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SLAC Magnetic Measurements

EPU Analysis
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Parameters:
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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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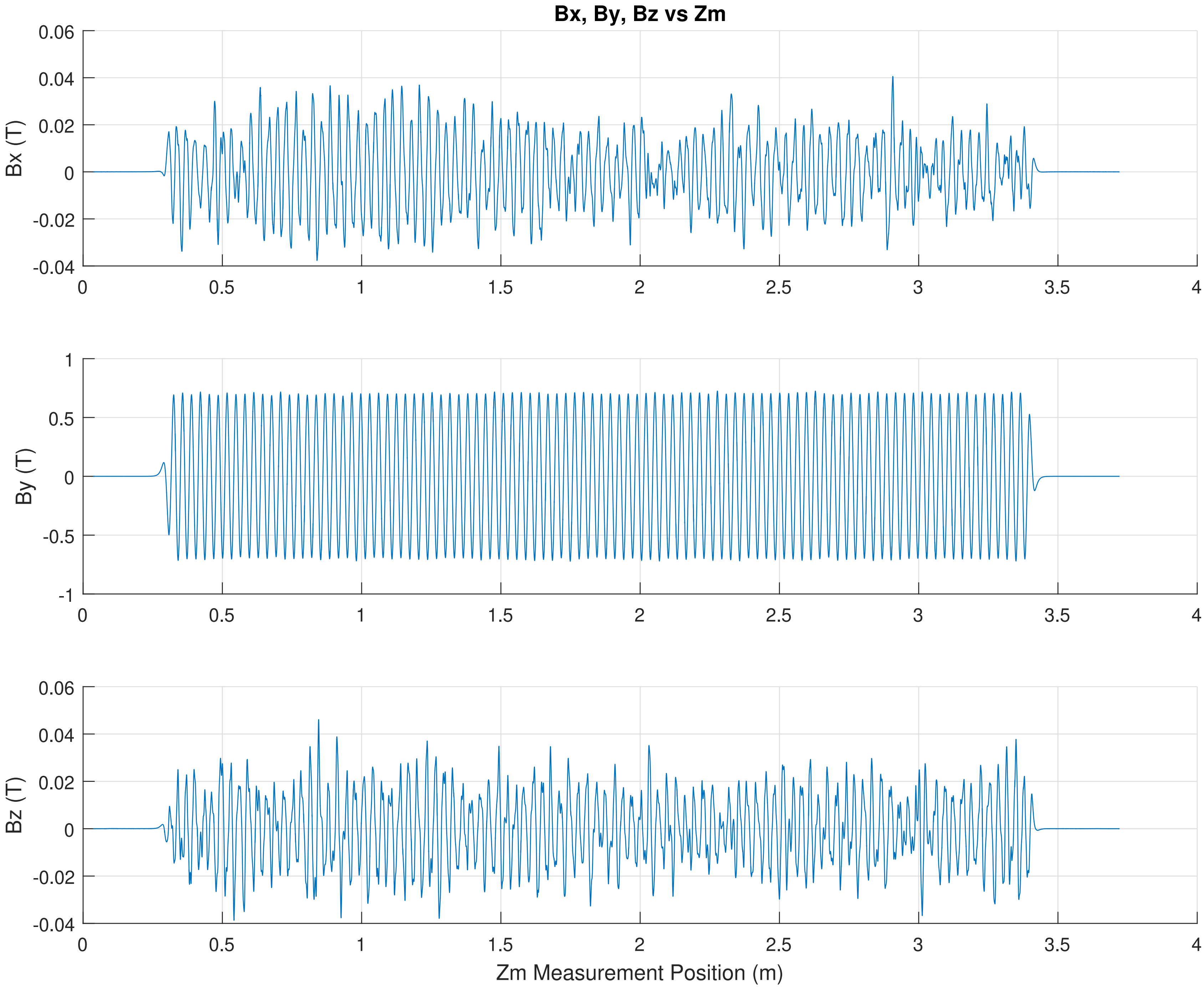
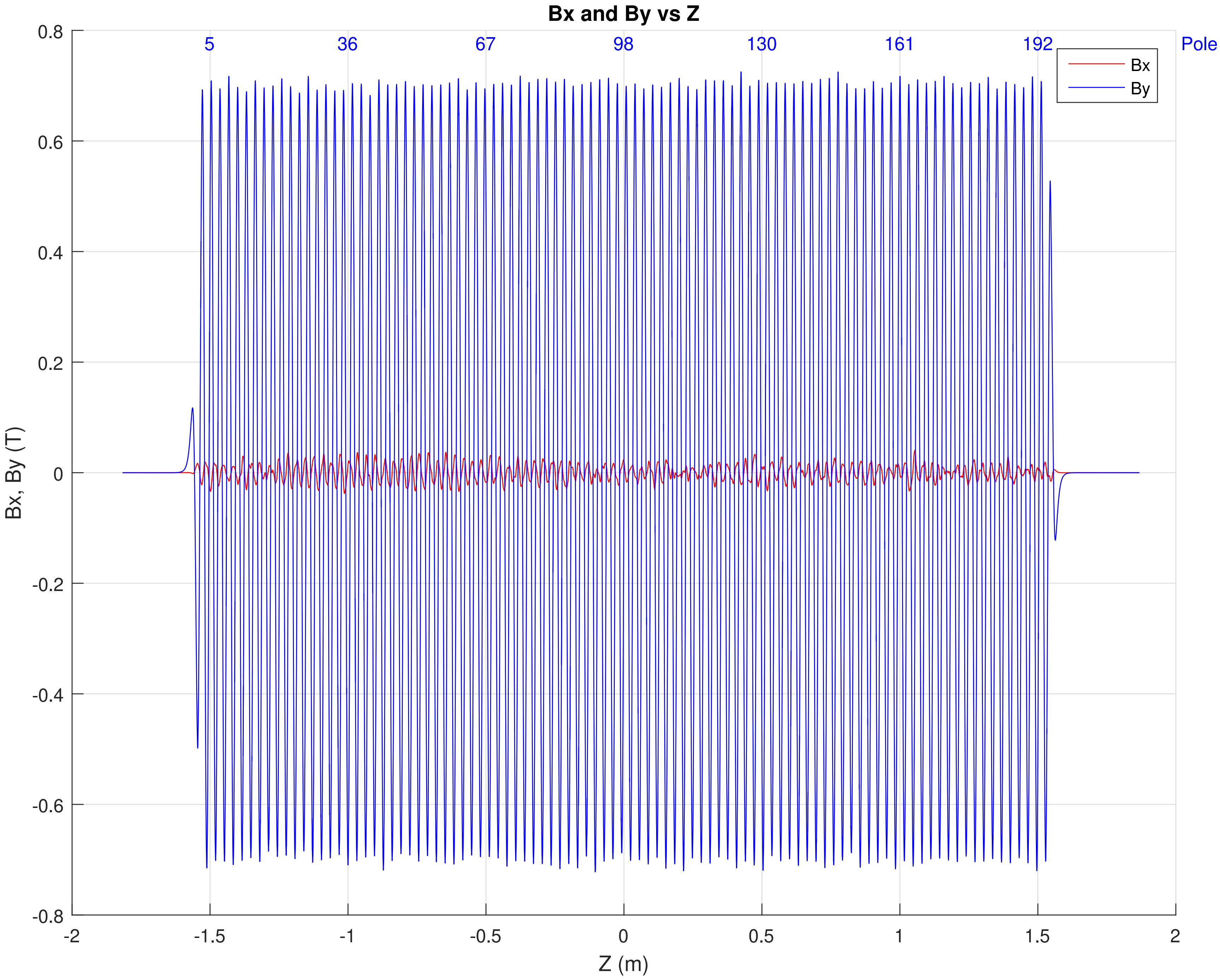
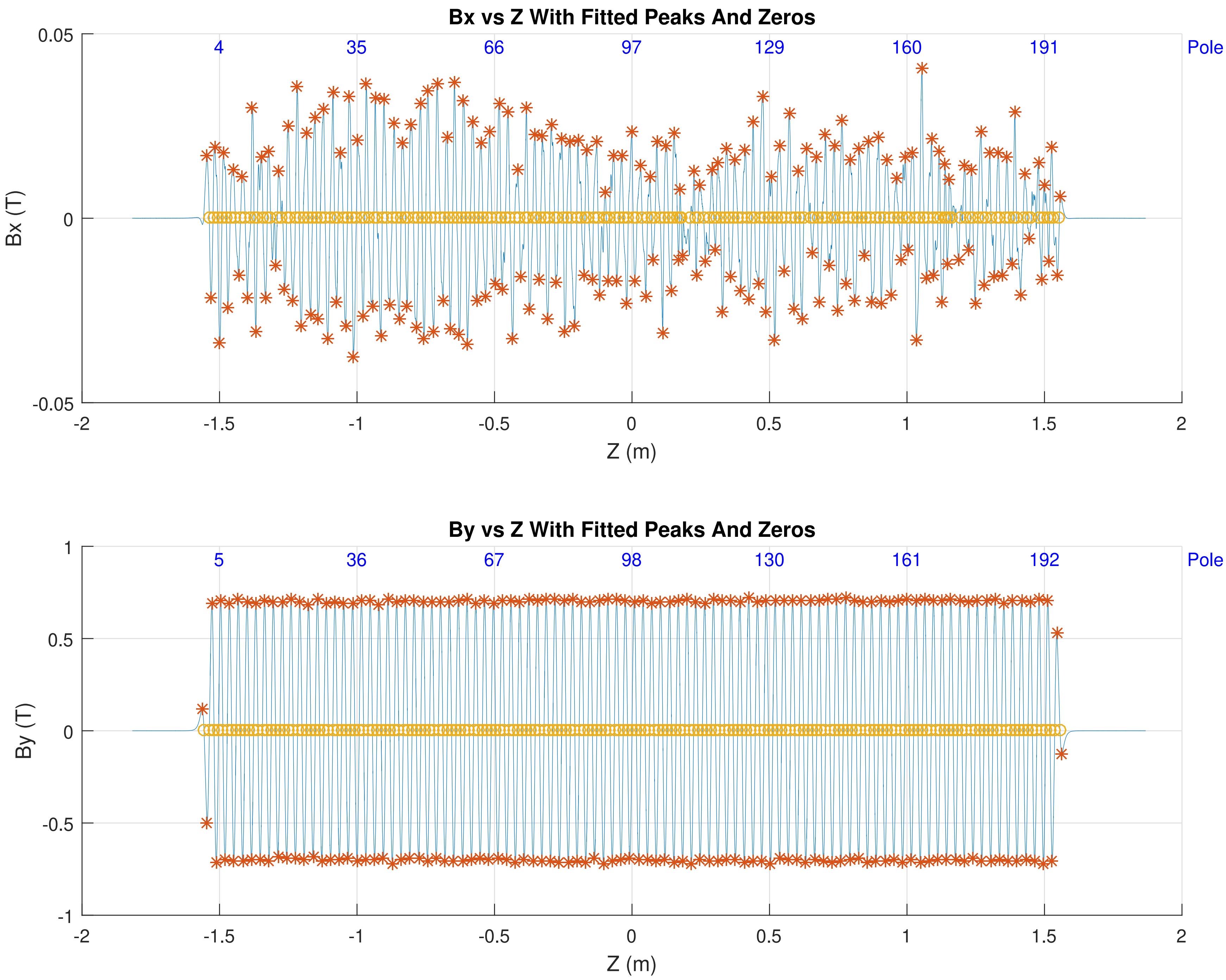
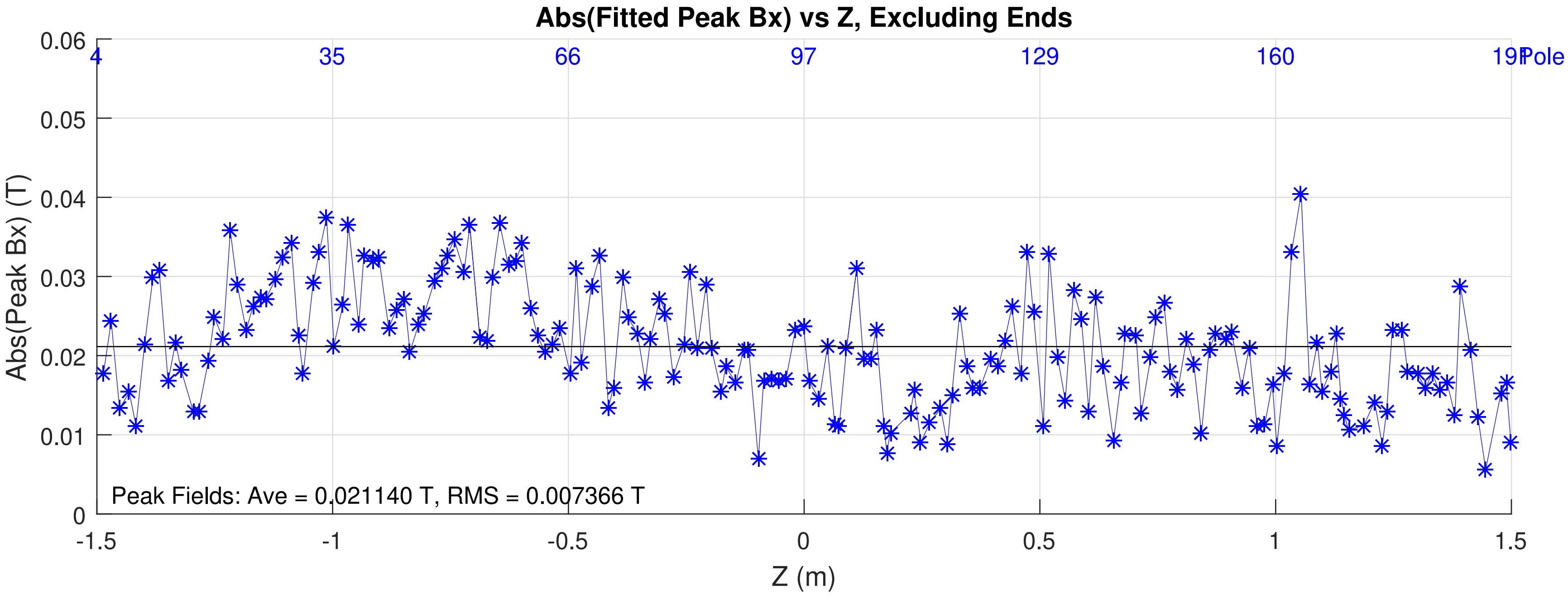

Bx, By, Bz vs Zm
Bx (T)
0.06
0.04
0.02
0
-0.02
-0.04
0
0.5
1
1.5
2
2.5
3
3.5
4
By (T)
1
0.5
0
-0.5
-1
0
0.5
1
1.5
2
2.5
3
3.5
4
Bz (T)
0.06
0.04
0.02
0
-0.02
-0.04
0
0.5
1
1.5
2
2.5
3
3.5
4
Zm Measurement Position (m)

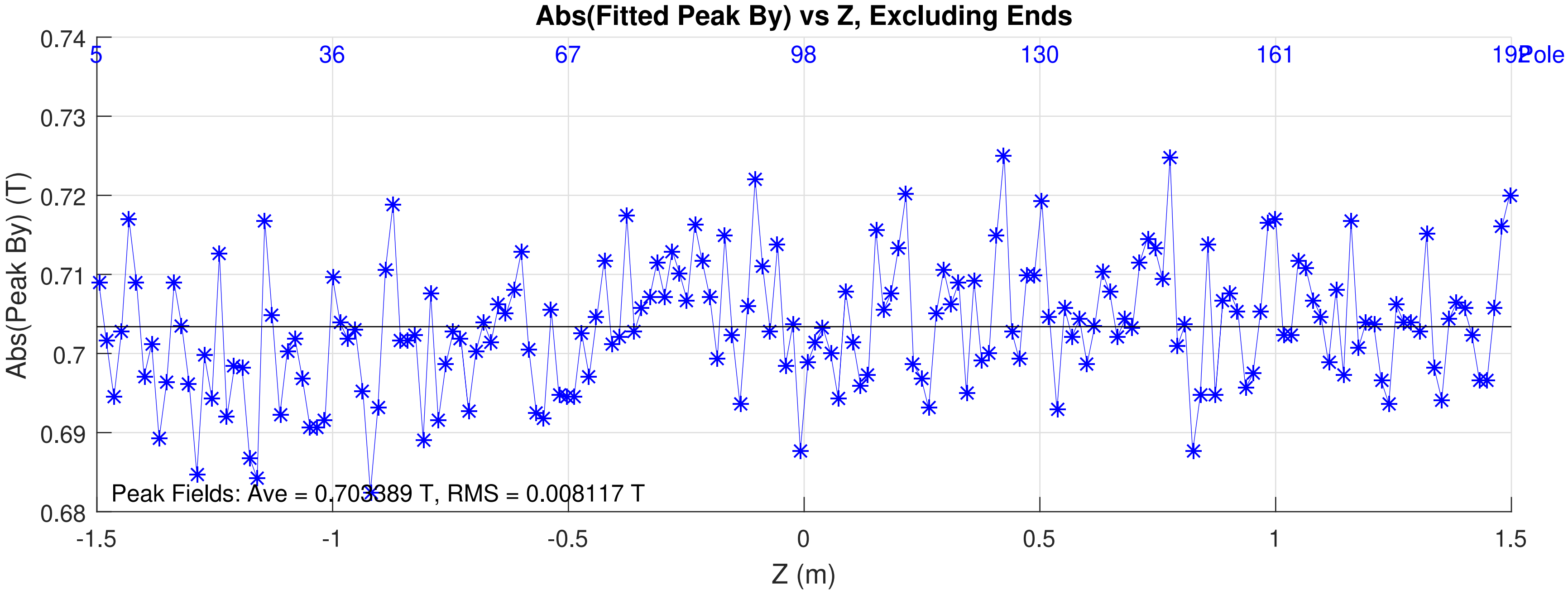

Bx and By vs Z
5
36
67
98
130
161
192
Pole
Bx
By
Bx, By (T)
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
Z (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2



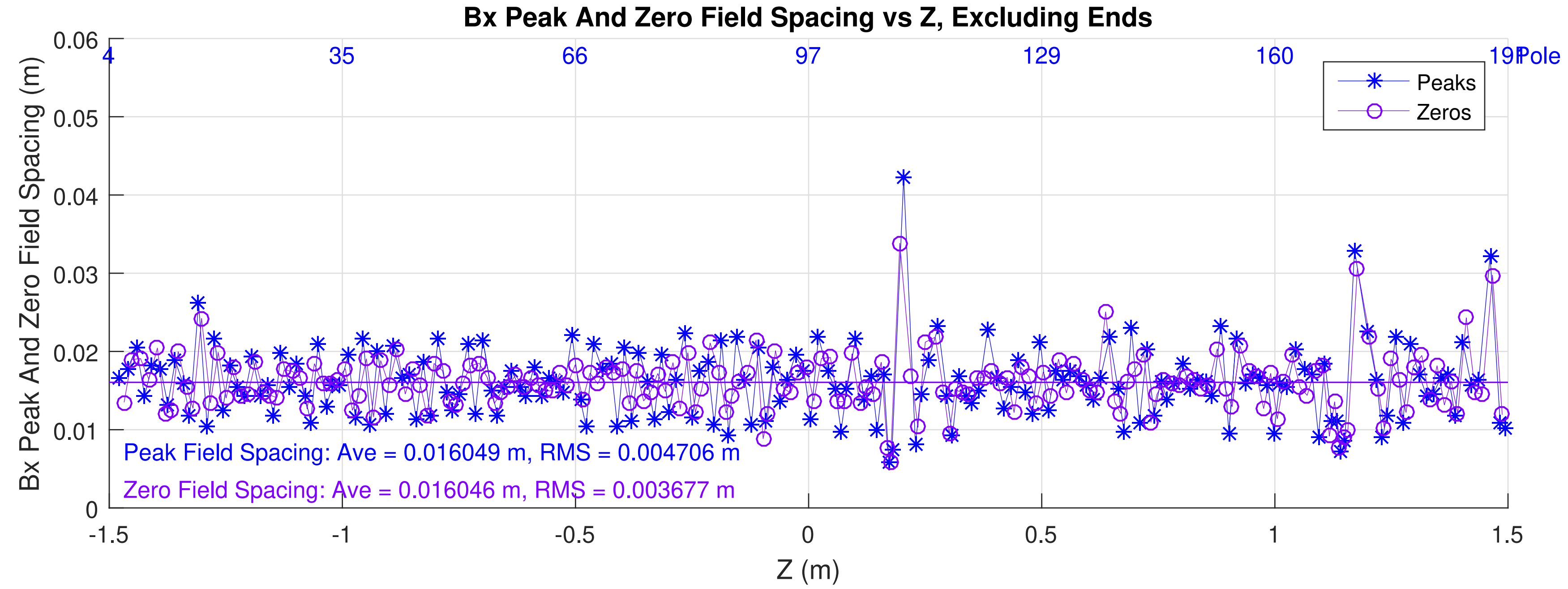
Bx vs Z With Fitted Peaks And Zeros
4
35
66
97
129
160
191
Pole
Bx (T)
0.05
0
-0.05
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
By vs Z With Fitted Peaks And Zeros
5
36
67
98
130
161
192
Pole
By (T)
1
0.5
0
-0.5
-1
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

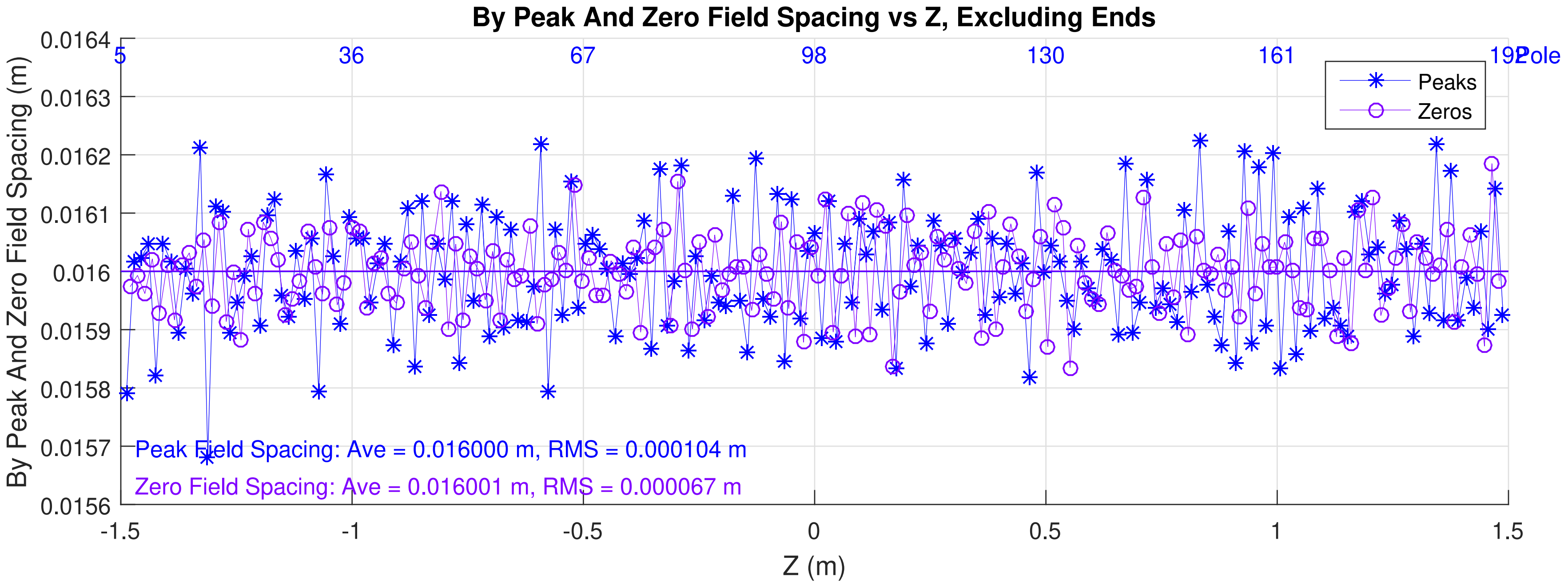


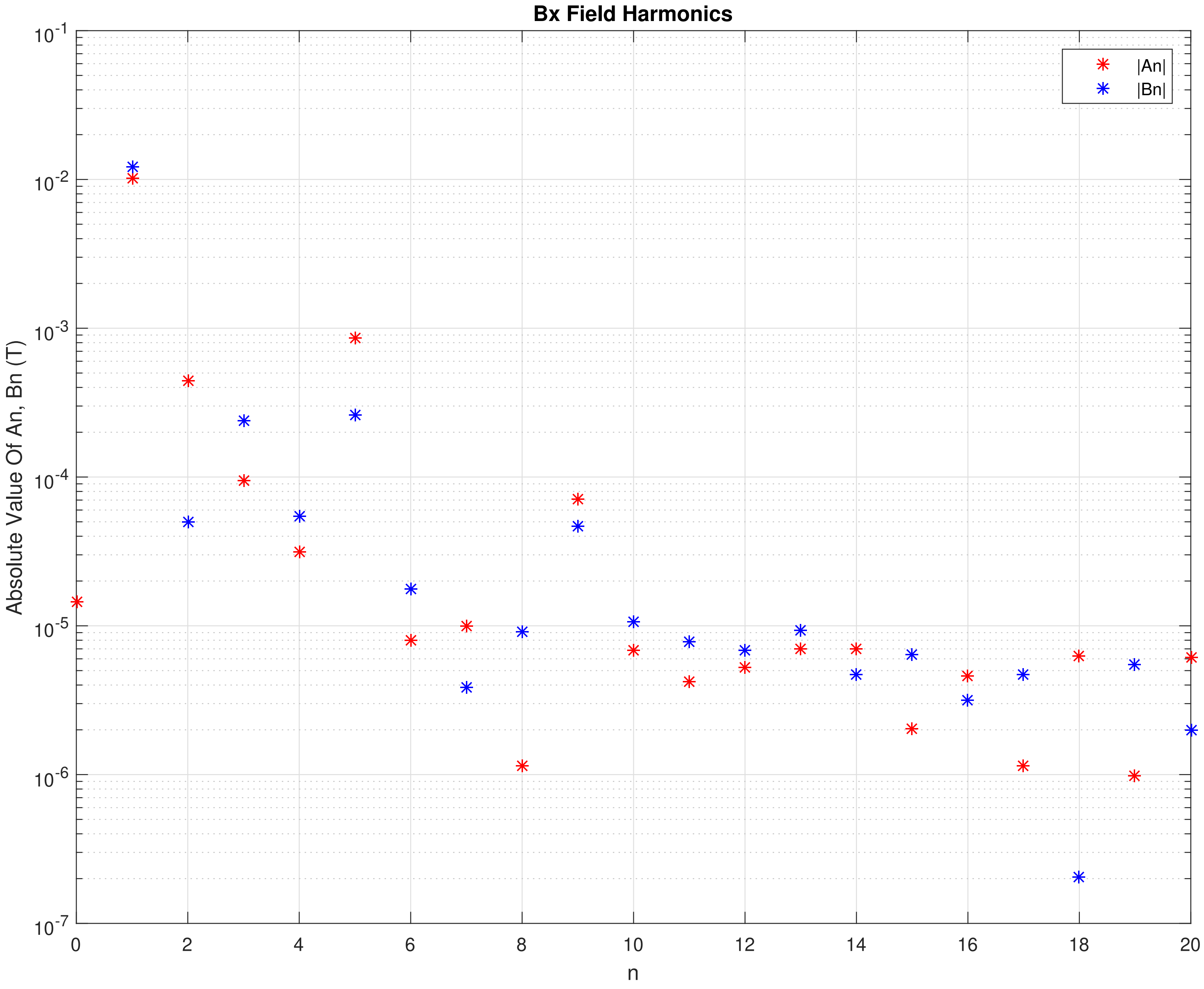
Abs(Fitted Peak Bx) vs Z, Excluding Ends

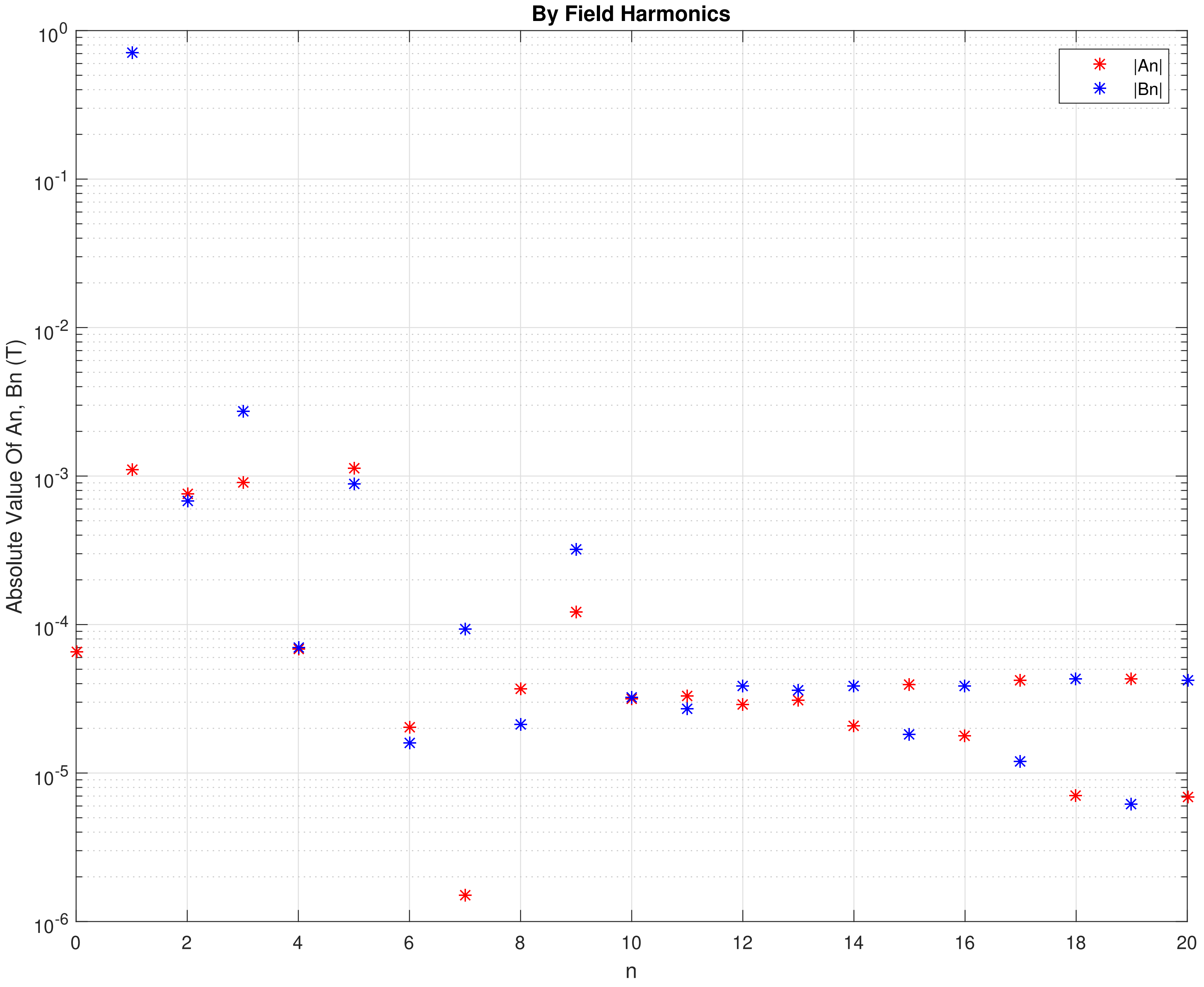


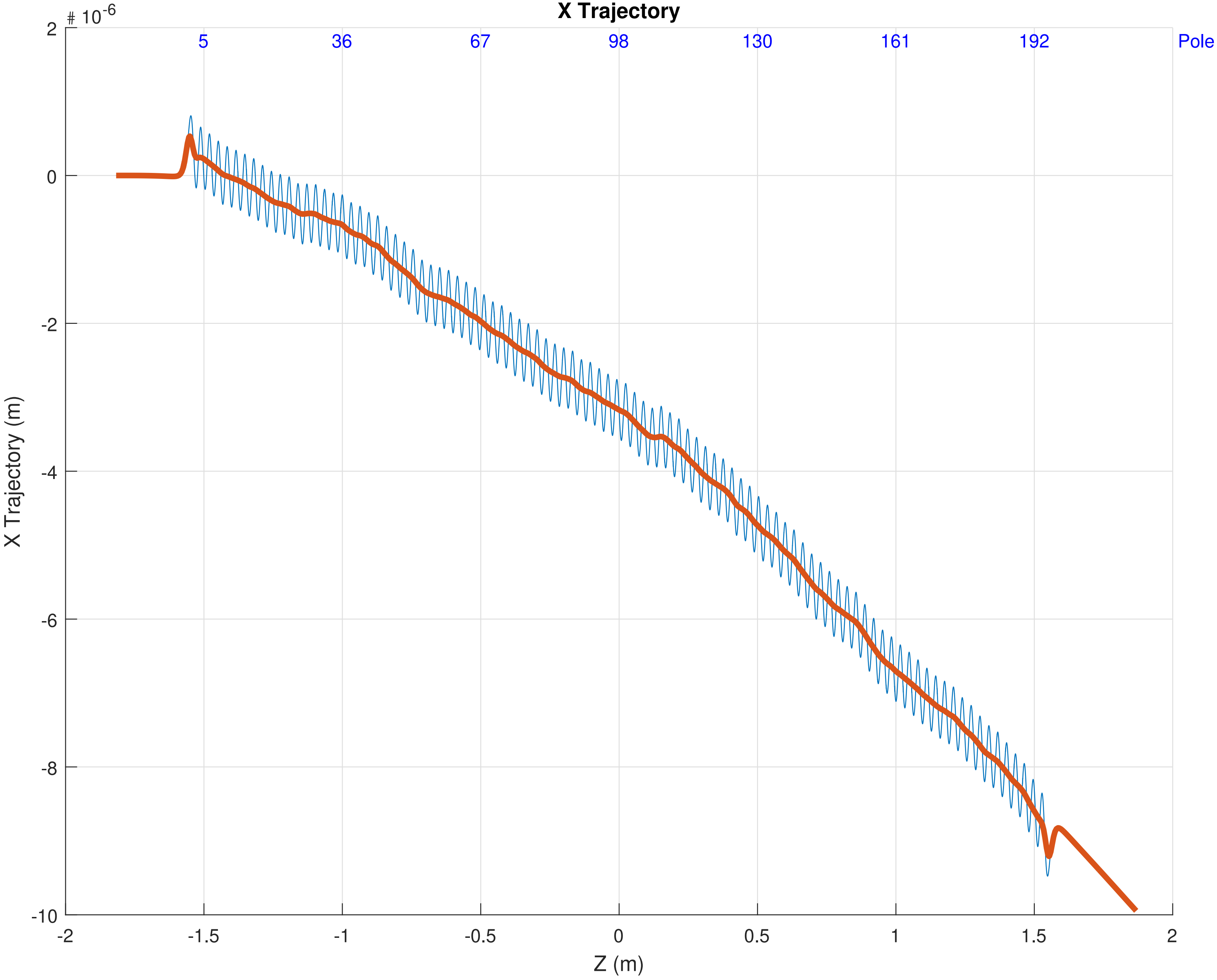
Abs(Fitted Peak By) vs Z, Excluding Ends

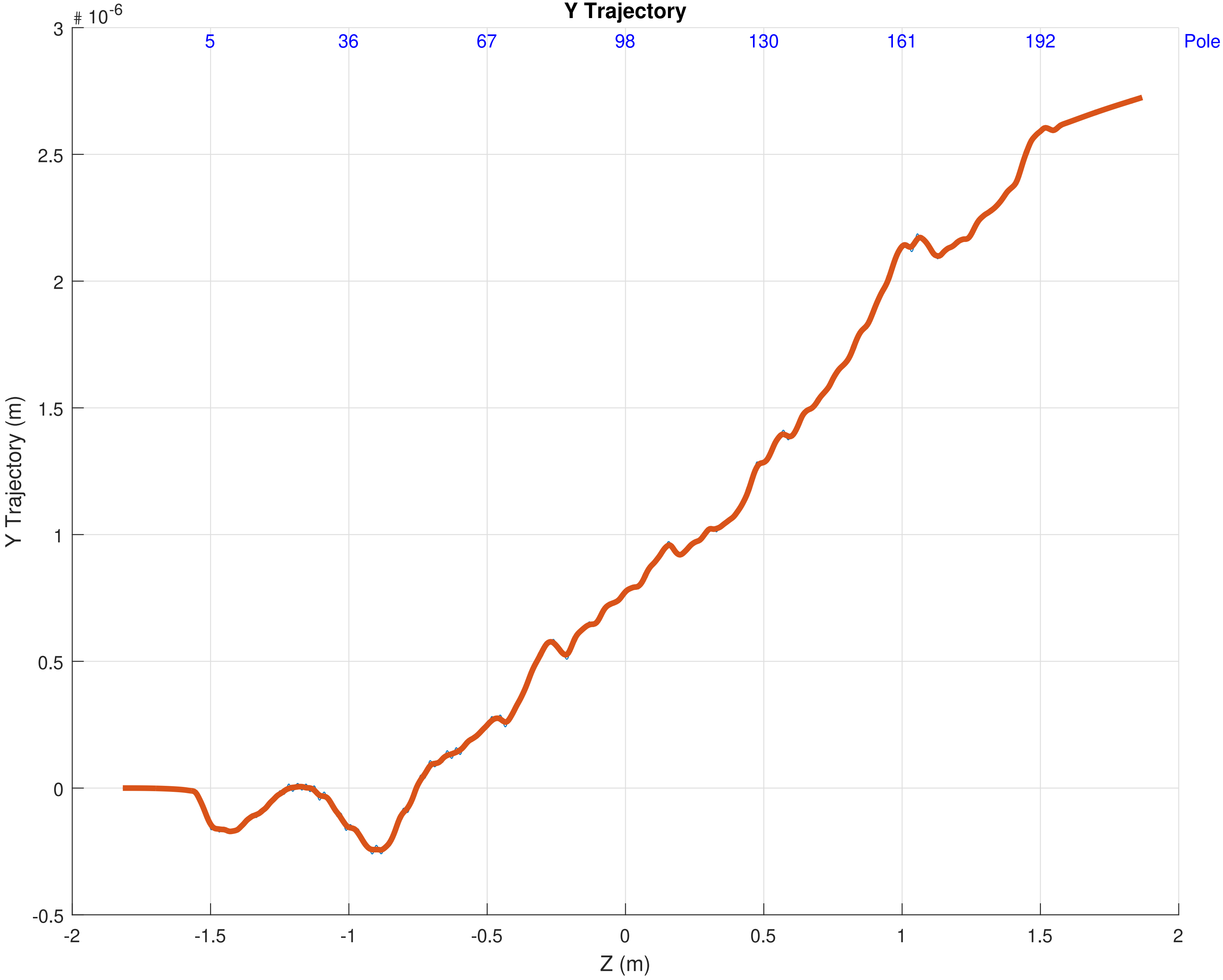

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
0.06
0.05
0.04
0.03
0.02
0.01
0
4
35
66
97
129
160
191
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016049 m, RMS = 0.004706 m
Zero Field Spacing: Ave = 0.016046 m, RMS = 0.003677 m
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)

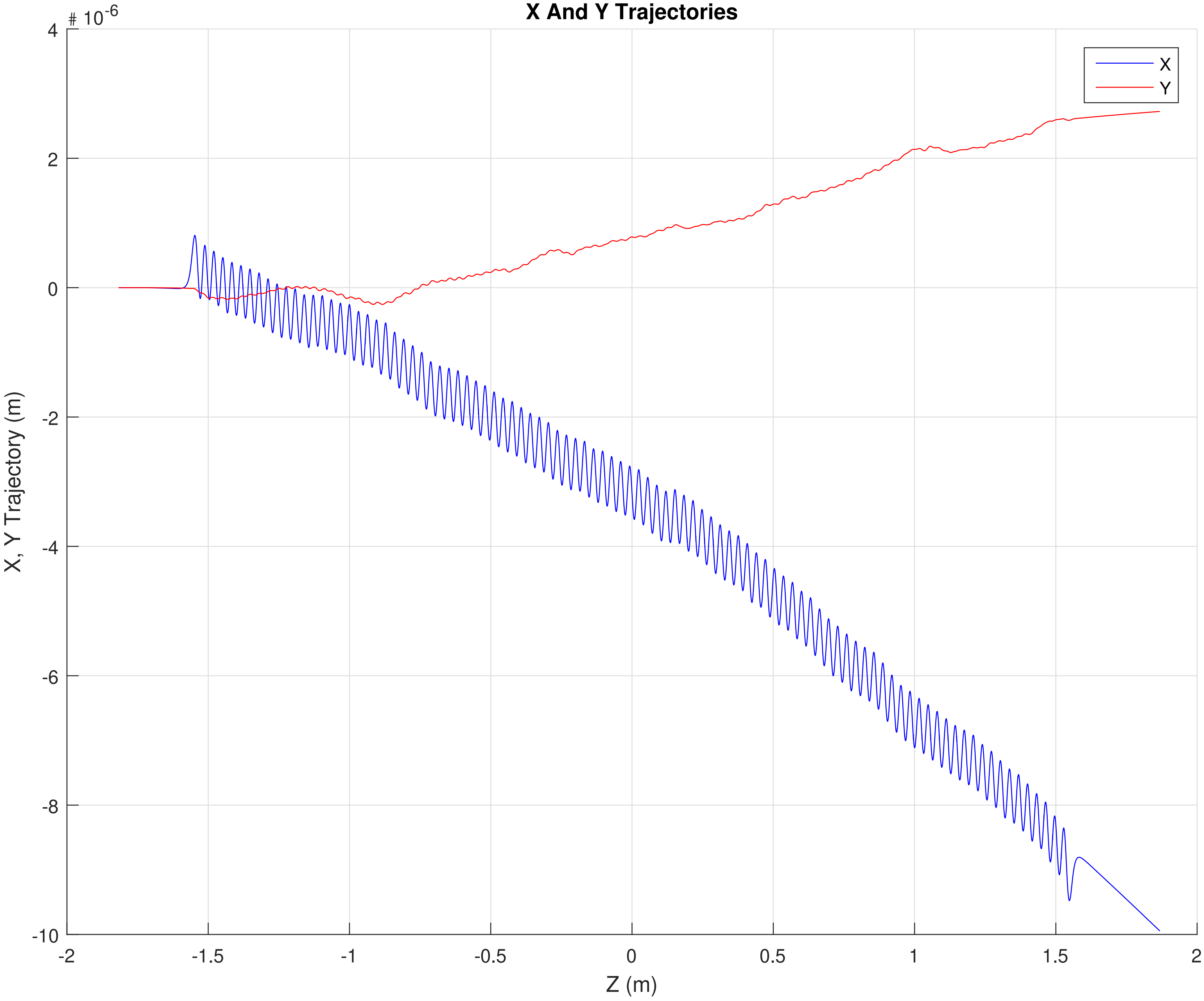

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
0.0164
0.0163
0.0162
0.0161
0.016
0.0159
0.0158
0.0157
0.0156
5
36
67
98
130
161
192
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016000 m, RMS = 0.000104 m
Zero Field Spacing: Ave = 0.016001 m, RMS = 0.000067 m
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)

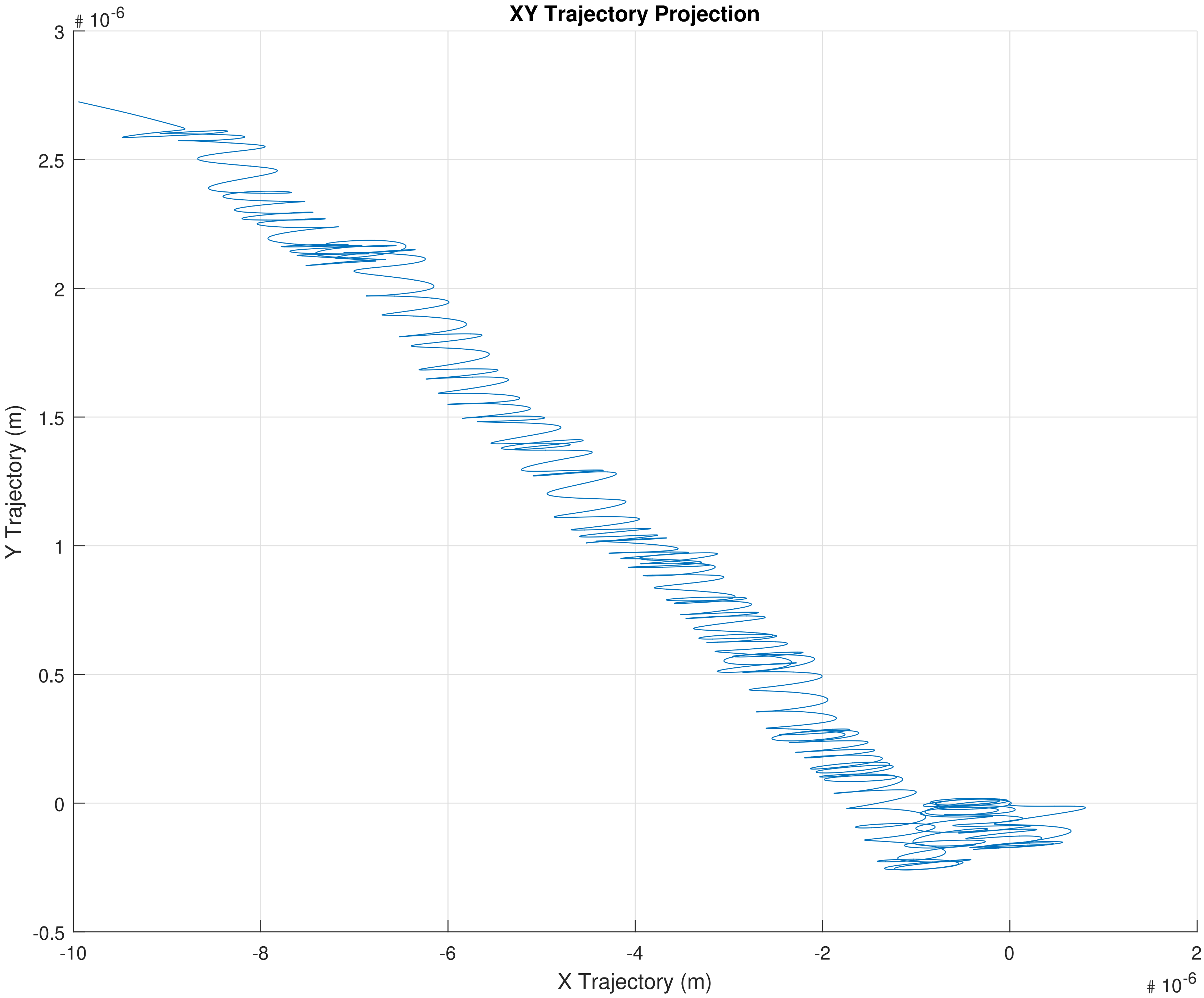

Bx Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
0
2
4
6
8
10
12
14
16
18
20
n

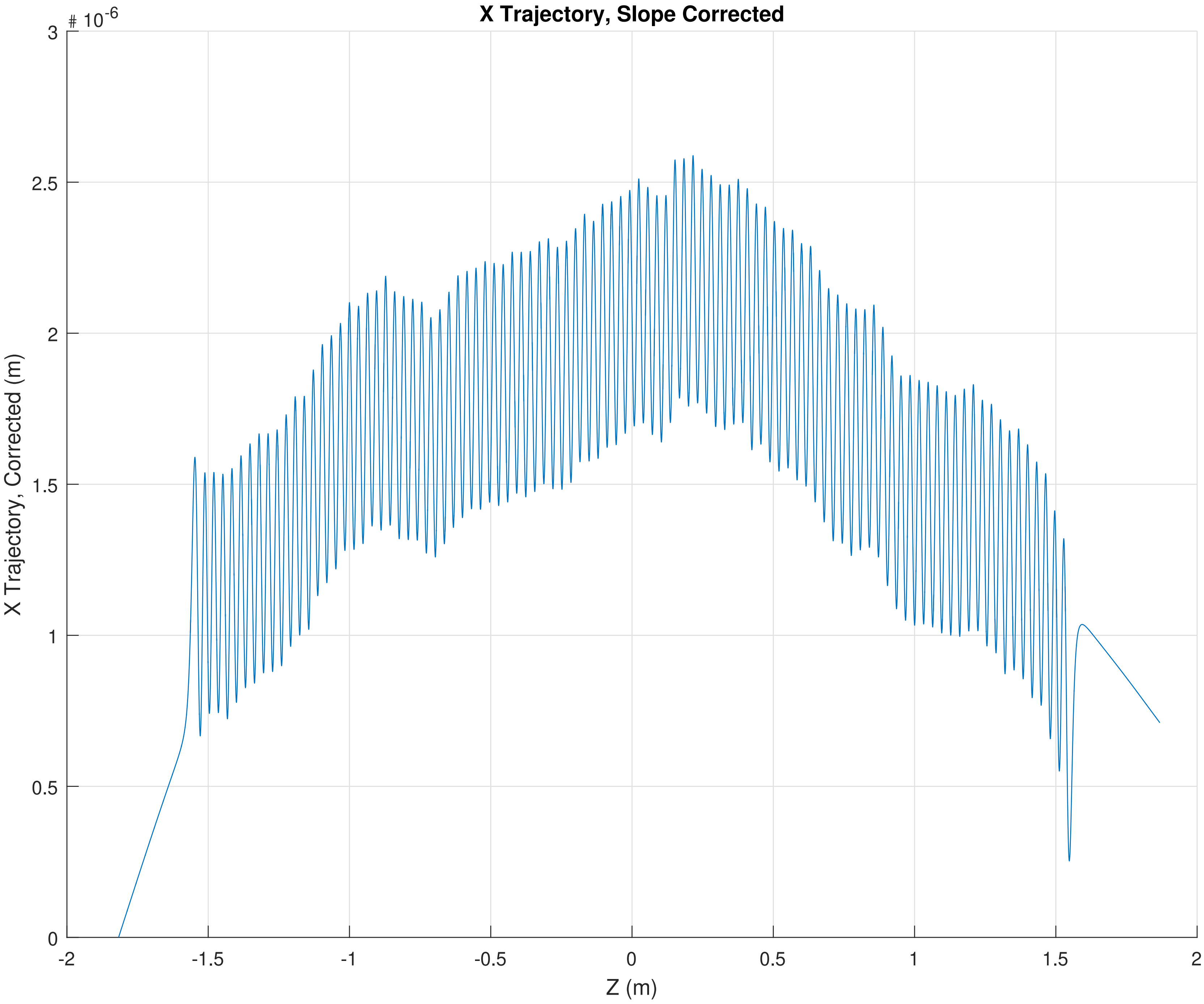

By Field Harmonics
Absolute Value Of An, Bn (T)
n
10^0
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
0
2
4
6
8
10
12
14
16
18
20
|An|
|Bn|

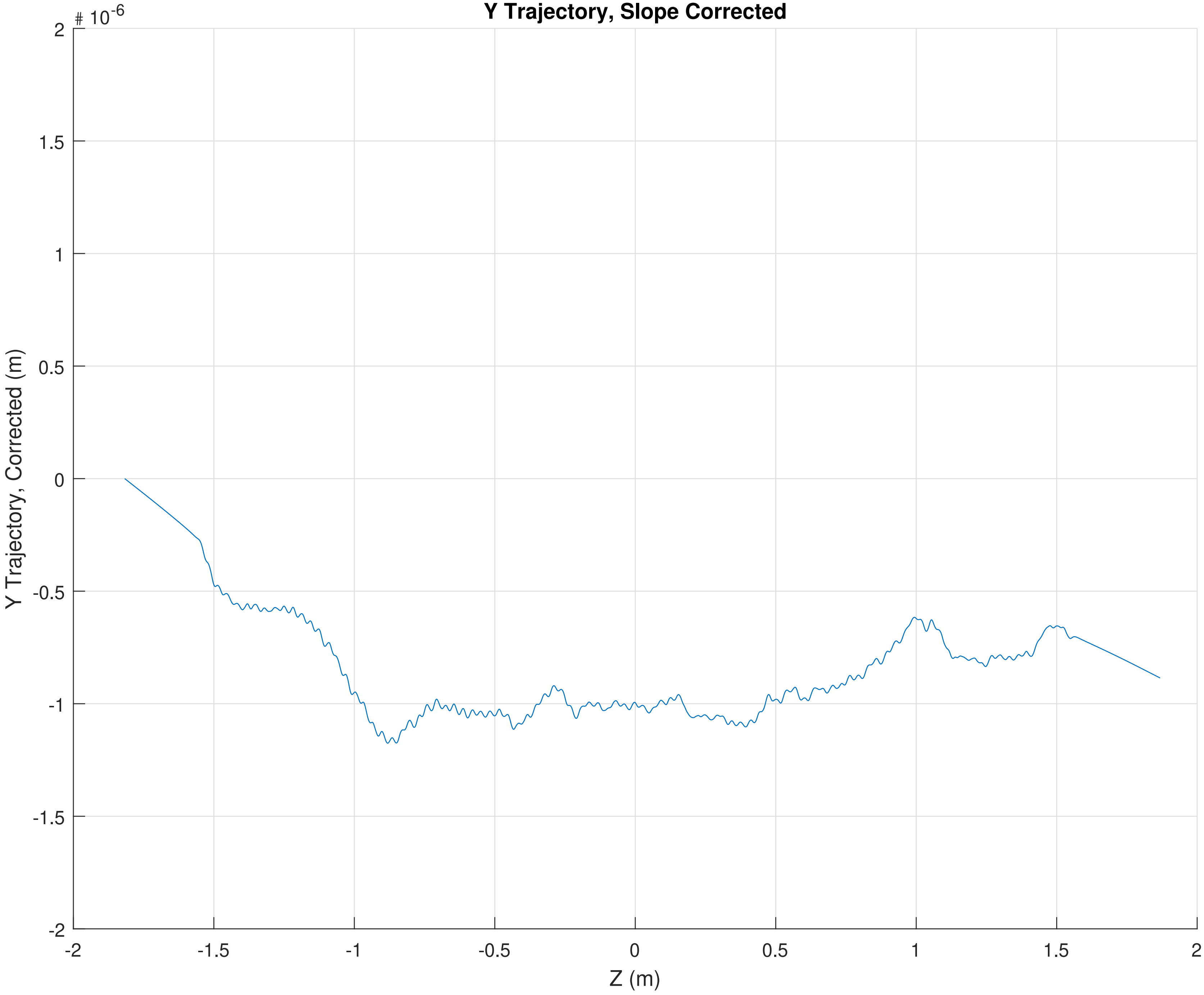

X Trajectory
10-6
2
0
-2
-4
-6
-8
-10
X Trajectory (m)
5
36
67
98
130
161
192
Pole
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

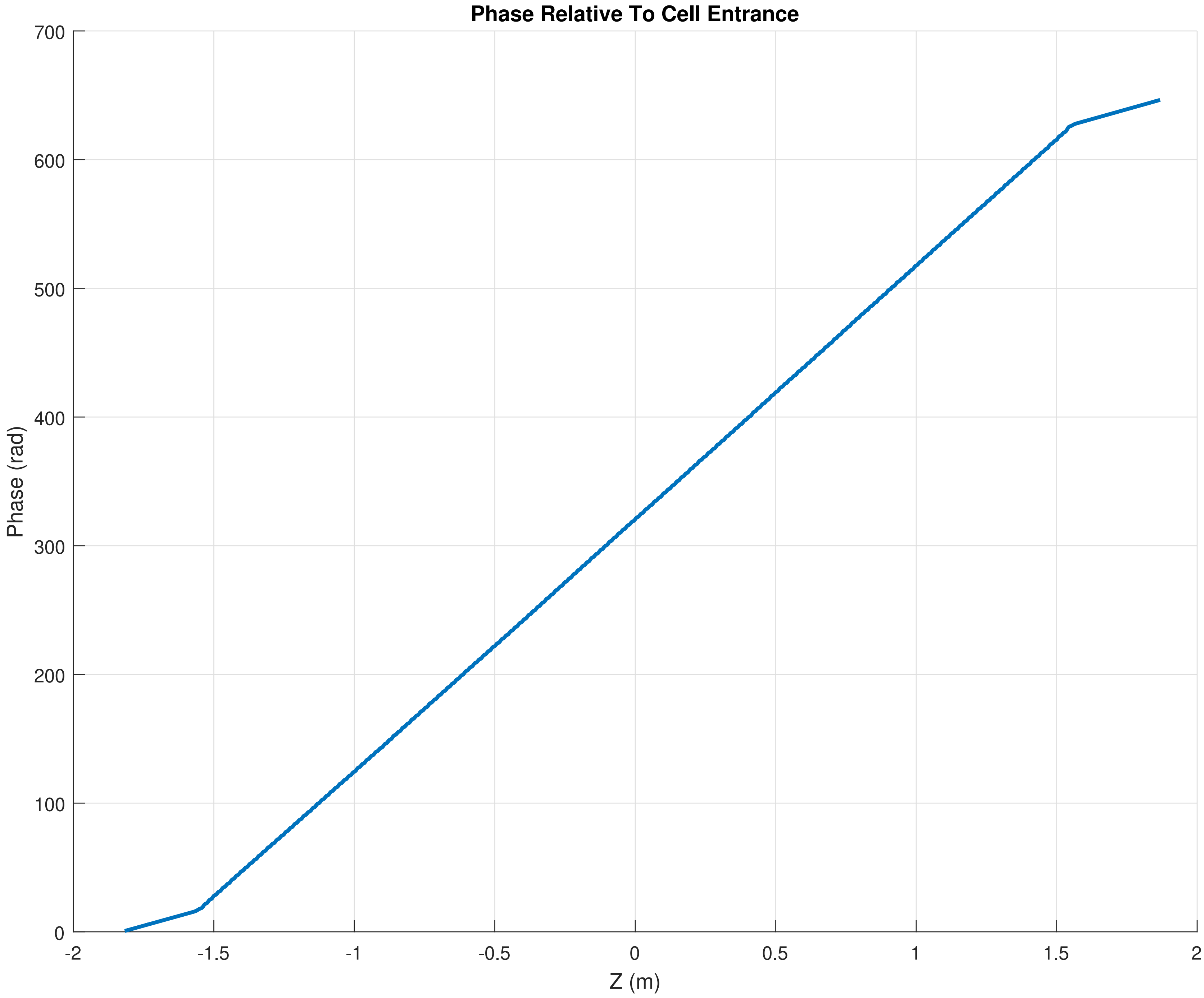

Y Trajectory
10^-6
3
2.5
2
1.5
1
0.5
0
-0.5
Y Trajectory (m)
5
36
67
98
130
161
192
Pole
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)


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

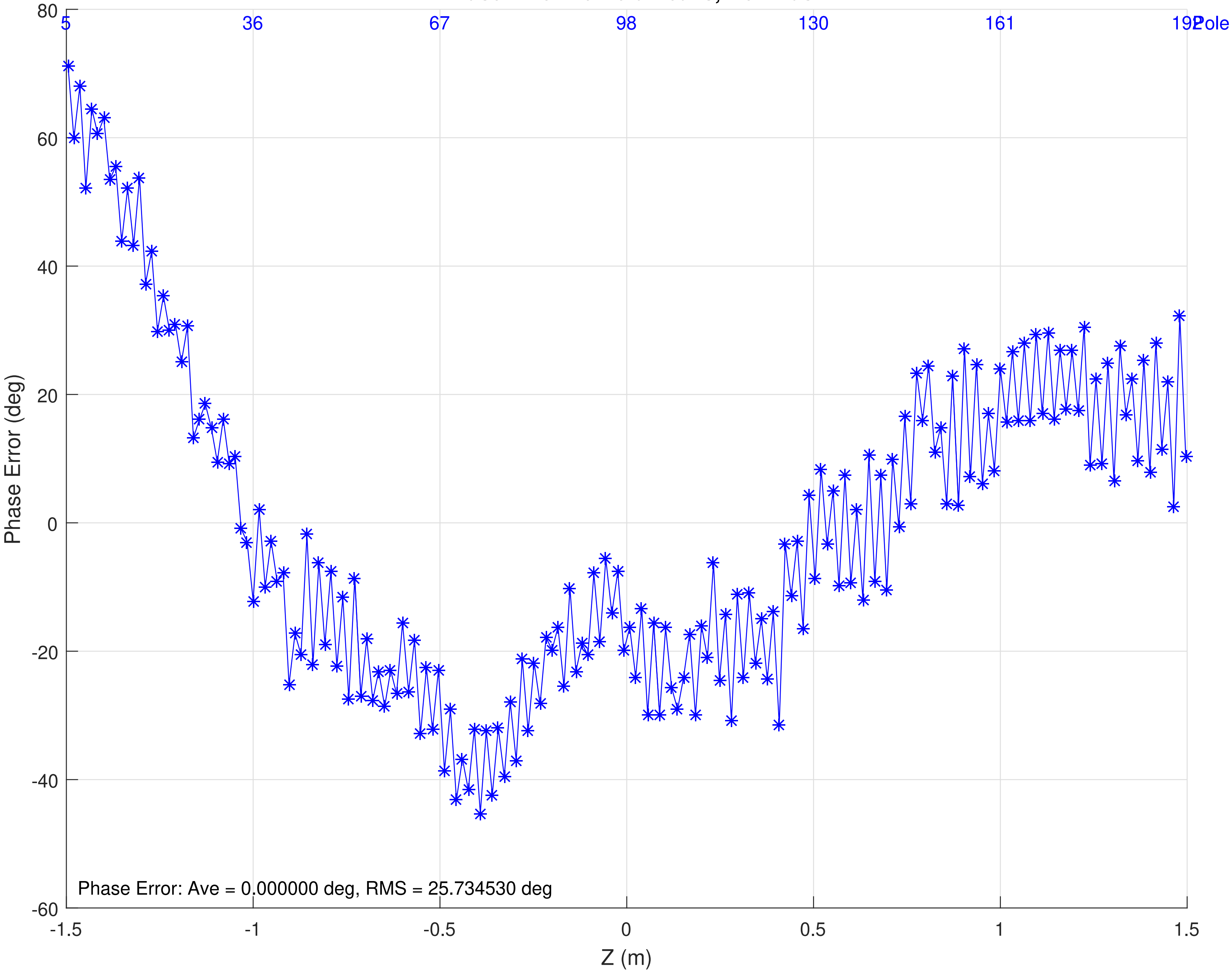

XY Trajectory Projection
10-6
3
2.5
2
1.5
1
0.5
0
-0.5
Y Trajectory (m)
-10
-8
-6
-4
-2
0
2
X Trajectory (m)
10-6


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)

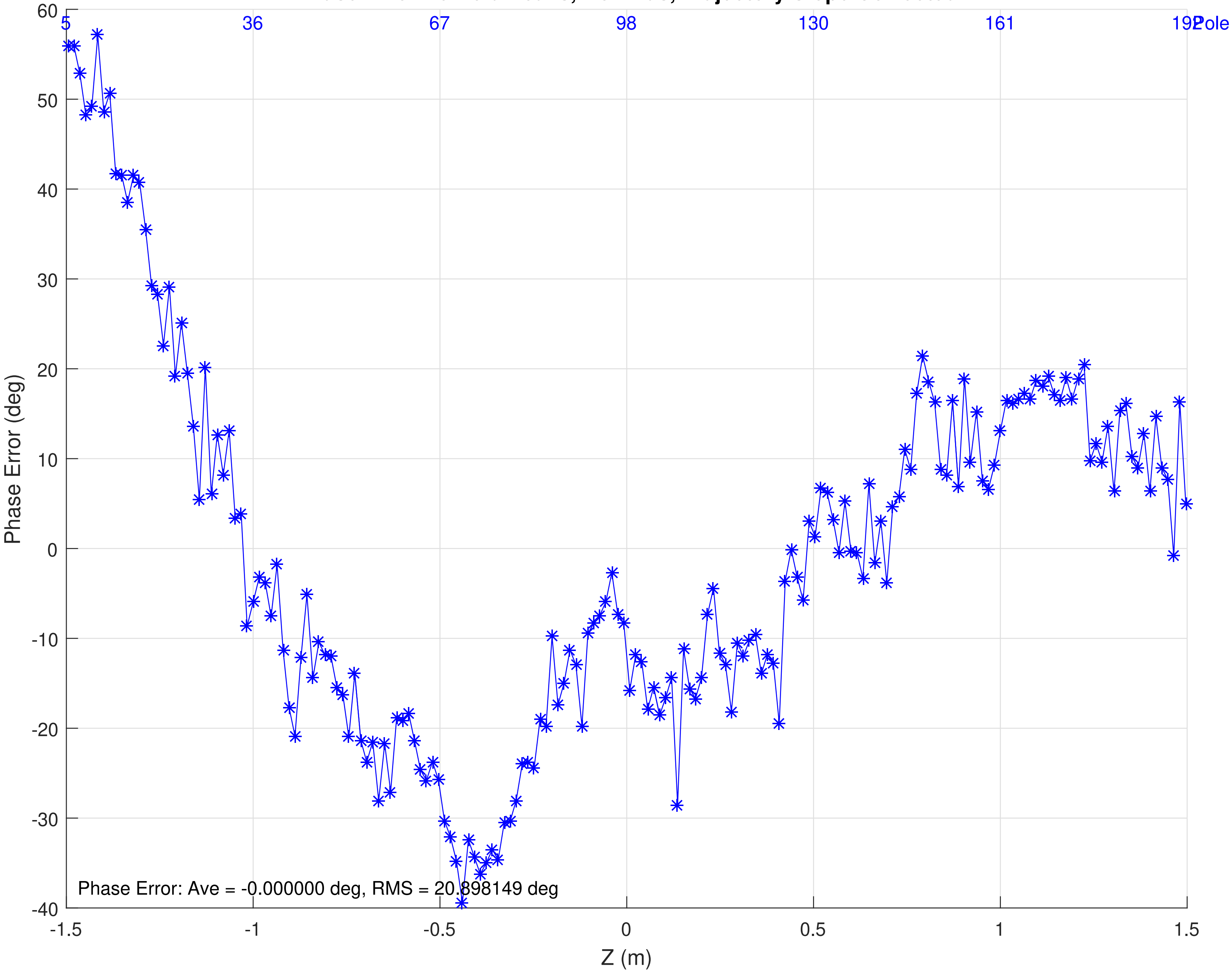

Phase Relative To Cell Entrance
Phase (rad)
700
600
500
400
300
200
100
0
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

Phase Error At Field Peaks, No Ends

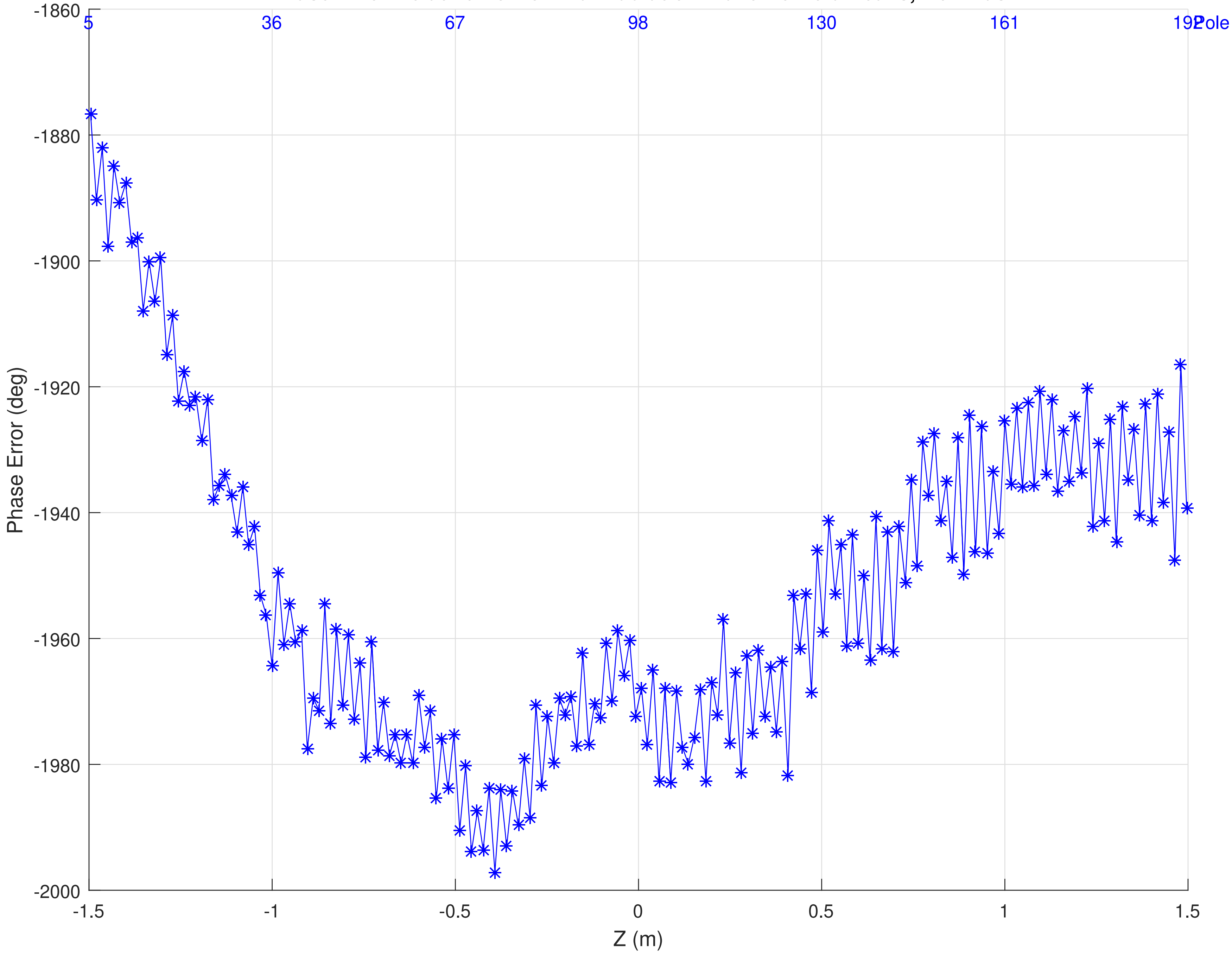


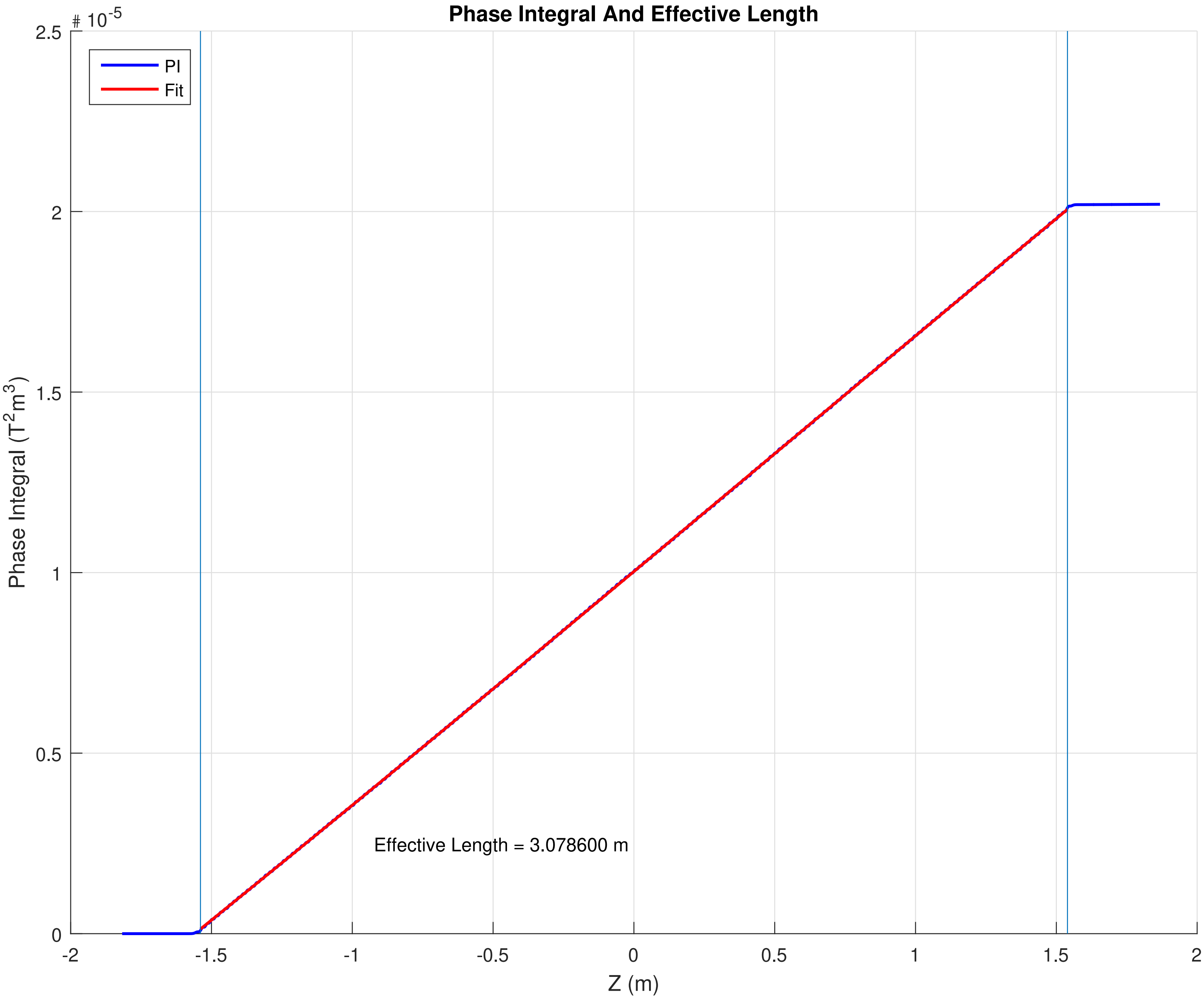
Phase Error: Ave = 0.000000 deg, RMS = 25.734530 deg

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

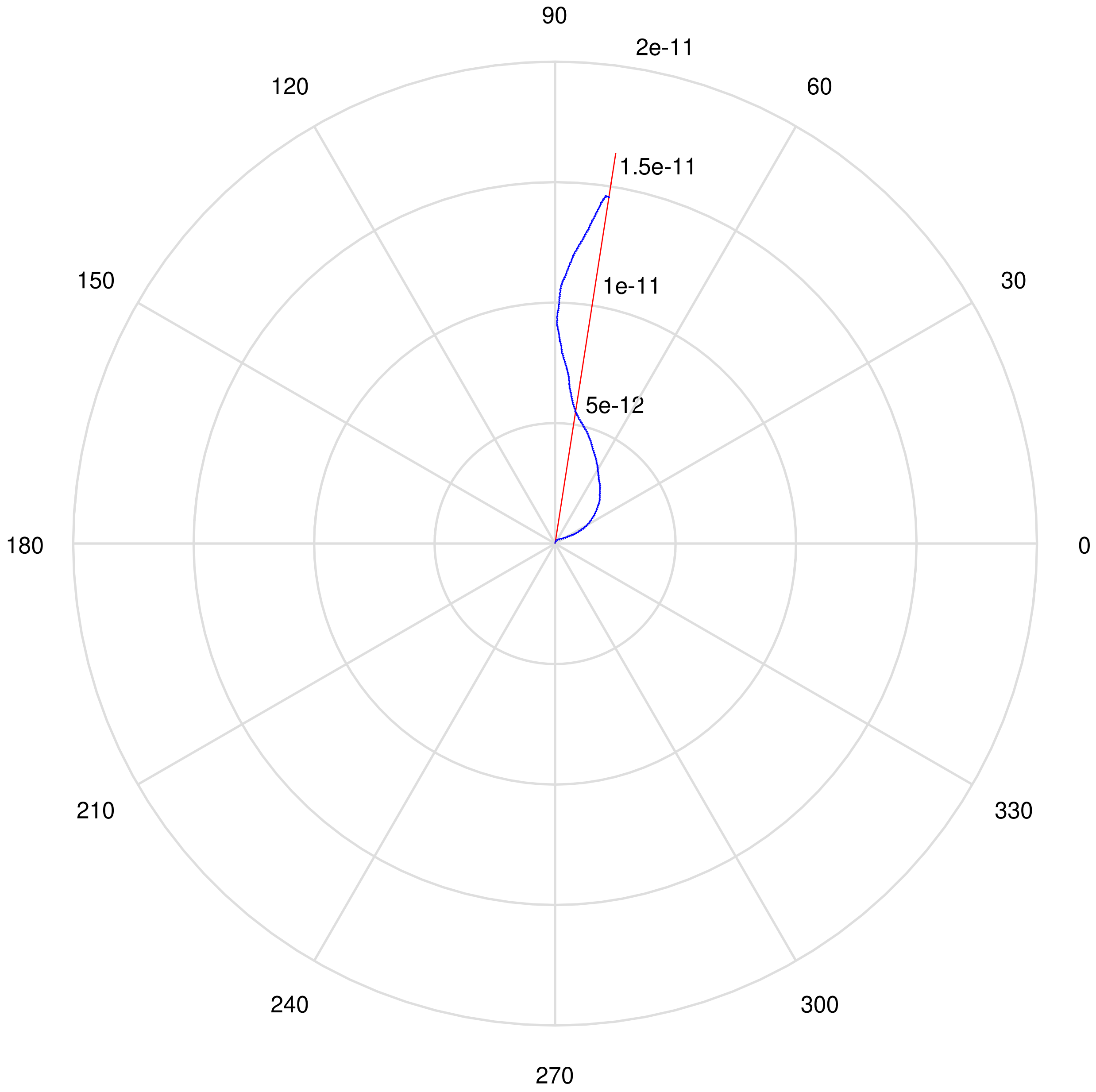


Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends

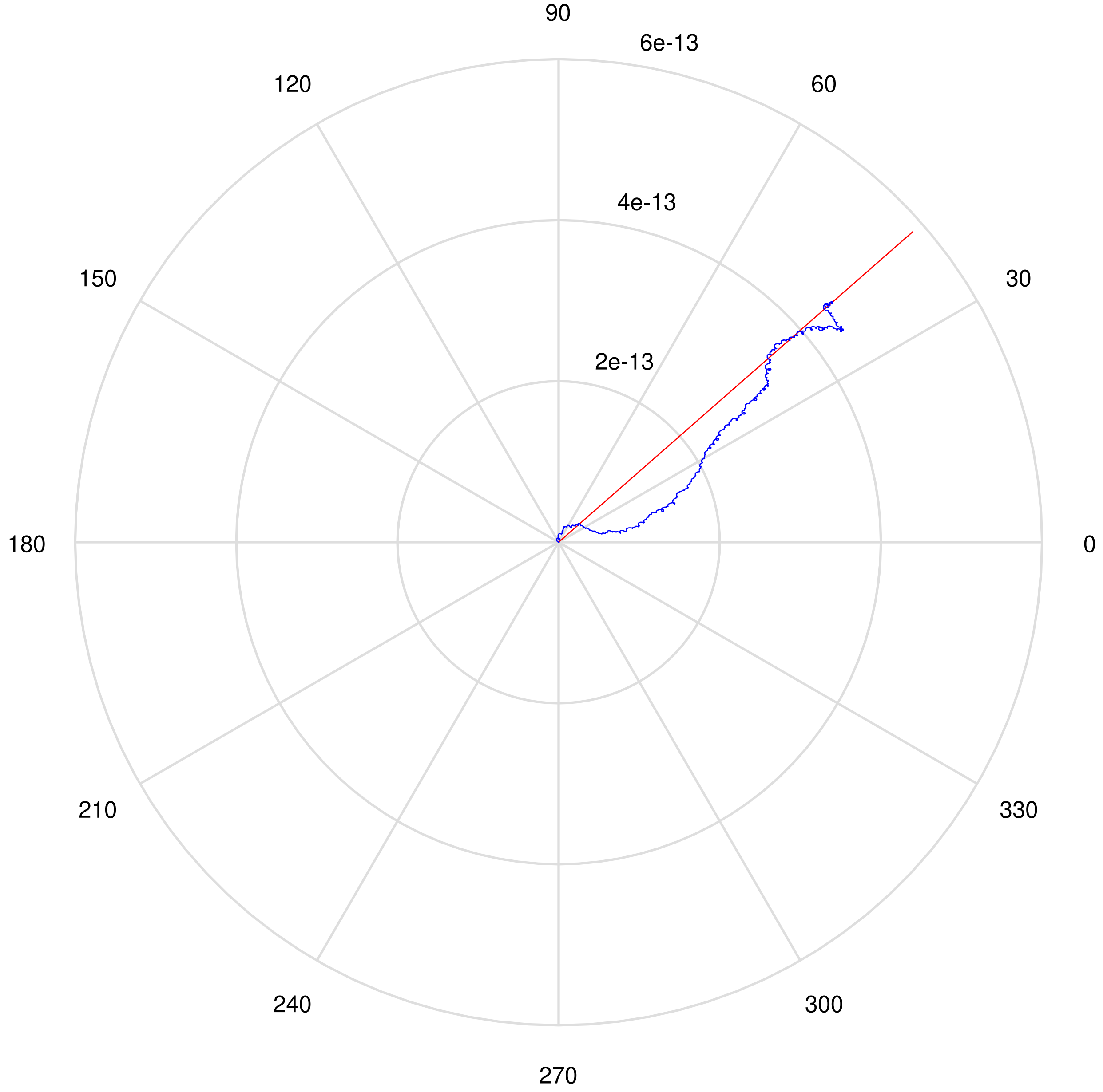


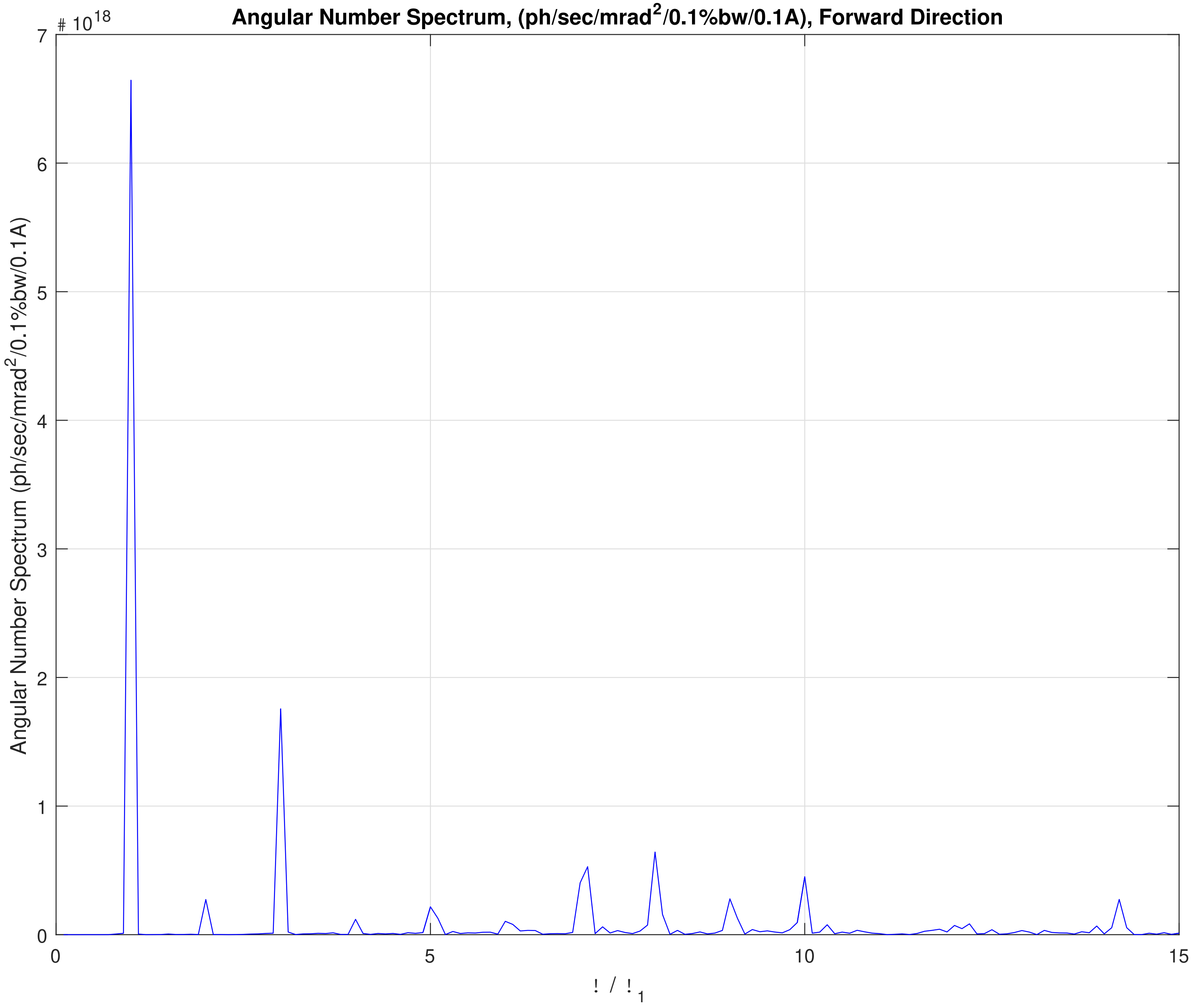

Phase Integral And Effective Length
10-5
2.5
2
1.5
1
0.5
0
Phase Integral (T2m3)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
PI
Fit
Effective Length = 3.078600 m

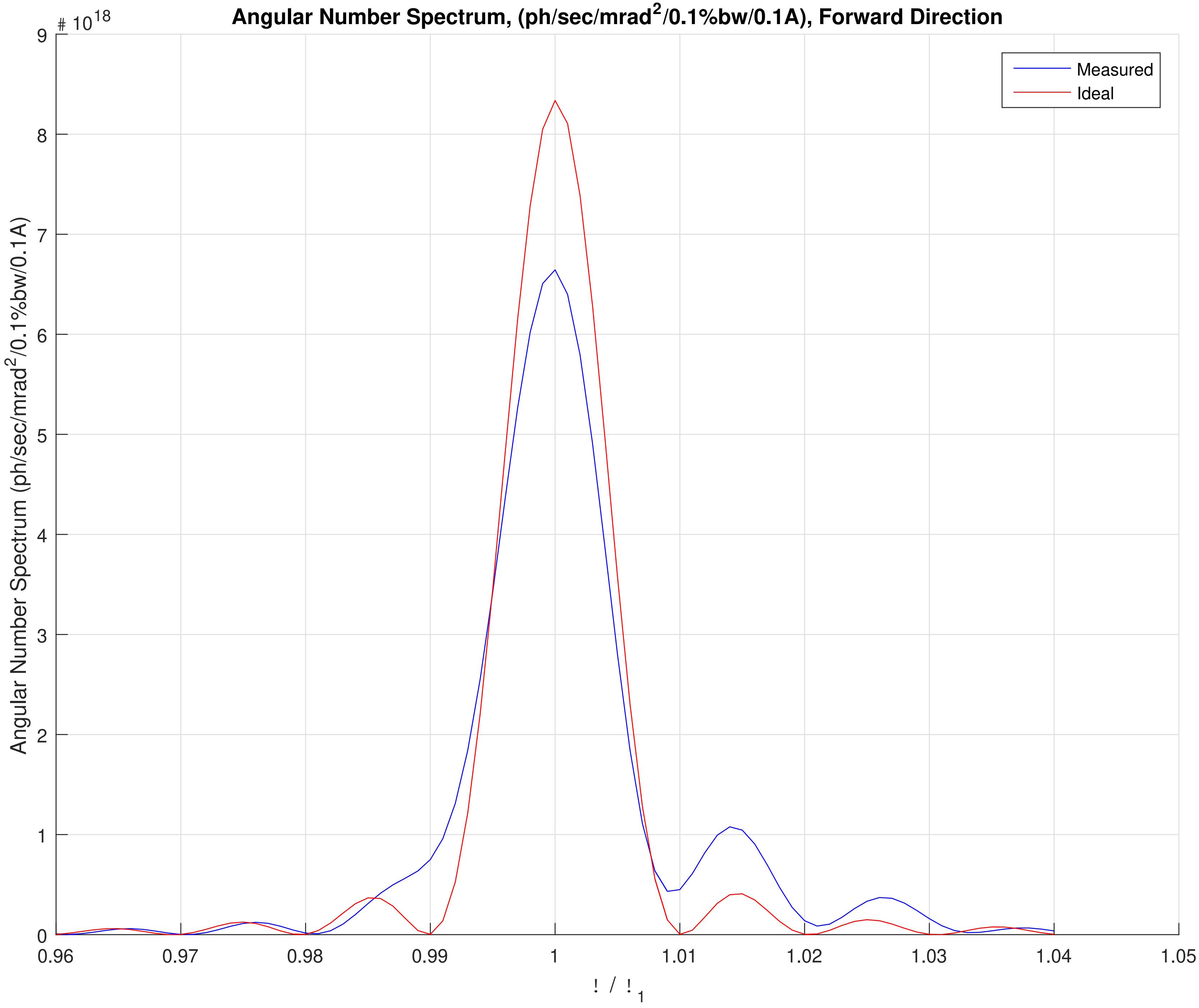
Re and Im Parts Of Ex(!), Forward Direction, $! = !_1$

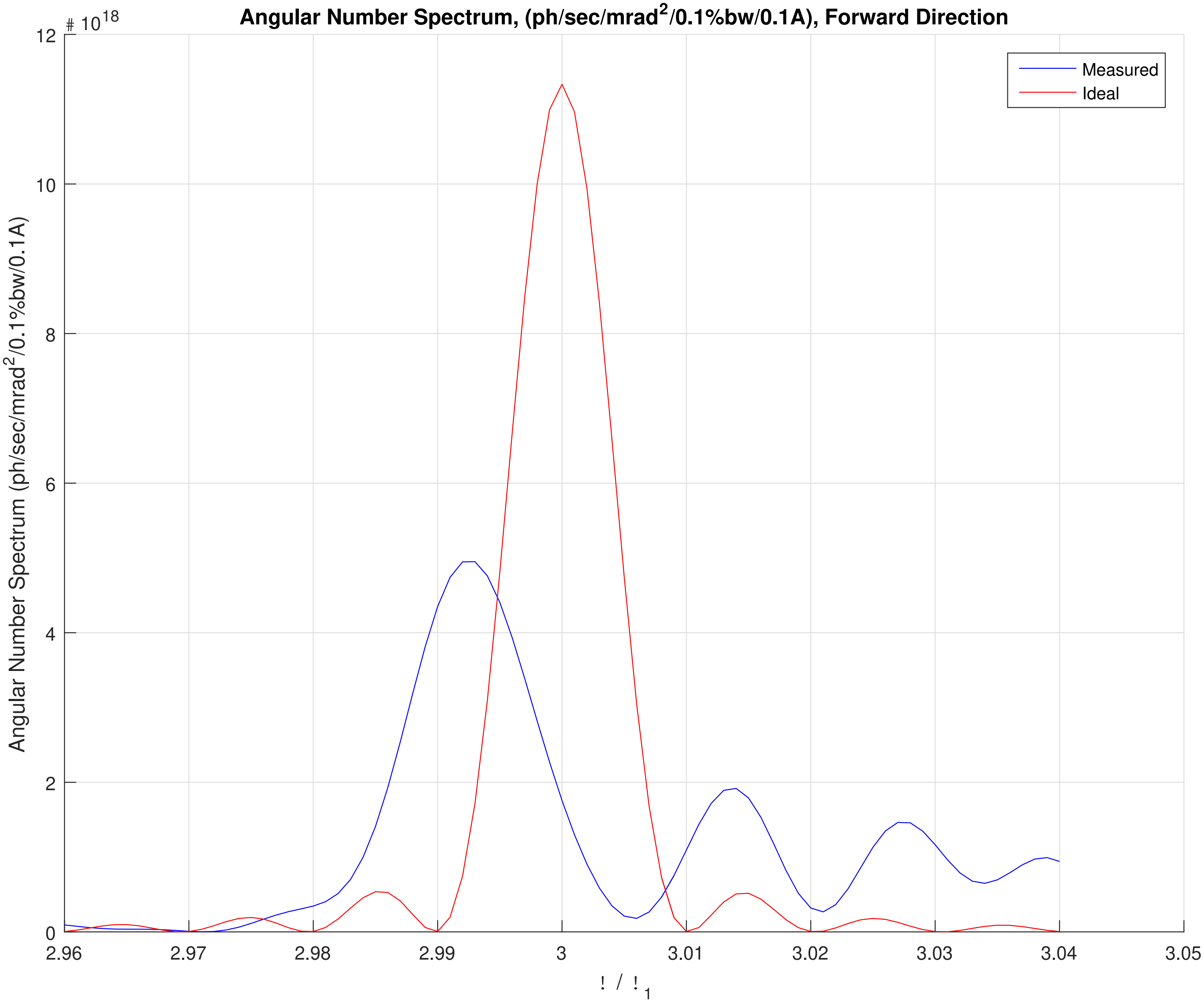


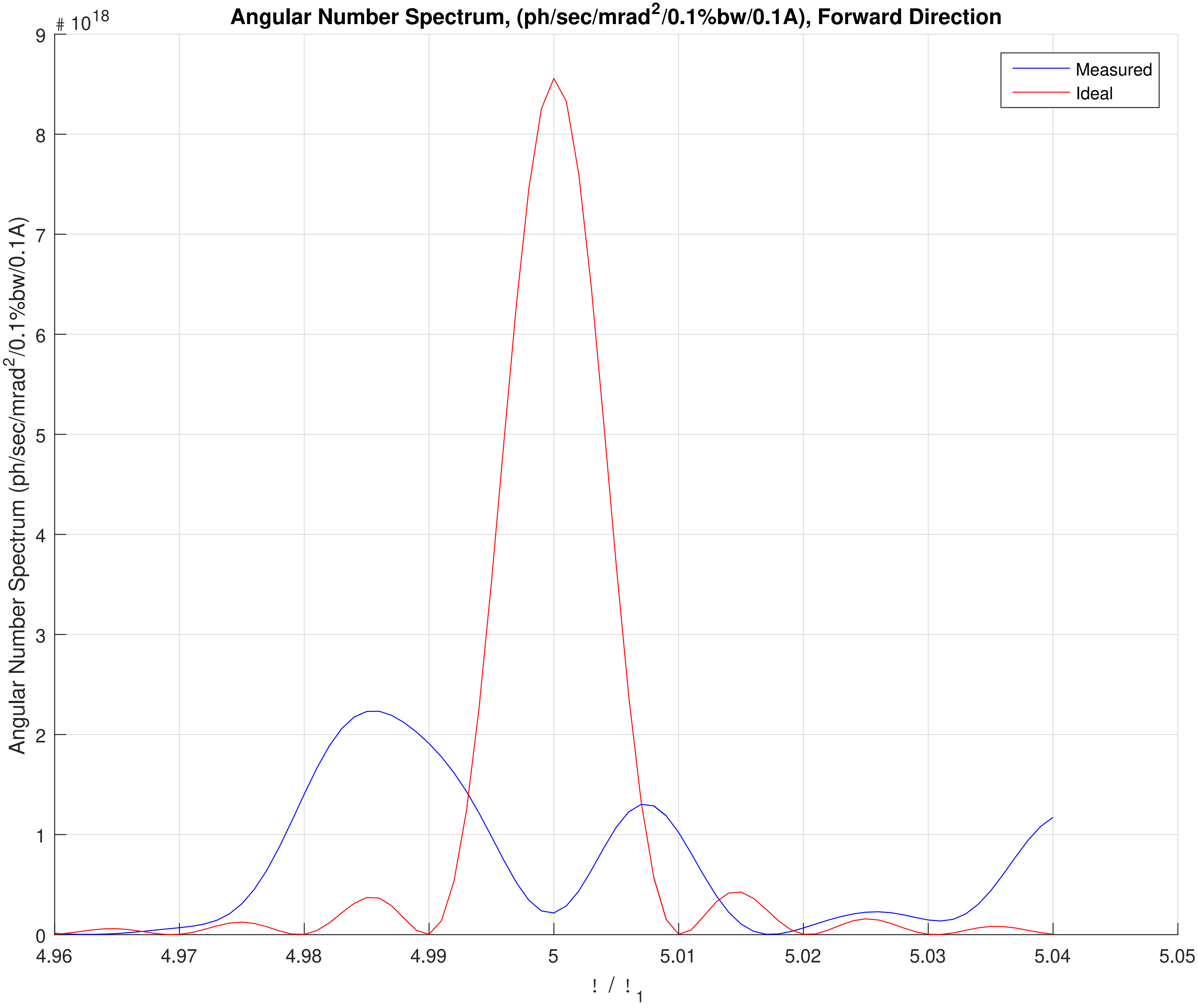
Re and Im Parts Of Ey(!), Forward Direction, ! = !$_1$




Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{18}
7
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)
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}
12
10
8
6
4
2
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}
9
8
7
6
5
4
3
2
1
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
! / !$_1$