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SLAC Magnetic Measurements

EPU Analysis
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Parameters:
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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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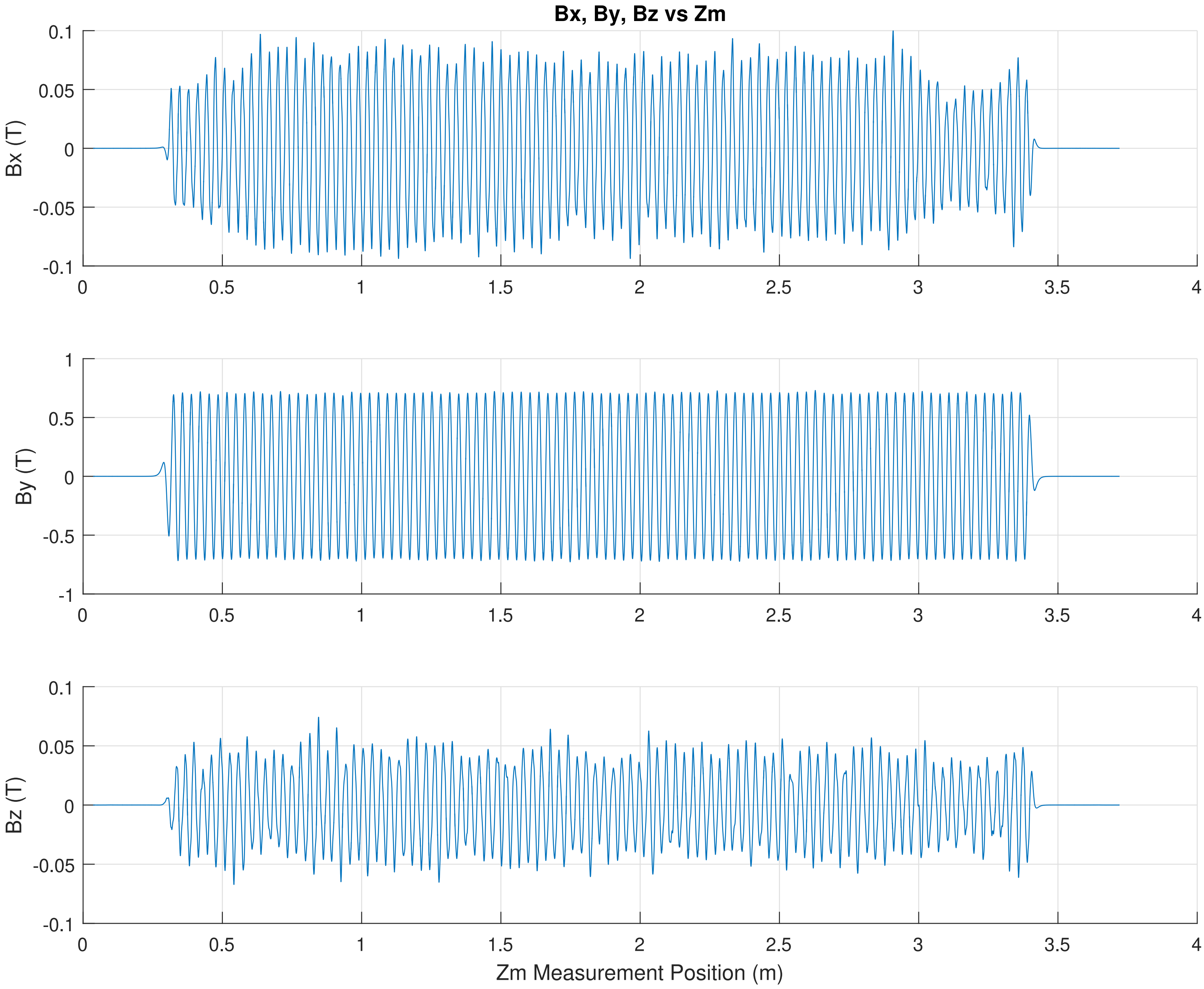
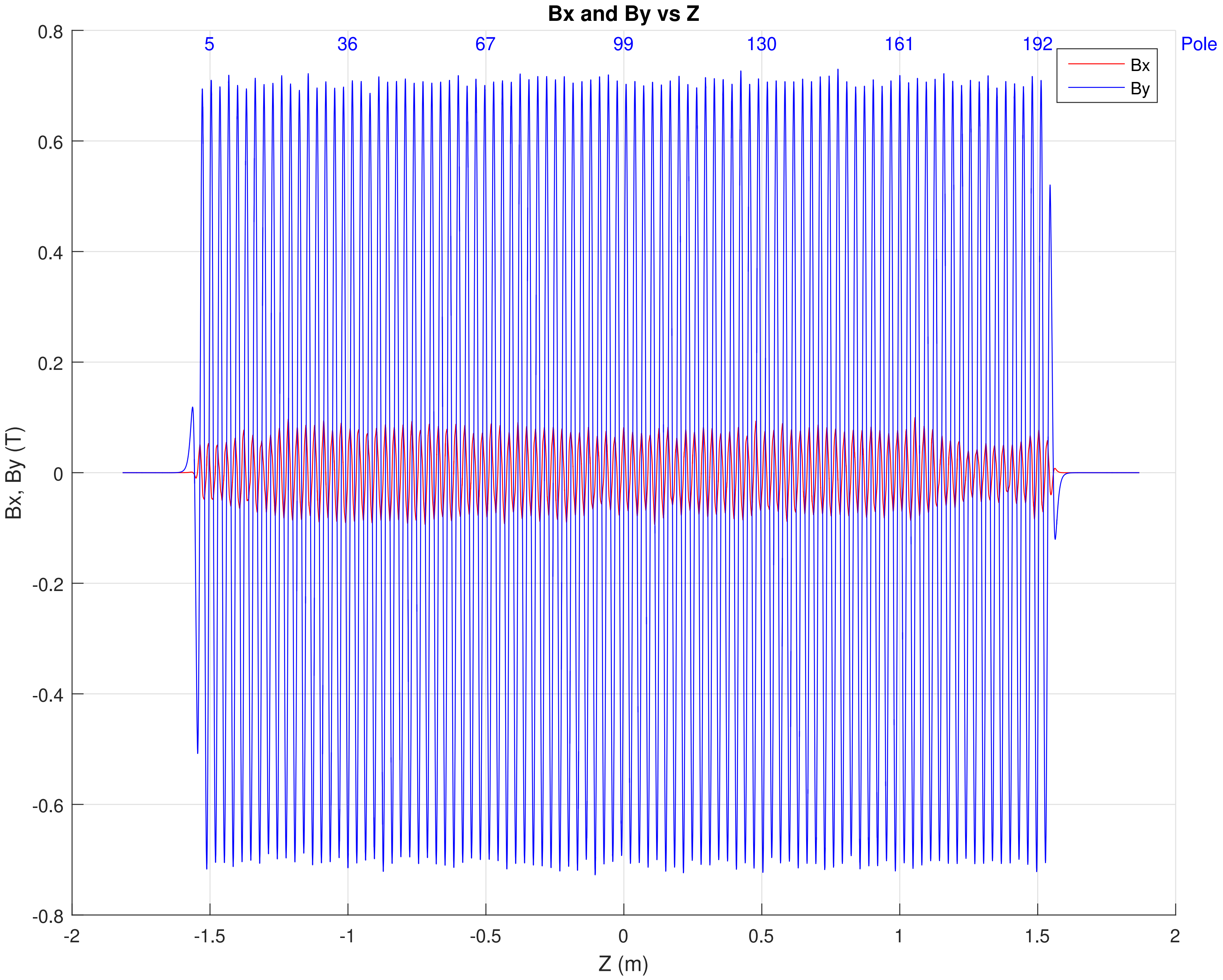
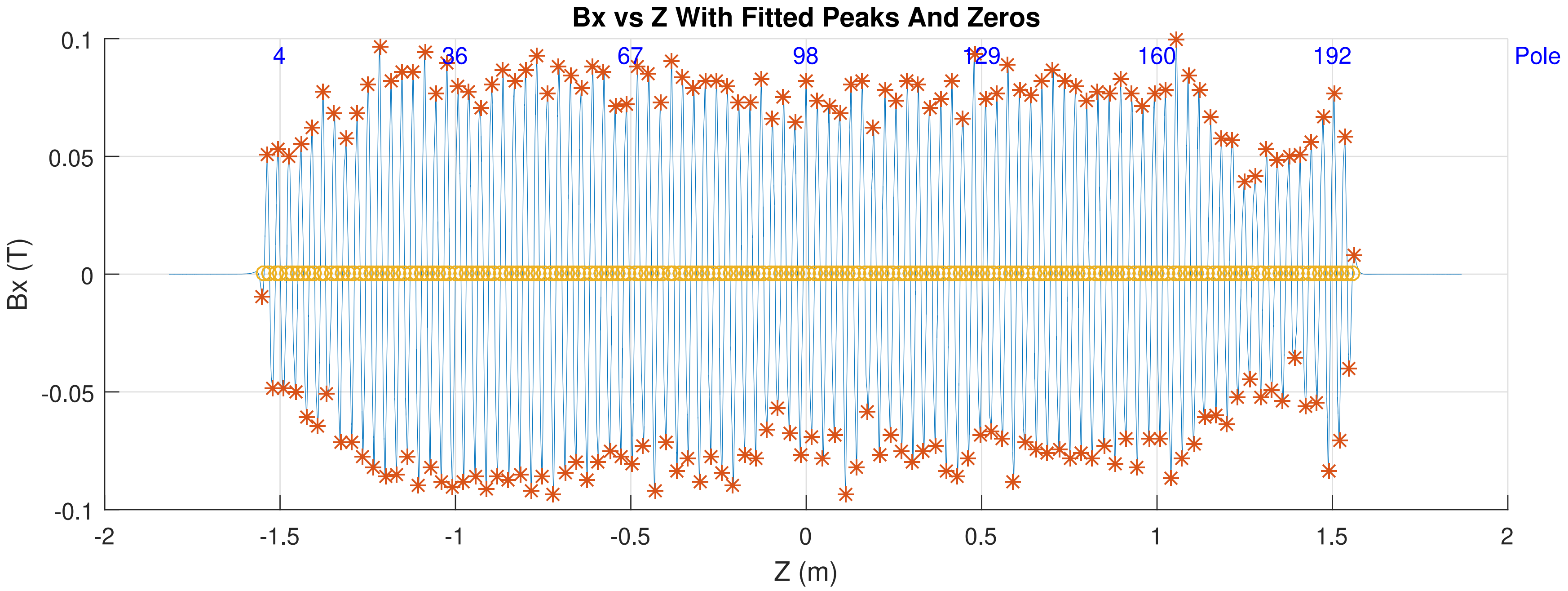
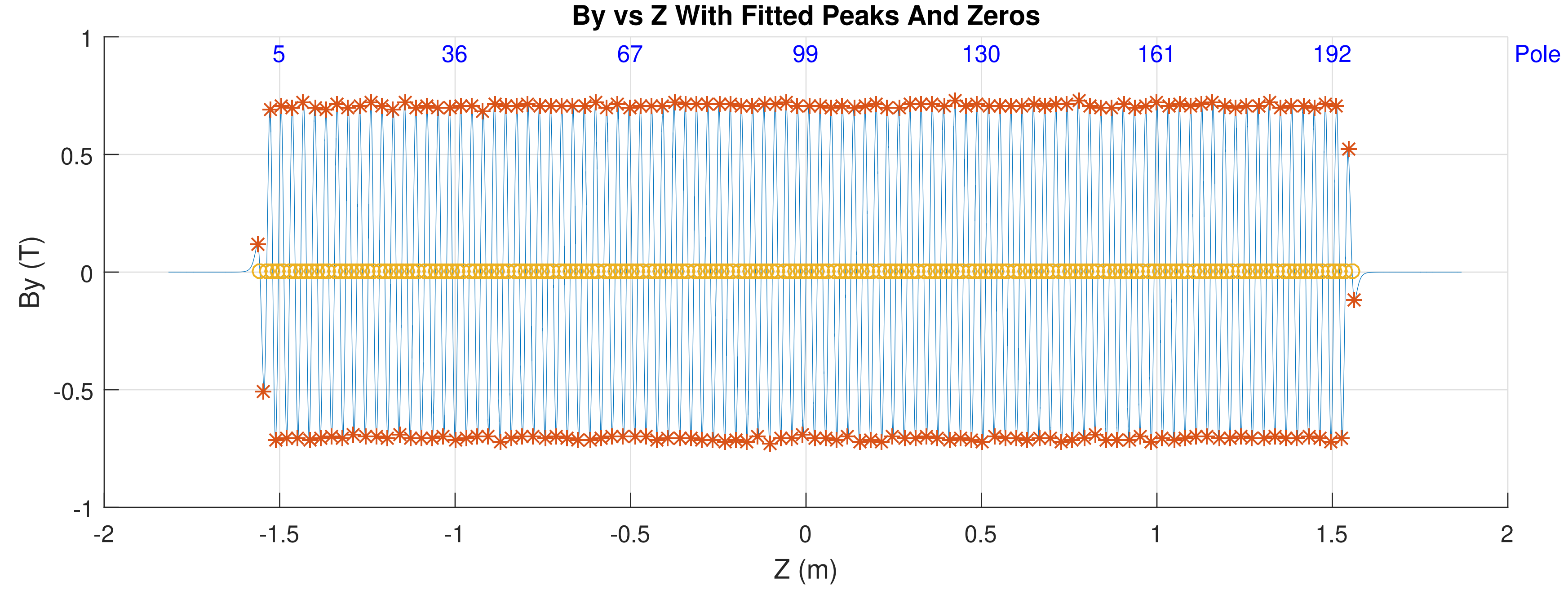
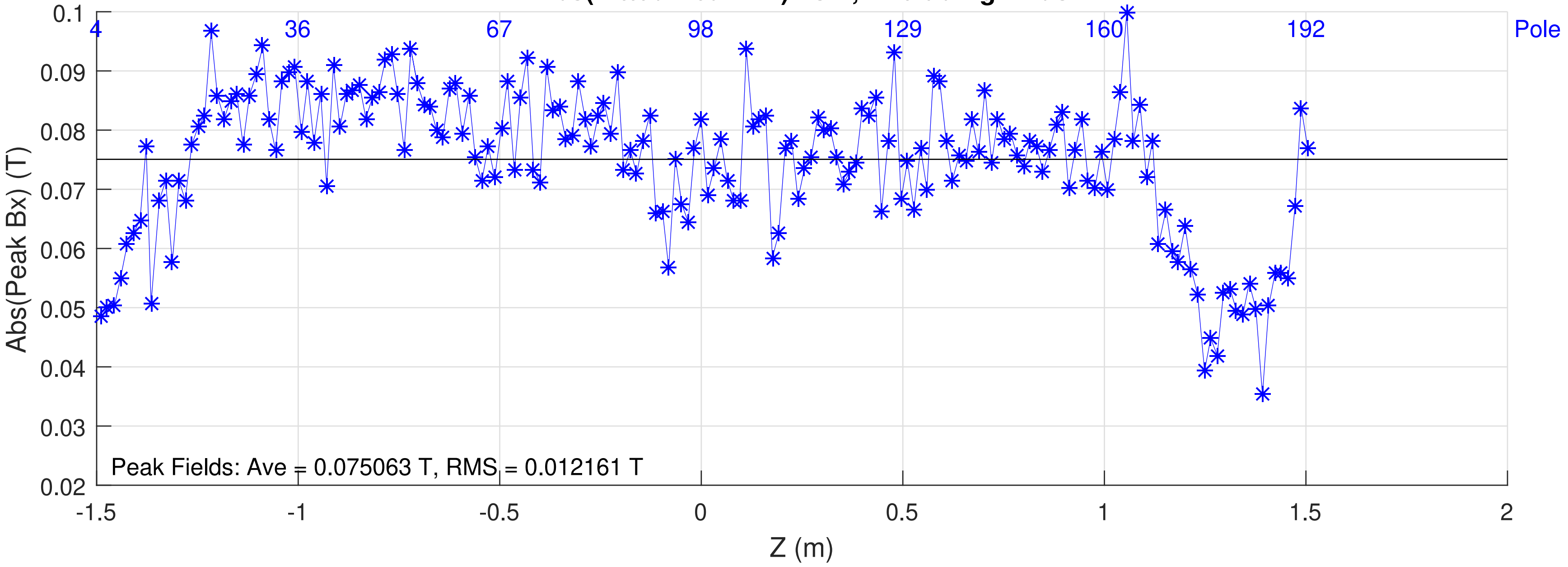

Bx, By, Bz vs Zm
Bx (T)
0.1
0.05
0
-0.05
-0.1
0
0.5
1
1.5
2
2.5
3
3.5
4
By (T)
1
0.5
0
-0.5
-1
0
0.5
1
1.5
2
2.5
3
3.5
4
Bz (T)
0.1
0.05
0
-0.05
-0.1
0
0.5
1
1.5
2
2.5
3
3.5
4
Zm Measurement Position (m)


Bx and By vs Z
5
36
67
99
130
161
192
Pole
Bx
By
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)

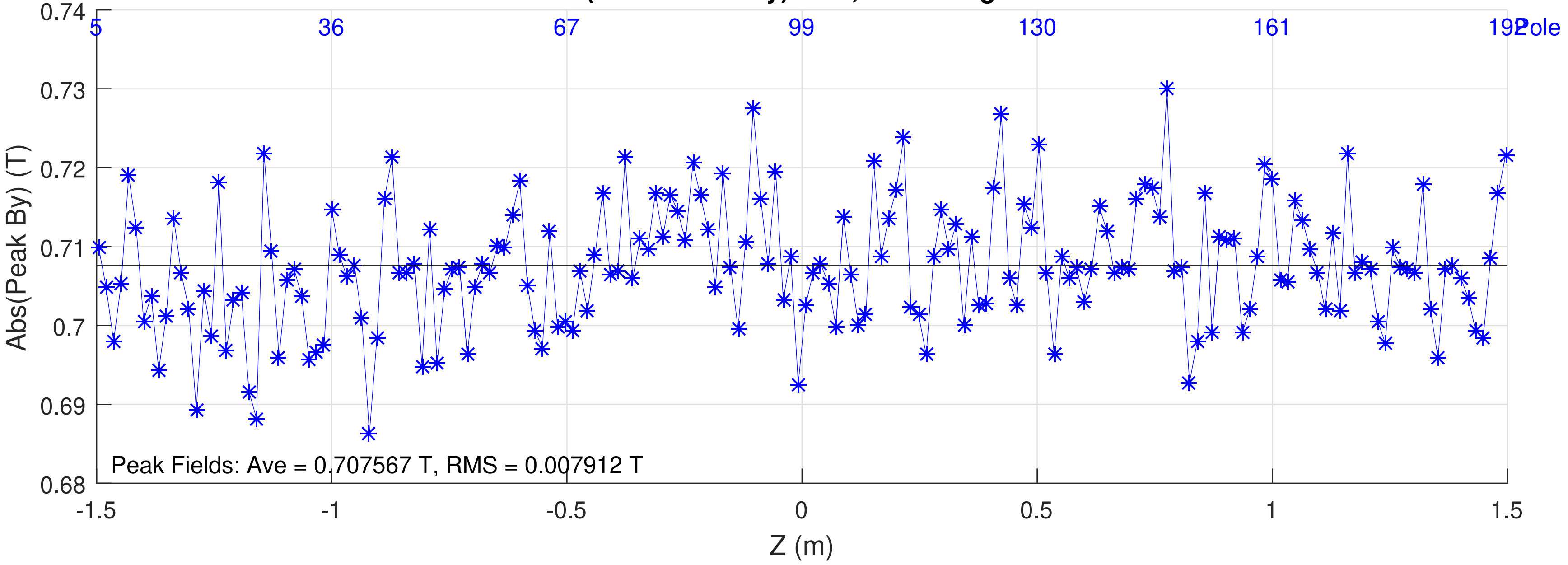

Bx vs Z With Fitted Peaks And Zeros


By vs Z With Fitted Peaks And Zeros



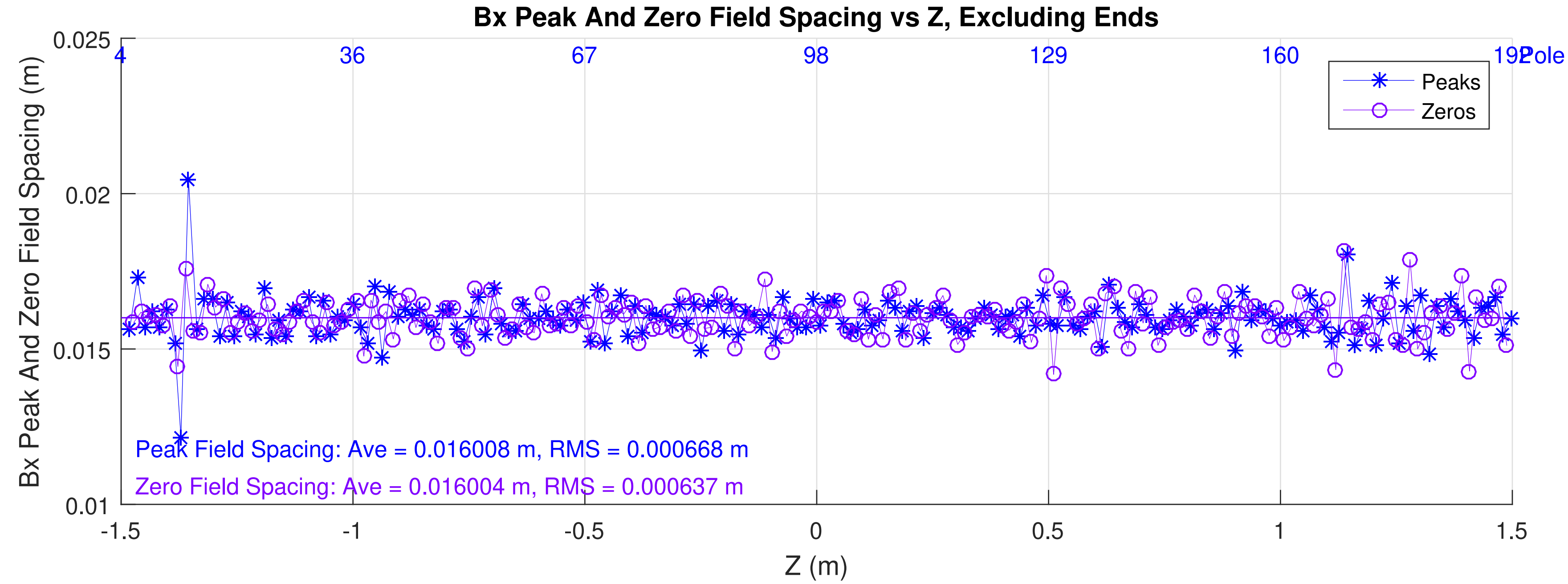
Abs(Fitted Peak Bx) vs Z, Excluding Ends

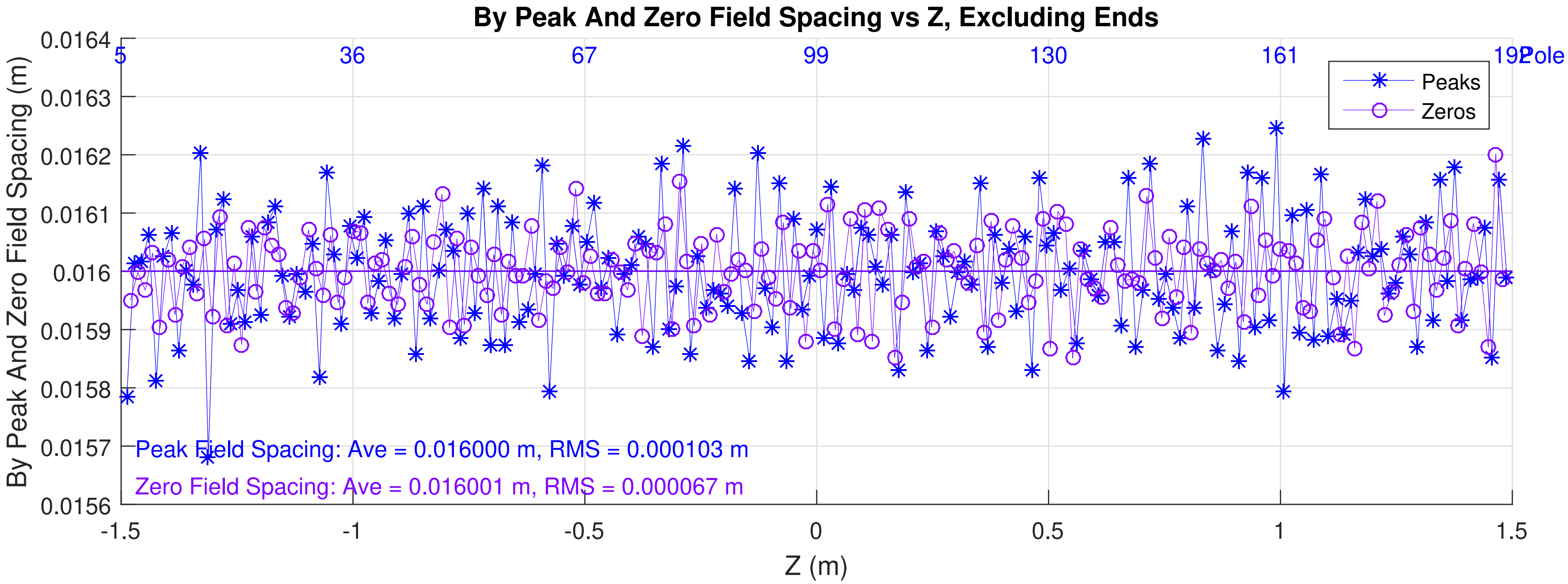
Peak Fields: Ave = 0.075063 T, RMS = 0.012161 T

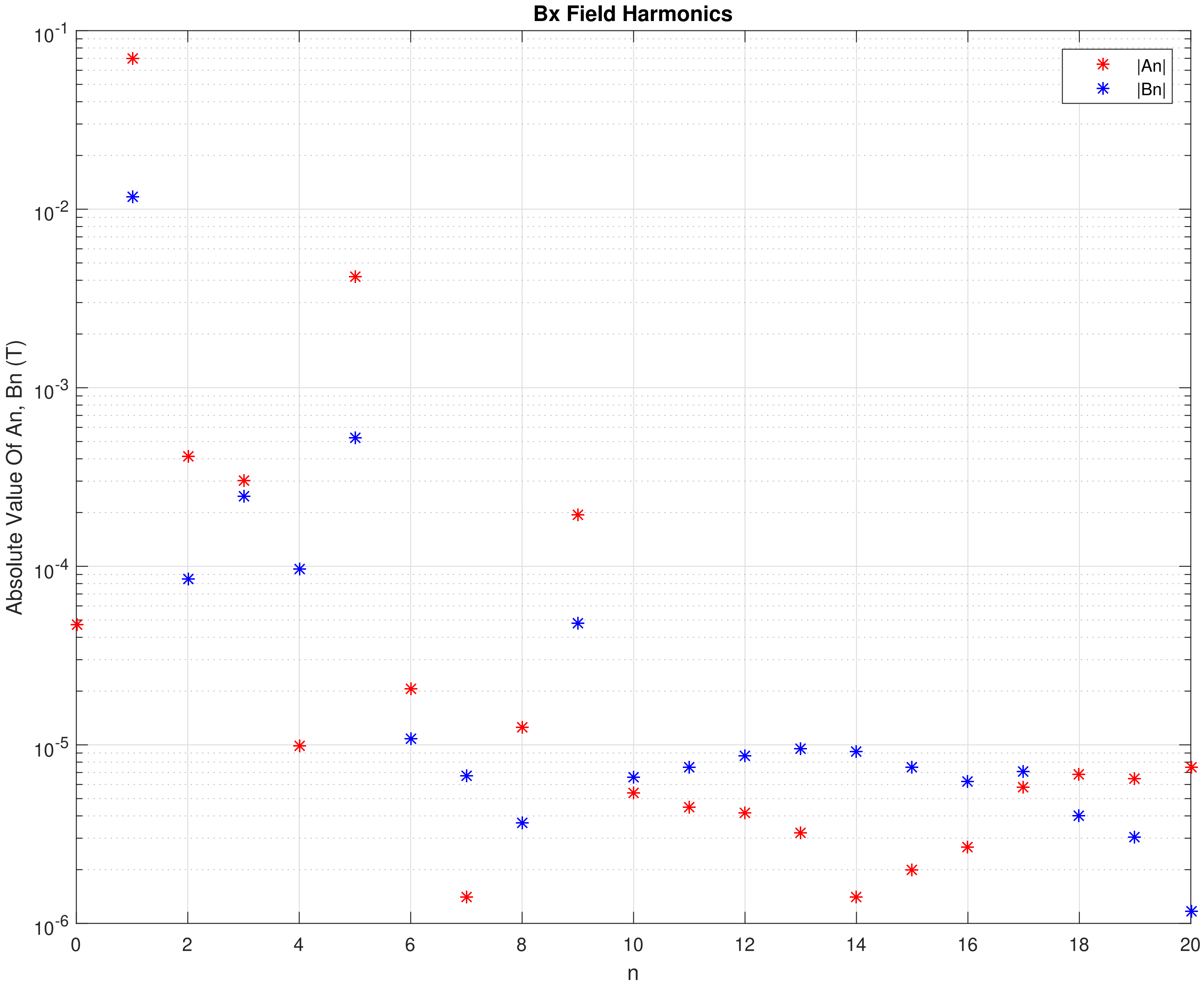


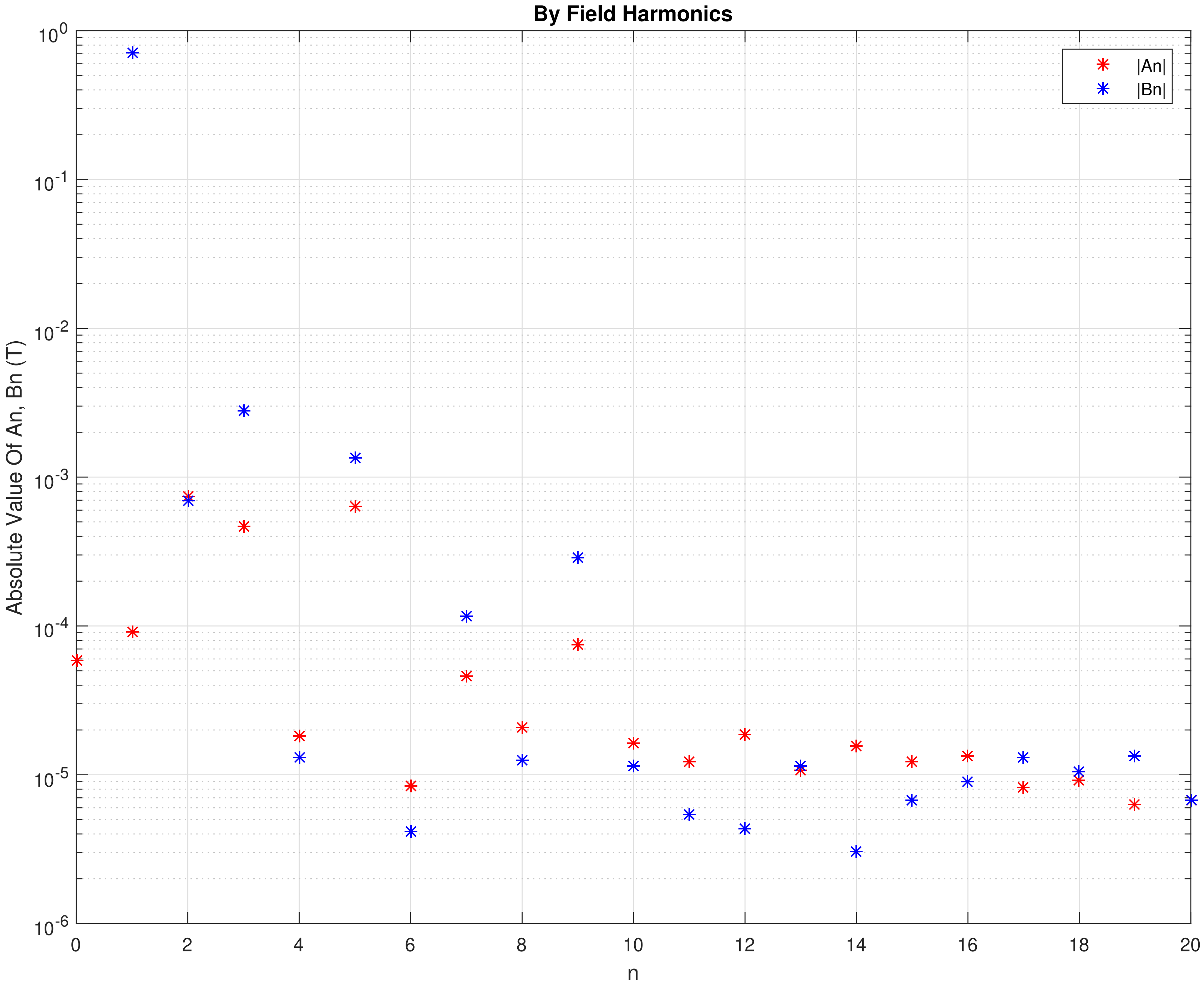
Abs(Fitted Peak By) vs Z, Excluding Ends

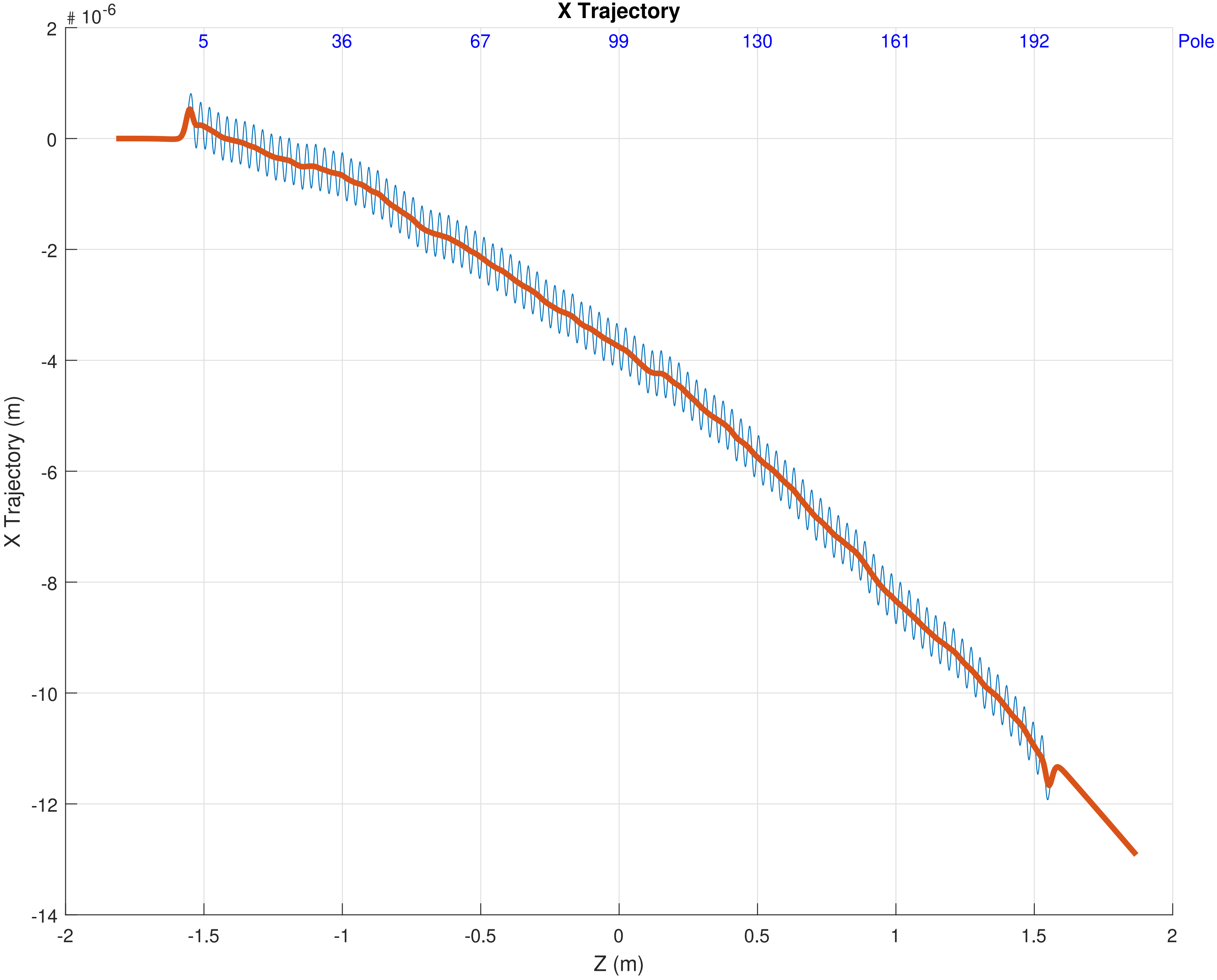
Peak Fields: Ave = 0.707567 T, RMS = 0.007912 T

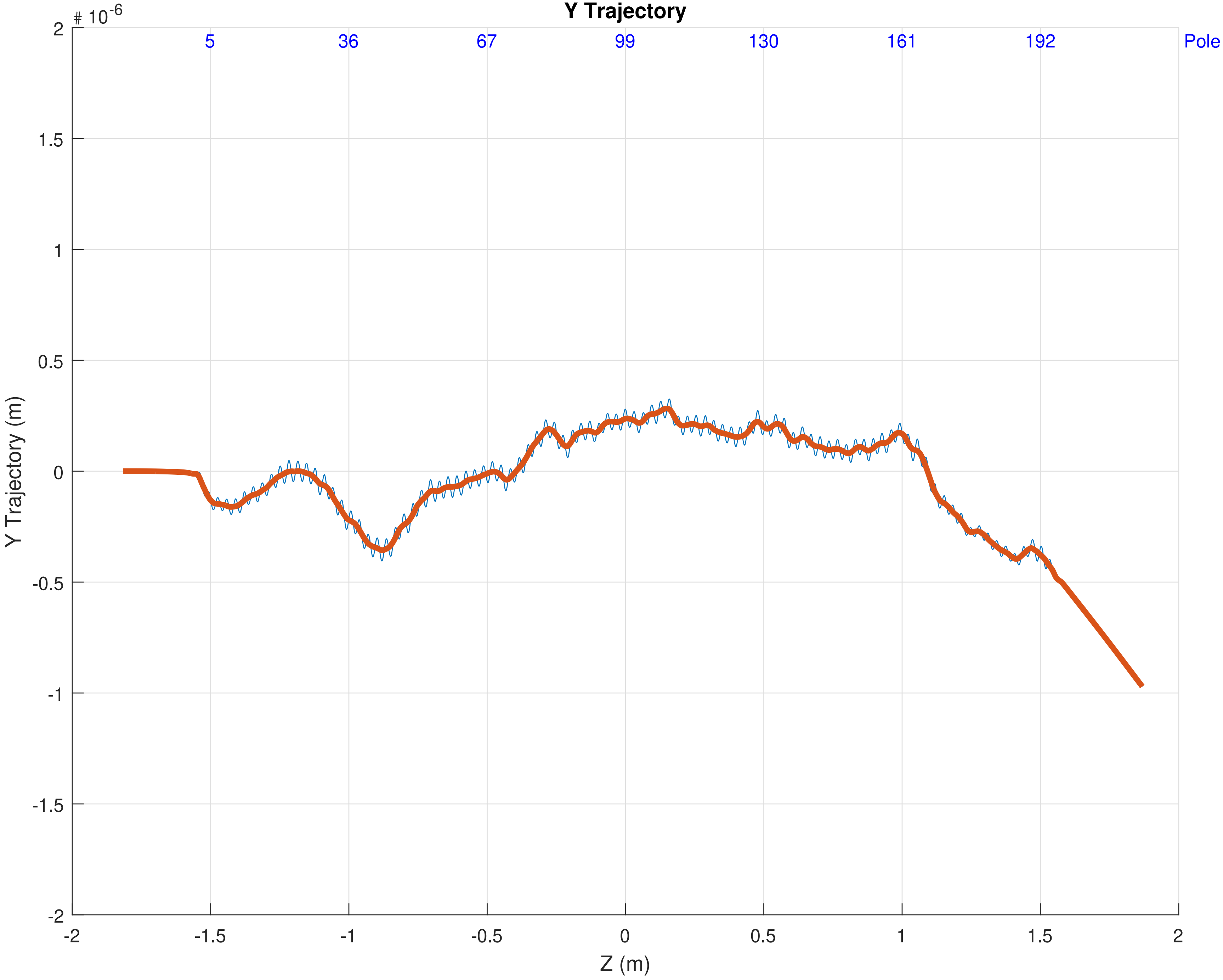

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
0.025
0.02
0.015
0.01
4
36
67
98
129
160
192
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016008 m, RMS = 0.000668 m
Zero Field Spacing: Ave = 0.016004 m, RMS = 0.000637 m
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)


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
99
130
161
192
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016000 m, RMS = 0.000103 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)

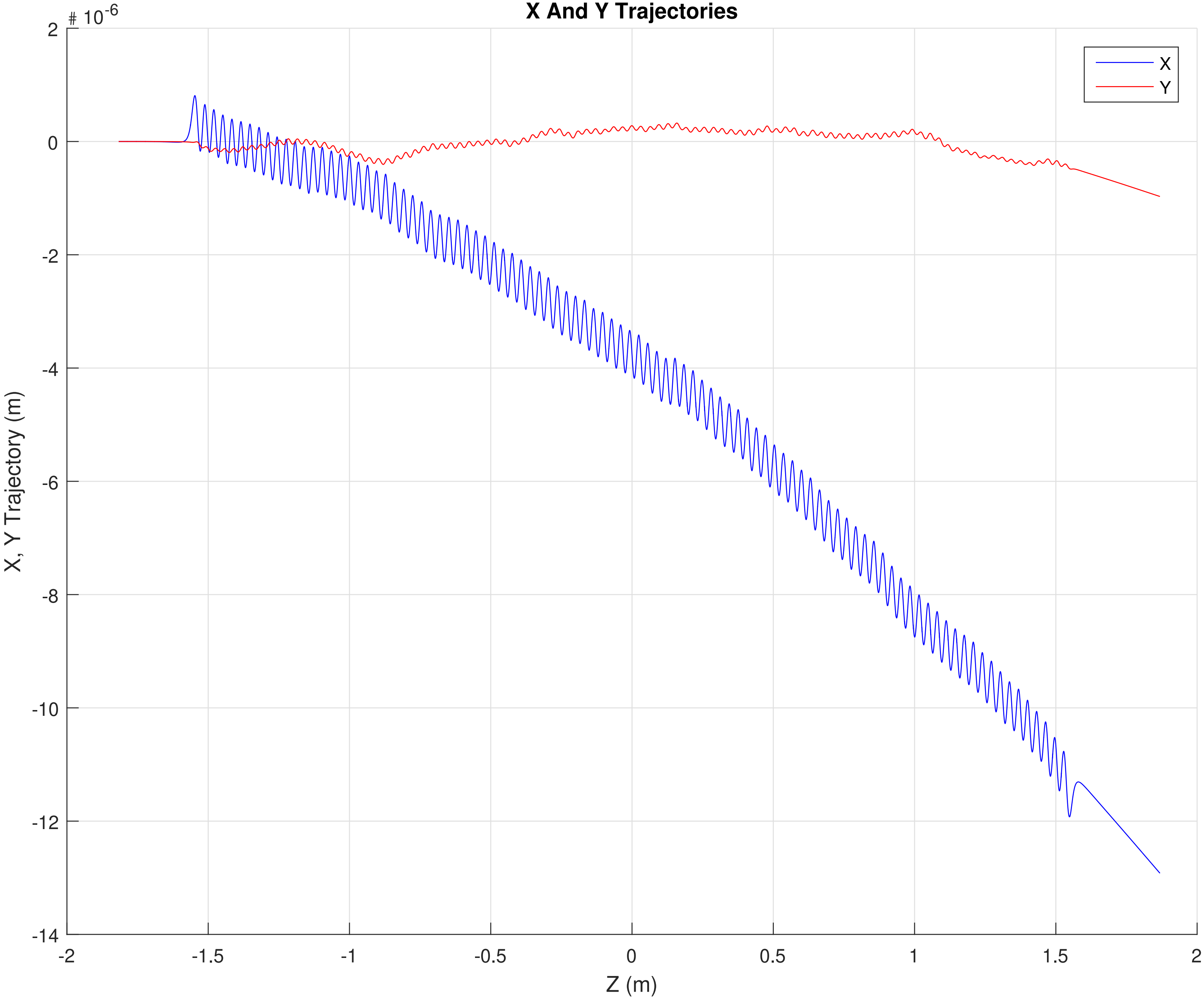

Bx Field Harmonics
Absolute Value Of An, Bn (T)
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
0
2
4
6
8
10
12
14
16
18
20
n
|An|
|Bn|

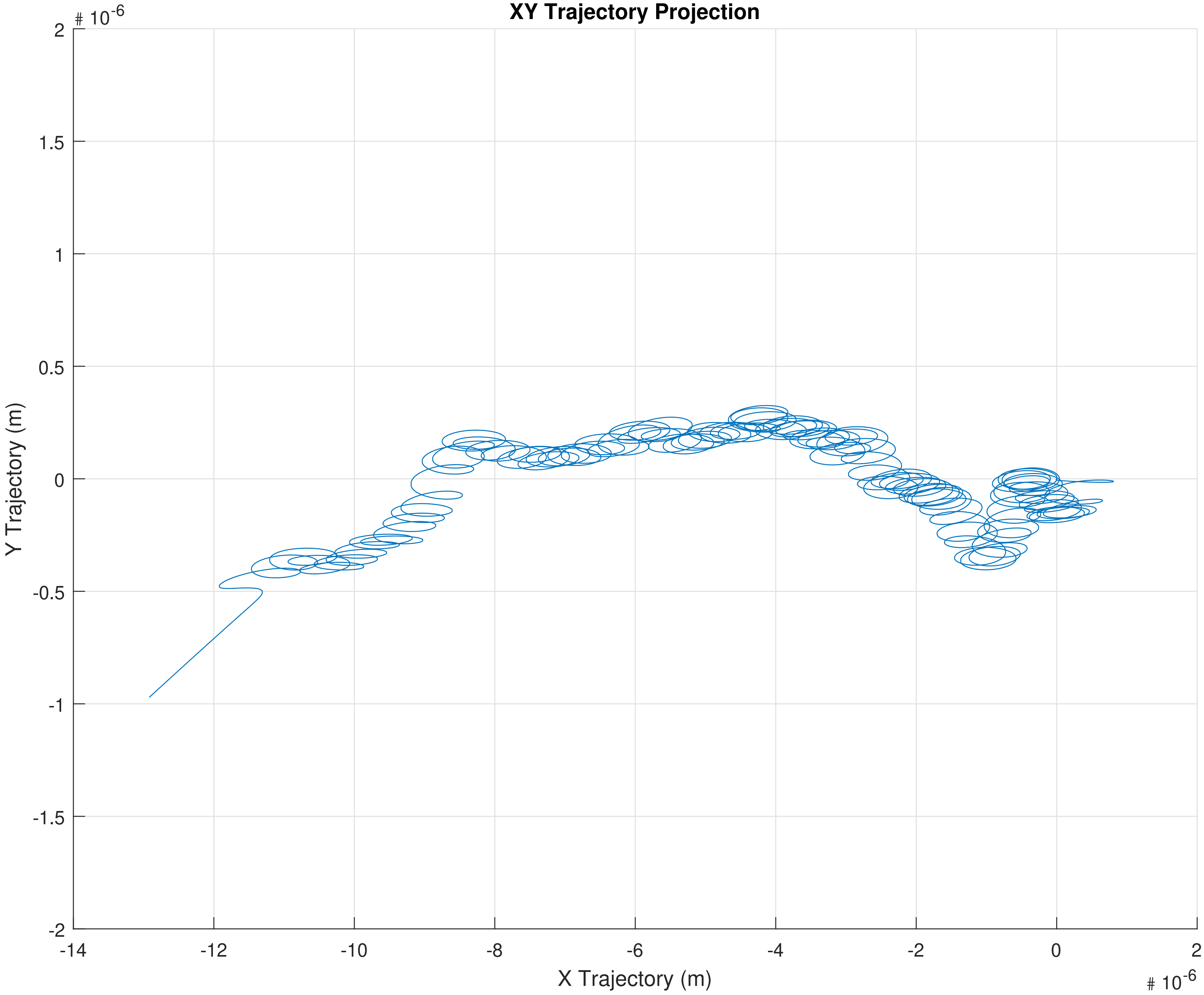

By Field Harmonics
Absolute Value Of An, Bn (T)
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
0
2
4
6
8
10
12
14
16
18
20
n
|An|
|Bn|

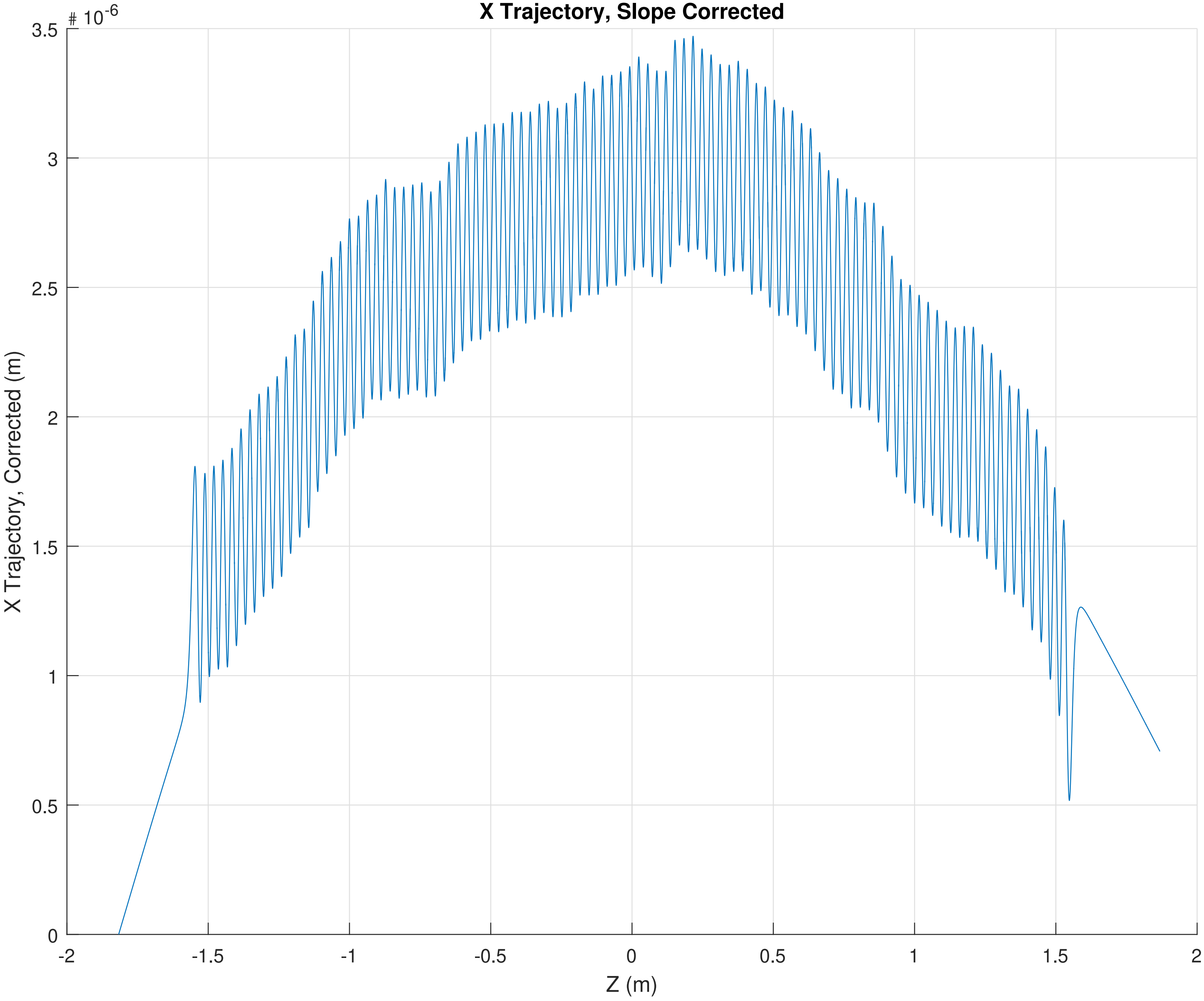

X Trajectory
10-6
5
36
67
99
130
161
192
Pole
2
0
-2
-4
-6
-8
-10
-12
-14
X Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)



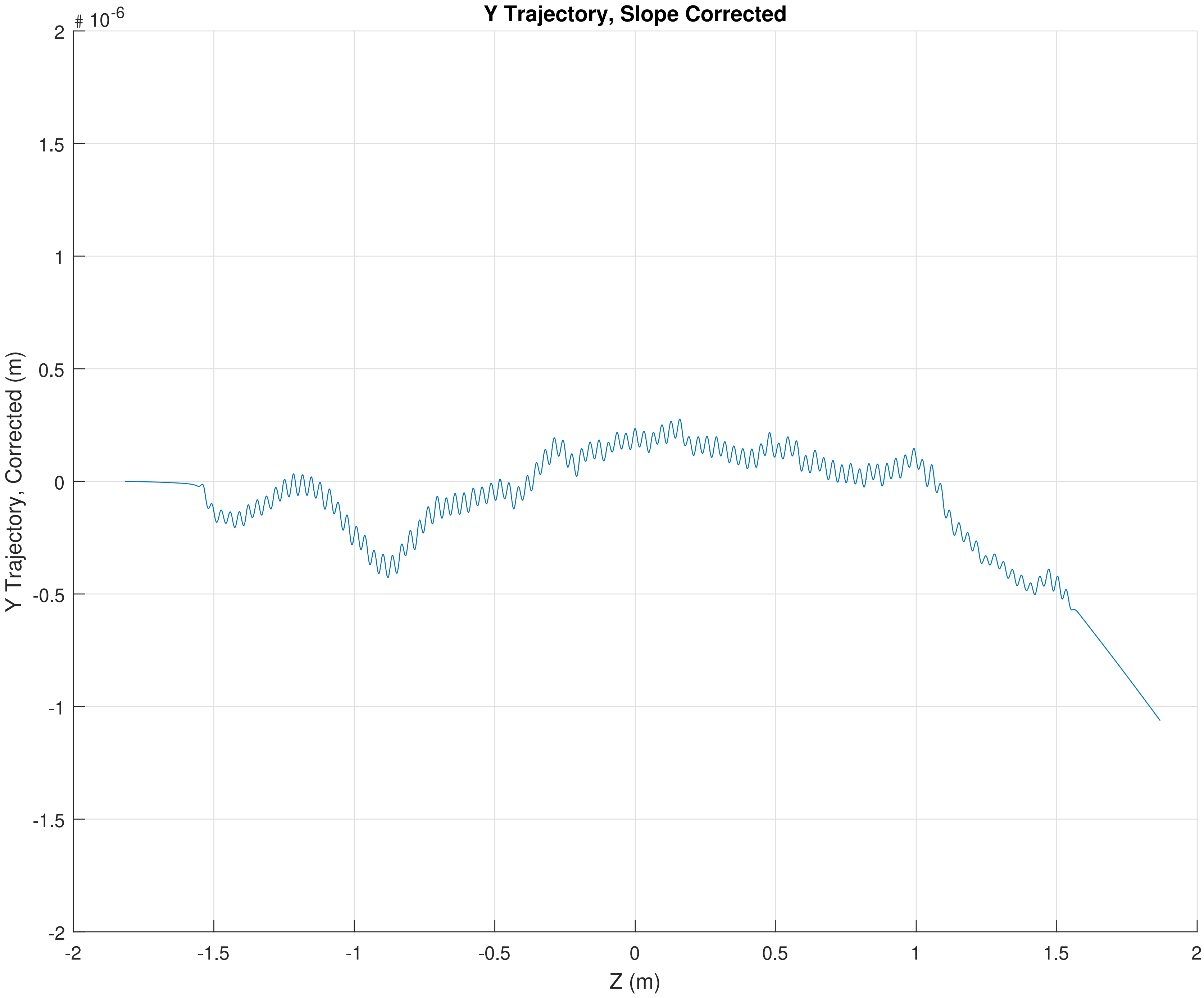
Y Trajectory
10-6
5
36
67
99
130
161
192
Pole
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

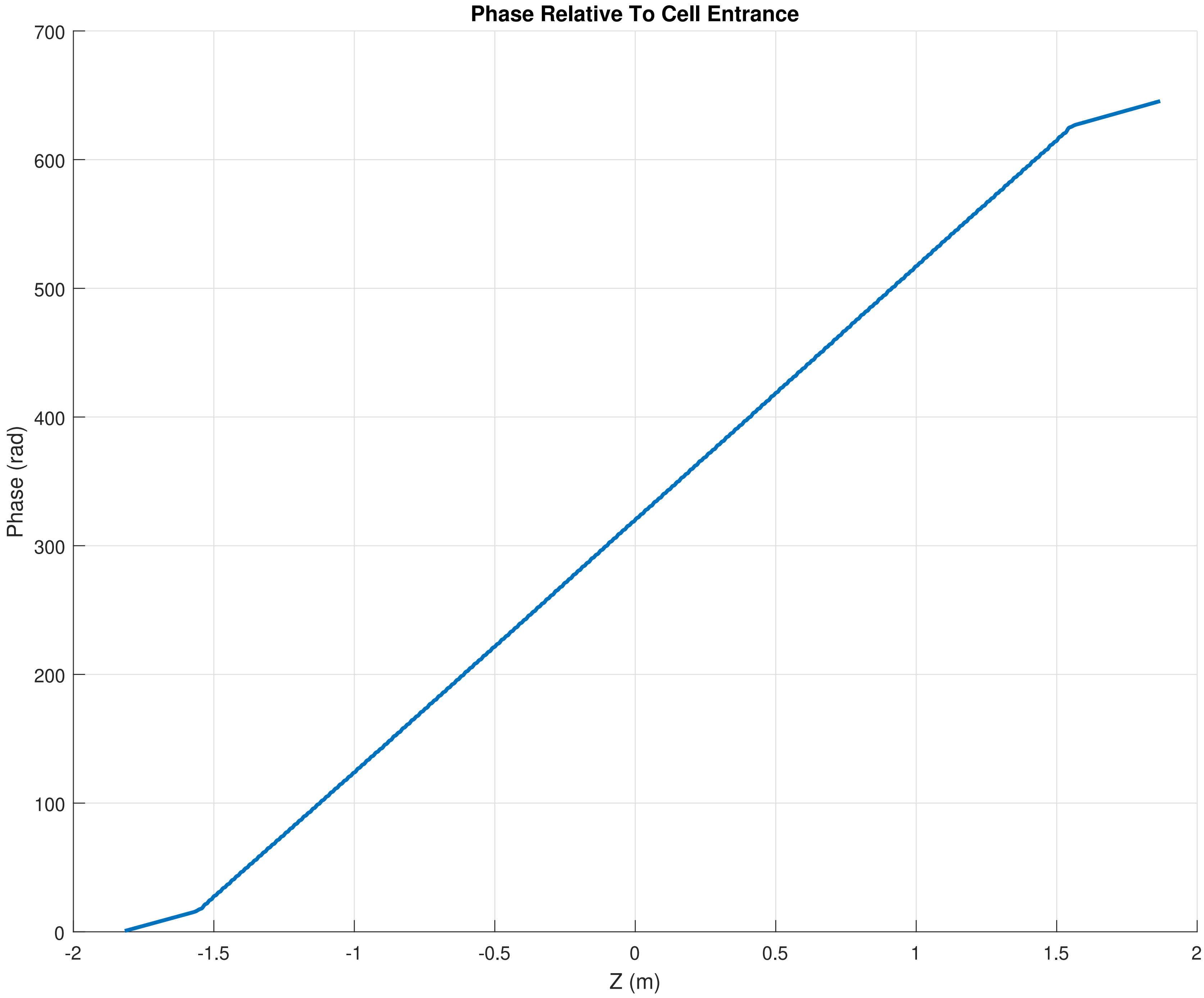

X And Y Trajectories
10^-6
2
0
-2
-4
-6
-8
-10
-12
-14
X, Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
X
Y


XY Trajectory Projection
10^-6
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
Y Trajectory (m)
-14
-12
-10
-8
-6
-4
-2
0
2
X Trajectory (m)
10^-6

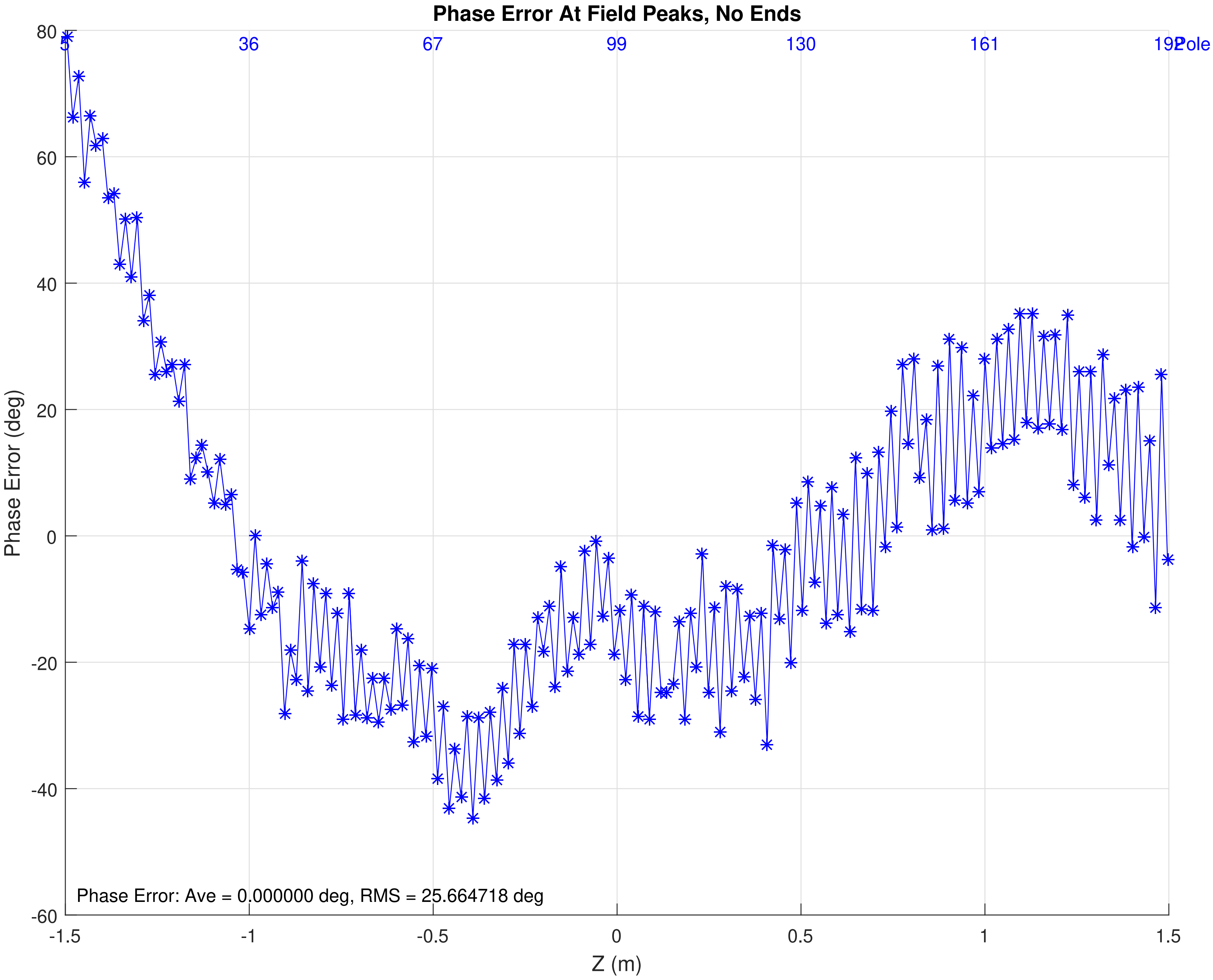


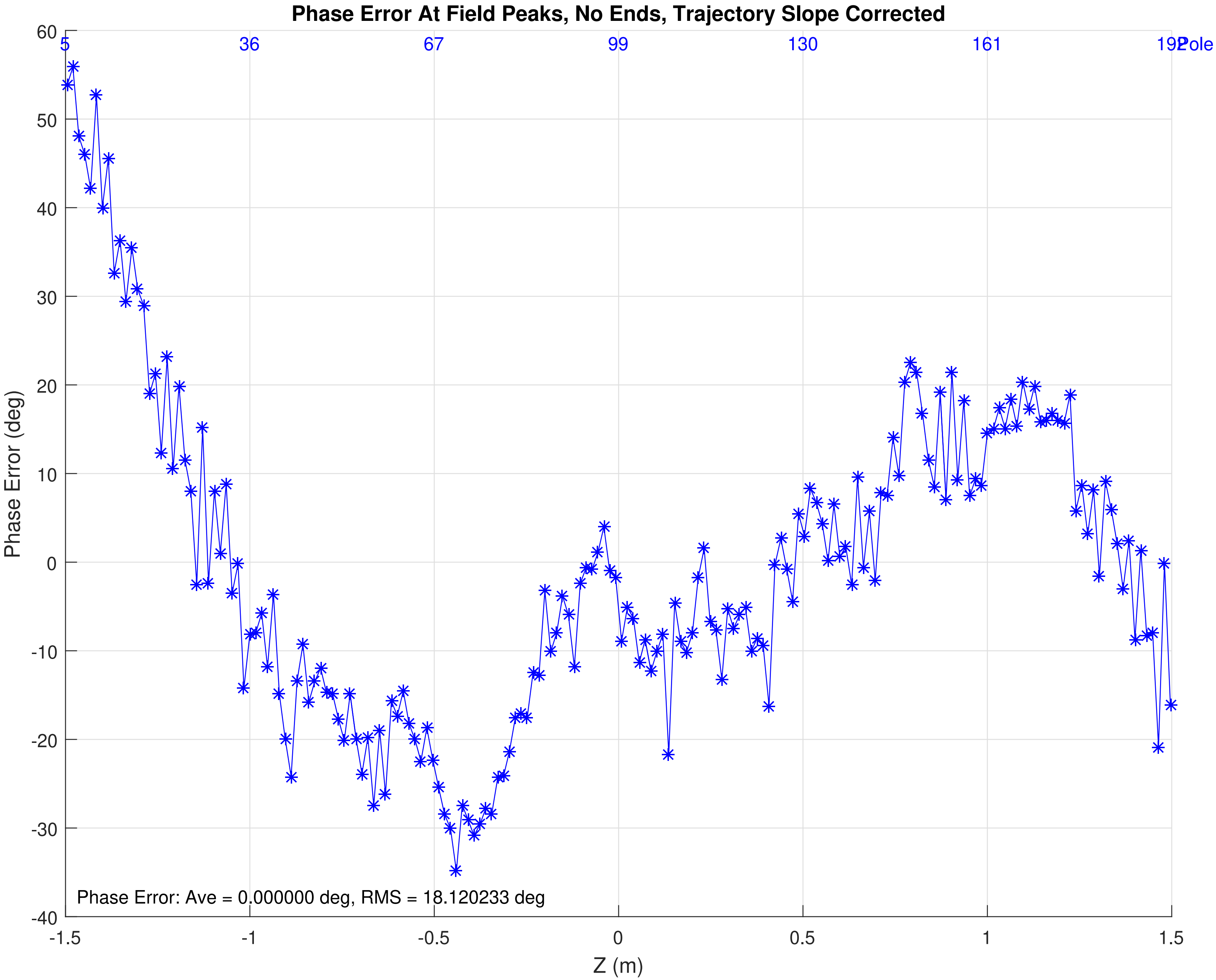
X Trajectory, Slope Corrected
10-6
3.5
3
2.5
2
1.5
1
0.5
0
X Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

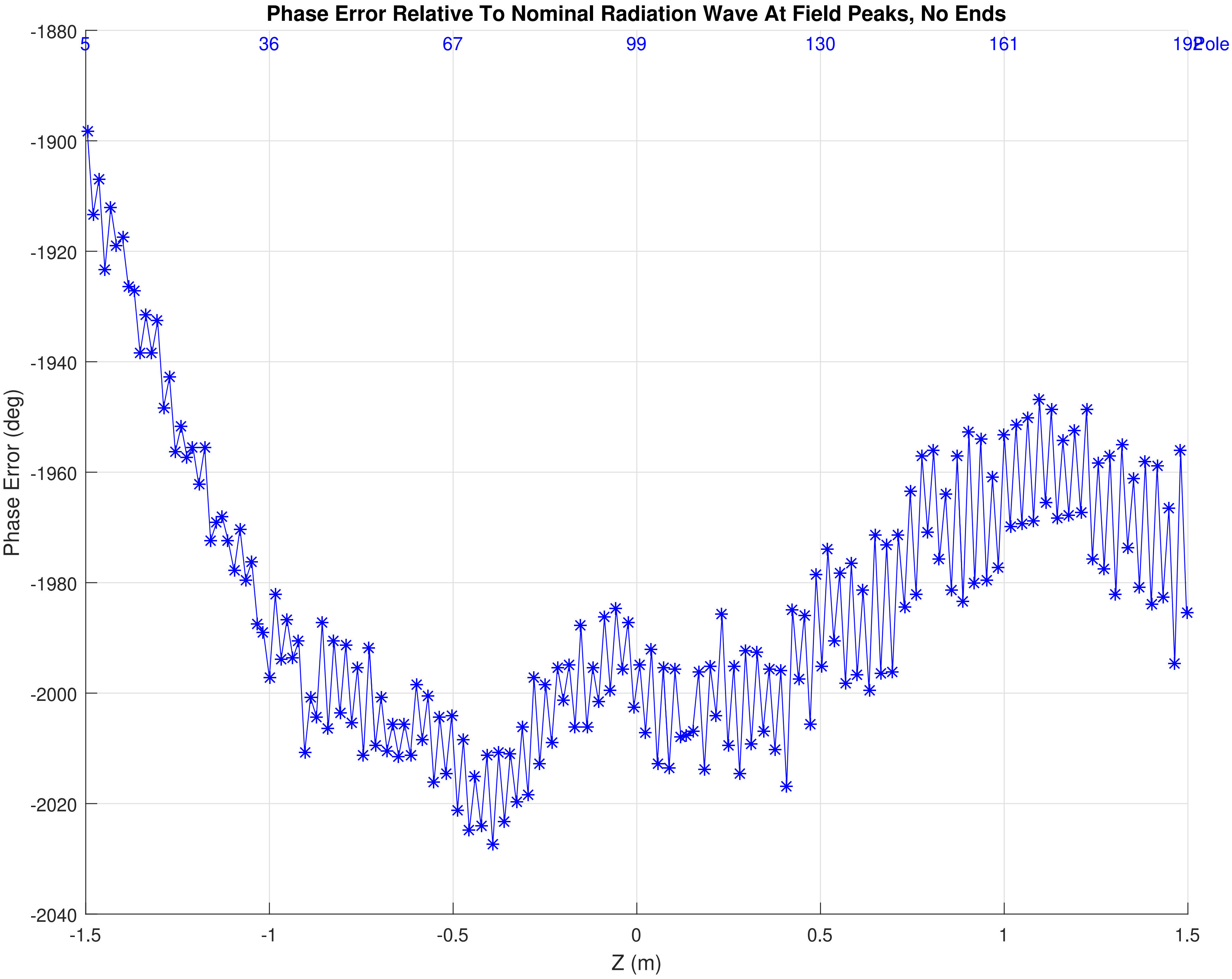

Y Trajectory, Slope Corrected
10-6
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
Y Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

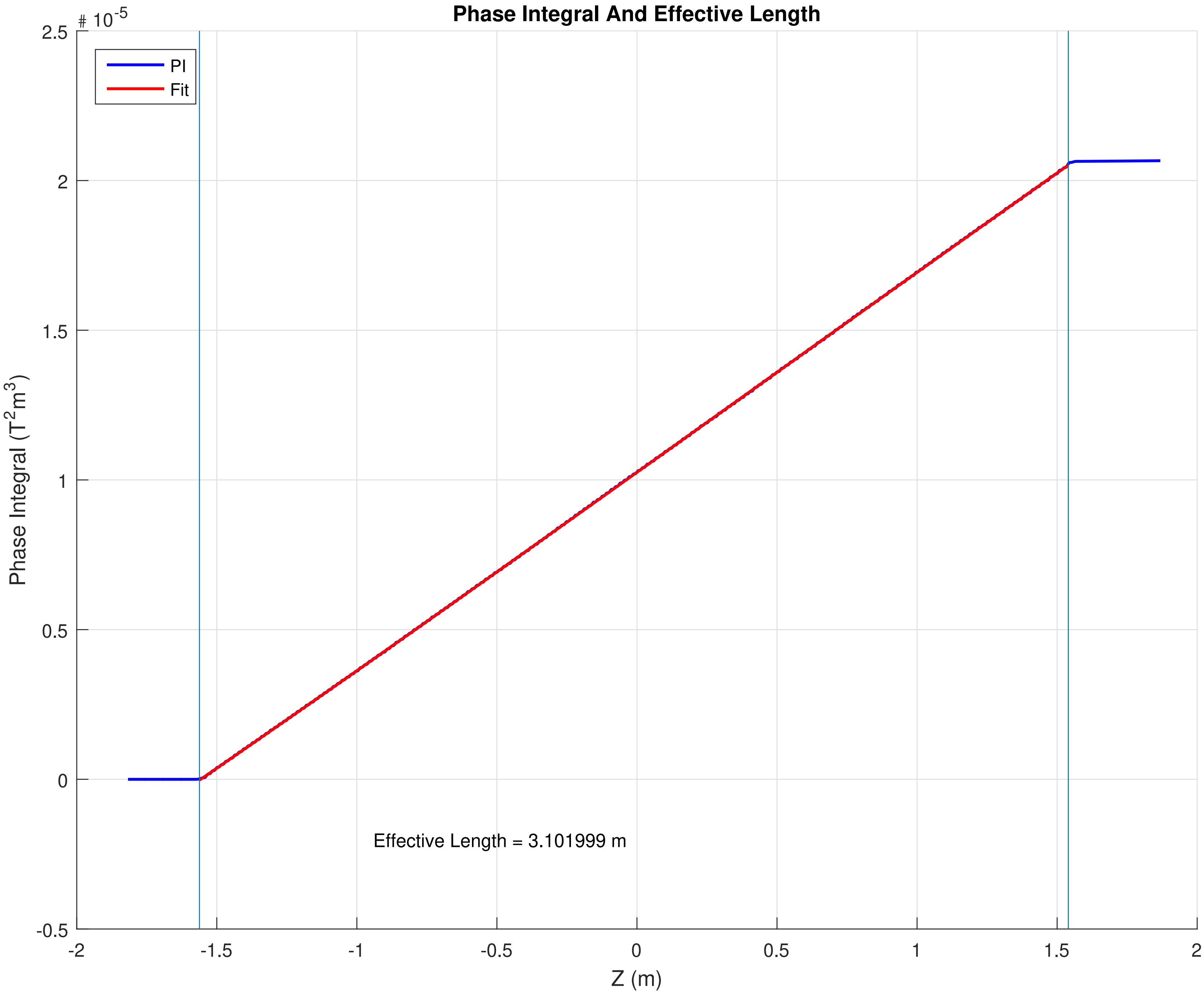


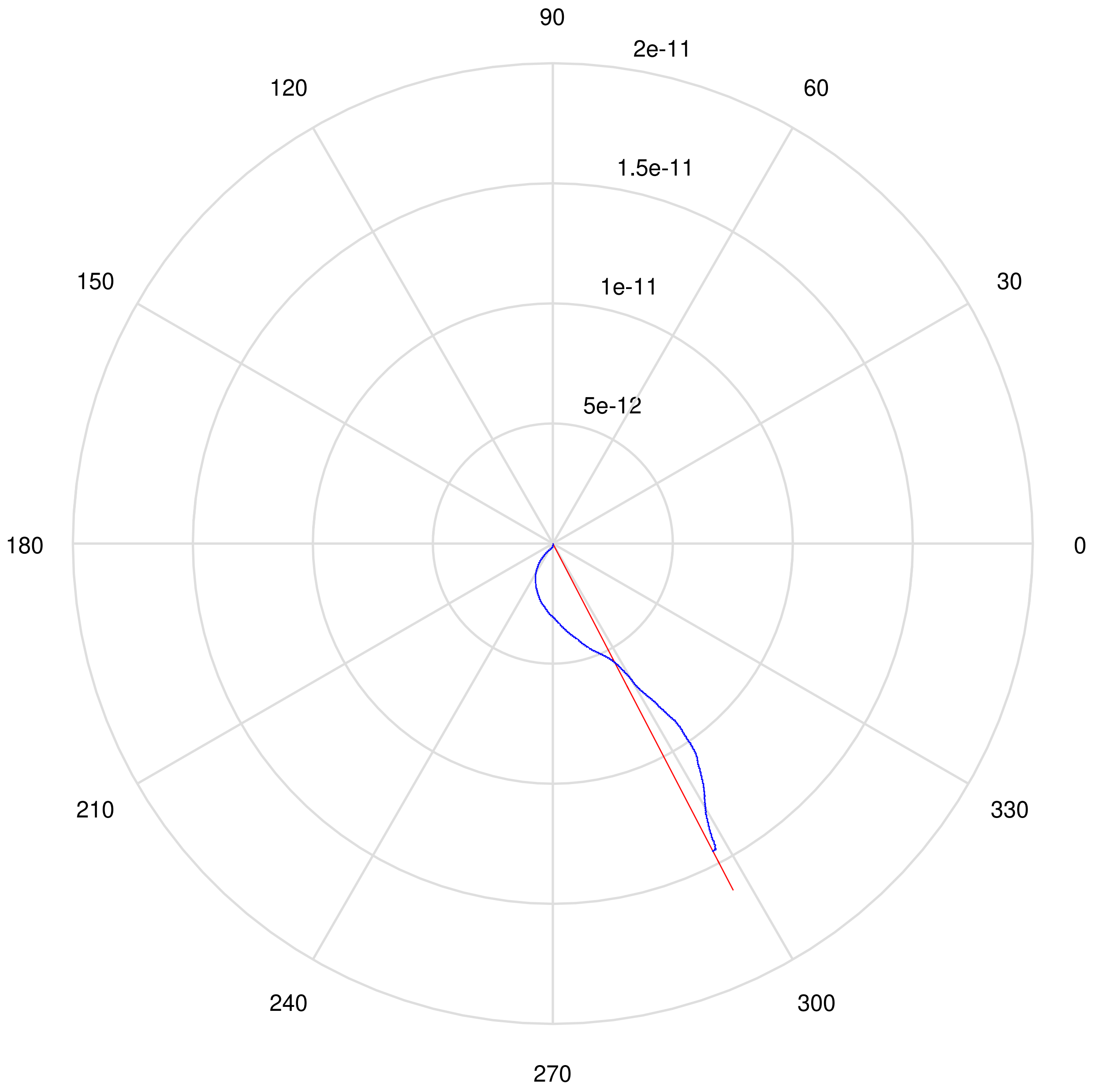
Phase Relative To Cell Entrance
Phase (rad)
Z (m)
0
100
200
300
400
500
600
700
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2


Phase Error At Field Peaks, No Ends
Phase Error (deg)
Z (m)
5
36
67
99
130
161
192
Pole
80
60
40
20
0
-20
-40
-60
-1.5
-1
-0.5
0
0.5
1
1.5
Phase Error: Ave = 0.000000 deg, RMS = 25.664718 deg


Phase Error At Field Peaks, No Ends, Trajectory Slope Corrected
5
36
67
99
130
161
192
Pole
60
50
40
30
20
10
0
-10
-20
-30
-40
Phase Error (deg)
Phase Error: Ave = 0.000000 deg, RMS = 18.120233 deg
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)

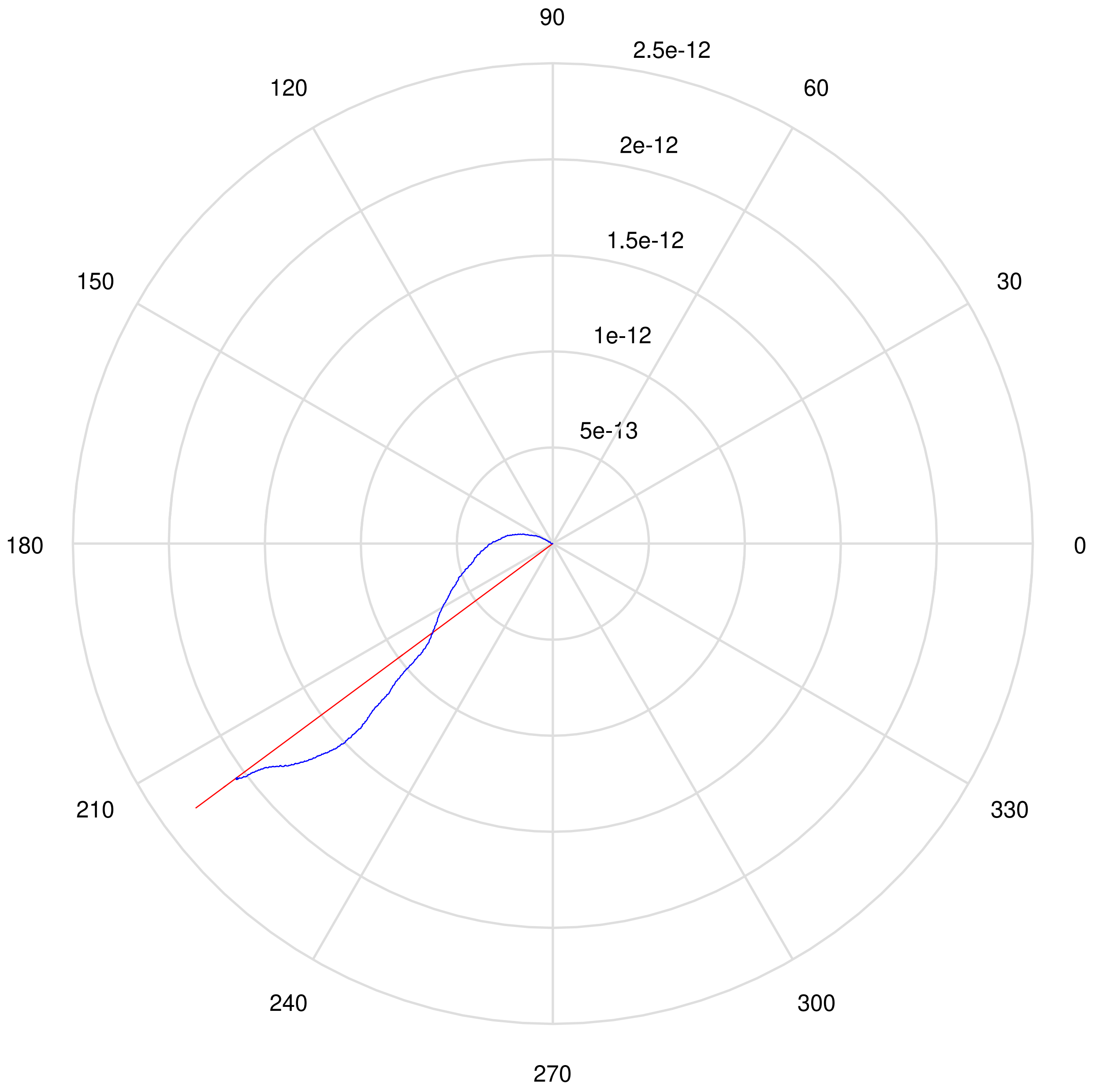

Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
-1880
-1900
-1920
-1940
-1960
-1980
-2000
-2020
-2040
Phase Error (deg)
5
36
67
99
130
161
192
Pole
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)

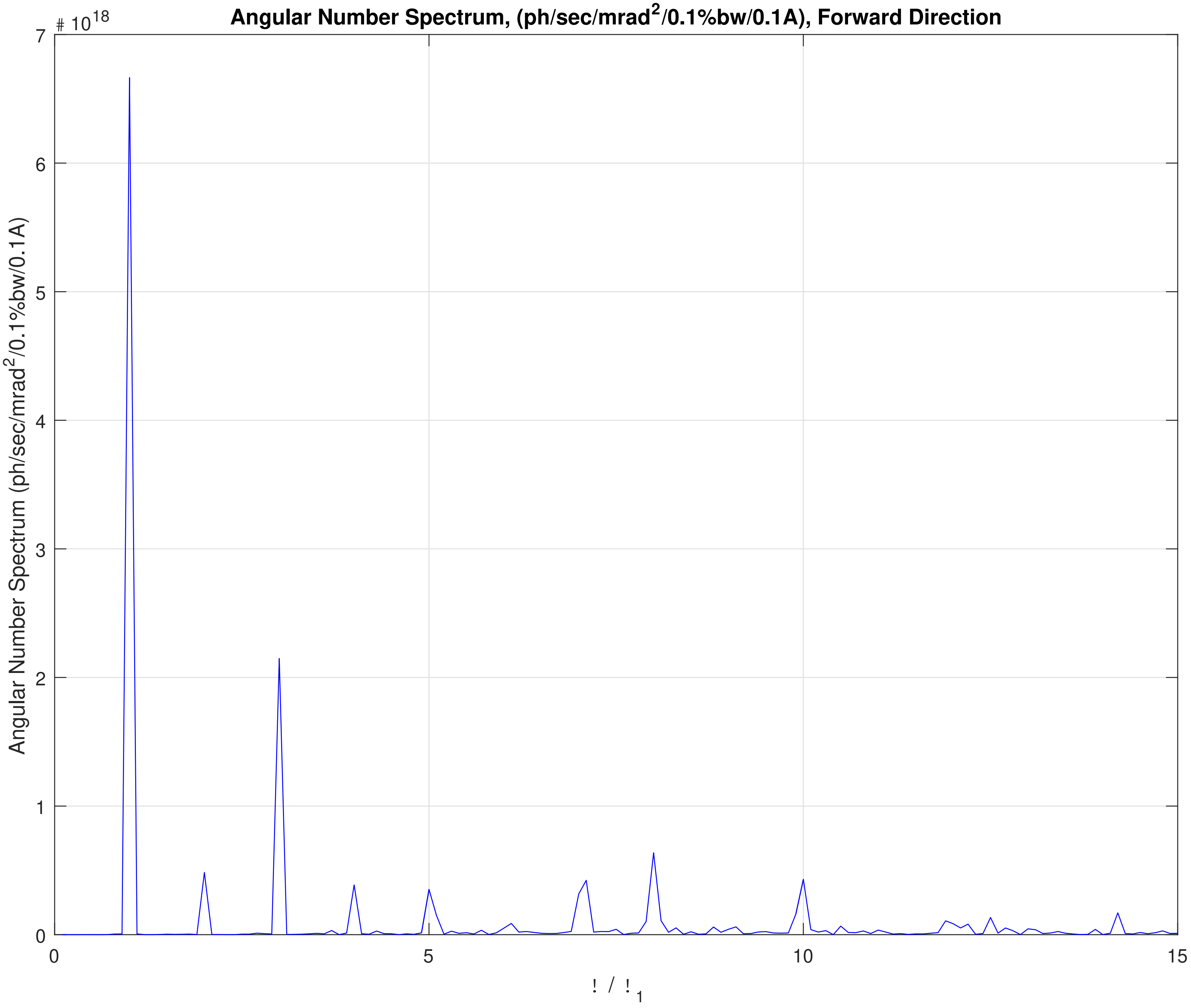

Phase Integral And Effective Length
10^-5
2.5
2
1.5
1
0.5
0
-0.5
Phase Integral (T^2m^3)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
PI
Fit
Effective Length = 3.101999 m

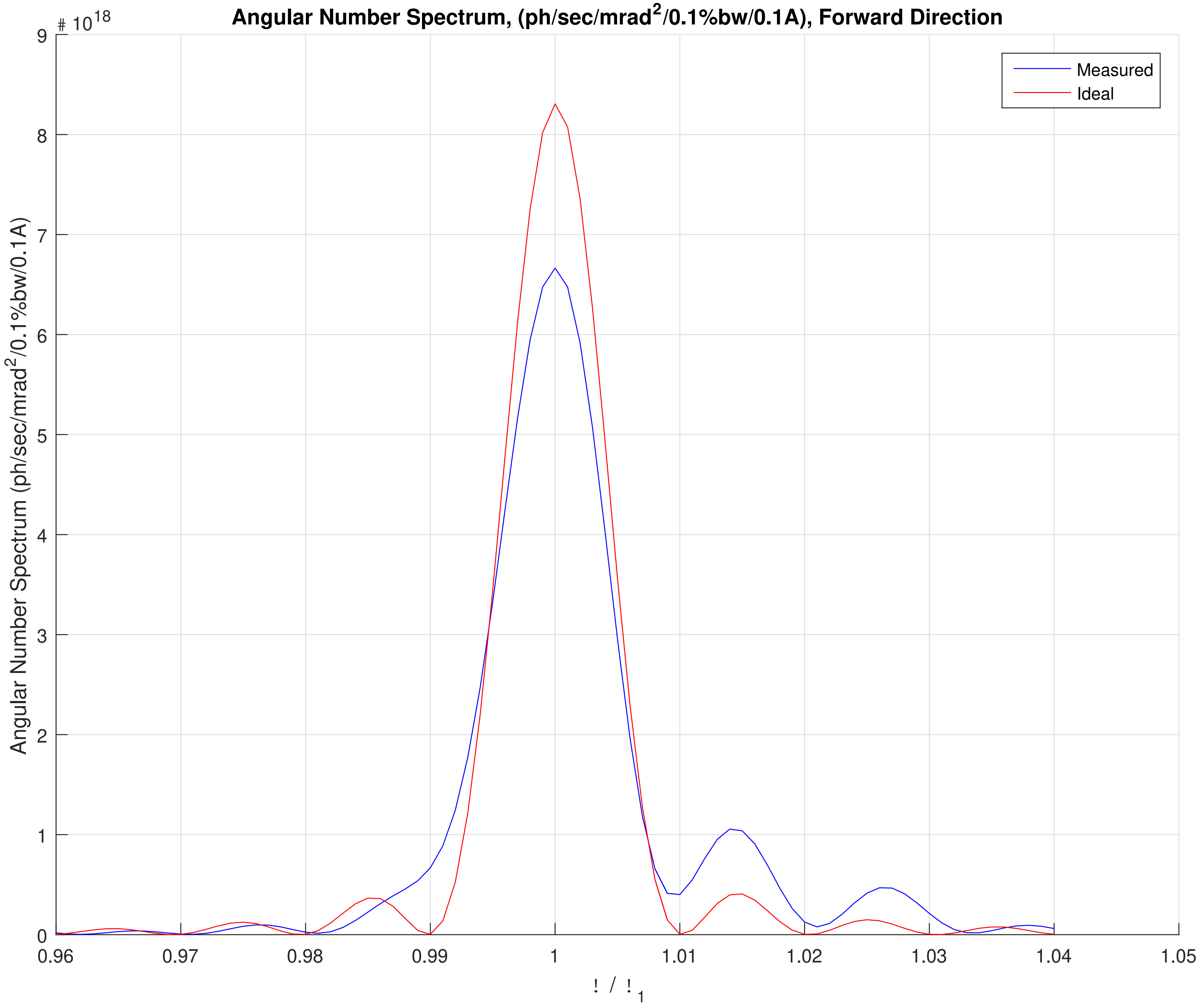


Re and Im Parts Of Ex(ω), Forward Direction, $\omega = \omega_1$

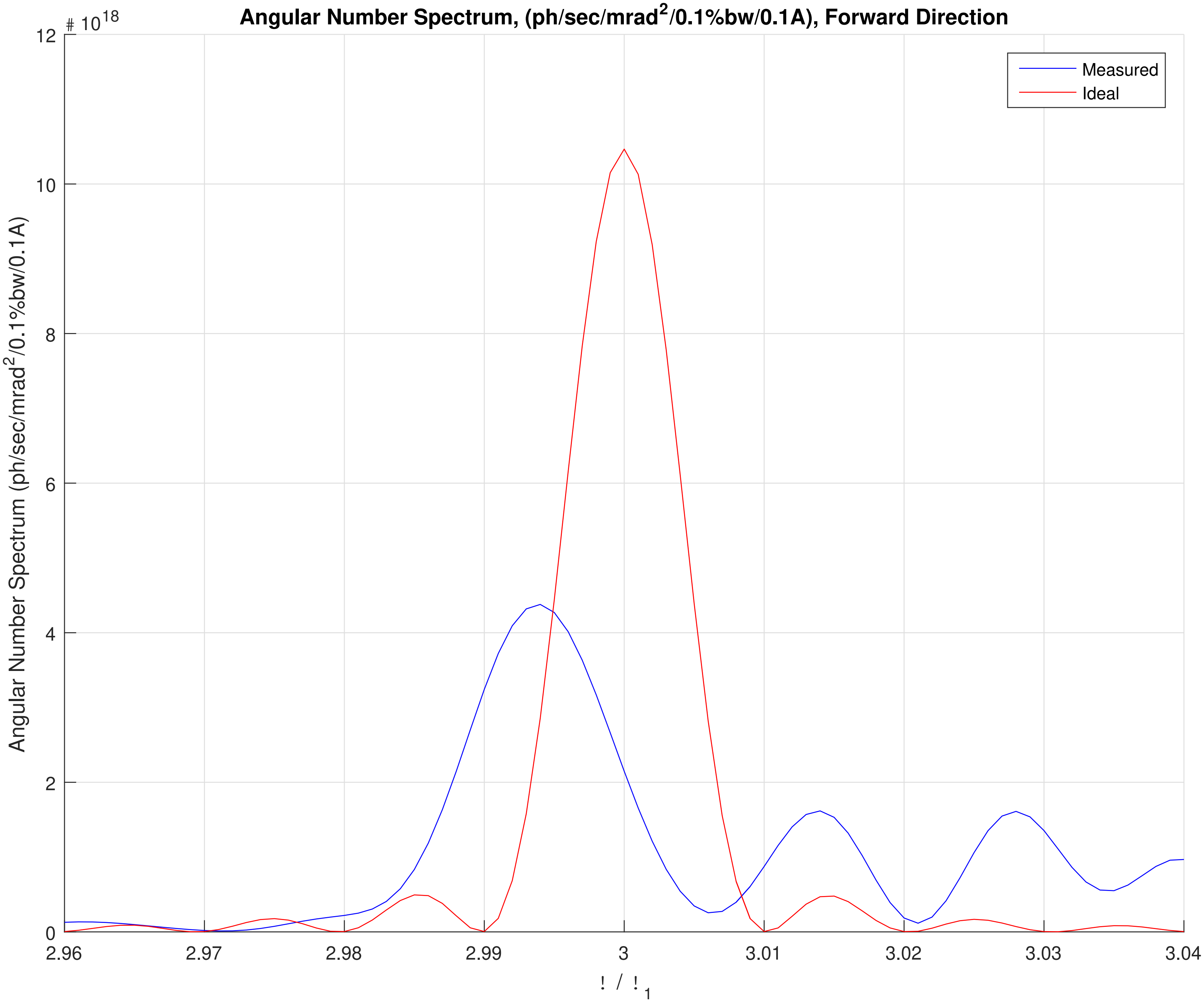
Re and Im Parts Of Ey(!), Forward Direction, $! = !_1$

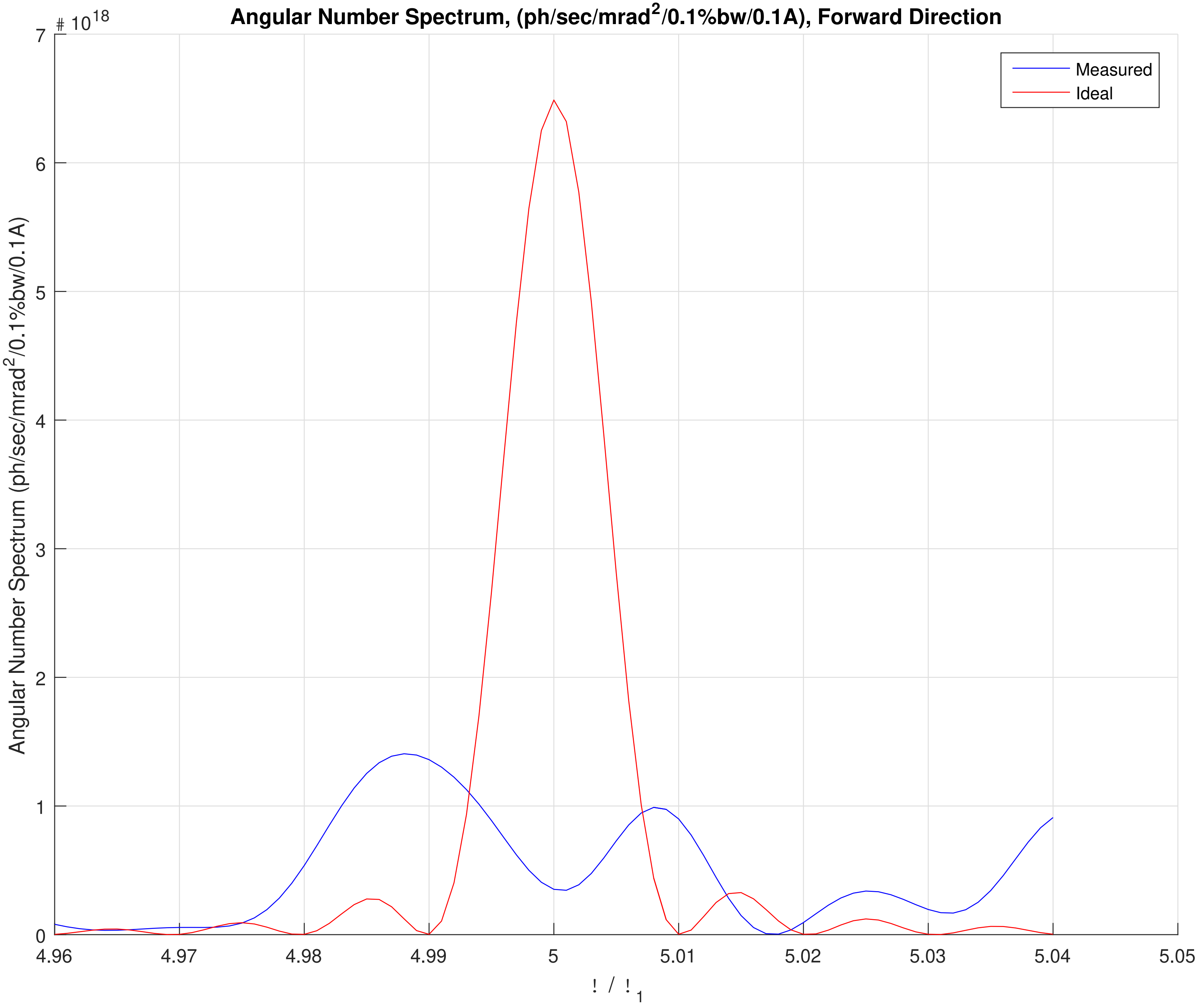



Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{18}
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
0
1
2
3
4
5
6
7
0
5
10
15
! / $!_1$



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
! / !$_1$
Measured
Ideal



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