SLAC Magnetic Measurements

EPU Analysis
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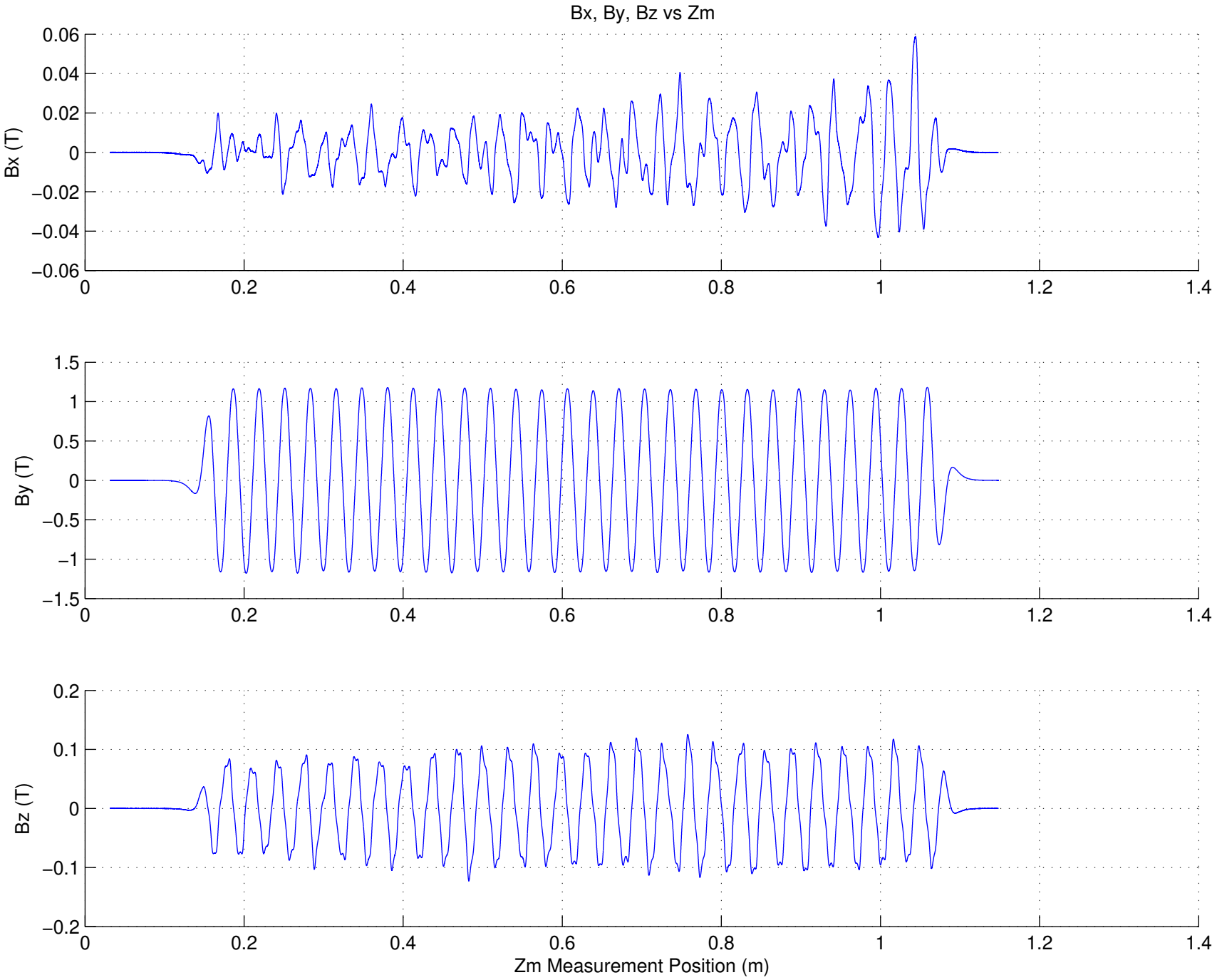
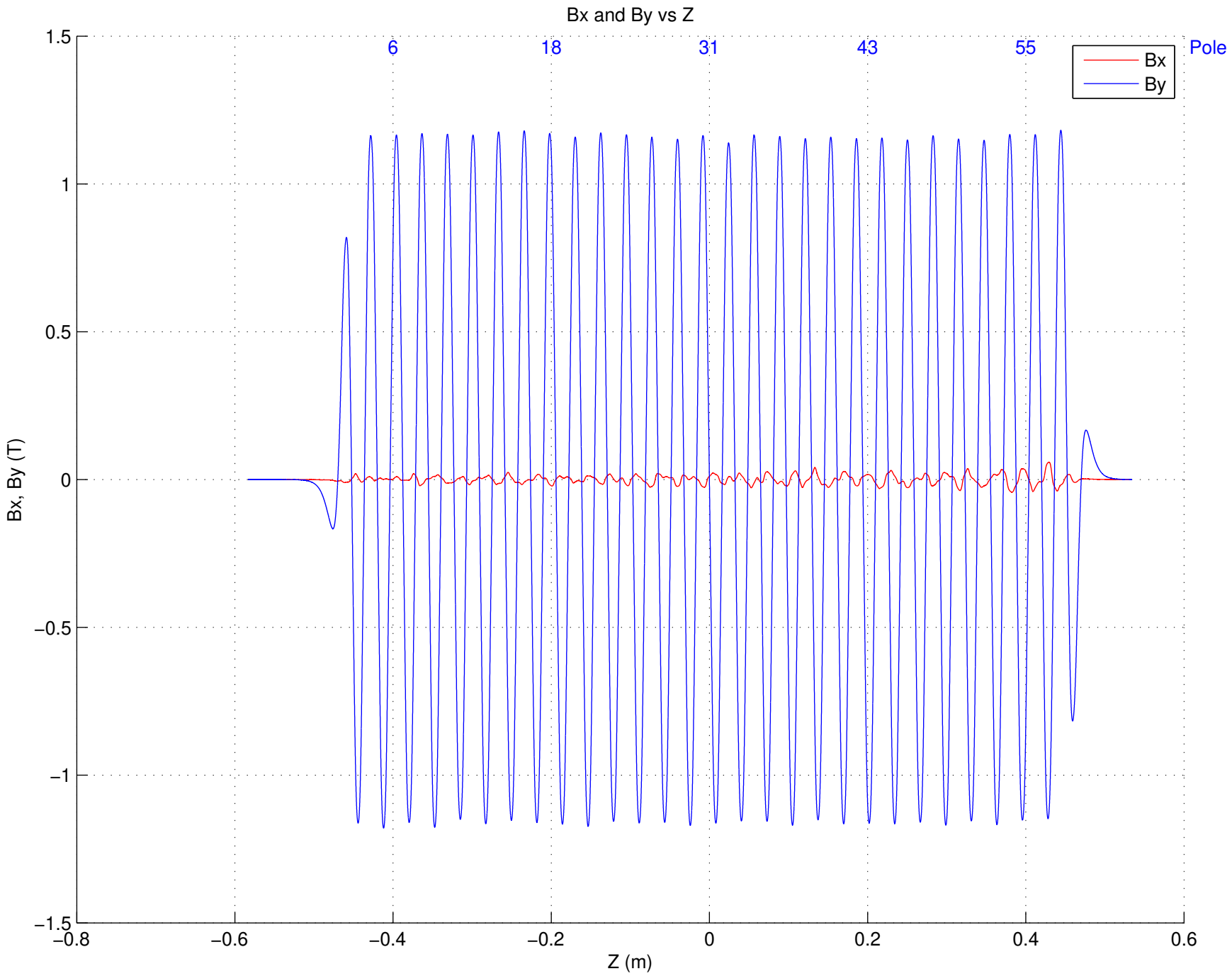
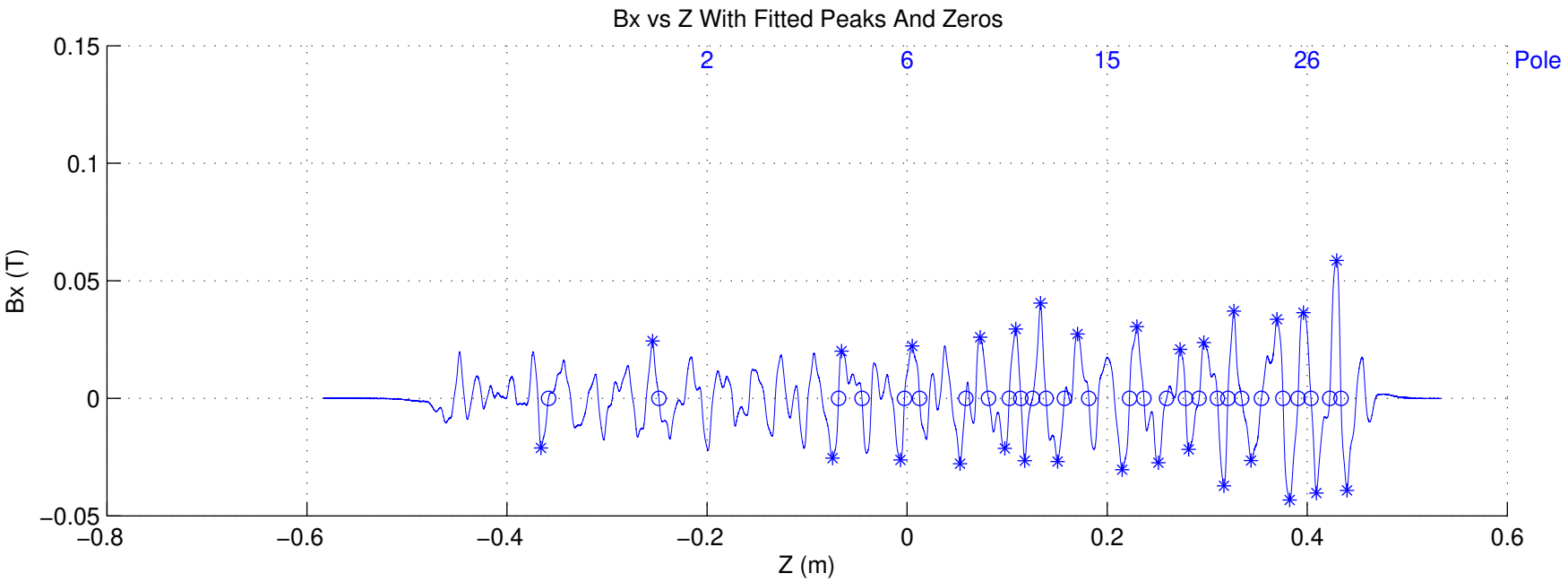
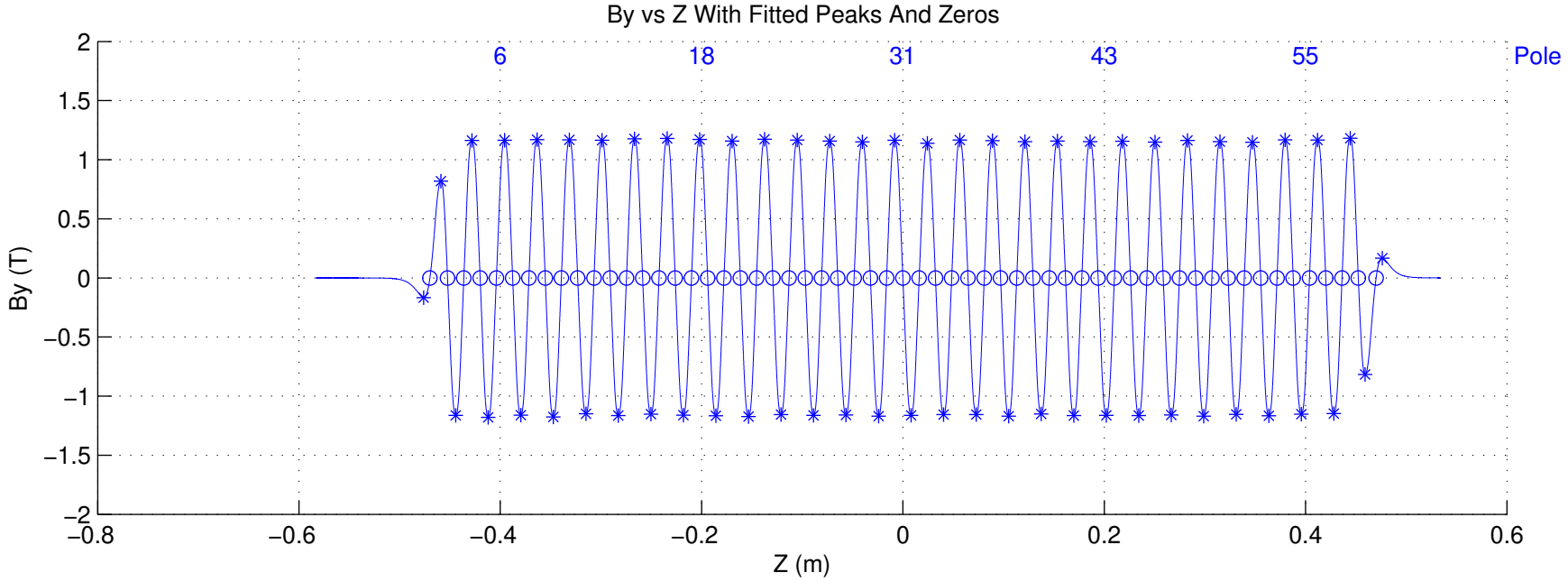
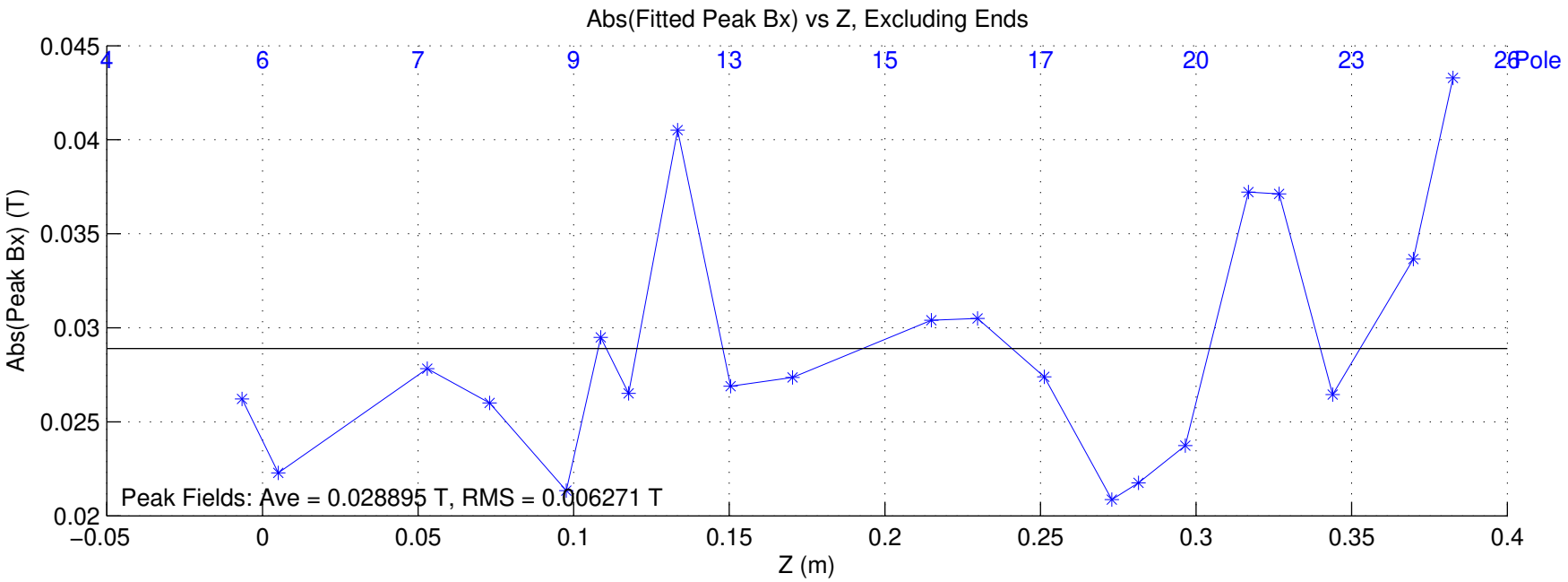
Parameters:
INPUT–FILE–DIR =V:\MET\MagServe\MagData\DELTA\Delta data\Run 200\
INPUT–FILE–NAME =hall2–anal–meas–field.dat
INPUT–FILE–TYPE =ZBXYZH
CORR–REQUIRED =0
GAMMA =26627.1
NOM–LAMBDA–U =0
NOM–K–VALUE =0
NOM–LAMBDA–R =0
NUM–POLES =60
NUM–END–POLES =4
CELL–LENGTH =3.126

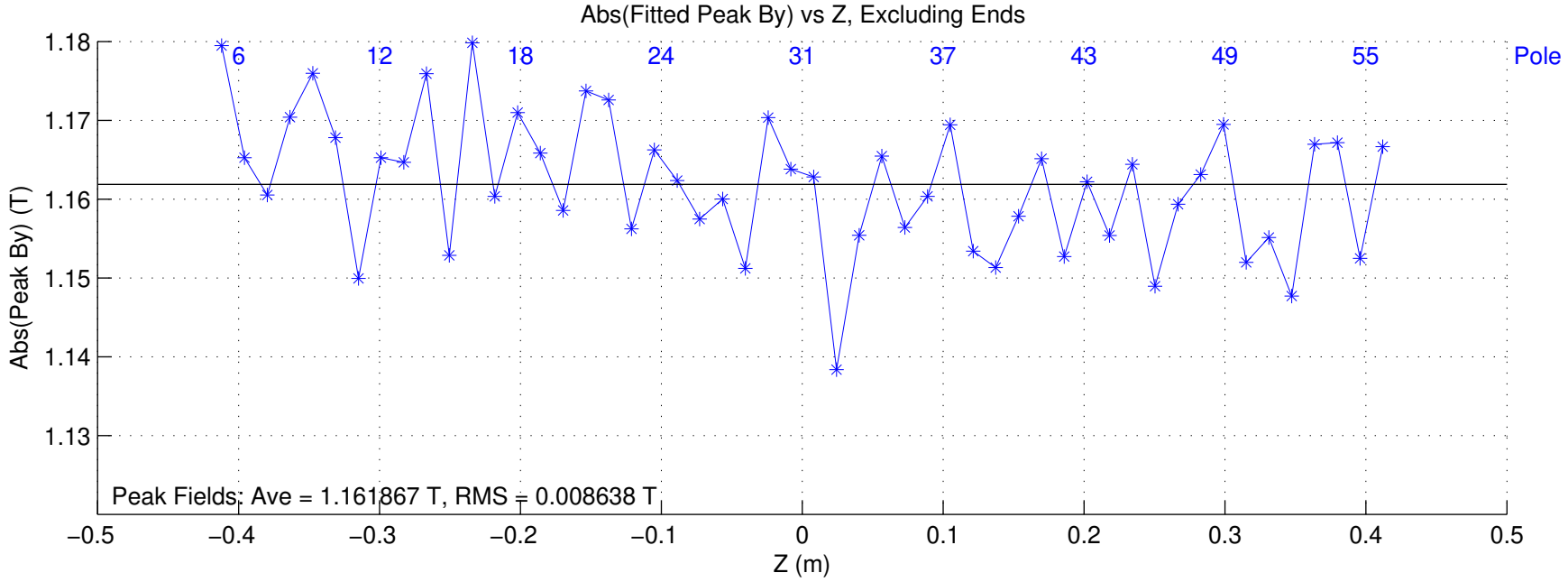

Bx, By, Bz vs Zm
Bx (T)
0.06
0.04
0.02
0
−0.02
−0.04
−0.06
By (T)
1.5
1
0.5
0
−0.5
−1
−1.5
Bz (T)
0.2
0.1
0
−0.1
−0.2
0
0.2
0.4
0.6
0.8
1
1.2
1.4
Zm Measurement Position (m)

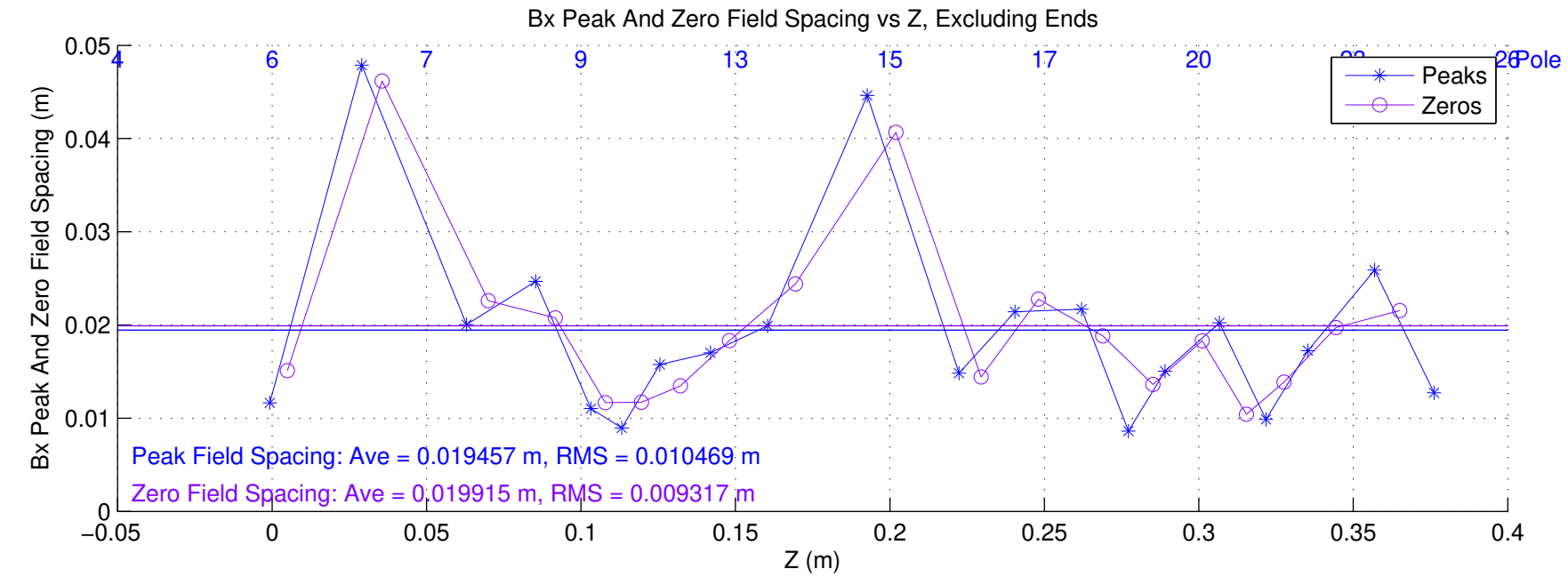

Bx and By vs Z
6
18
31
43
55
Pole
Bx
By
1.5
1
0.5
0
−0.5
−1
−1.5
Bx, By (T)
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
Z (m)

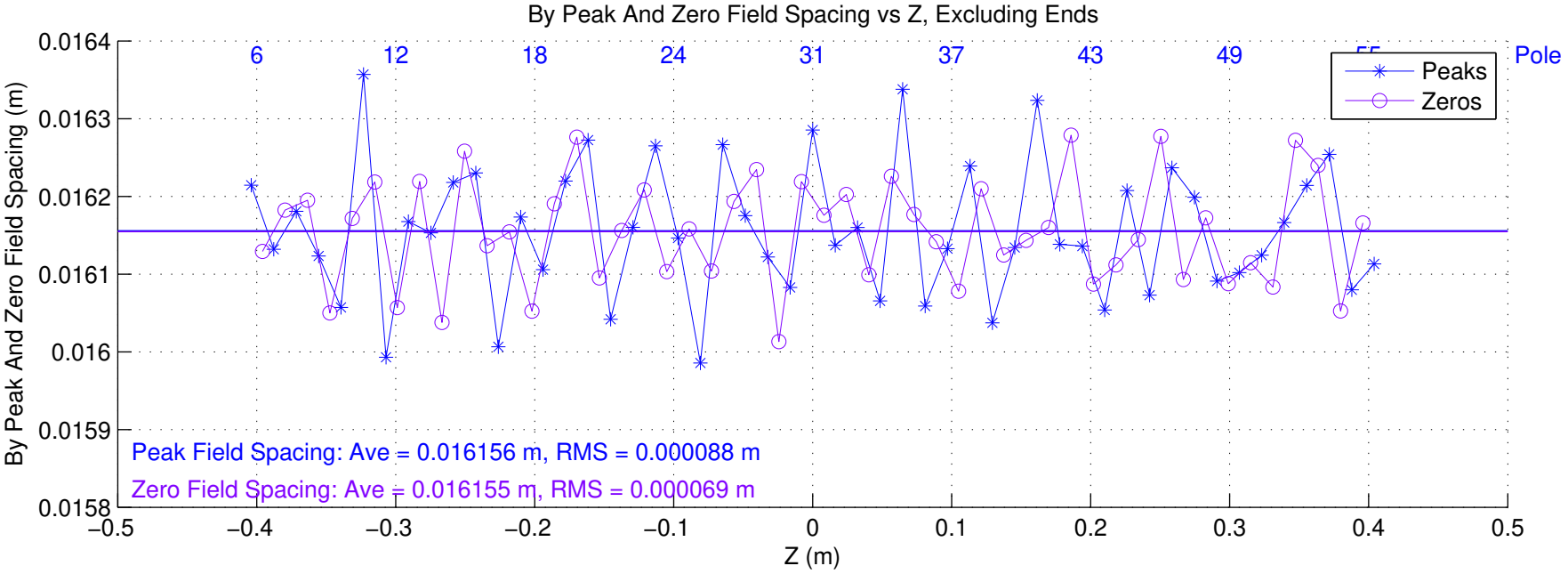

Bx vs Z With Fitted Peaks And Zeros
2
6
15
26
Pole
0.15
0.1
0.05
0
−0.05
Bx (T)
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
Z (m)

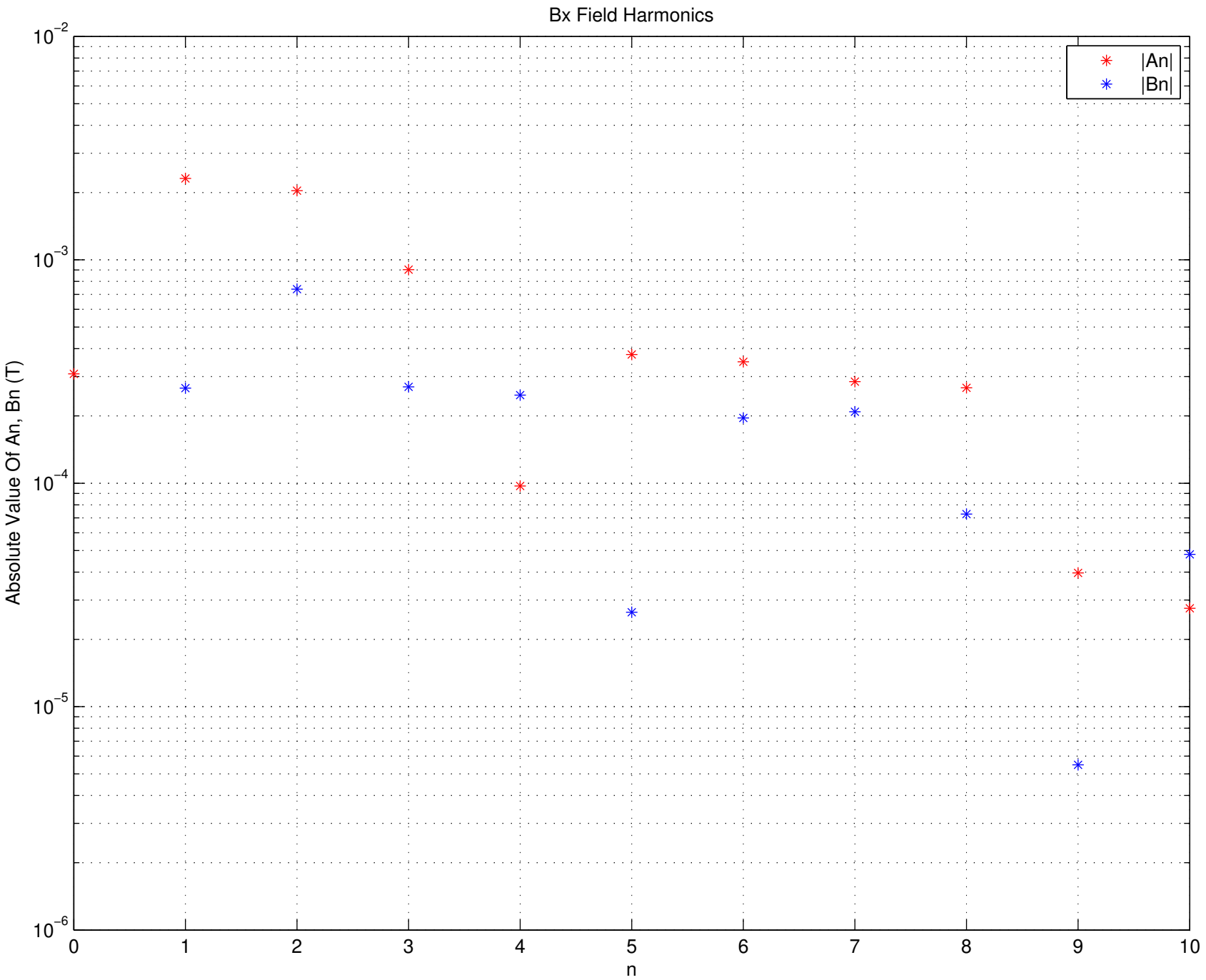

By vs Z With Fitted Peaks And Zeros
6
18
31
43
55
Pole
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
By (T)
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
Z (m)

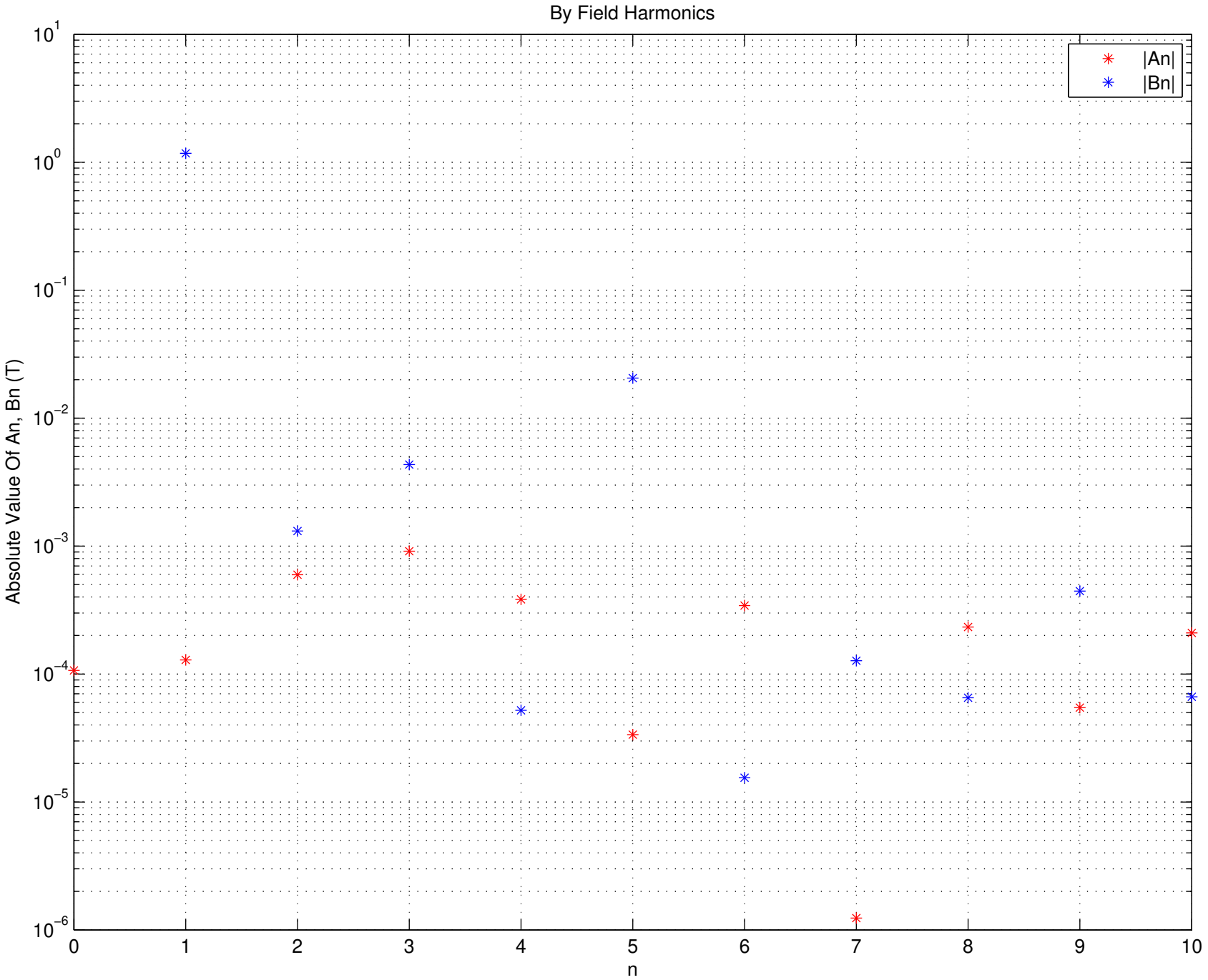

Abs(Fitted Peak Bx) vs Z, Excluding Ends
Abs(Peak Bx) (T)
Z (m)
Pole
4
6
7
9
13
15
17
20
23
26
0.045
0.04
0.035
0.03
0.025
0.02
−0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
Peak Fields: Ave = 0.028895 T, RMS = 0.006271 T

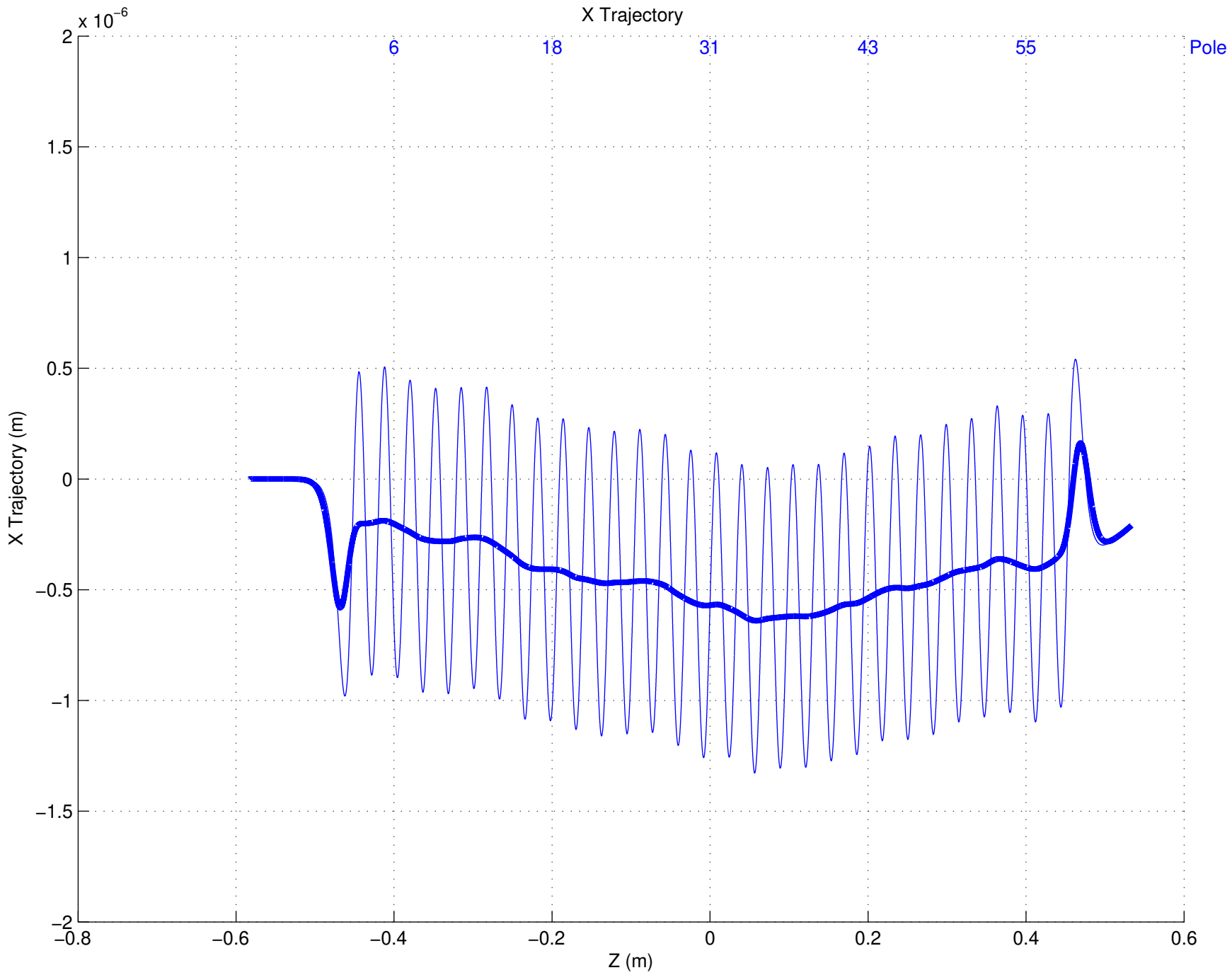

Abs(Fitted Peak By) vs Z, Excluding Ends
Abs(Peak By) (T)
Z (m)
Pole
6
12
18
24
31
37
43
49
55
1.18
1.17
1.16
1.15
1.14
1.13
−0.5
−0.4
−0.3
−0.2
−0.1
0
0.1
0.2
0.3
0.4
0.5
Peak Fields: Ave = 1.161867 T, RMS = 0.008638 T

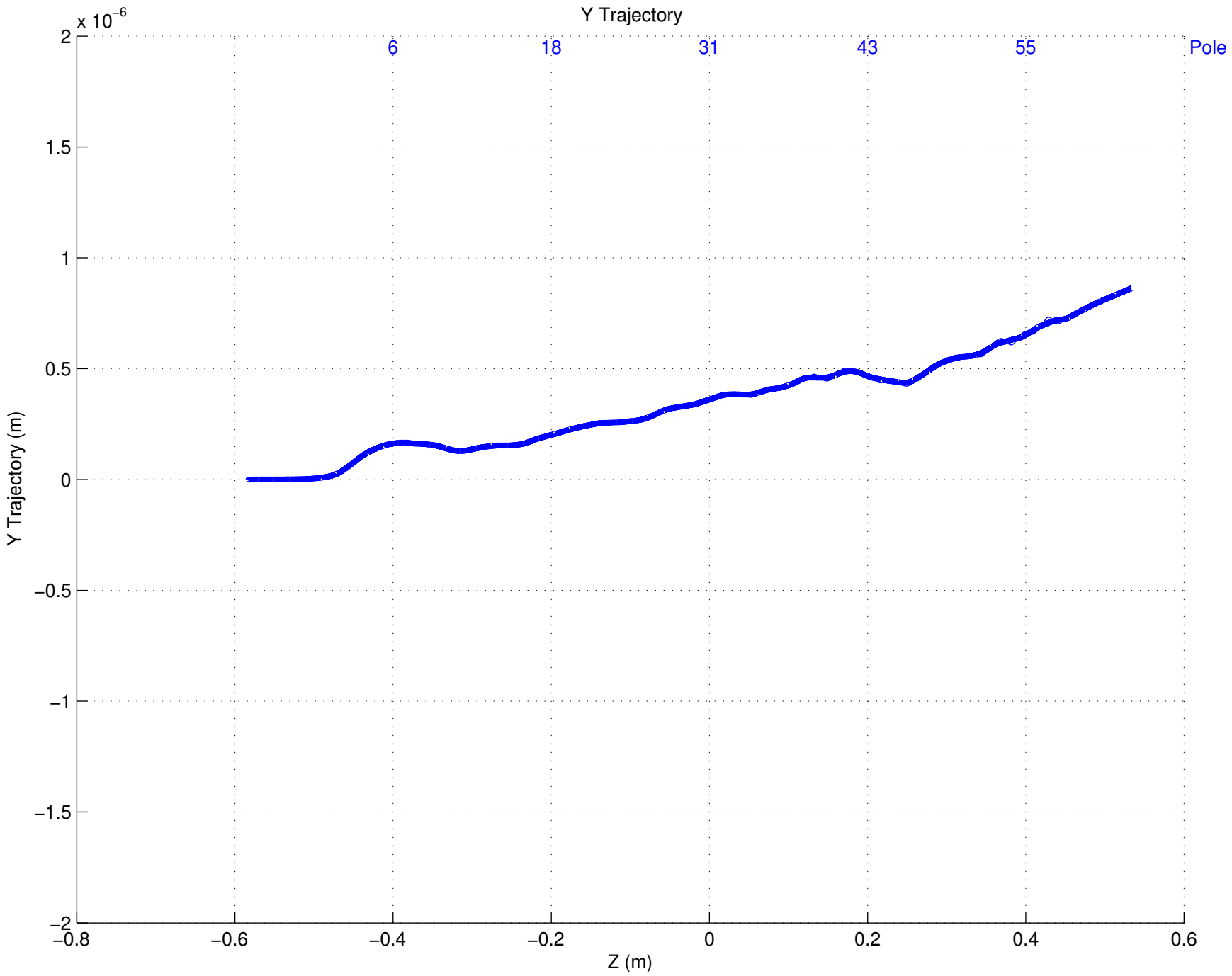

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
Z (m)
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.019457 m, RMS = 0.010469 m
Zero Field Spacing: Ave = 0.019915 m, RMS = 0.009317 m

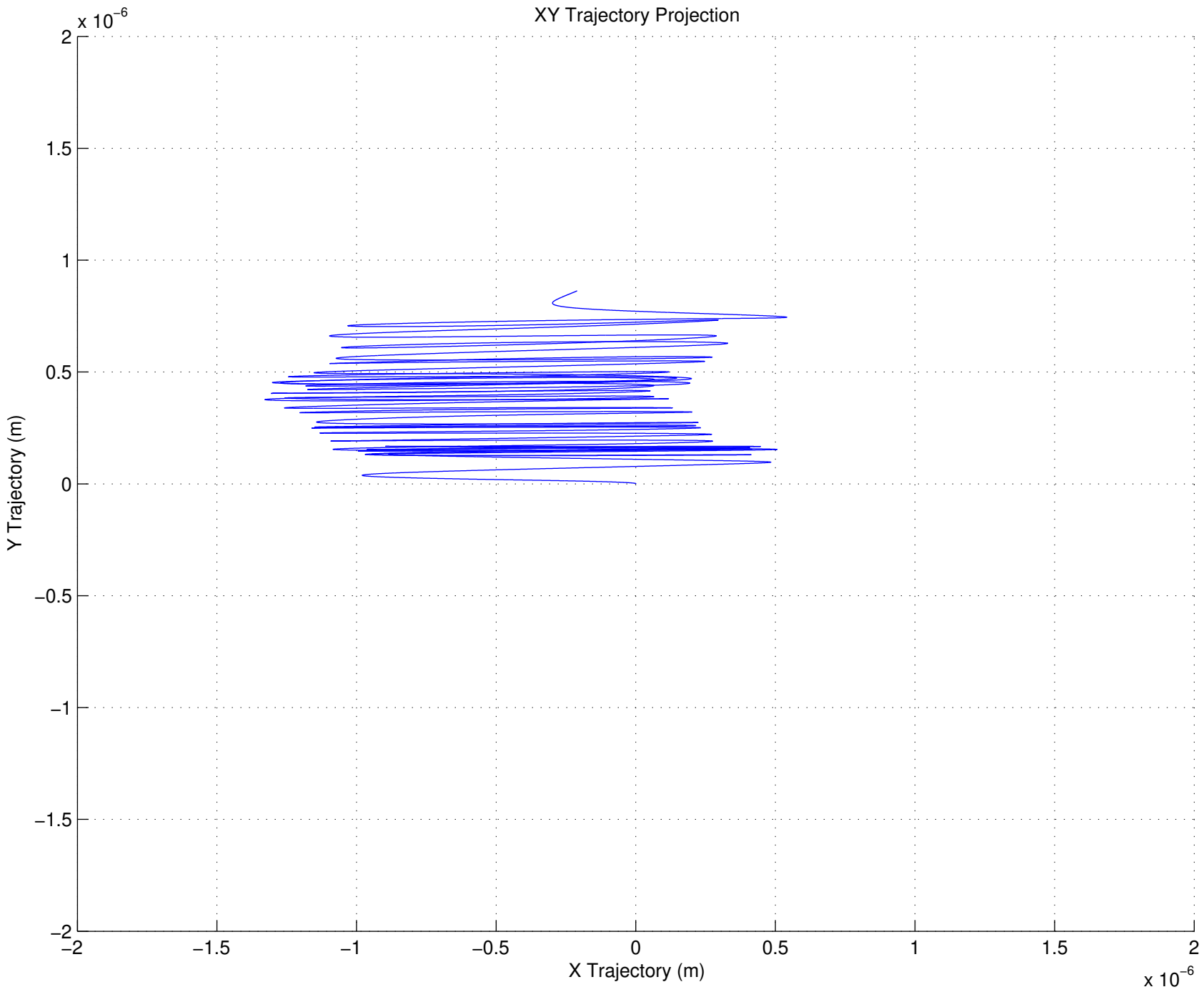

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
Z (m)
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016156 m, RMS = 0.000088 m
Zero Field Spacing: Ave = 0.016155 m, RMS = 0.000069 m

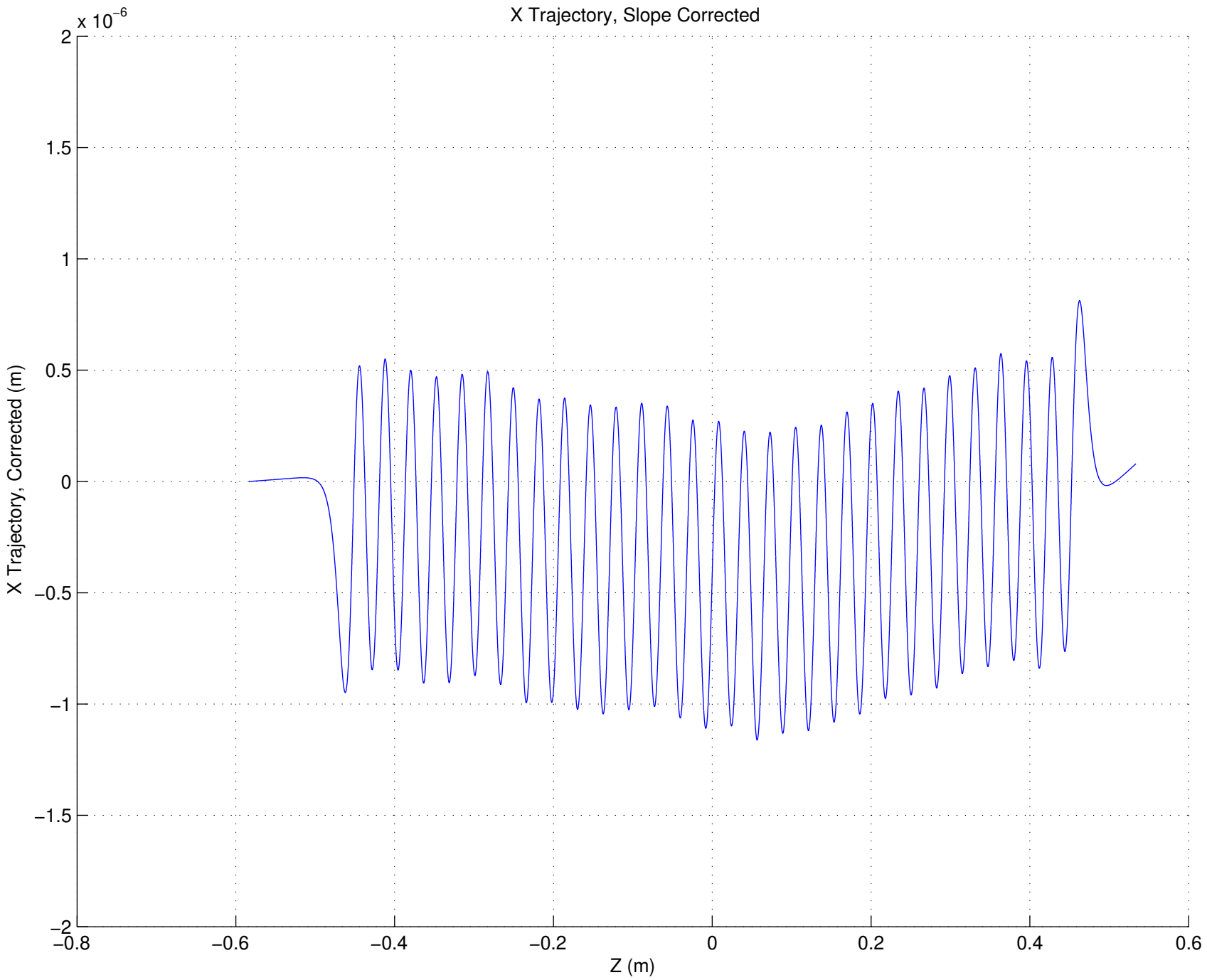

Bx Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
0
1
2
3
4
5
6
7
8
9
10

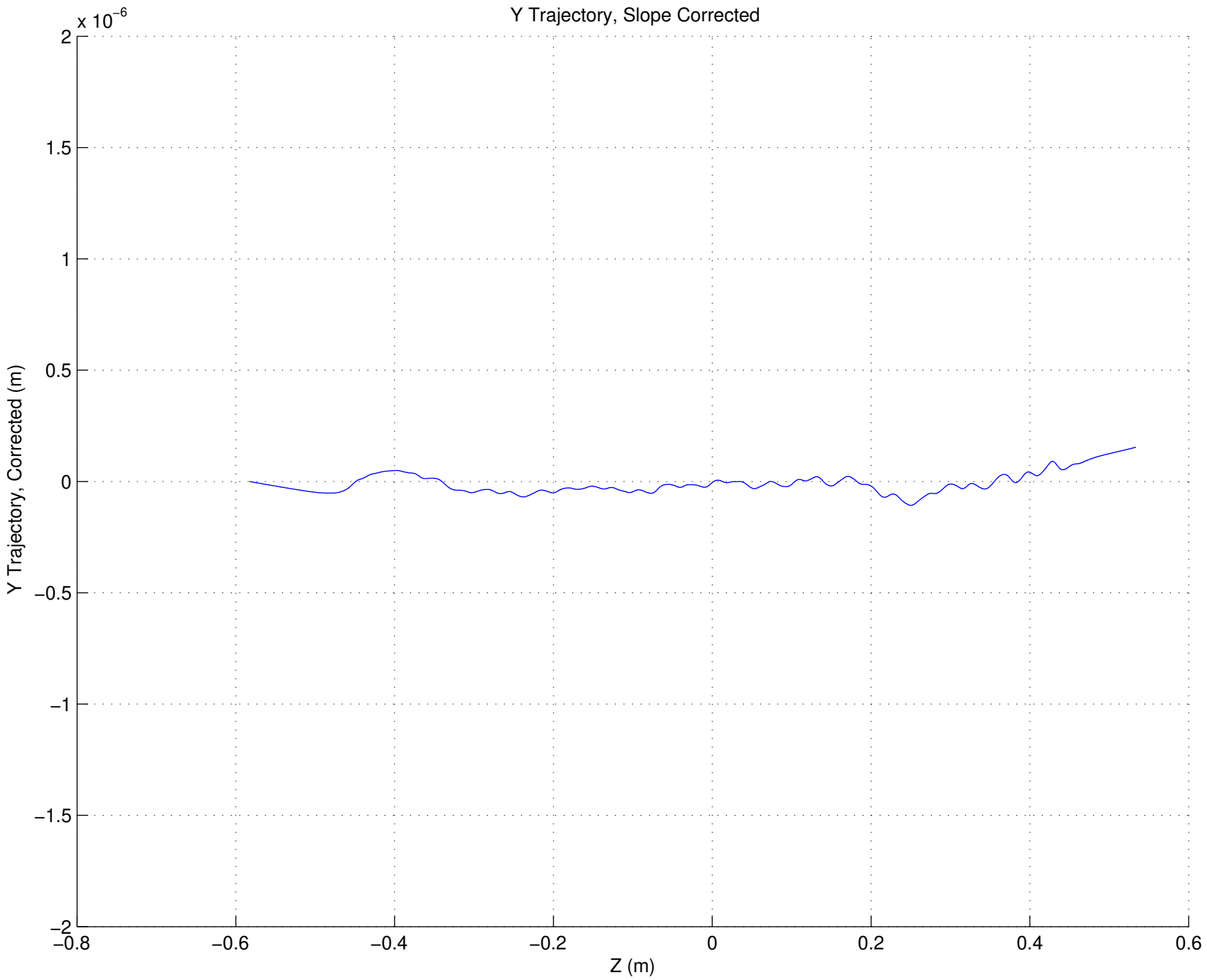

By Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
0
1
2
3
4
5
6
7
8
9
10

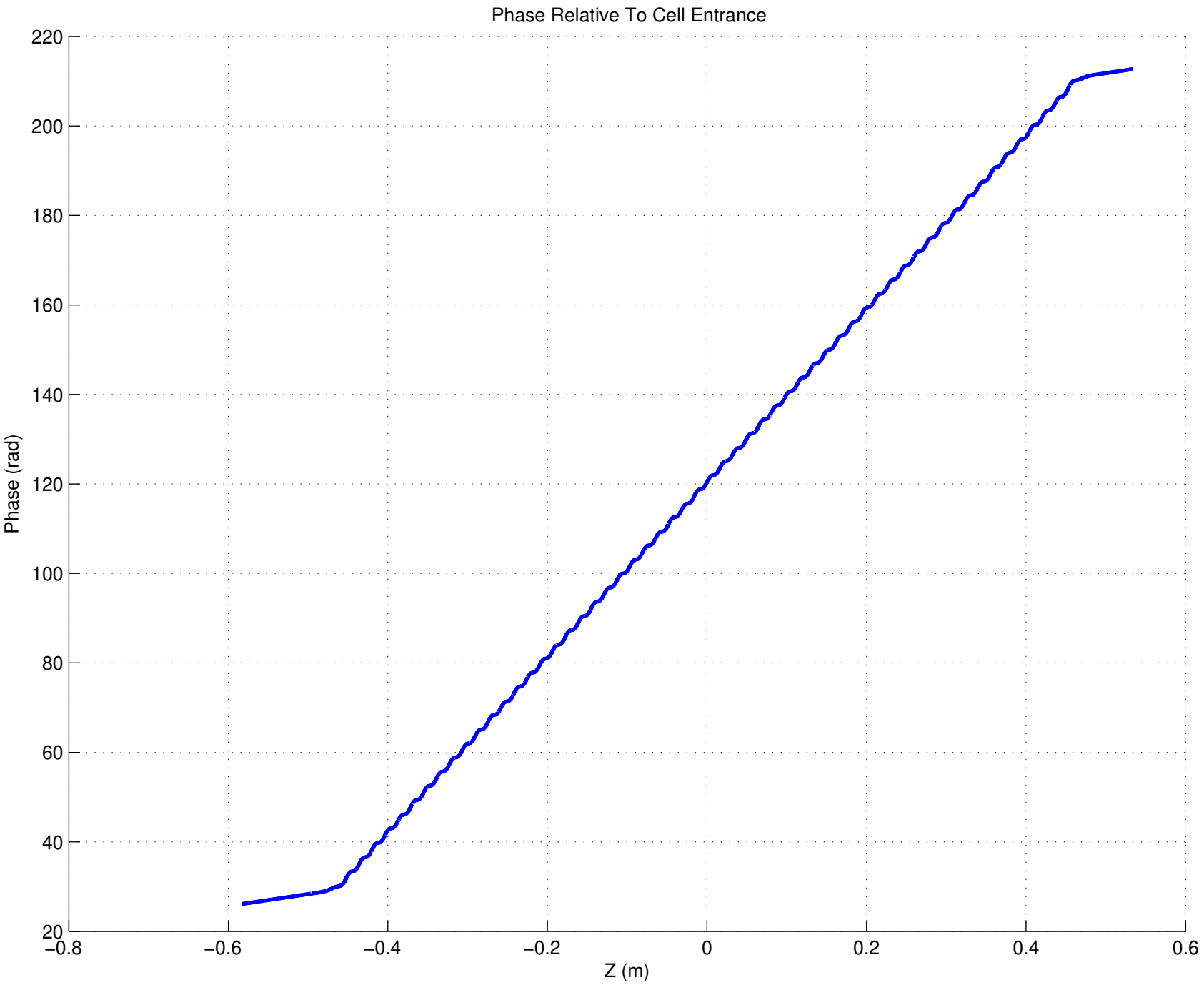

X Trajectory
x 10^-6
6
18
31
43
55
Pole
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
X Trajectory (m)
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
Z (m)

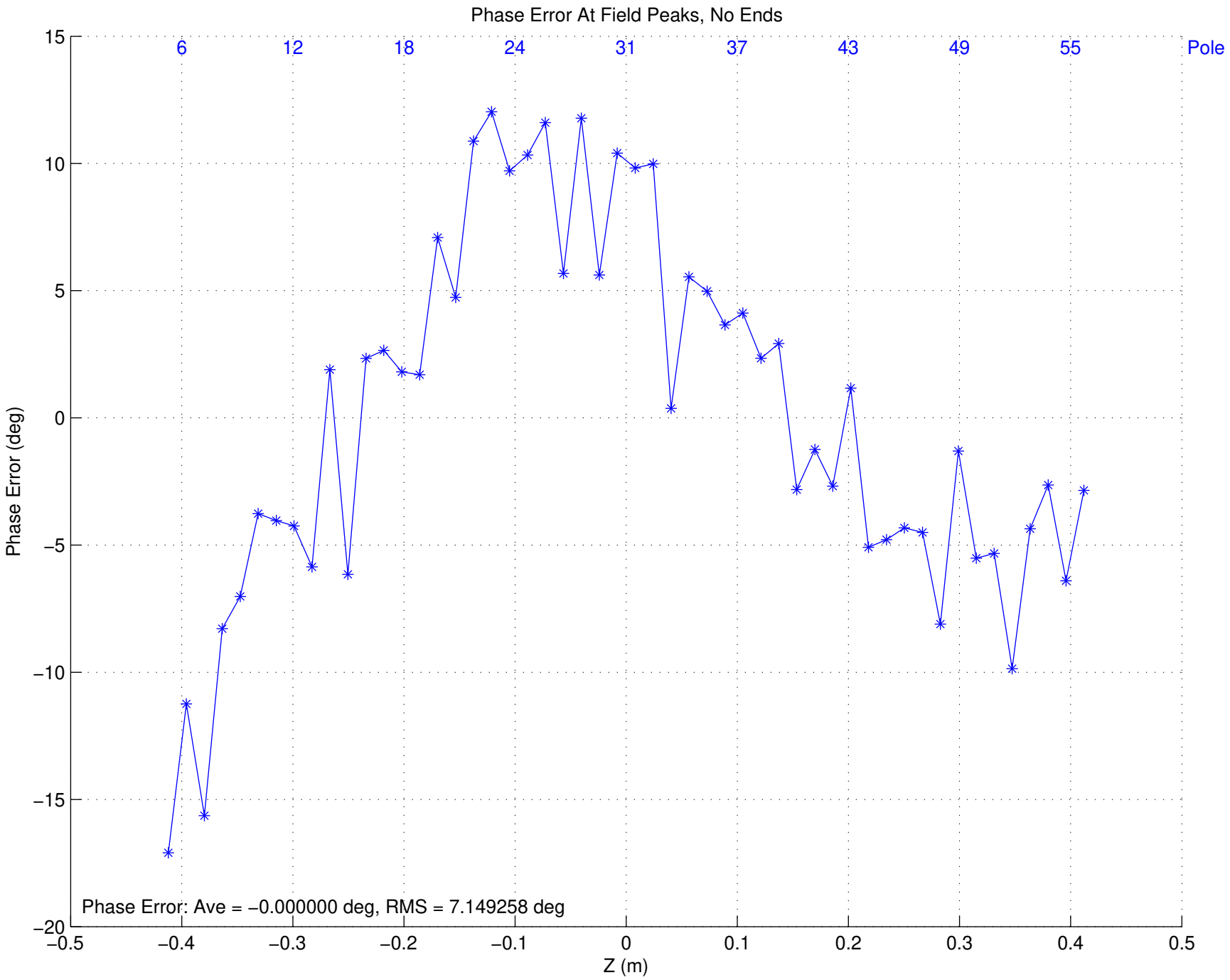

Y Trajectory
x 10^-6
6
18
31
43
55
Pole
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
Y Trajectory (m)
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
Z (m)

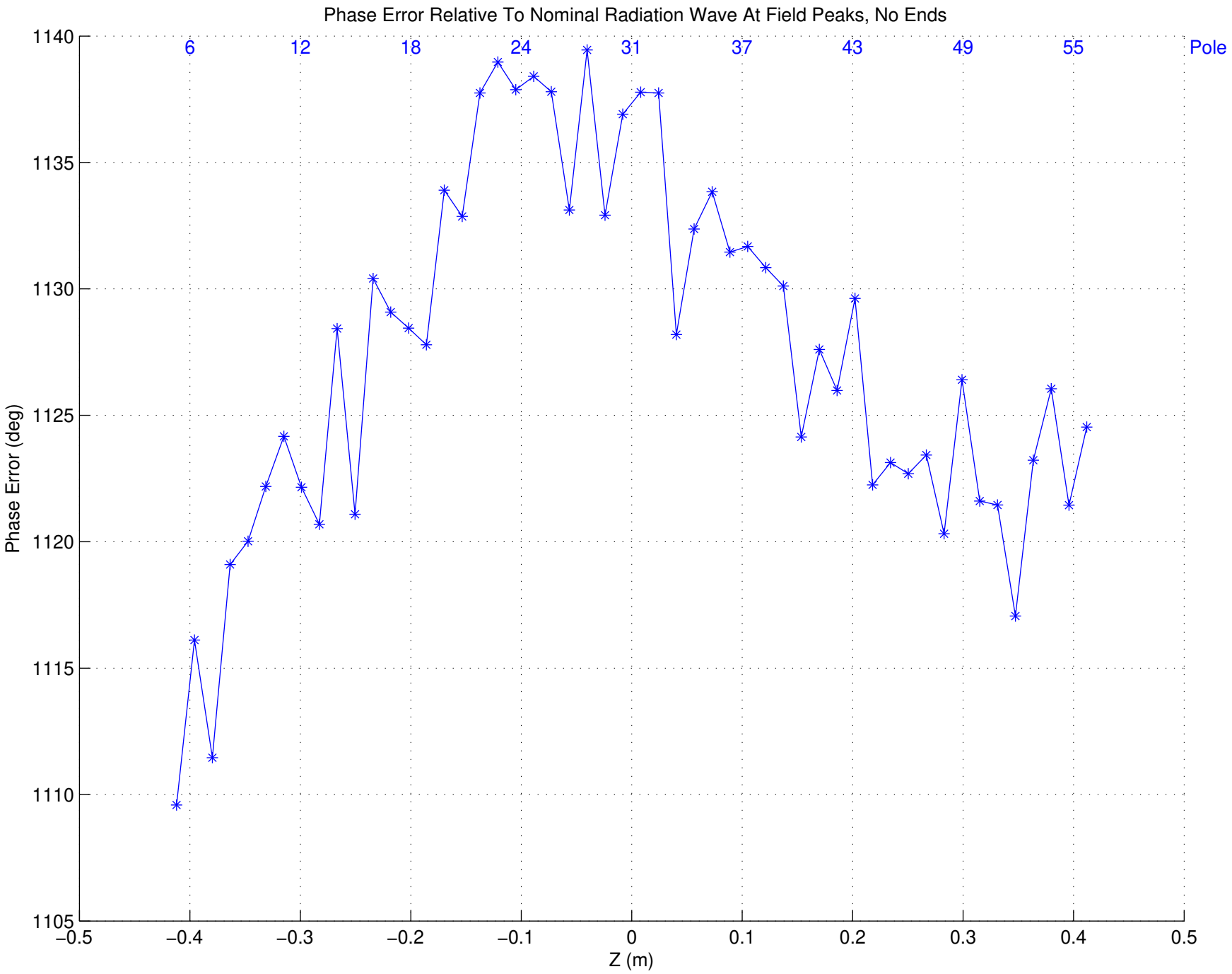

XY Trajectory Projection
x 10^-6
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
Y Trajectory (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
X Trajectory (m)
x 10^-6

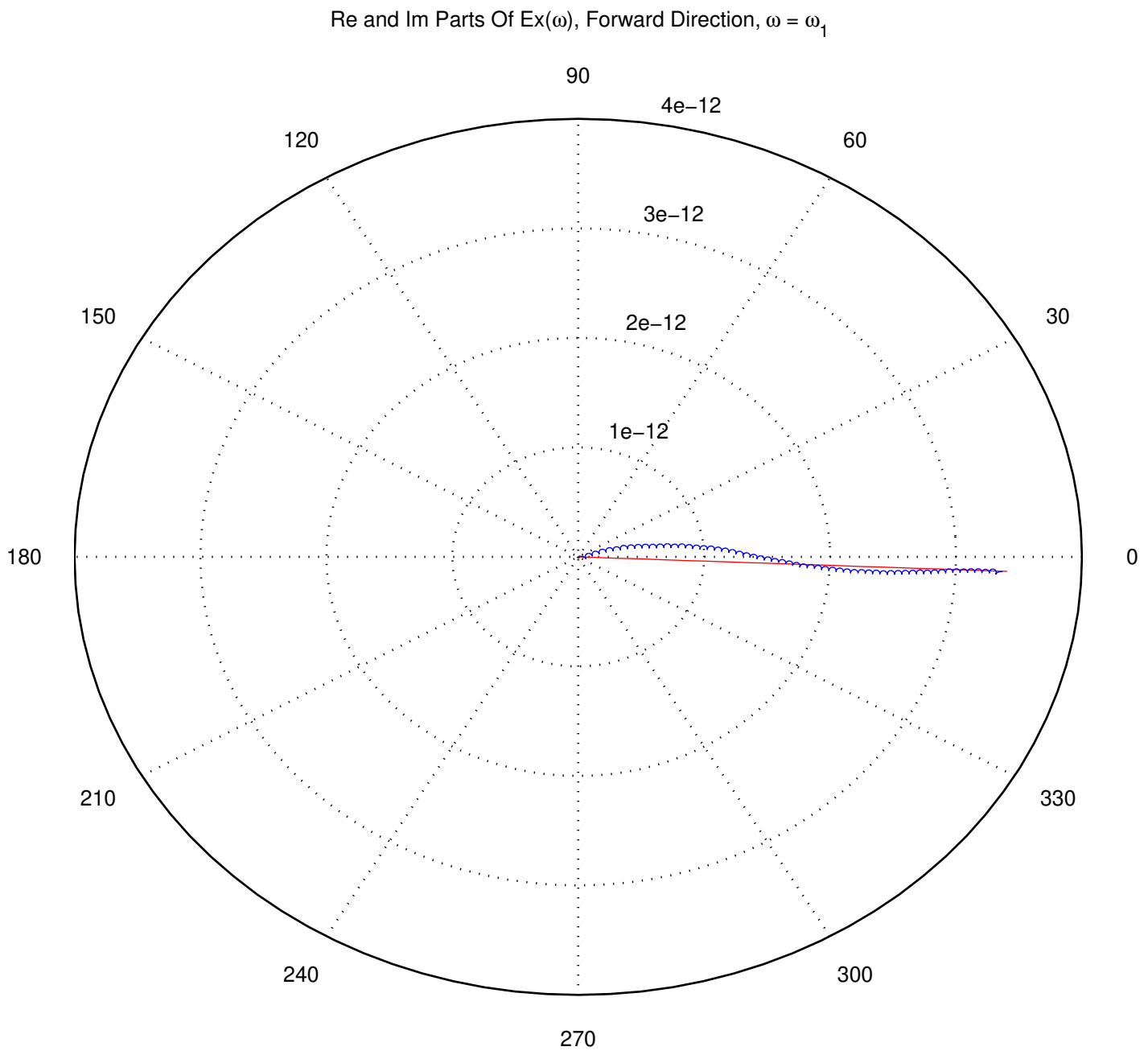

X Trajectory, Slope Corrected
x 10^-6
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
X Trajectory, Corrected (m)
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
Z (m)

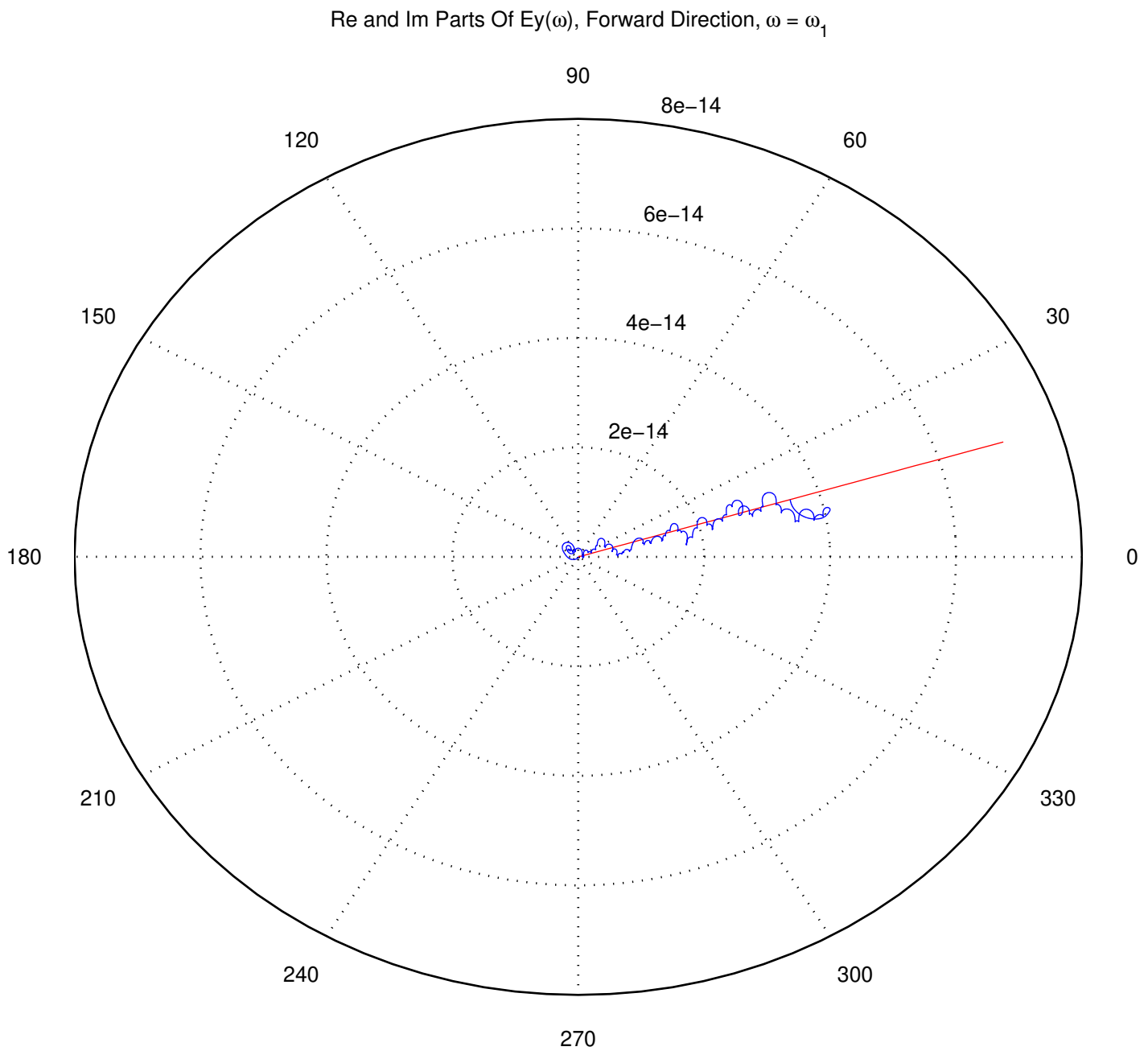

Y Trajectory, Slope Corrected
x 10^-6
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
Y Trajectory, Corrected (m)
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
Z (m)

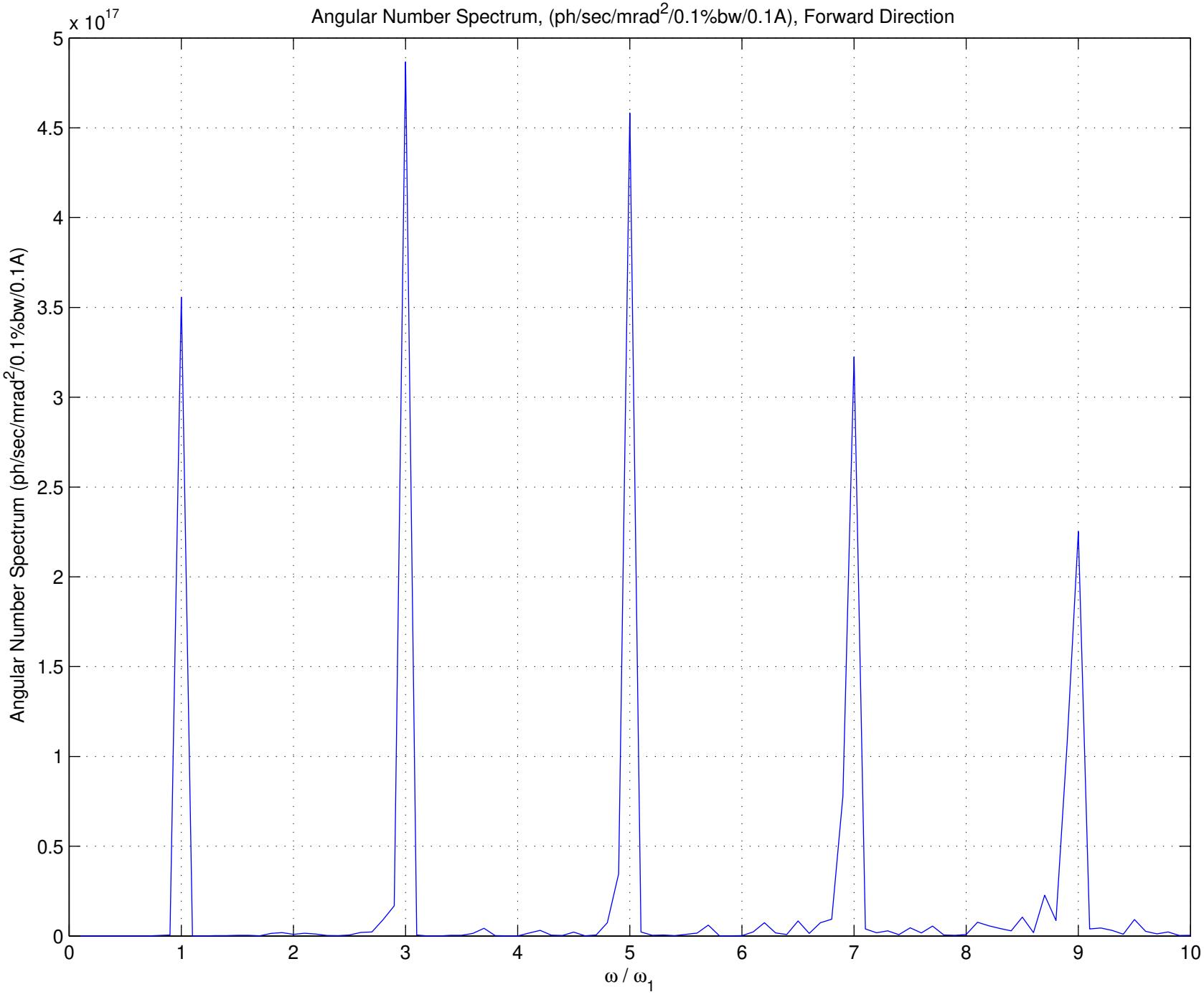

Phase Relative To Cell Entrance
Phase (rad)
Z (m)
220
200
180
160
140
120
100
80
60
40
20
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6

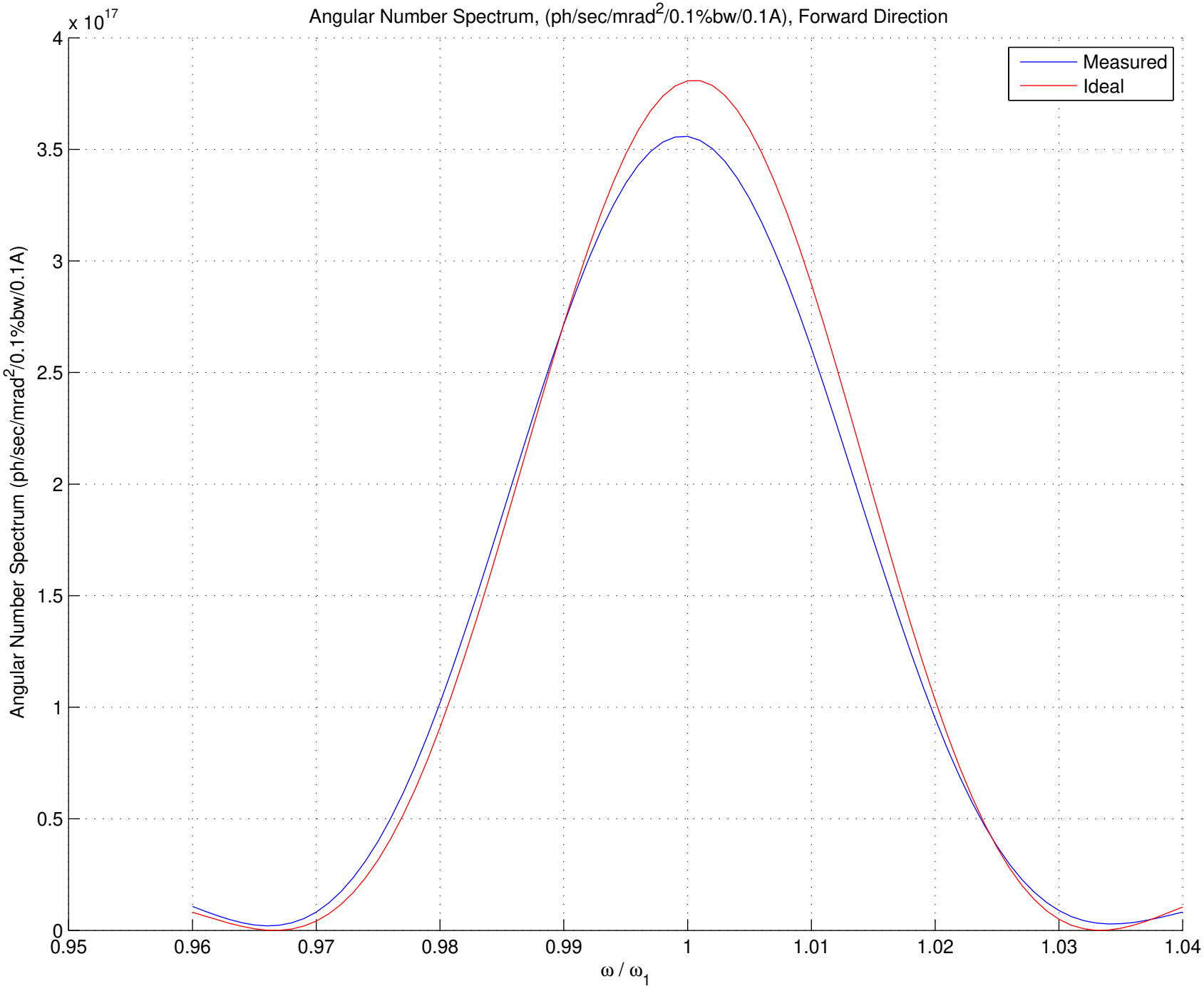

Phase Error At Field Peaks, No Ends
6
12
18
24
31
37
43
49
55
Pole
15
10
5
0
−5
−10
−15
−20
Phase Error (deg)
Phase Error: Ave = −0.000000 deg, RMS = 7.149258 deg
−0.5
−0.4
−0.3
−0.2
−0.1
0
0.1
0.2
0.3
0.4
0.5
Z (m)

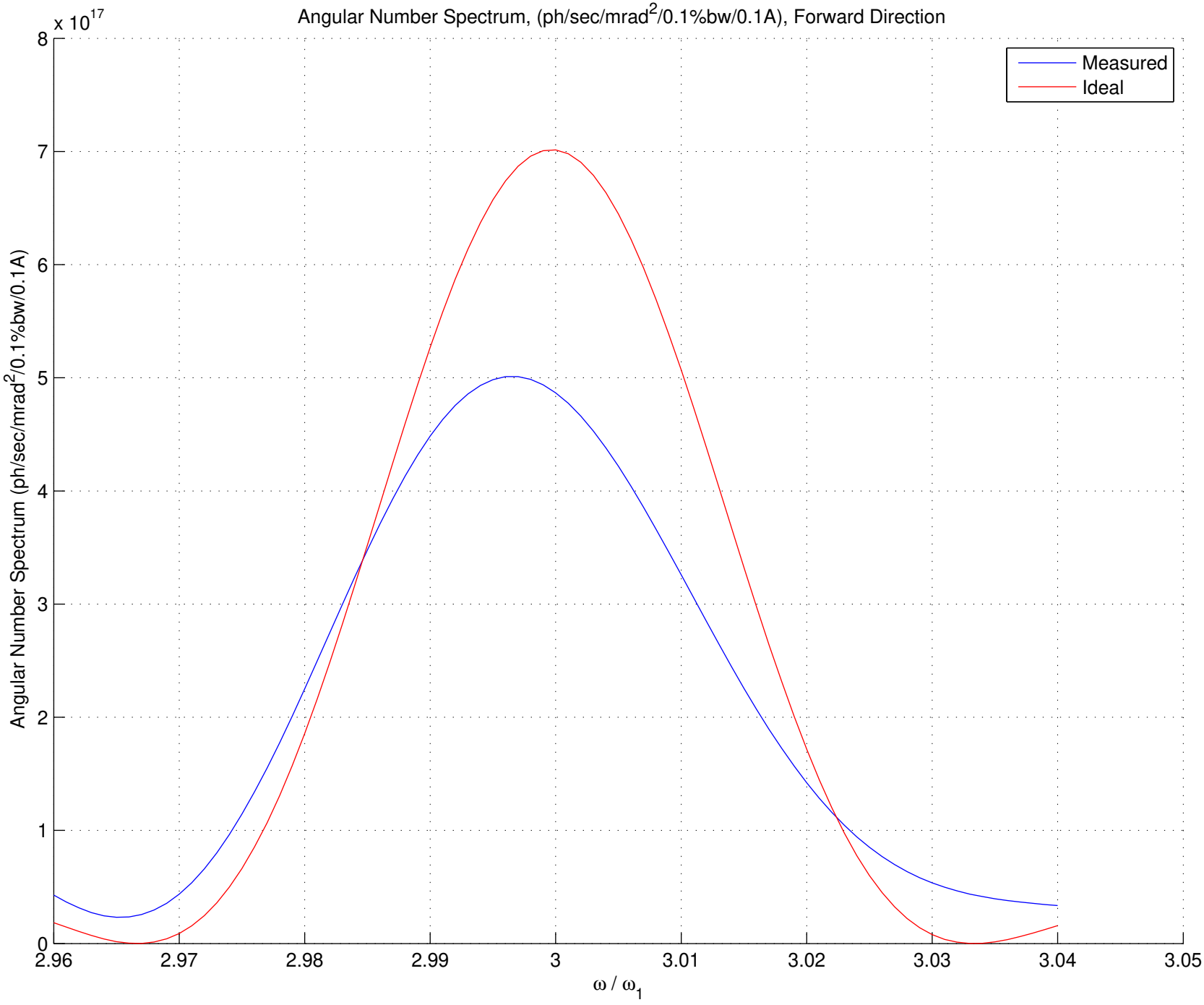

Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
6
12
18
24
31
37
43
49
55
Pole
1140
1135
1130
1125
1120
1115
1110
1105
Phase Error (deg)
−0.5
−0.4
−0.3
−0.2
−0.1
0
0.1
0.2
0.3
0.4
0.5
Z (m)

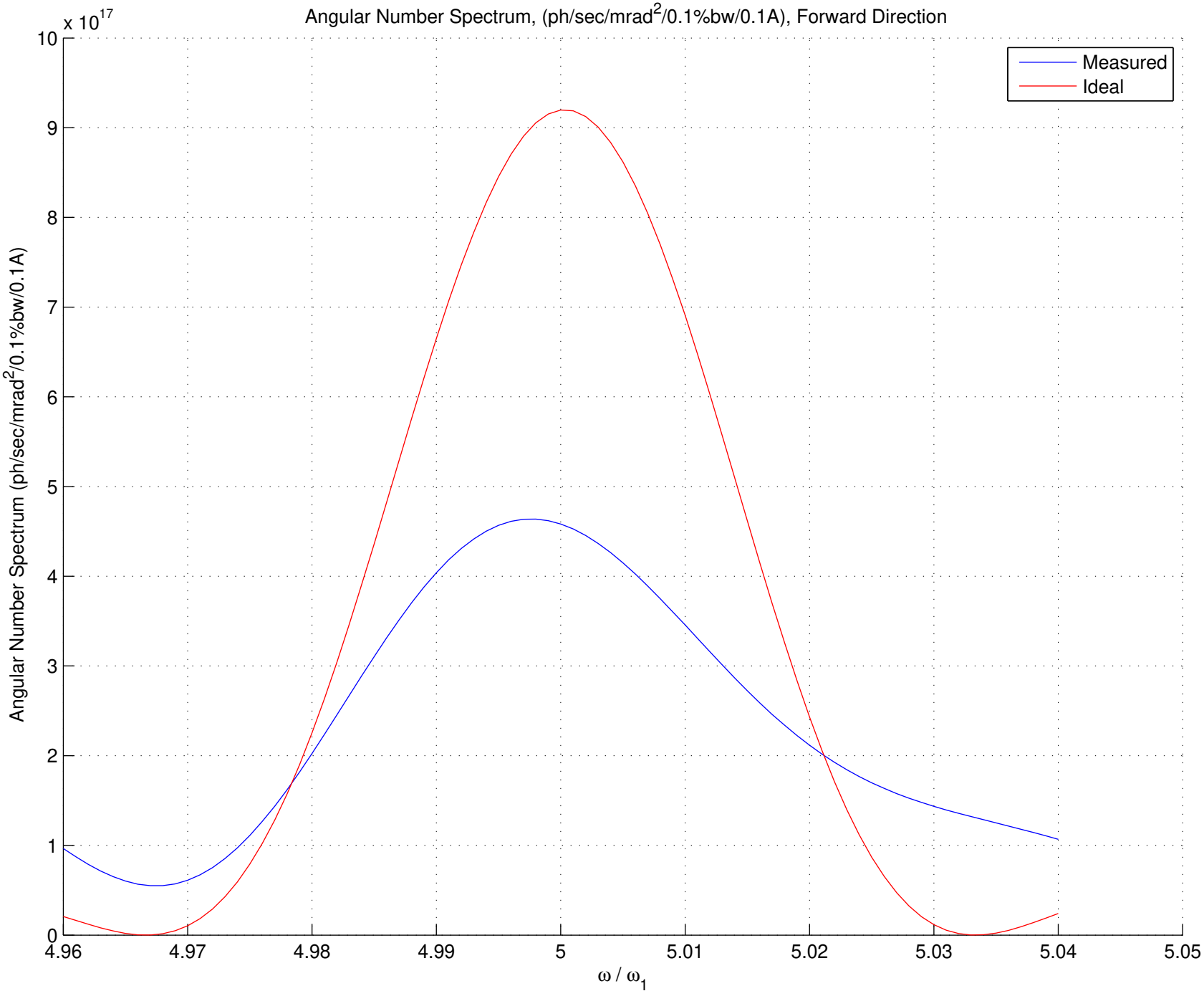

Re and Im Parts Of Ex(ω), Forward Direction, ω = ω1
90
4e−12
120
60
3e−12
150
30
2e−12
1e−12
180
0
210
330
240
300
270


Re and Im Parts Of Ey(ω), Forward Direction, ω = ω1
90
8e−14
120
60
6e−14
150
30
4e−14
2e−14
180
0
210
330
240
300
270


Angular Number Spectrum, (ph/sec/mrad2/0.1%bw/0.1A), Forward Direction
x 10^17
Angular Number Spectrum (ph/sec/mrad2/0.1%bw/0.1A)
ω / ω1
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
0
1
2
3
4
5
6
7
8
9
10


Angular Number Spectrum, (ph/sec/mrad2/0.1%bw/0.1A), Forward Direction
x 10^17
Angular Number Spectrum (ph/sec/mrad2/0.1%bw/0.1A)
ω / ω1
Measured
Ideal
0
0.5
1
1.5
2
2.5
3
3.5
4
0.95
0.96
0.97
0.98
0.99
1
1.01
1.02
1.03
1.04


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


Angular Number Spectrum, (ph/sec/mrad2/0.1%bw/0.1A), Forward Direction
x 10^17
Angular Number Spectrum (ph/sec/mrad2/0.1%bw/0.1A)
ω / ω1
Measured
Ideal
0
1
2
3
4
5
6
7
8
9
10
4.96
4.97
4.98
4.99
5
5.01
5.02
5.03
5.04
5.05