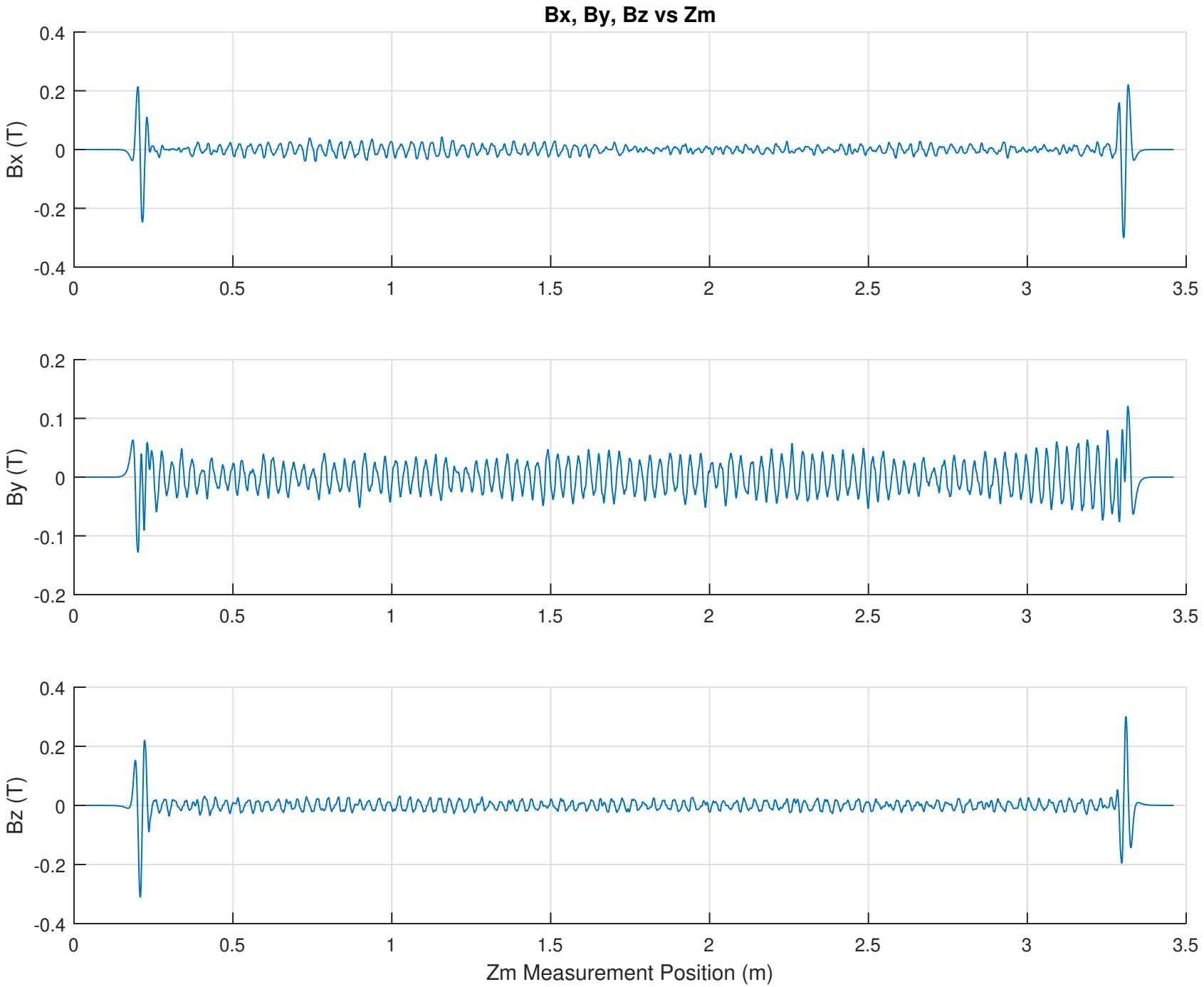
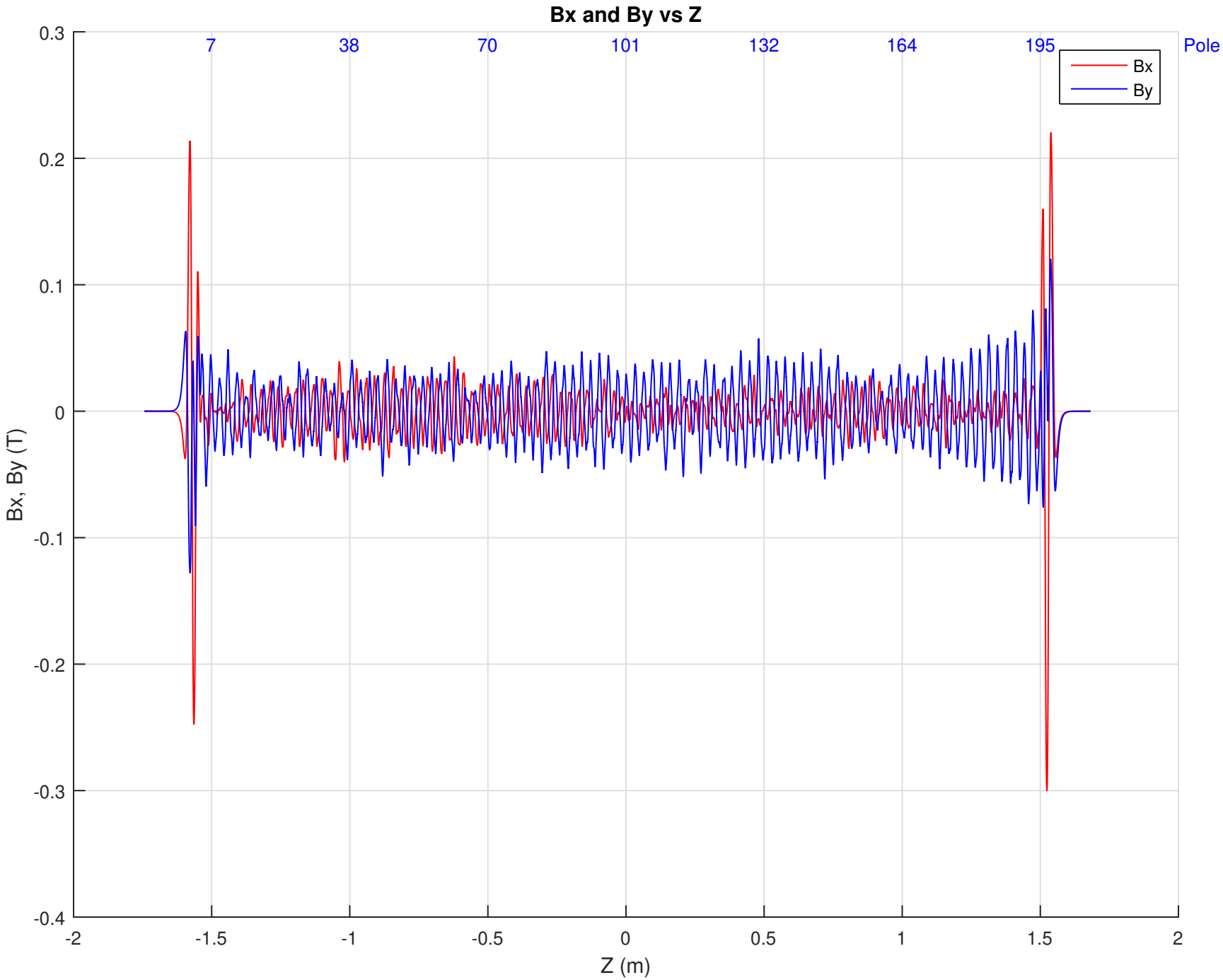
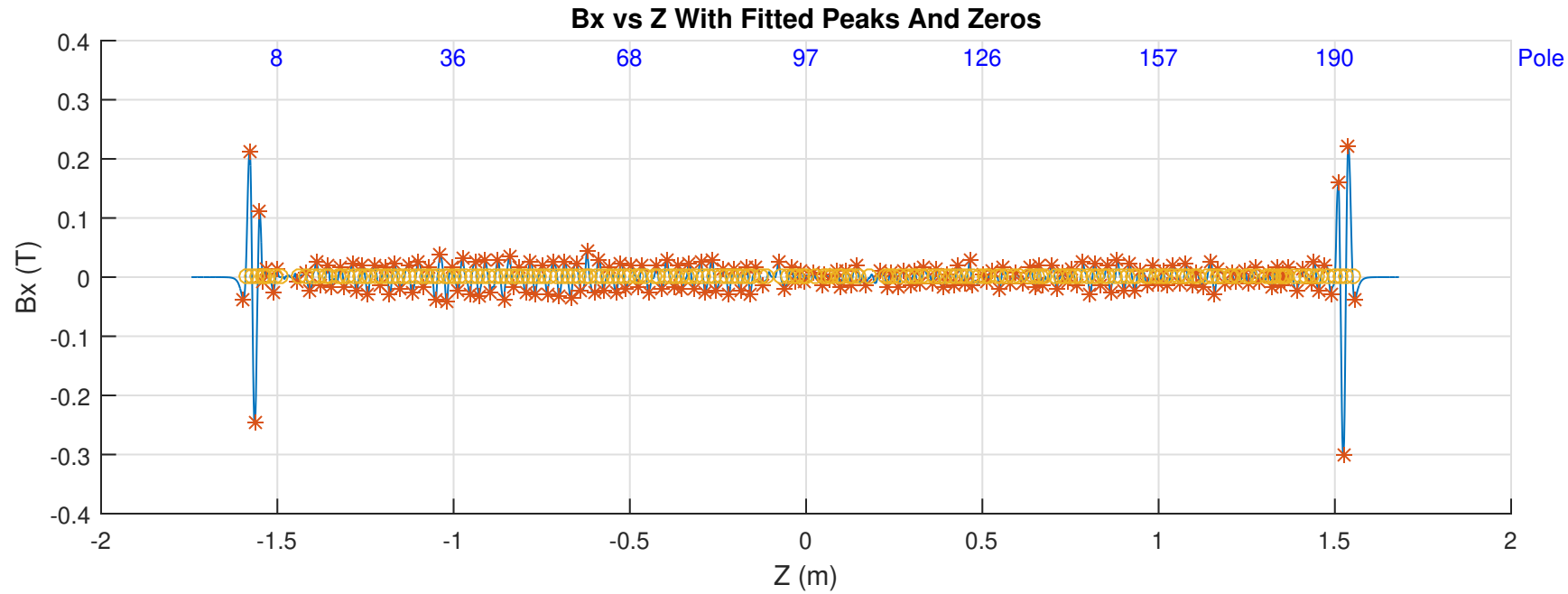
SLAC Magnetic Measurements

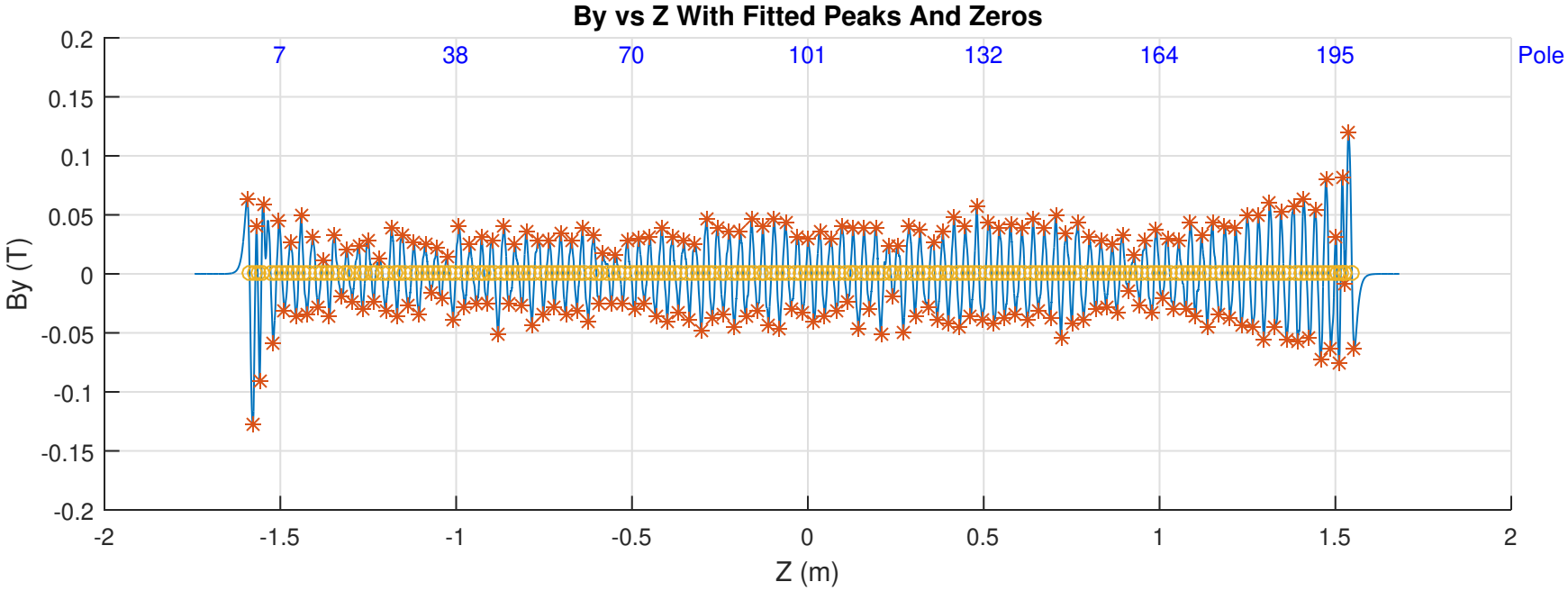
EPU Analysis

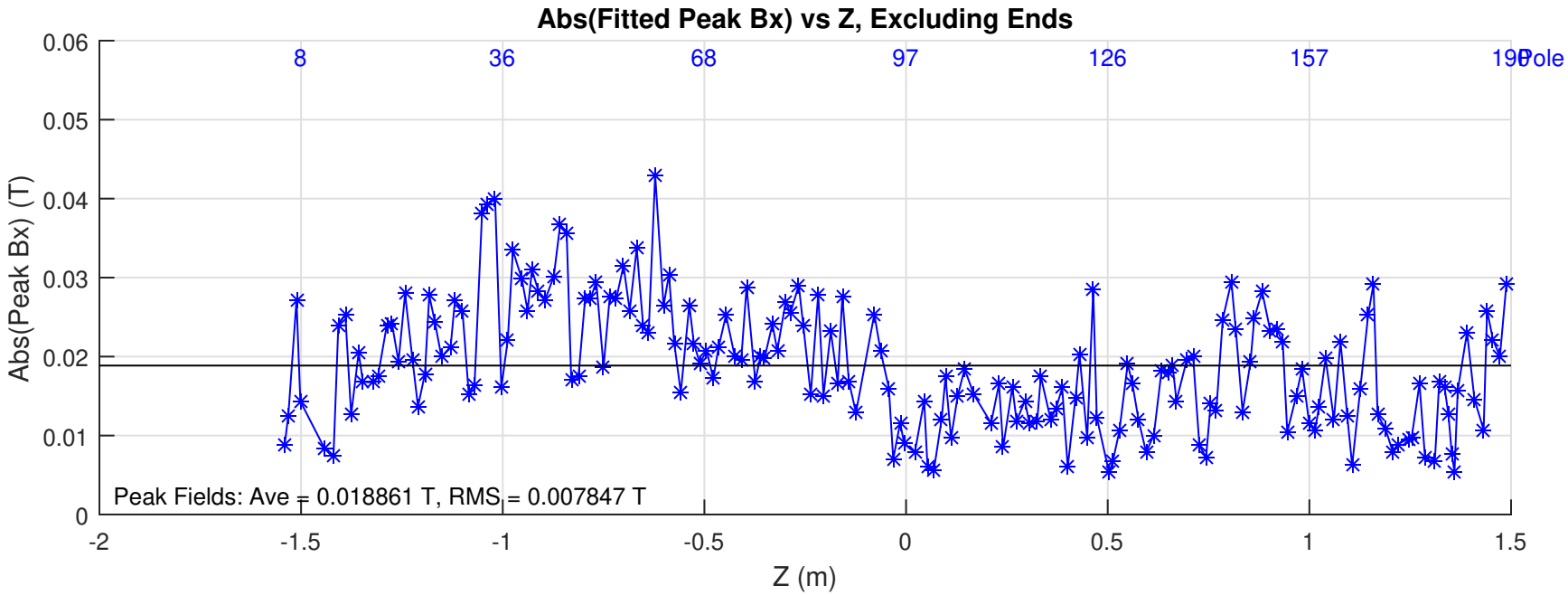
Parameters:
INPUT-FILE-DIR =V:\MET\MagServe\MagData\DELTA\Delta Data 2015\Repeat 2014 Measurements\Data Set 1 Run 042\LPHMF\K
INPUT-FILE-NAME =hall2-anal-probe1-field.dat
INPUT-FILE-TYPE =ZBXYZH
CORR-REQUIRED =0
GAMMA =26671.59
NOM-LAMBDA-U =0
NOM-K-VALUE =0
NOM-LAMBDA-R =0
NUM-POLES =196
NUM-END-POLES =4
CELL-LENGTH =3.656

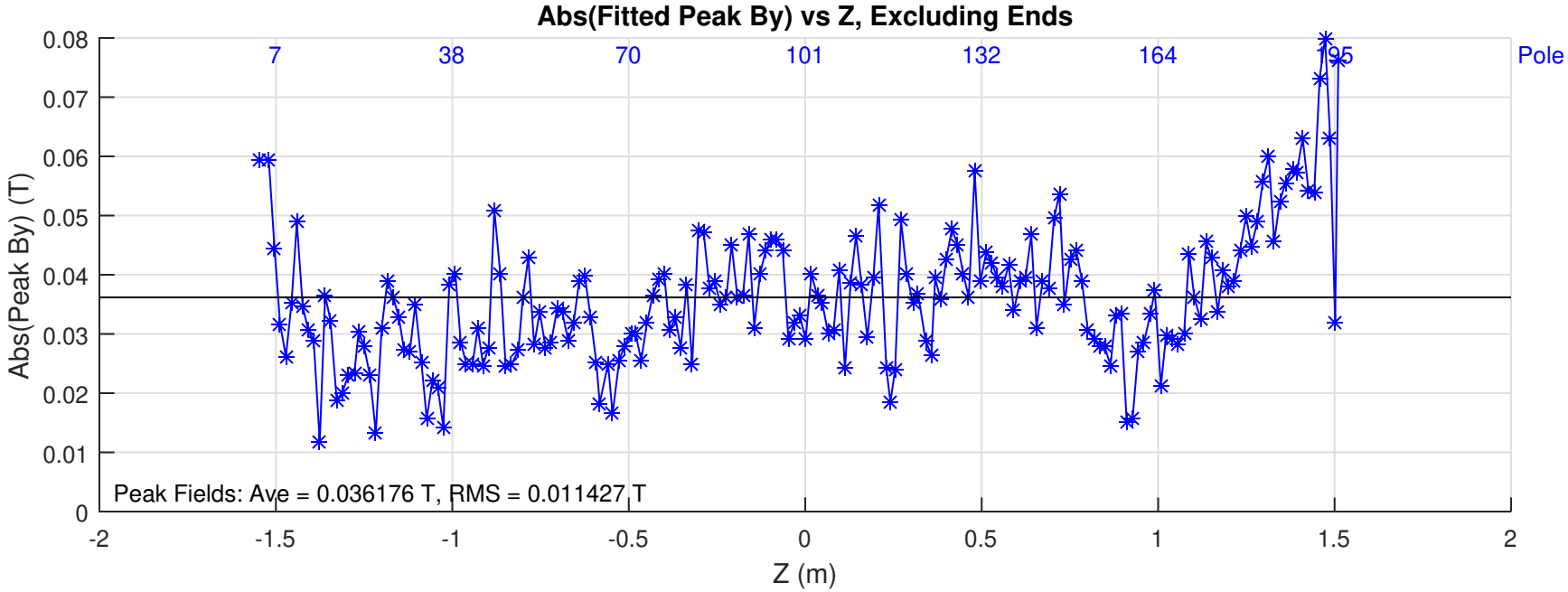

Bx, By, Bz vs Zm
Bx (T)
By (T)
Bz (T)
Zm Measurement Position (m)
0.4
0.2
0
-0.2
-0.4
0.1
-0.1
0.5
1
1.5
2
2.5
3
3.5

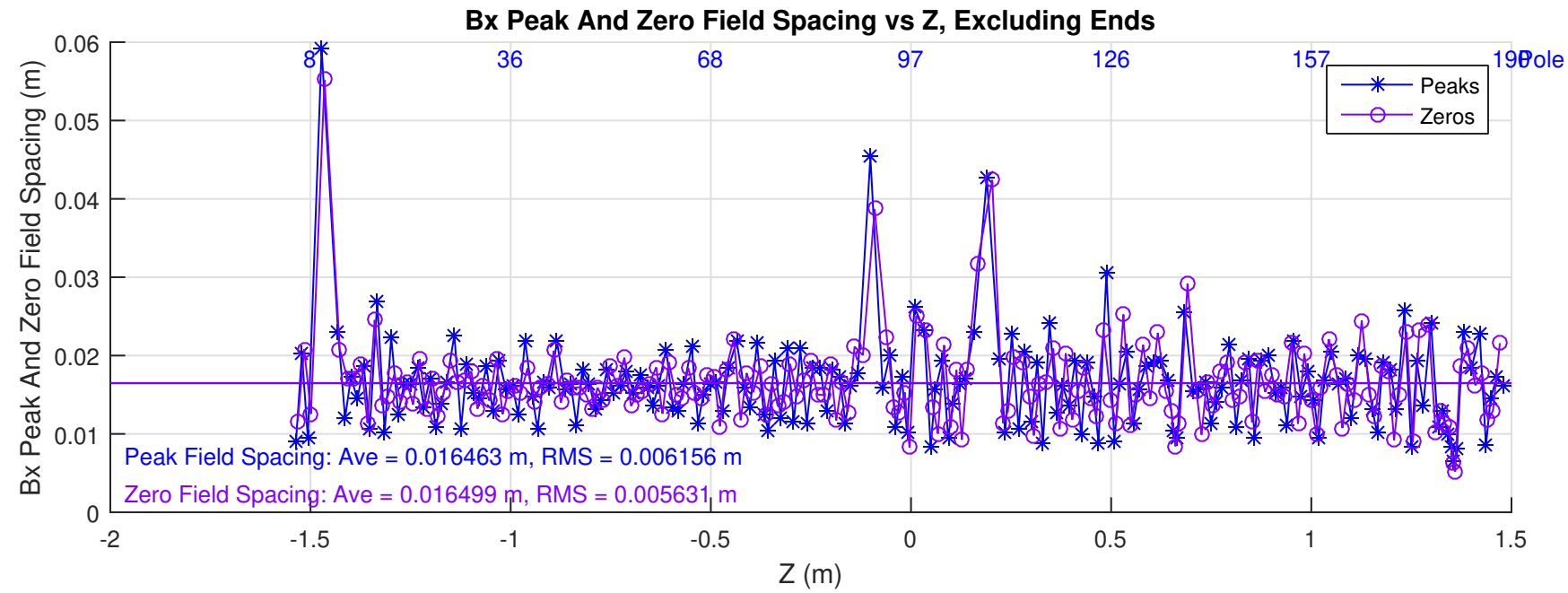

Bx and By vs Z
7
38
70
101
132
164
195
Pole
Bx
By
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Bx, By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

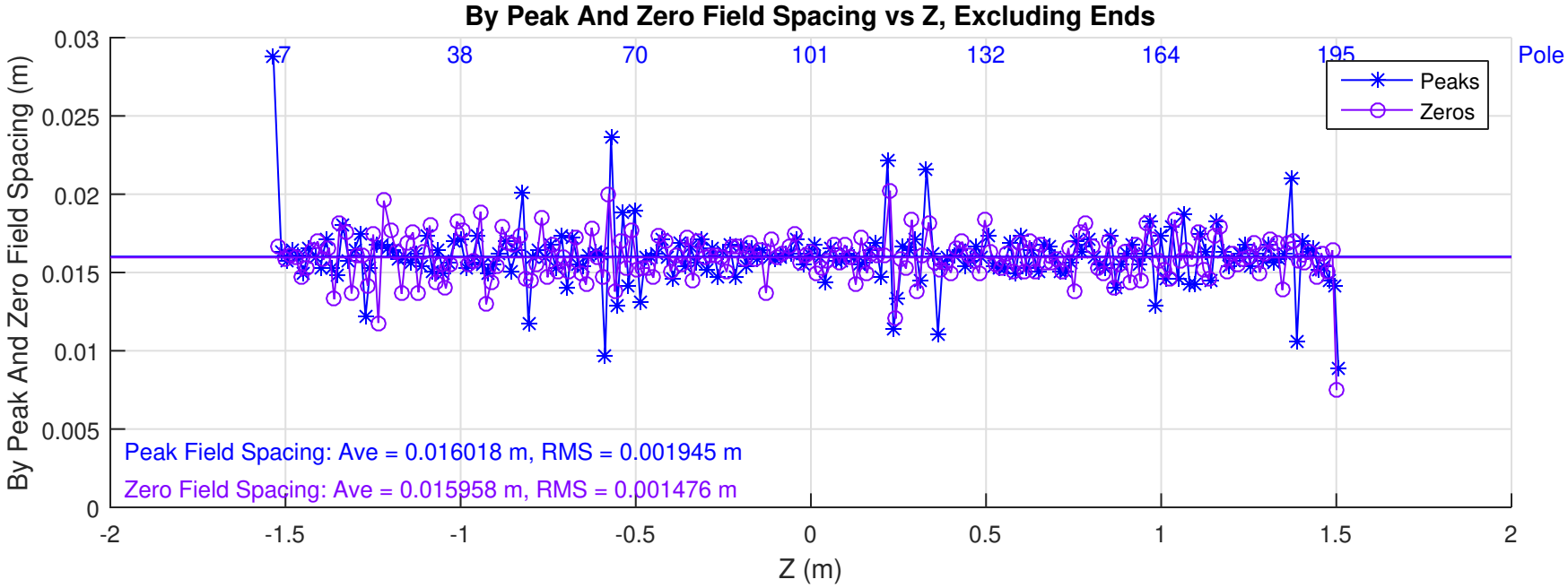

Bx vs Z With Fitted Peaks And Zeros
8
36
68
97
126
157
190
Pole
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Bx (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

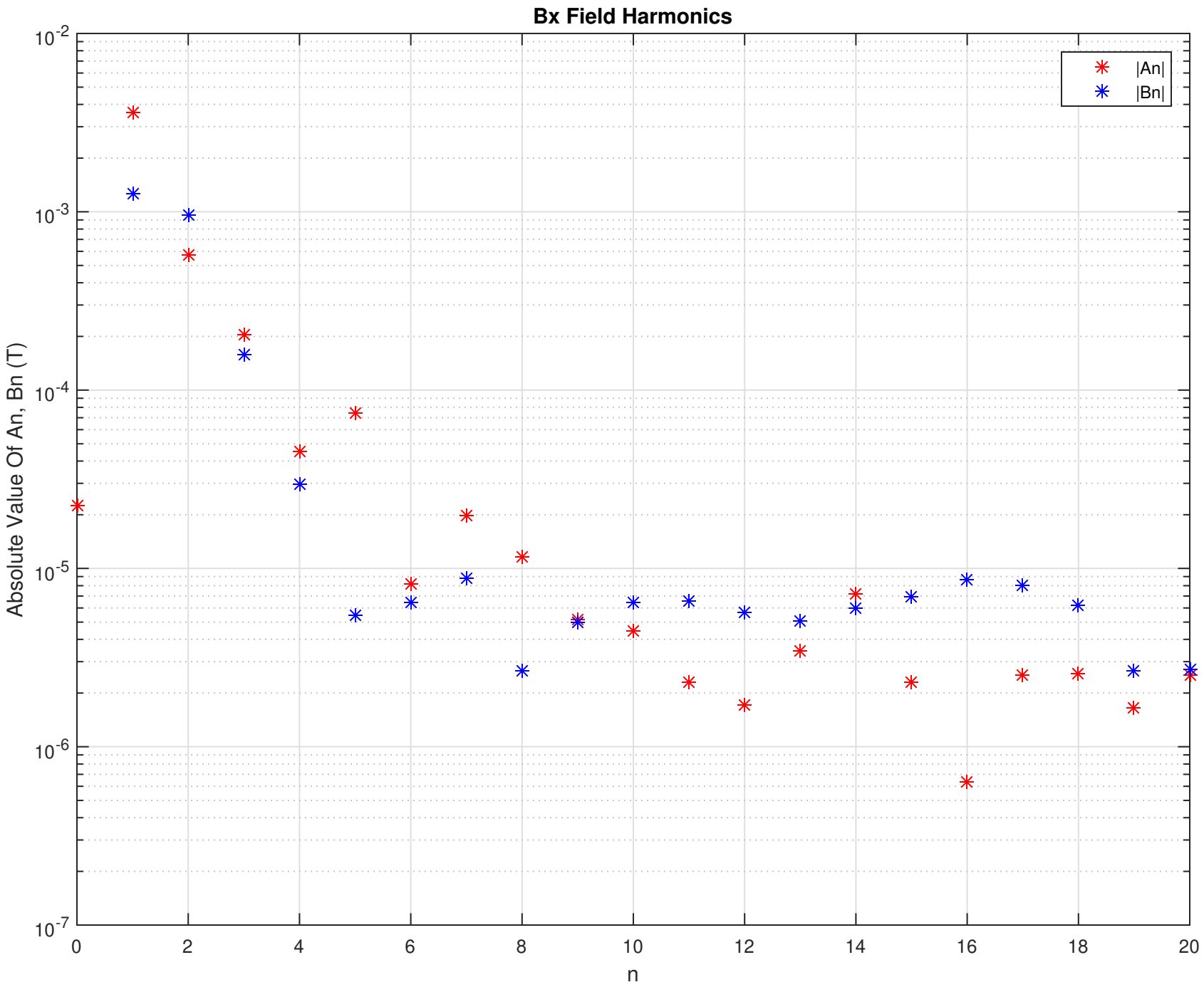

By vs Z With Fitted Peaks And Zeros
7
38
70
101
132
164
195
Pole
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

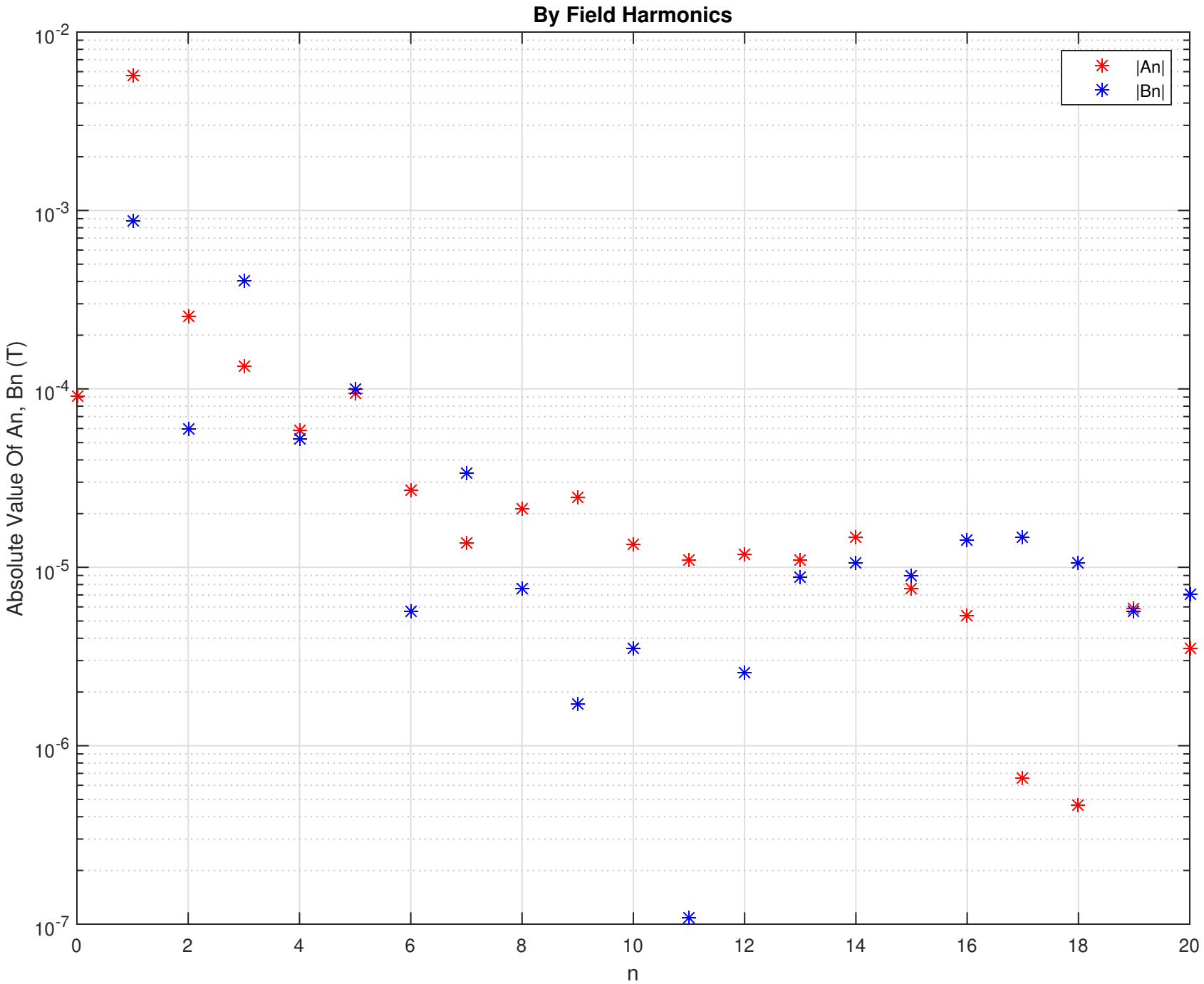

Abs(Fitted Peak Bx) vs Z, Excluding Ends
Abs(Peak Bx) (T)
Z (m)
Pole
8
36
68
97
126
157
Peak Fields: Ave = 0.018861 T, RMS = 0.007847 T

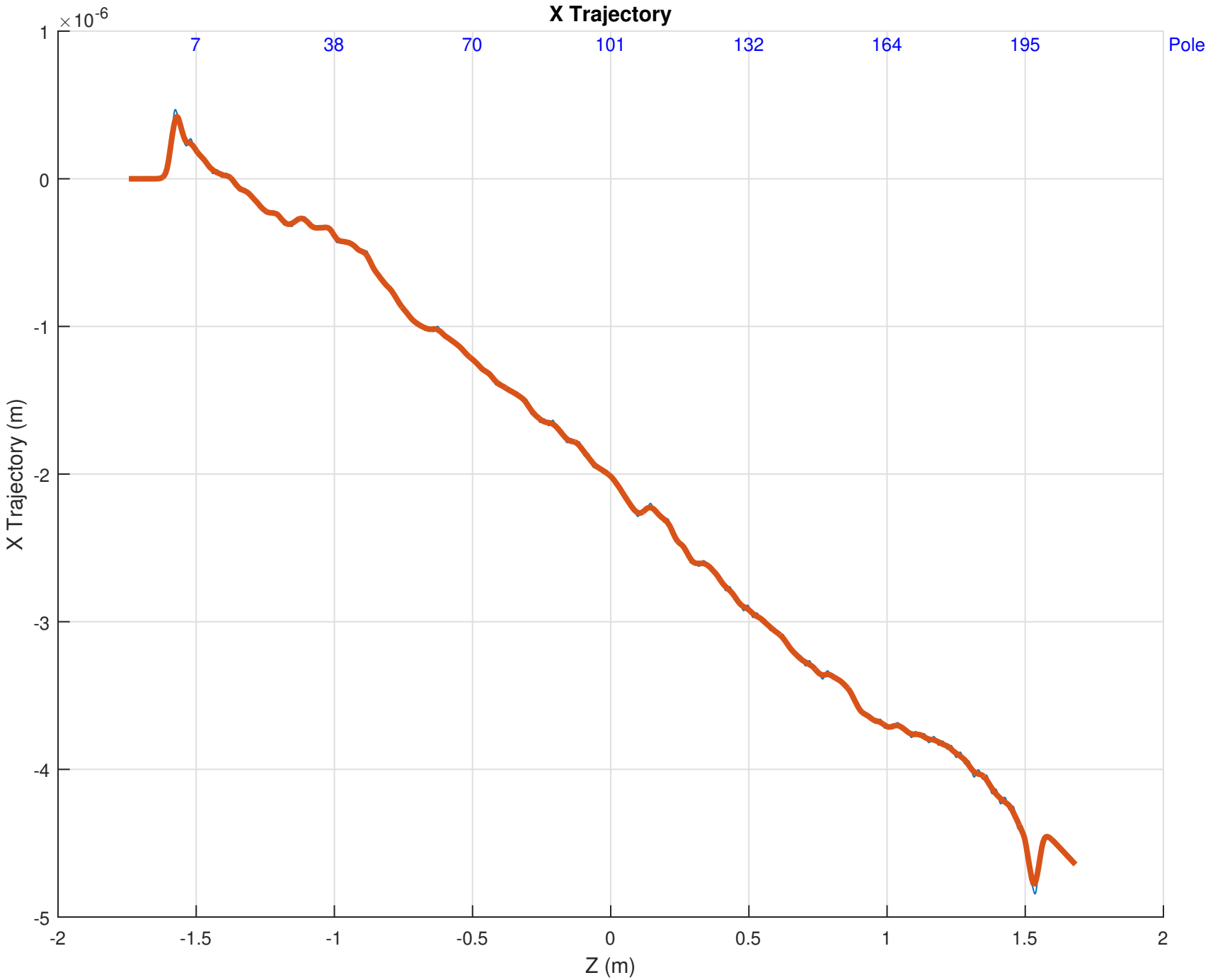

Abs(Fitted Peak By) vs Z, Excluding Ends
Abs(Peak By) (T)
Z (m)
Pole
7
38
70
101
132
164
Peak Fields: Ave = 0.036176 T, RMS = 0.011427 T

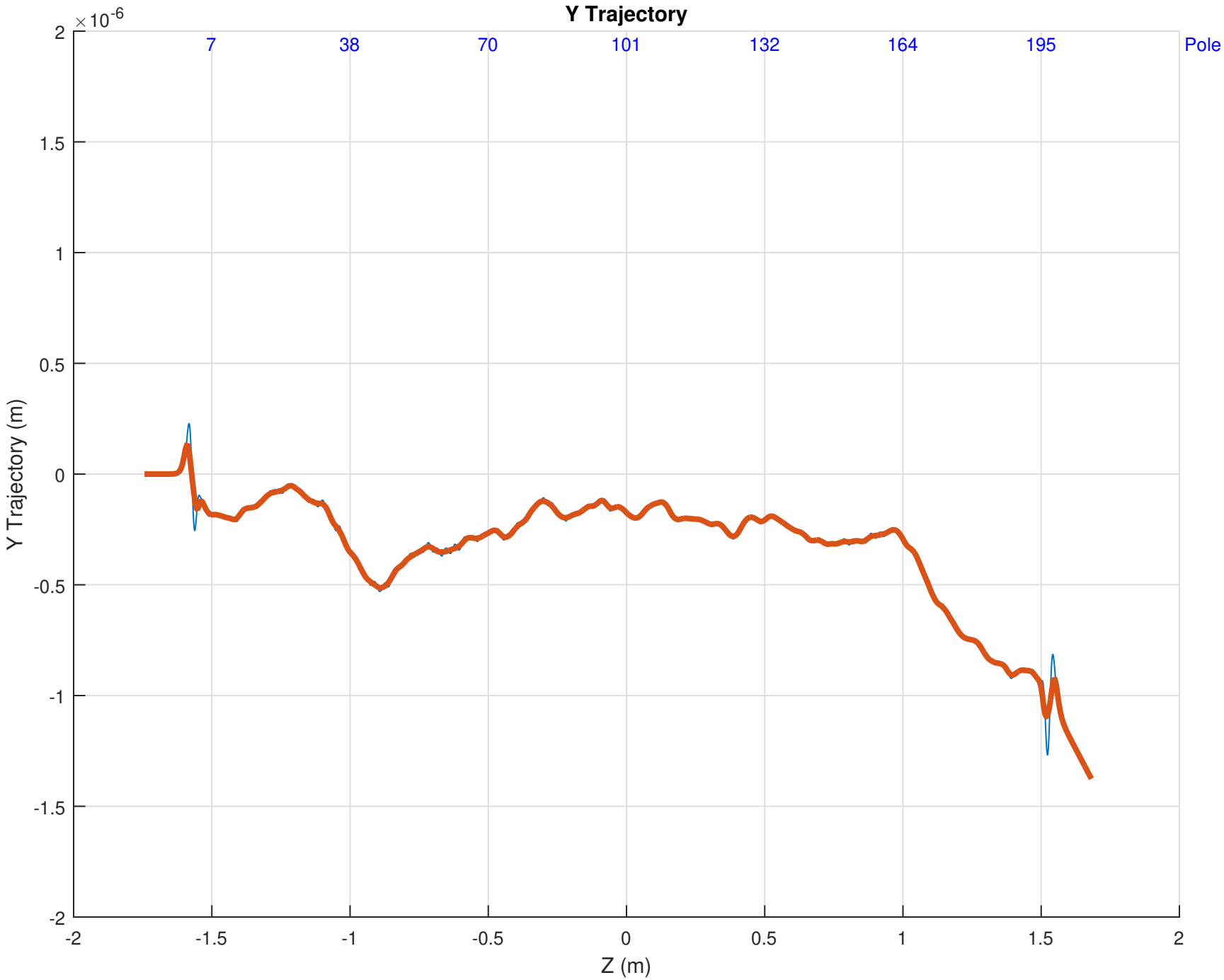

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
Z (m)
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016463 m, RMS = 0.006156 m
Zero Field Spacing: Ave = 0.016499 m, RMS = 0.005631 m

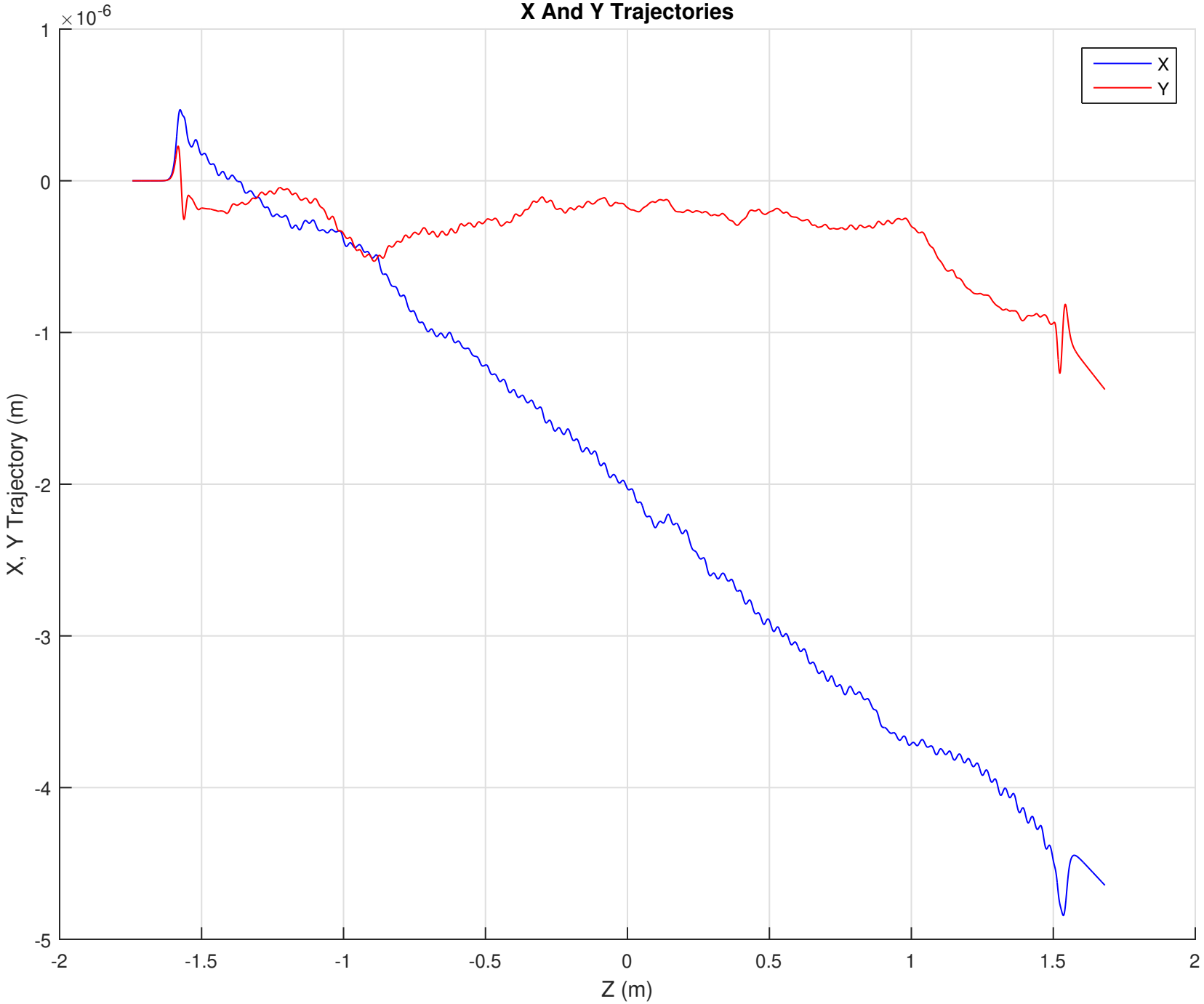

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
Z (m)
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016018 m, RMS = 0.001945 m
Zero Field Spacing: Ave = 0.015958 m, RMS = 0.001476 m

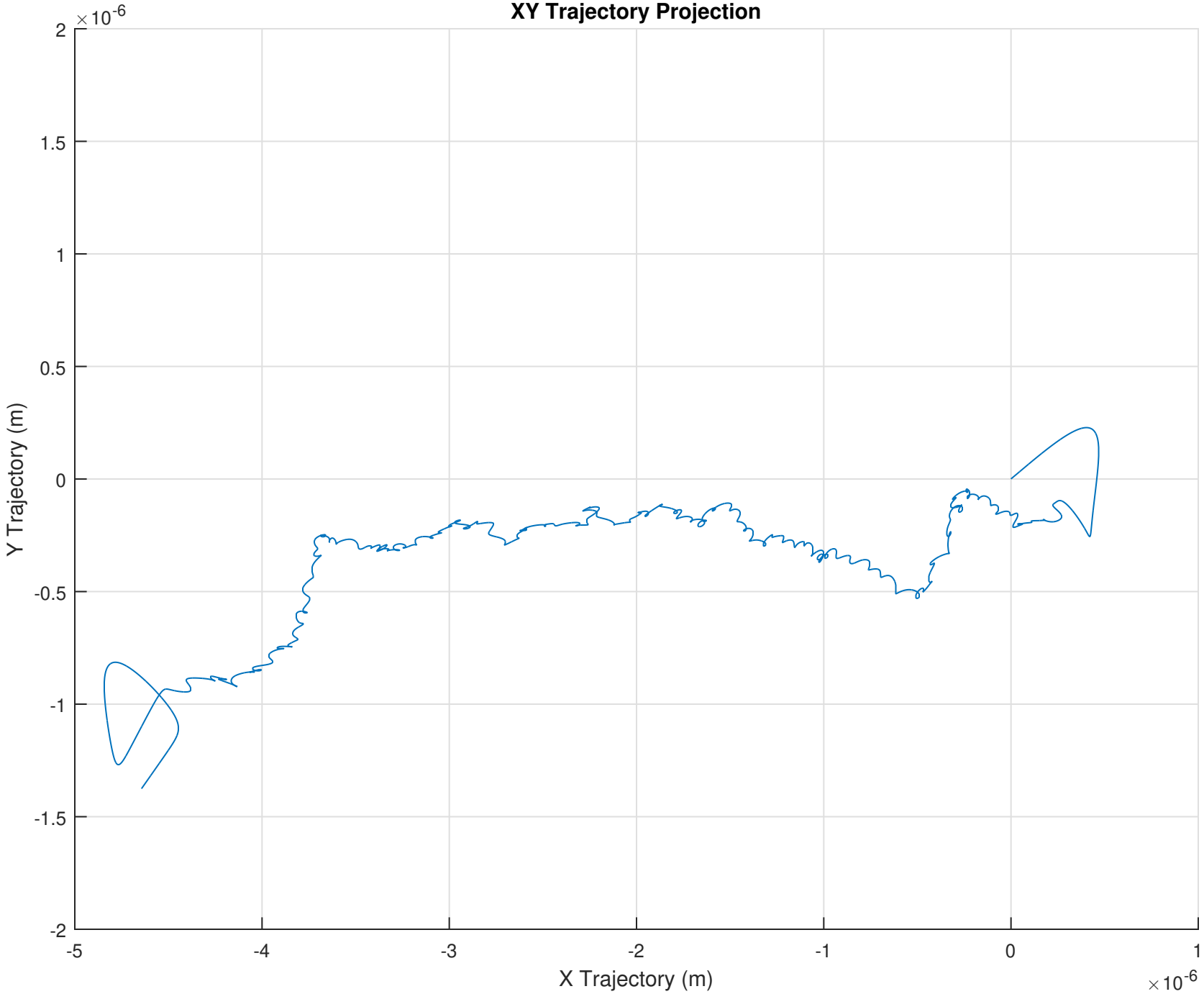

Bx Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^-2
10^-3
10^-4
10^-5
10^-6
10^-7
0
2
4
6
8
10
12
14
16
18
20

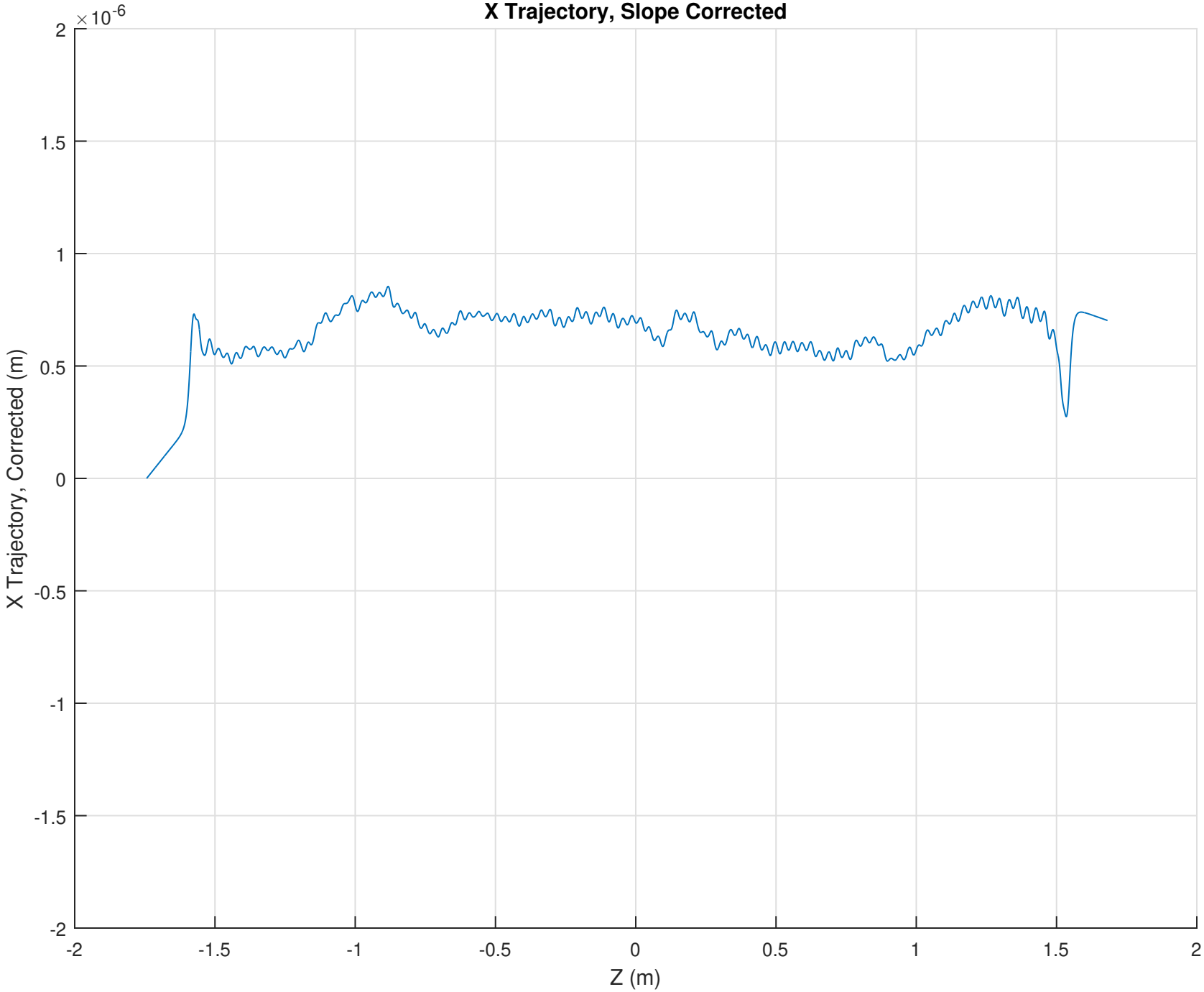

By Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^-2
10^-3
10^-4
10^-5
10^-6
10^-7
0
2
4
6
8
10
12
14
16
18
20

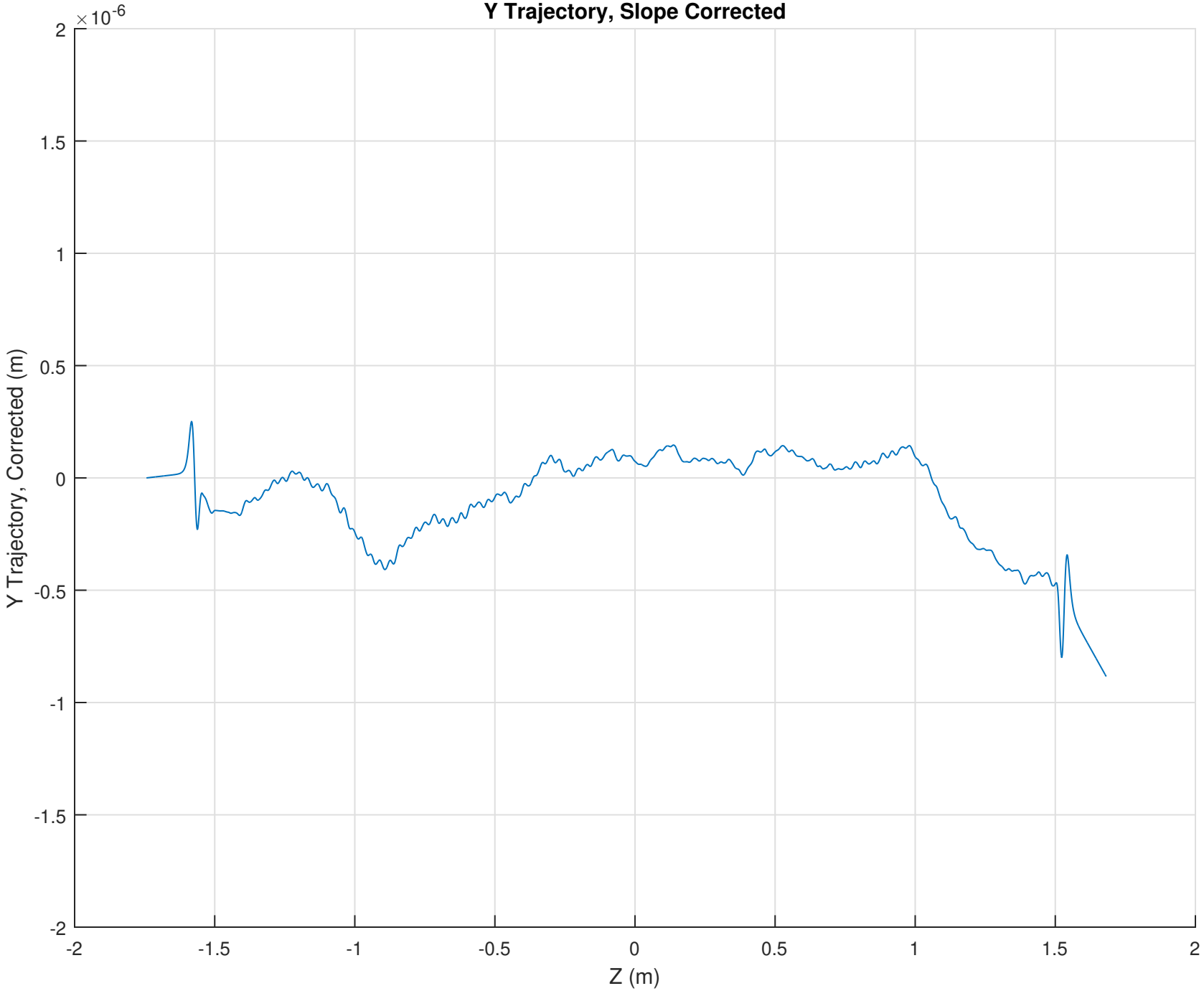

X Trajectory
×10-6
7
38
70
101
132
164
195
Pole
1
0
-1
-2
-3
-4
-5
X Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

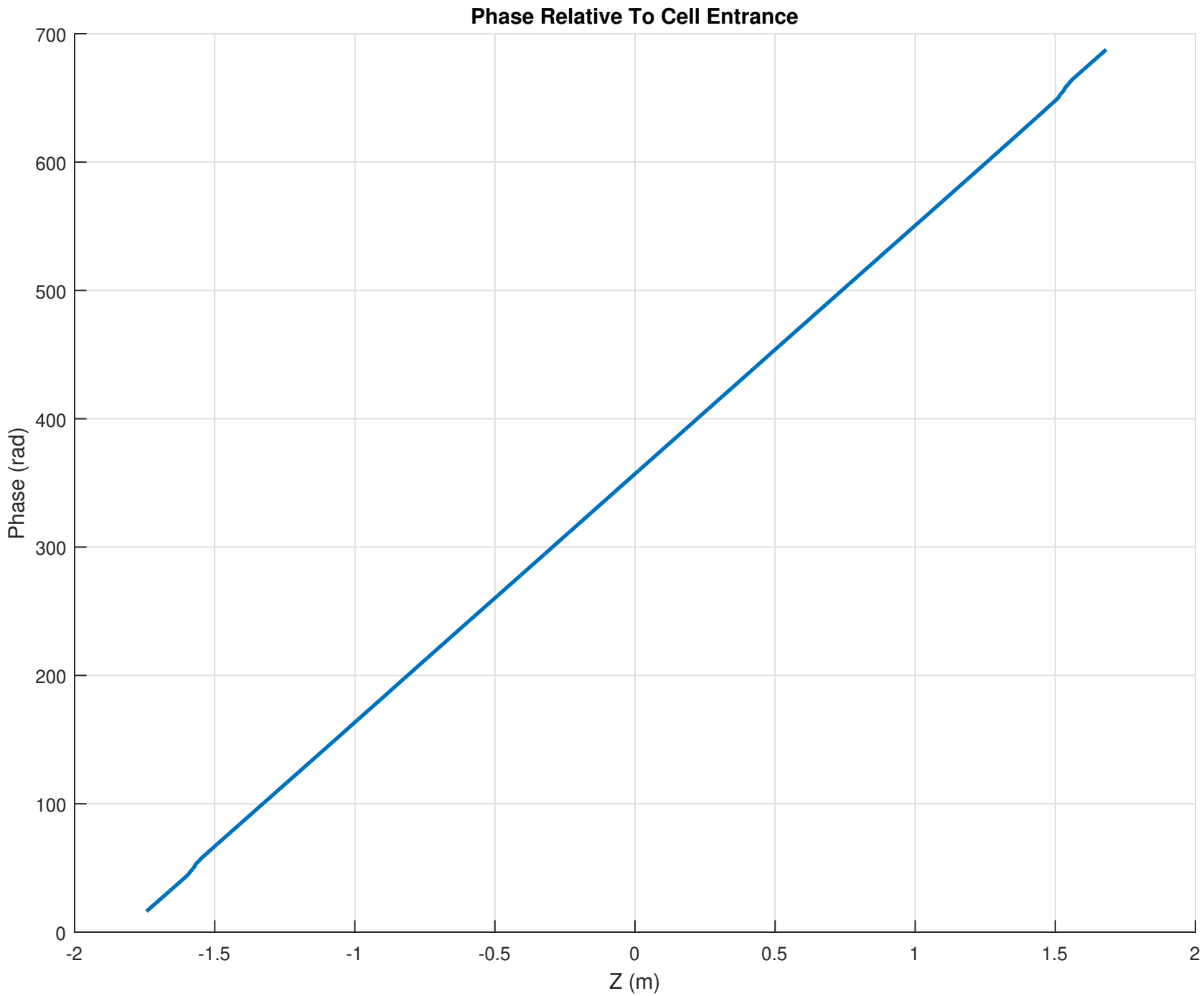

Y Trajectory
×10-6
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
7
38
70
101
132
164
195
Pole
Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

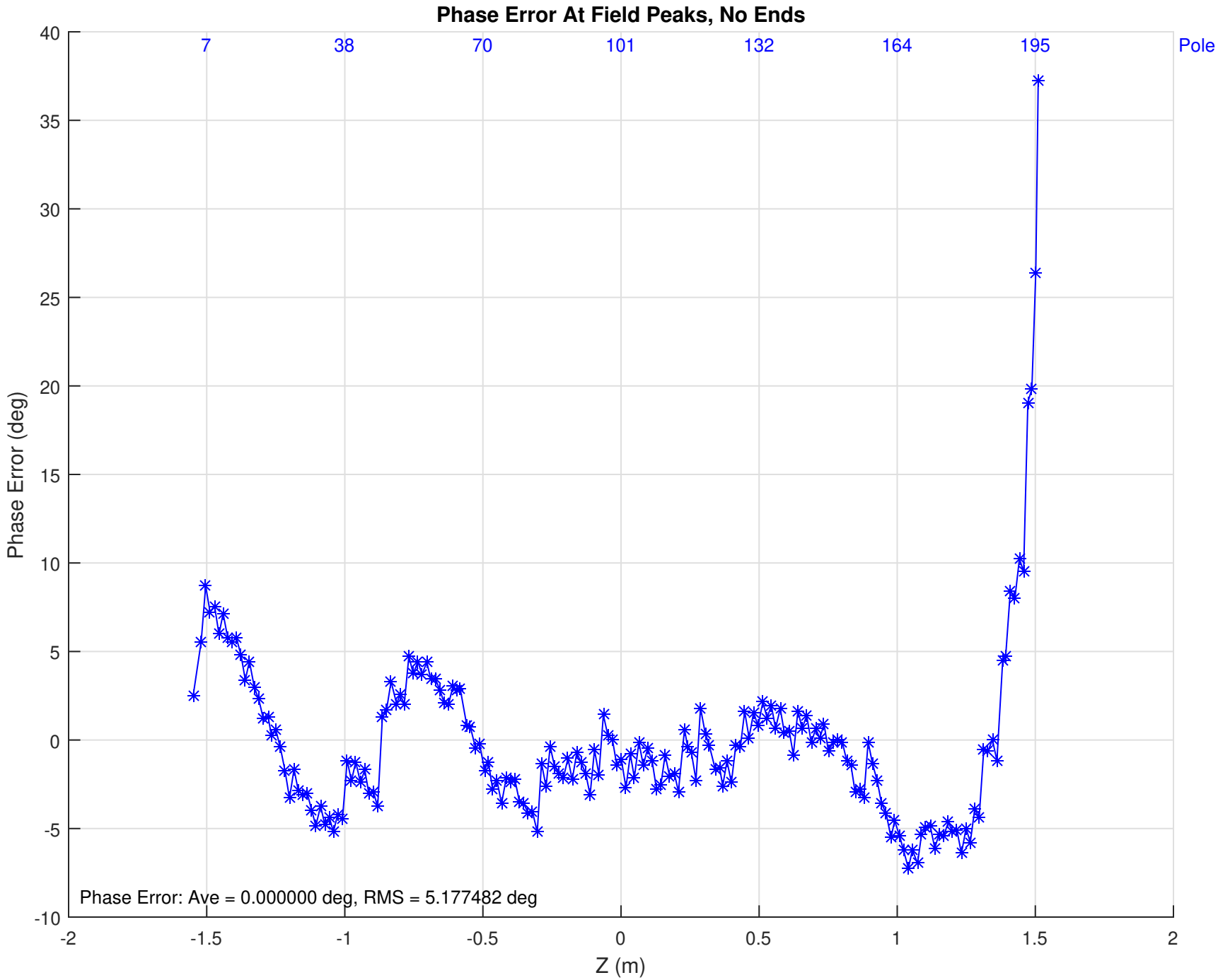

X And Y Trajectories
×10-6
1
0
-1
-2
-3
-4
-5
X, Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
X
Y

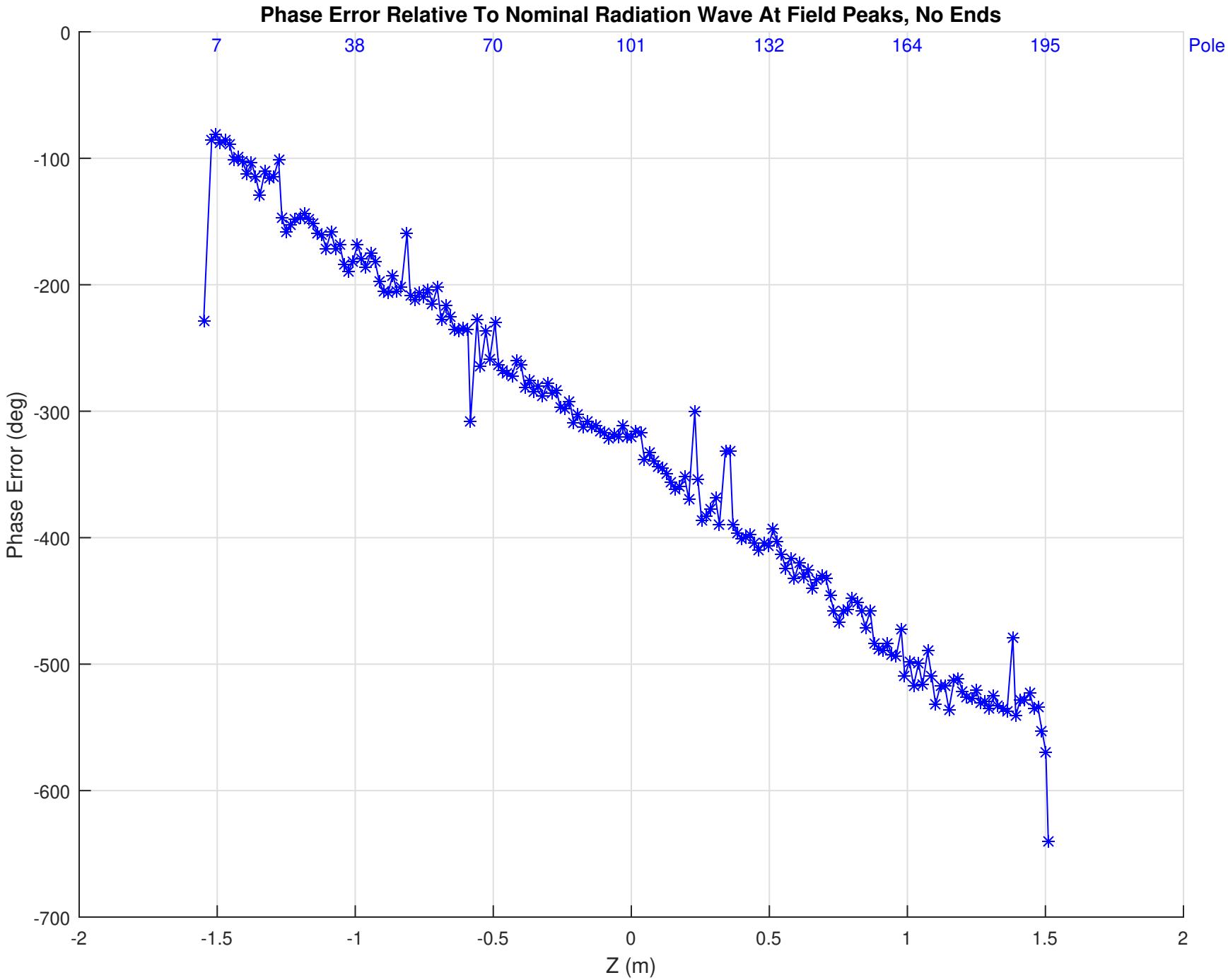

XY Trajectory Projection
×10-6
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
Y Trajectory (m)
-5
-4
-3
-2
-1
0
1
X Trajectory (m)
×10-6

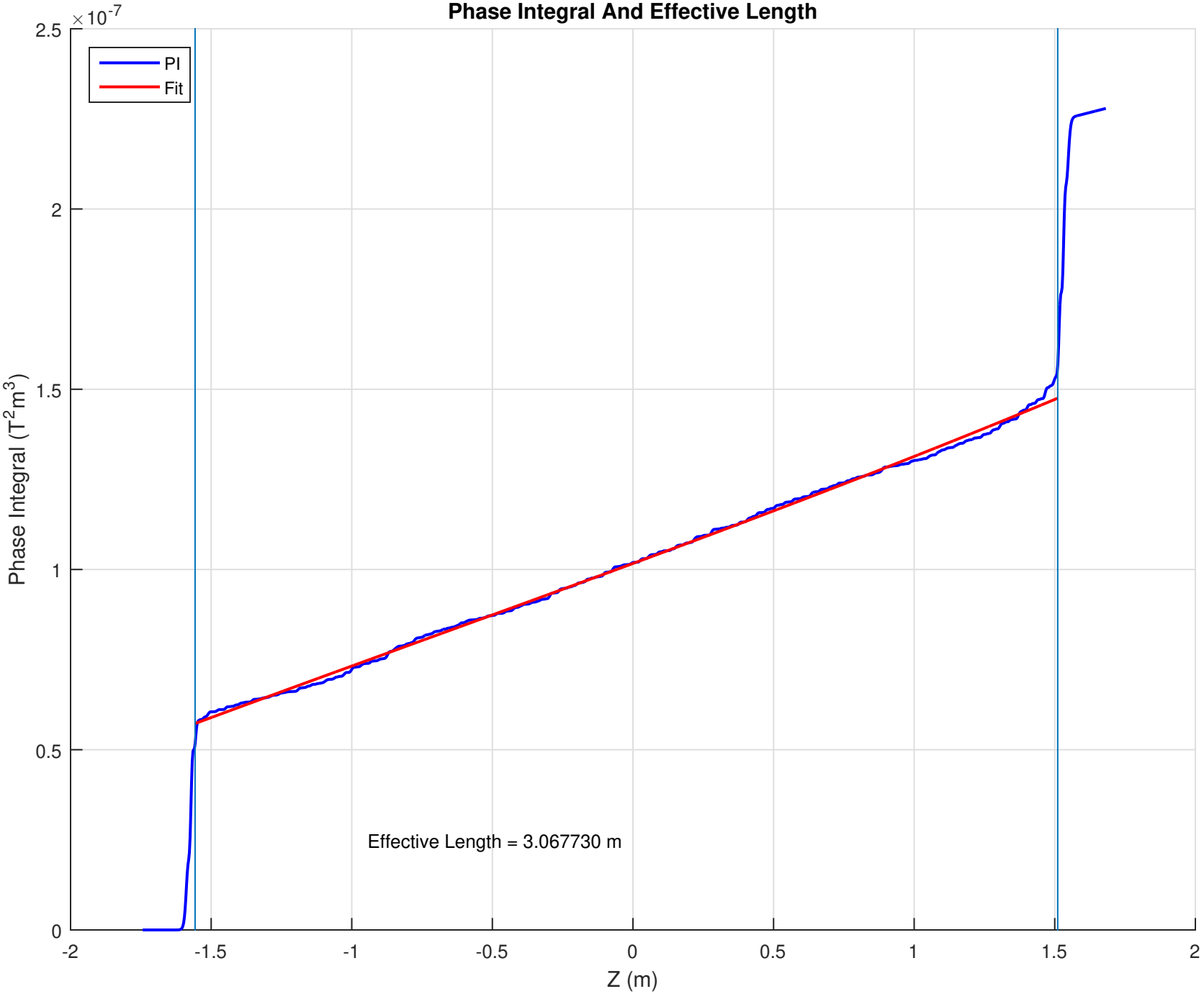

X Trajectory, Slope Corrected
×10-6
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
X Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

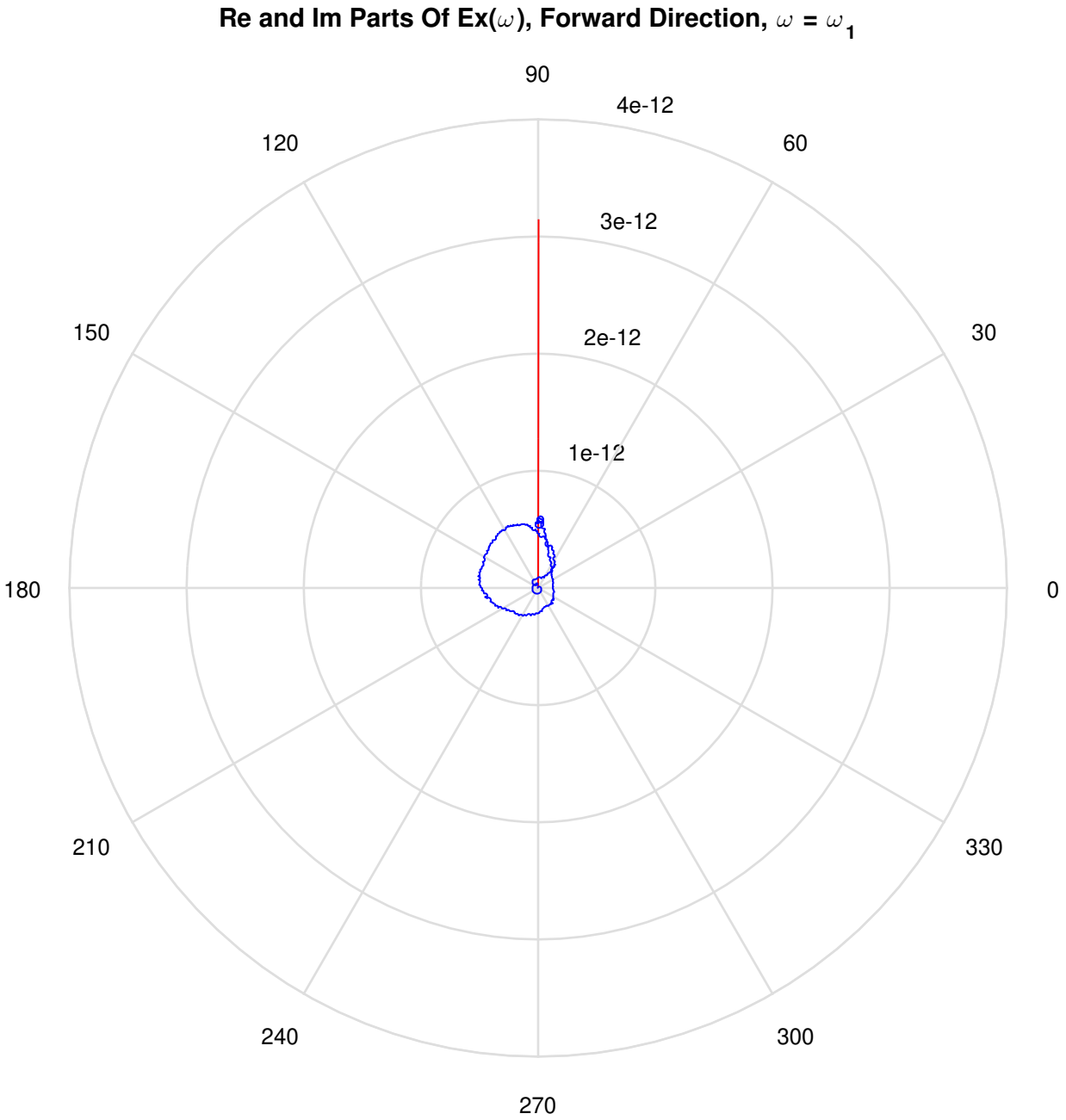

Y Trajectory, Slope Corrected
×10-6
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
Y Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

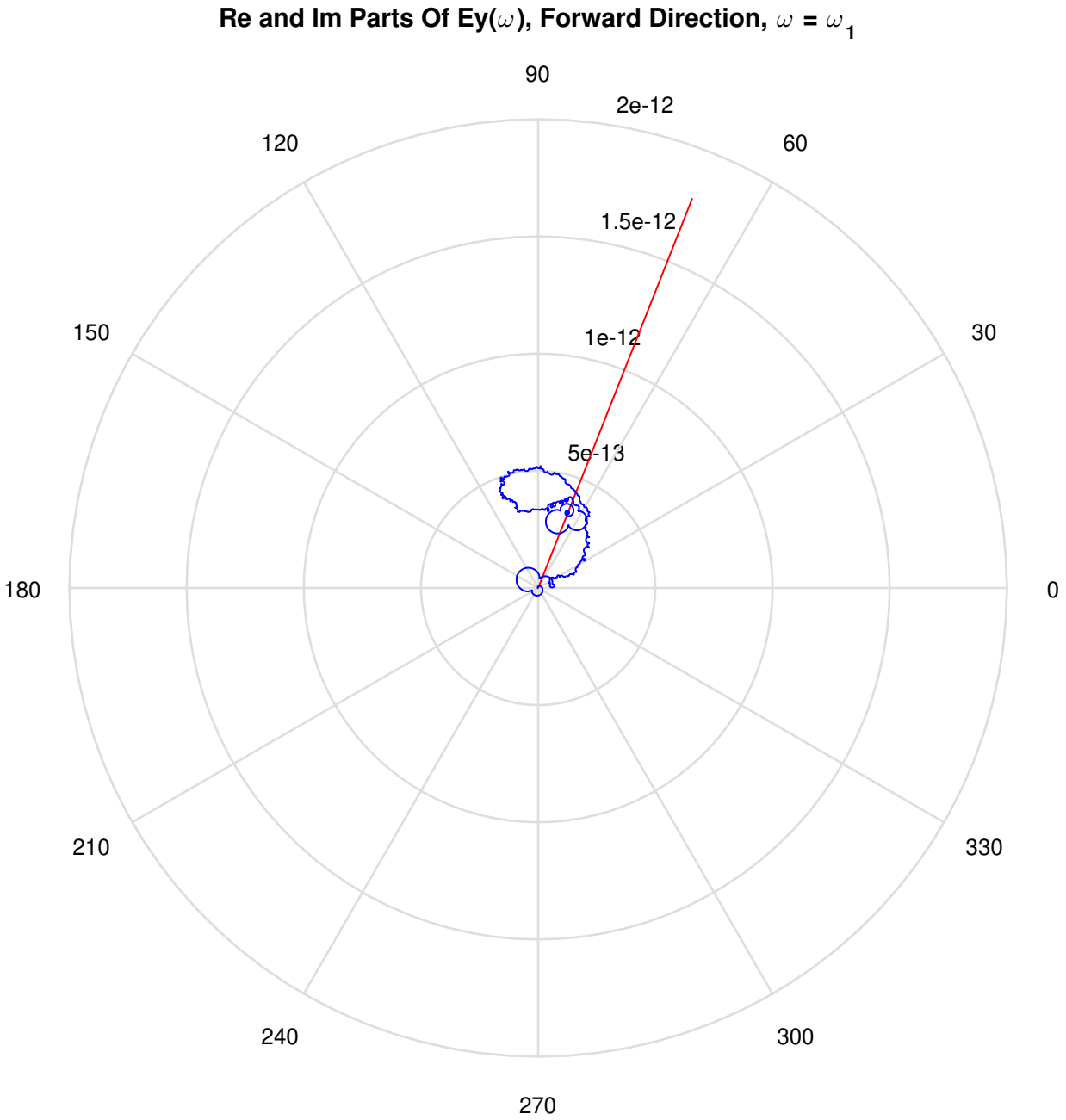

Phase Relative To Cell Entrance
Phase (rad)
Z (m)
700
600
500
400
300
200
100
0
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2

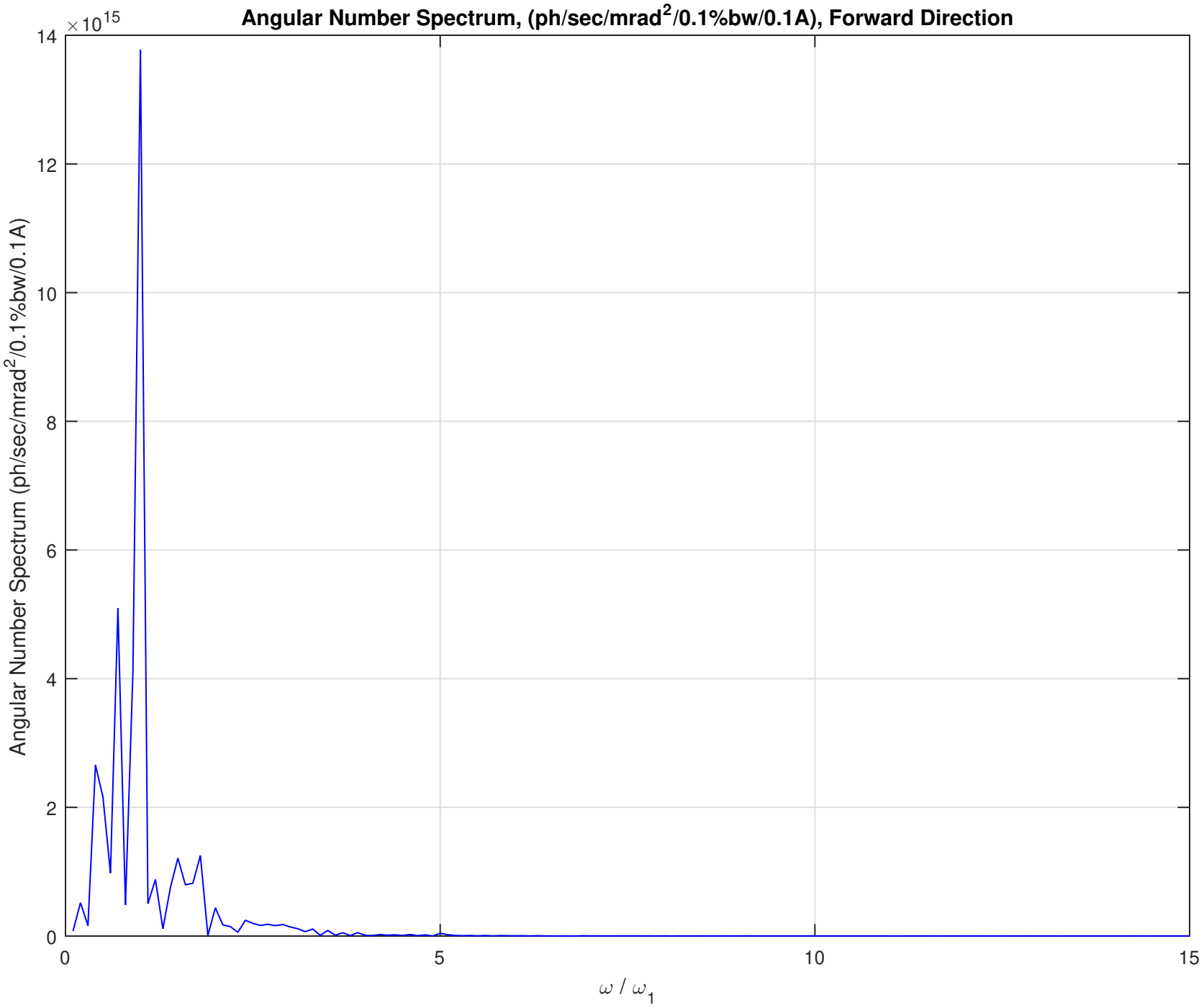

Phase Error At Field Peaks, No Ends
7
38
70
101
132
164
195
Pole
40
35
30
25
20
15
10
5
0
-5
-10
Phase Error (deg)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
Phase Error: Ave = 0.000000 deg, RMS = 5.177482 deg

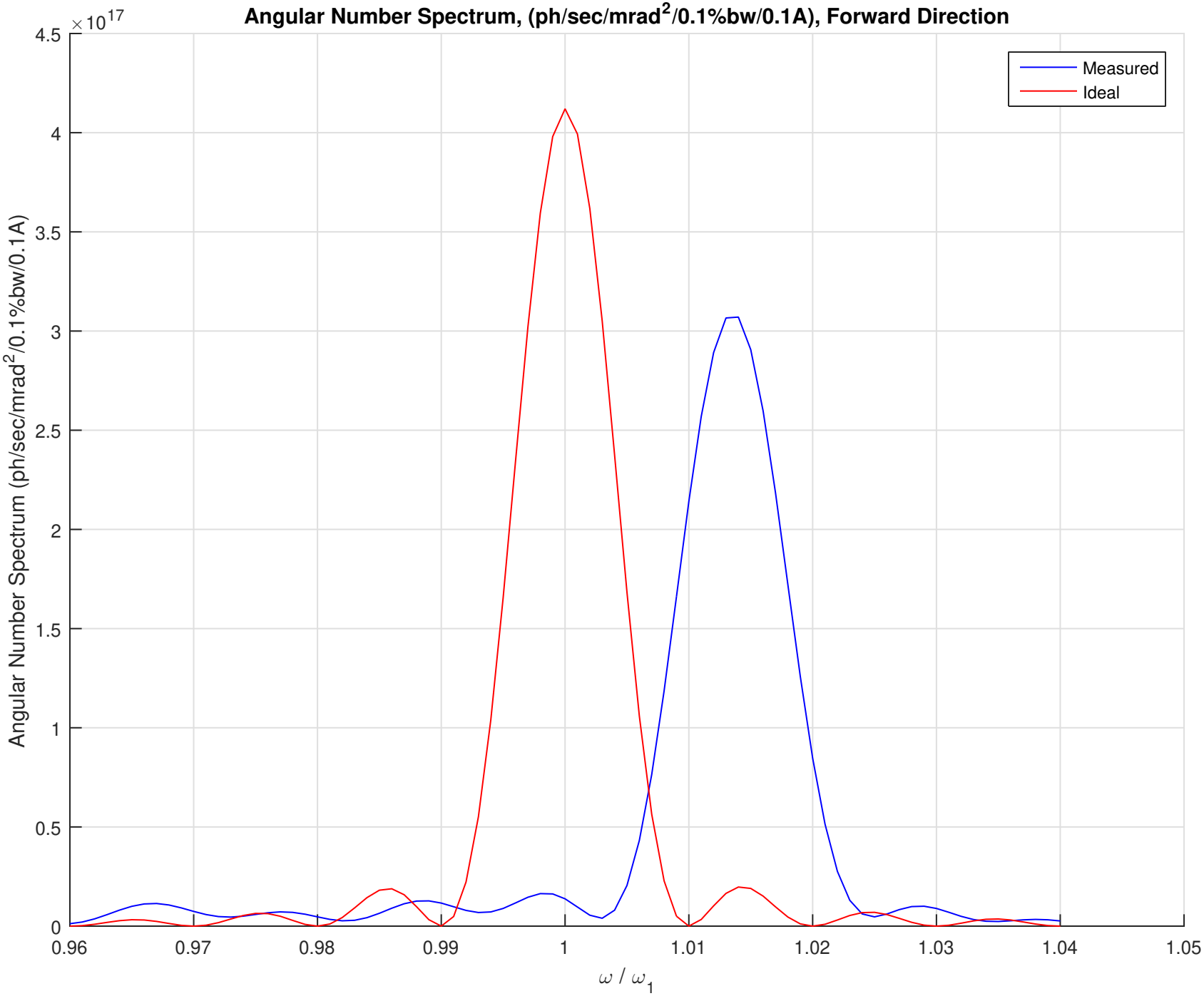

Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
7
38
70
101
132
164
195
Pole
0
-100
-200
-300
-400
-500
-600
-700
Phase Error (deg)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

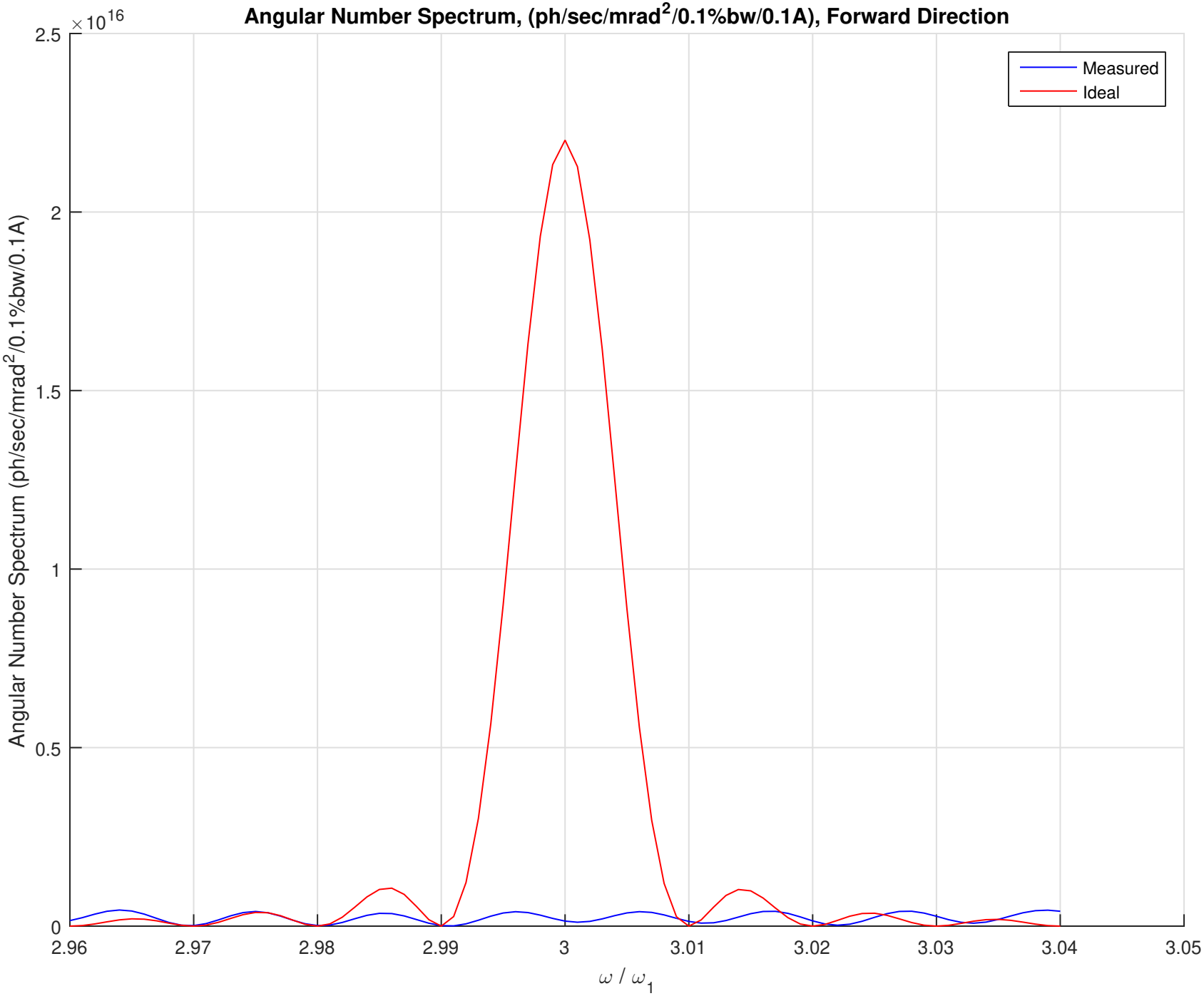

Phase Integral And Effective Length
×10^-7
2.5
2
1.5
1
0.5
0
PI
Fit
Phase Integral (T^2m^3)
Effective Length = 3.067730 m
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

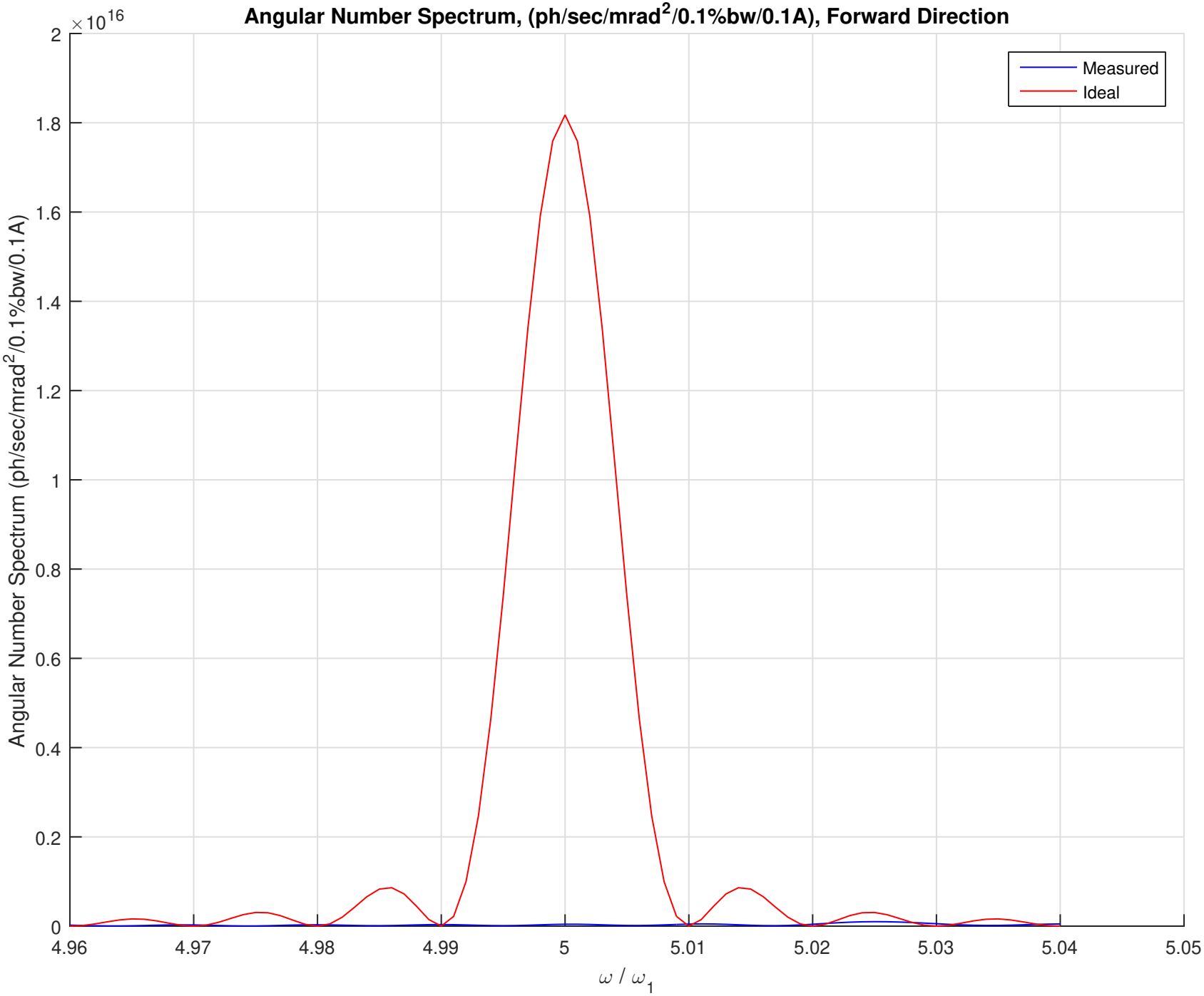

Re and Im Parts Of Ex(ω), Forward Direction, ω = ω1
90
4e-12
120
60
3e-12
150
30
2e-12
1e-12
180
0
210
330
240
300
270


Re and Im Parts Of Ey(ω), Forward Direction, ω = ω1
90
2e-12
120
60
1.5e-12
150
1e-12
30
5e-13
180
0
210
330
240
300
270


Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
$\times 10^{15}$
14
12
10
8
6
4
2
0
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
0
5
10
15
ω / ω_1


Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
$\times 10^{17}$
4.5
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
ω / ω_1
Measured
Ideal


Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
$\times 10^{16}$
2.5
2
1.5
1
0.5
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
ω / ω_1
Measured
Ideal


Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
$\times 10^{16}$
Measured
Ideal
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
4.96
4.97
4.98
4.99
5
5.01
5.02
5.03
5.04
5.05
ω / ω_1