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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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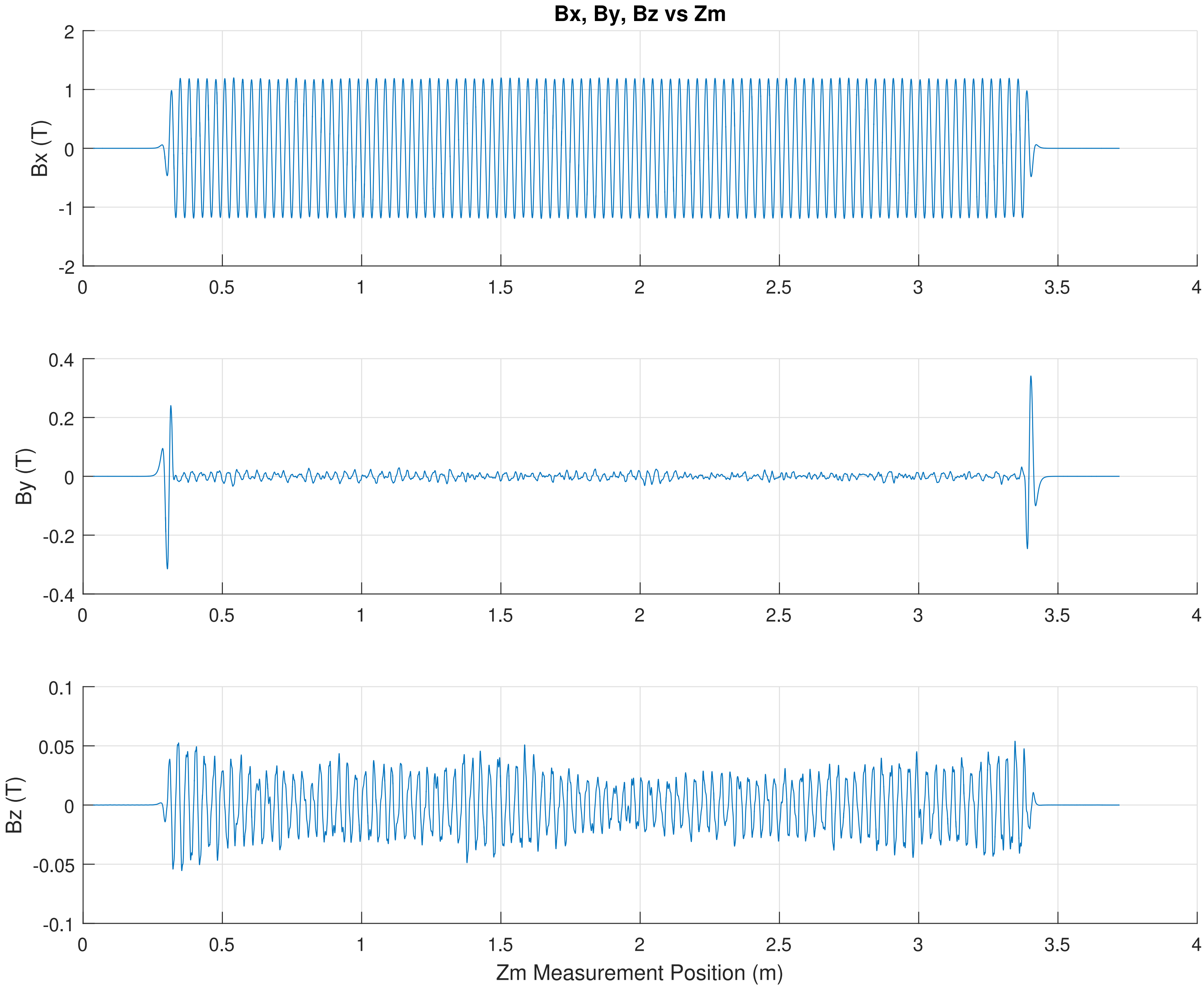
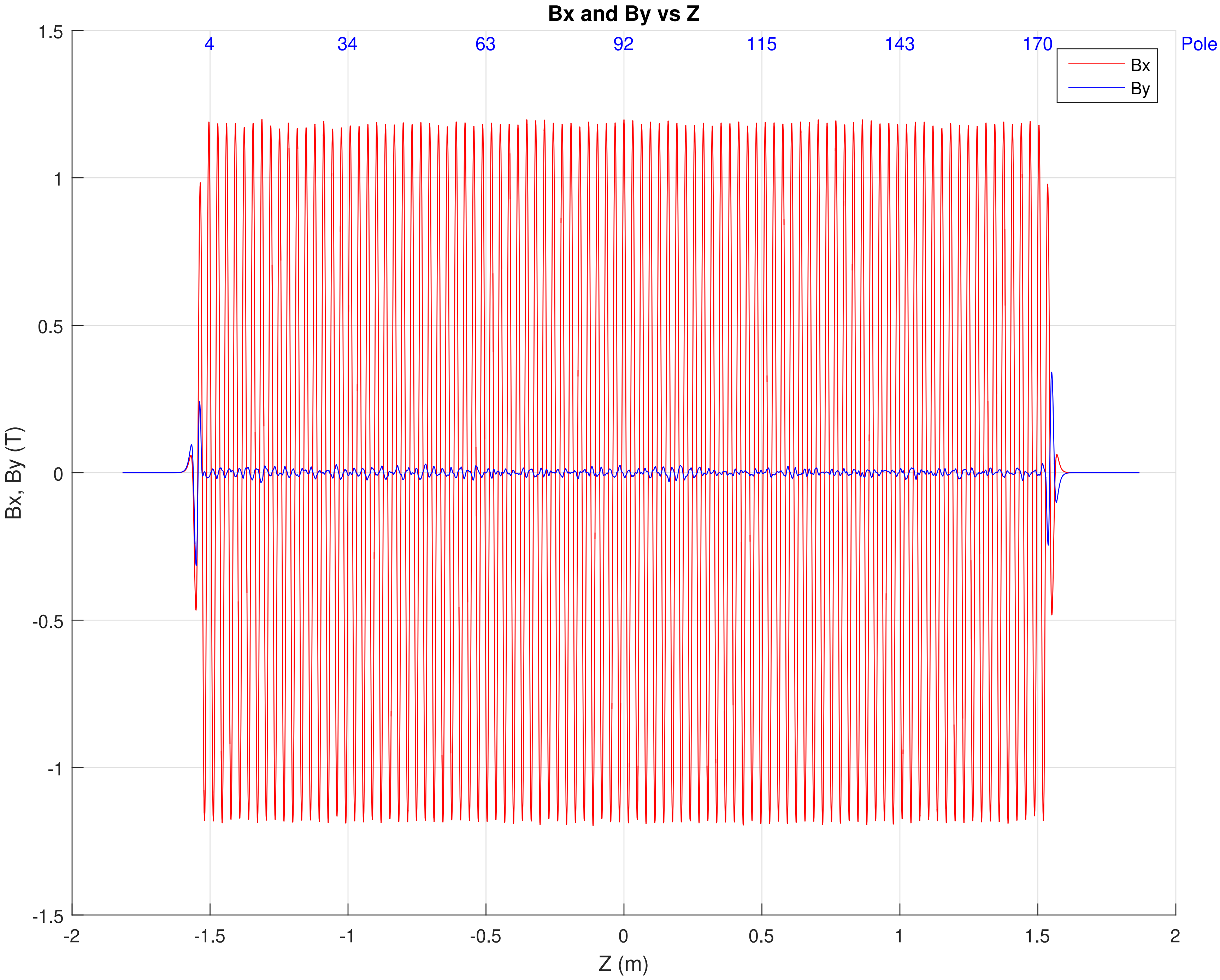
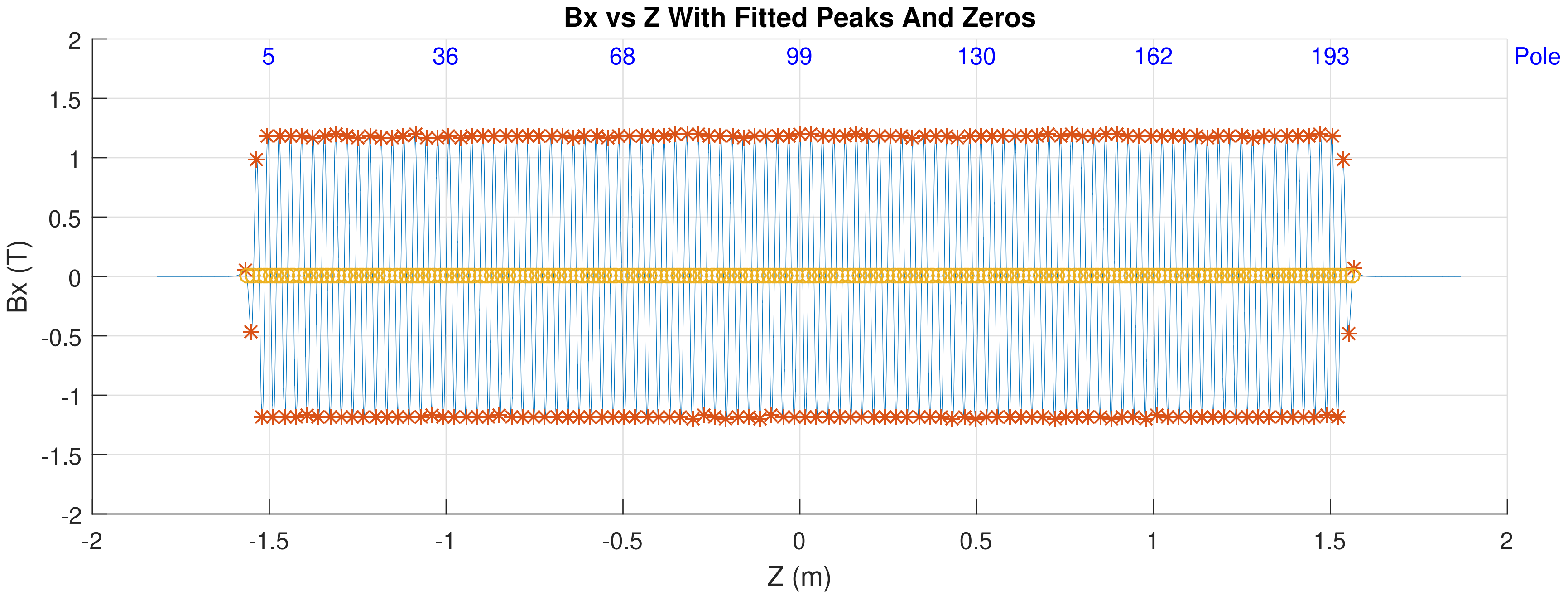
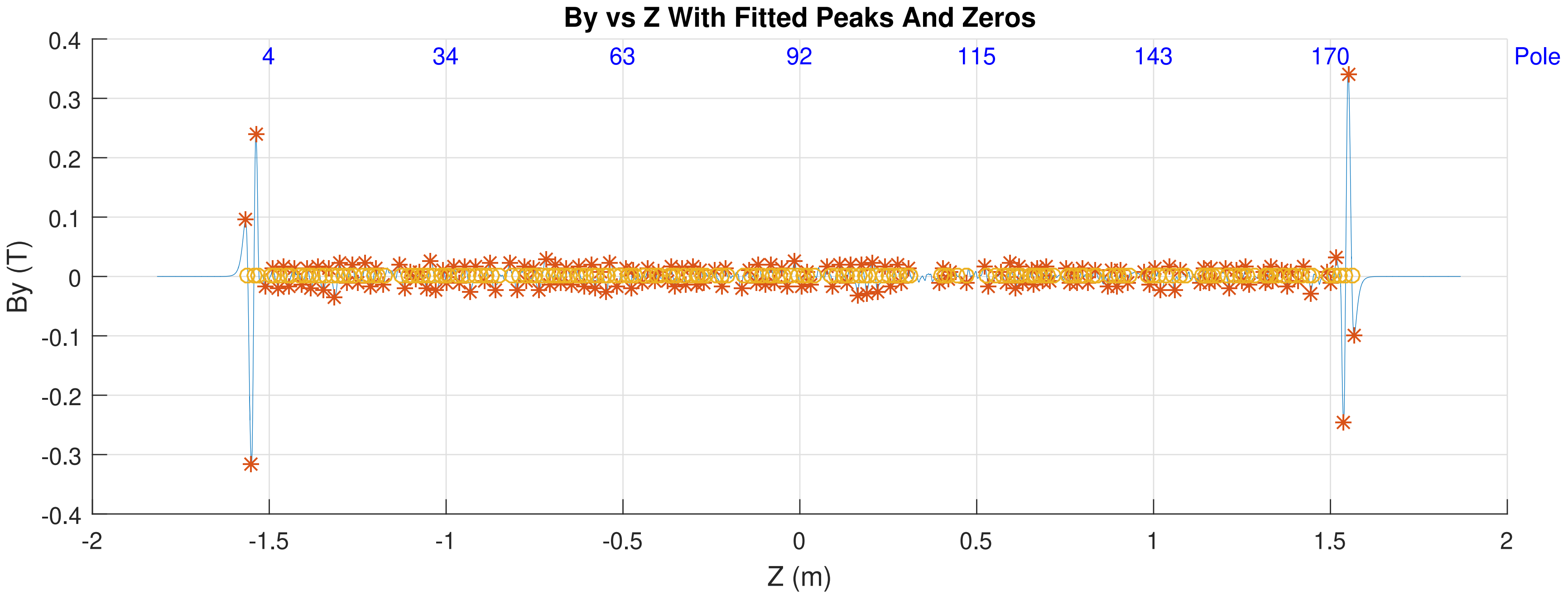
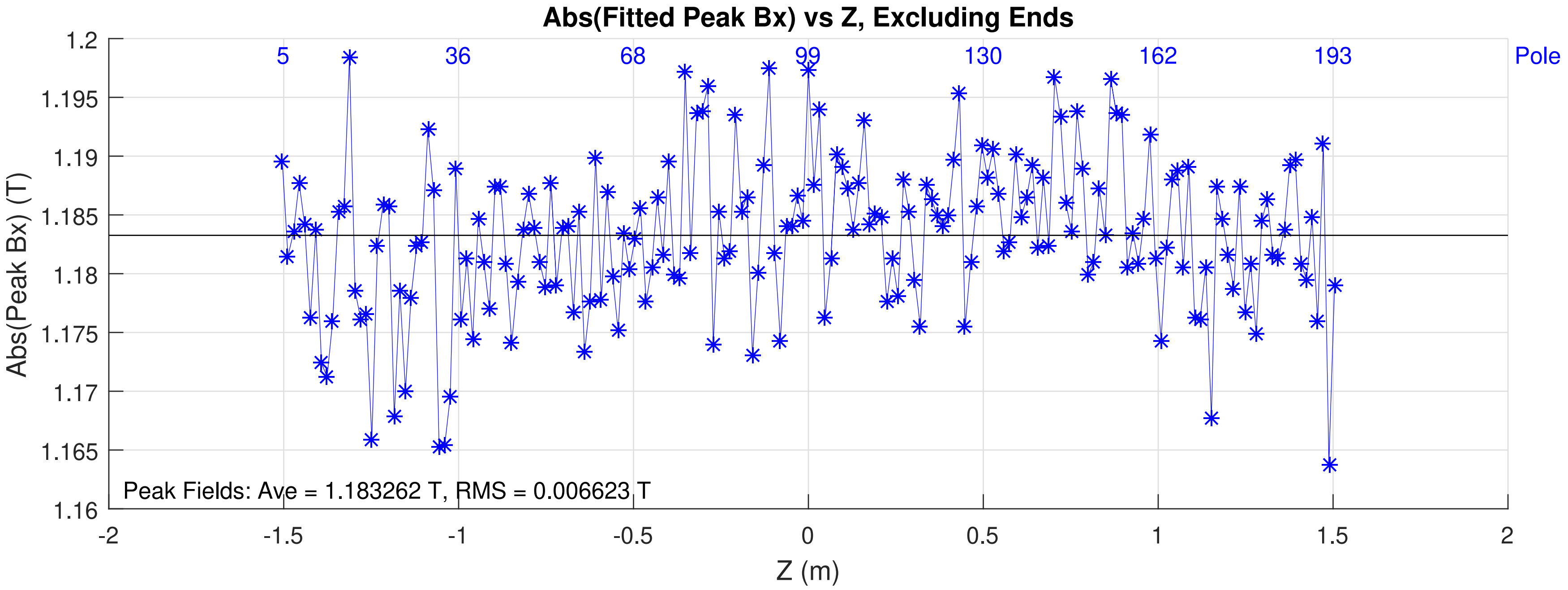
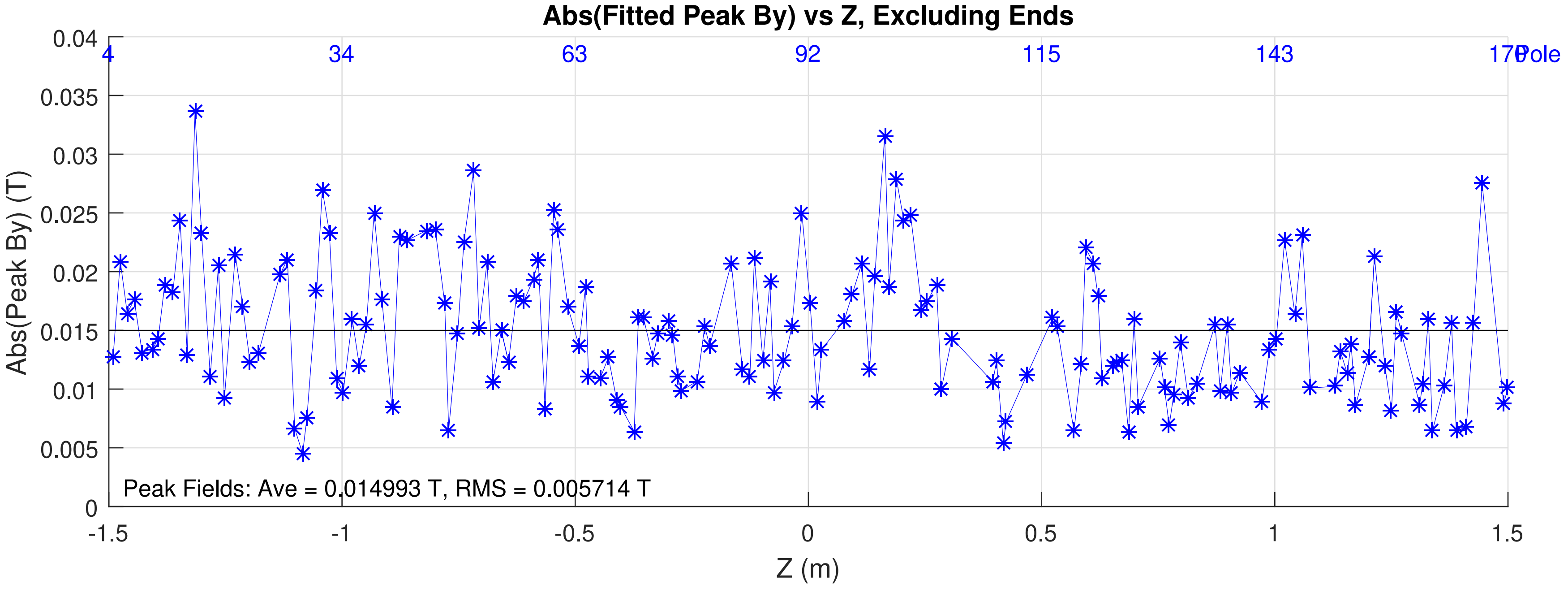

Bx, By, Bz vs Zm
Bx (T)
2
1
0
-1
-2
0
0.5
1
1.5
2
2.5
3
3.5
4
By (T)
0.4
0.2
0
-0.2
-0.4
0
0.5
1
1.5
2
2.5
3
3.5
4
Bz (T)
0.1
0.05
0
-0.05
-0.1
0
0.5
1
1.5
2
2.5
3
3.5
4
Zm Measurement Position (m)

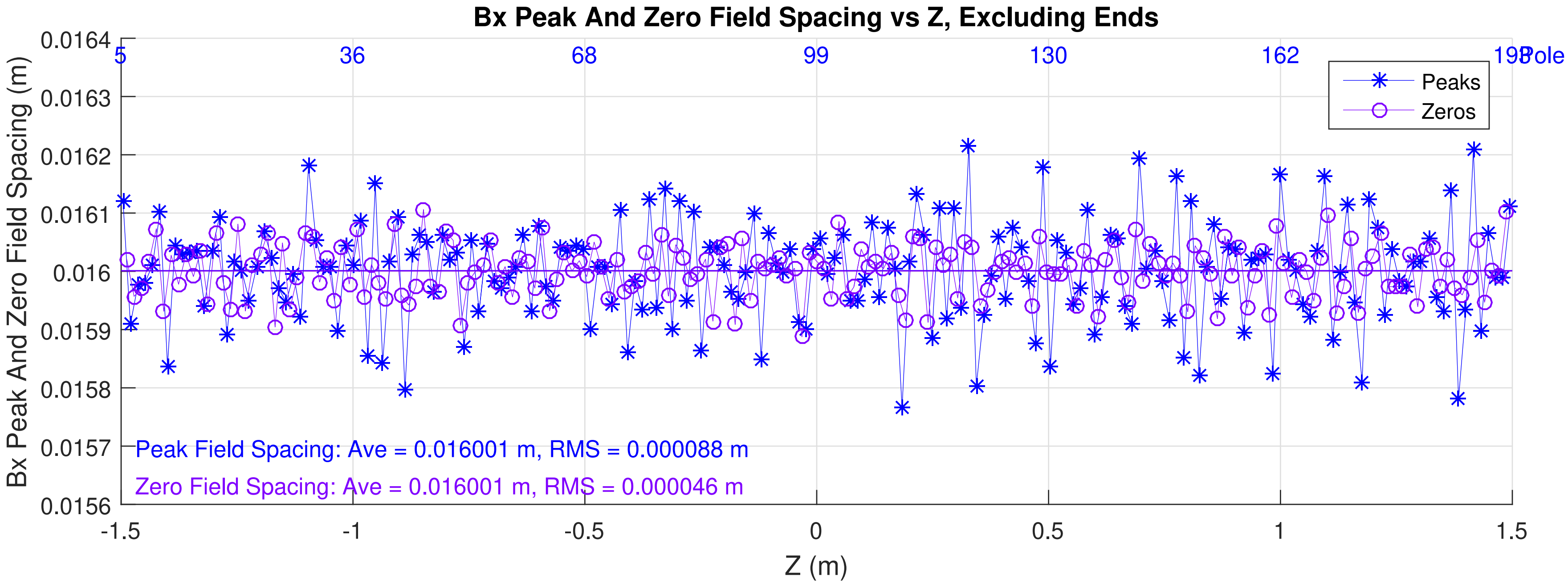

Bx and By vs Z
4
34
63
92
115
143
170
Pole
Bx
By
1.5
1
0.5
0
-0.5
-1
-1.5
Bx, By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

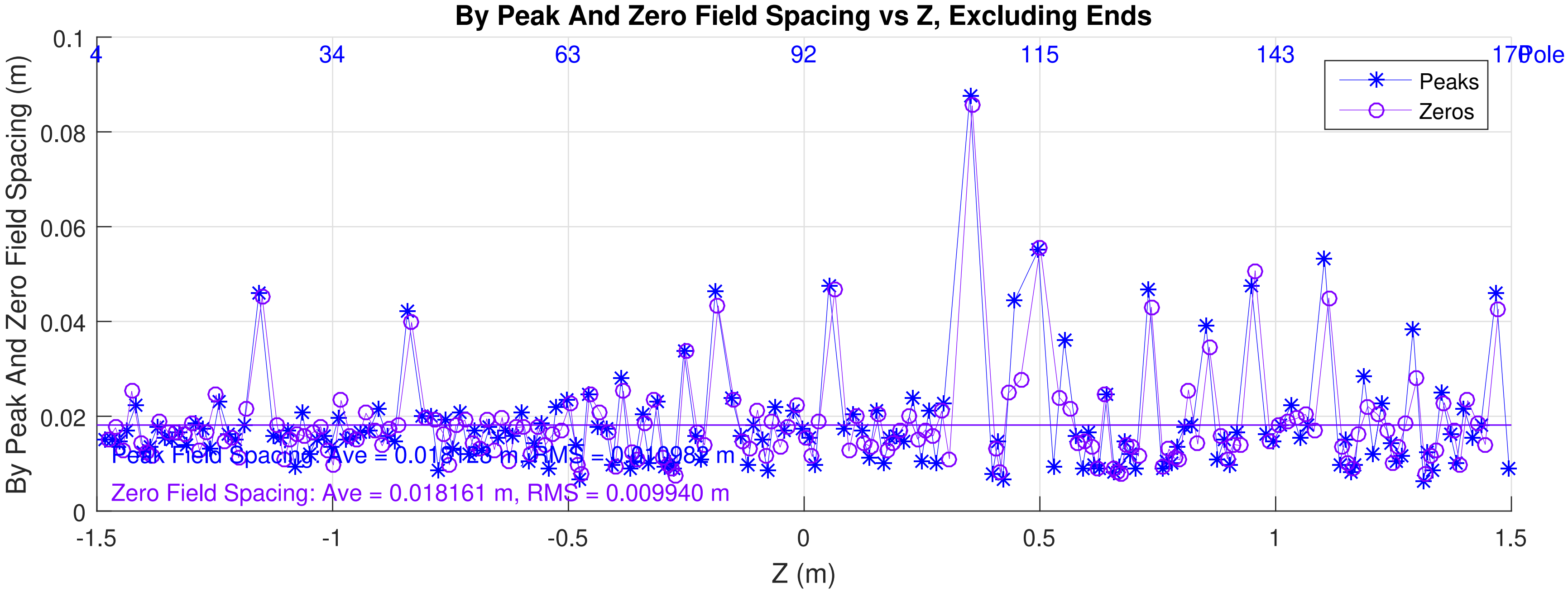

Bx vs Z With Fitted Peaks And Zeros
5
36
68
99
130
162
193
Pole
Bx (T)
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

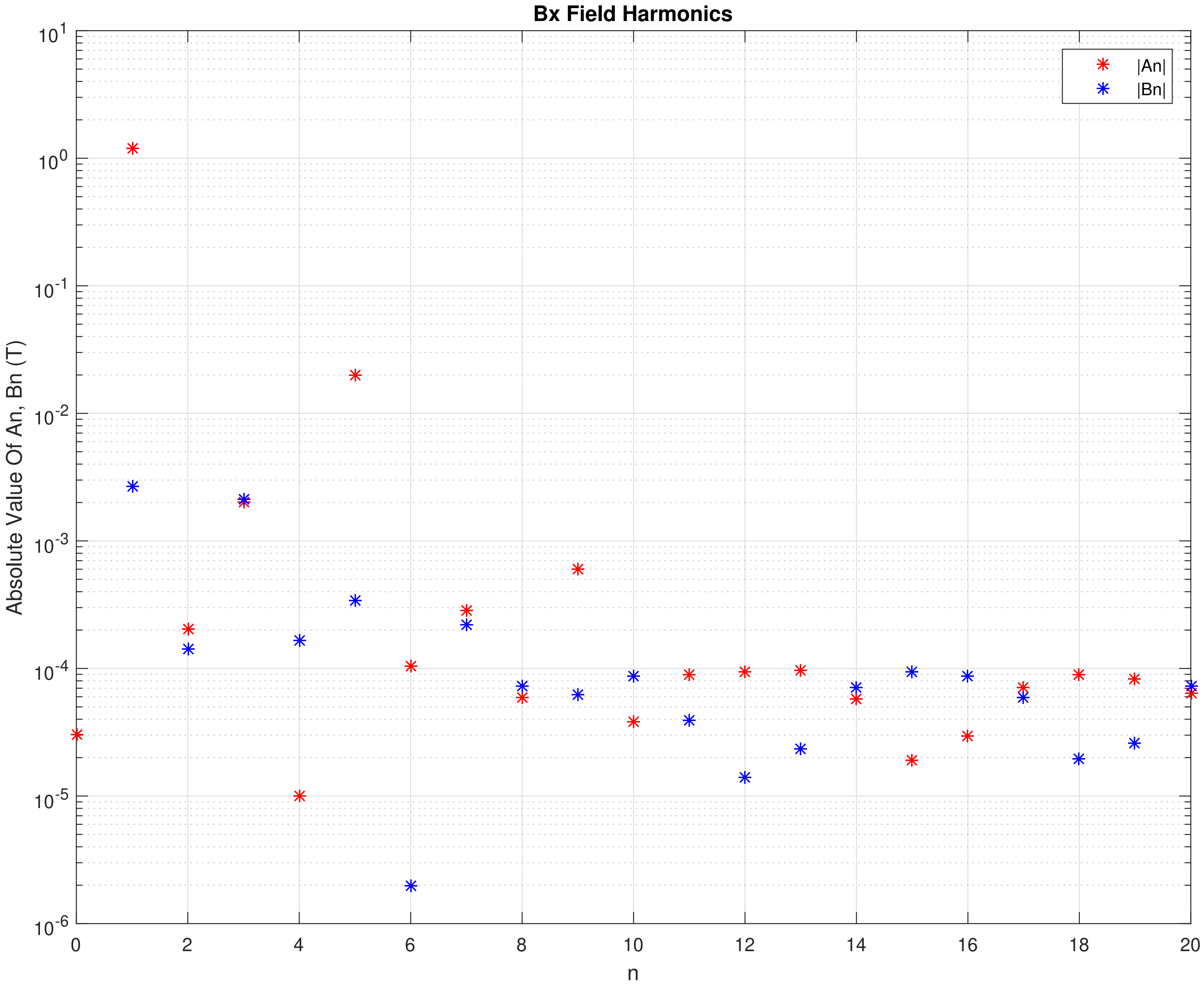

By vs Z With Fitted Peaks And Zeros
4
34
63
92
115
143
170
Pole
By (T)
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

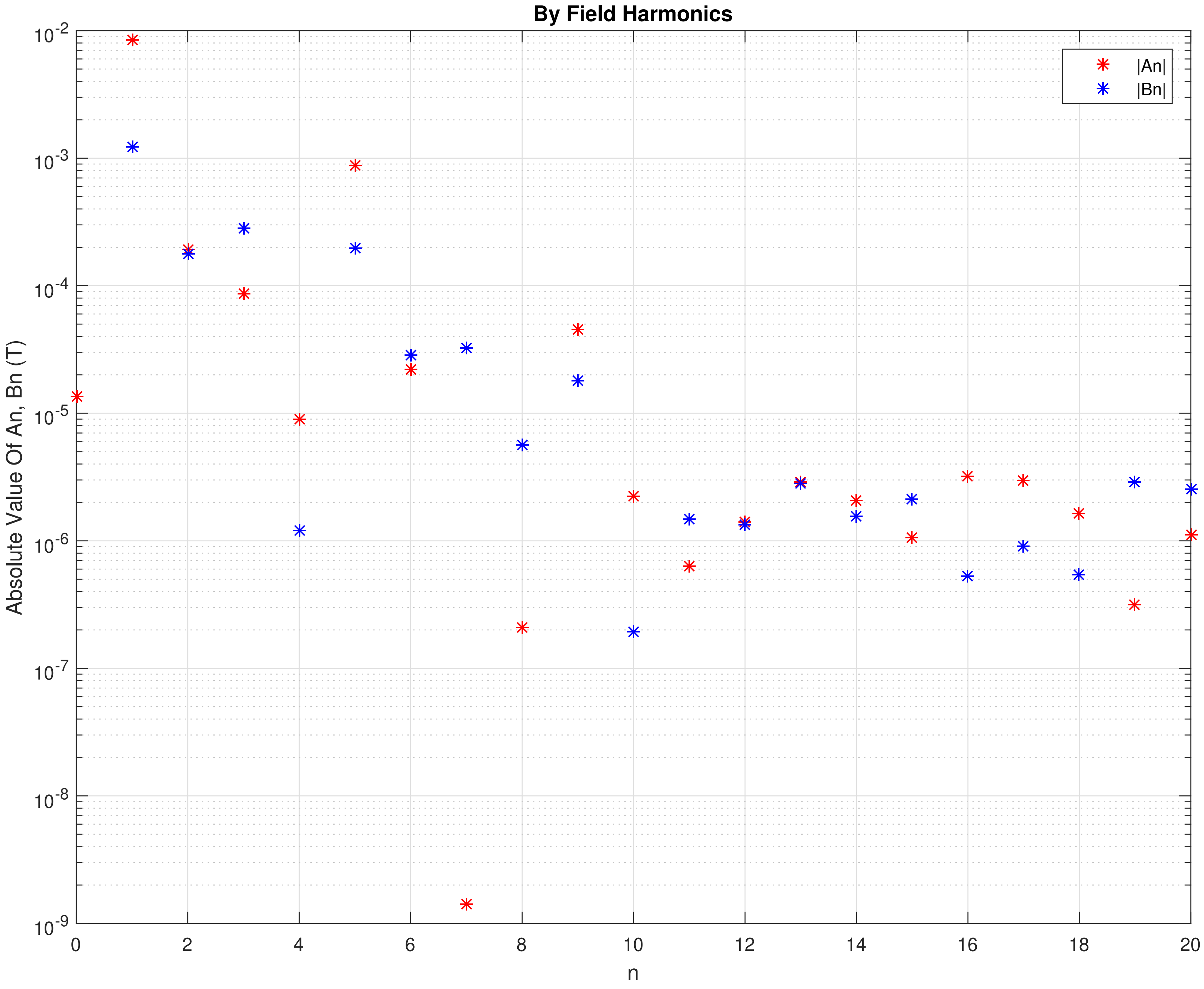

Abs(Fitted Peak Bx) vs Z, Excluding Ends

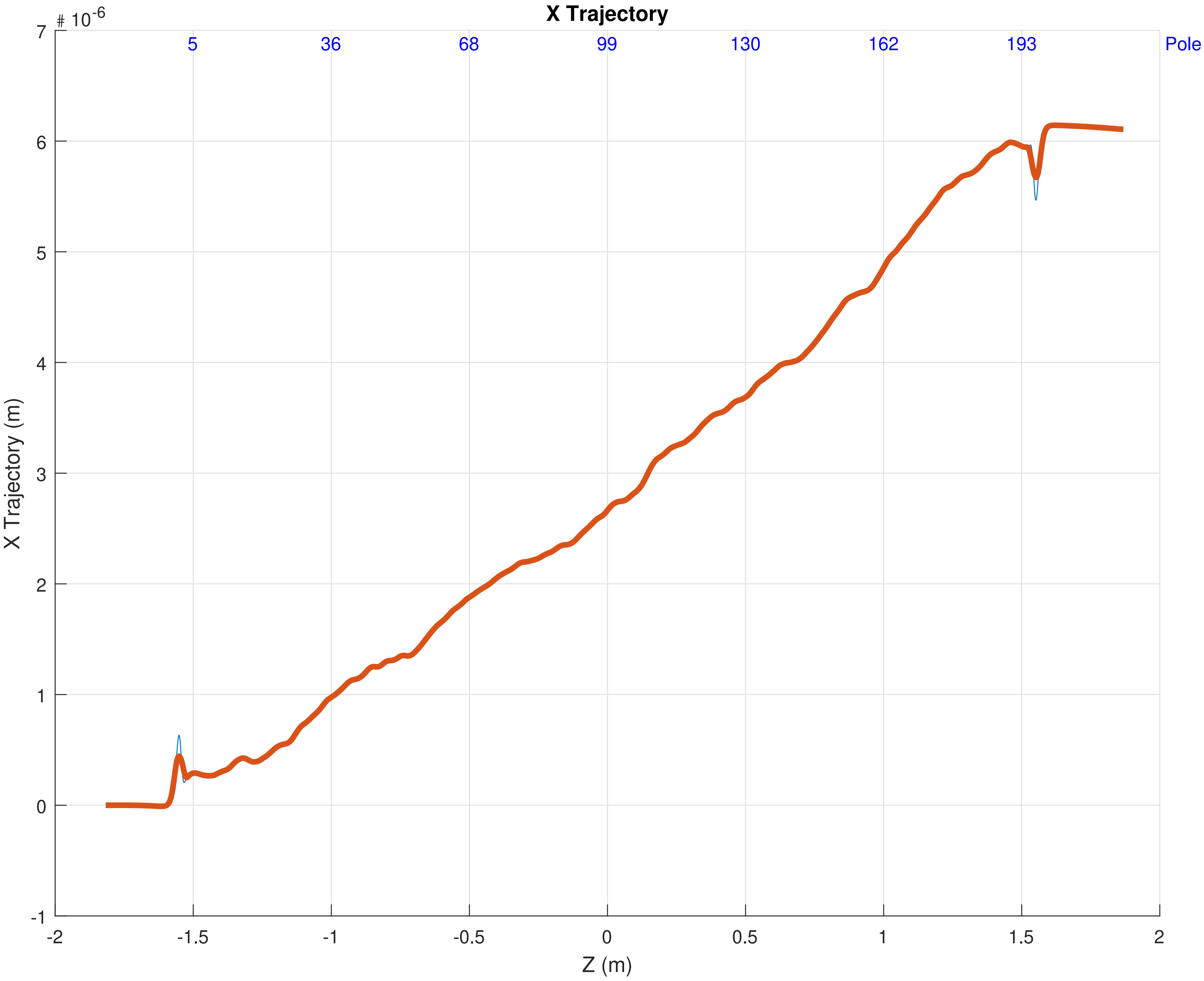

Abs(Fitted Peak By) vs Z, Excluding Ends

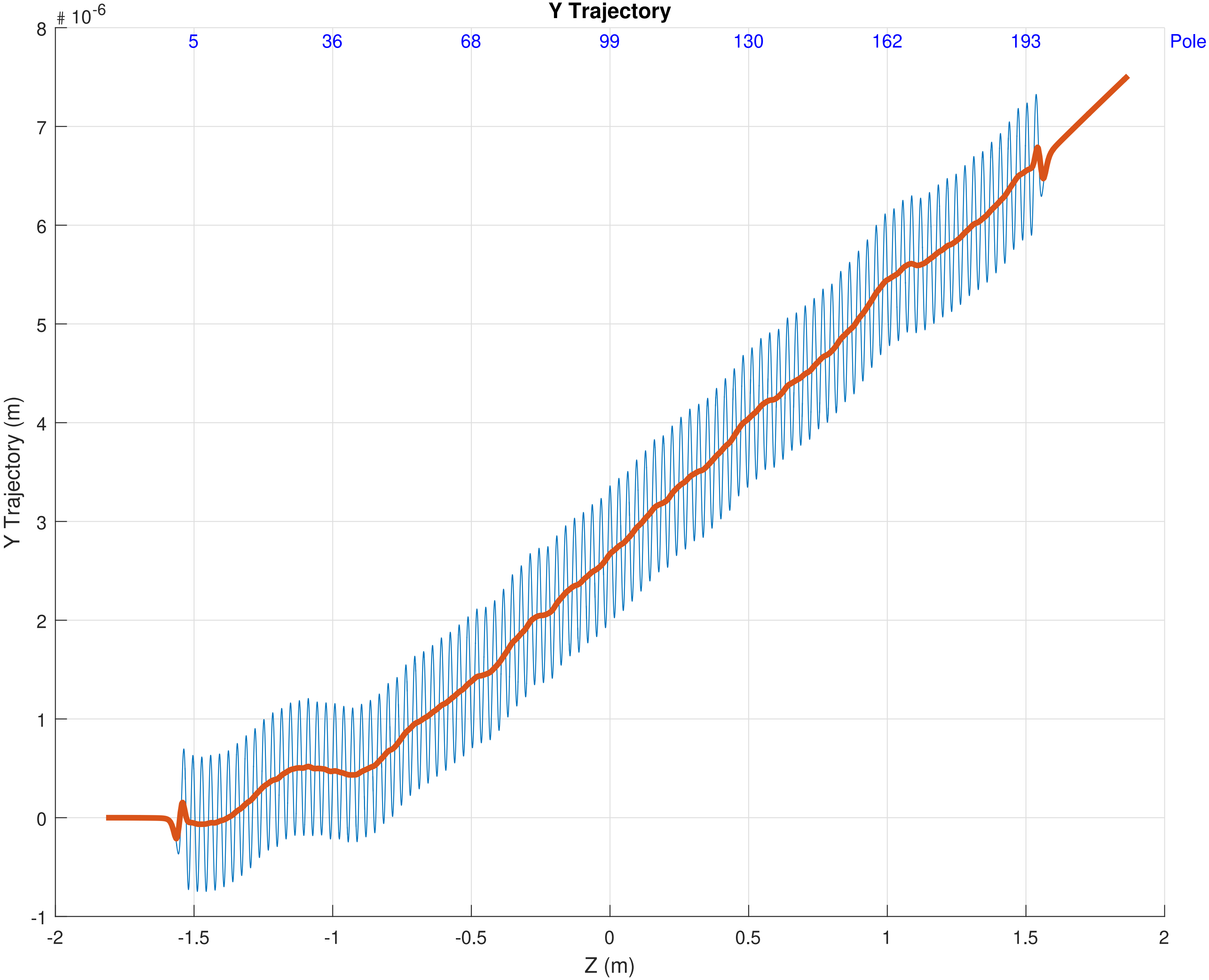

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
0.0164
0.0163
0.0162
0.0161
0.016
0.0159
0.0158
0.0157
0.0156
5
36
68
99
130
162
193
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016001 m, RMS = 0.000088 m
Zero Field Spacing: Ave = 0.016001 m, RMS = 0.000046 m
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)

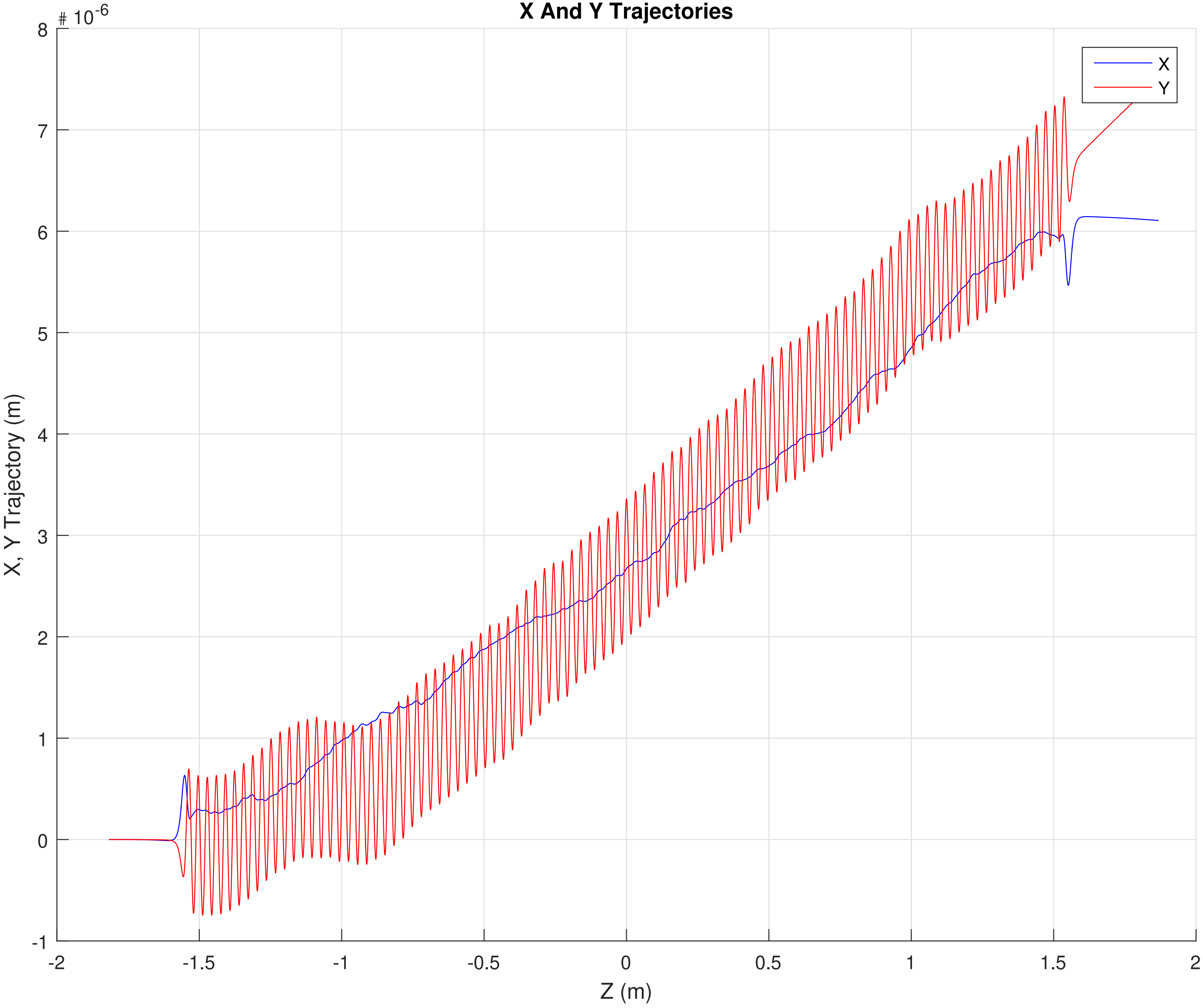

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
0.1
0.08
0.06
0.04
0.02
0
4
34
63
92
115
143
170
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.018128 m, RMS = 0.010982 m
Zero Field Spacing: Ave = 0.018161 m, RMS = 0.009940 m
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)

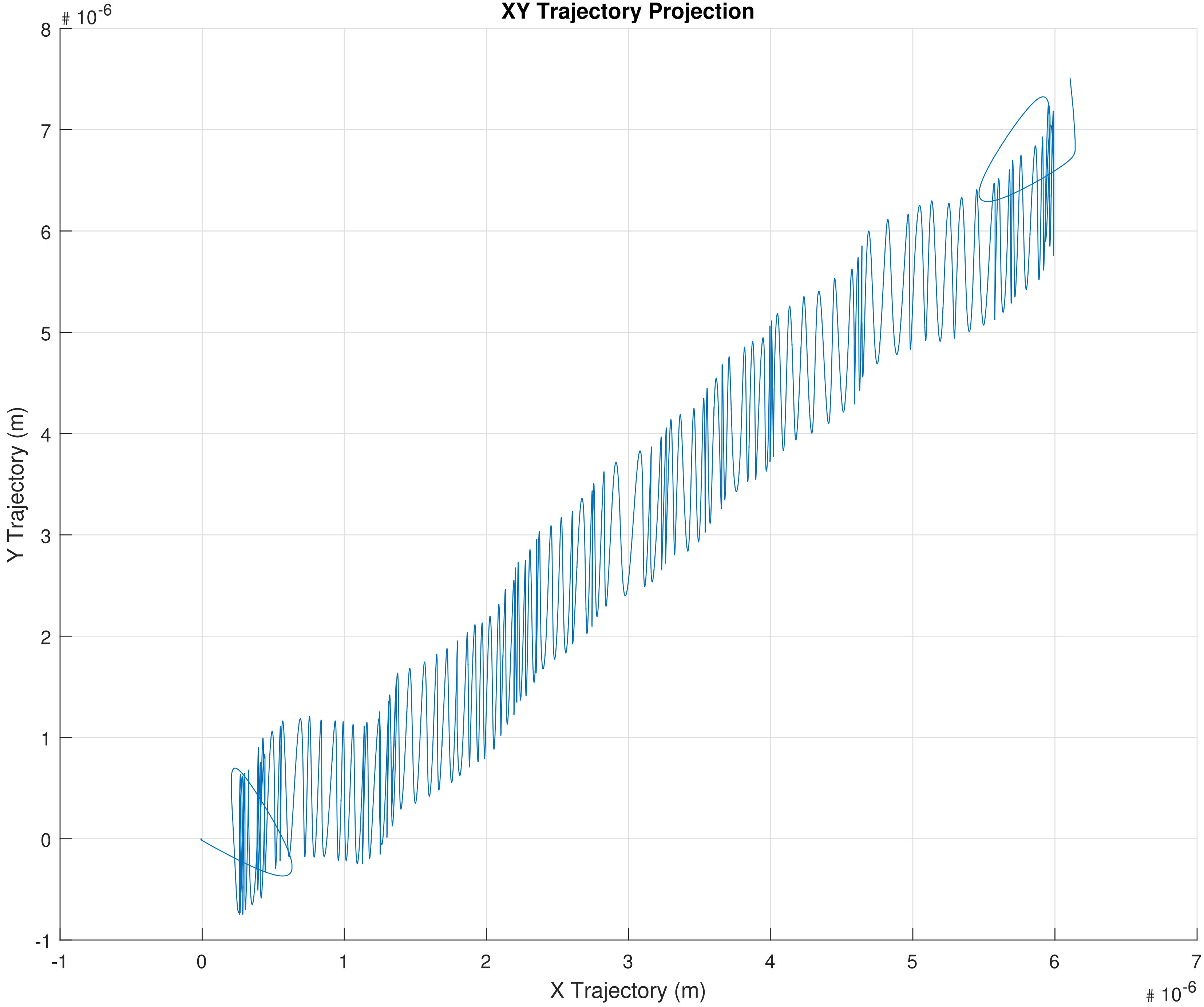

Bx Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
0
2
4
6
8
10
12
14
16
18
20
n

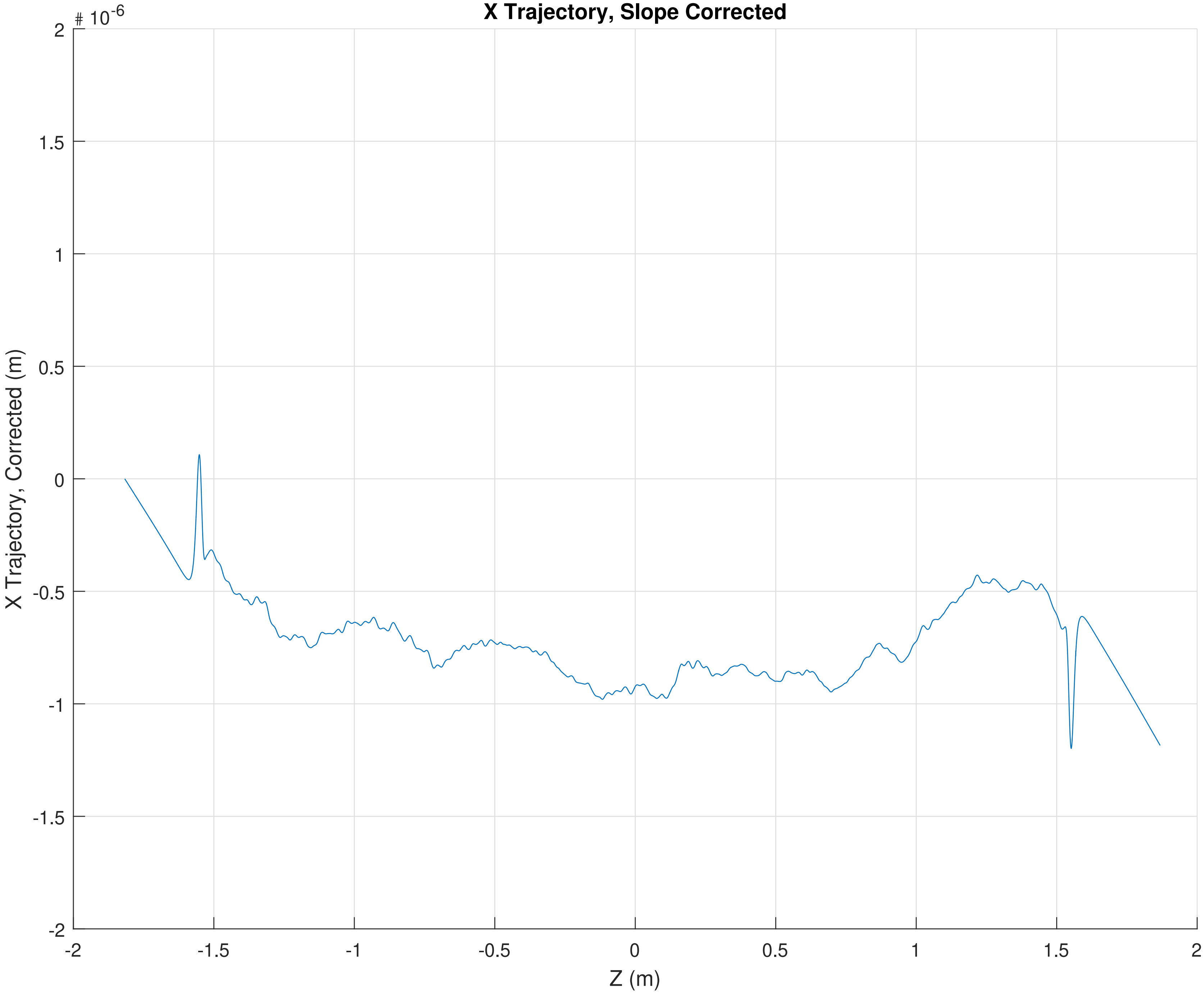

By Field Harmonics
Absolute Value Of An, Bn (T)
n
|An|
|Bn|
10^-2
10^-3
10^-4
10^-5
10^-6
10^-7
10^-8
10^-9
0
2
4
6
8
10
12
14
16
18
20

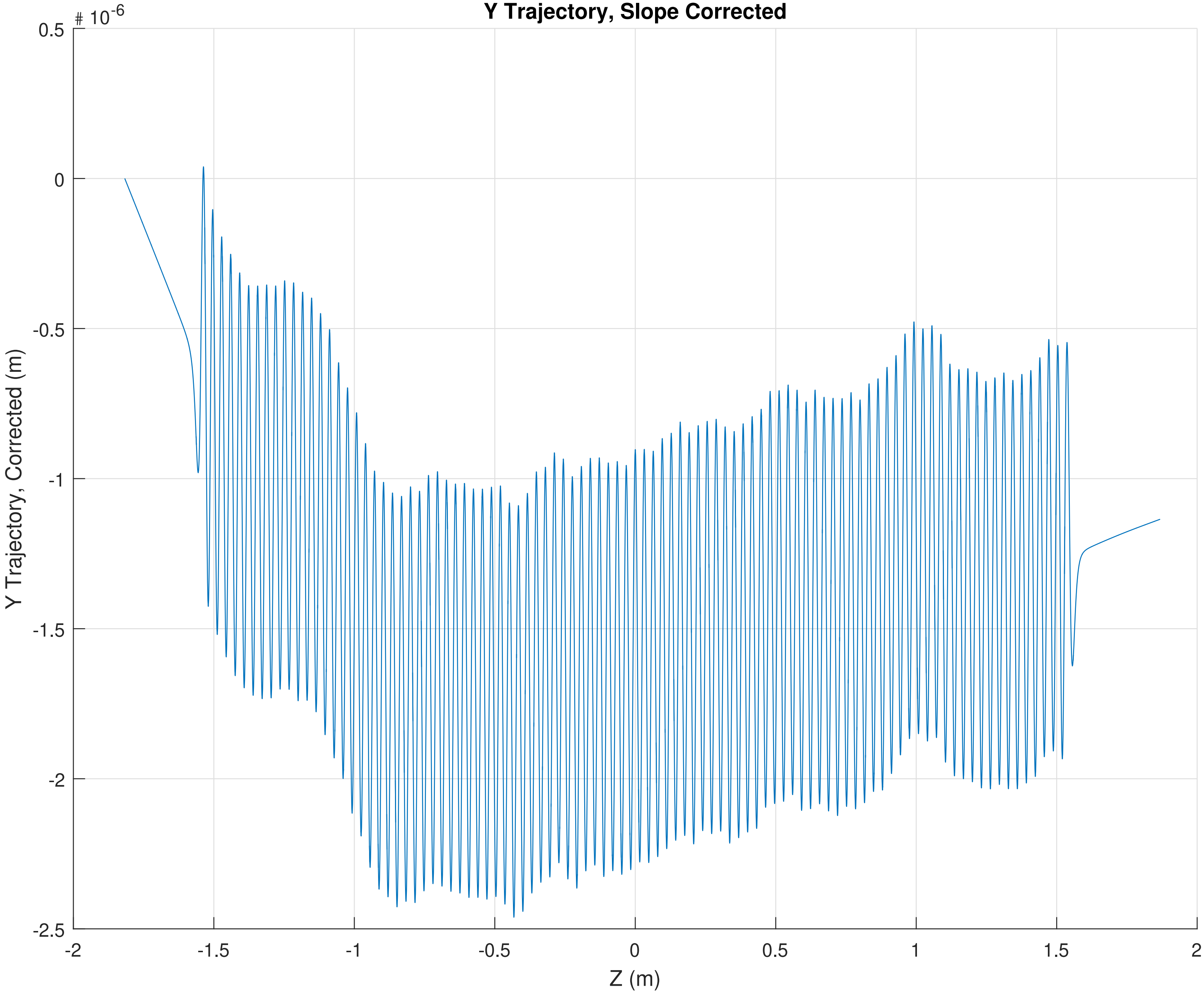

X Trajectory
10^-6
7
6
5
4
3
2
1
0
-1
X Trajectory (m)
5
36
68
99
130
162
193
Pole
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

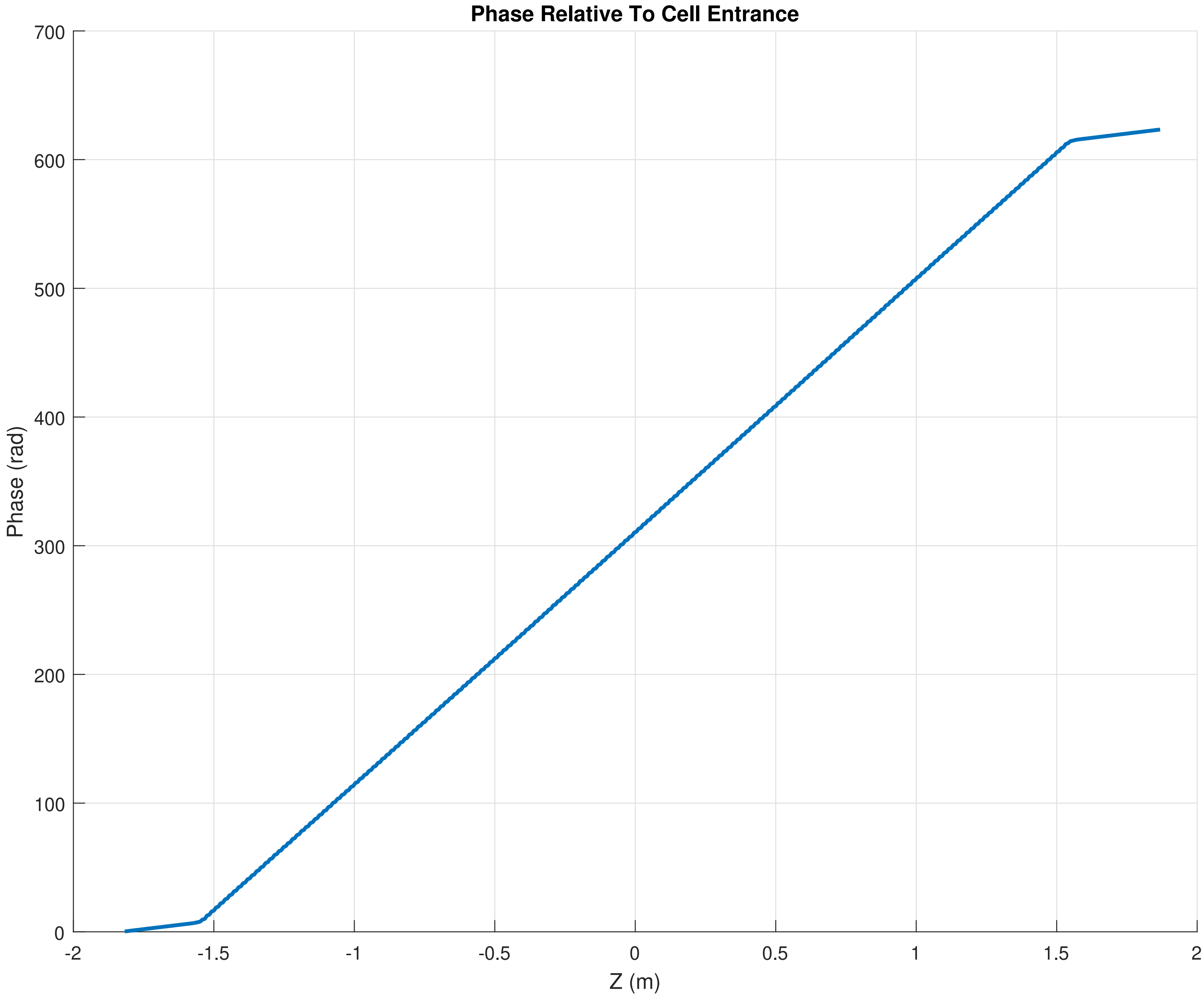

Y Trajectory
10^-6
8
7
6
5
4
3
2
1
0
-1
Y Trajectory (m)
5
36
68
99
130
162
193
Pole
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

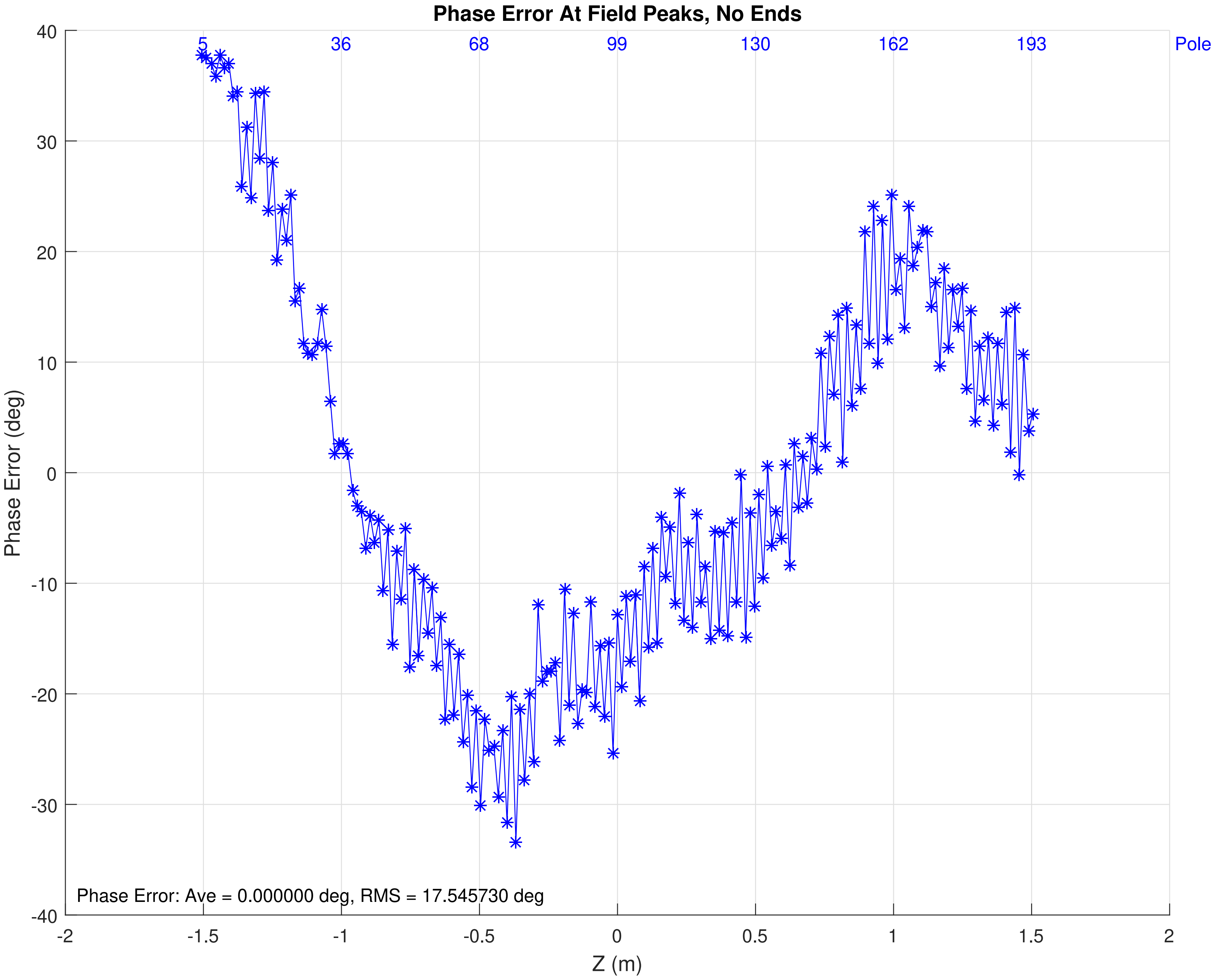

X And Y Trajectories
10^-6
8
7
6
5
4
3
2
1
0
-1
X, Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
X
Y

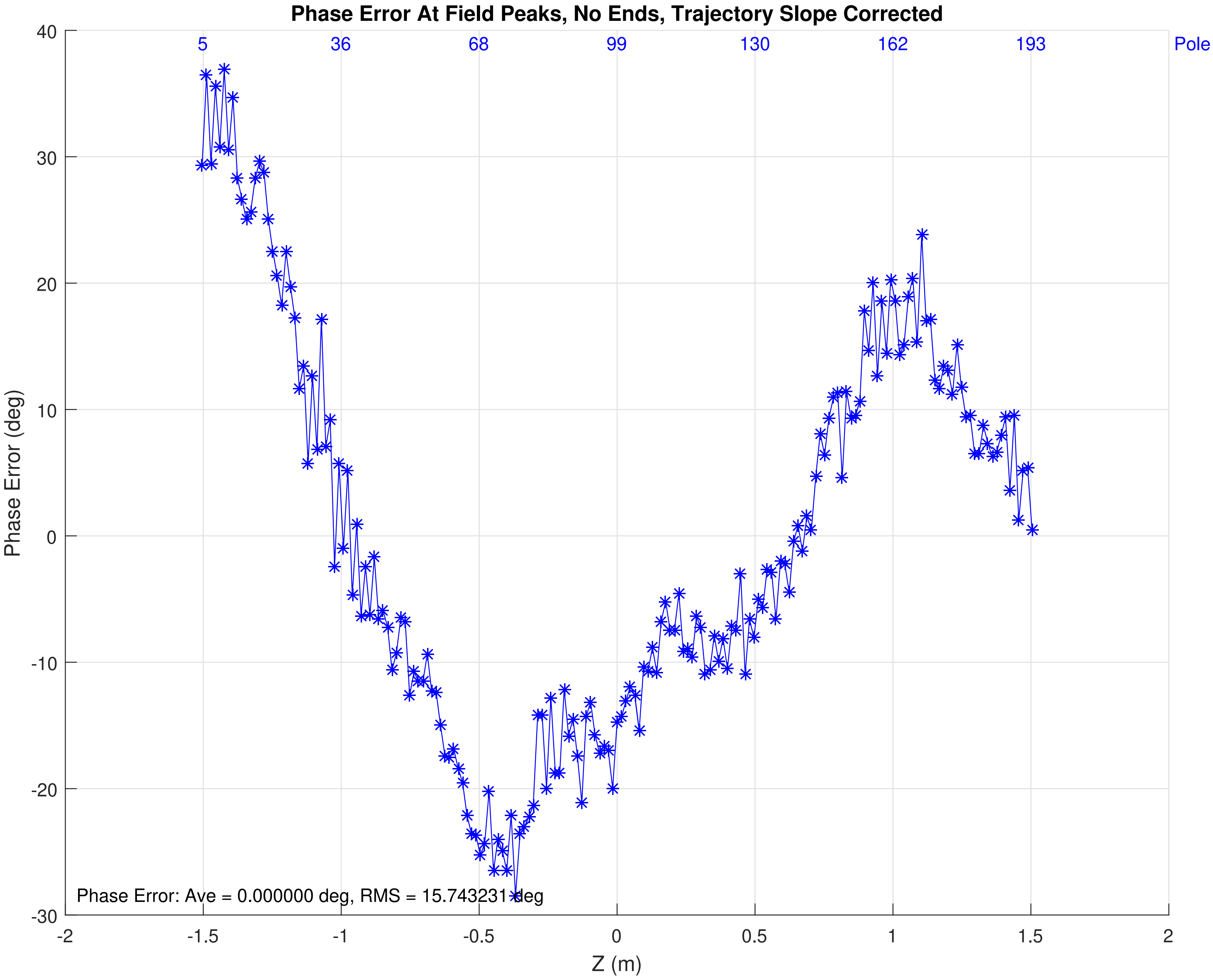

XY Trajectory Projection
10-6
8
7
6
5
4
3
2
1
0
-1
Y Trajectory (m)
-1
0
1
2
3
4
5
6
7
X Trajectory (m)
10-6

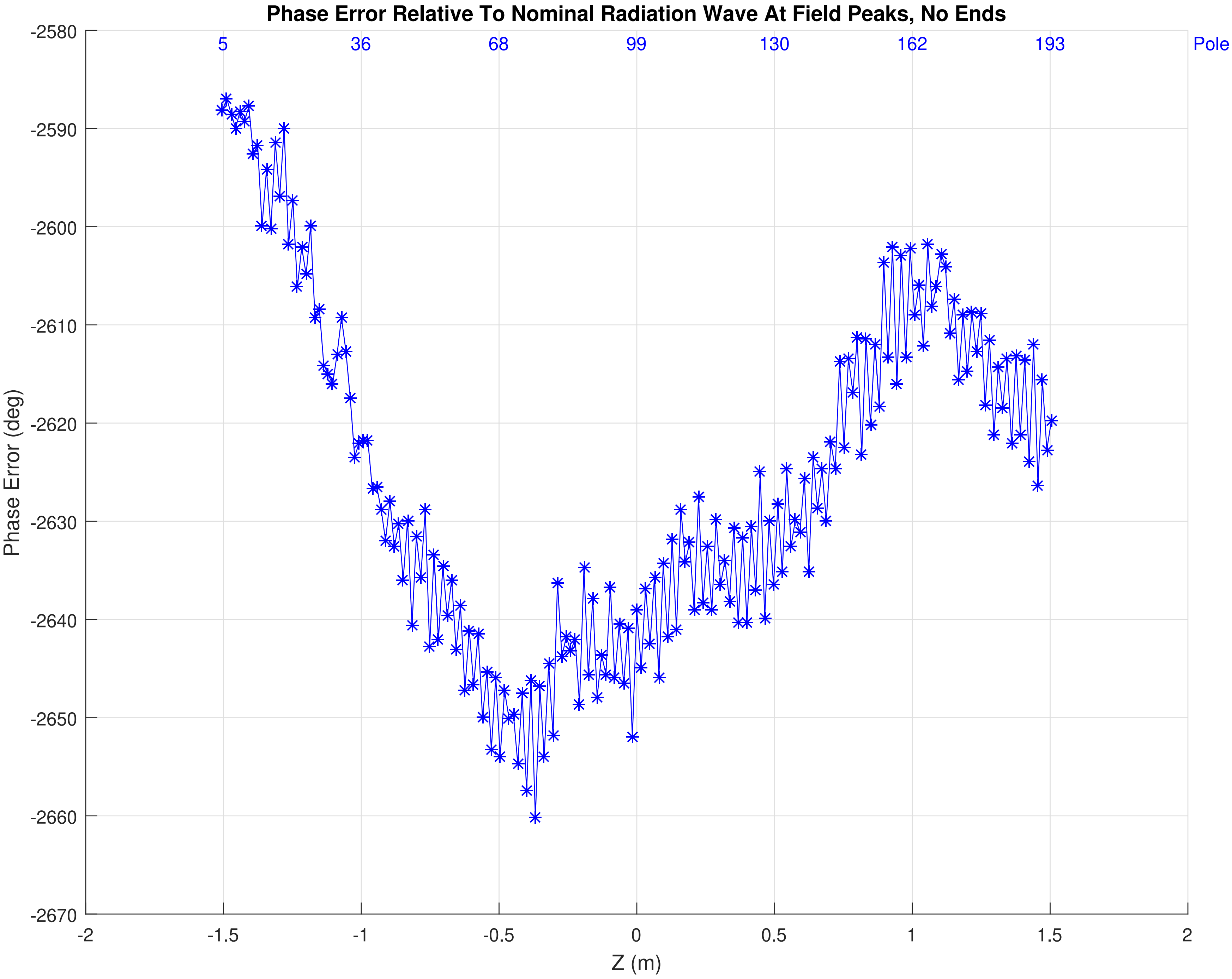

X Trajectory, Slope Corrected
10-6
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
X Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

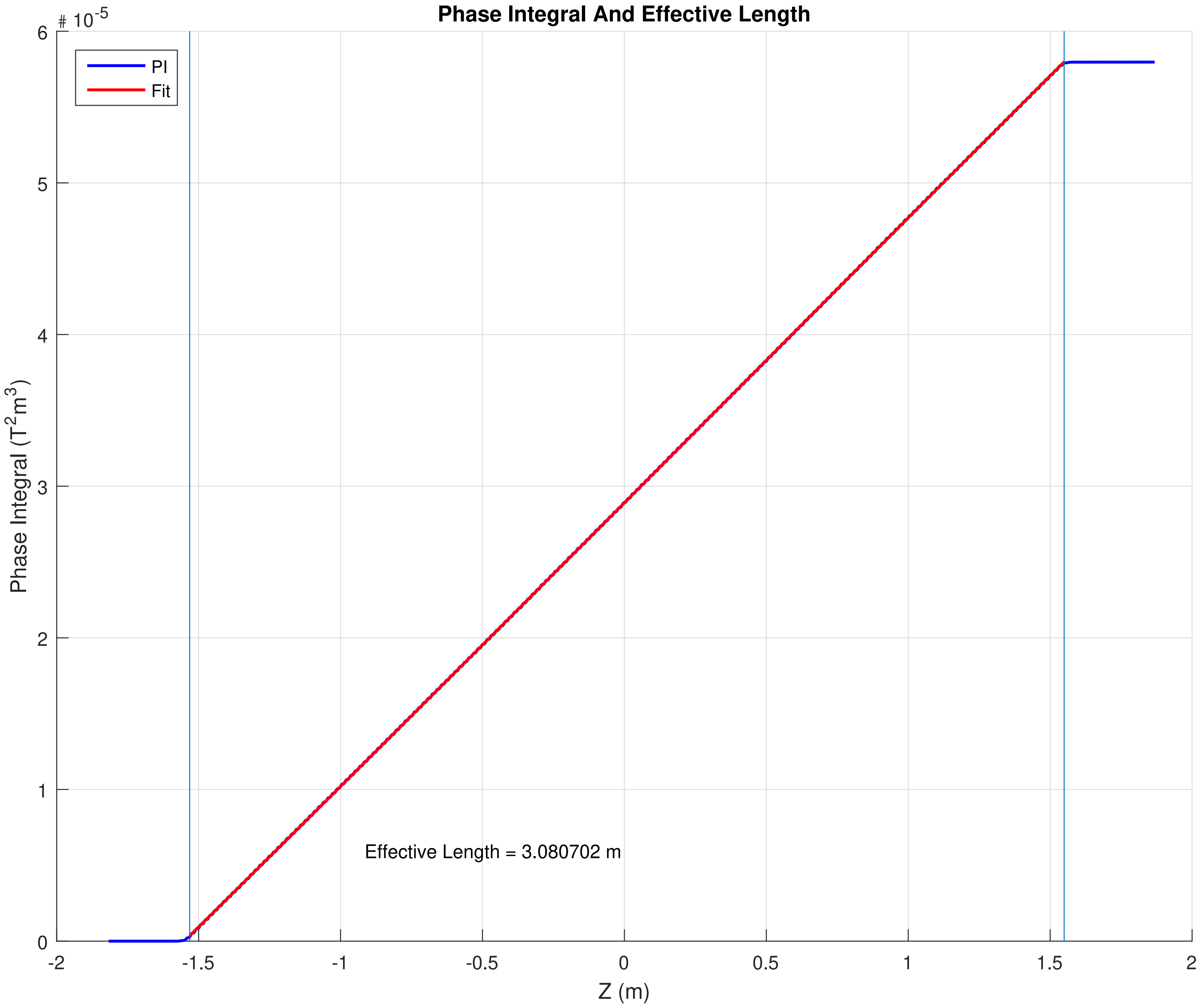

Y Trajectory, Slope Corrected
10-6
0.5
0
-0.5
-1
-1.5
-2
-2.5
Y Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

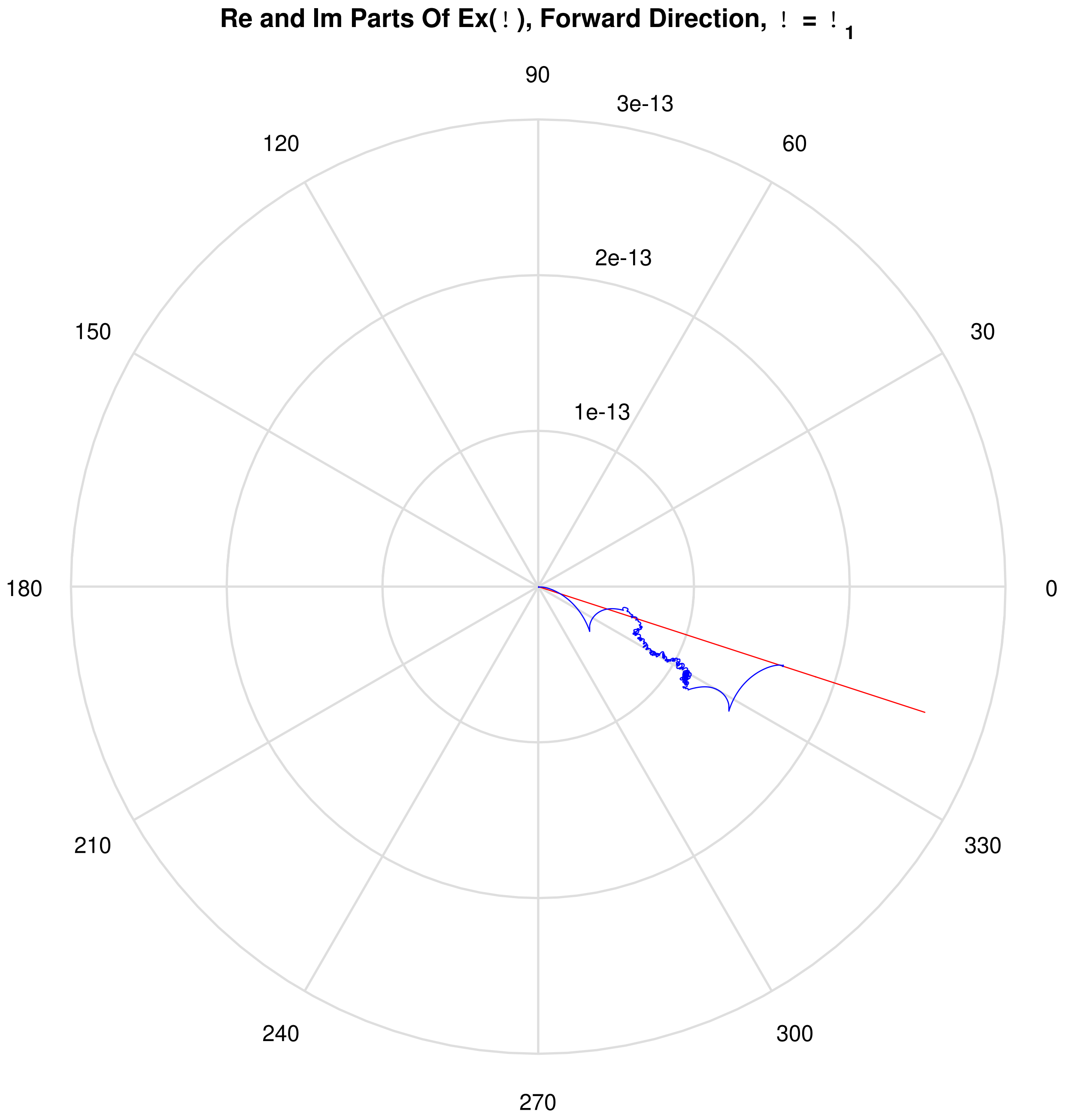

Phase Relative To Cell Entrance
700
600
500
400
300
200
100
0
Phase (rad)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

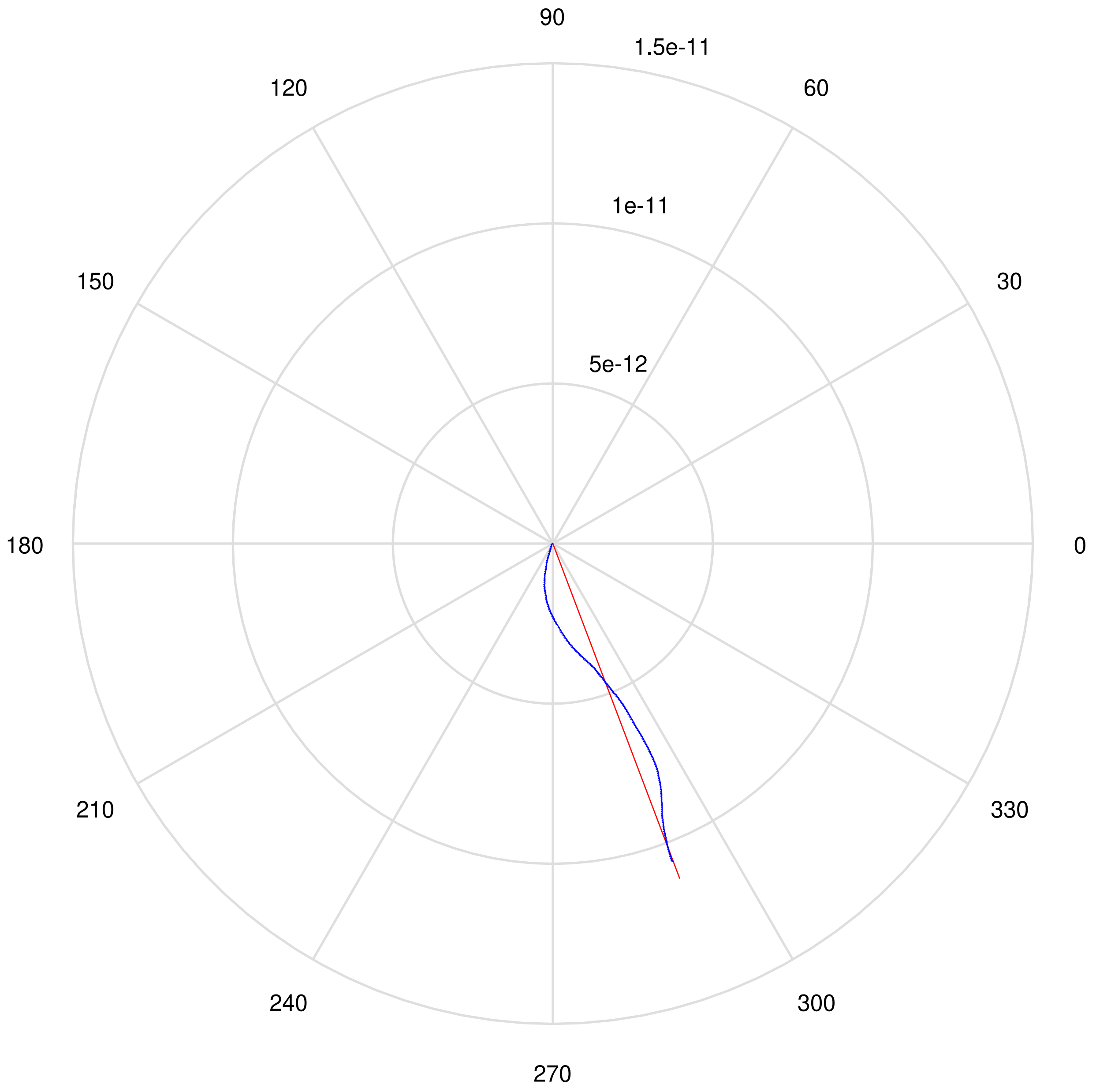

Phase Error At Field Peaks, No Ends
5
36
68
99
130
162
193
Pole
40
30
20
10
0
-10
-20
-30
-40
Phase Error (deg)
Phase Error: Ave = 0.000000 deg, RMS = 17.545730 deg
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)


Phase Error At Field Peaks, No Ends, Trajectory Slope Corrected
5
36
68
99
130
162
193
Pole
Phase Error (deg)
40
30
20
10
0
-10
-20
-30
Z (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Phase Error: Ave = 0.000000 deg, RMS = 15.743231 deg

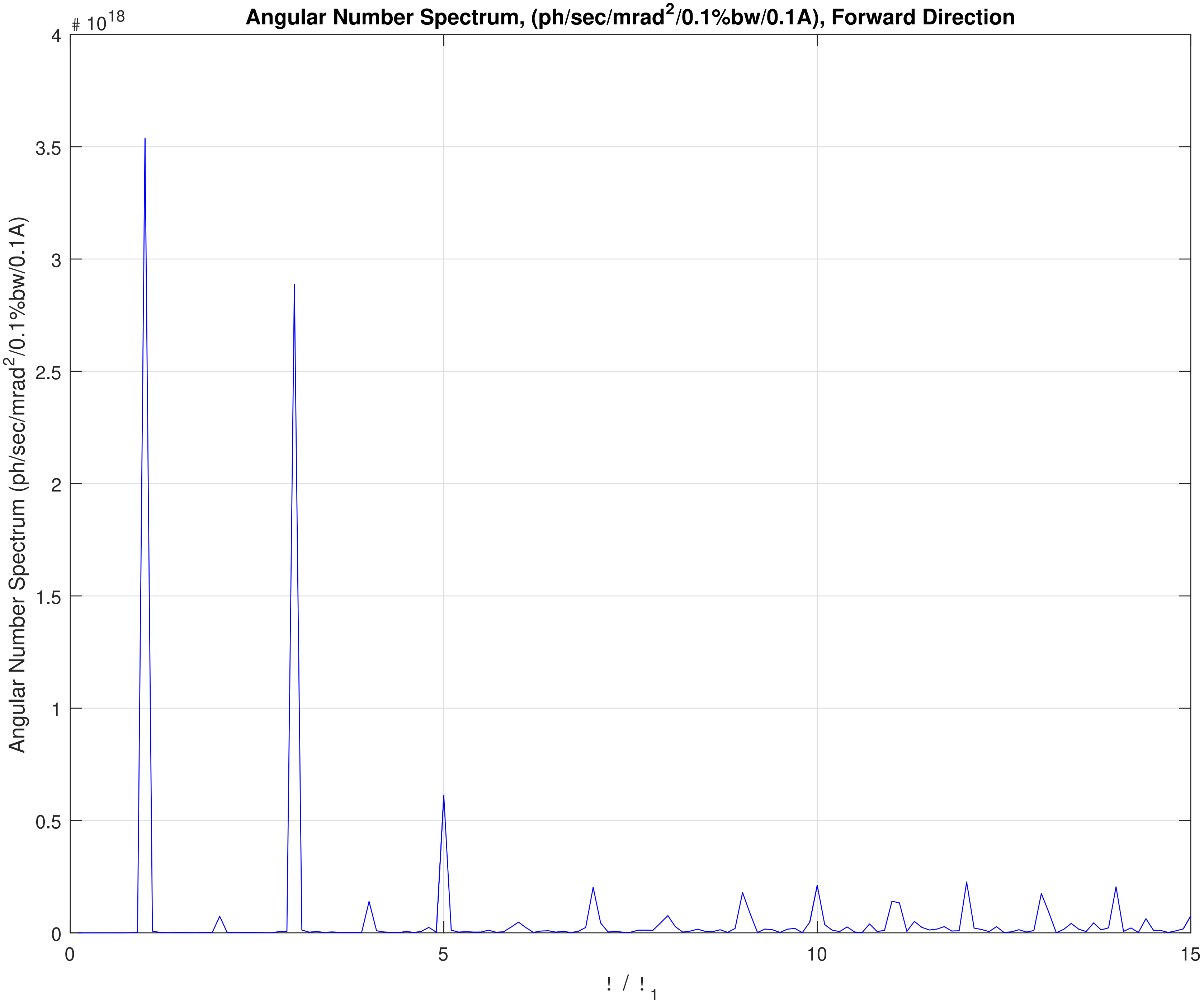

Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
5
36
68
99
130
162
193
Pole
-2580
-2590
-2600
-2610
-2620
-2630
-2640
-2650
-2660
-2670
Phase Error (deg)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)


Phase Integral And Effective Length
10^-5
6
5
4
3
2
1
0
Phase Integral (T^2m^3)
PI
Fit
Effective Length = 3.080702 m
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

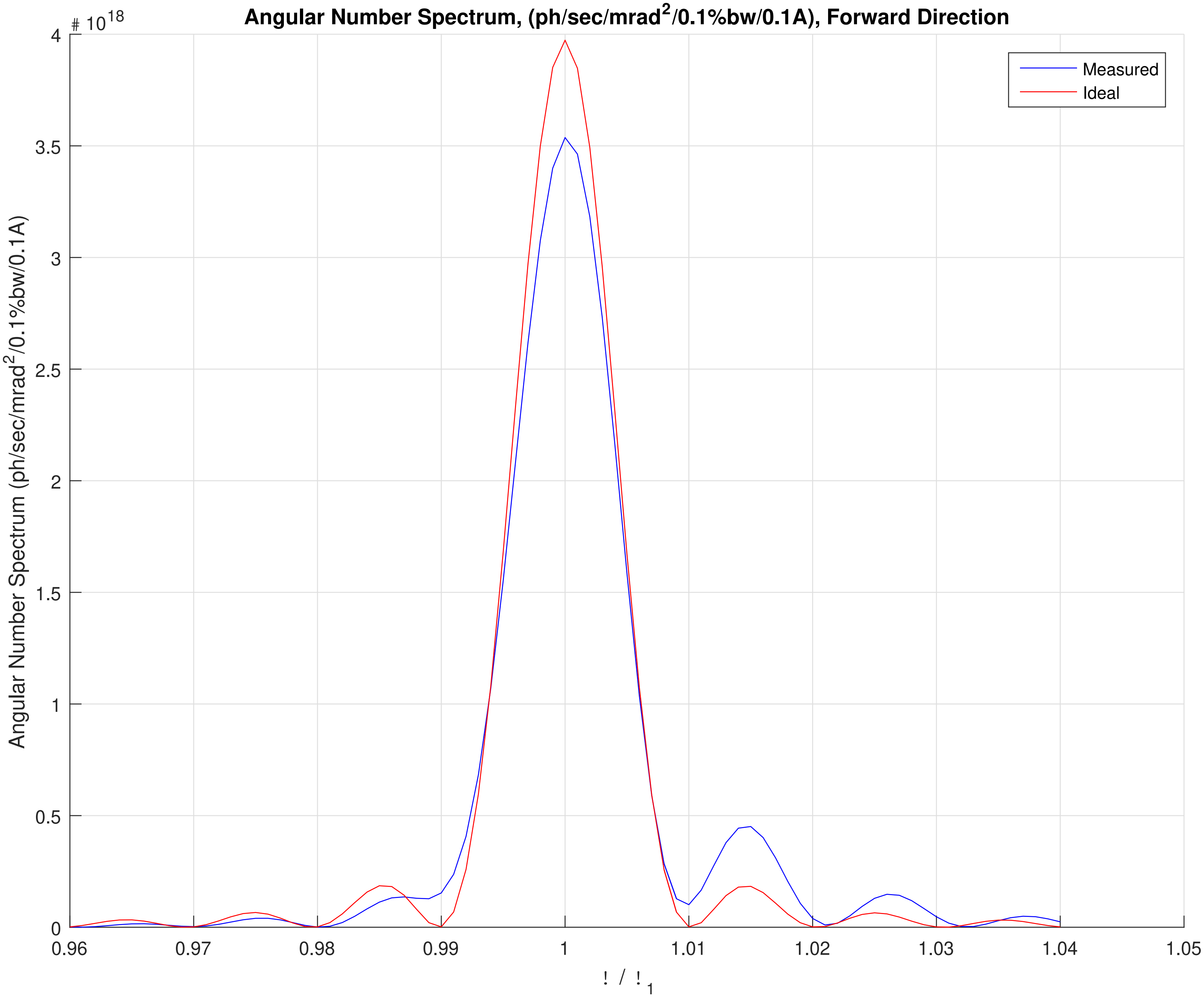

Re and Im Parts Of Ex(!), Forward Direction, ! = $!_1$

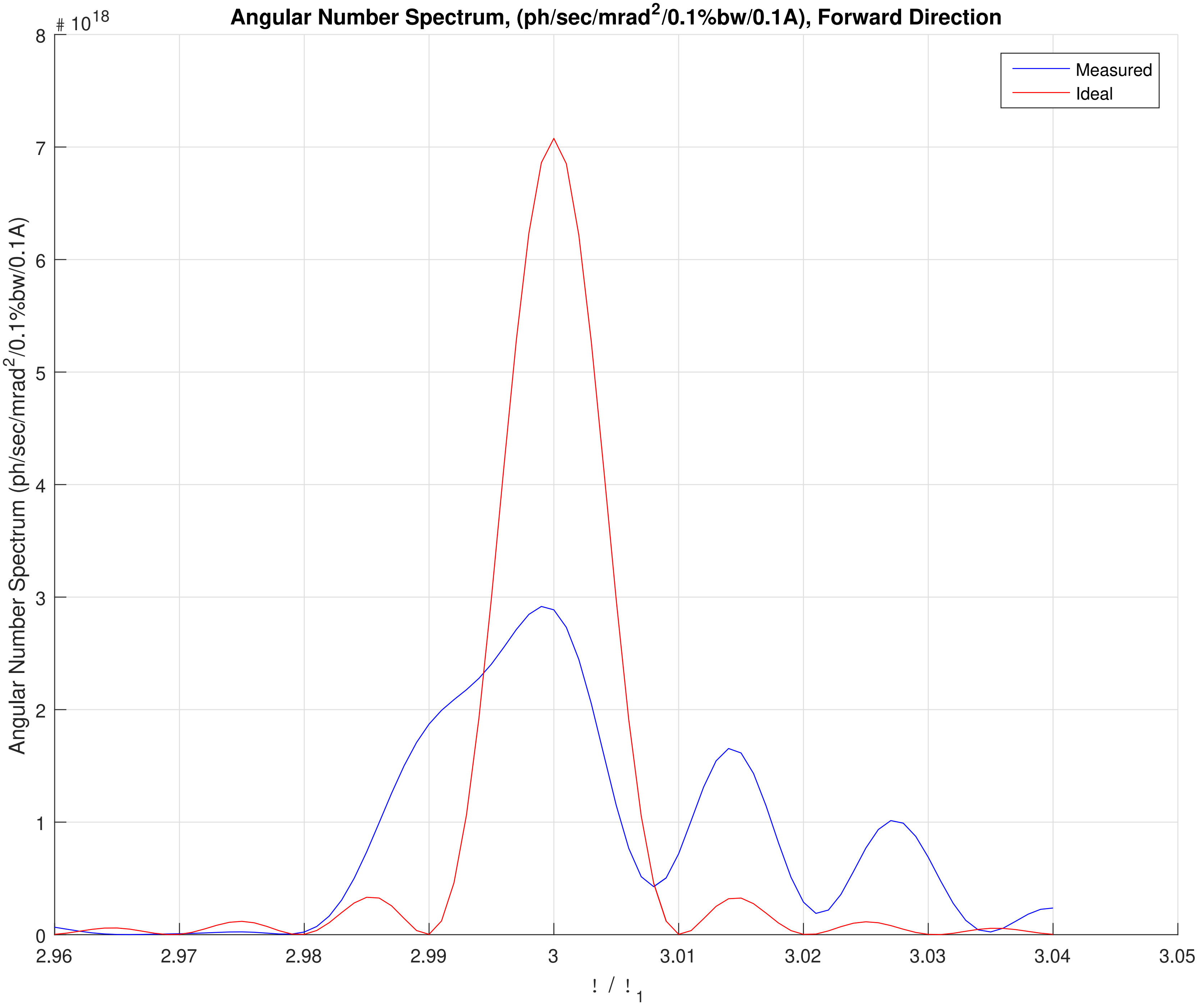


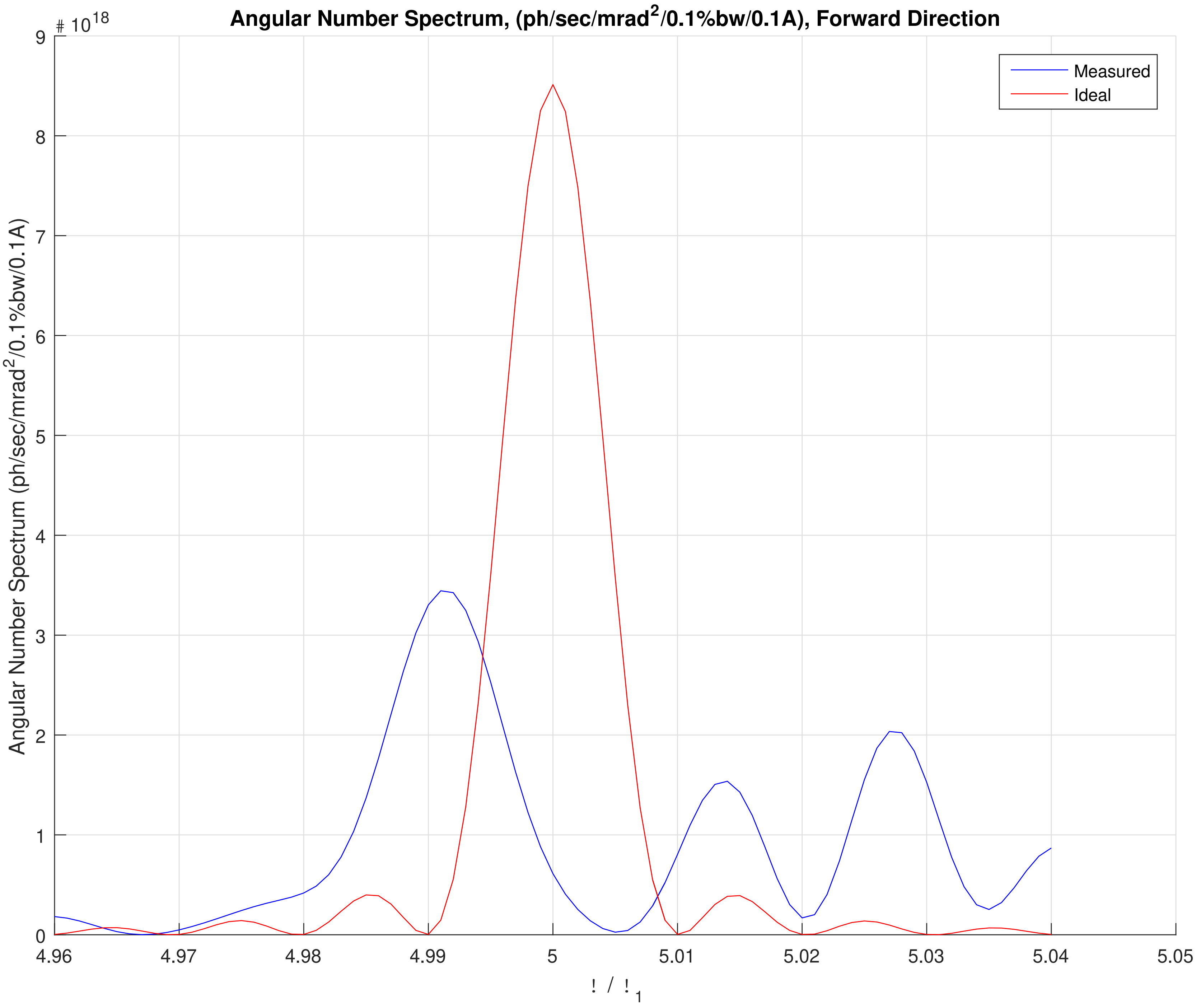
Re and Im Parts Of Ey(!), Forward Direction, ! = !$_1$



Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction


Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{18}
4
3.5
3
2.5
2
1.5
1
0.5
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}
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
0
1
2
3
4
5
6
7
8
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}
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
0
1
2
3
4
5
6
7
8
9
4.96
4.97
4.98
4.99
5
5.01
5.02
5.03
5.04
5.05
! / !$_1$
Measured
Ideal