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SLAC Magnetic Measurements

EPU Analysis
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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-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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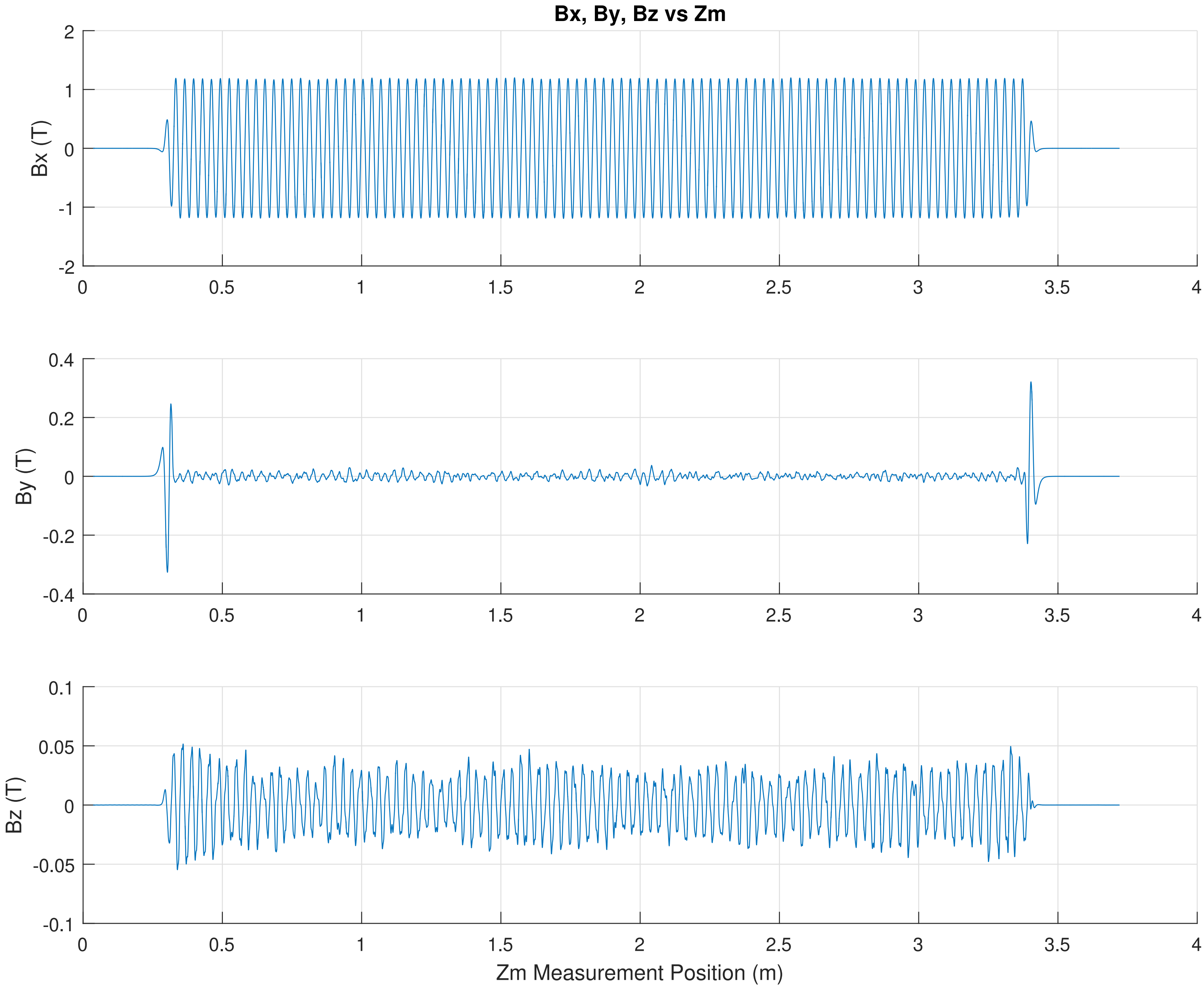
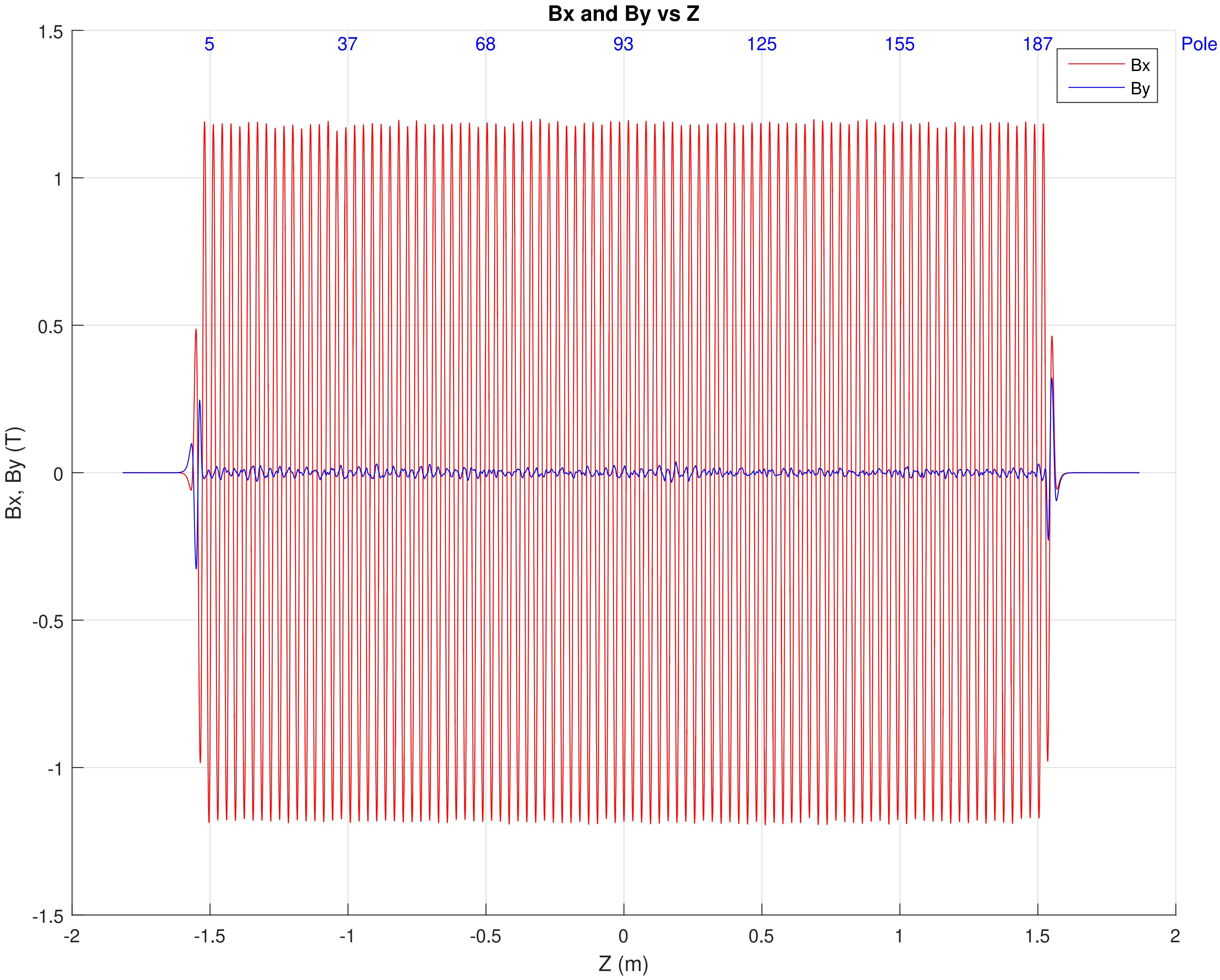
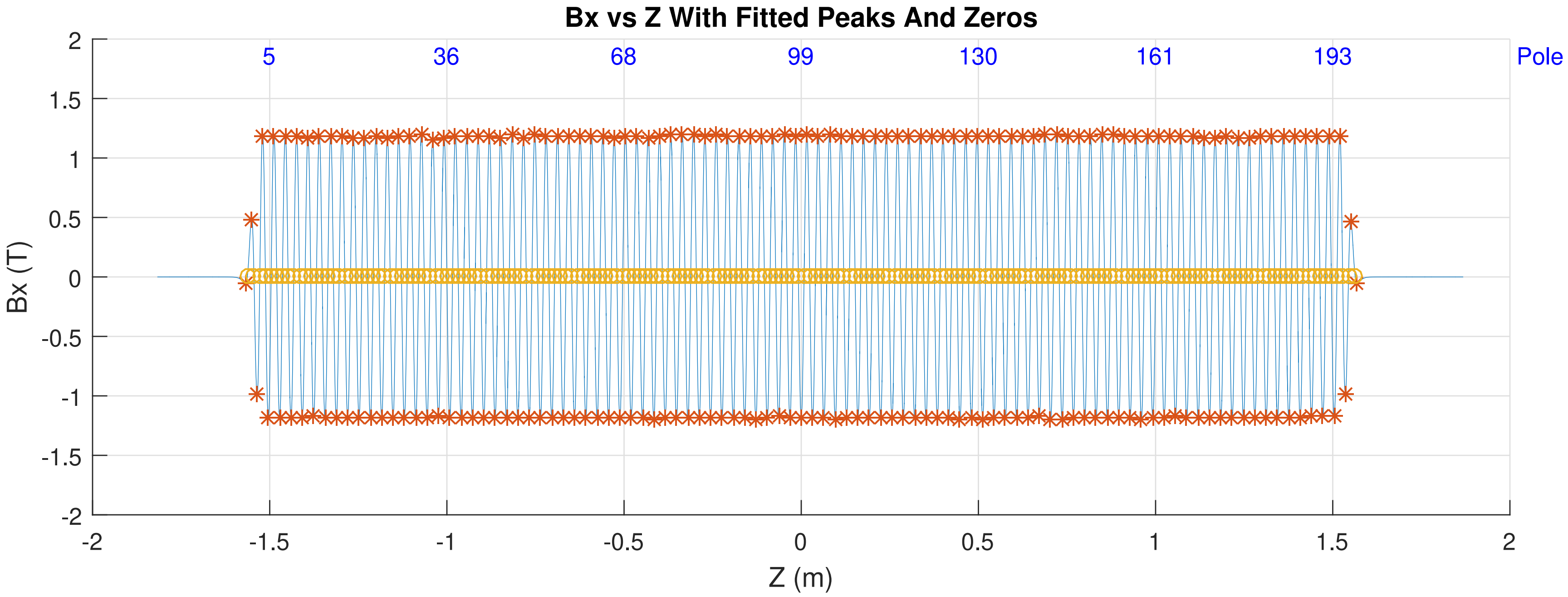
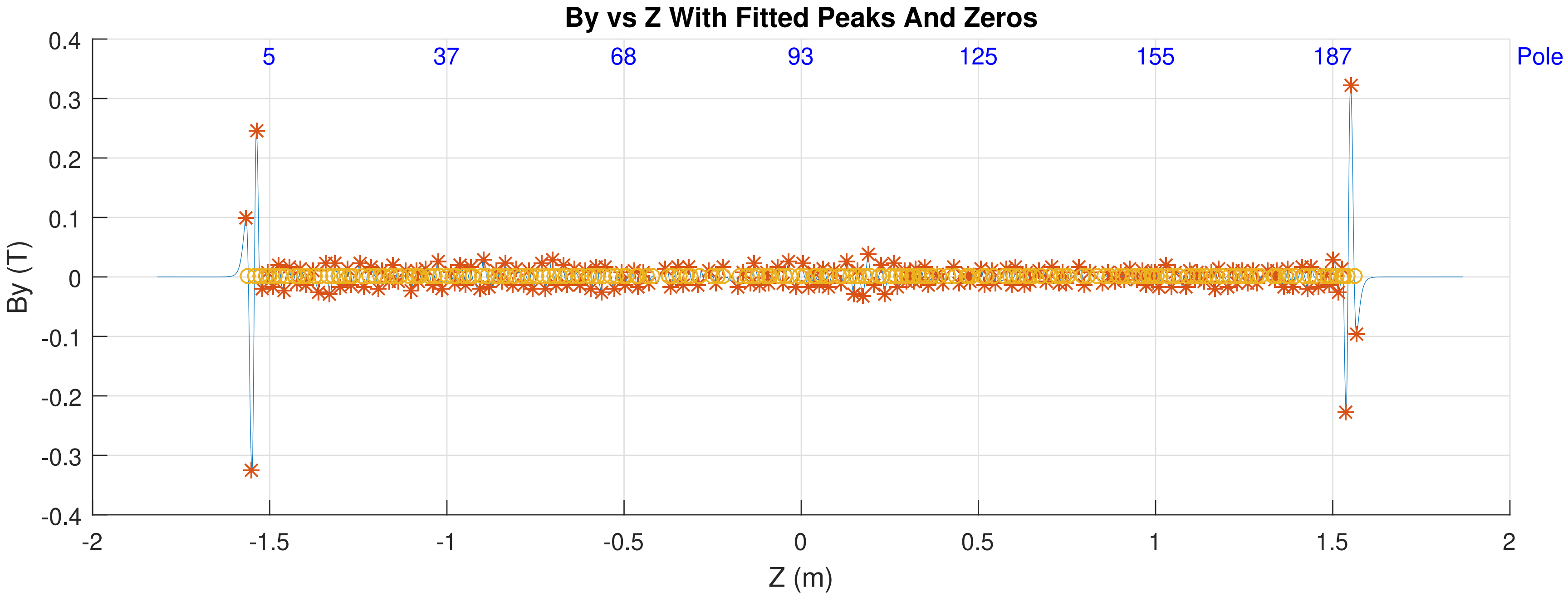
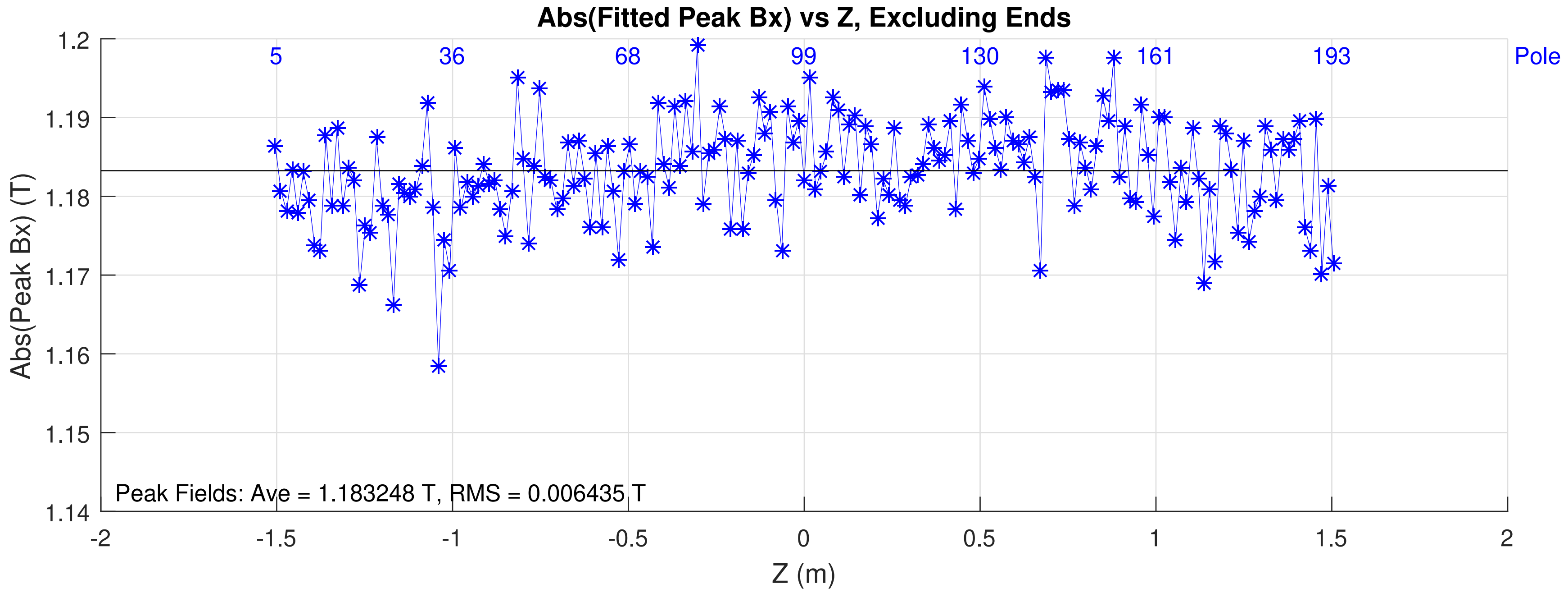


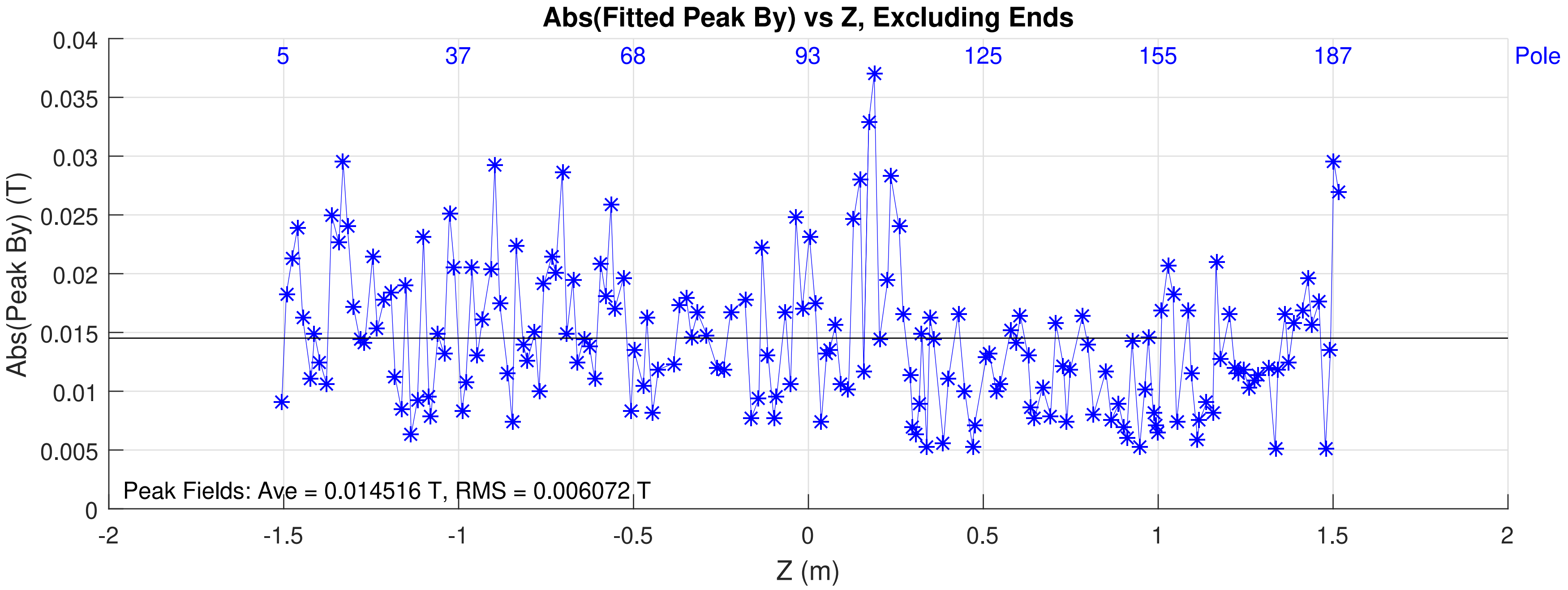
Bx, By, Bz vs Zm
Bx (T)
2
1
0
-1
-2
By (T)
0.4
0.2
0
-0.2
-0.4
Bz (T)
0.1
0.05
0
-0.05
-0.1
0
0.5
1
1.5
2
2.5
3
3.5
4
Zm Measurement Position (m)

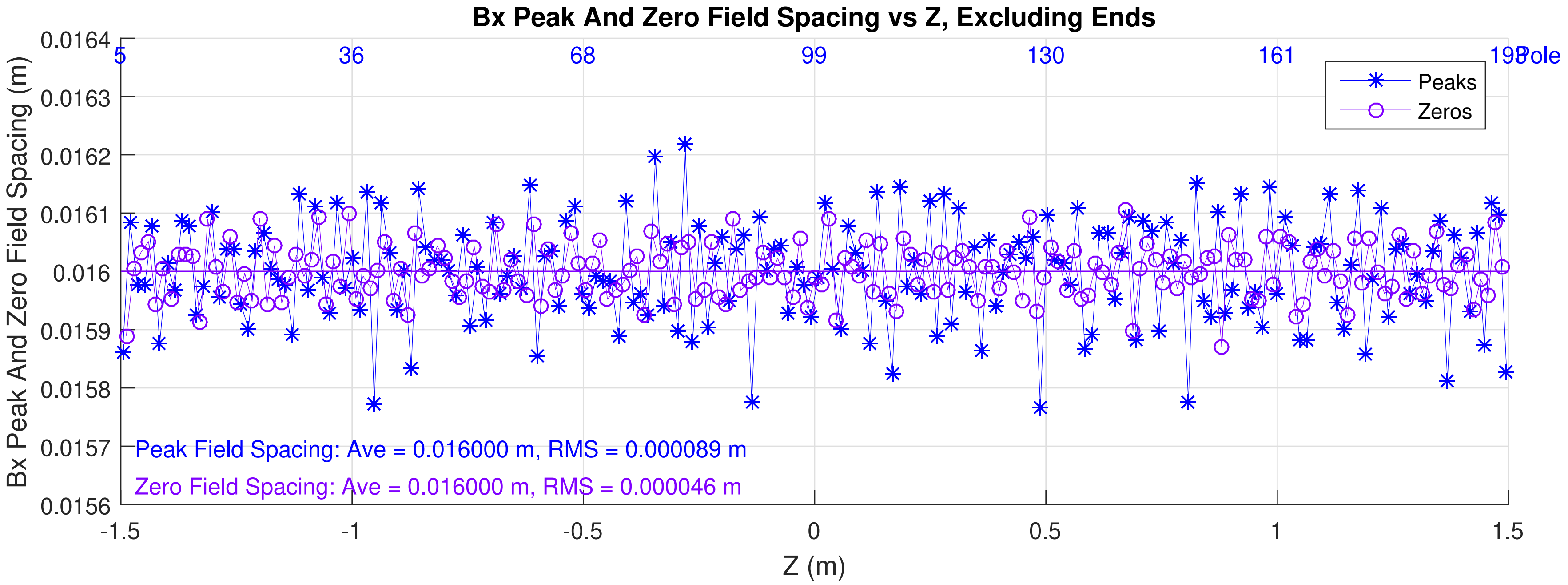

Bx and By vs Z
5
37
68
93
125
155
187
Pole
Bx
By
1.5
1
0.5
0
-0.5
-1
-1.5
Bx, By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)


Bx vs Z With Fitted Peaks And Zeros
5
36
68
99
130
161
193
Pole
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
Bx (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)


By vs Z With Fitted Peaks And Zeros
5
37
68
93
125
155
187
Pole
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

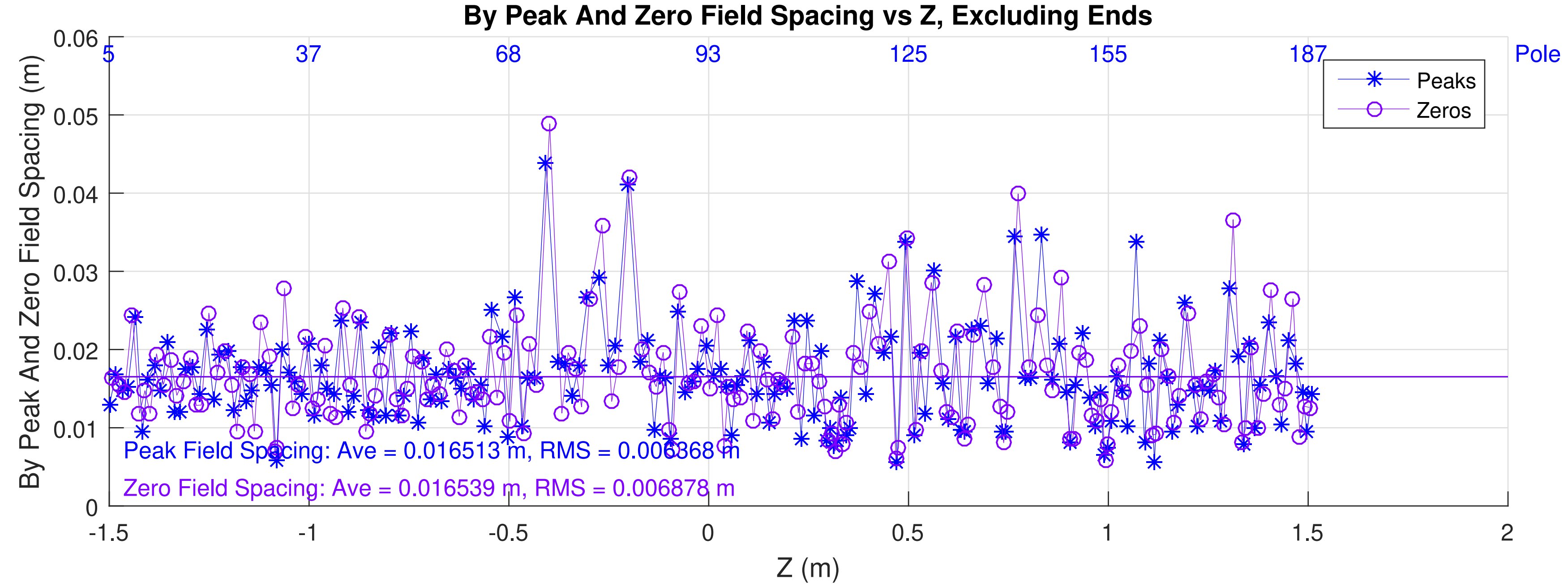

Abs(Fitted Peak Bx) vs Z, Excluding Ends
5
36
68
99
130
161
193
Pole
Abs(Peak Bx) (T)
1.2
1.19
1.18
1.17
1.16
1.15
1.14
Peak Fields: Ave = 1.183248 T, RMS = 0.006435 T
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)


Abs(Fitted Peak By) vs Z, Excluding Ends
5
37
68
93
125
155
187
Pole
Abs(Peak By) (T)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
Peak Fields: Ave = 0.014516 T, RMS = 0.006072 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

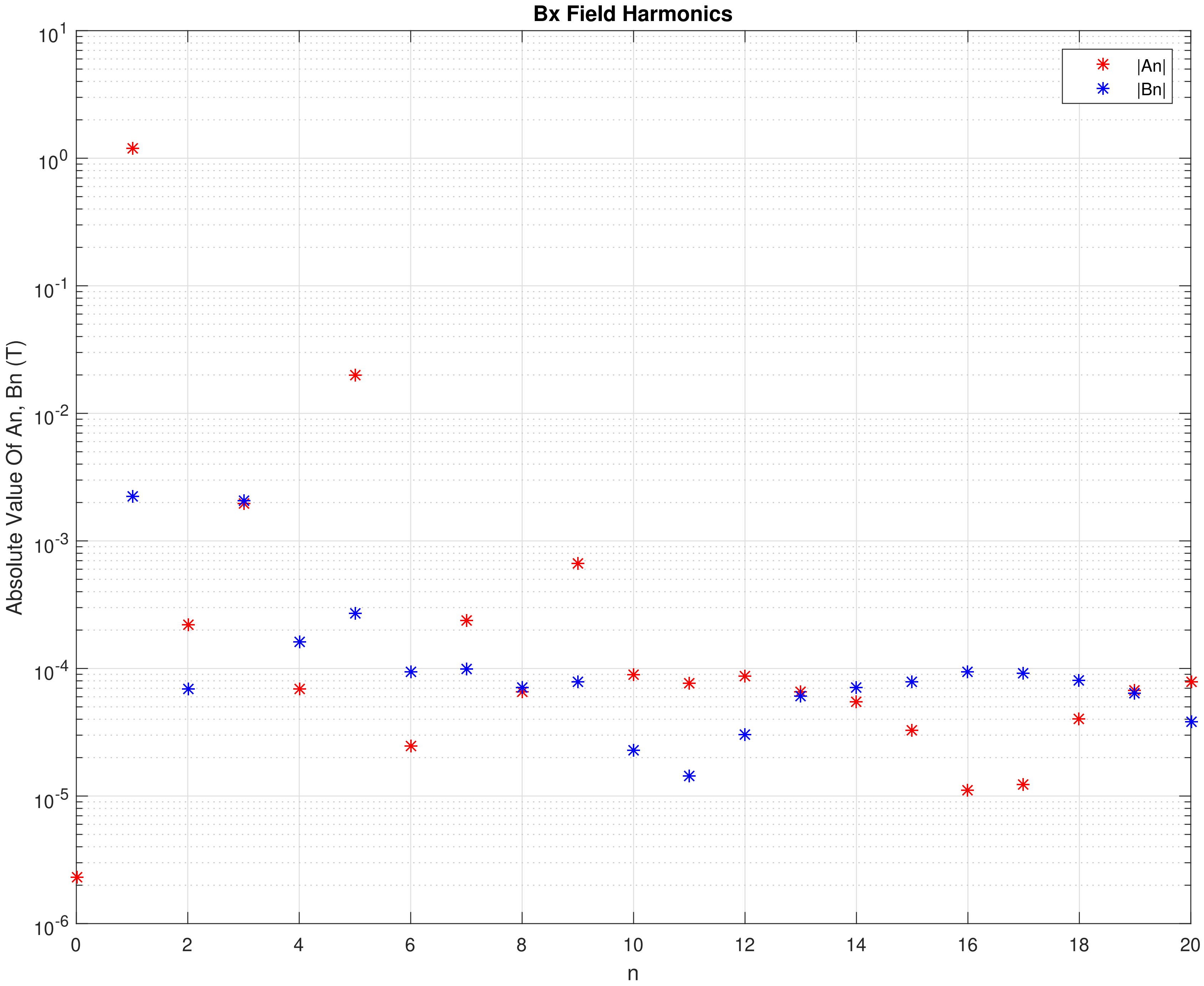
Peak Field Spacing: Ave = 0.016000 m, RMS = 0.000089 m

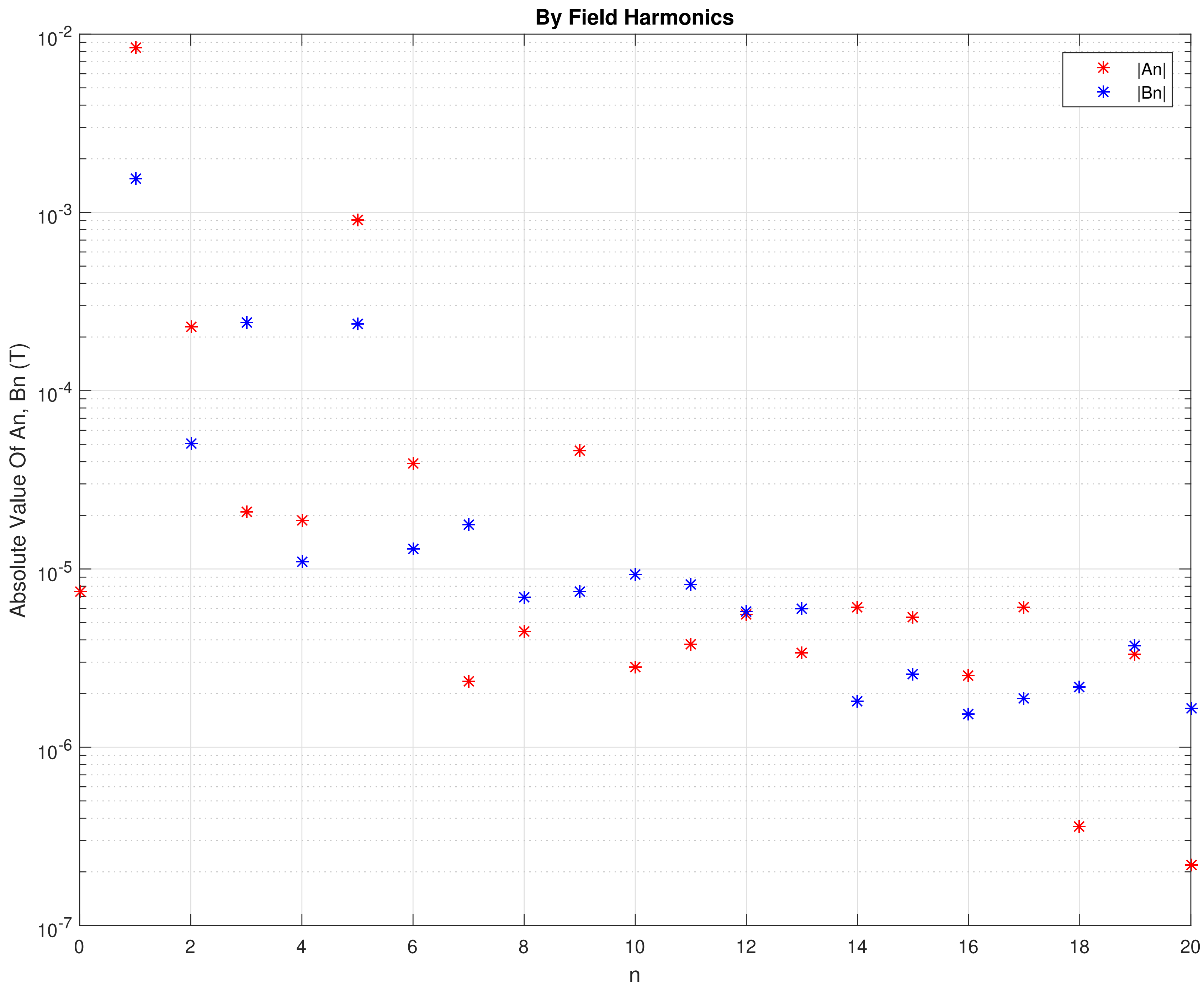
Zero Field Spacing: Ave = 0.016000 m, RMS = 0.000046 m

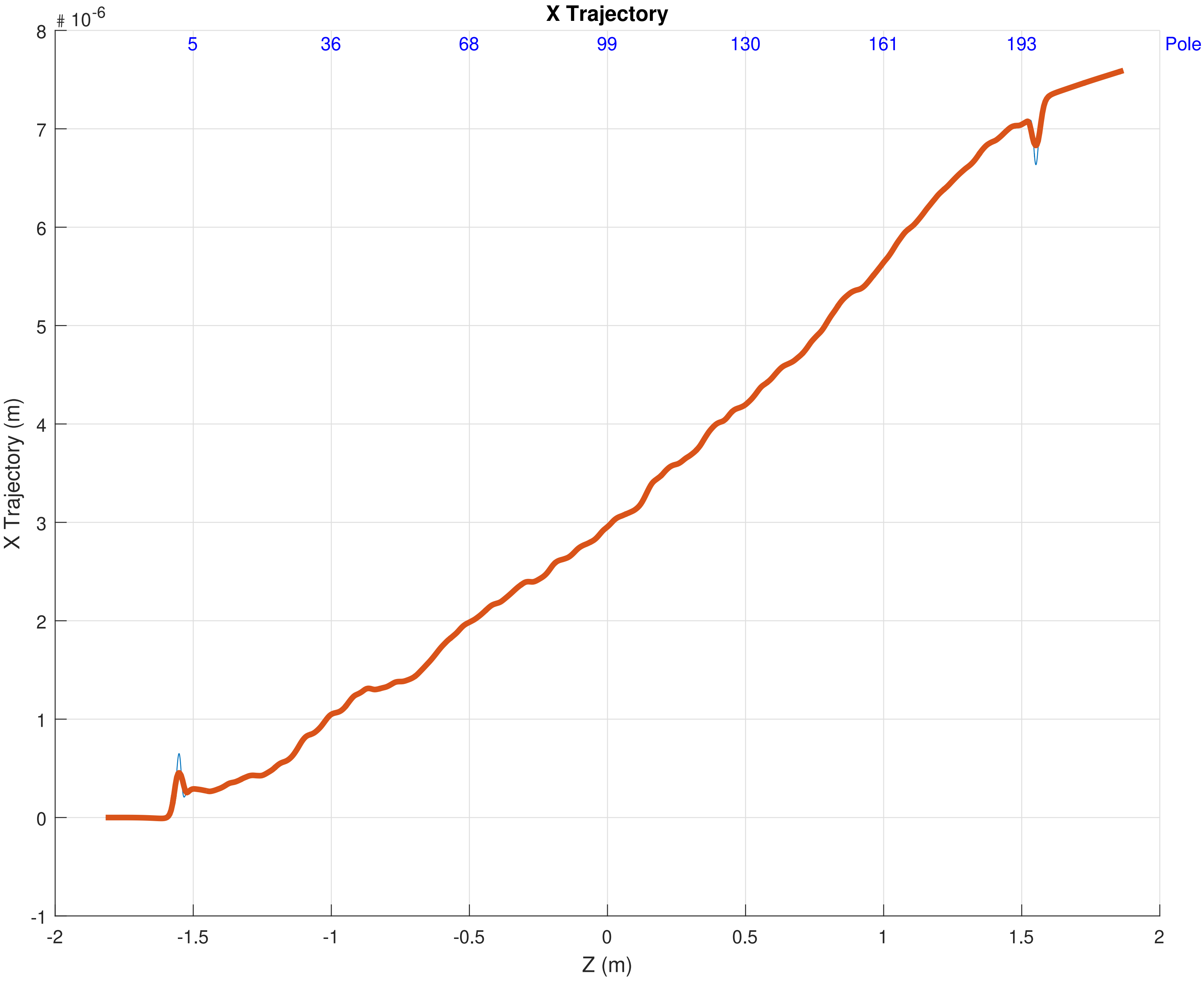

By Peak And Zero Field Spacing vs Z, Excluding Ends

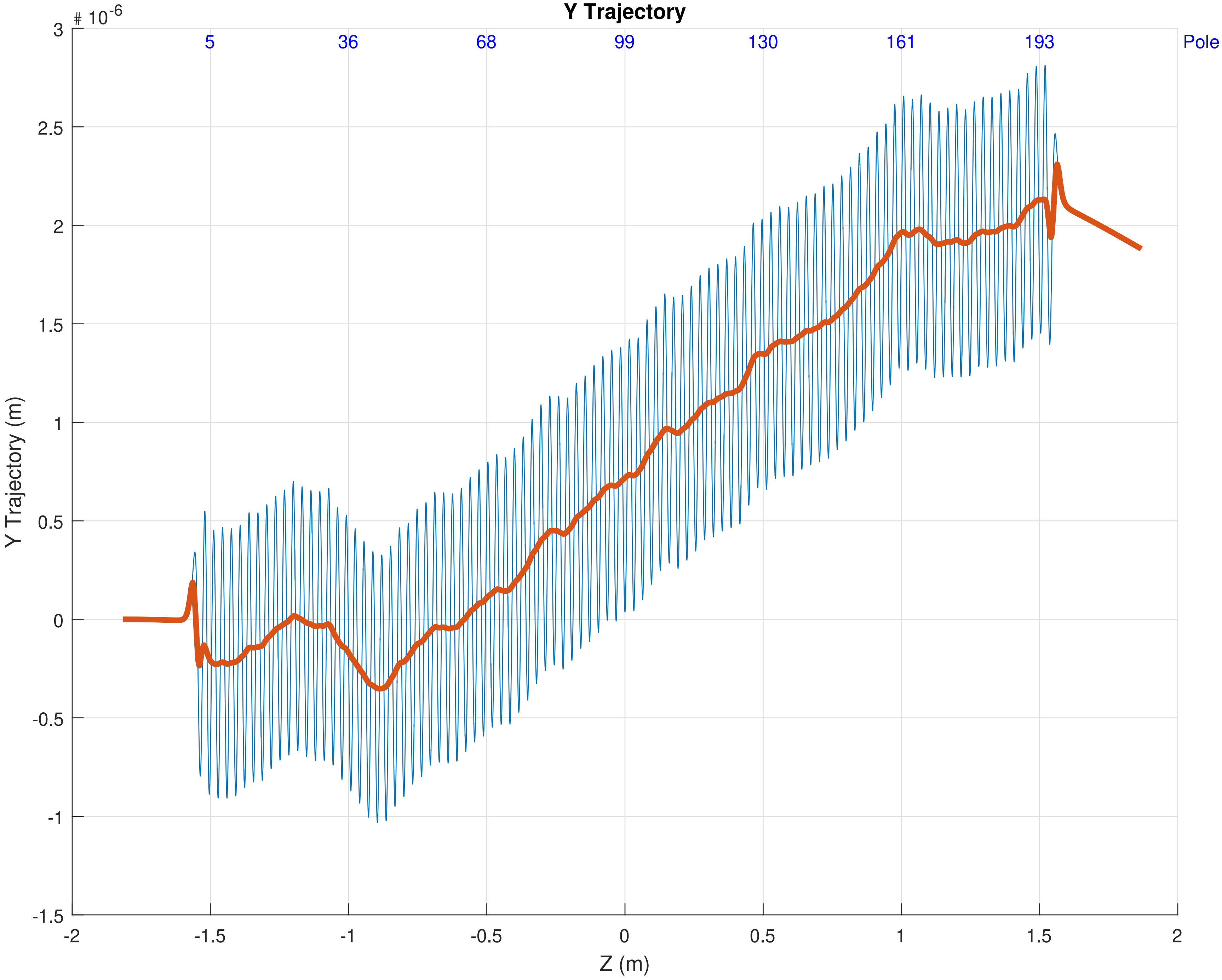
Peak Field Spacing: Ave = 0.016513 m, RMS = 0.006868 m

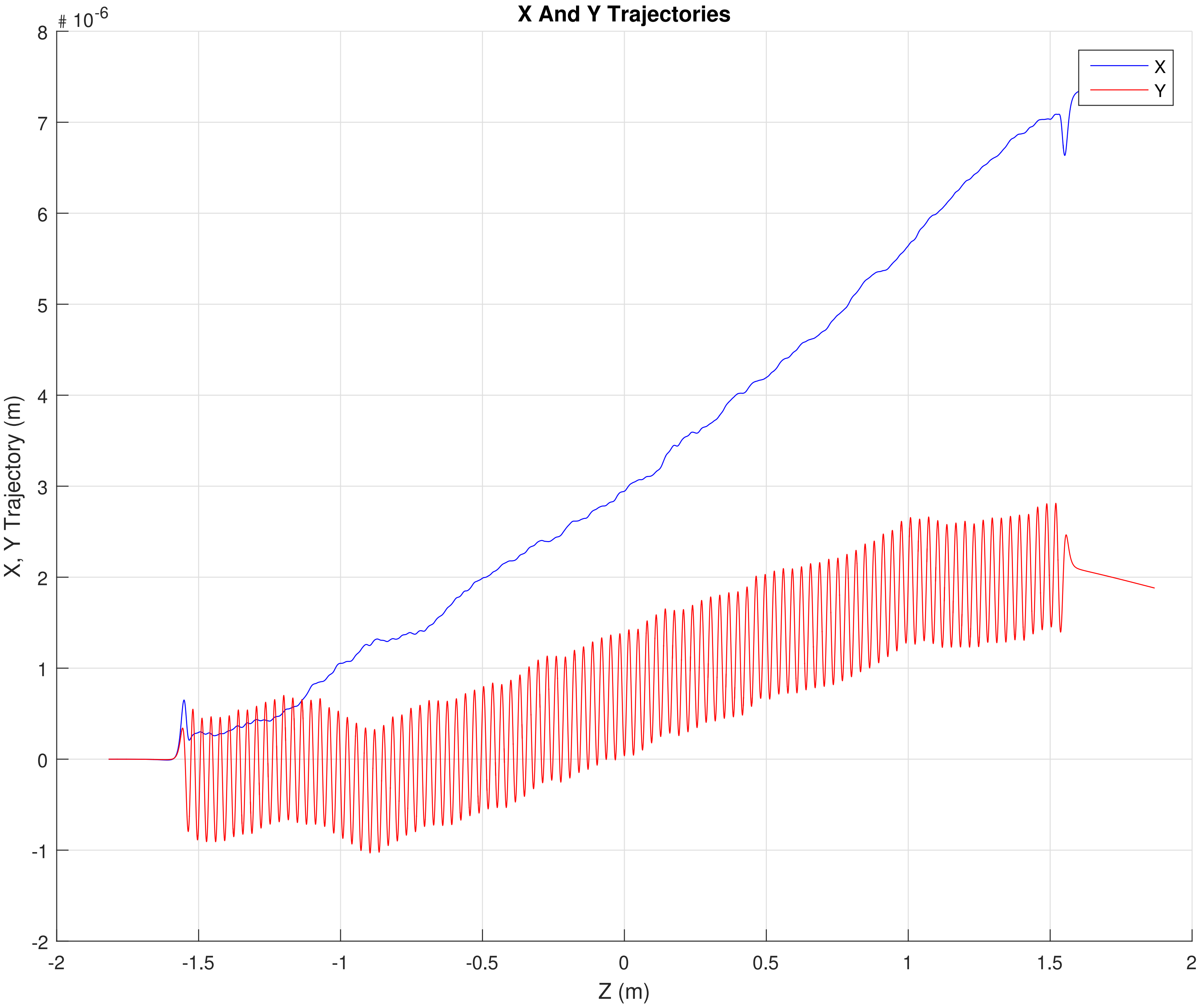
Zero Field Spacing: Ave = 0.016539 m, RMS = 0.006878 m

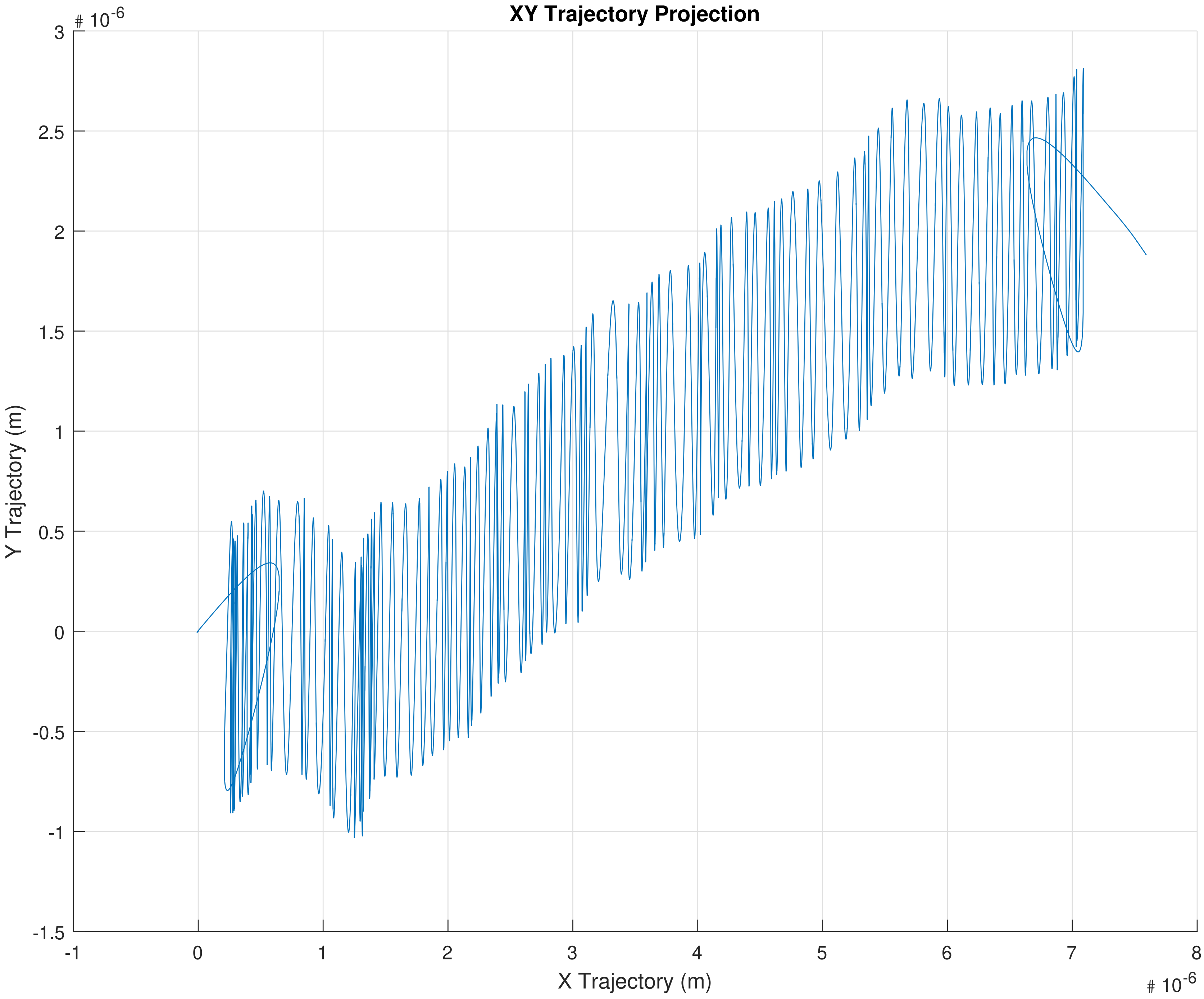

Bx Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
0
2
4
6
8
10
12
14
16
18
20

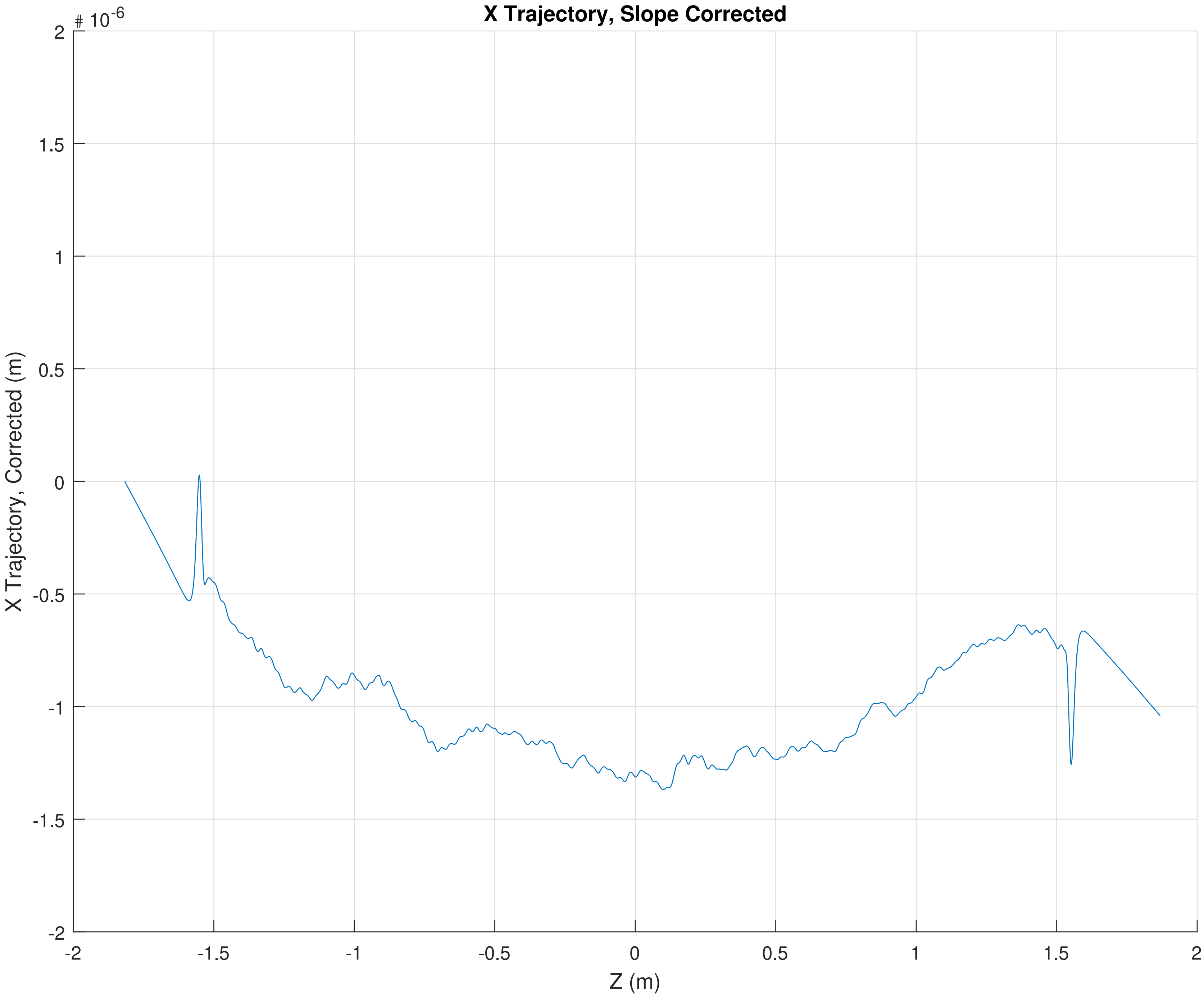

By Field Harmonics
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
Absolute Value Of An, Bn (T)
0
2
4
6
8
10
12
14
16
18
20
n
|An|
|Bn|

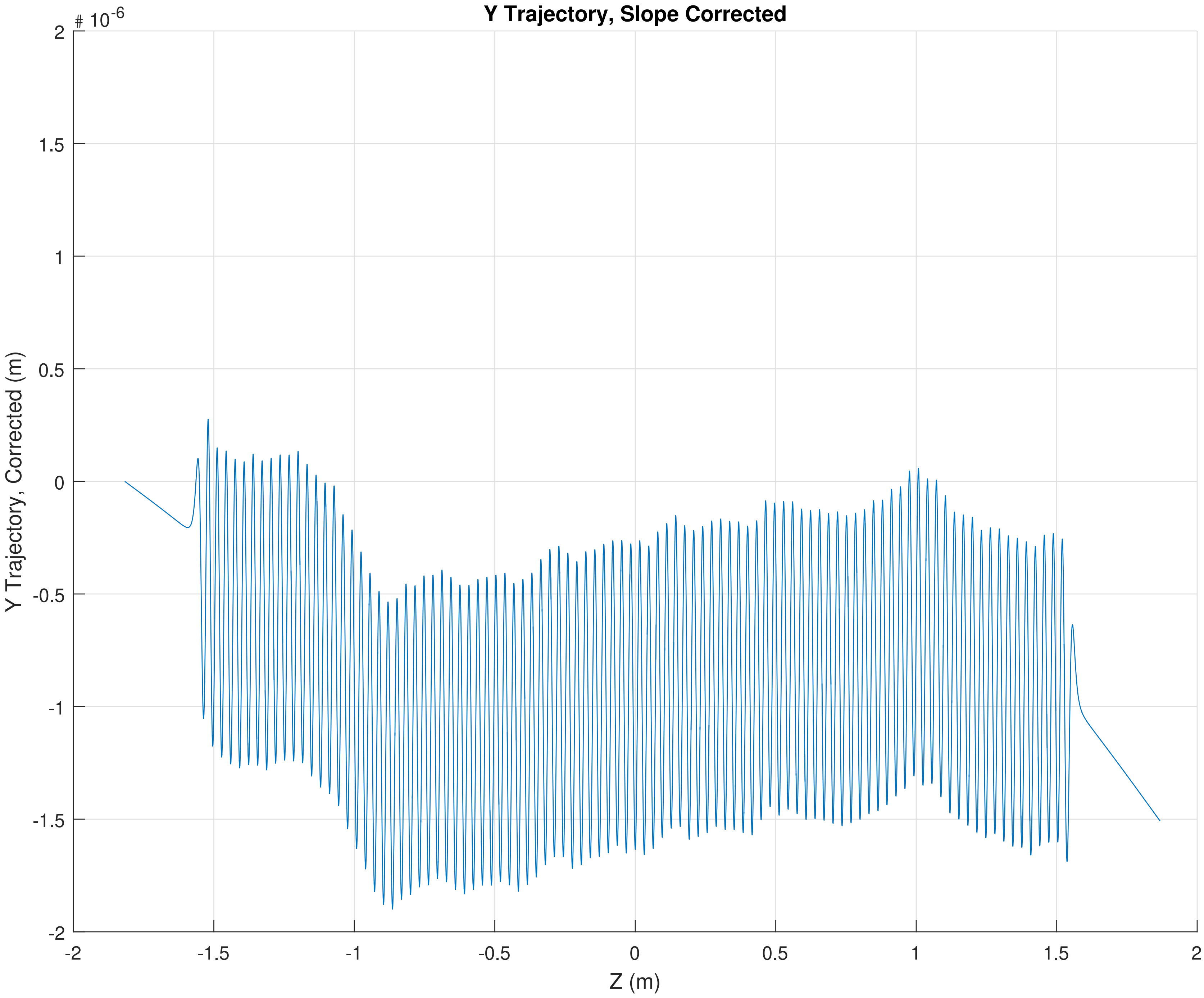

X Trajectory
10-6
X Trajectory (m)
Z (m)
5
36
68
99
130
161
193
Pole
8
7
6
5
4
3
2
1
0
-1
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2

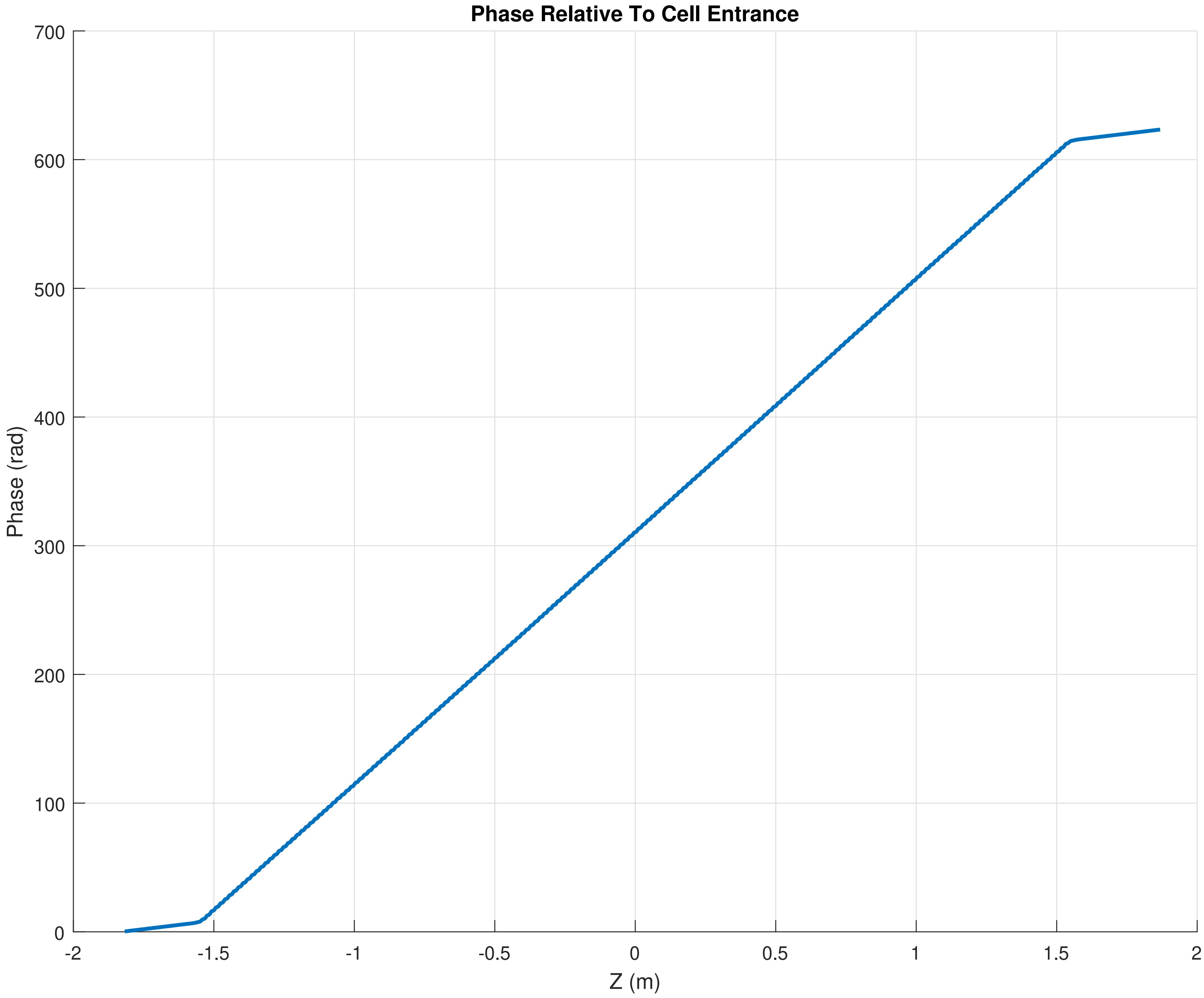

Y Trajectory
10^{-6}
Pole
5
36
68
99
130
161
193
Y Trajectory (m)
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

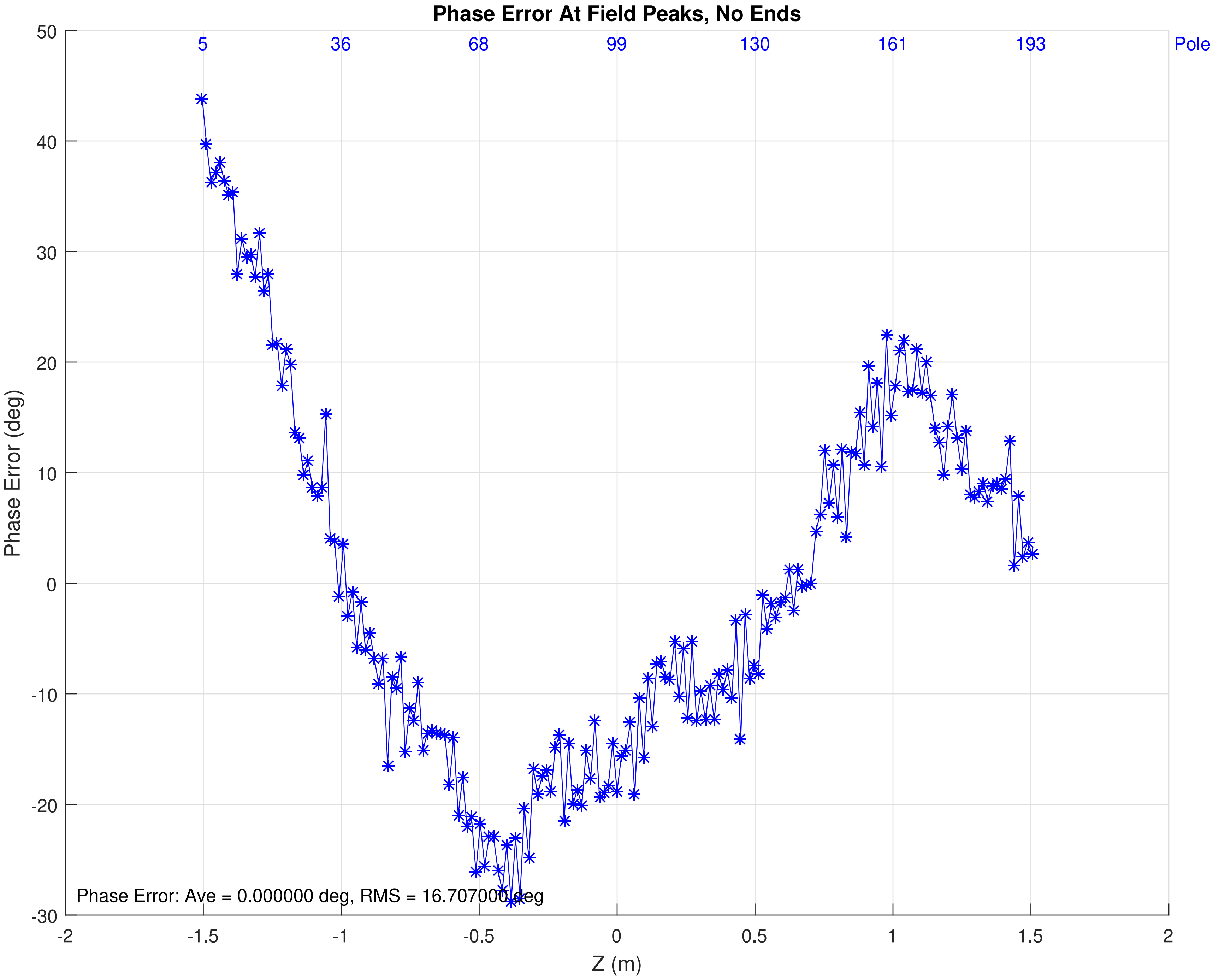

X And Y Trajectories
10^-6
8
7
6
5
4
3
2
1
0
-1
-2
X, Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
X
Y

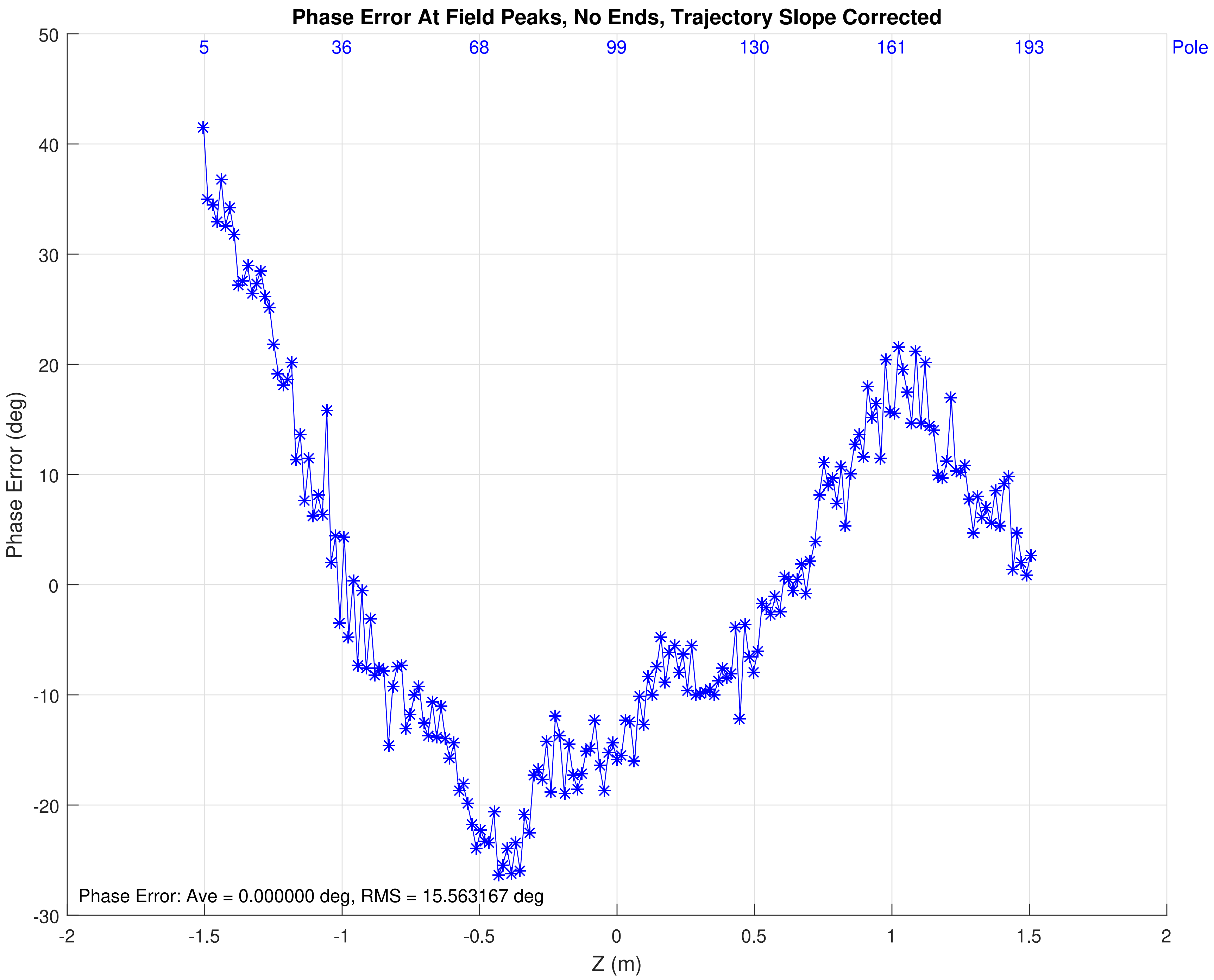

XY Trajectory Projection
10-6
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
Y Trajectory (m)
-1
0
1
2
3
4
5
6
7
8
X Trajectory (m)
10-6


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


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

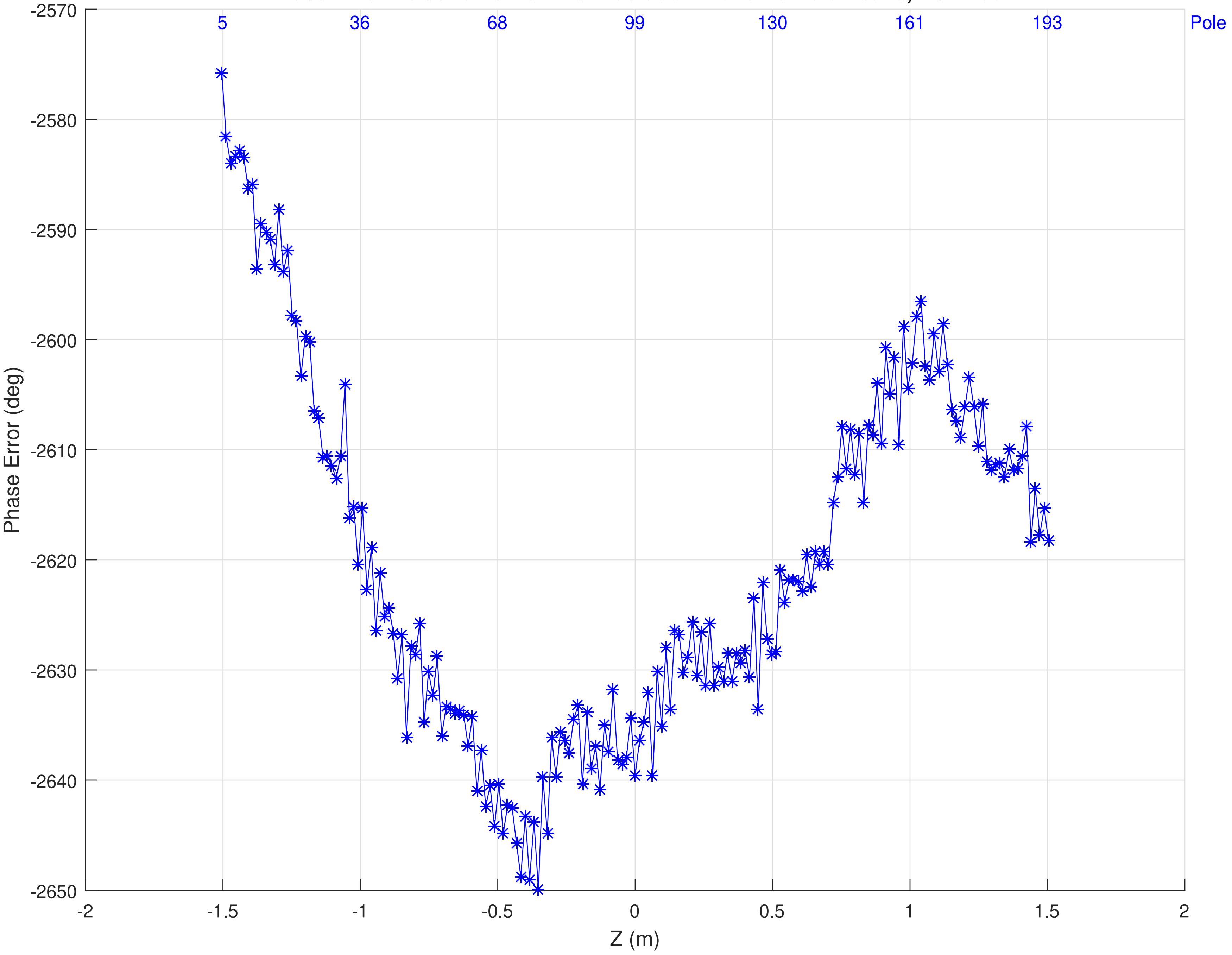

Phase Error At Field Peaks, No Ends
5
36
68
99
130
161
193
Pole
50
40
30
20
10
0
-10
-20
-30
Phase Error (deg)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
Phase Error: Ave = 0.000000 deg, RMS = 16.707000 deg

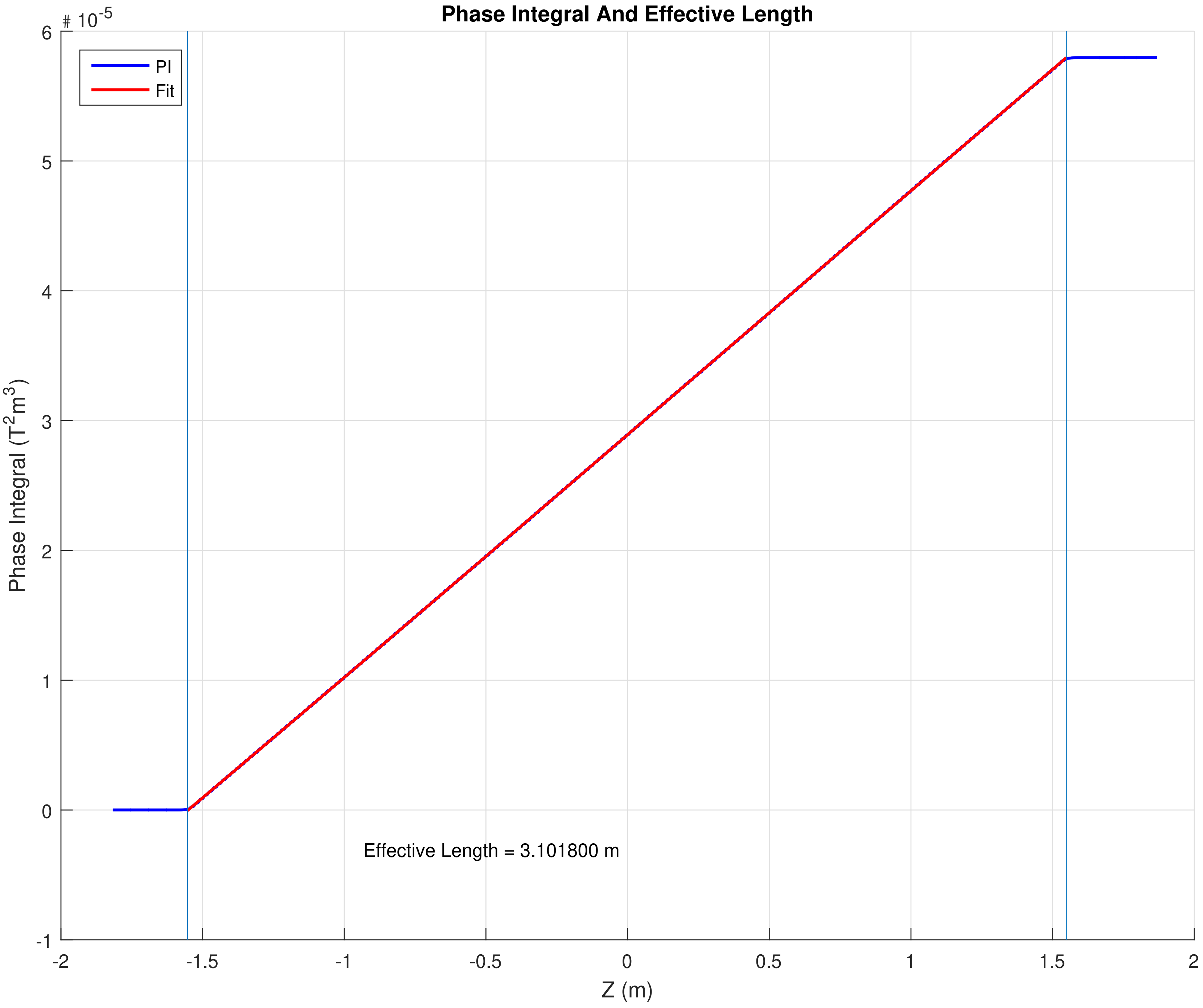


Phase Error At Field Peaks, No Ends, Trajectory Slope Corrected

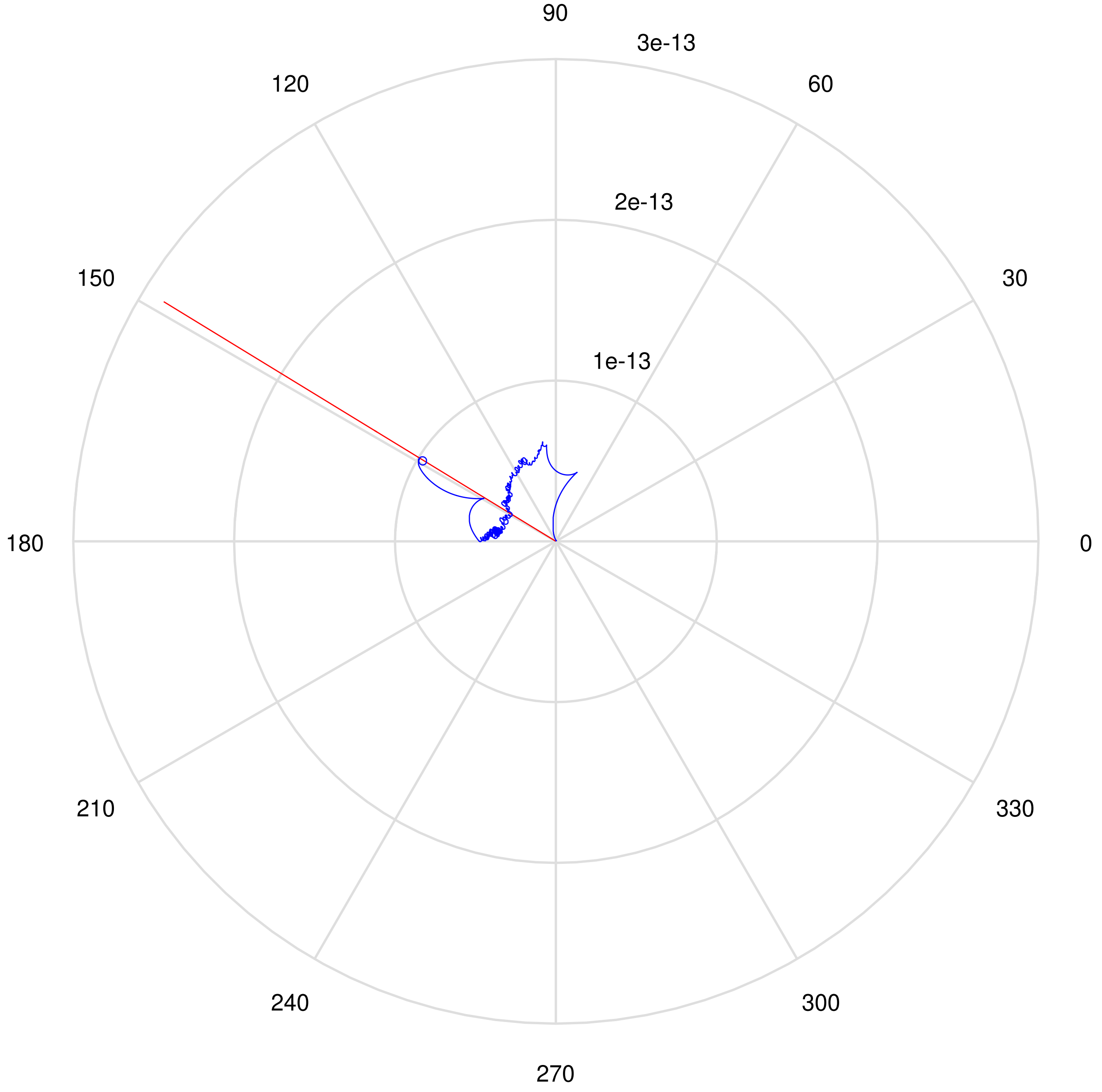
Phase Error: Ave = 0.000000 deg, RMS = 15.563167 deg

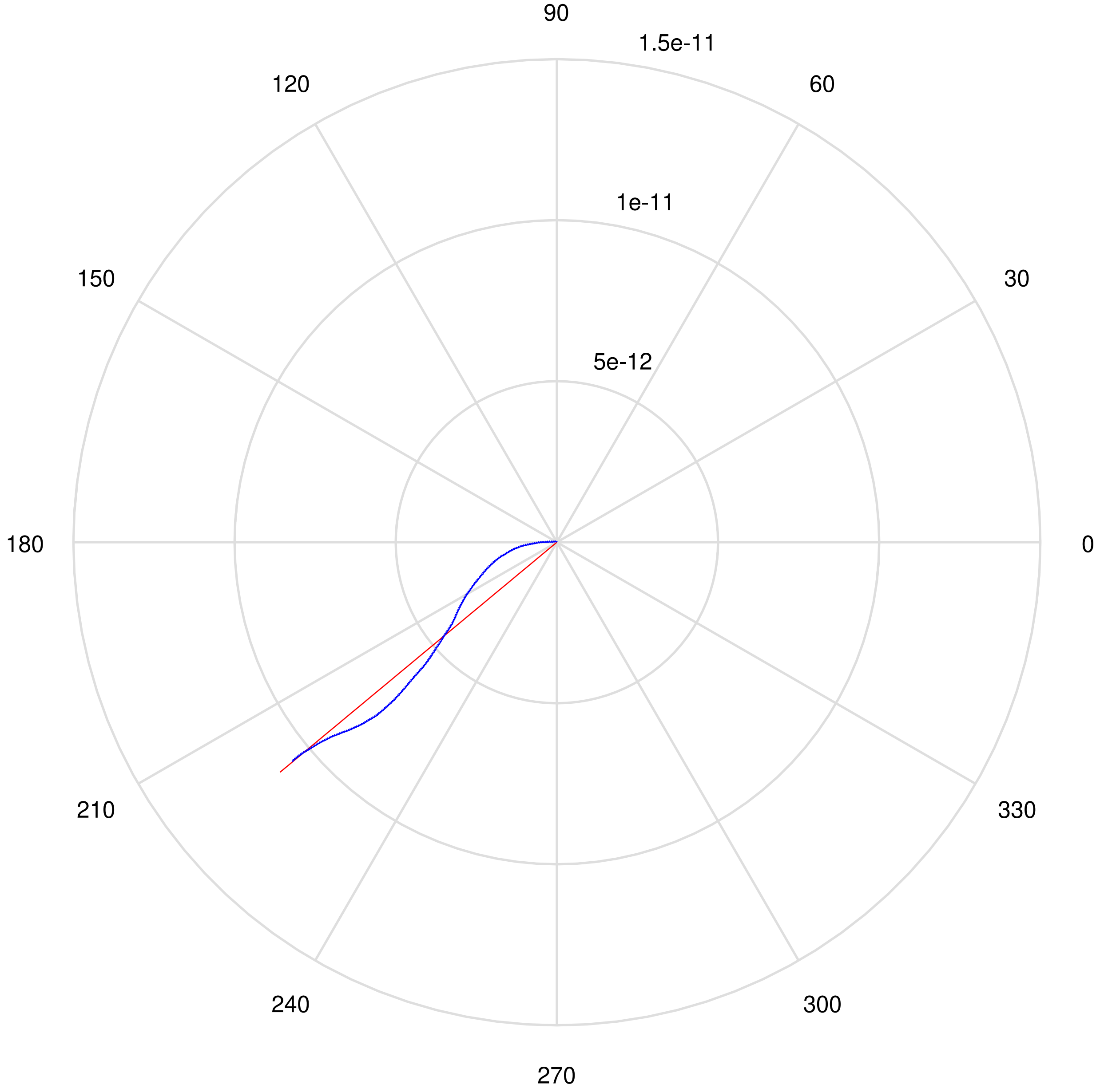
Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends



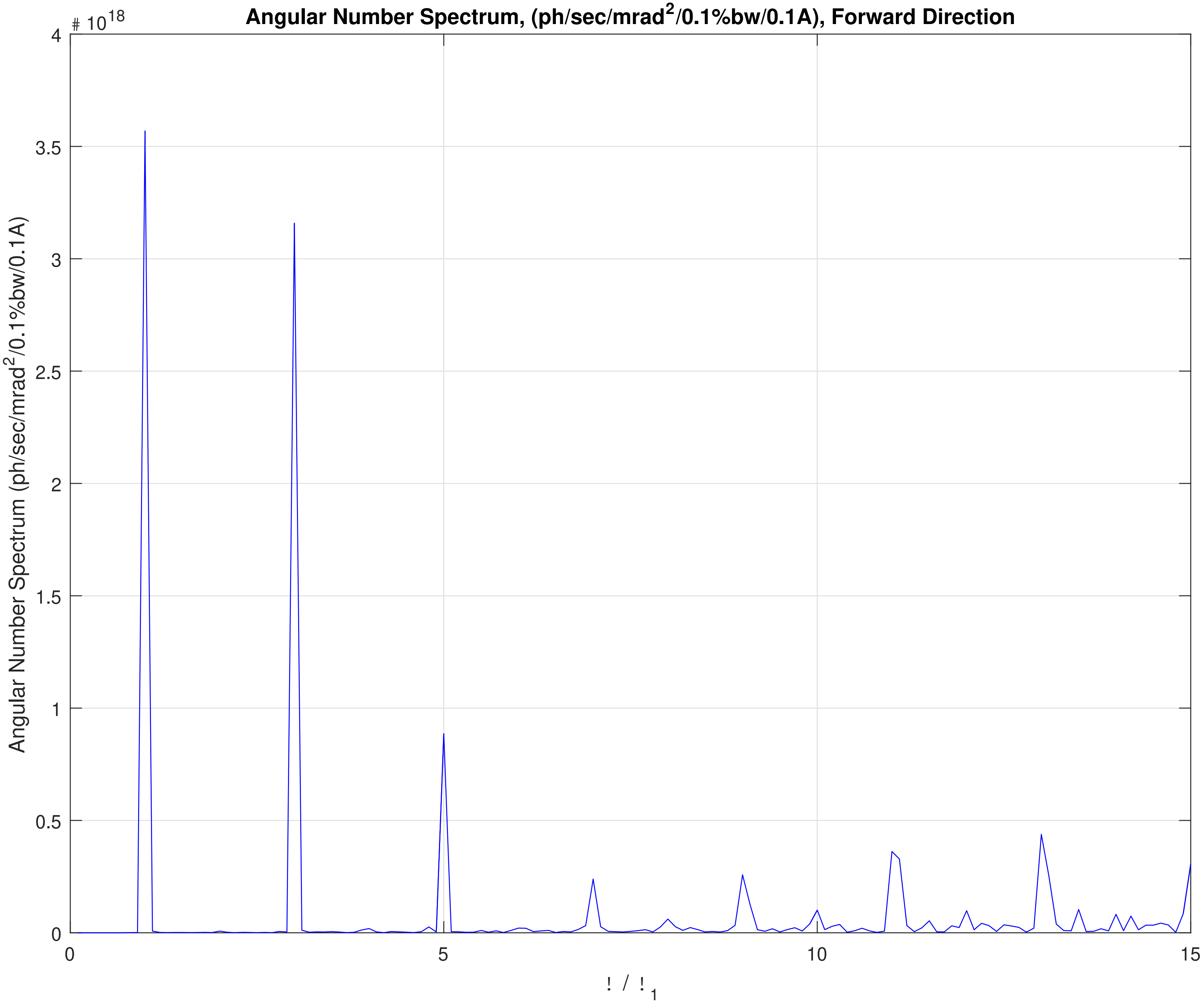

Phase Integral And Effective Length
10^{-5}
6
5
4
3
2
1
0
-1
Phase Integral (T^{2}m^3)
PI
Fit
Effective Length = 3.101800 m
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

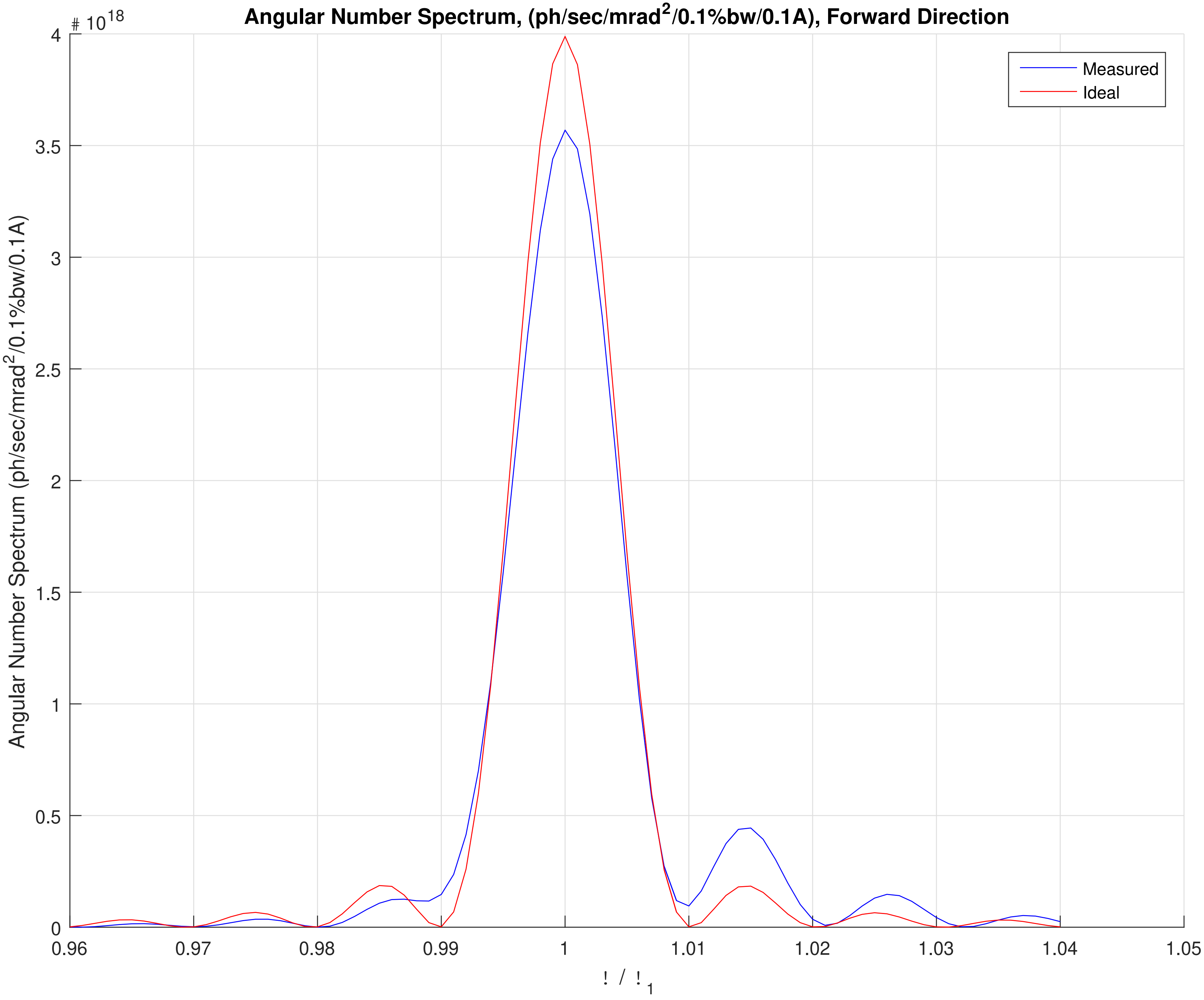
Re and Im Parts Of Ex(!), Forward Direction, ! = $!_1$

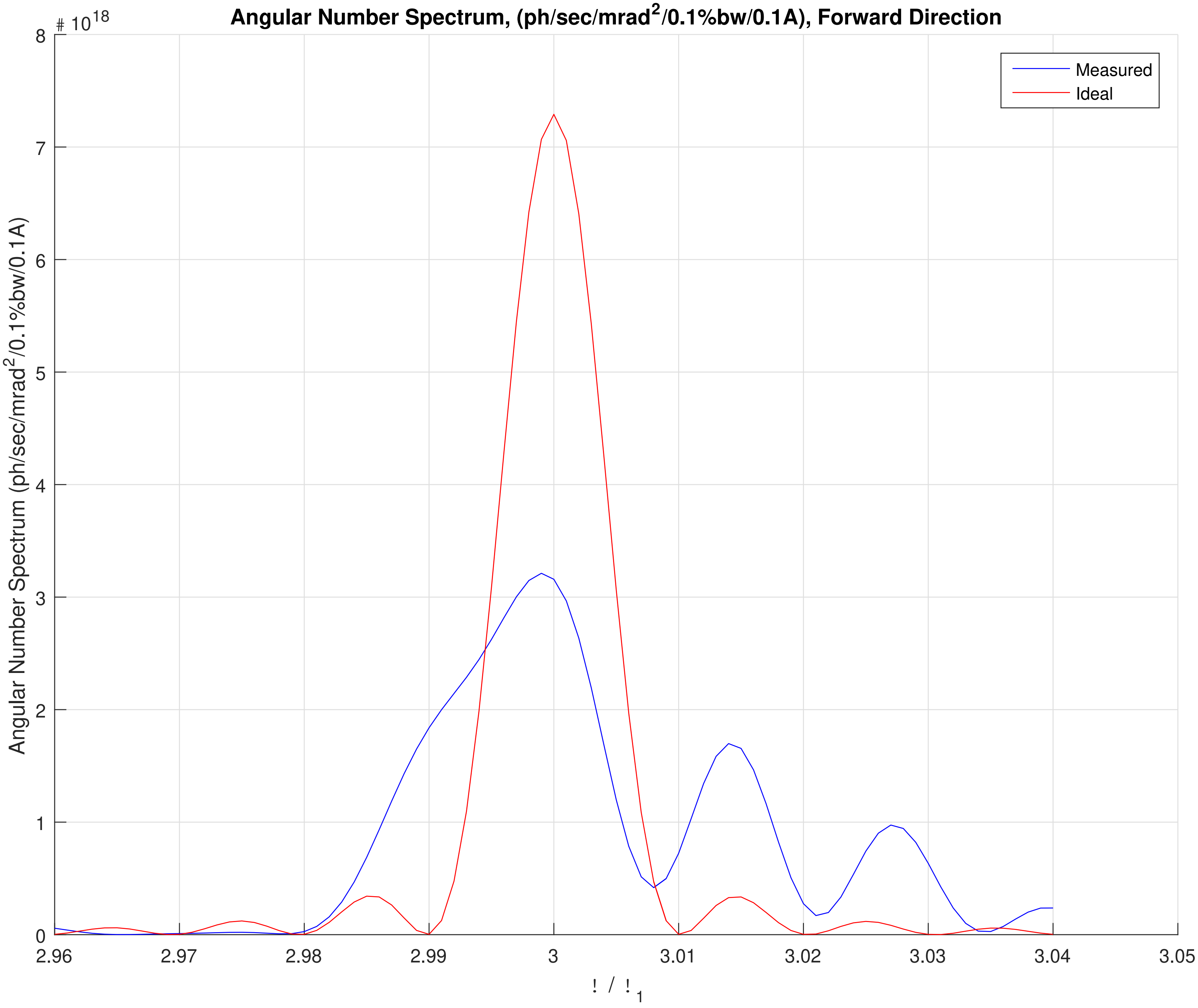


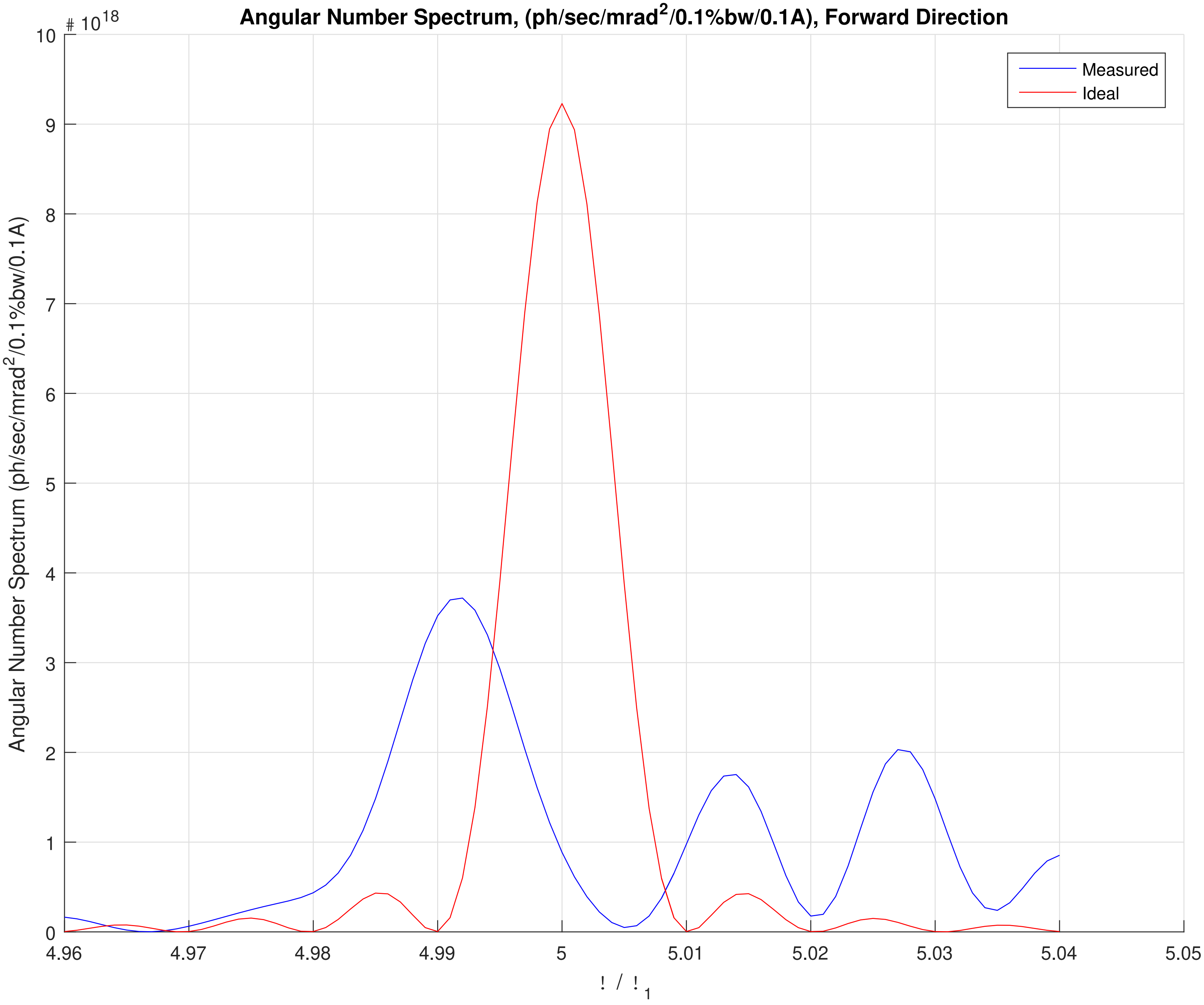


Re and Im Parts Of Ey(!), Forward Direction, ! = !$_1$


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


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


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)
Measured
Ideal
4.96
4.97
4.98
4.99
5
5.01
5.02
5.03
5.04
5.05
! / !$_1$