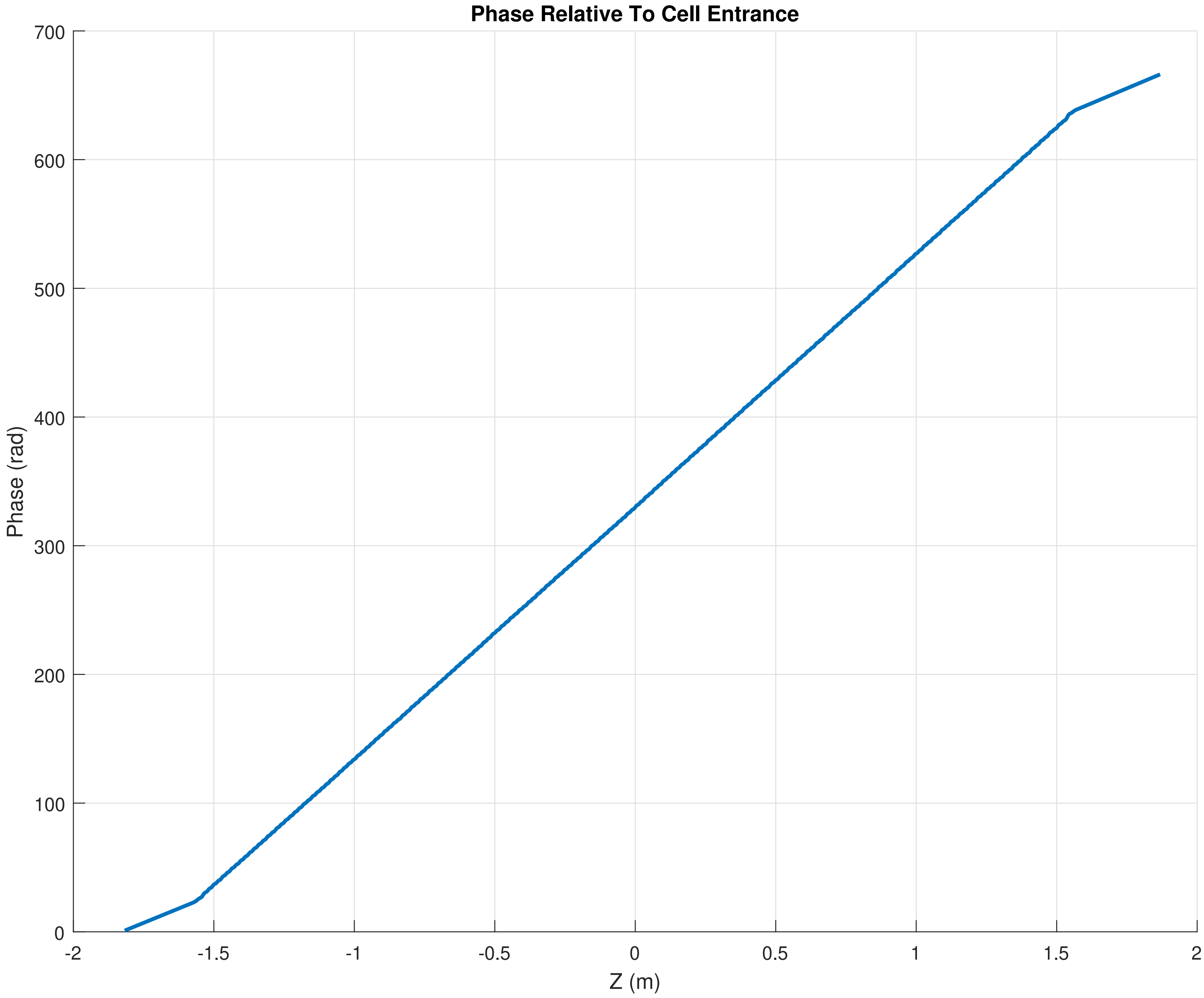

Y Trajectory
10^-6
1
0
-1
-2
-3
-4
-5
-6
Y Trajectory (m)
5
36
67
98
130
161
192
Pole
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

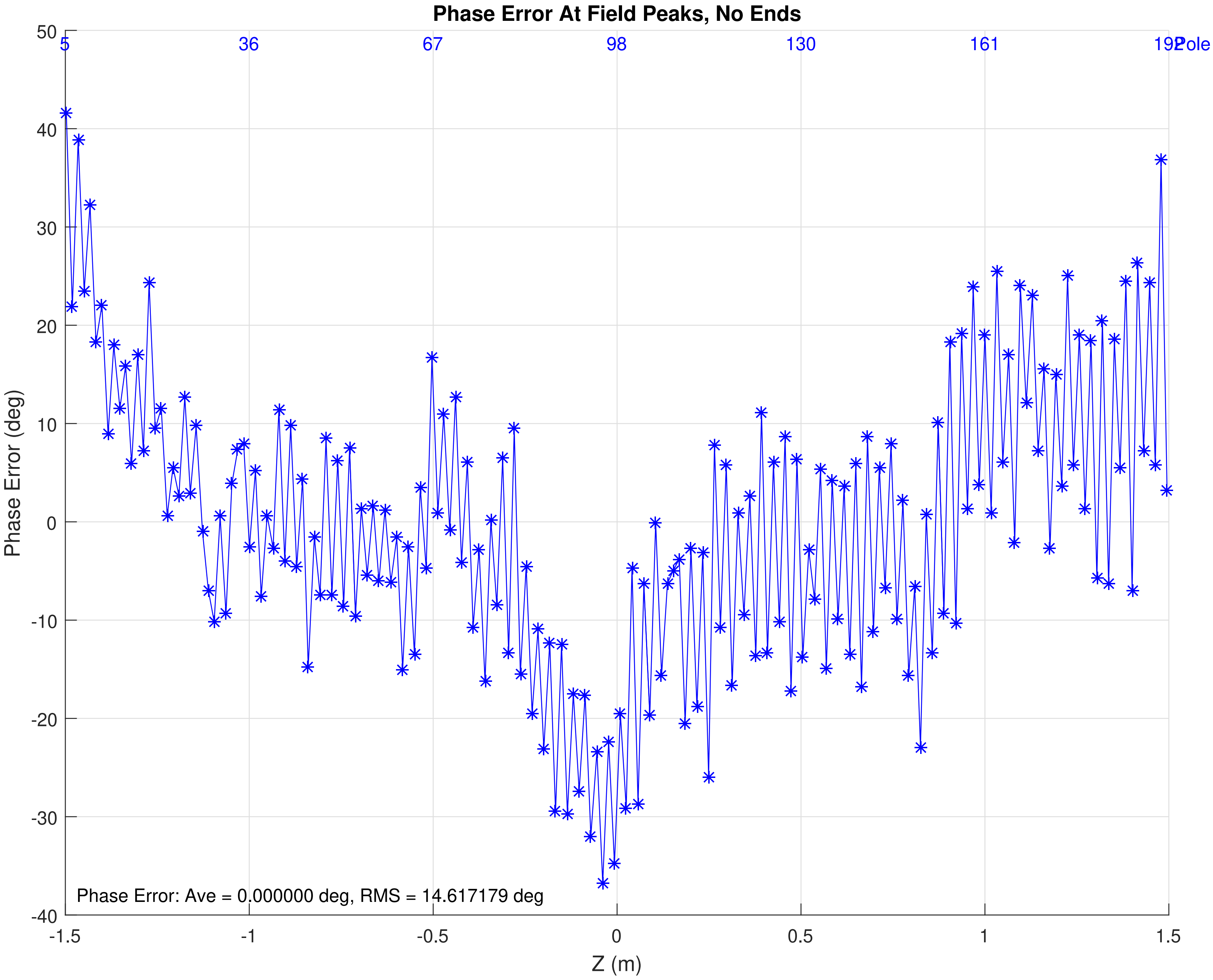

X And Y Trajectories
10^-6
2
0
-2
-4
-6
-8
-10
-12
X, Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
X
Y


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

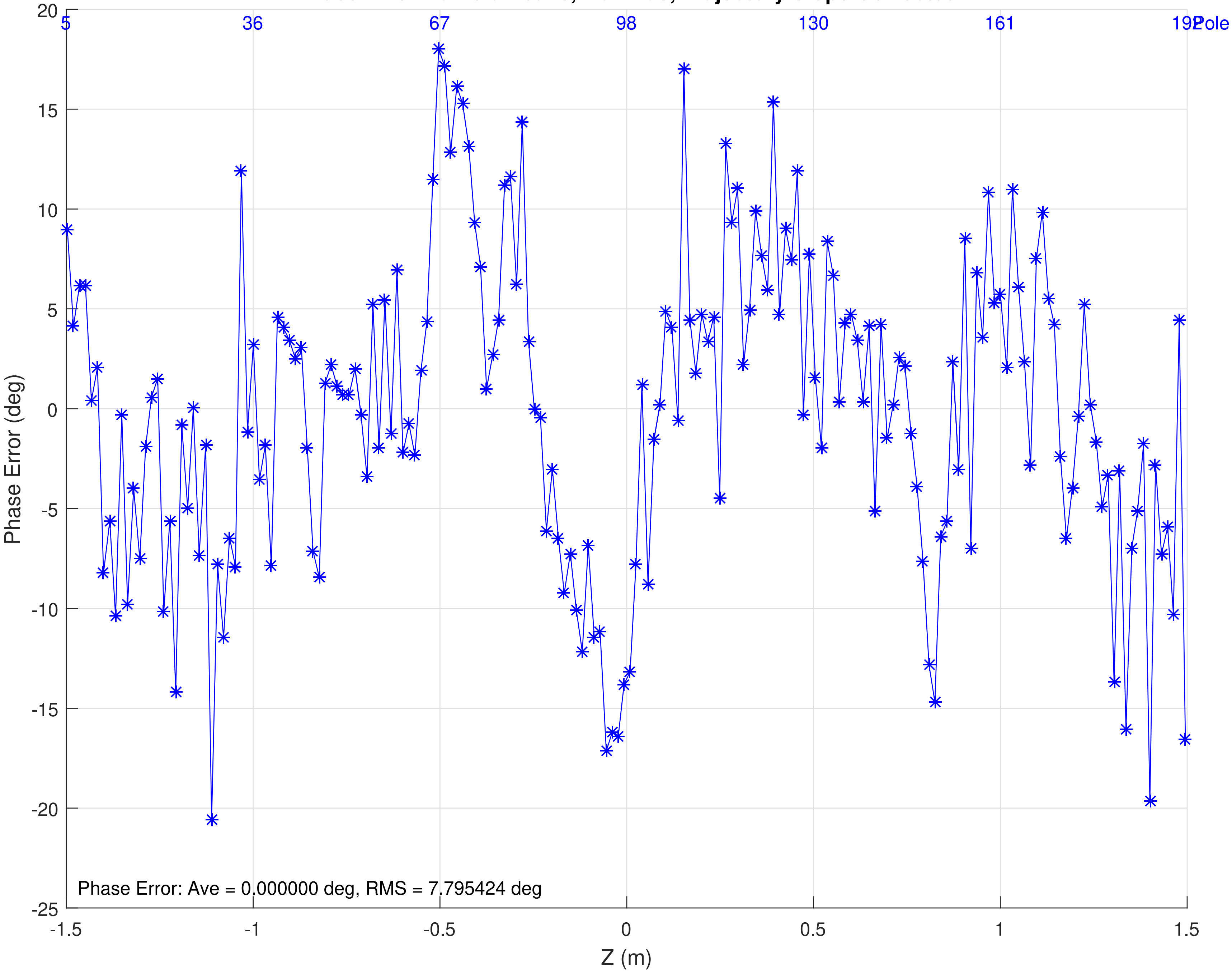

X Trajectory, Slope Corrected
10^-6
3
2.5
2
1.5
1
0.5
0
X Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)


Y Trajectory, Slope Corrected
10^{-6}
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

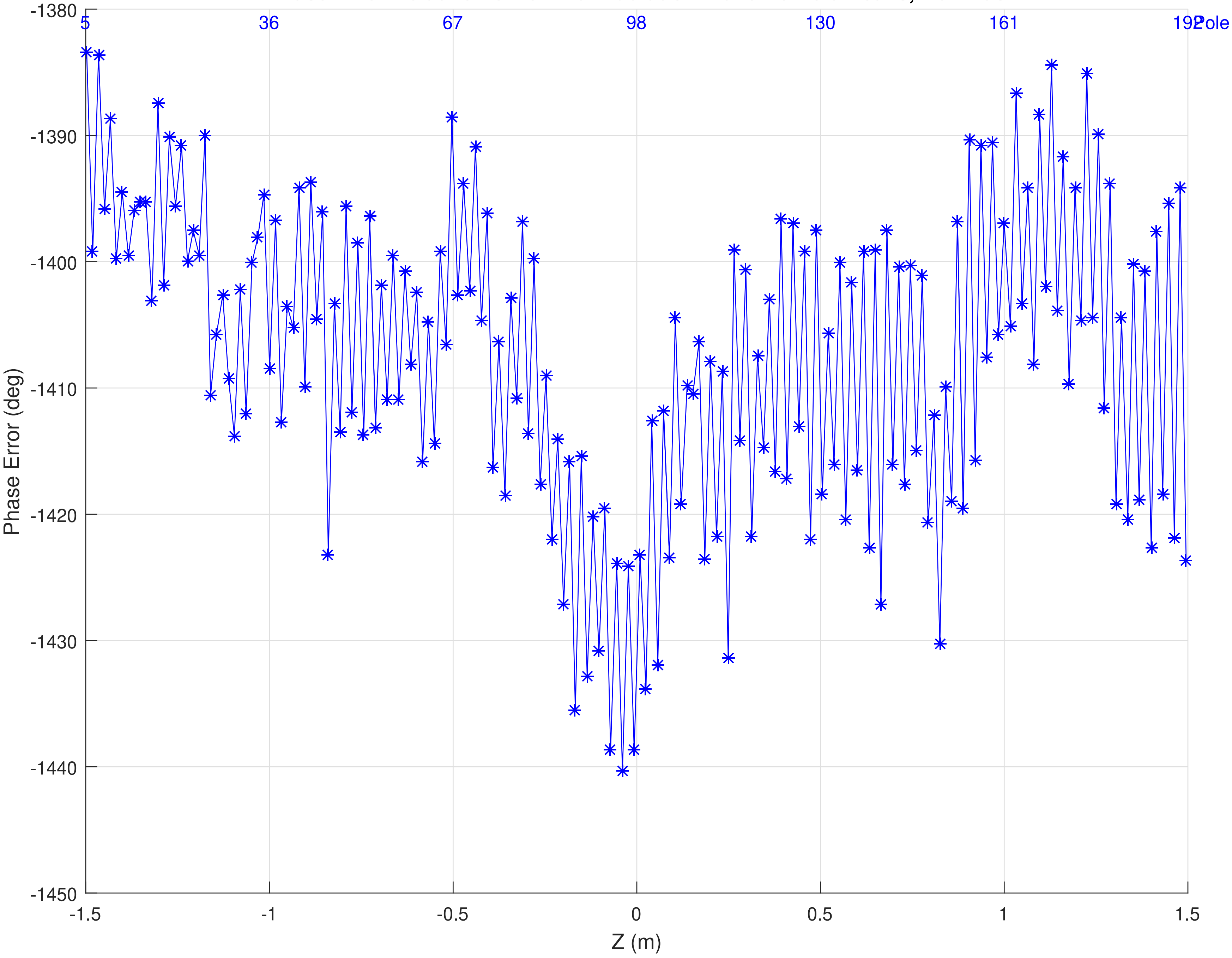

Phase Error At Field Peaks, No Ends
5
36
67
98
130
161
192
Pole
50
40
30
20
10
0
-10
-20
-30
-40
Phase Error (deg)
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)
Phase Error: Ave = 0.000000 deg, RMS = 14.617179 deg

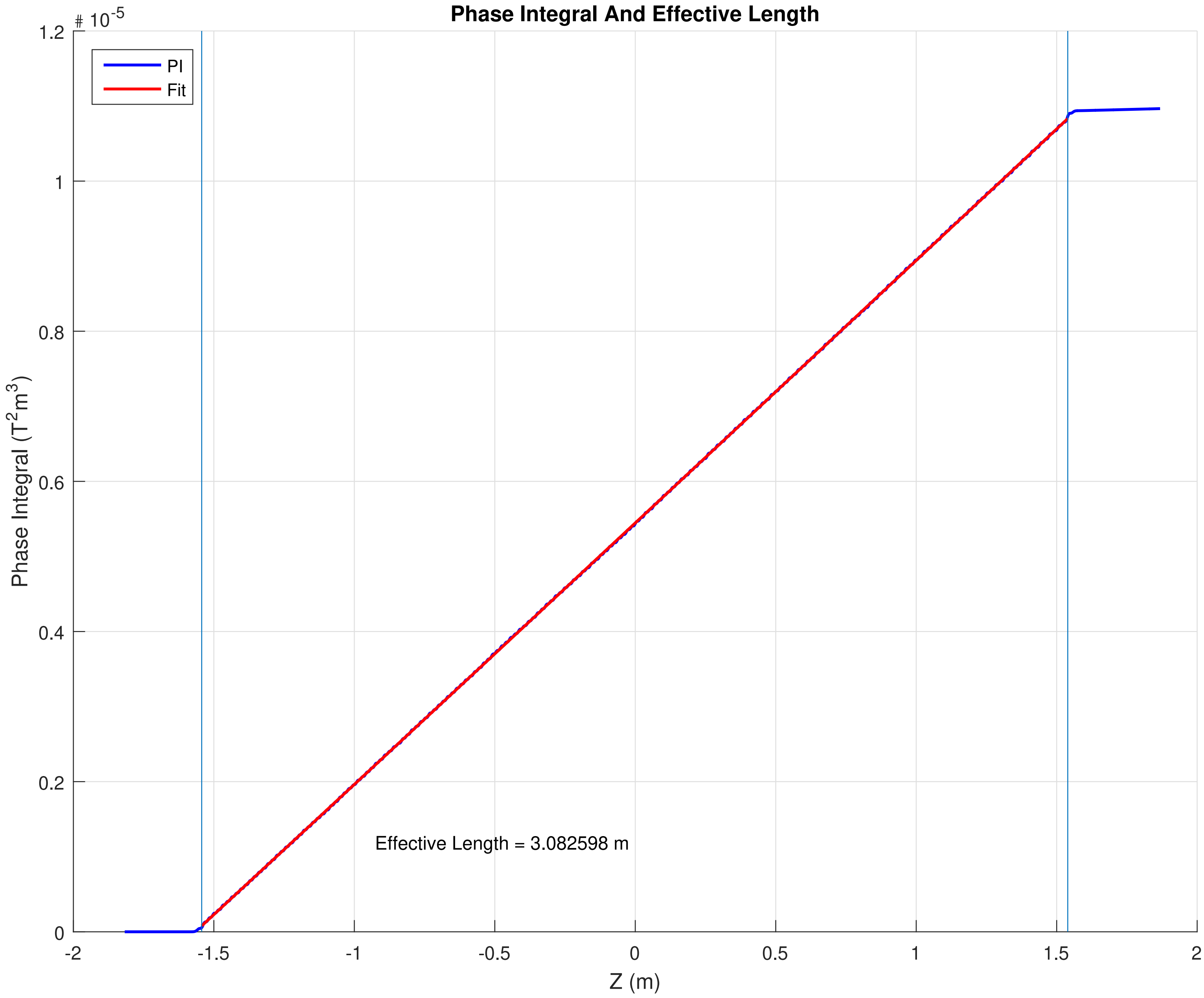
Phase Error At Field Peaks, No Ends, Trajectory Slope Corrected

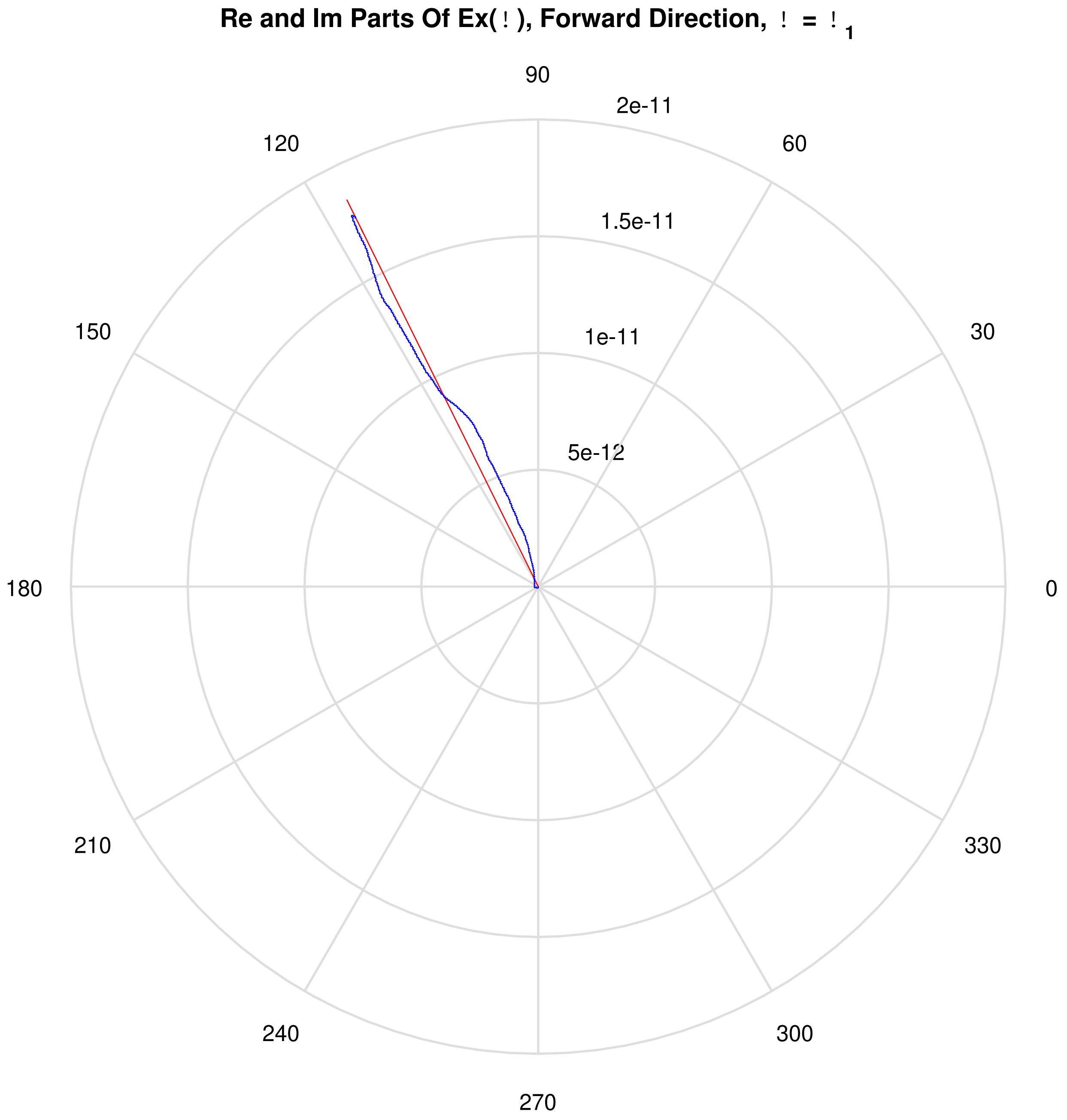


Phase Error: Ave = 0.000000 deg, RMS = 7.795424 deg

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

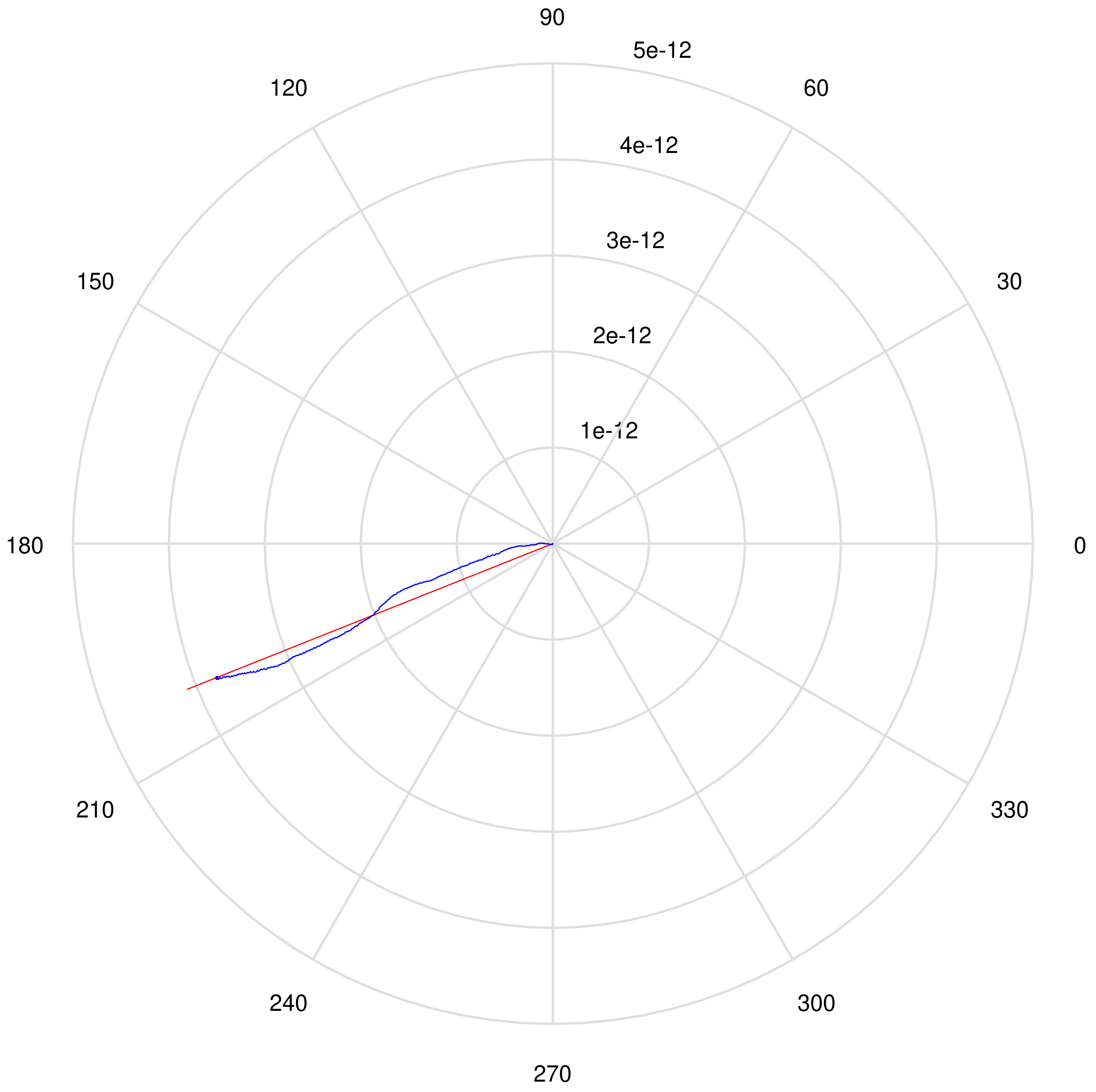


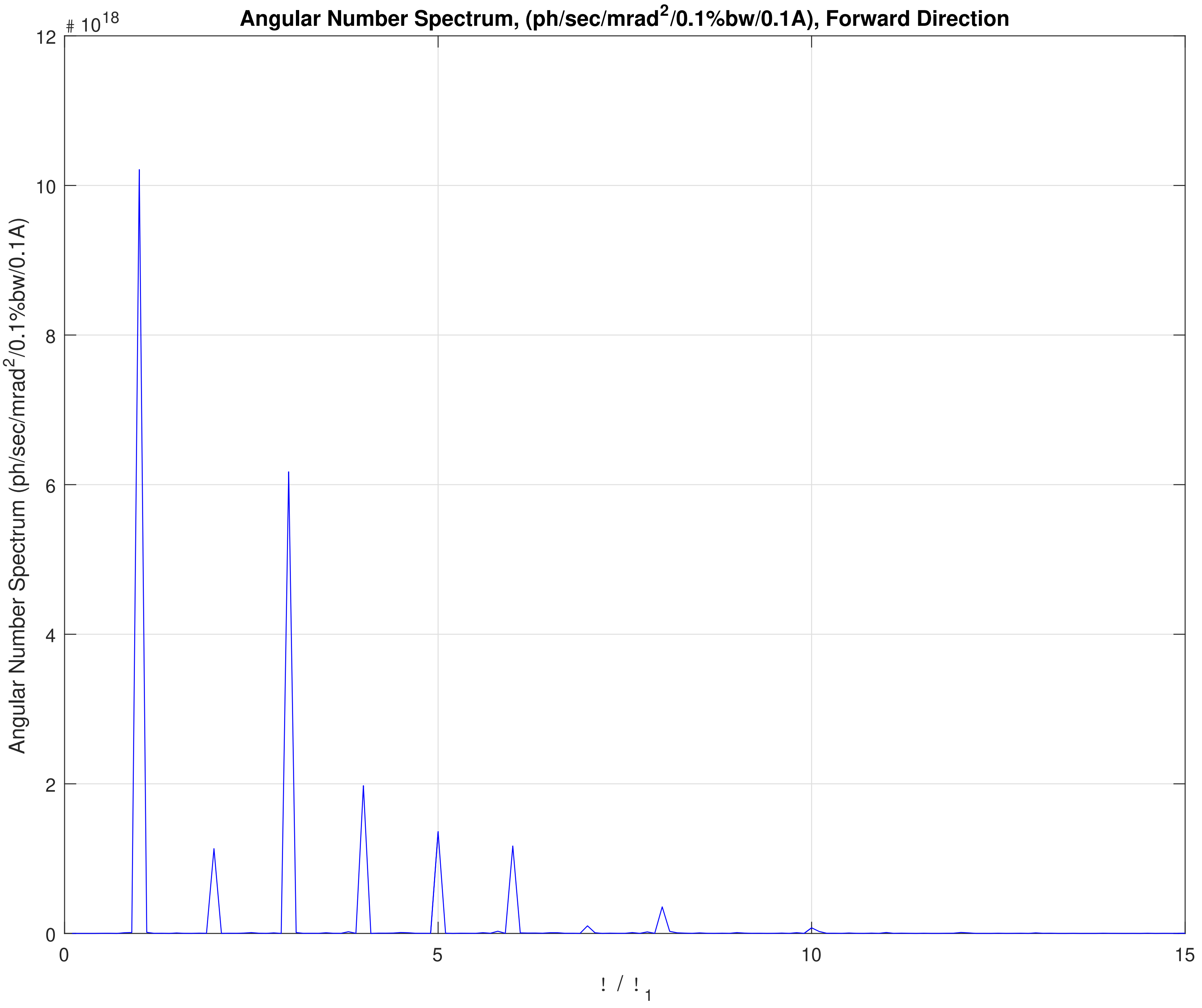

Phase Integral And Effective Length
10-5
1.2
1
0.8
0.6
0.4
0.2
0
Phase Integral (T2m3)
PI
Fit
Effective Length = 3.082598 m
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

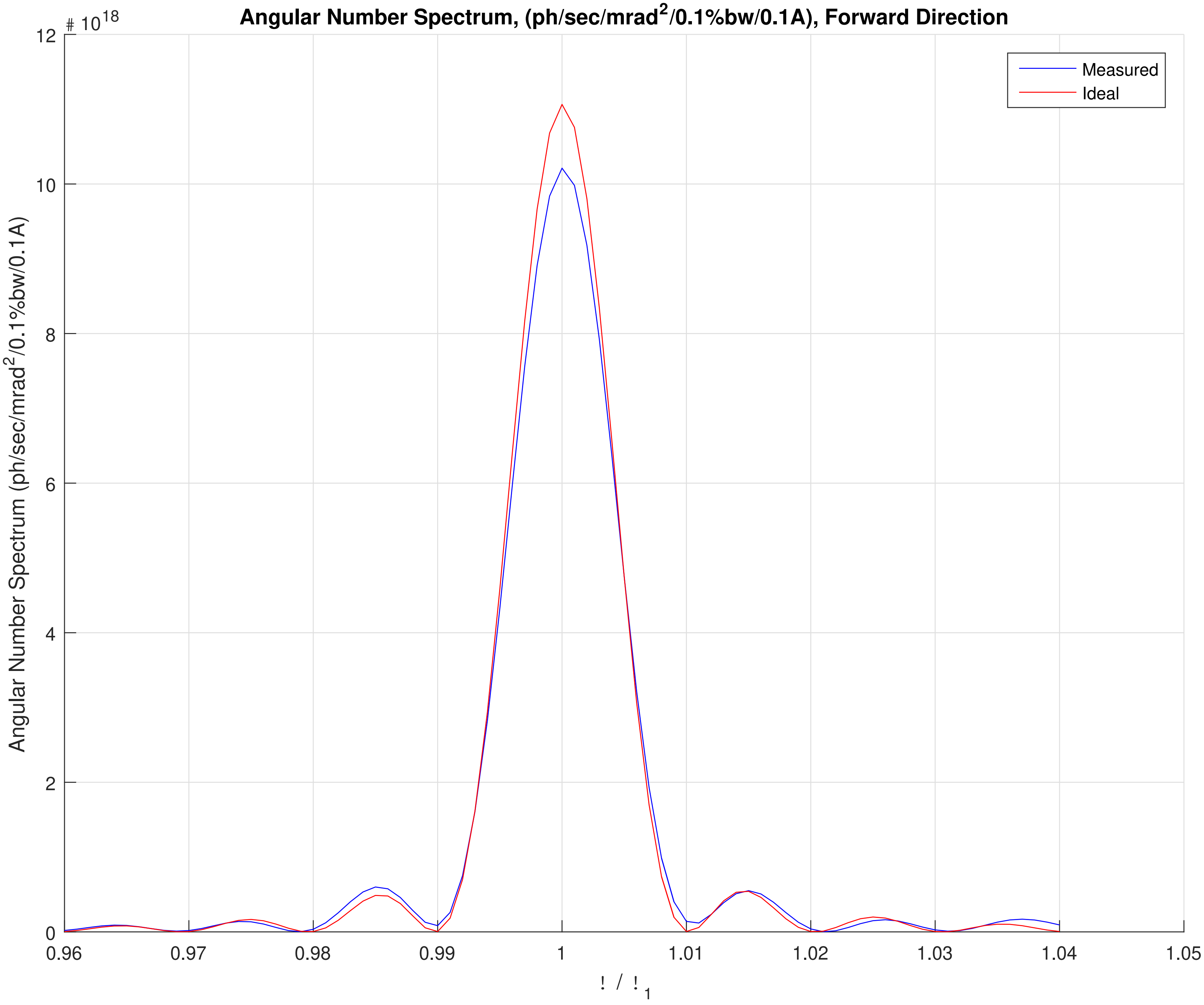


Re and Im Parts Of Ex(!), Forward Direction, ! = !$_1$

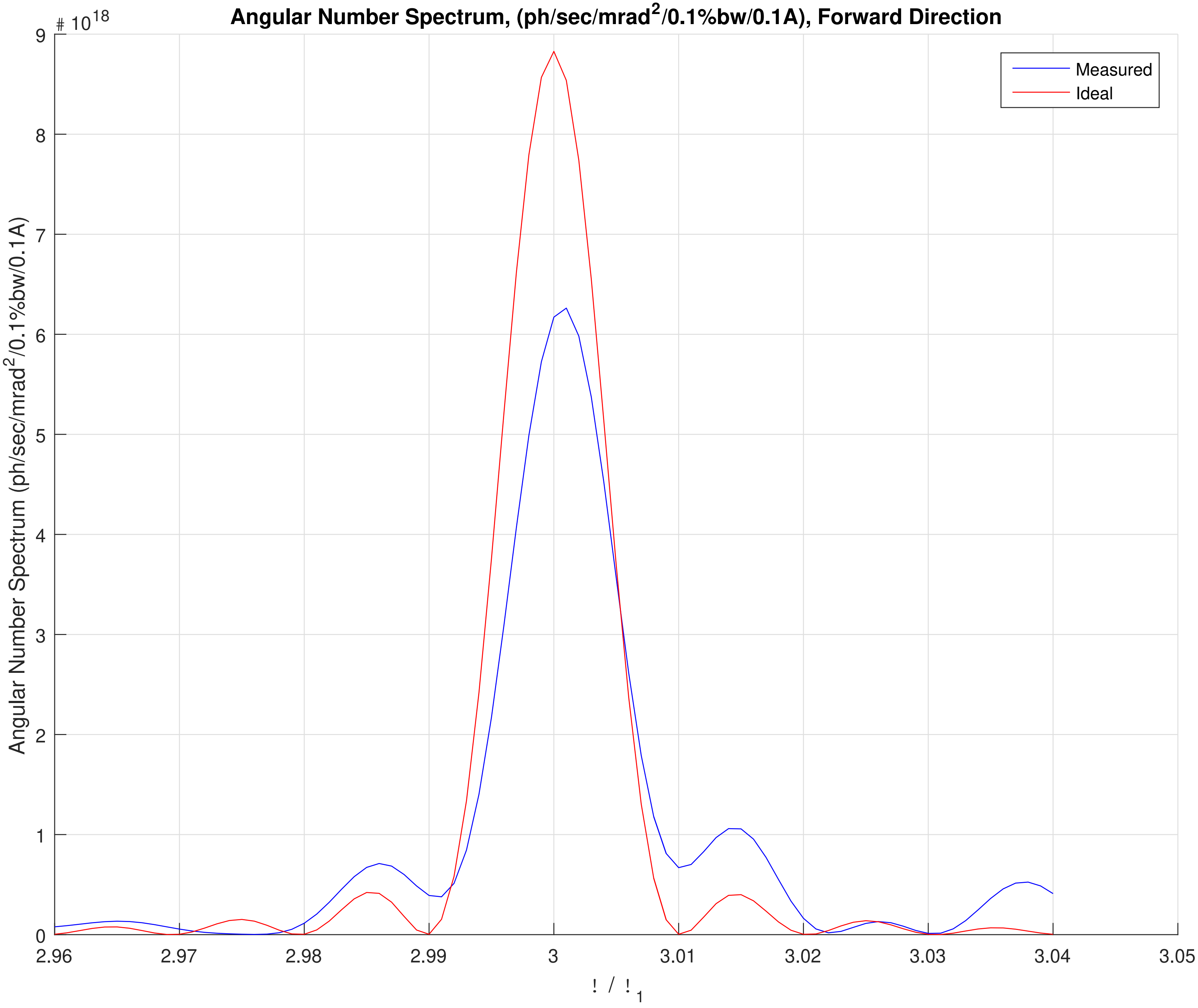
Re and Im Parts Of Ey(!), Forward Direction, ! = $!_1$



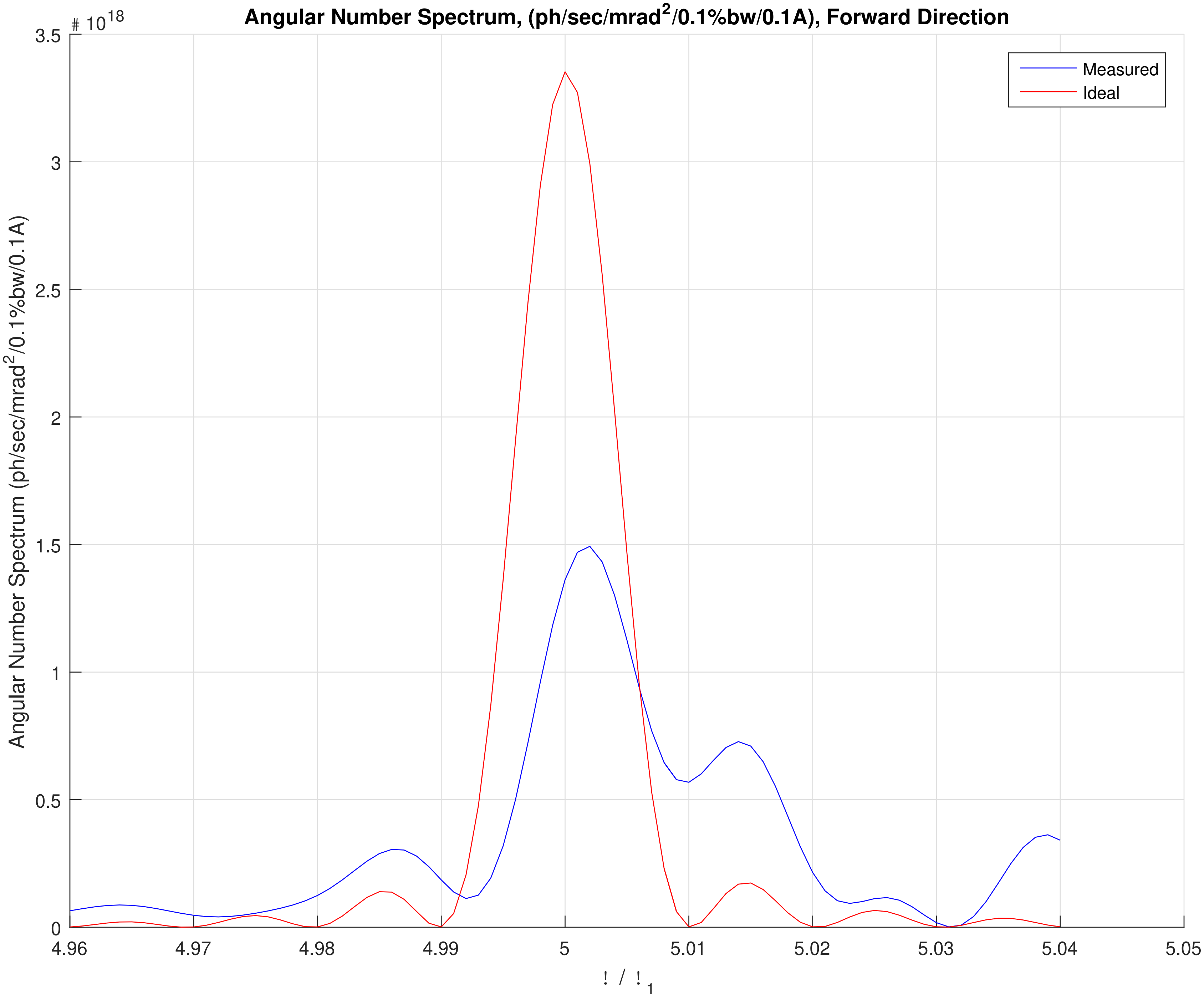

Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{18}
12
10
8
6
4
2
0
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
0
5
10
15
! / !$_1$



Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{18}
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}
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}
3.5
3
2.5
2
1.5
1
0.5
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