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SLAC Magnetic Measurements

EPU Analysis
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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
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NUM-POLES =196
NUM-END-POLES =4
CELL-LENGTH =3.656
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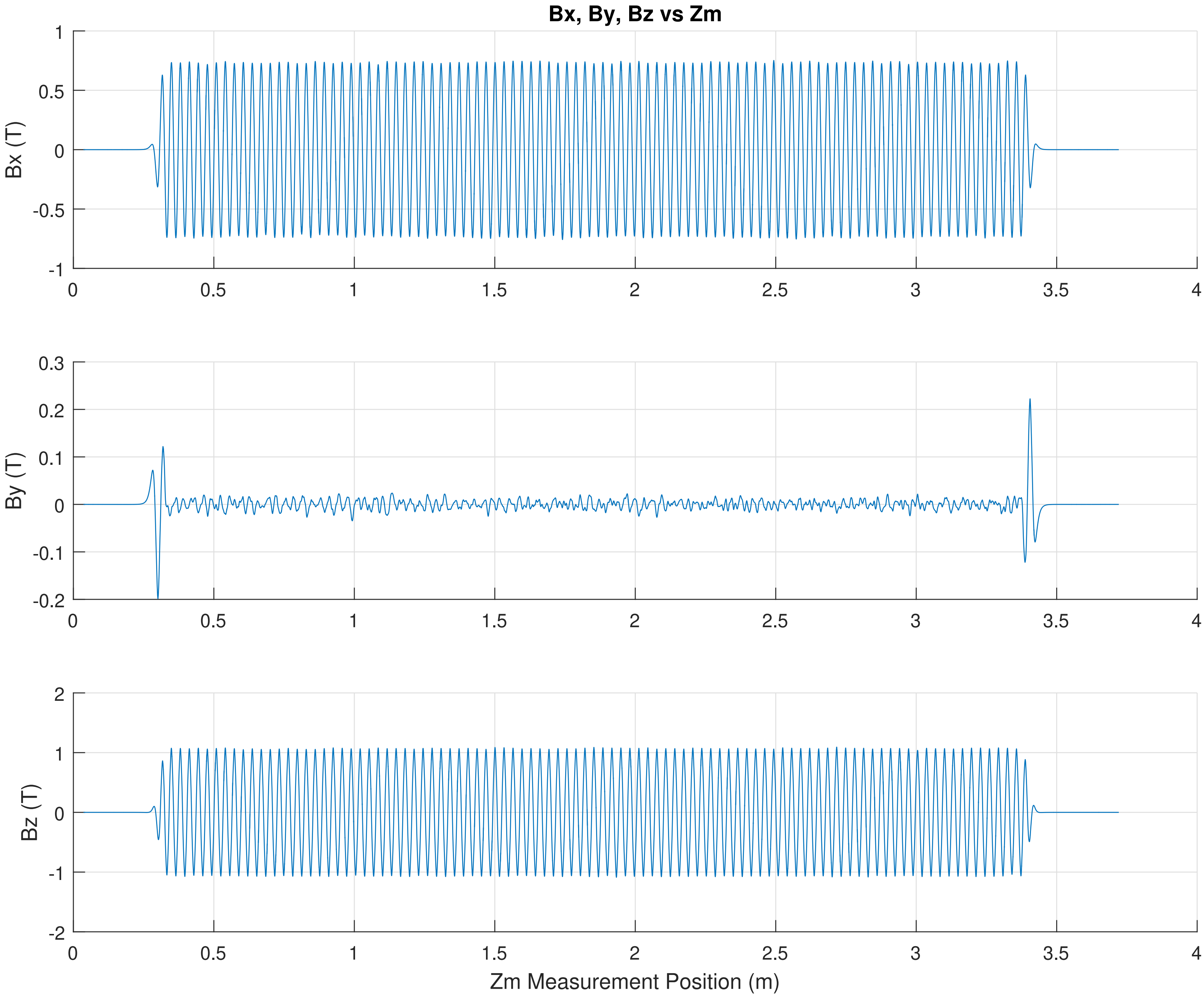
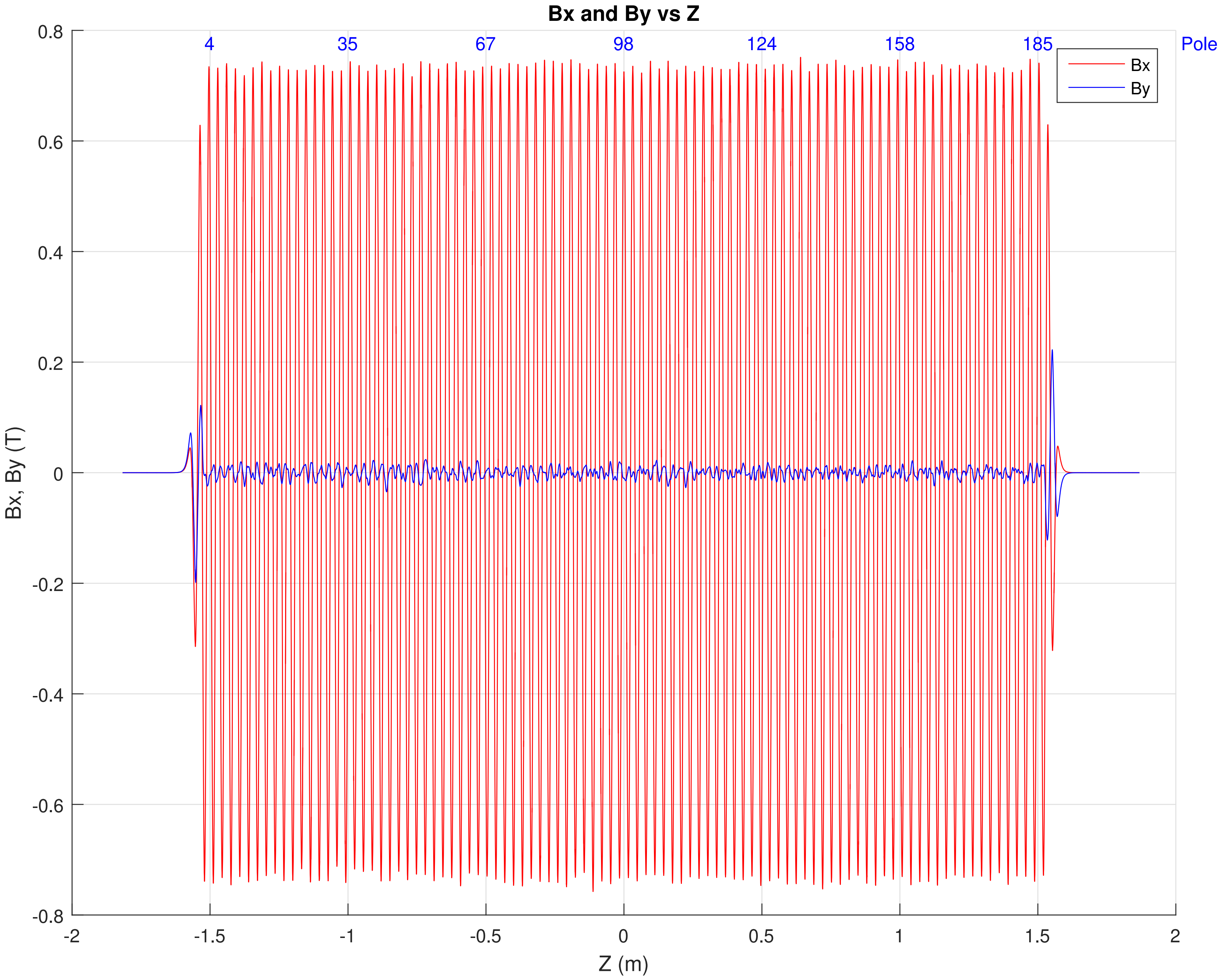
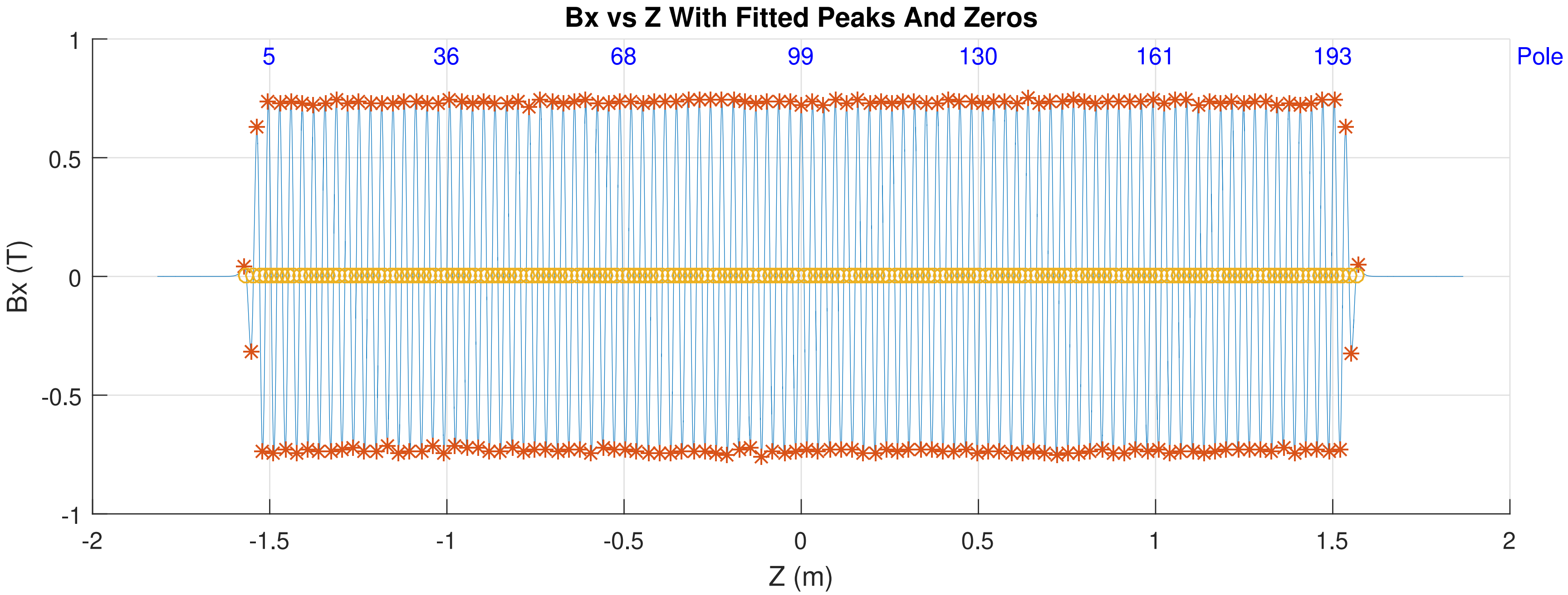
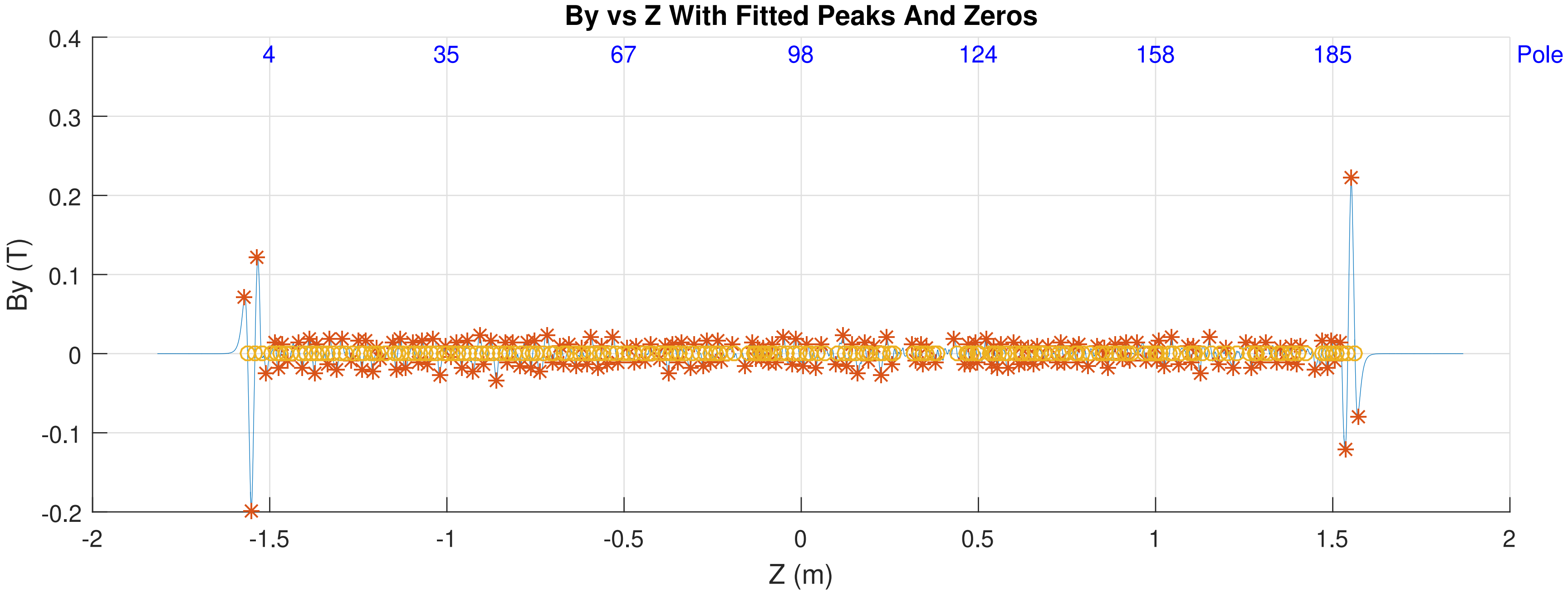
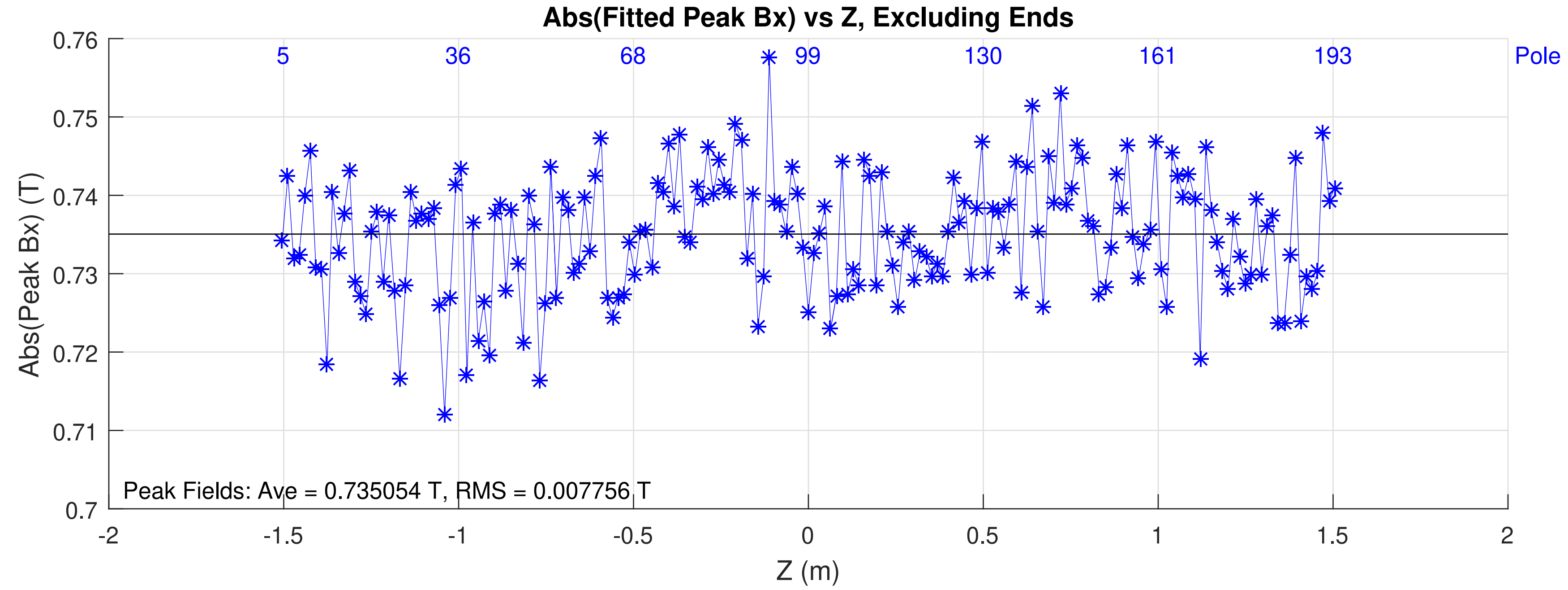
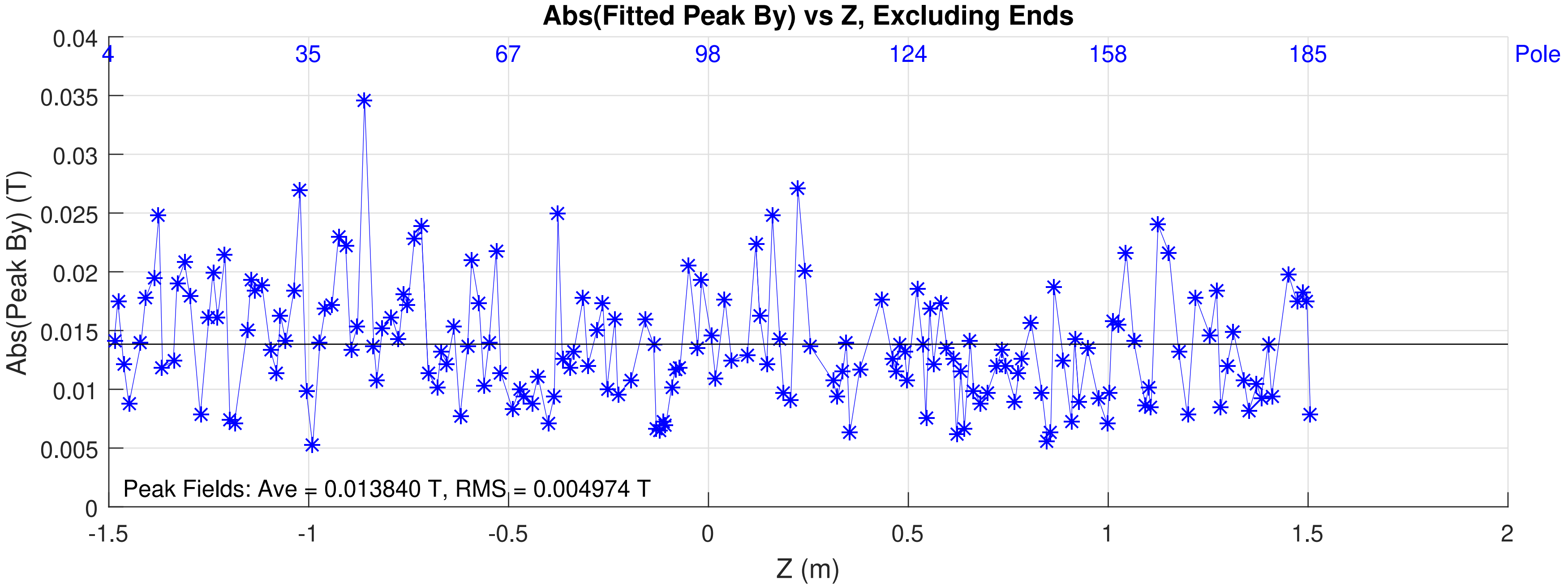

Bx, By, Bz vs Zm
Bx (T)
1
0.5
0
-0.5
-1
0
0.5
1
1.5
2
2.5
3
3.5
4
By (T)
0.3
0.2
0.1
0
-0.1
-0.2
0
0.5
1
1.5
2
2.5
3
3.5
4
Bz (T)
2
1
0
-1
-2
0
0.5
1
1.5
2
2.5
3
3.5
4
Zm Measurement Position (m)


Bx and By vs Z
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)
4
35
67
98
124
158
185
Pole
Bx
By

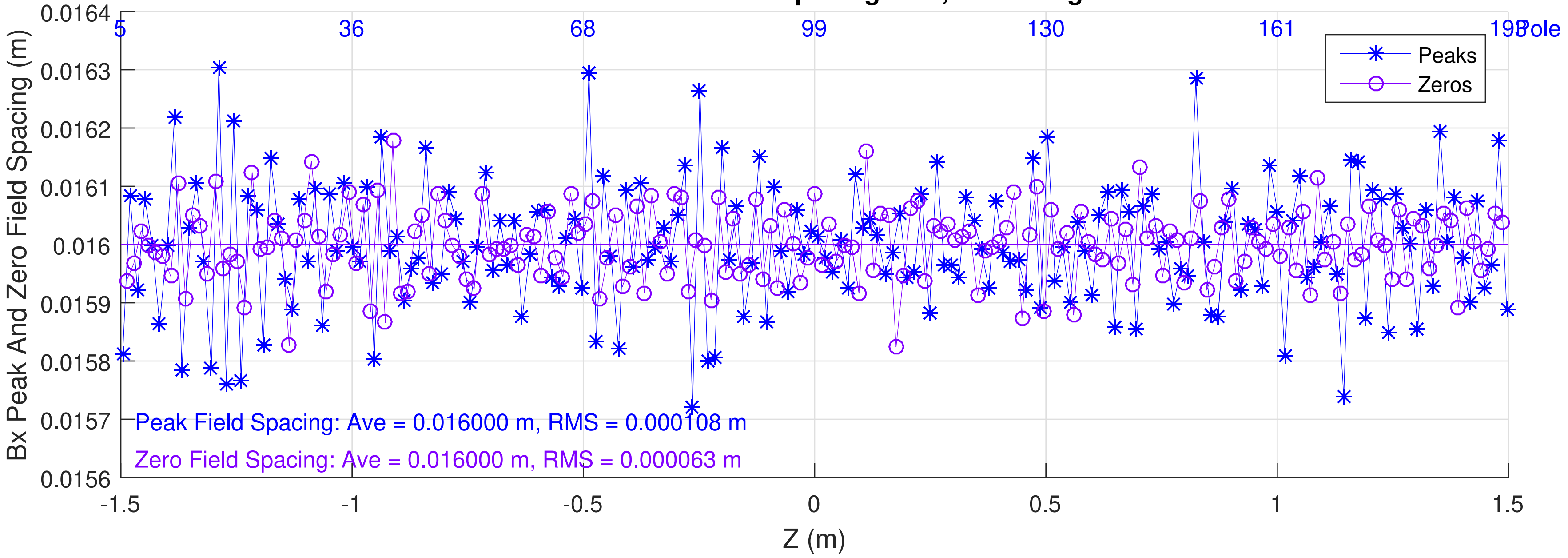

Bx vs Z With Fitted Peaks And Zeros


By vs Z With Fitted Peaks And Zeros

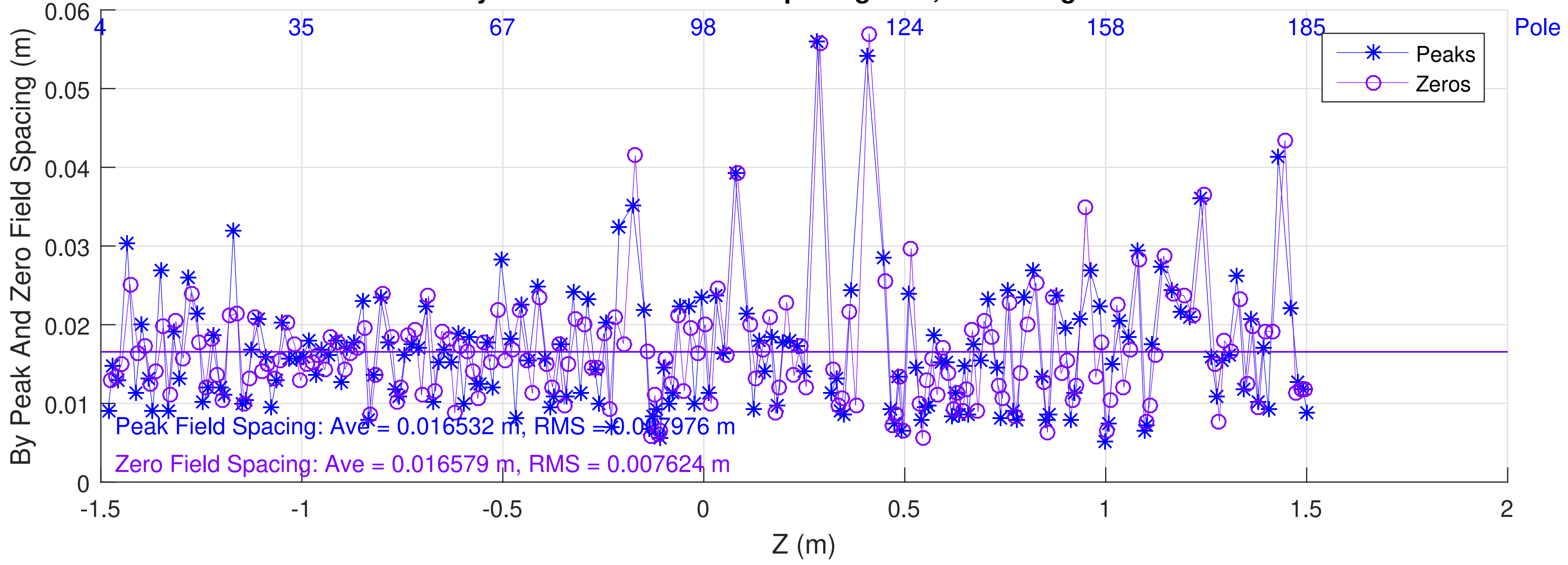

Abs(Fitted Peak Bx) vs Z, Excluding Ends
Abs(Peak Bx) (T)
0.76
0.75
0.74
0.73
0.72
0.71
0.7
5
36
68
99
130
161
193
Pole
Peak Fields: Ave = 0.735054 T, RMS = 0.007756 T
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

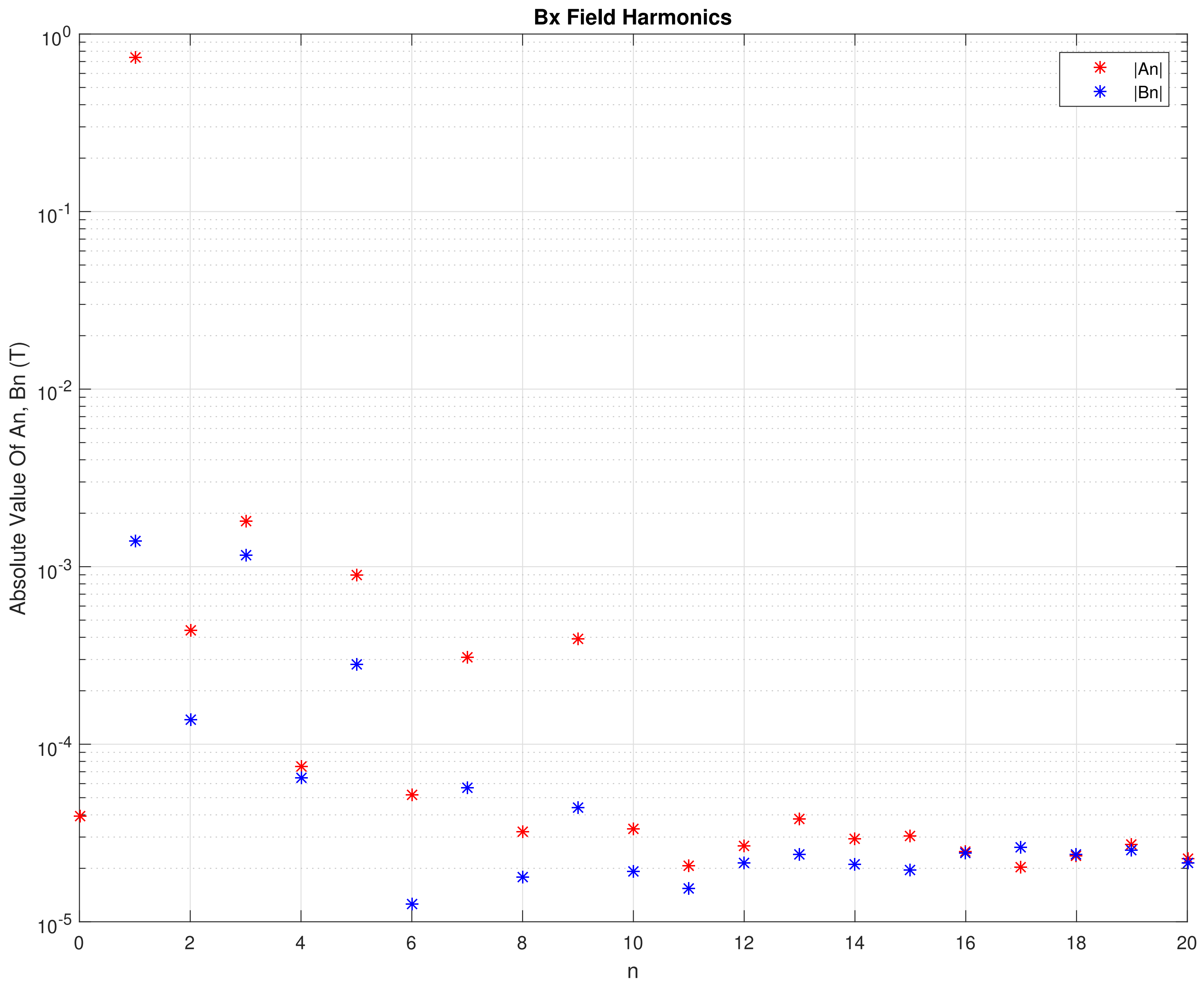

Abs(Fitted Peak By) vs Z, Excluding Ends
Abs(Peak By) (T)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
4
35
67
98
124
158
185
Pole
Peak Fields: Ave = 0.013840 T, RMS = 0.004974 T
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

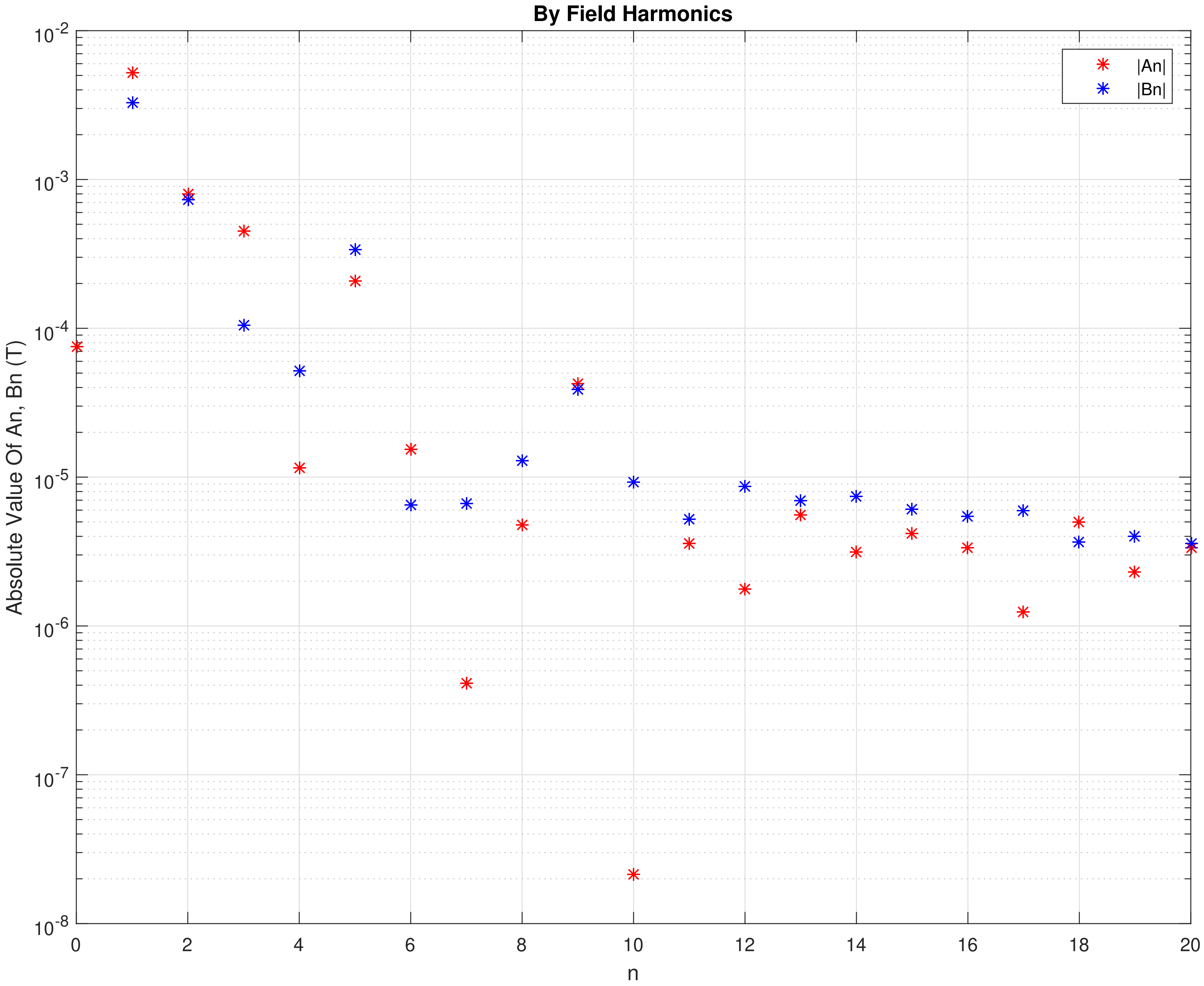
Bx Peak And Zero Field Spacing vs Z, Excluding Ends

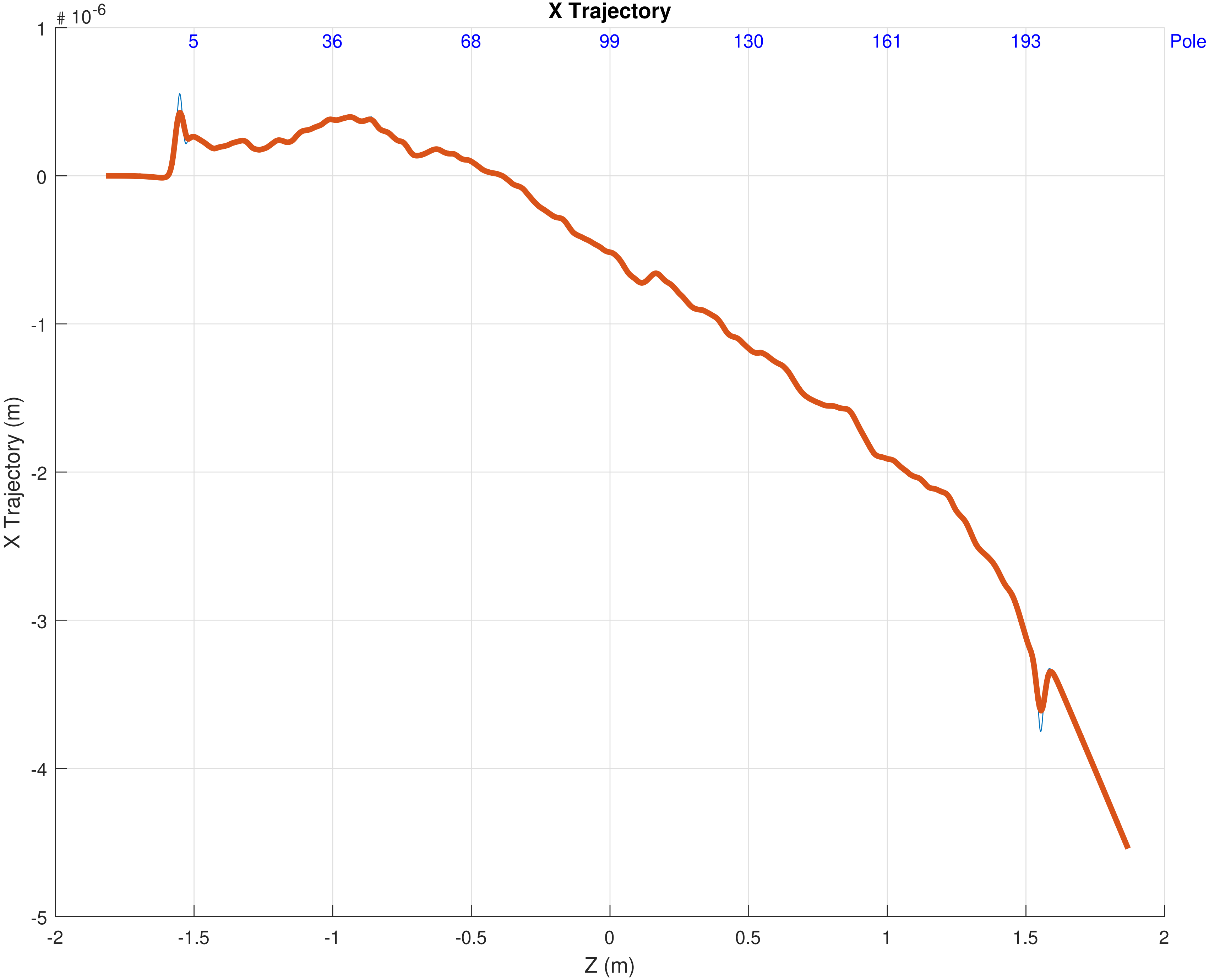


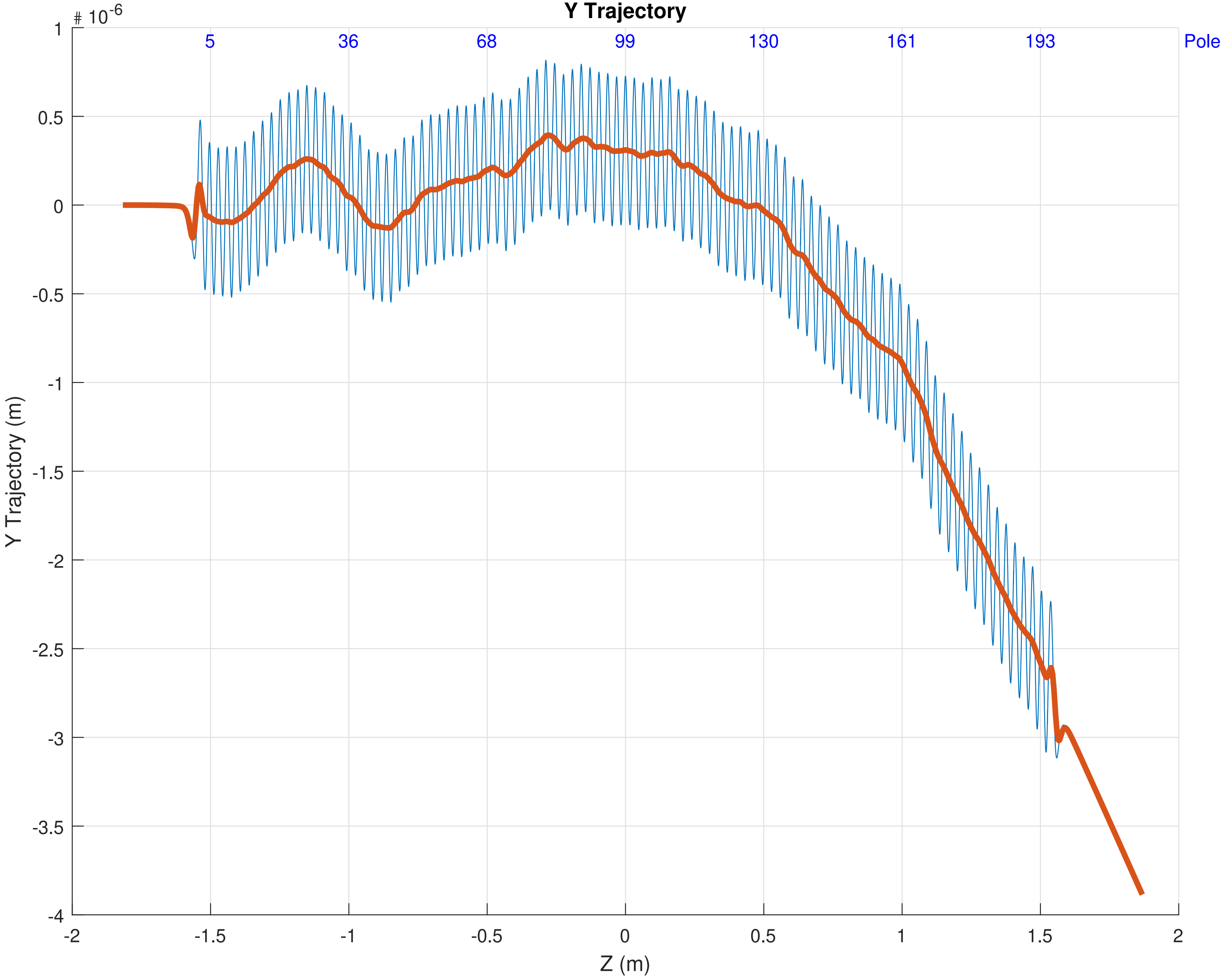
By Peak And Zero Field Spacing vs Z, Excluding Ends

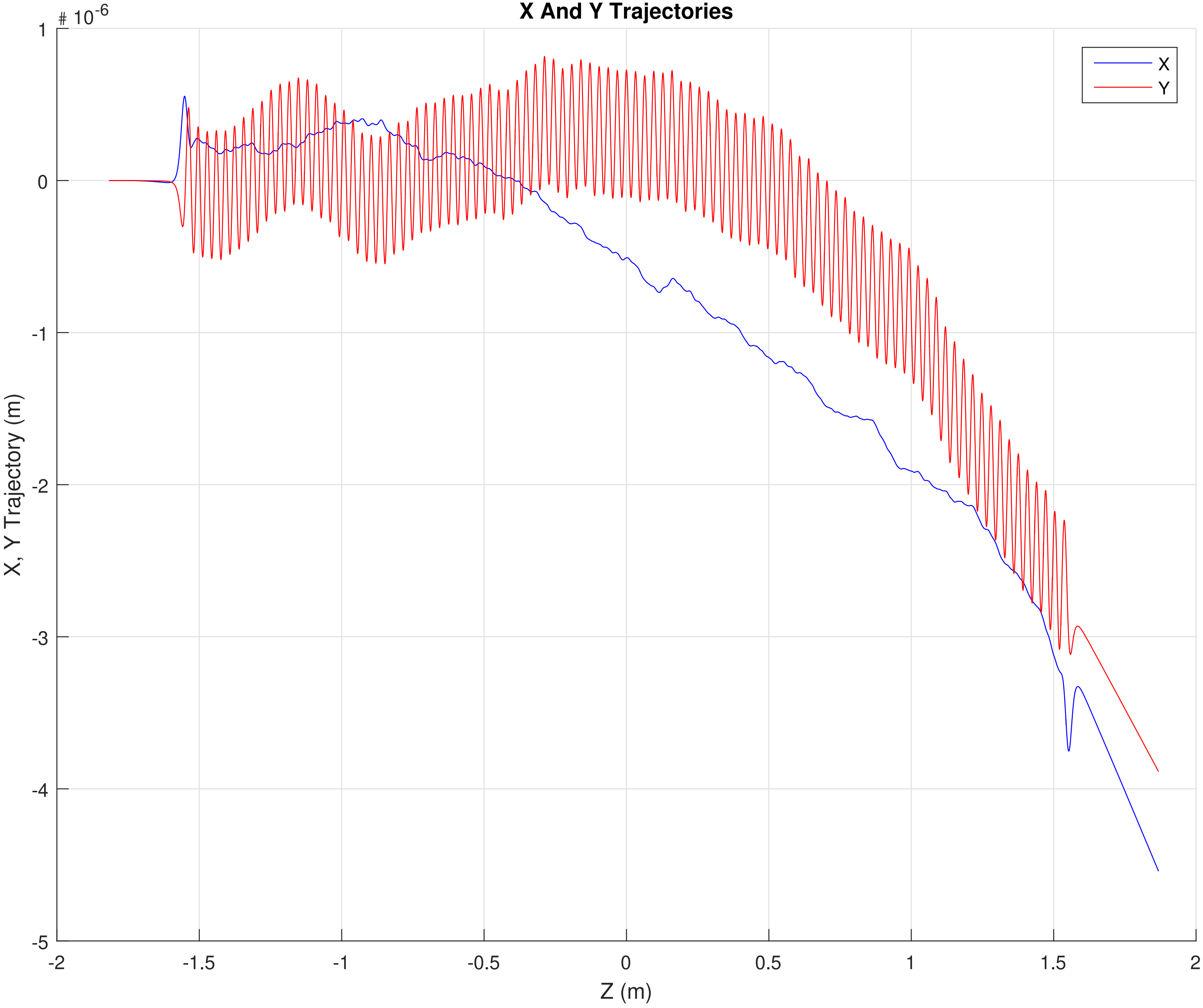


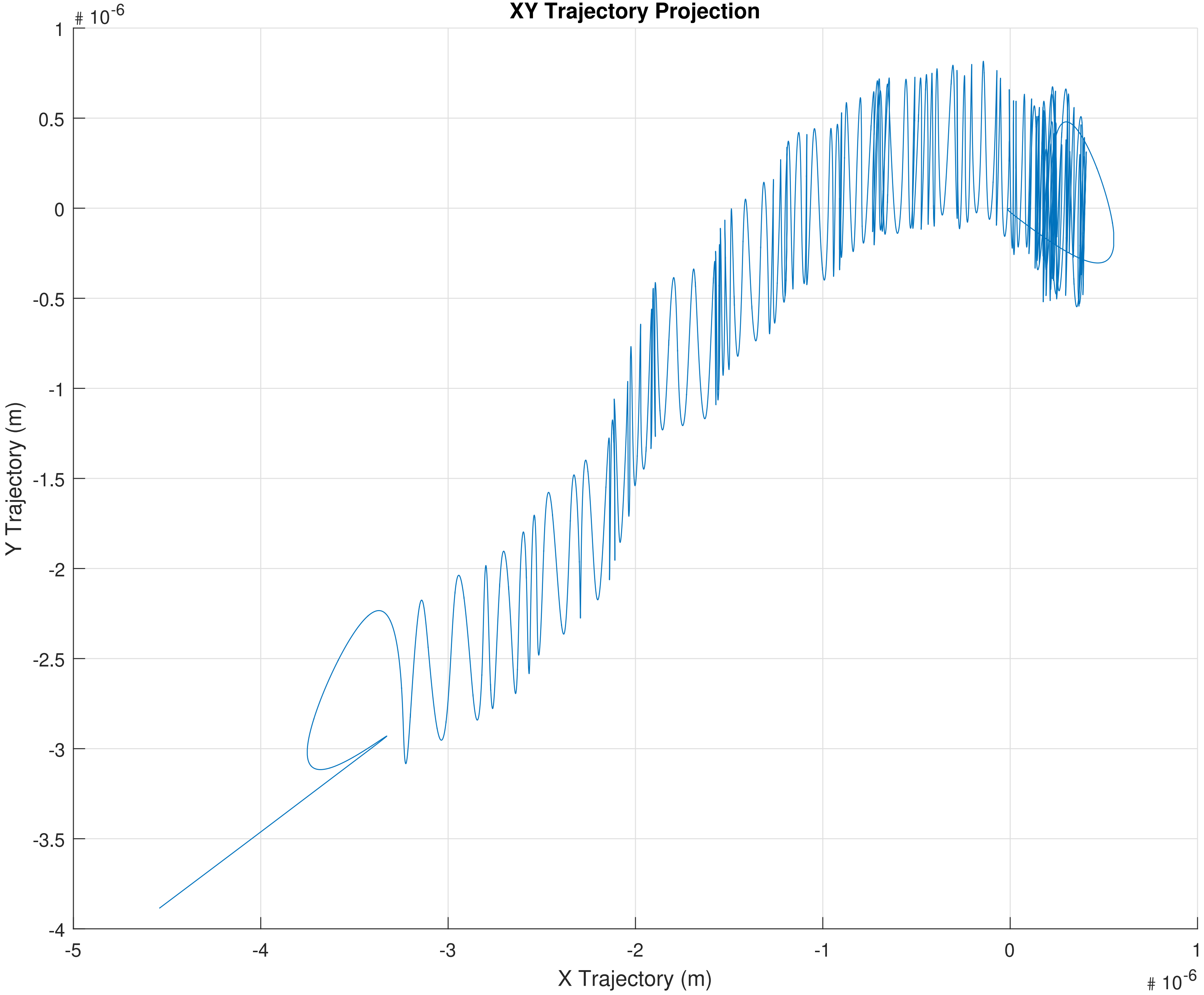

Bx Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
0
2
4
6
8
10
12
14
16
18
20
n

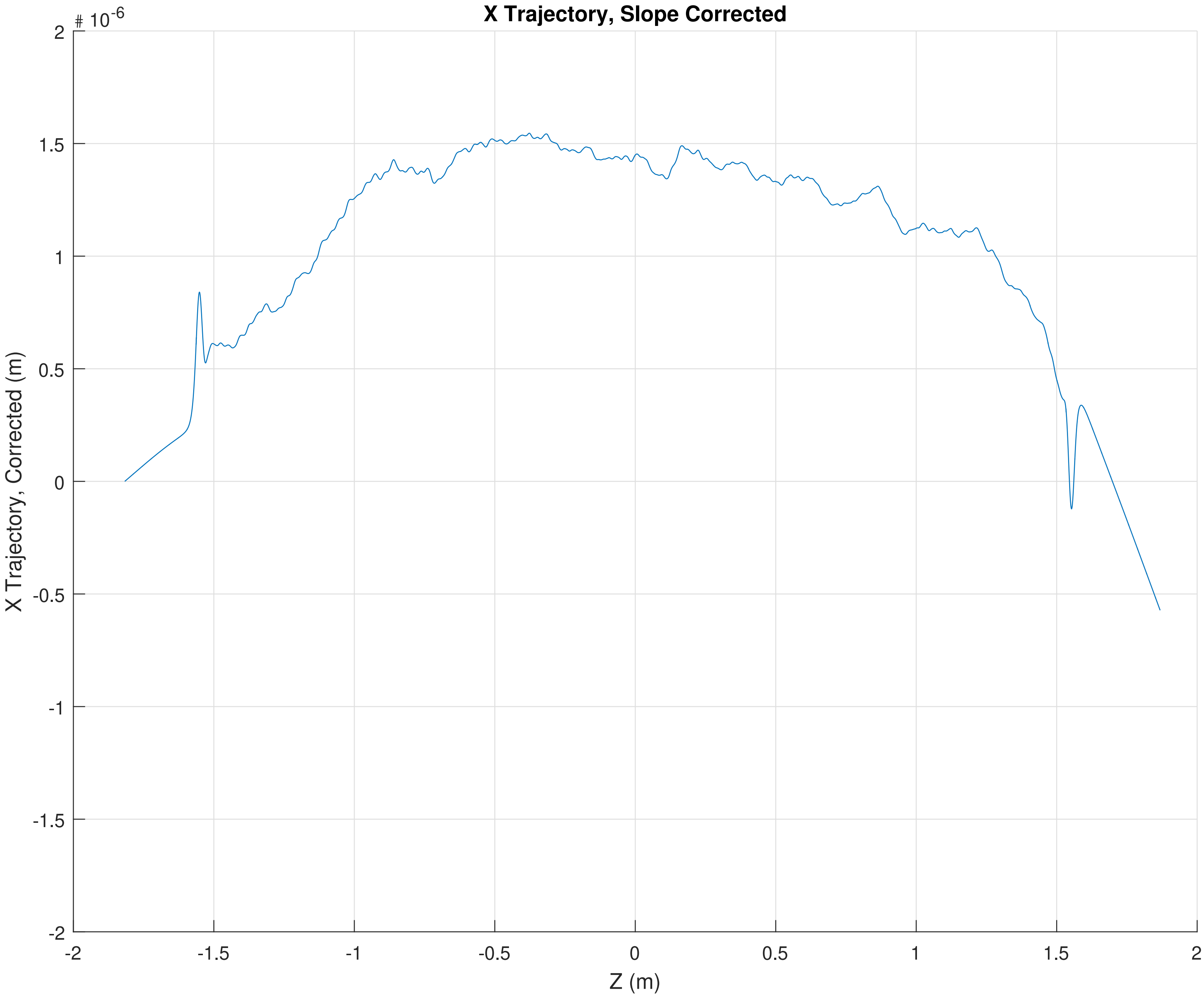

By Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
10^-2
10^-3
10^-4
10^-5
10^-6
10^-7
10^-8
0
2
4
6
8
10
12
14
16
18
20
n

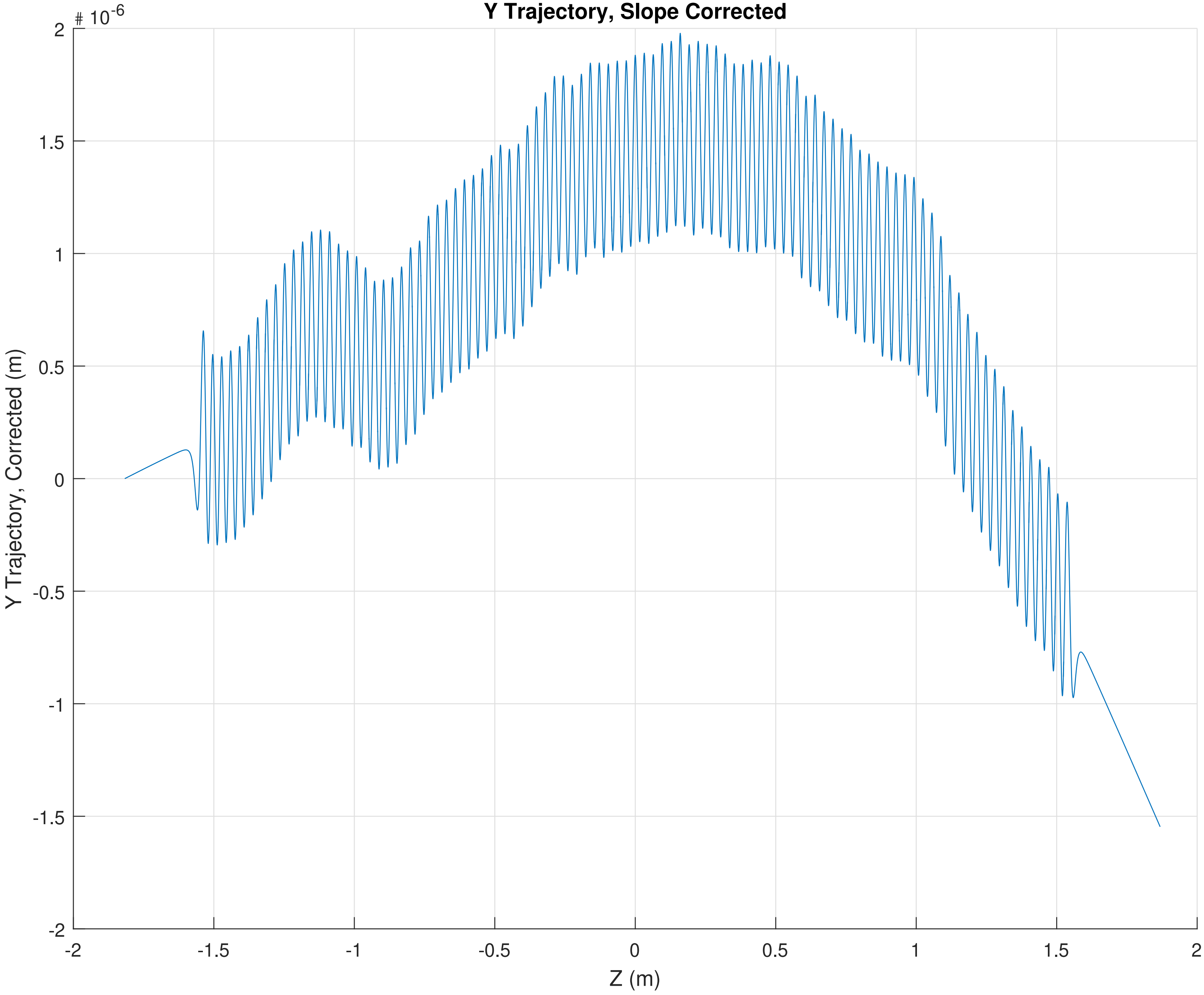

X Trajectory
10-6
1
0
-1
-2
-3
-4
-5
X Trajectory (m)
5
36
68
99
130
161
193
Pole
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

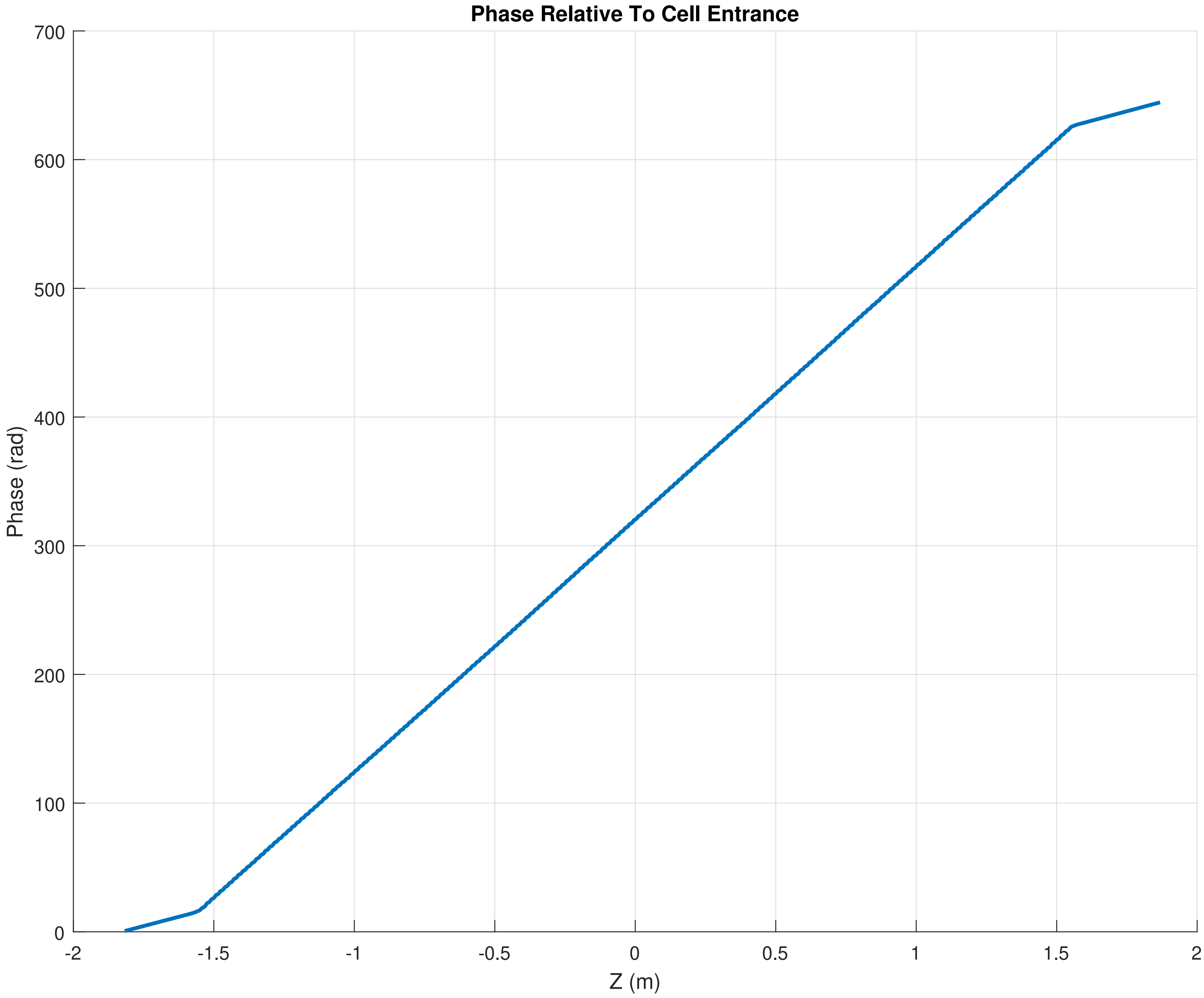

Y Trajectory
10^-6
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
-3.5
-4
5
36
68
99
130
161
193
Pole
Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

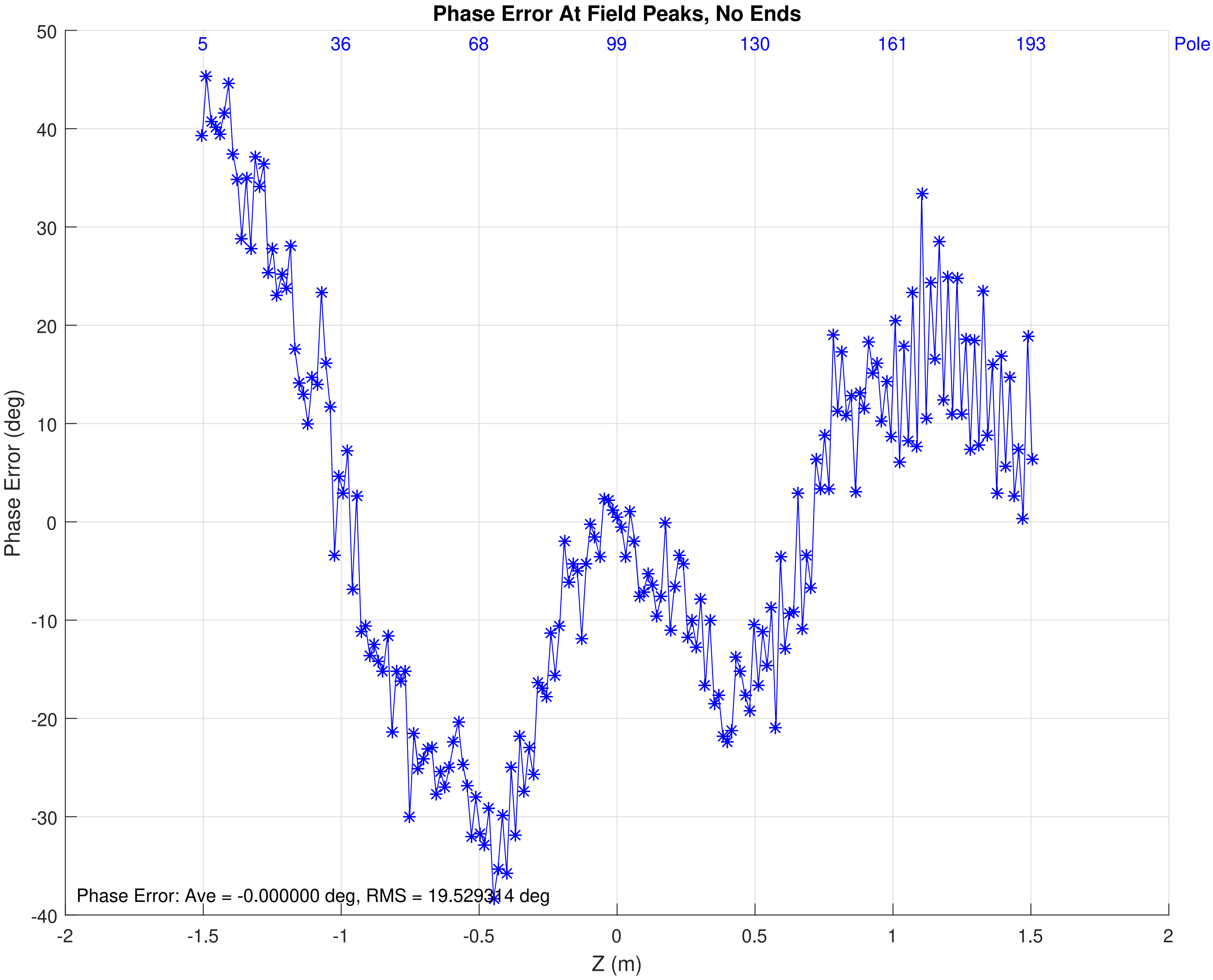

X And Y Trajectories
10-6
1
0
-1
-2
-3
-4
-5
X, Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
X
Y

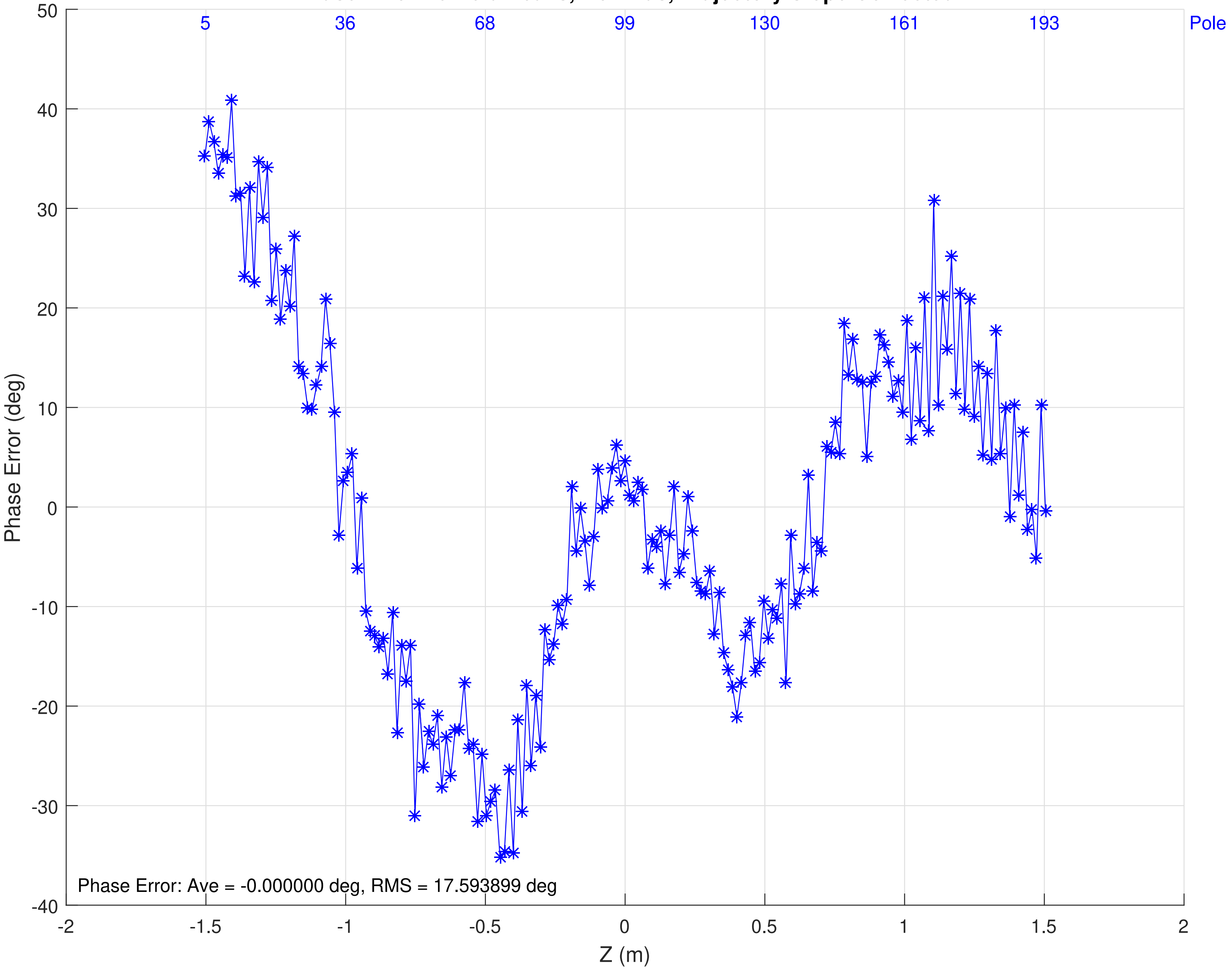

XY Trajectory Projection
10-6
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
-3.5
-4
Y Trajectory (m)
-5
-4
-3
-2
-1
0
1
X Trajectory (m)
10-6


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)

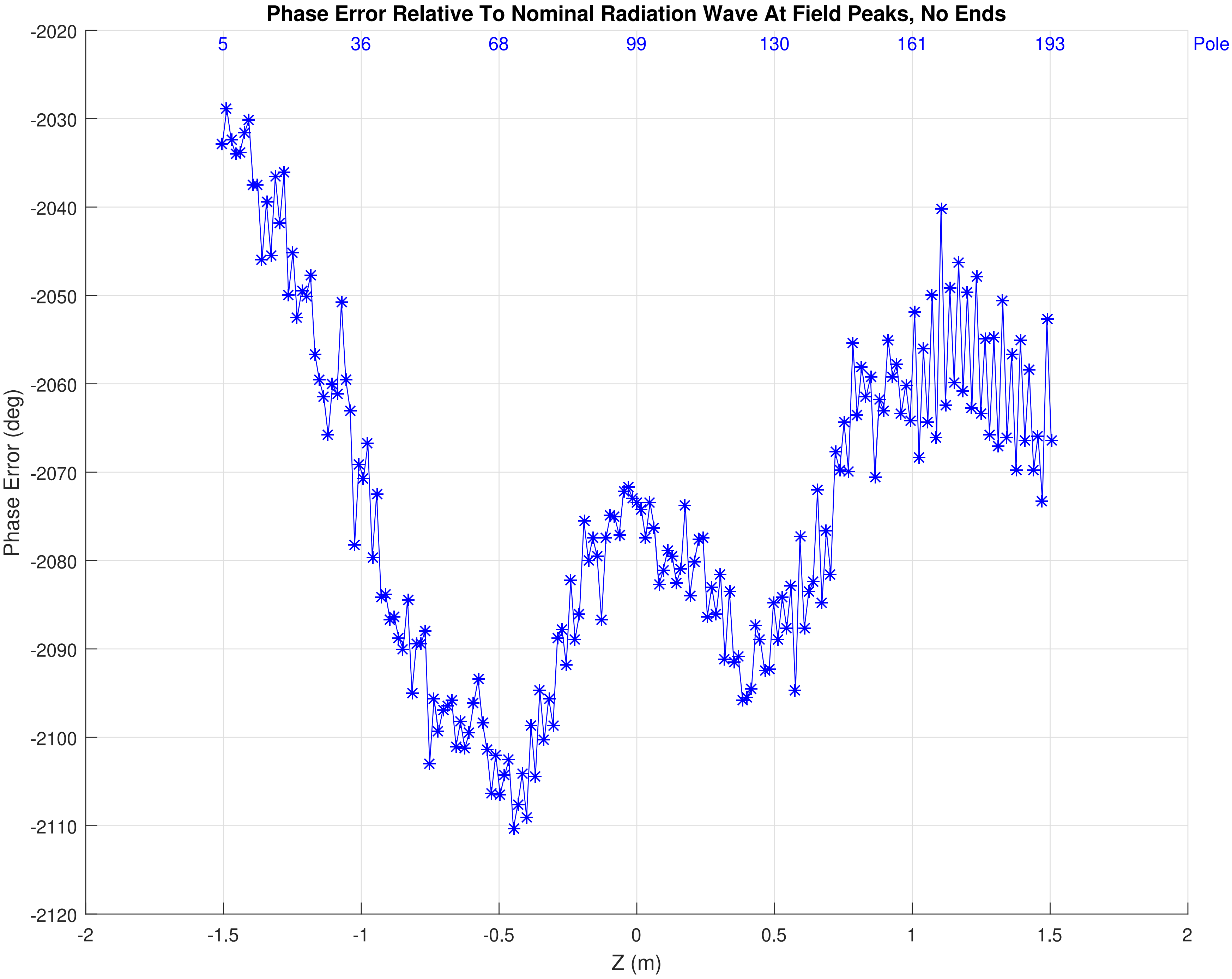

Y Trajectory, Slope Corrected
10-6
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
Y Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

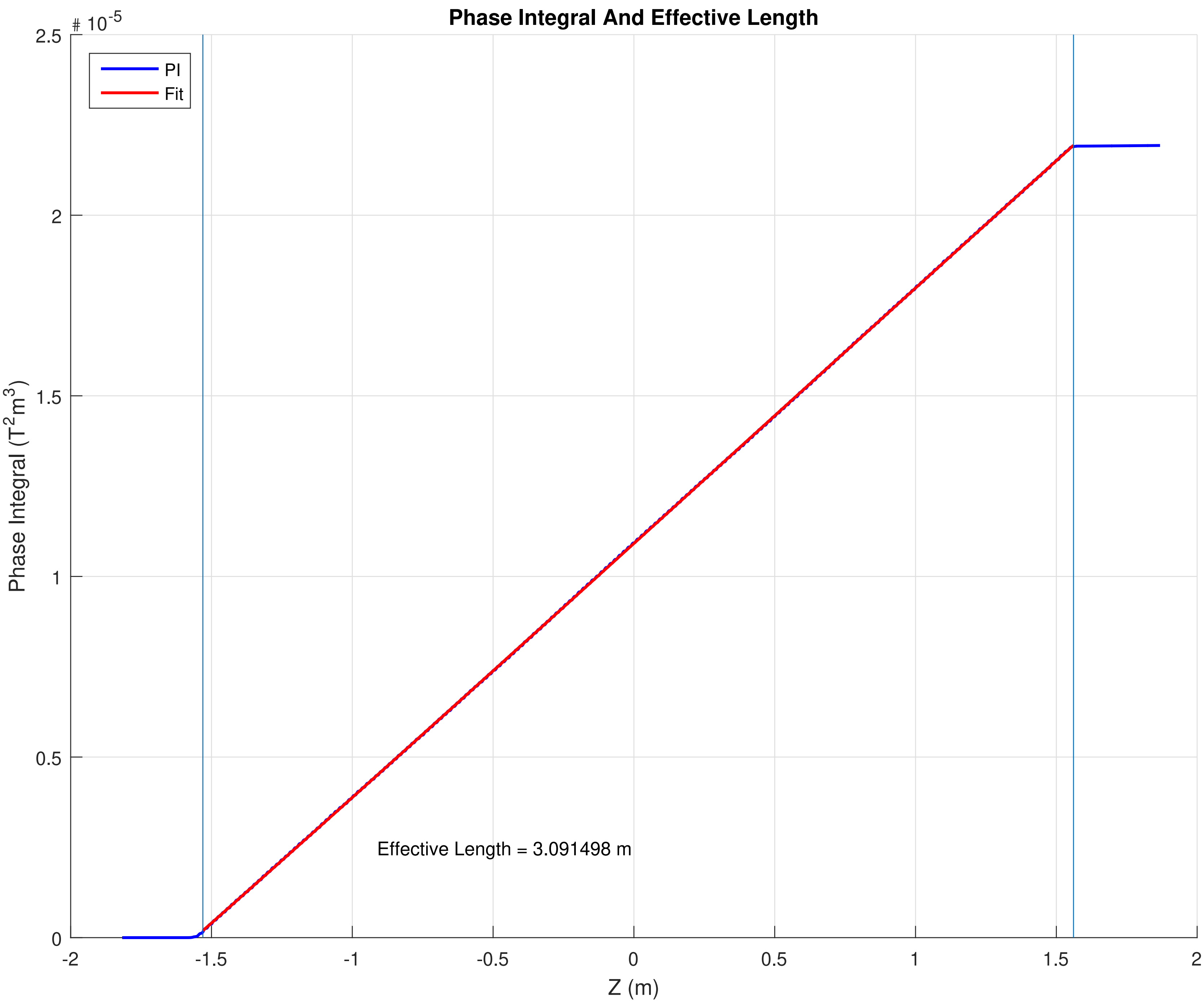

Phase Relative To Cell Entrance
Phase (rad)
700
600
500
400
300
200
100
0
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)


Phase Error At Field Peaks, No Ends
5
36
68
99
130
161
193
Pole
50
40
30
20
10
0
-10
-20
-30
-40
Phase Error (deg)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
Phase Error: Ave = -0.000000 deg, RMS = 19.529314 deg

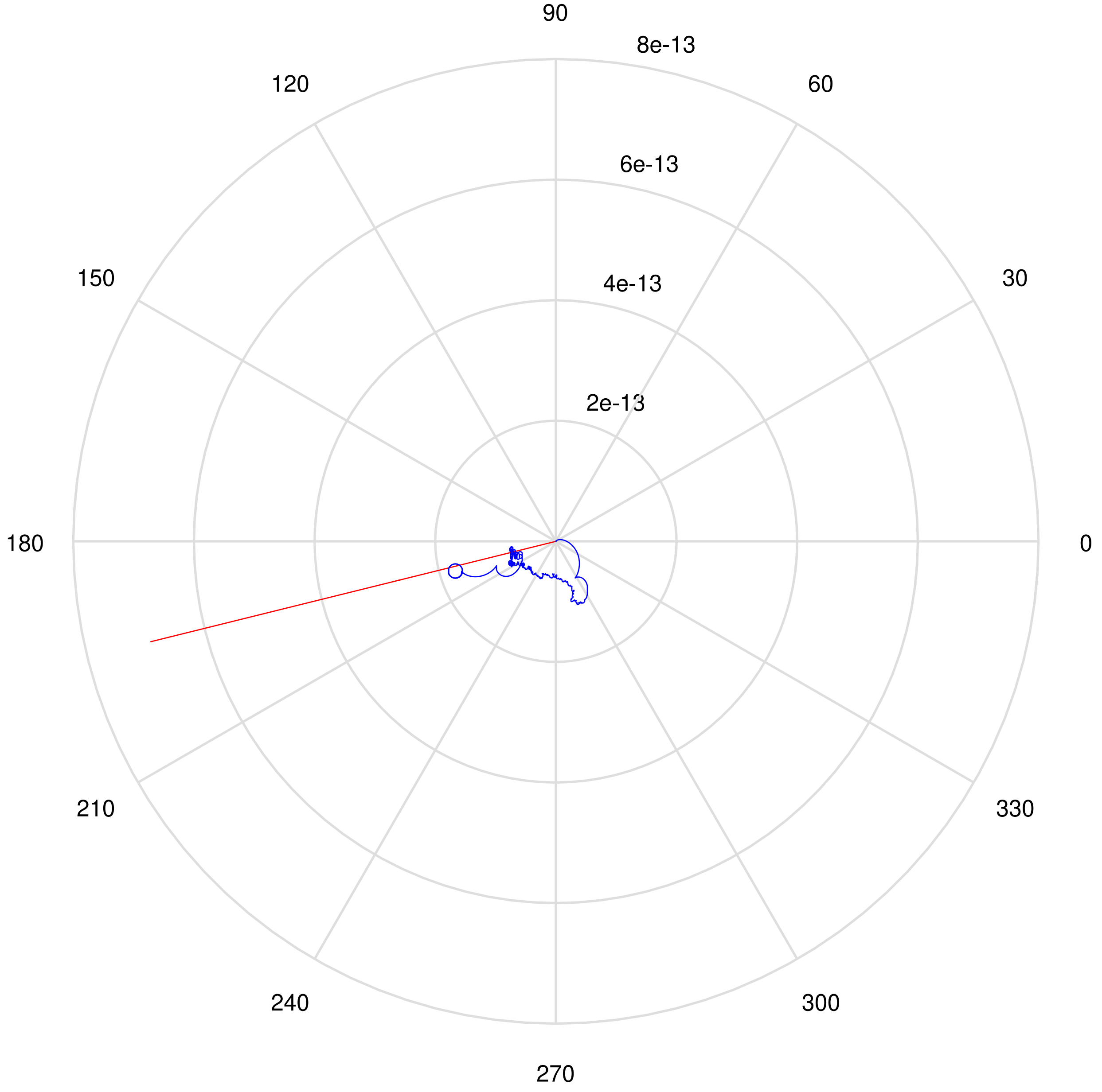


Phase Error At Field Peaks, No Ends, Trajectory Slope Corrected

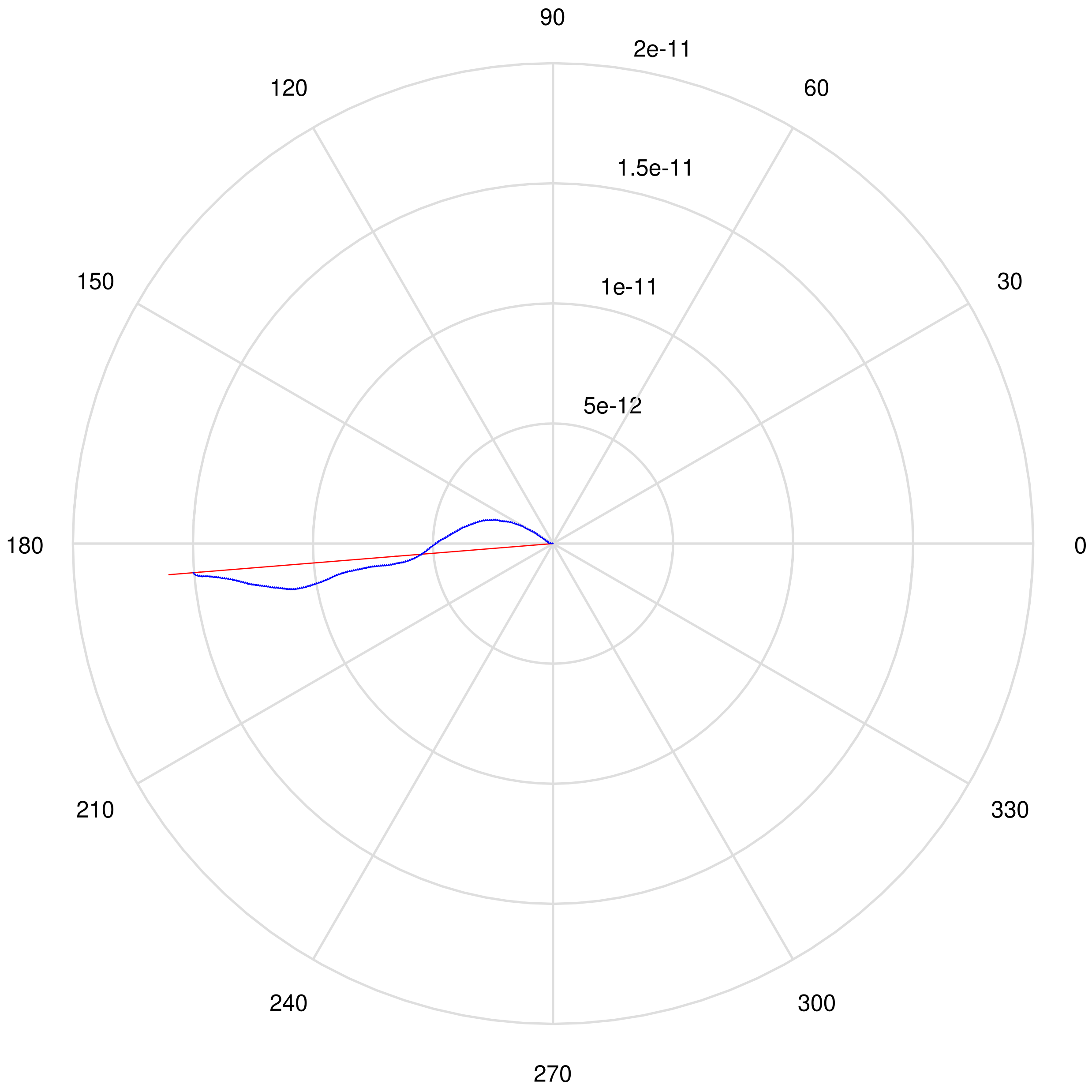

Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
Phase Error (deg)
-2020
-2030
-2040
-2050
-2060
-2070
-2080
-2090
-2100
-2110
-2120
Z (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
5
36
68
99
130
161
193
Pole

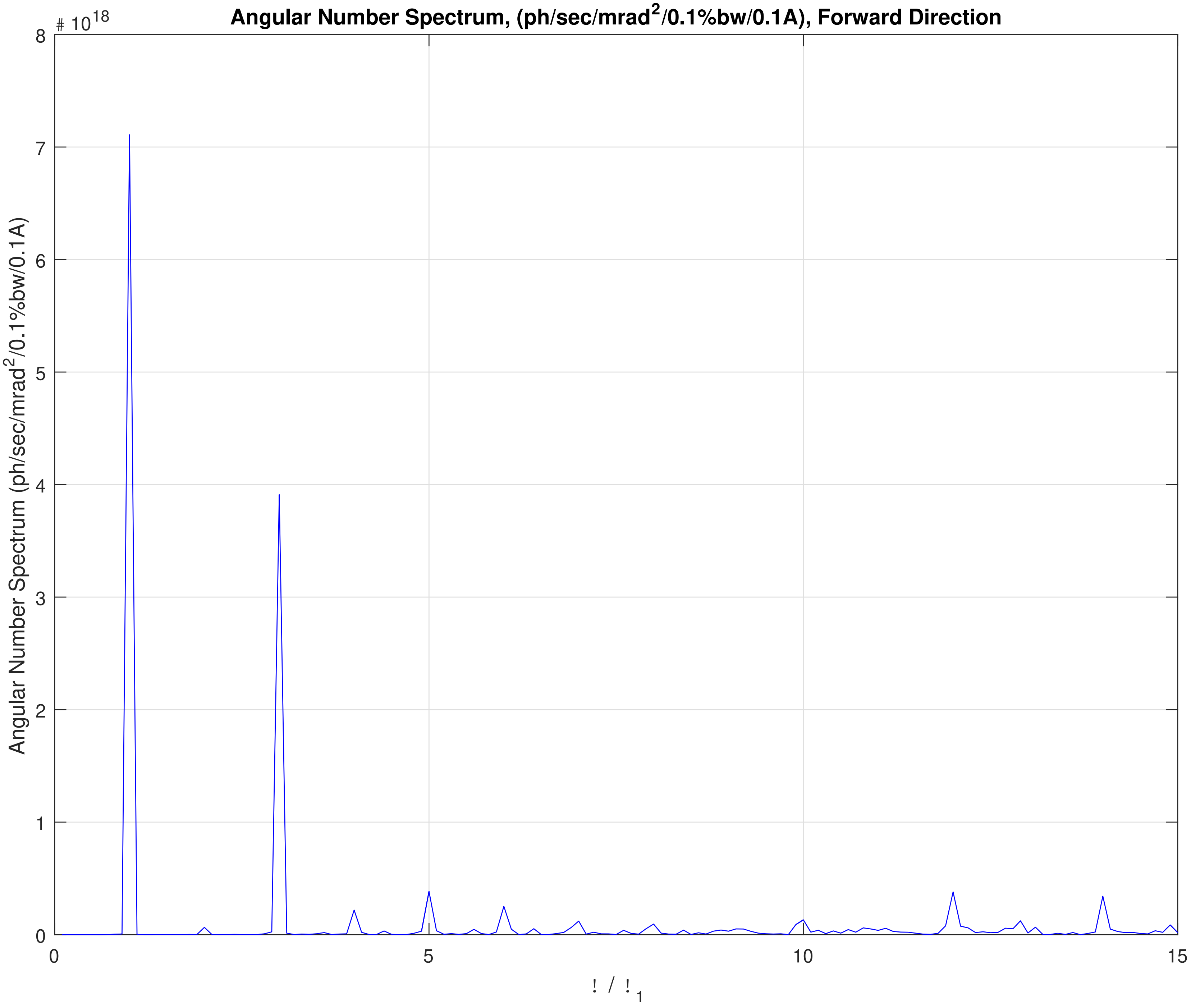

Phase Integral And Effective Length
10^-5
2.5
2
1.5
1
0.5
0
Phase Integral (T^2m^3)
PI
Fit
Effective Length = 3.091498 m
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

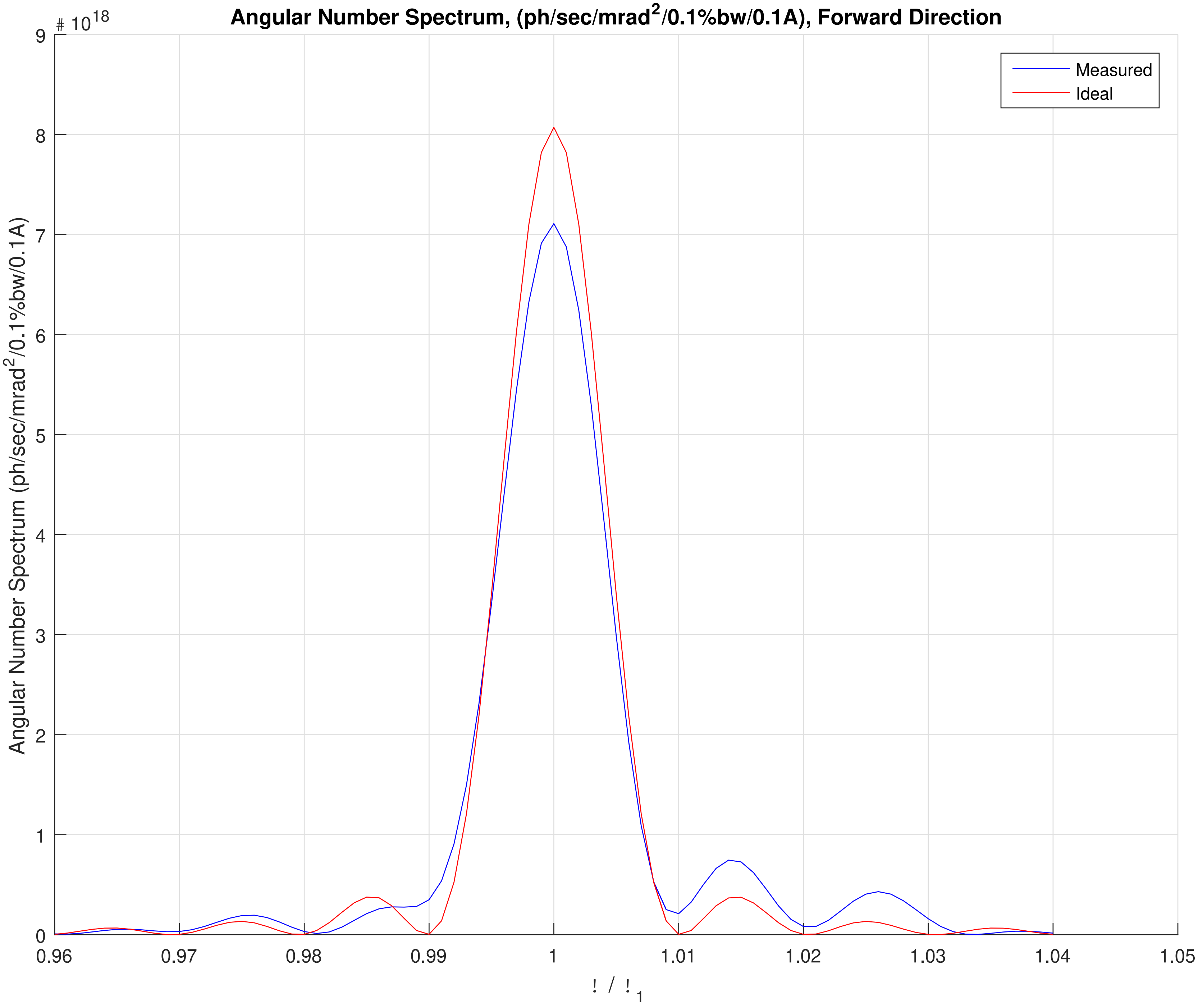
Re and Im Parts Of Ex(!), Forward Direction, ! = !$_1$

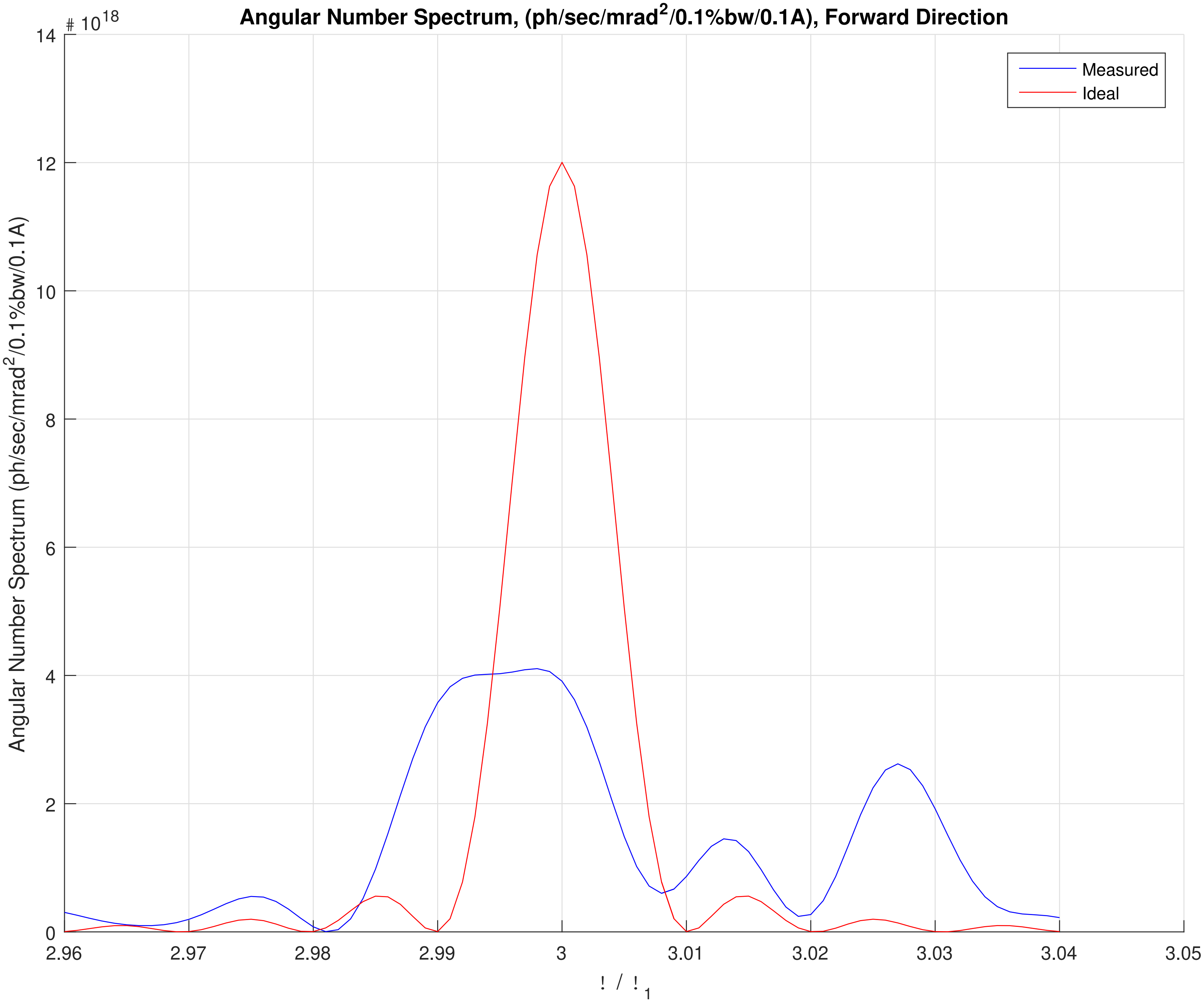


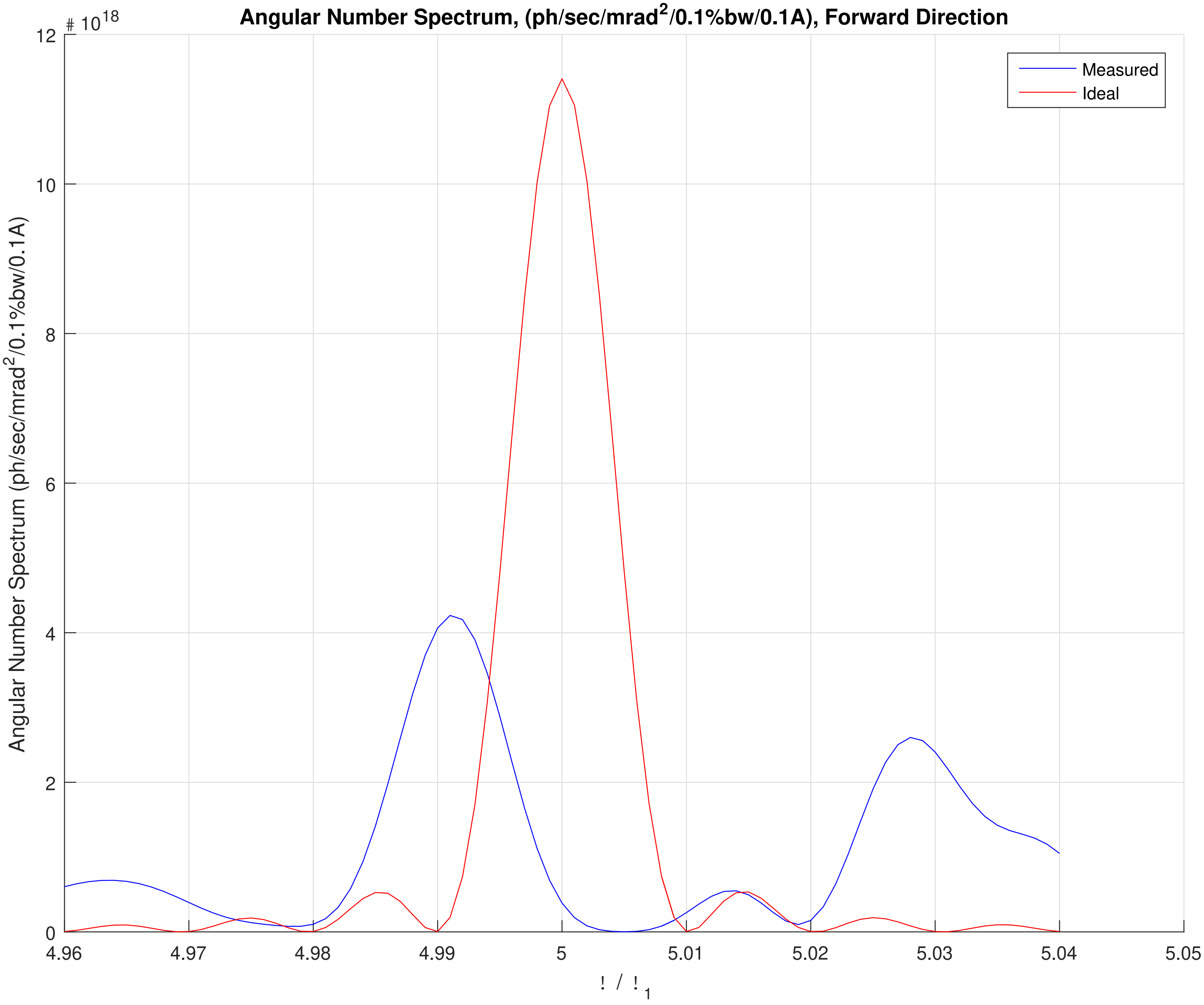
Re and Im Parts Of Ey(!), Forward Direction, ! = $!_1$




Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{18}
8
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/mrad2/0.1%bw/0.1A), Forward Direction
10 18
14
12
10
8
6
4
2
0
Angular Number Spectrum (ph/sec/mrad2/0.1%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}
12
10
8
6
4
2
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