SLAC Magnetic Measurements

EPU Analysis
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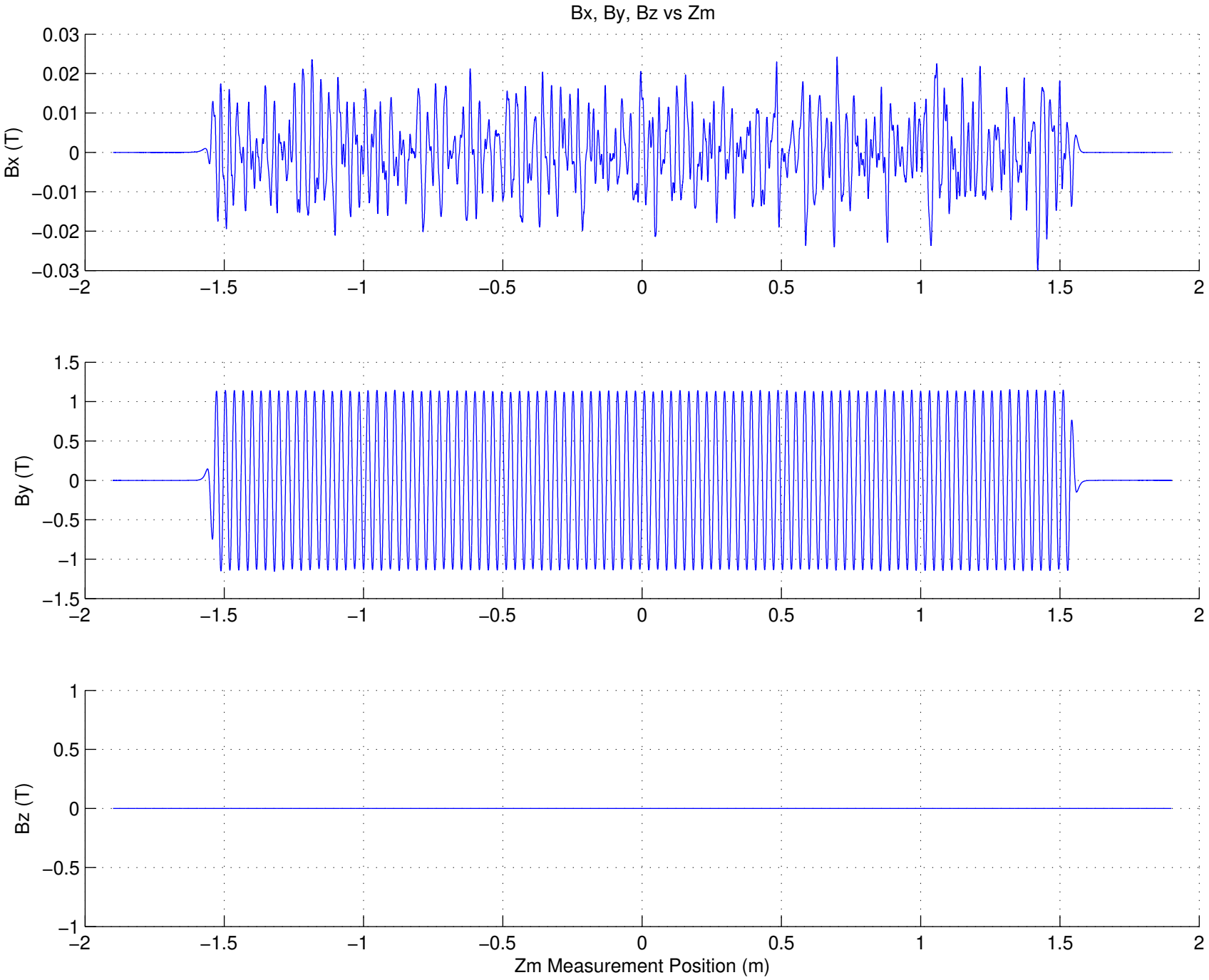
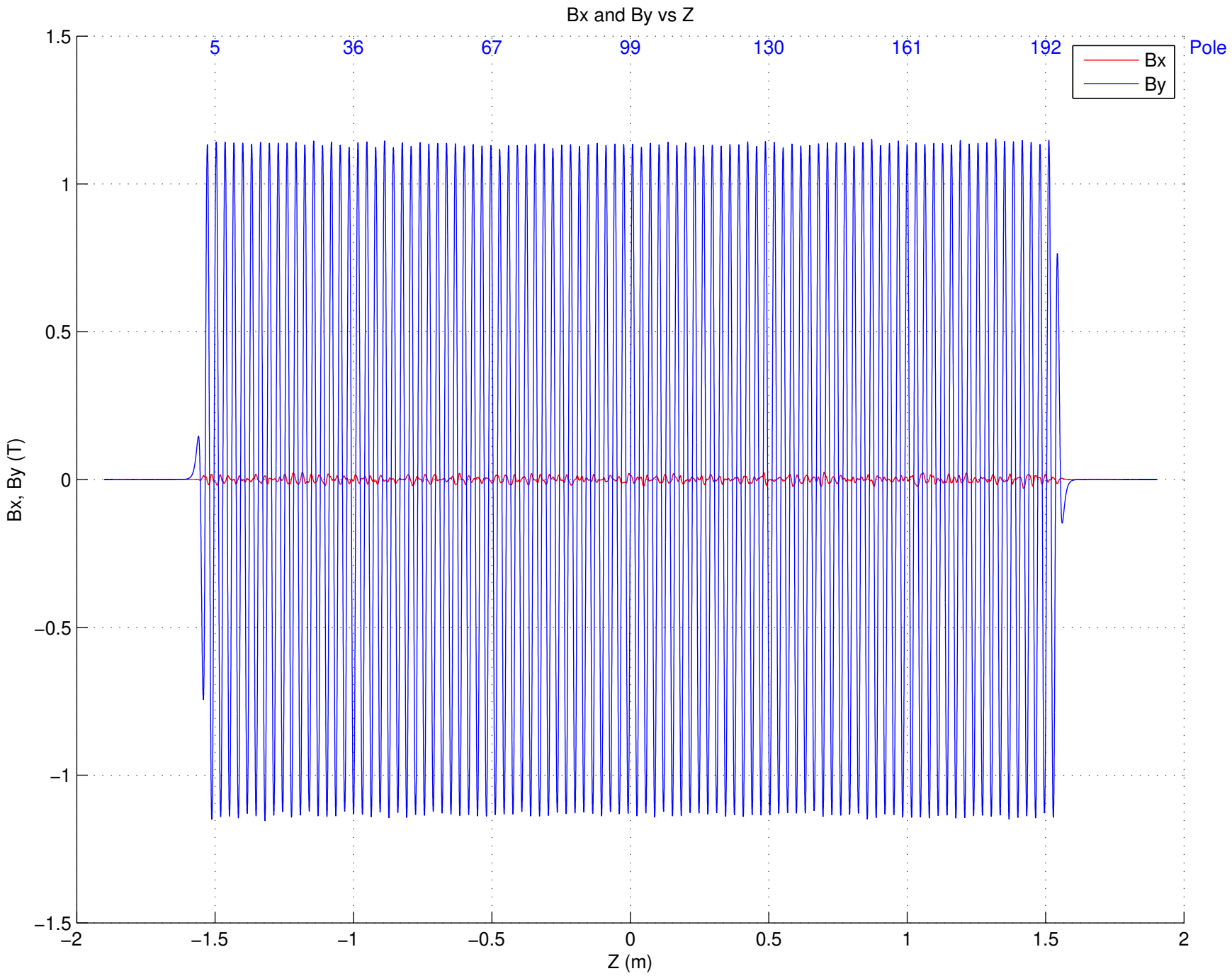
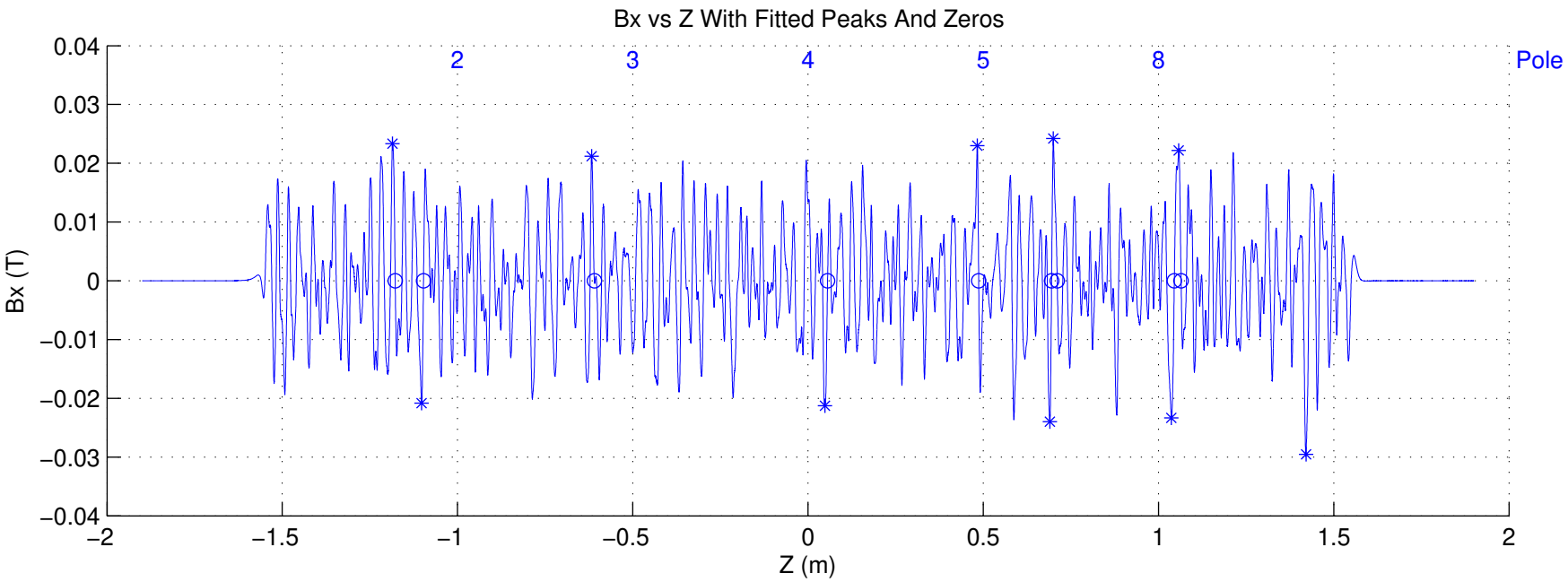
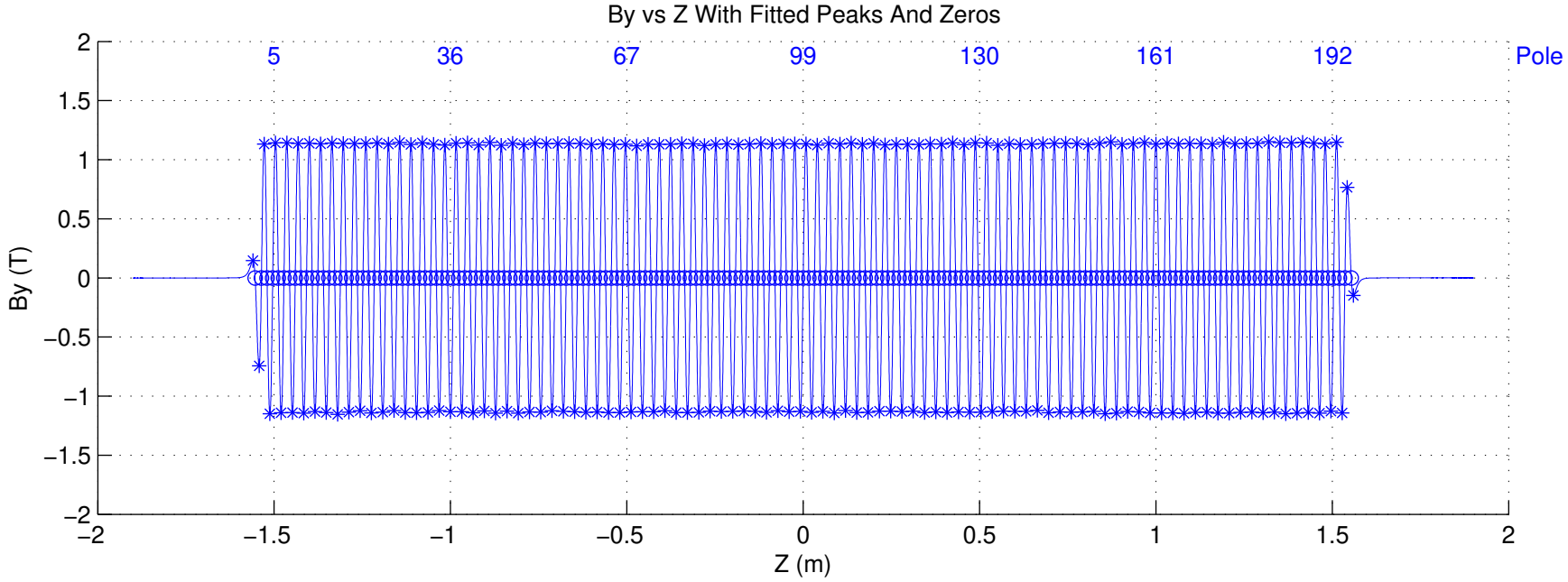
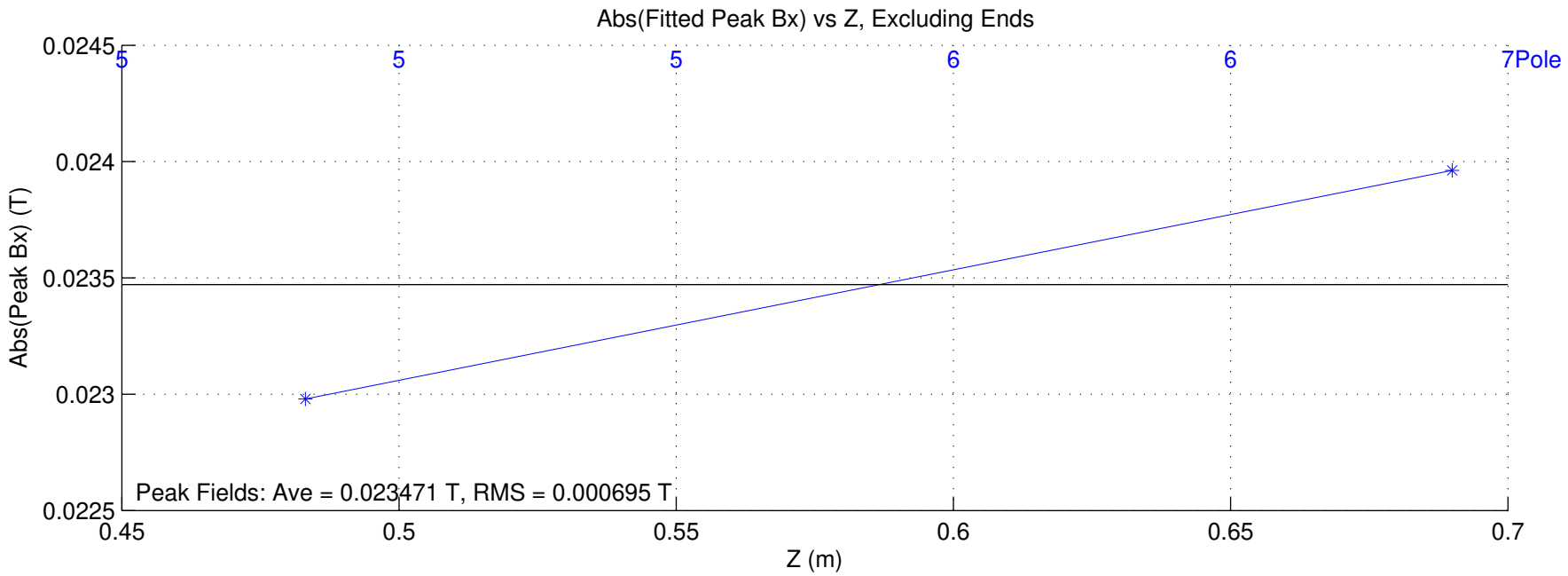
Parameters:
INPUT–FILE–DIR =C:\Magdata\Delta 3.2 Superpose Quadrants\Linear Vertical Field\
INPUT–FILE–NAME =superpose–quadrants.dat
INPUT–FILE–TYPE =ZBXYZH
CORR–REQUIRED =0
GAMMA =26627.1
NOM–LAMBDA–U =0
NOM–K–VALUE =0
NOM–LAMBDA–R =0
NUM–POLES =196
NUM–END–POLES =4
CELL–LENGTH =3.126

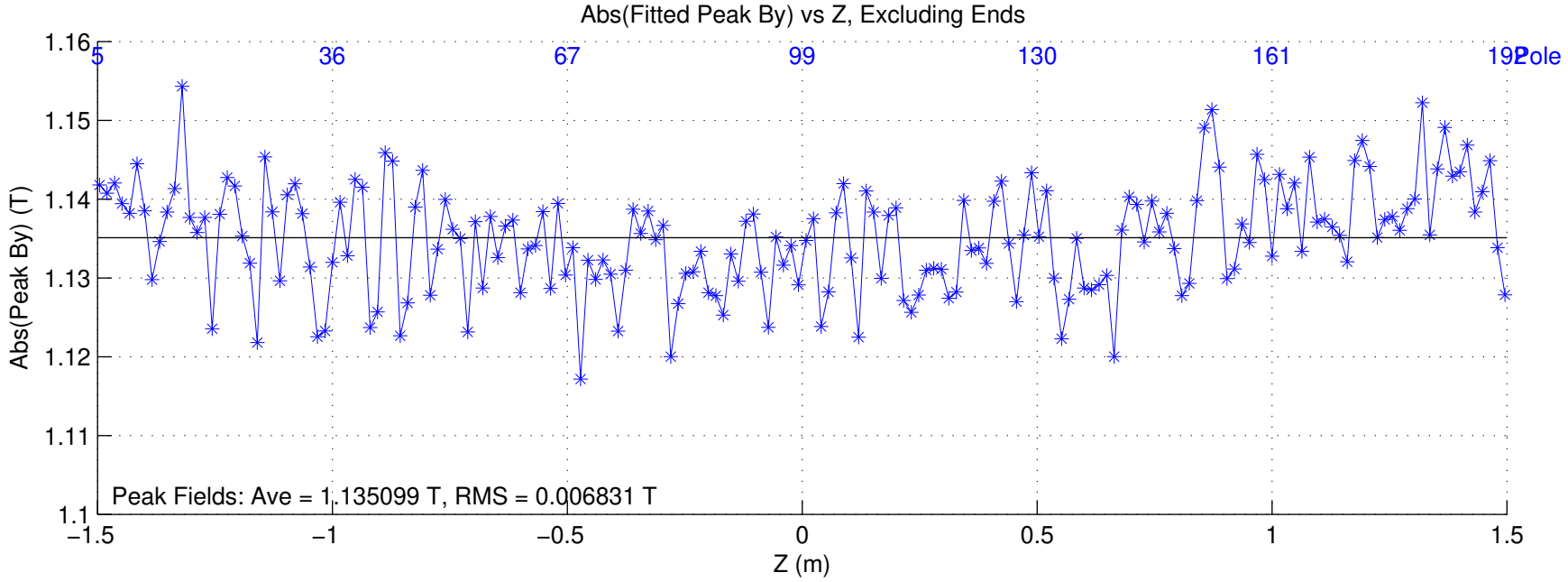

Bx, By, Bz vs Zm
Bx (T)
By (T)
Bz (T)
Zm Measurement Position (m)
0.03
0.02
0.01
0
−0.01
−0.02
−0.03
1.5
1
0.5
0
−0.5
−1
−1.5
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2

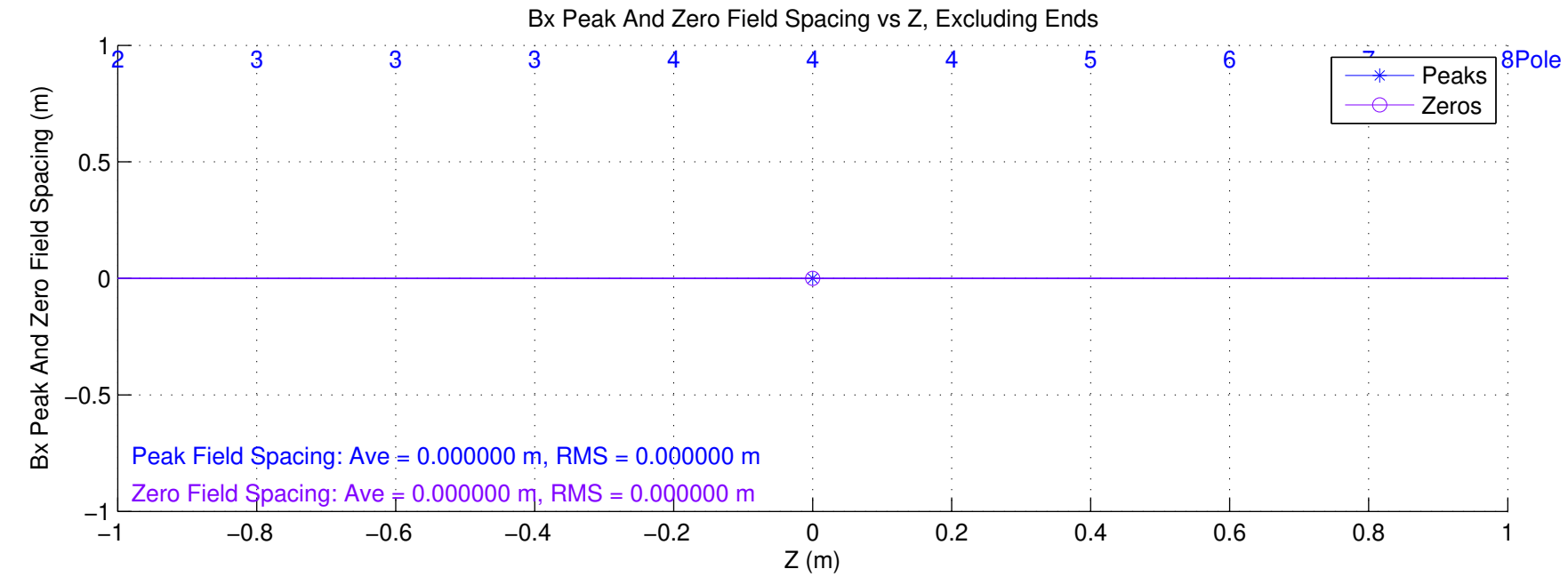

Bx and By vs Z
5
36
67
99
130
161
192
Pole
Bx
By
1.5
1
0.5
0
−0.5
−1
−1.5
Bx, By (T)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

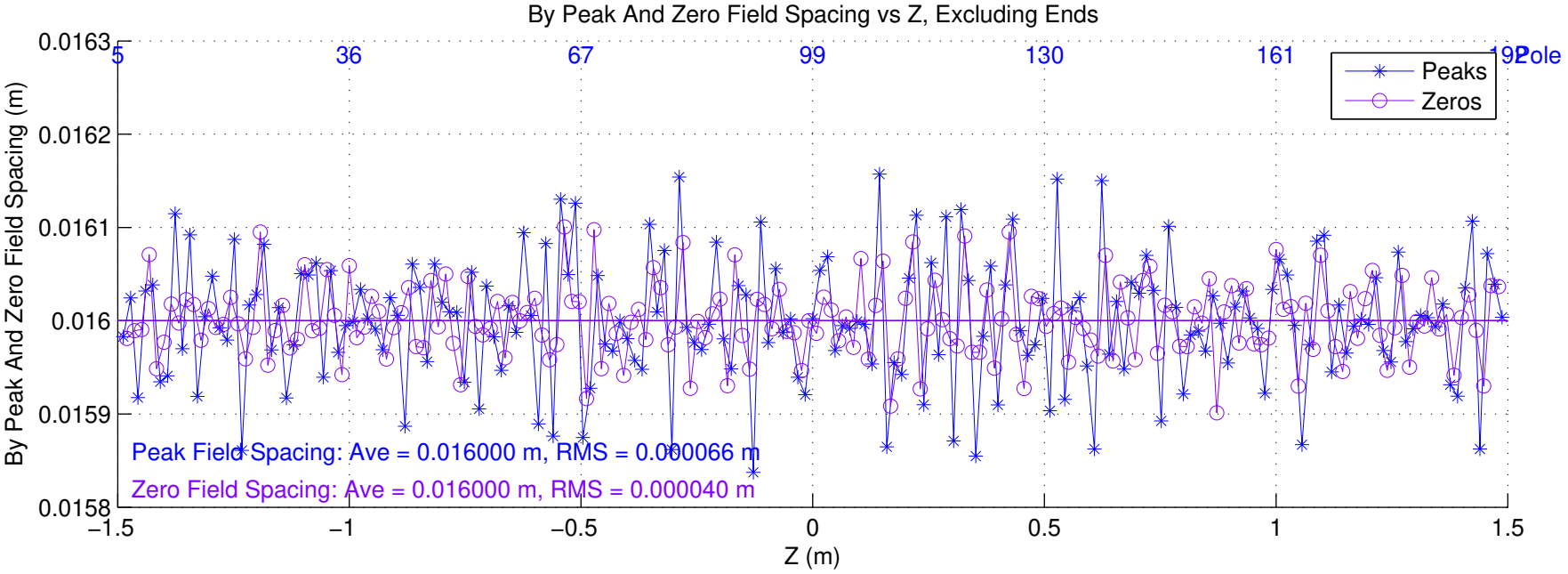

Bx vs Z With Fitted Peaks And Zeros
Pole
2
3
4
5
8
Bx (T)
Z (m)
0.04
0.03
0.02
0.01
0
−0.01
−0.02
−0.03
−0.04
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2

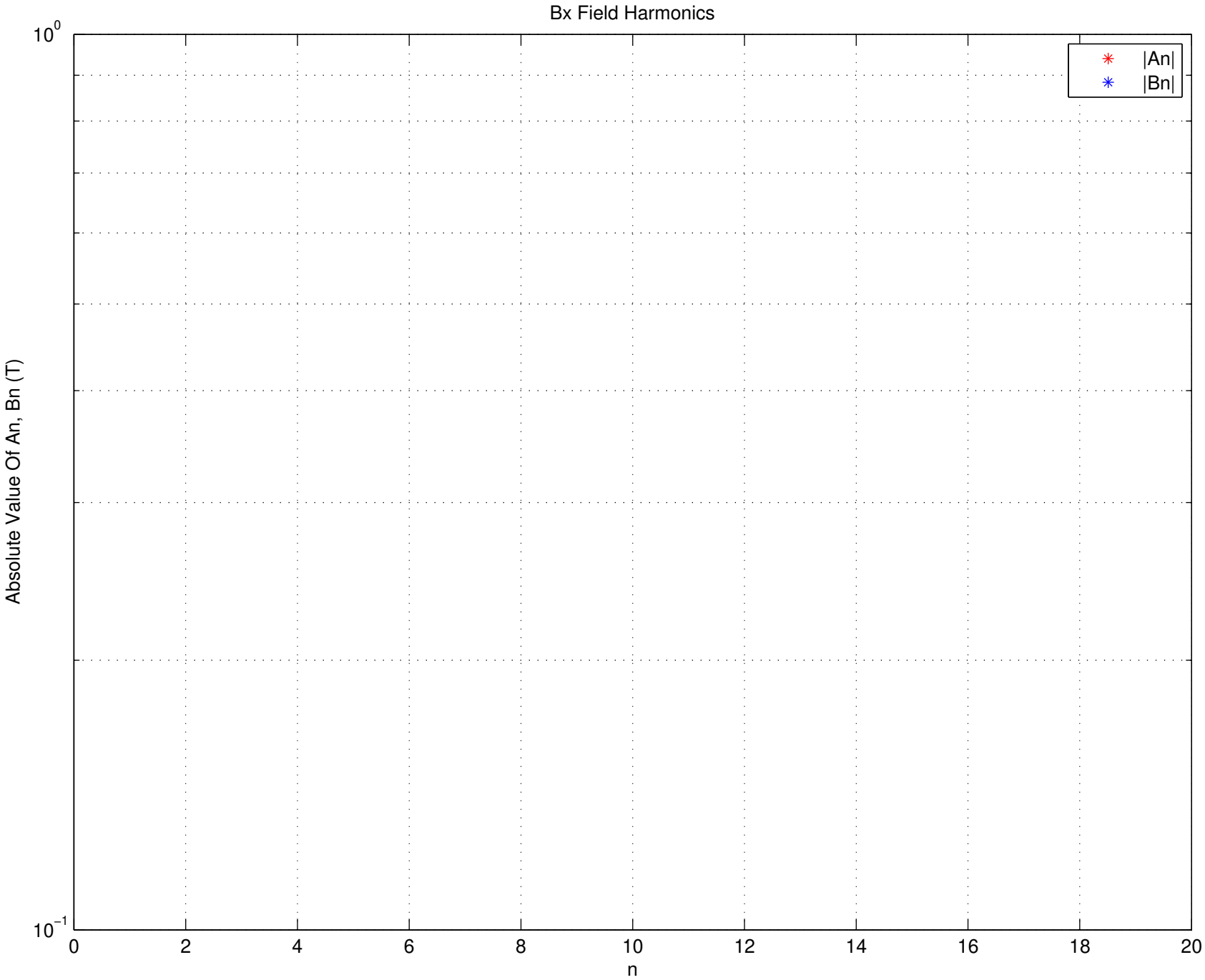

By vs Z With Fitted Peaks And Zeros
Pole
5
36
67
99
130
161
192
By (T)
Z (m)
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2

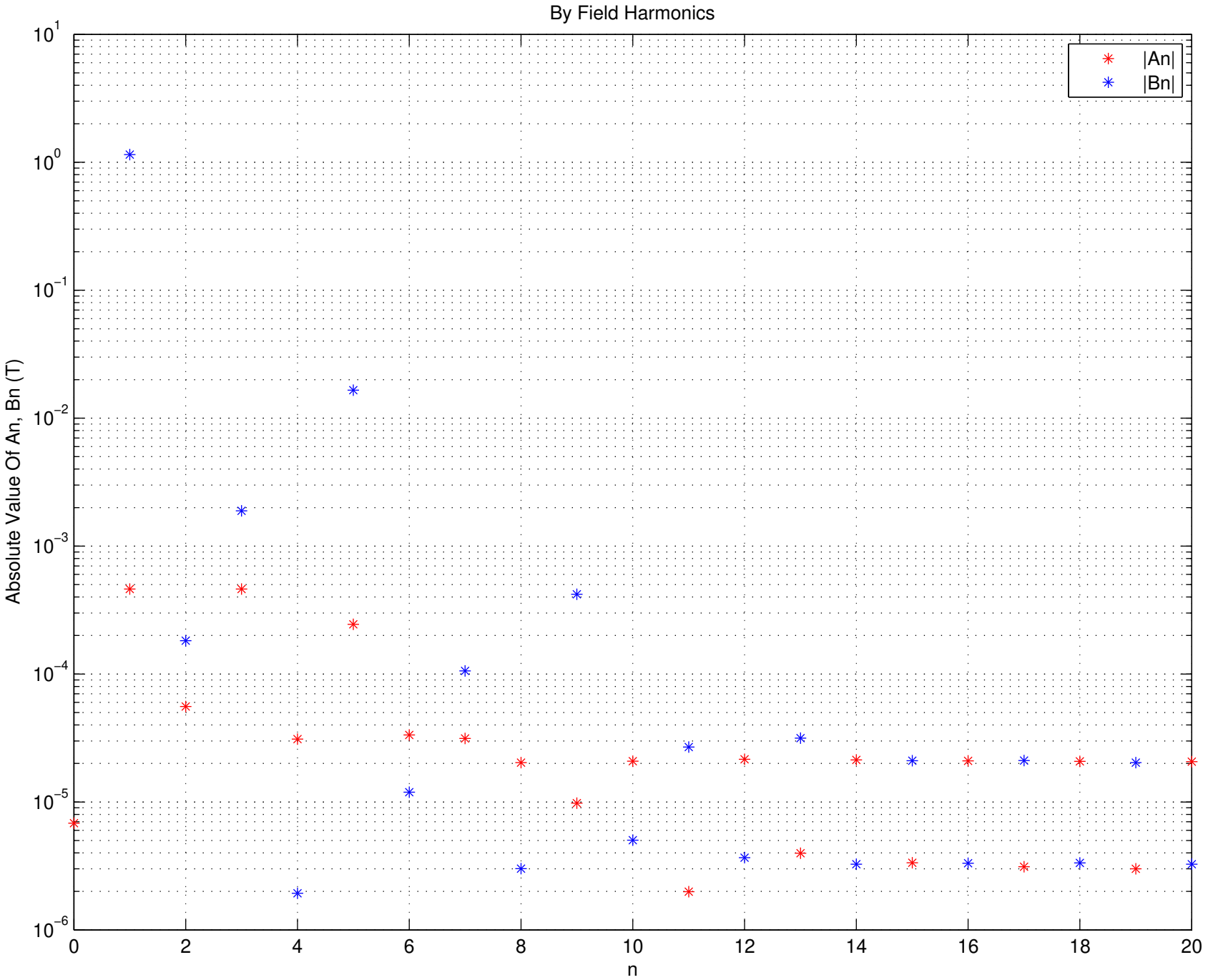

Abs(Fitted Peak Bx) vs Z, Excluding Ends
5
5
5
6
6
7Pole
0.0245
0.024
0.0235
0.023
0.0225
Abs(Peak Bx) (T)
Peak Fields: Ave = 0.023471 T, RMS = 0.000695 T
0.45
0.5
0.55
0.6
0.65
0.7
Z (m)

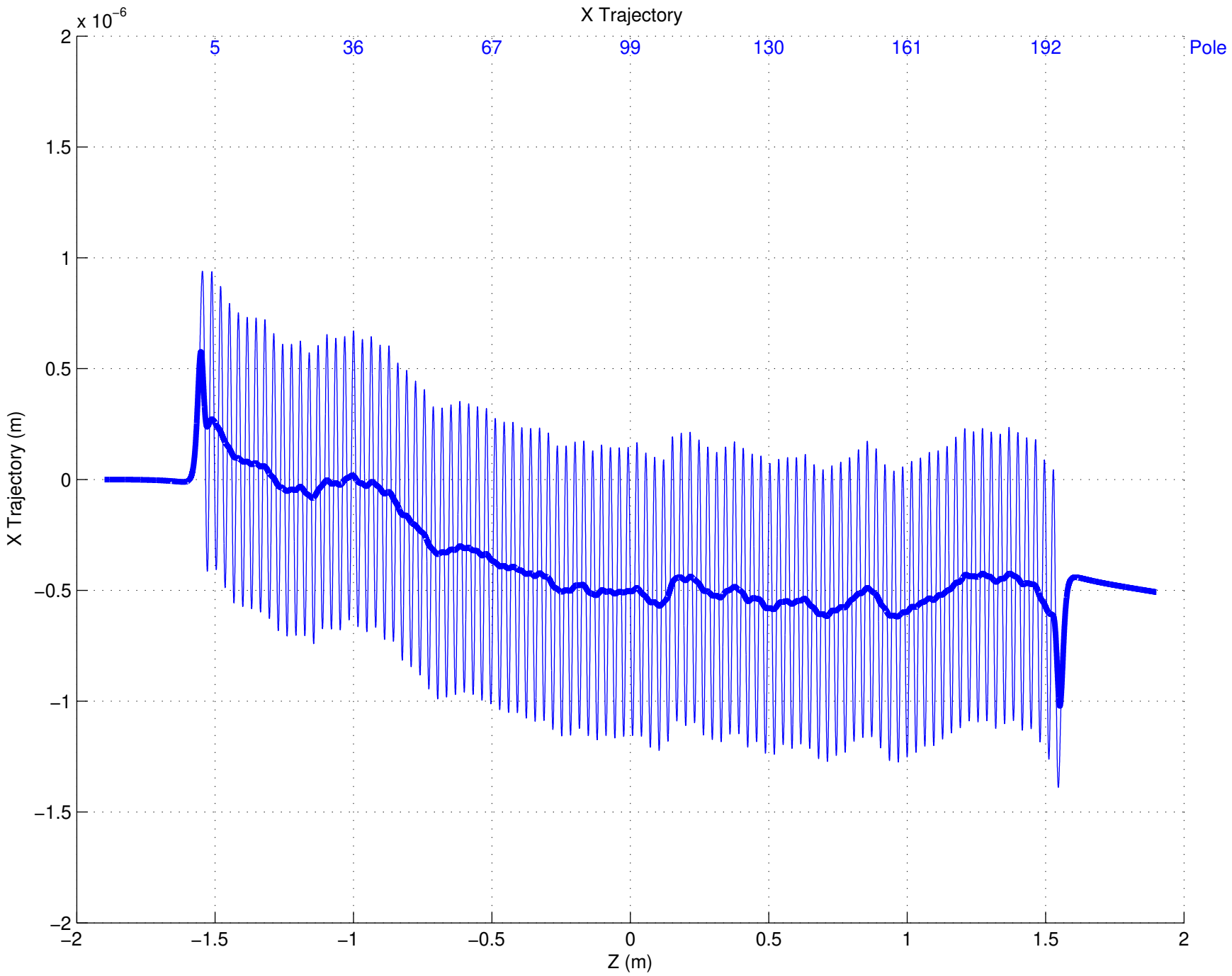

Abs(Fitted Peak By) vs Z, Excluding Ends
5
36
67
99
130
161
192Pole
1.16
1.15
1.14
1.13
1.12
1.11
1.1
Abs(Peak By) (T)
Peak Fields: Ave = 1.135099 T, RMS = 0.006831 T
−1.5
−1
−0.5
0
0.5
1
1.5
Z (m)

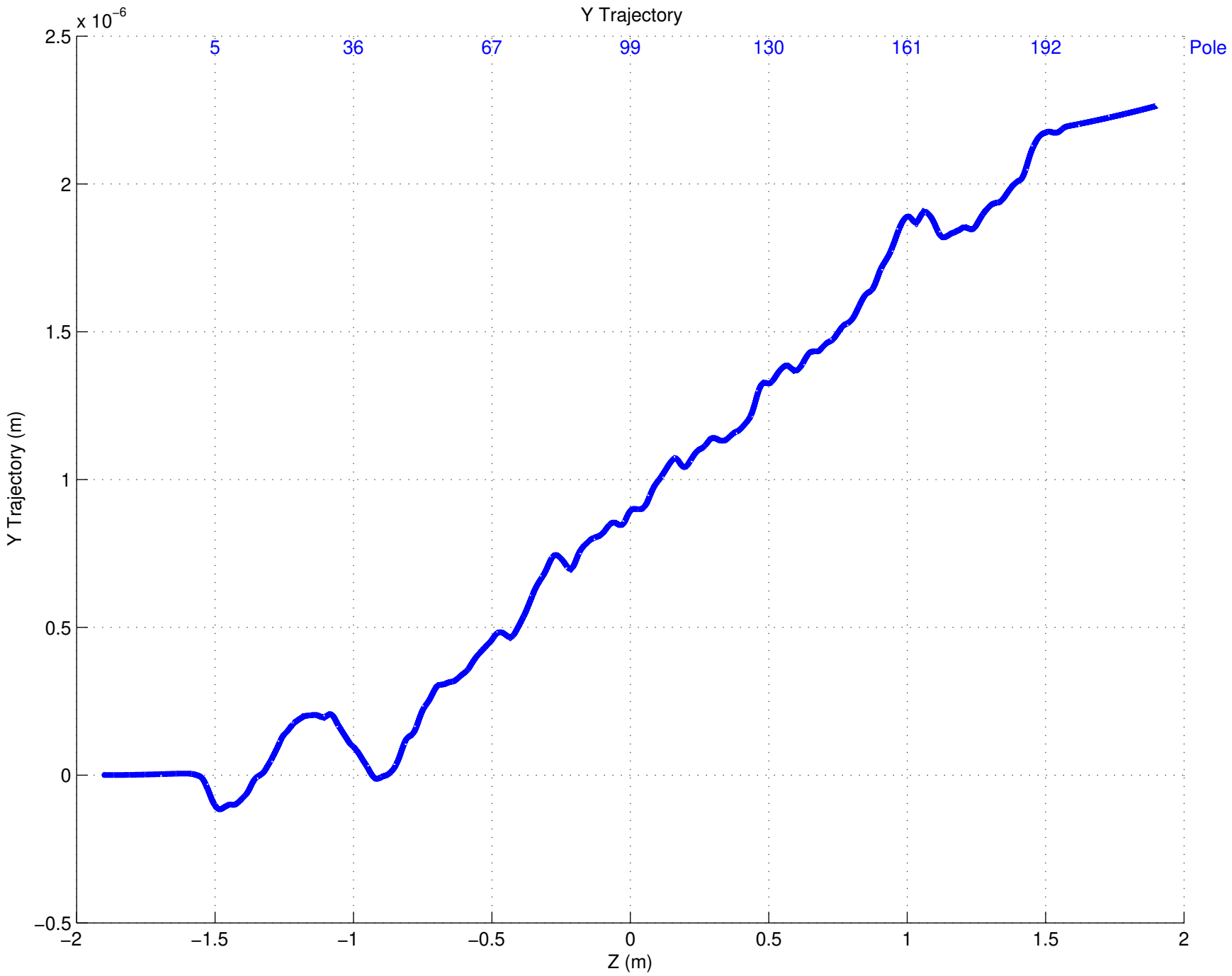

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
Z (m)
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.000000 m, RMS = 0.000000 m
Zero Field Spacing: Ave = 0.000000 m, RMS = 0.000000 m

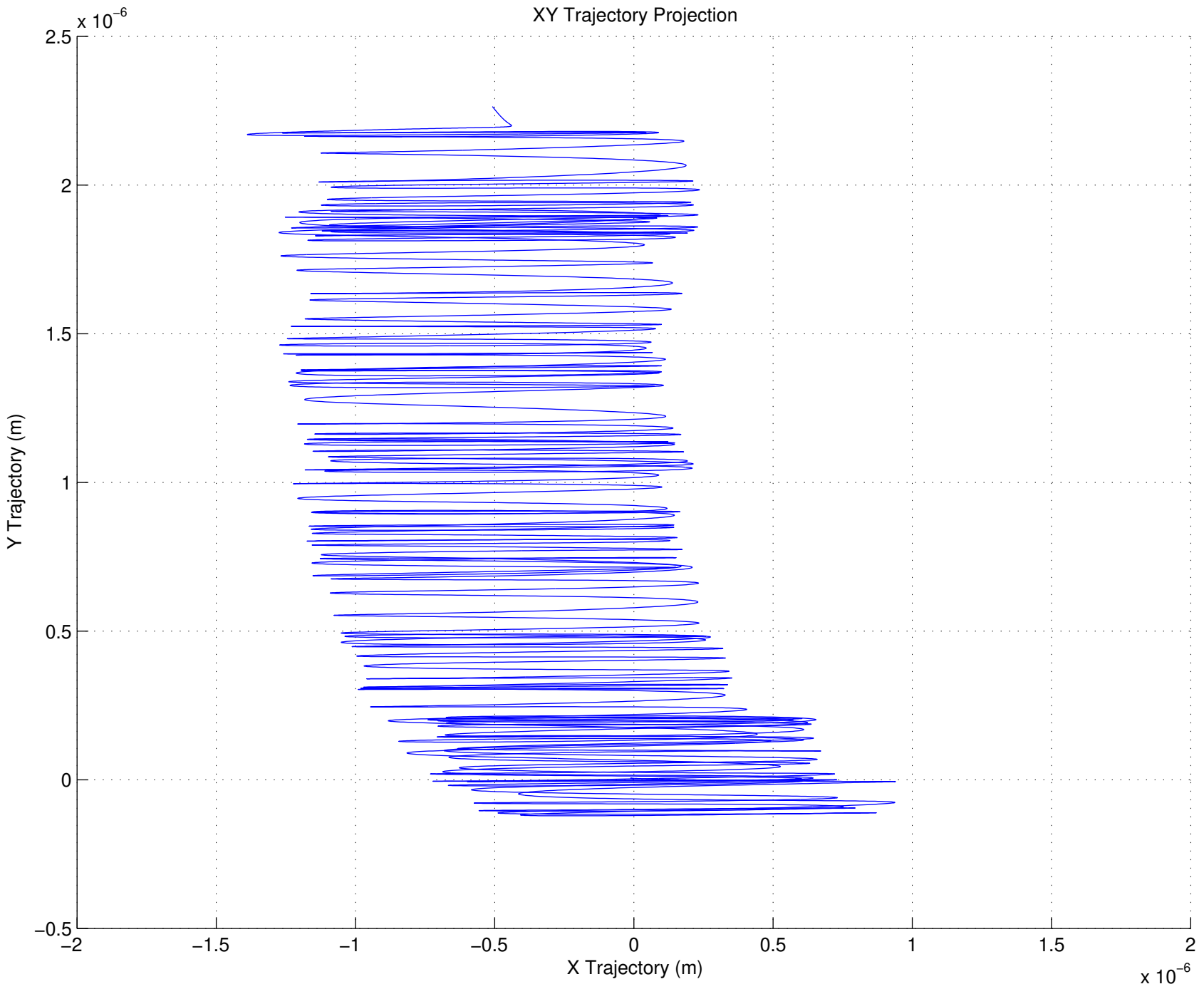

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
Z (m)
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016000 m, RMS = 0.000066 m
Zero Field Spacing: Ave = 0.016000 m, RMS = 0.000040 m

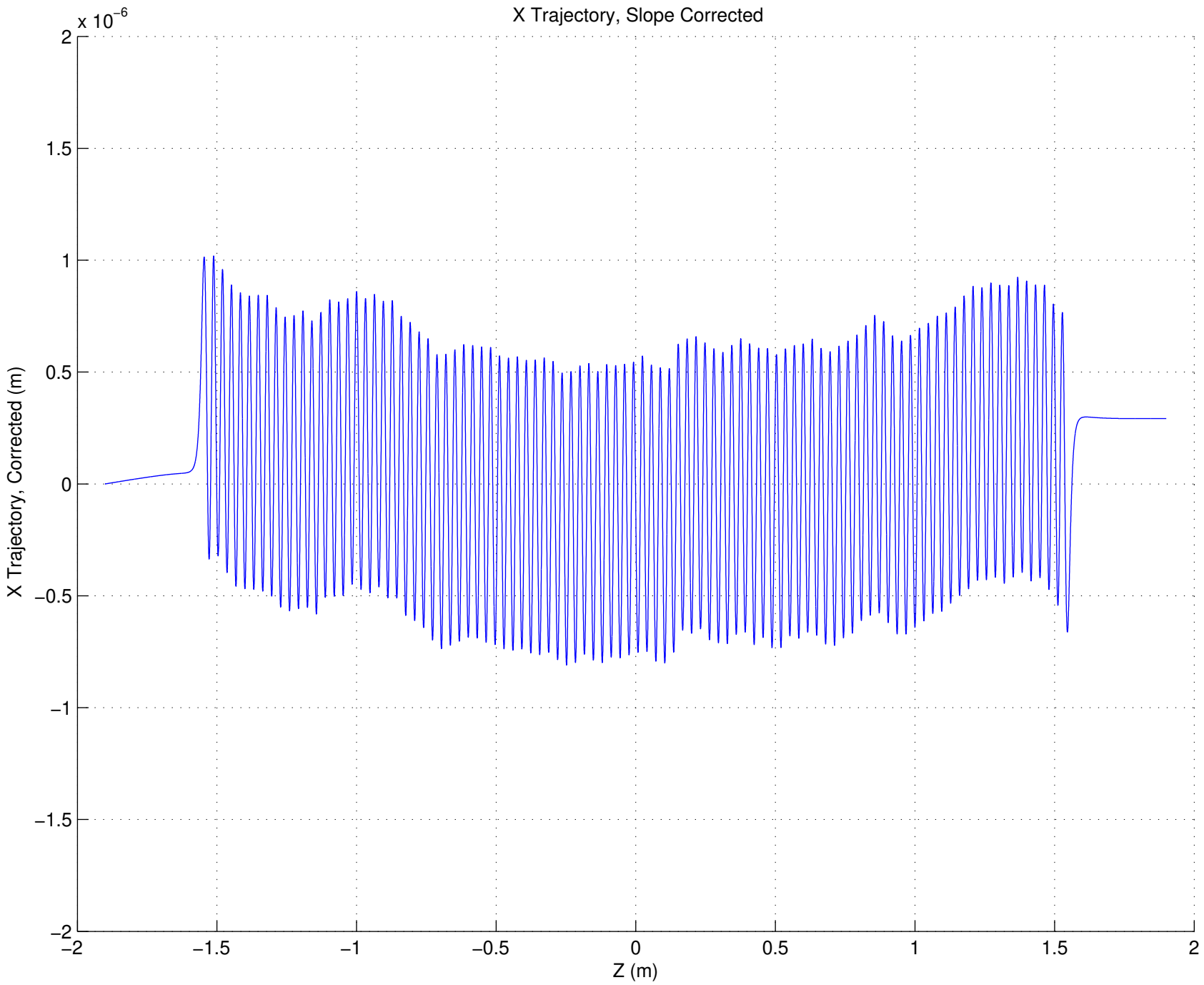

Bx Field Harmonics
$10^0$
$10^{-1}$
Absolute Value Of An, Bn (T)
0
2
4
6
8
10
12
14
16
18
20
n
|An|
|Bn|

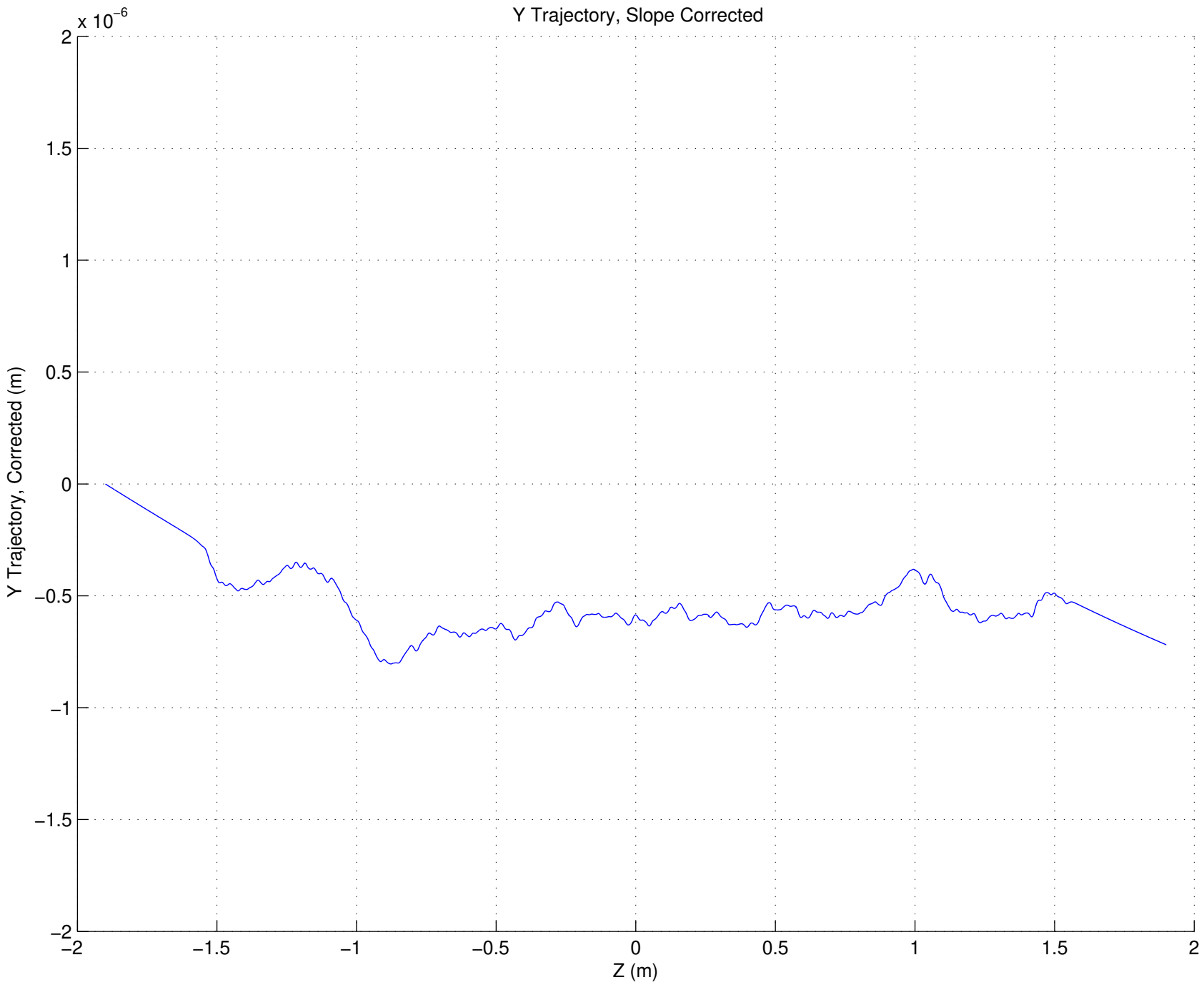

By Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
$10^{1}$
$10^{0}$
$10^{-1}$
$10^{-2}$
$10^{-3}$
$10^{-4}$
$10^{-5}$
$10^{-6}$
0
2
4
6
8
10
12
14
16
18
20

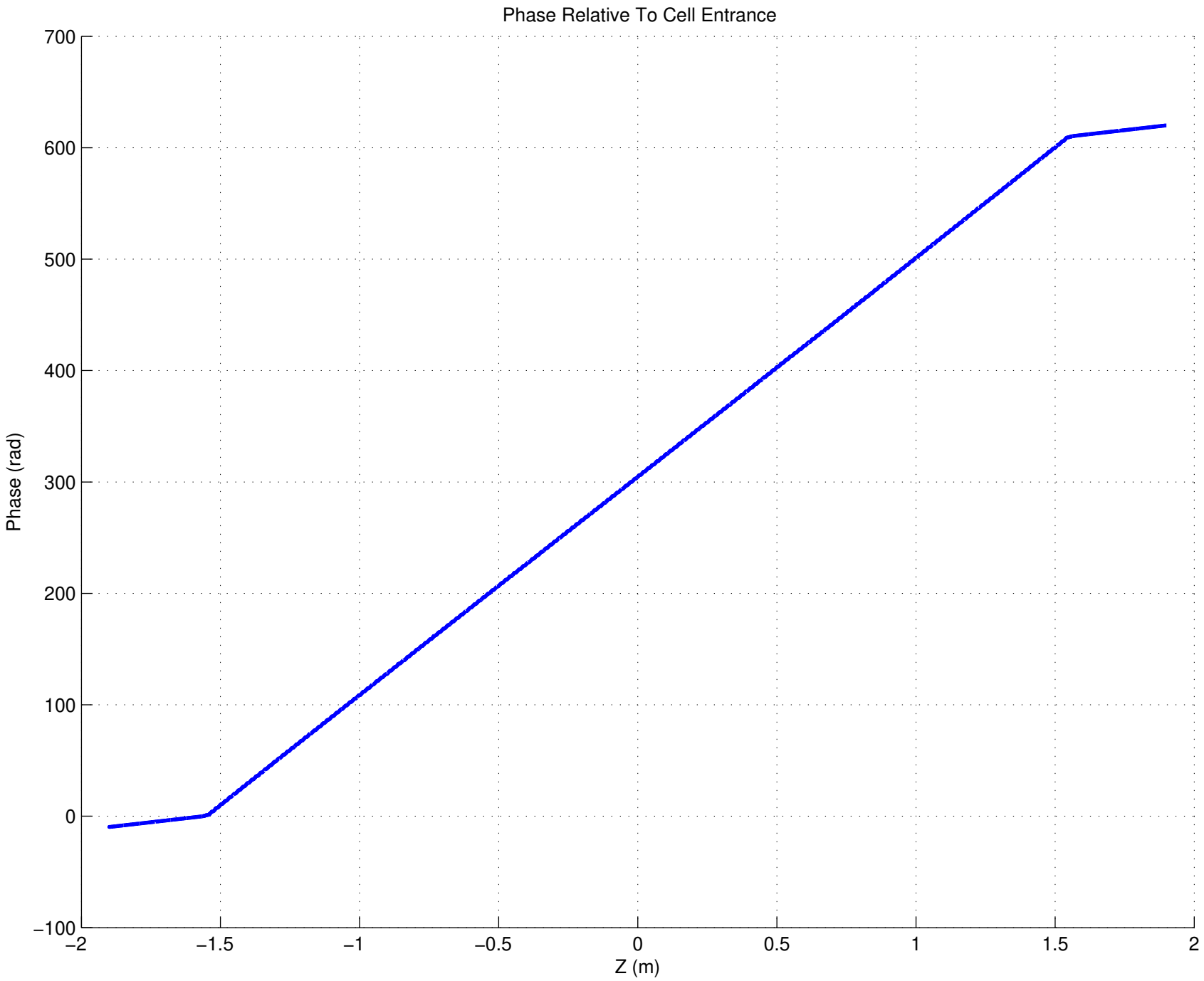

X Trajectory
x 10^-6
5
36
67
99
130
161
192
Pole
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
X Trajectory (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

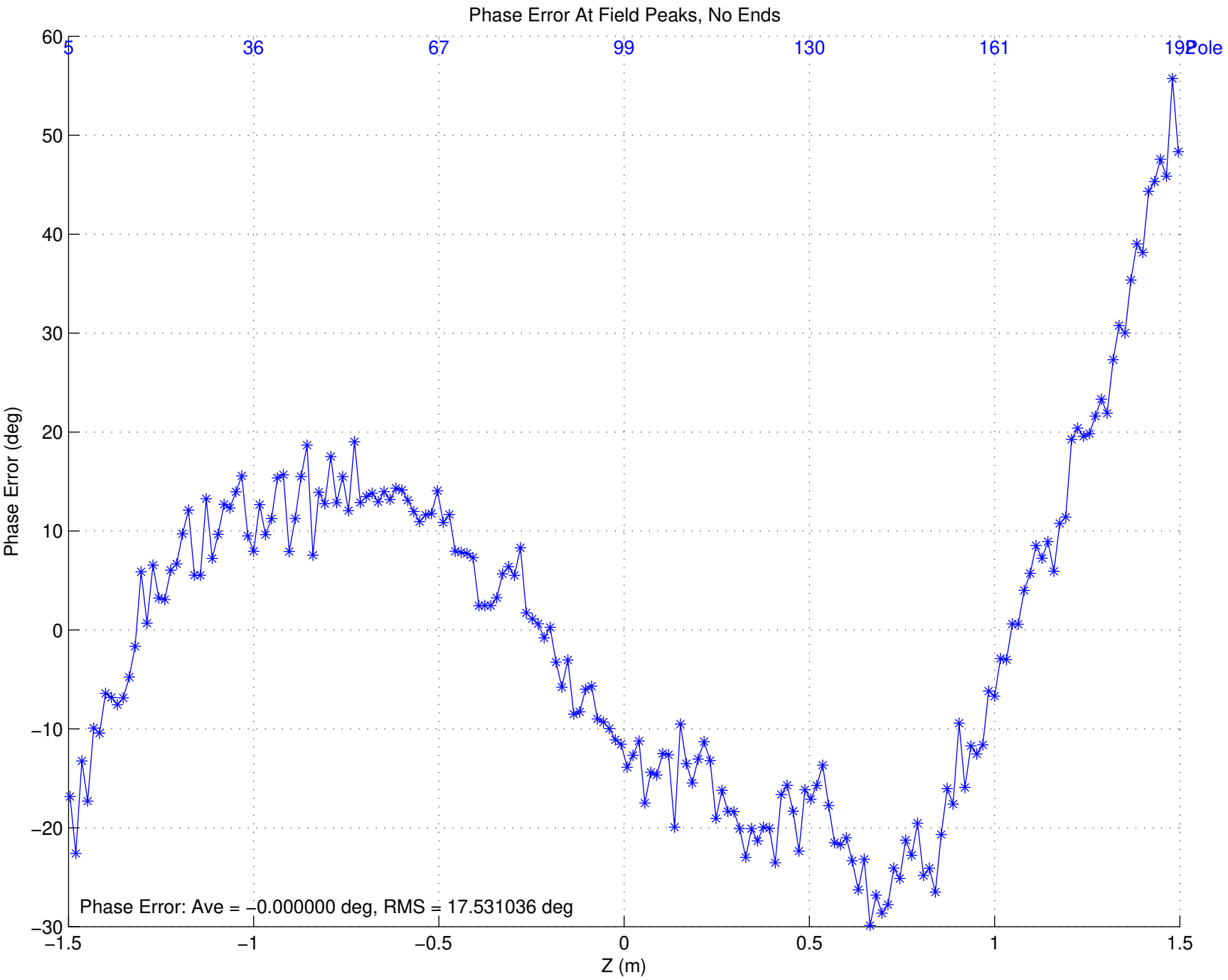

Y Trajectory
x 10^-6
2.5
2
1.5
1
0.5
0
−0.5
5
36
67
99
130
161
192
Pole
Y Trajectory (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

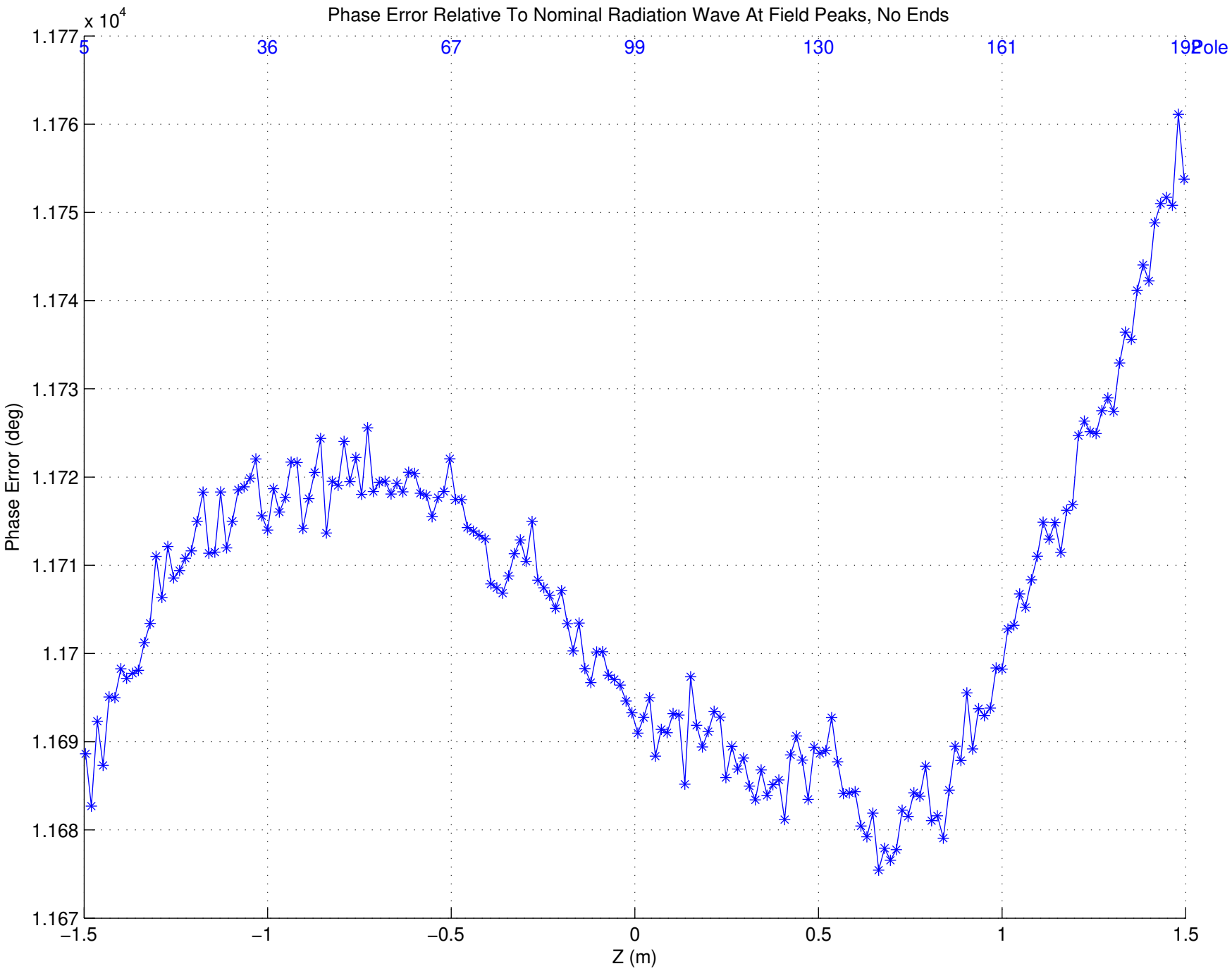

XY Trajectory Projection
x 10^-6
2.5
2
1.5
1
0.5
0
−0.5
Y Trajectory (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
X Trajectory (m)
x 10^-6

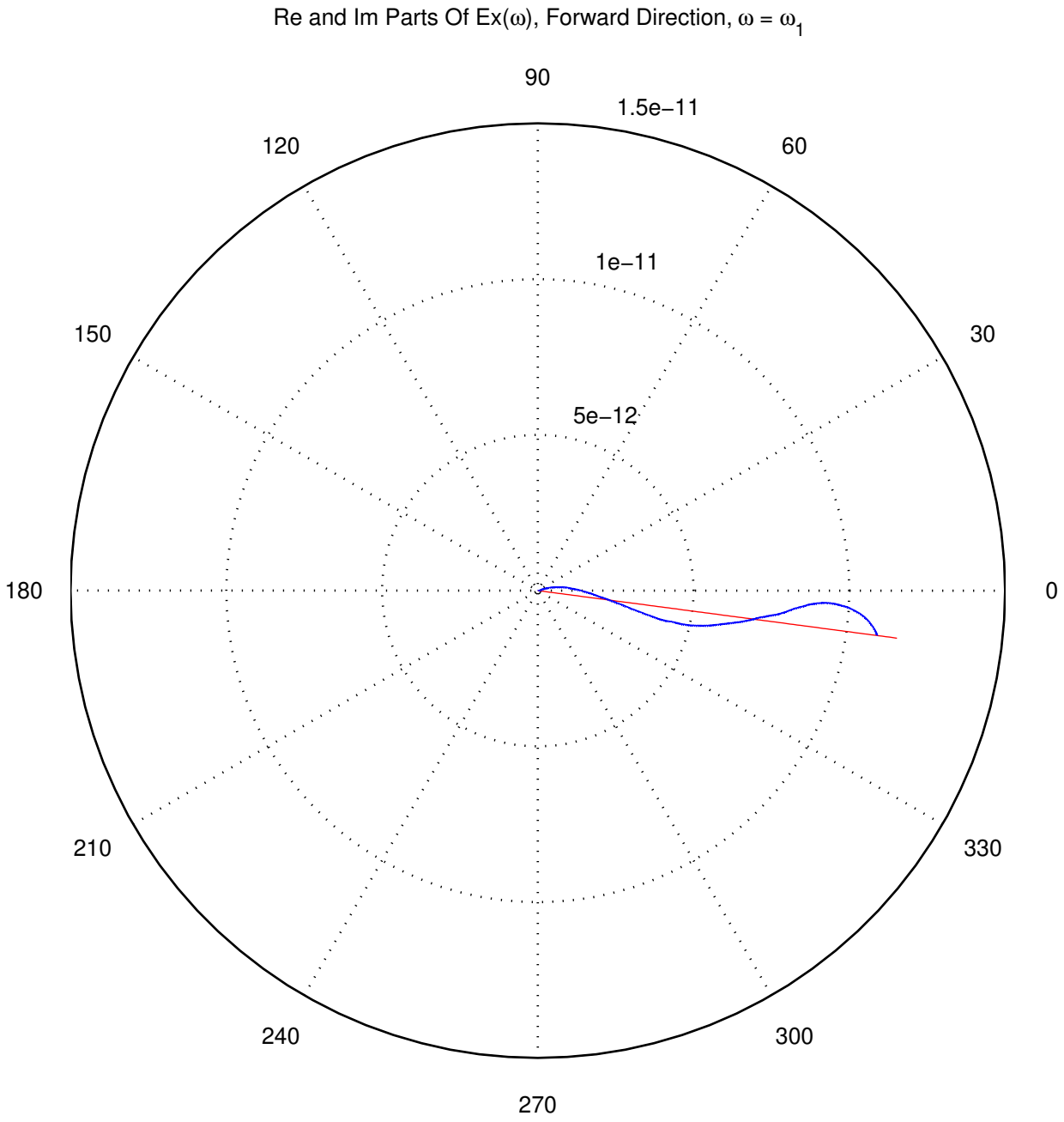

X Trajectory, Slope Corrected
x 10^-6
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
X Trajectory, Corrected (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

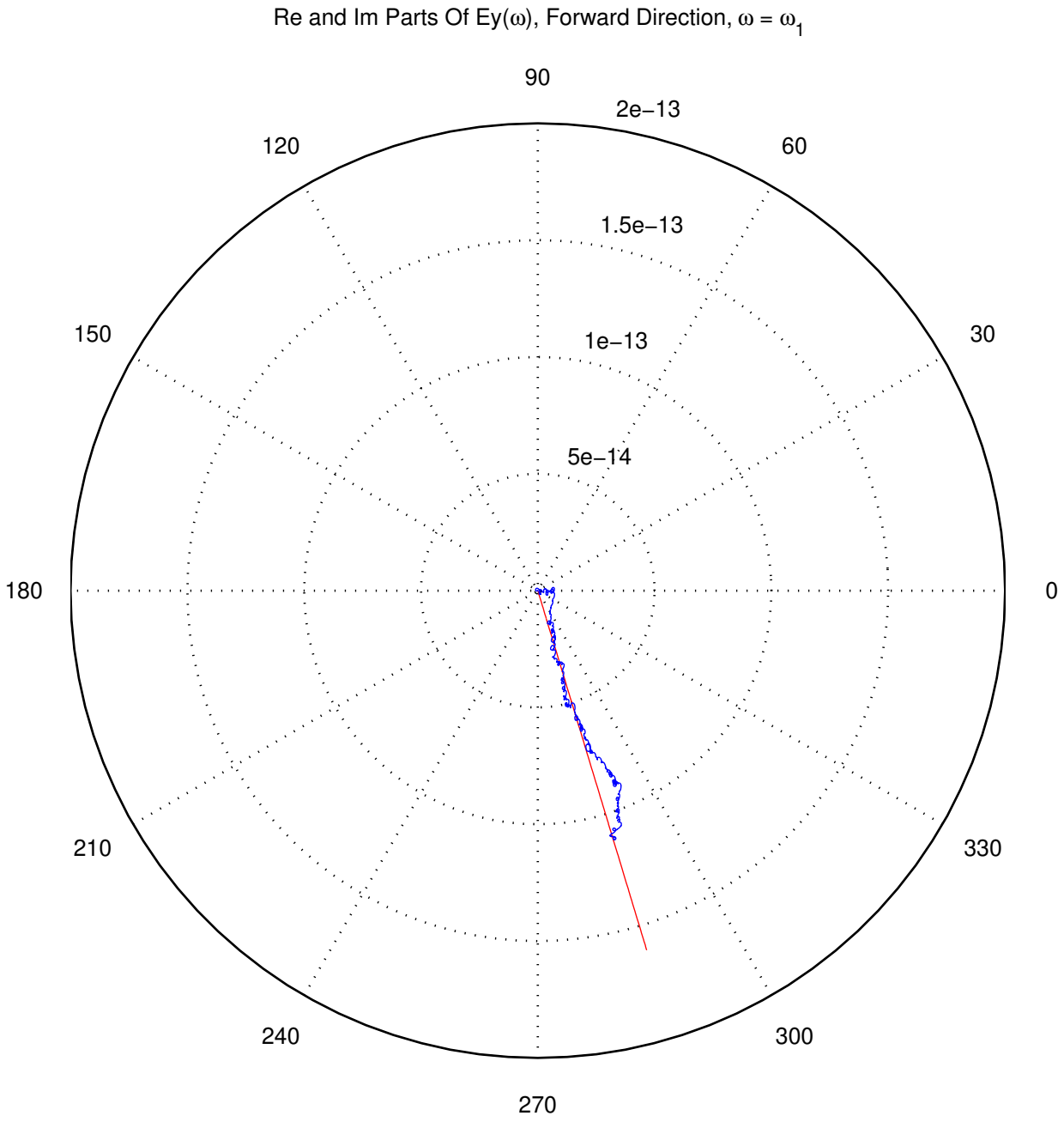

Y Trajectory, Slope Corrected
x 10^-6
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
Y Trajectory, Corrected (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

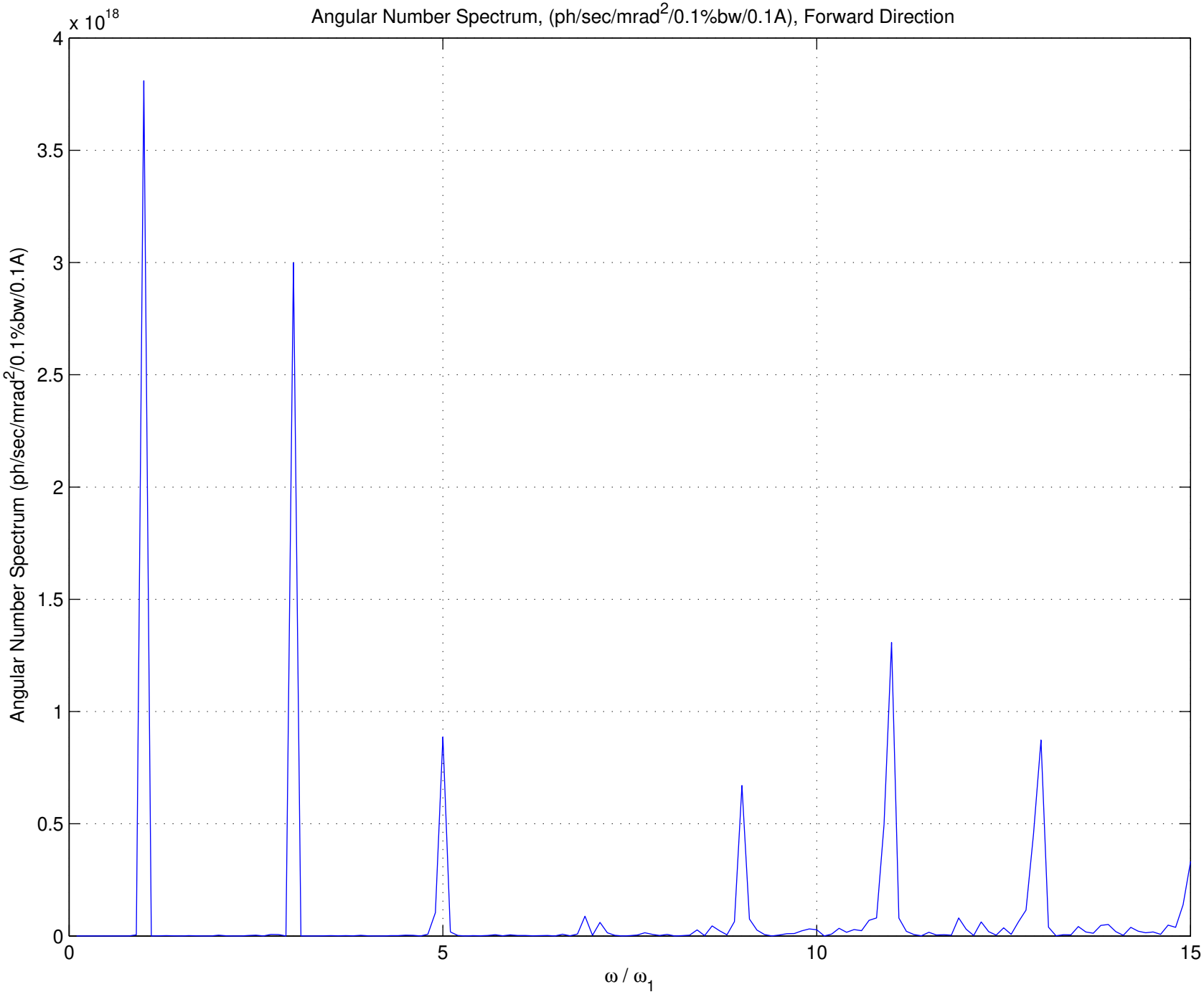

Phase Relative To Cell Entrance
Phase (rad)
Z (m)
700
600
500
400
300
200
100
0
−100
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2

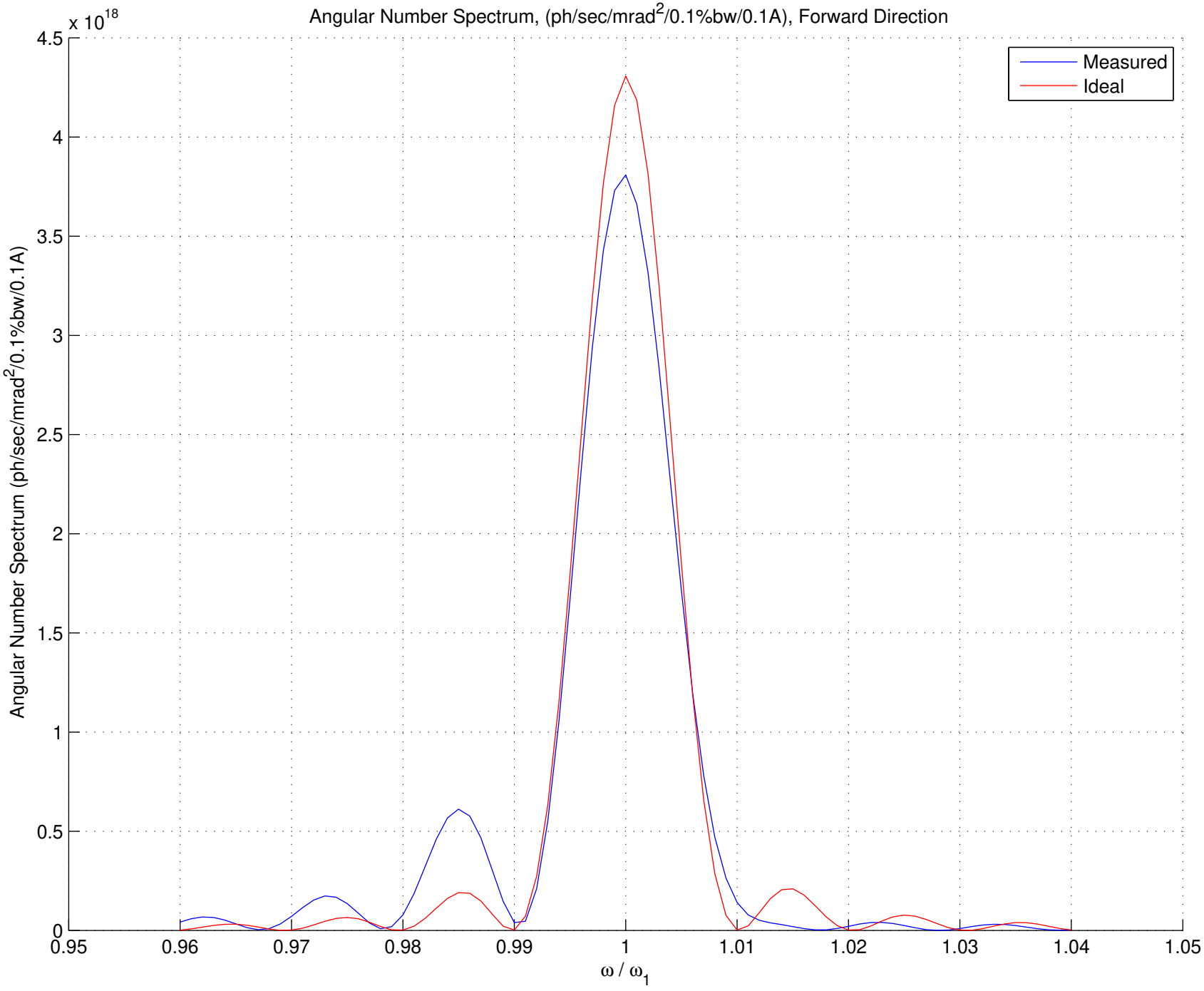

Phase Error At Field Peaks, No Ends
5
36
67
99
130
161
192
Pole
60
50
40
30
20
10
0
−10
−20
−30
Phase Error (deg)
−1.5
−1
−0.5
0
0.5
1
1.5
Z (m)
Phase Error: Ave = −0.000000 deg, RMS = 17.531036 deg

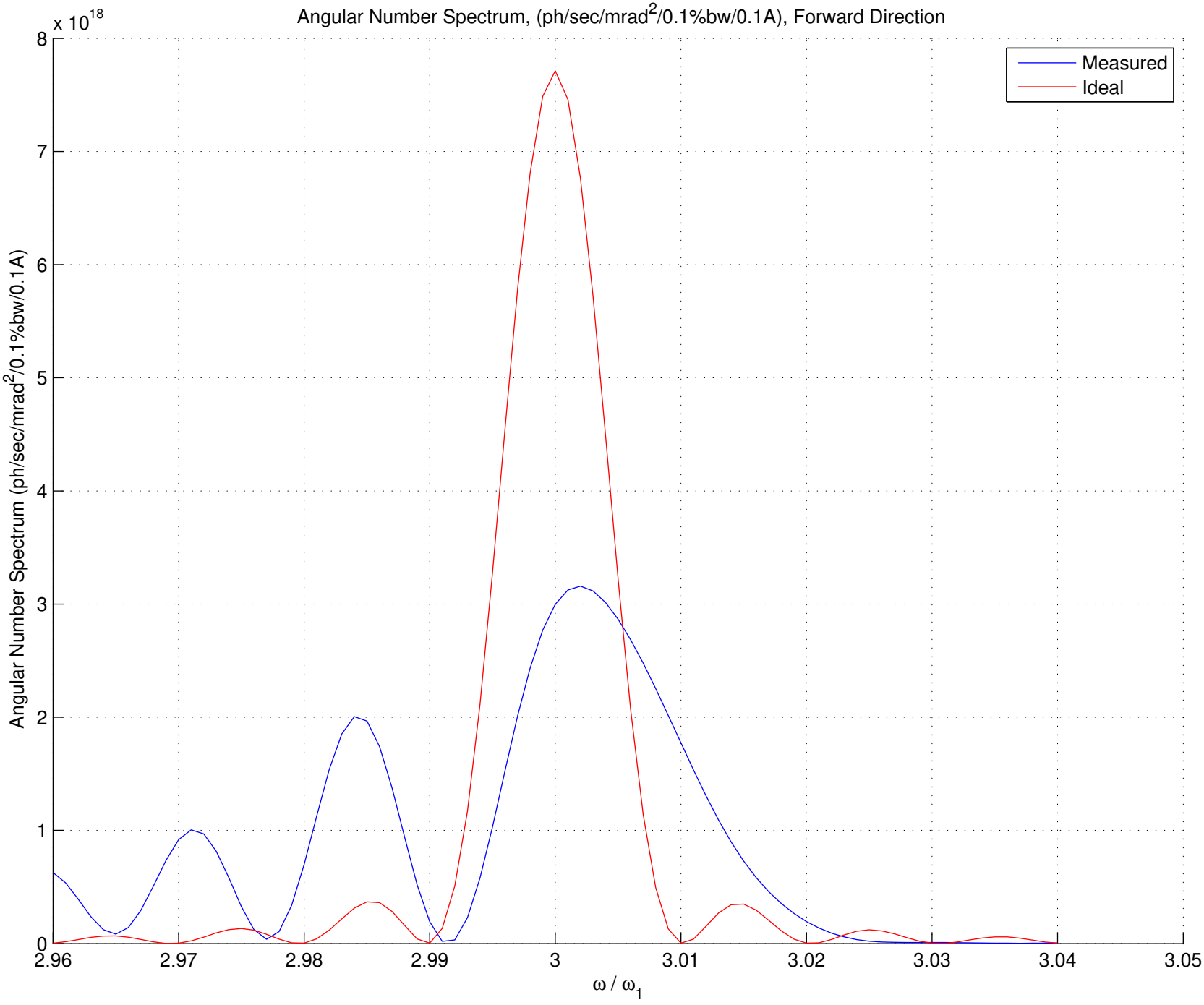

Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
x 10^4
1.177
1.176
1.175
1.174
1.173
1.172
1.171
1.17
1.169
1.168
1.167
Phase Error (deg)
5
36
67
99
130
161
192
Pole
−1.5
−1
−0.5
0
0.5
1
1.5
Z (m)

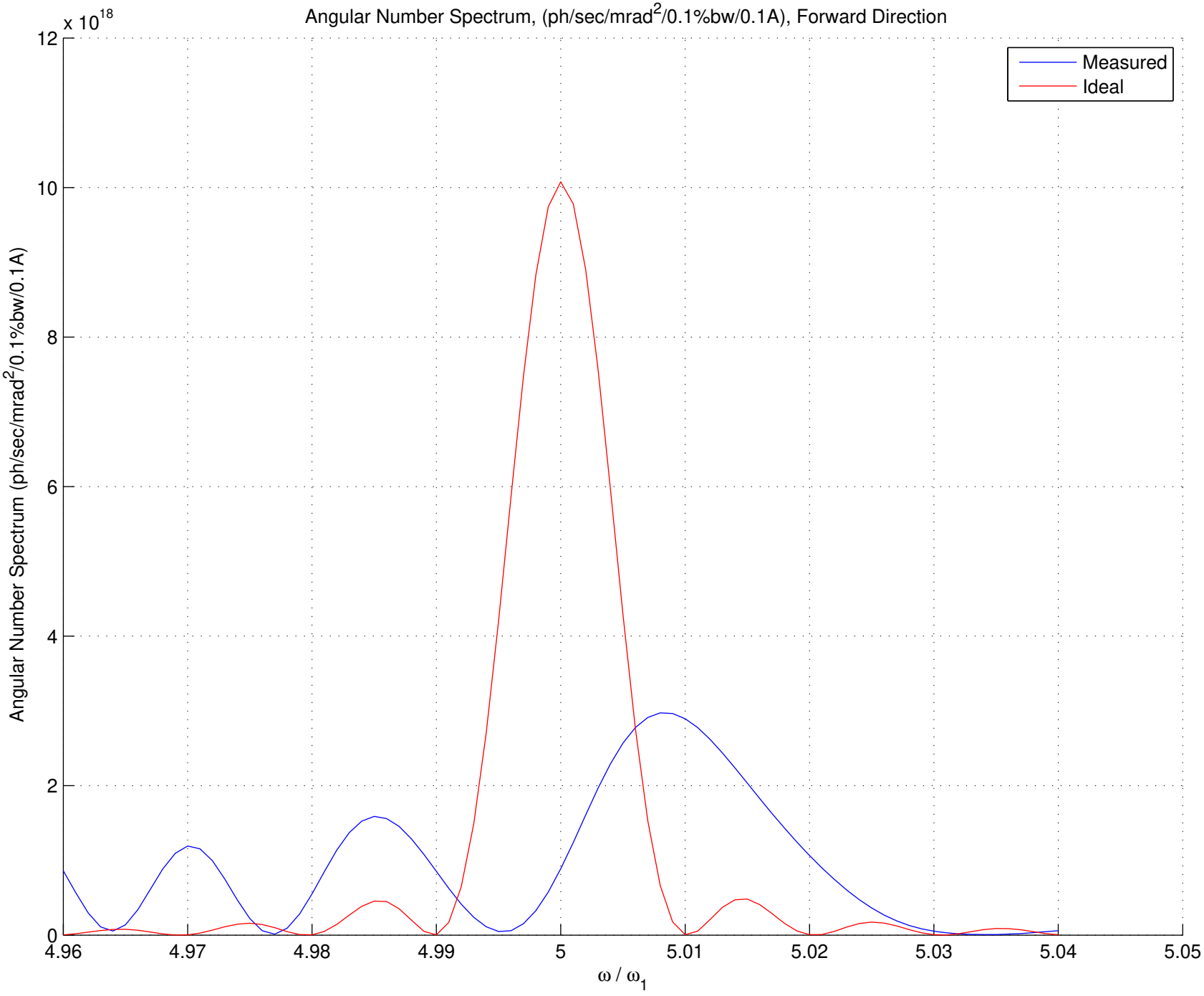

Re and Im Parts Of Ex(ω), Forward Direction, ω = ω1
90
1.5e−11
120
60
1e−11
150
30
5e−12
180
0
210
330
240
300
270


Re and Im Parts Of Ey(ω), Forward Direction, ω = ω1
90
2e−13
120
60
1.5e−13
150
30
1e−13
5e−14
180
0
210
330
240
300
270


Angular Number Spectrum, (ph/sec/mrad$^2$/0.1%bw/0.1A), Forward Direction
x $10^{18}$
Angular Number Spectrum (ph/sec/mrad$^2$/0.1%bw/0.1A)
ω / $\omega_1$
0
0.5
1
1.5
2
2.5
3
3.5
4
0
5
10
15


Angular Number Spectrum, (ph/sec/mrad$^2$/0.1%bw/0.1A), Forward Direction
x $10^{18}$
Angular Number Spectrum (ph/sec/mrad$^2$/0.1%bw/0.1A)
$\omega$ / $\omega_1$
Measured
Ideal
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
0.95
0.96
0.97
0.98
0.99
1
1.01
1.02
1.03
1.04
1.05


Angular Number Spectrum, (ph/sec/mrad$^2$/0.1%bw/0.1A), Forward Direction
x $10^{18}$
Angular Number Spectrum (ph/sec/mrad$^2$/0.1%bw/0.1A)
ω / $ω_1$
Measured
Ideal
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


Angular Number Spectrum, (ph/sec/mrad$^2$/0.1%bw/0.1A), Forward Direction
x $10^{18}$
Measured
Ideal
Angular Number Spectrum (ph/sec/mrad$^2$/0.1%bw/0.1A)
0
2
4
6
8
10
12
4.96
4.97
4.98
4.99
5
5.01
5.02
5.03
5.04
5.05
ω / $ω_1$