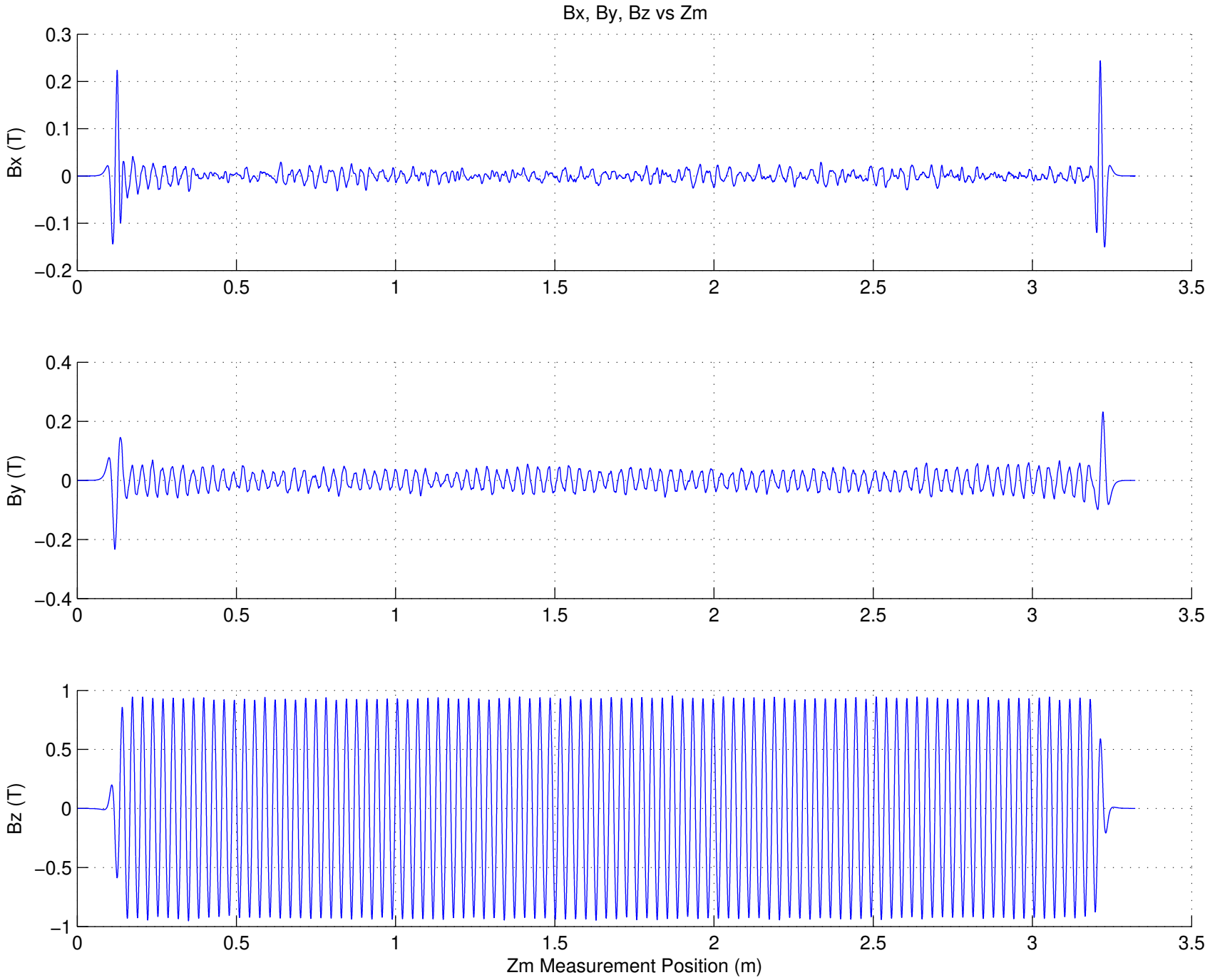
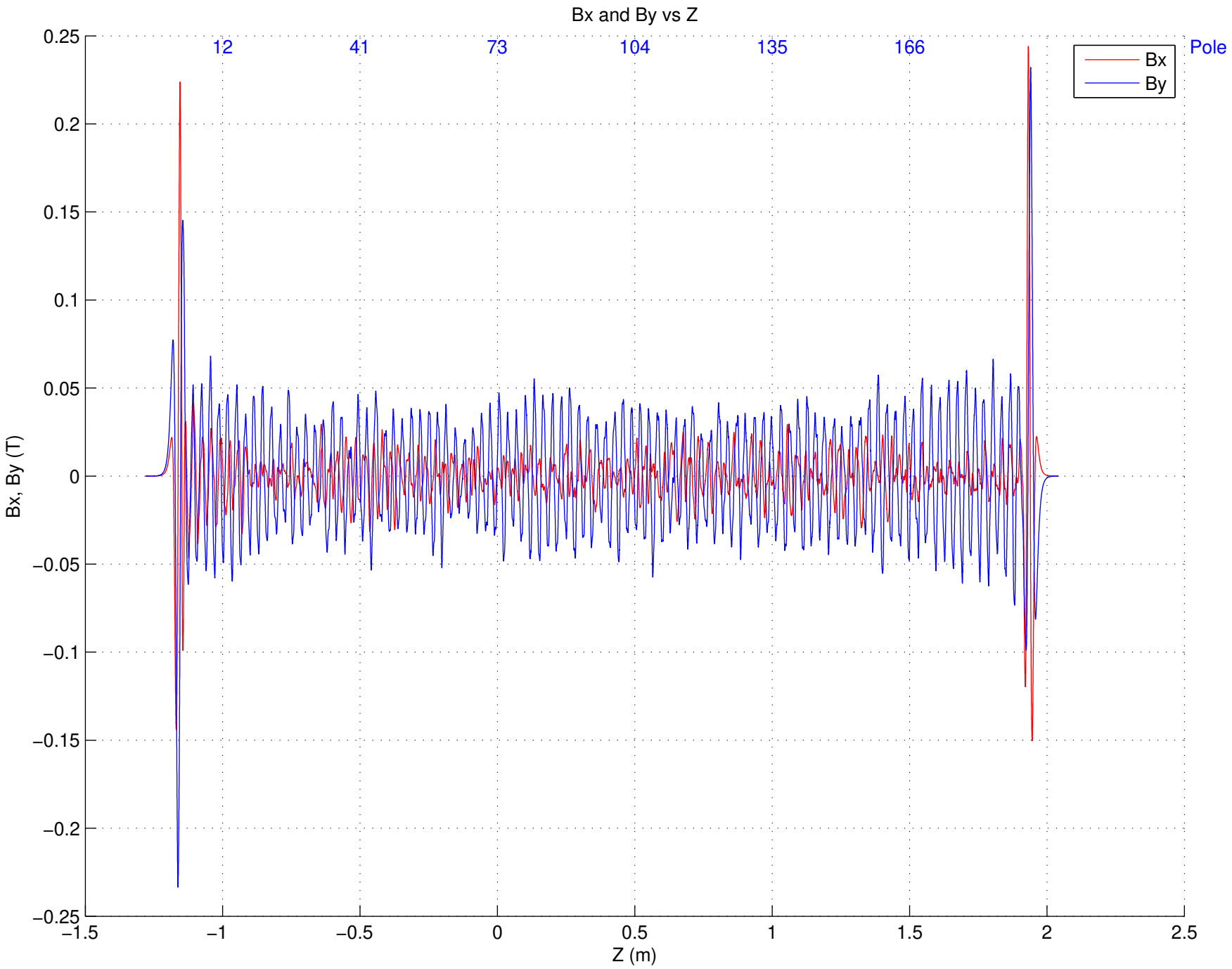
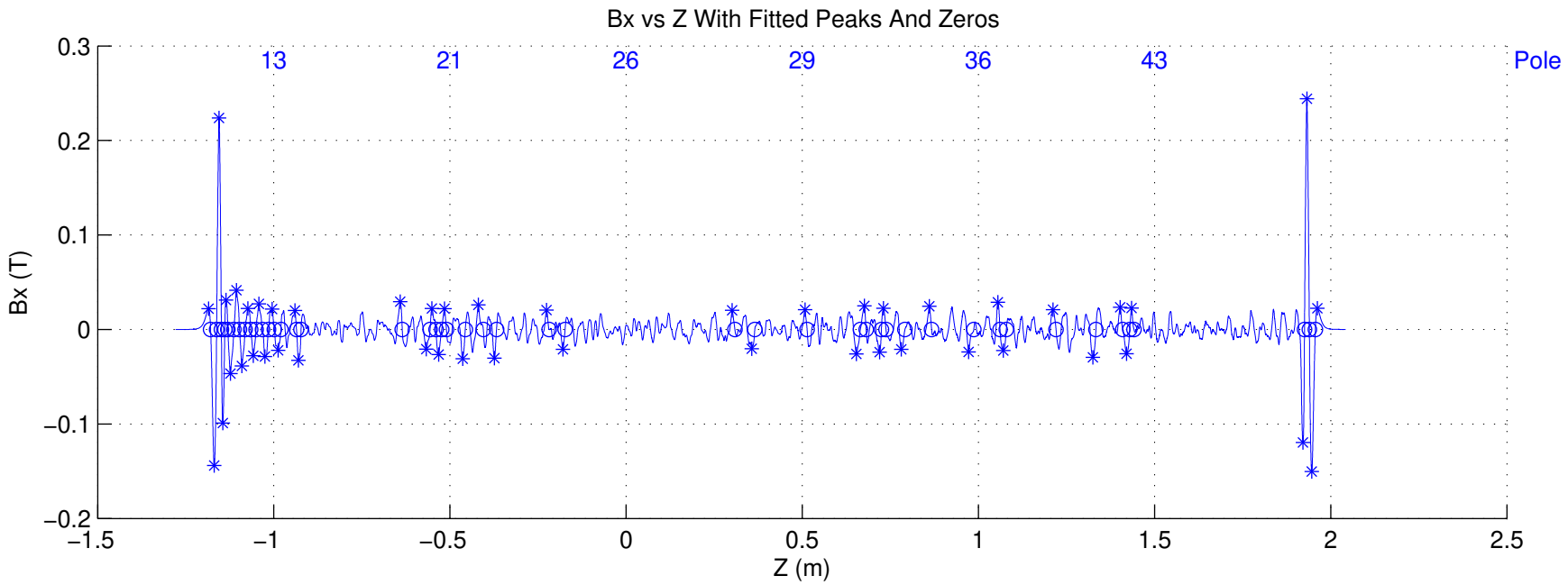
SLAC Magnetic Measurements

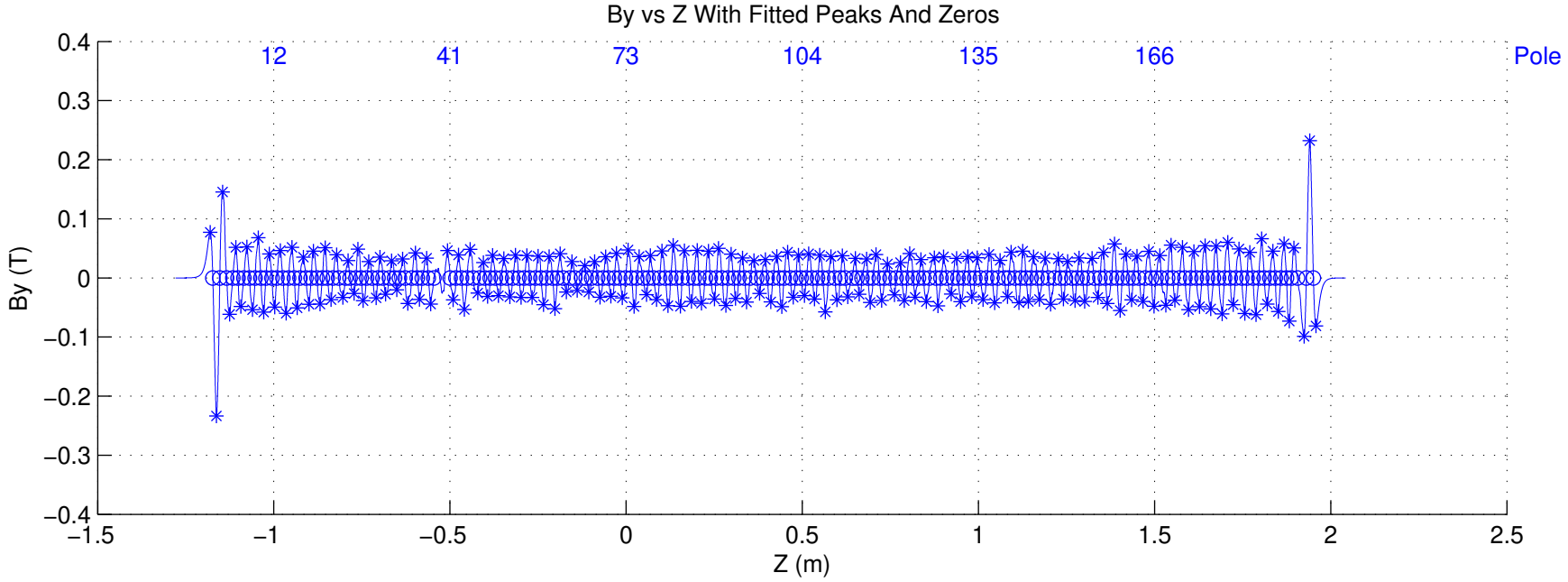
EPU Analysis
−−−−−−−−−−−

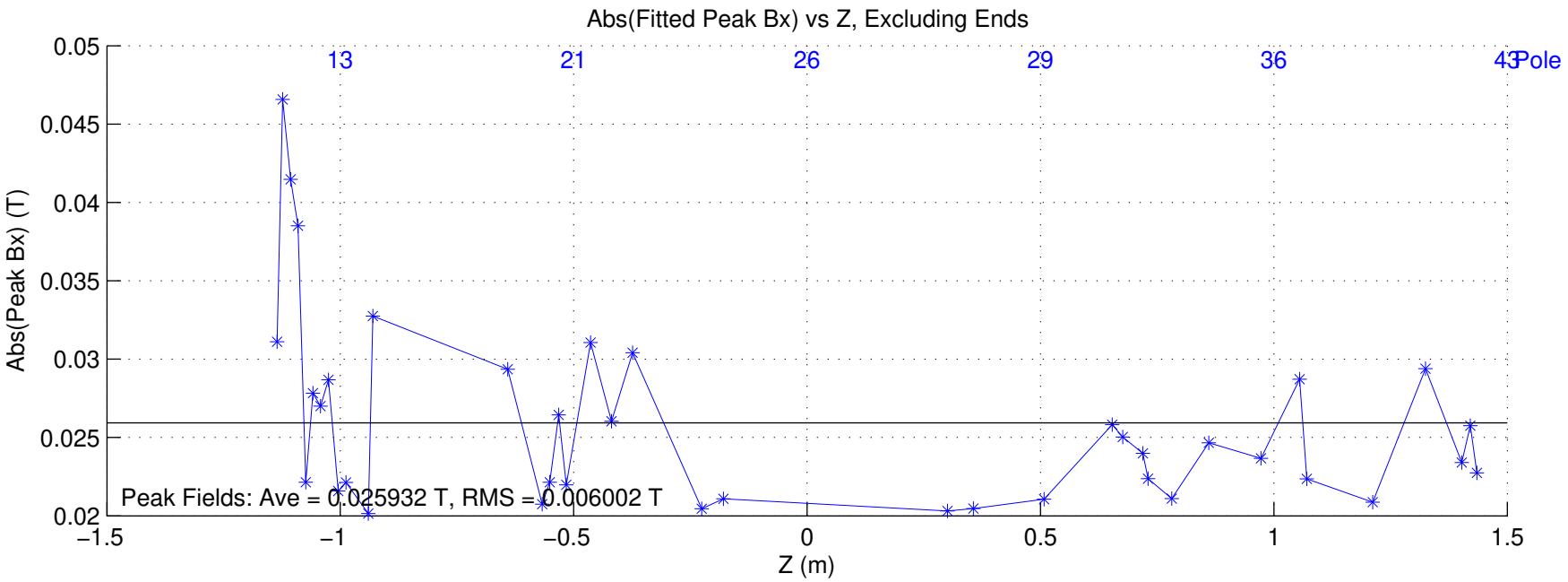
Parameters:
INPUT−FILE−DIR =V:\MET\MagServe\MagData\DELTA\Delta data\Assembled Measurements\Final Measurements\CPRMF\KR0
INPUT−FILE−NAME =hall2−anal−meas−field.dat
INPUT−FILE−TYPE =ZBXYZH
CORR−REQUIRED =0
GAMMA =26627.1
NOM−LAMBDA−U =0
NOM−K−VALUE =0
NOM−LAMBDA−R =0
NUM−POLES =196
NUM−END−POLES =4
CELL−LENGTH =3.126

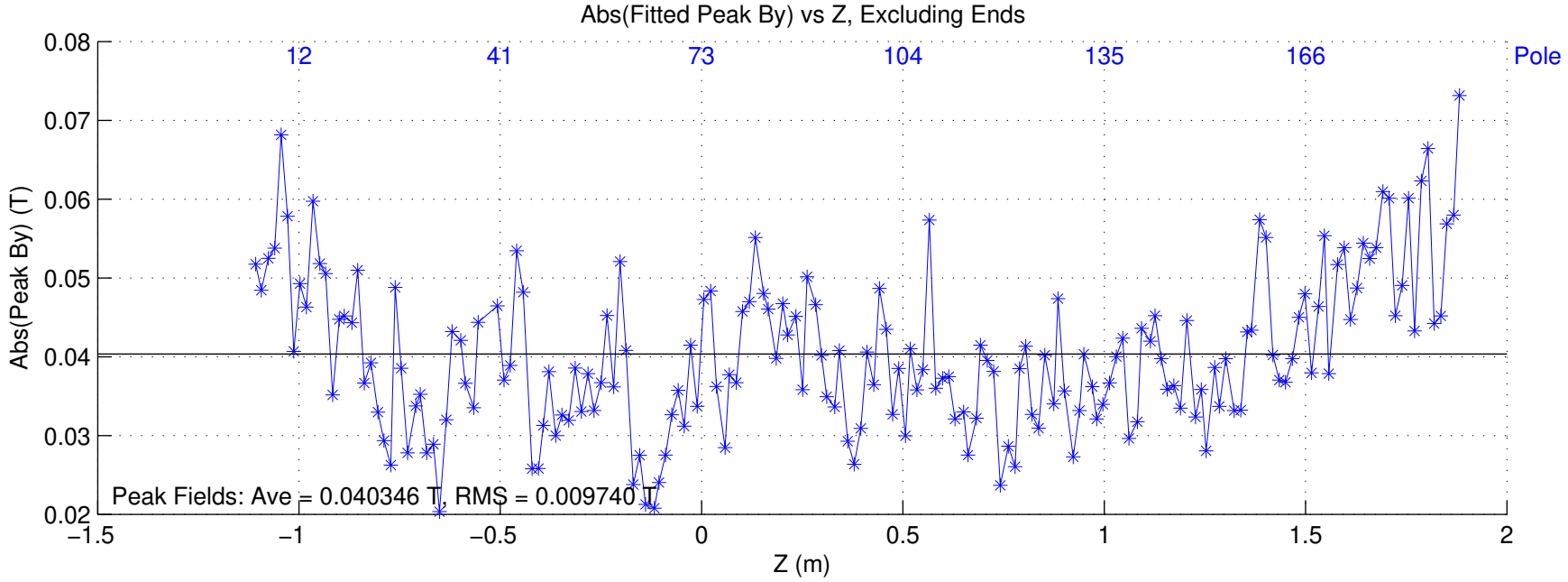

Bx, By, Bz vs Zm
Bx (T)
0.3
0.2
0.1
0
−0.1
−0.2
By (T)
0.4
0.2
0
−0.2
−0.4
Bz (T)
1
0.5
0
−0.5
−1
0
0.5
1
1.5
2
2.5
3
3.5
Zm Measurement Position (m)

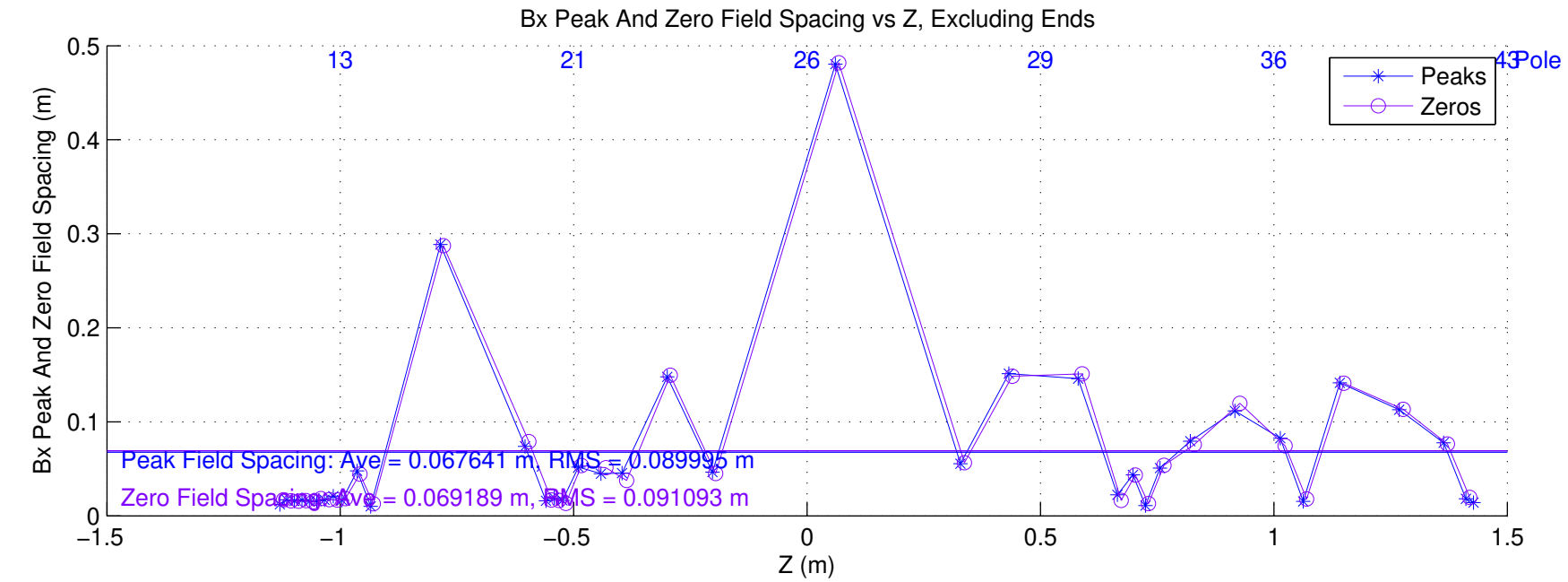

Bx and By vs Z
12
41
73
104
135
166
Pole
Bx
By
0.25
0.2
0.15
0.1
0.05
0
−0.05
−0.1
−0.15
−0.2
−0.25
Bx, By (T)
−1.5
−1
−0.5
0
0.5
1
1.5
2
2.5
Z (m)

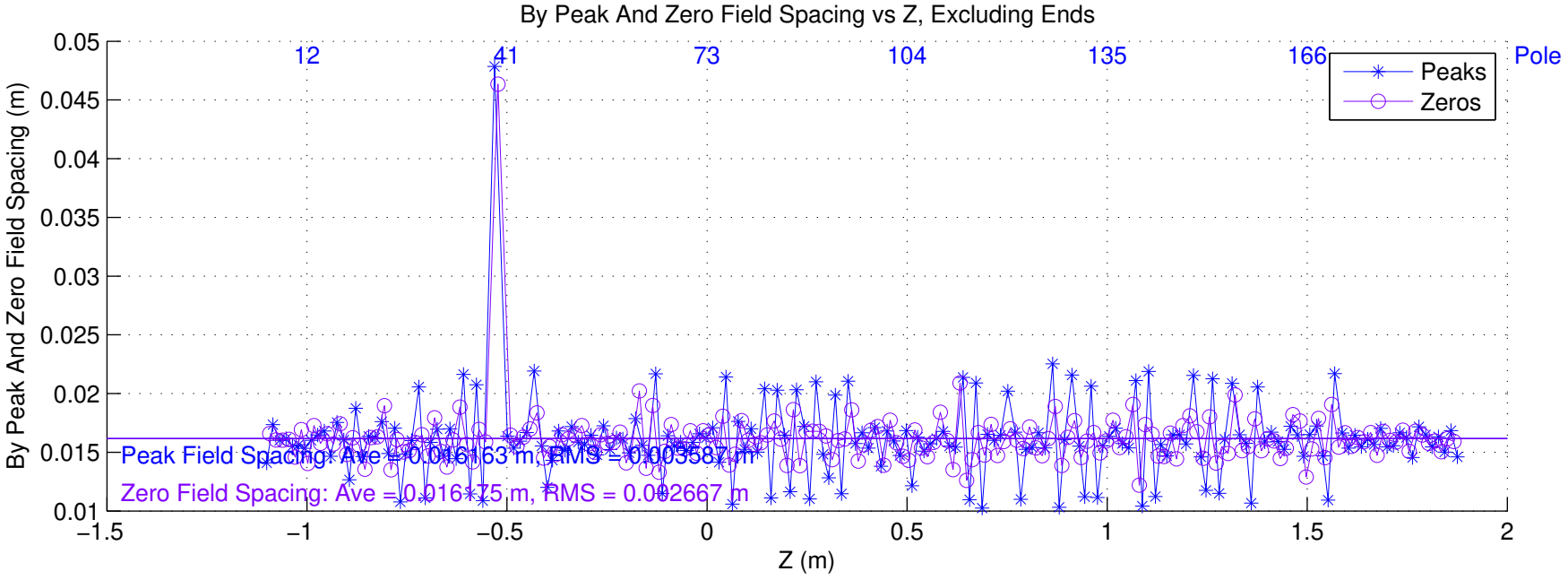

Bx vs Z With Fitted Peaks And Zeros
13
21
26
29
36
43
Pole
0.3
0.2
0.1
0
−0.1
−0.2
Bx (T)
−1.5
−1
−0.5
0
0.5
1
1.5
2
2.5
Z (m)

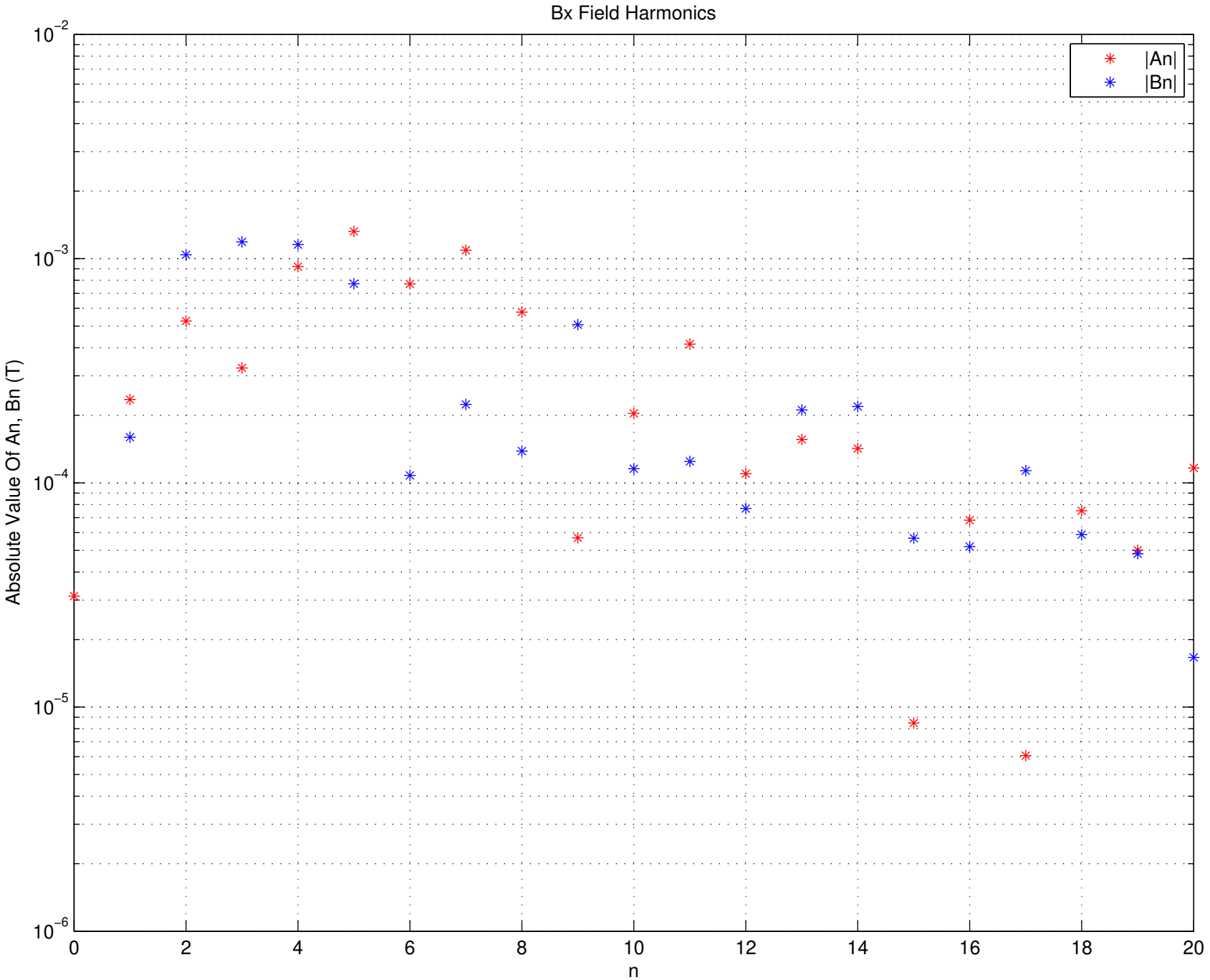

By vs Z With Fitted Peaks And Zeros
12
41
73
104
135
166
Pole
0.4
0.3
0.2
0.1
0
−0.1
−0.2
−0.3
−0.4
By (T)
−1.5
−1
−0.5
0
0.5
1
1.5
2
2.5
Z (m)

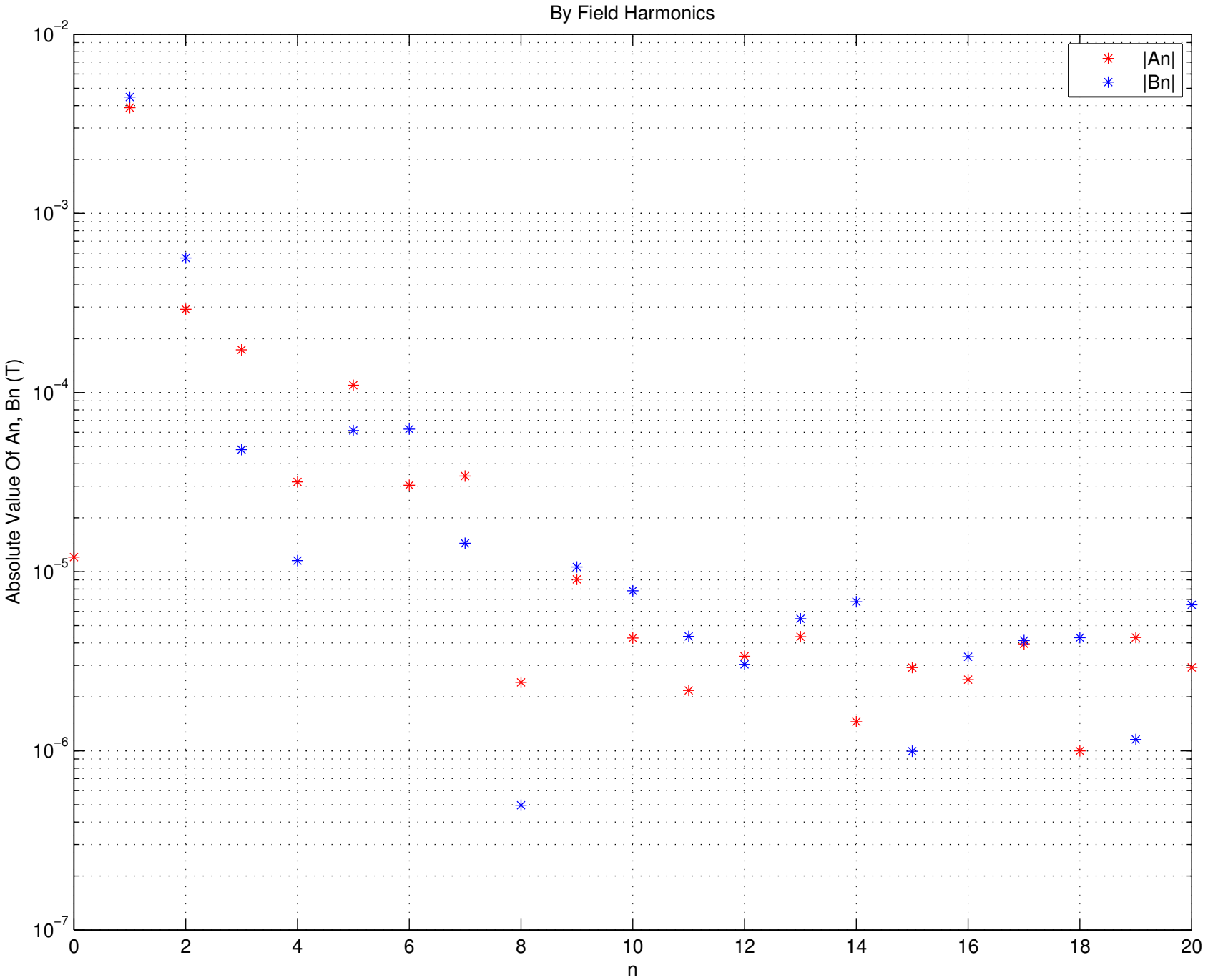

Abs(Fitted Peak Bx) vs Z, Excluding Ends
13
21
26
29
36
43
Pole
0.05
0.045
0.04
0.035
0.03
0.025
0.02
Abs(Peak Bx) (T)
Peak Fields: Ave = 0.025932 T, RMS = 0.006002 T
−1.5
−1
−0.5
0
0.5
1
1.5
Z (m)

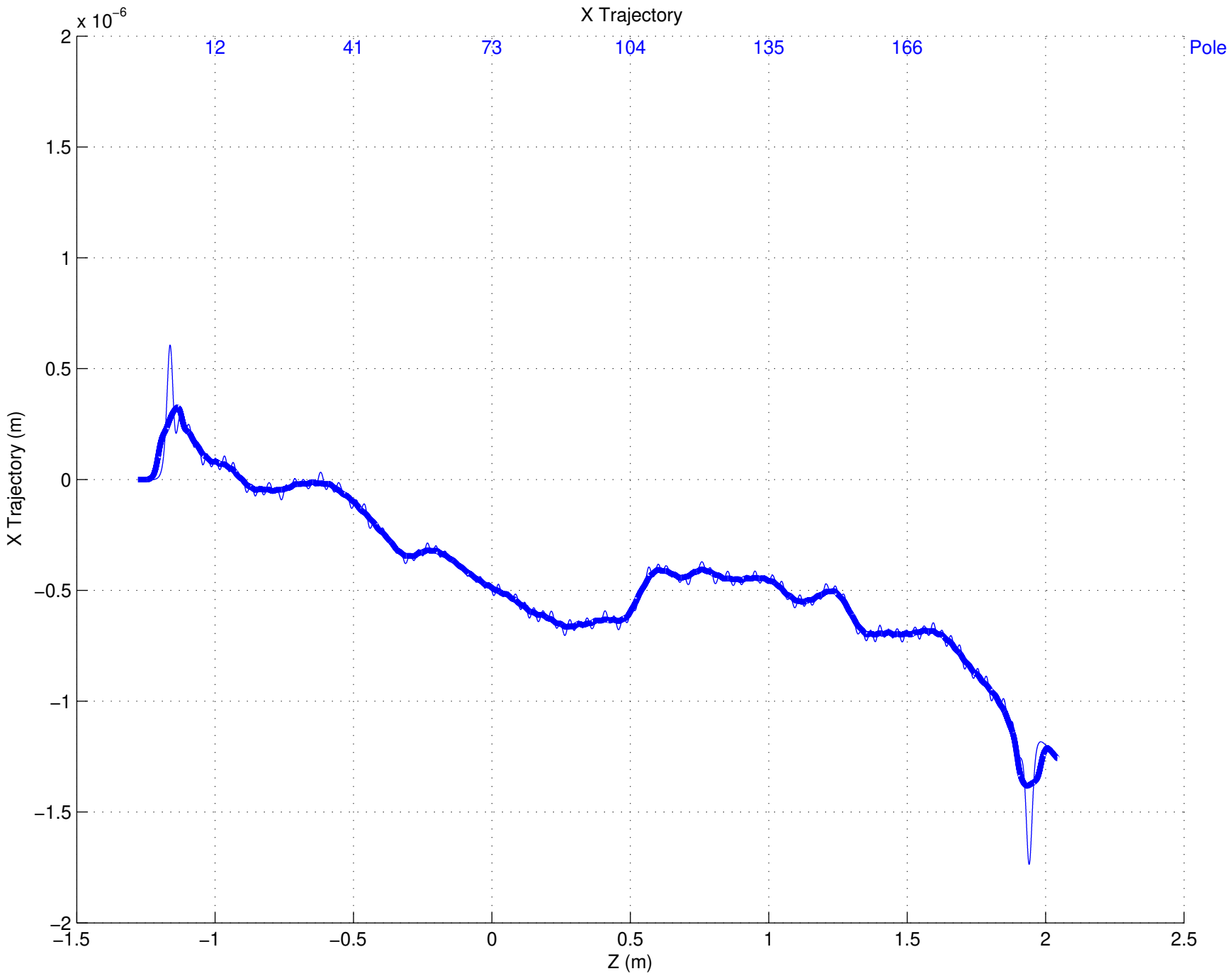

Abs(Fitted Peak By) vs Z, Excluding Ends
12
41
73
104
135
166
Pole
0.08
0.07
0.06
0.05
0.04
0.03
0.02
Abs(Peak By) (T)
Peak Fields: Ave = 0.040346 T, RMS = 0.009740 T
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

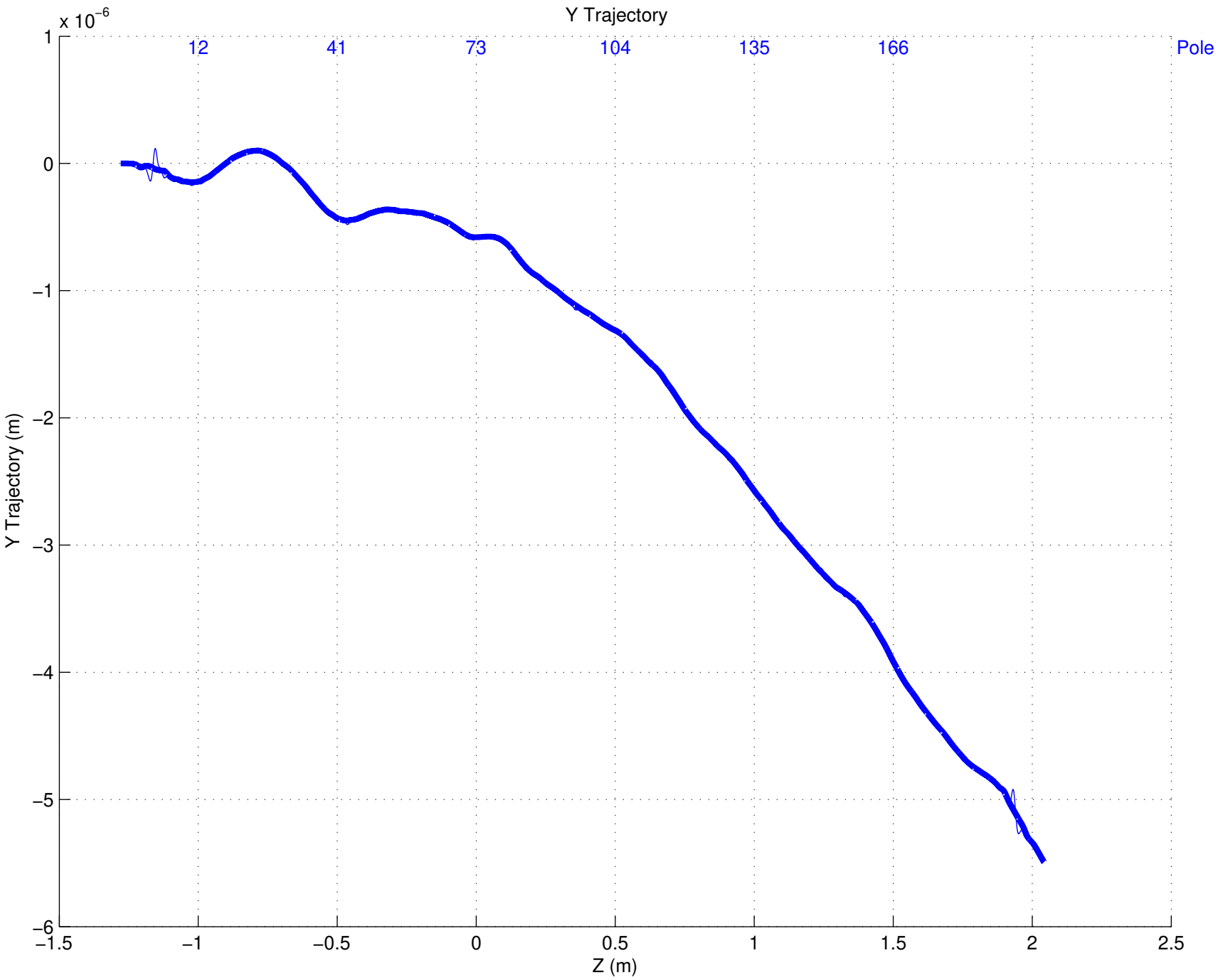

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
Z (m)
13
21
26
29
36
43
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.067641 m, RMS = 0.089995 m
Zero Field Spacing: Ave = 0.069189 m, RMS = 0.091093 m

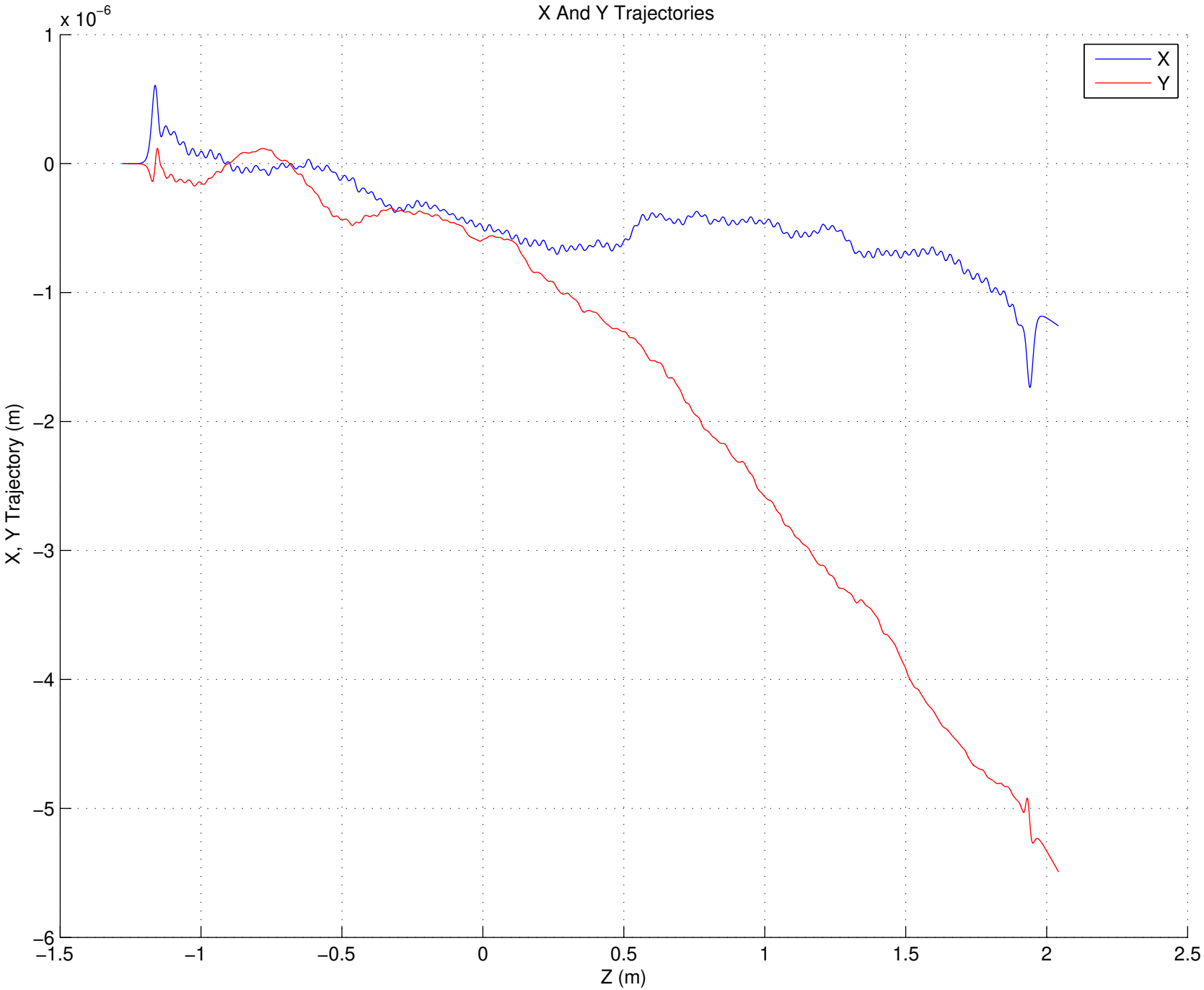

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
Z (m)
12
41
73
104
135
166
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016163 m, RMS = 0.003582 m
Zero Field Spacing: Ave = 0.016175 m, RMS = 0.002667 m

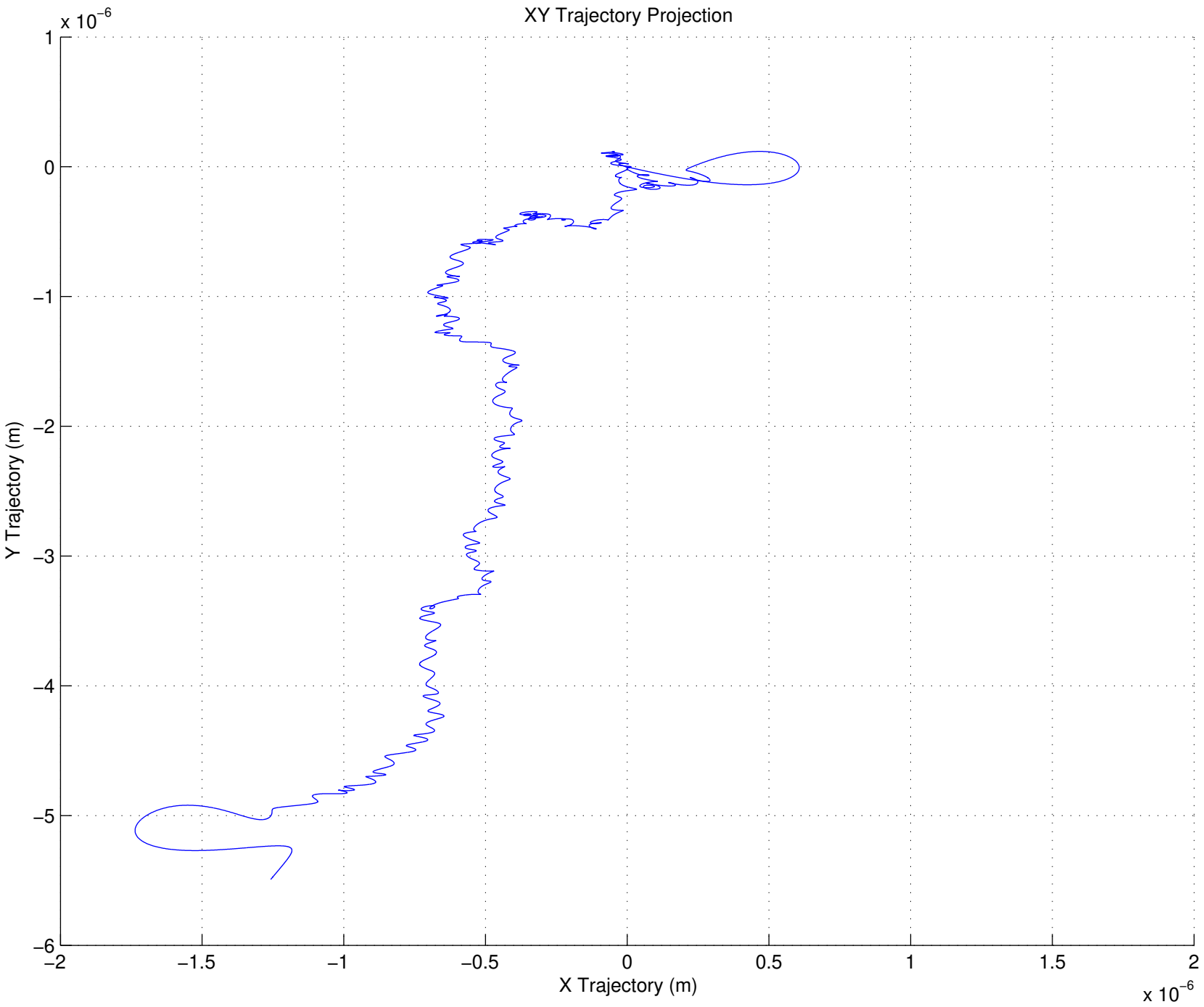

Bx Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
0
2
4
6
8
10
12
14
16
18
20

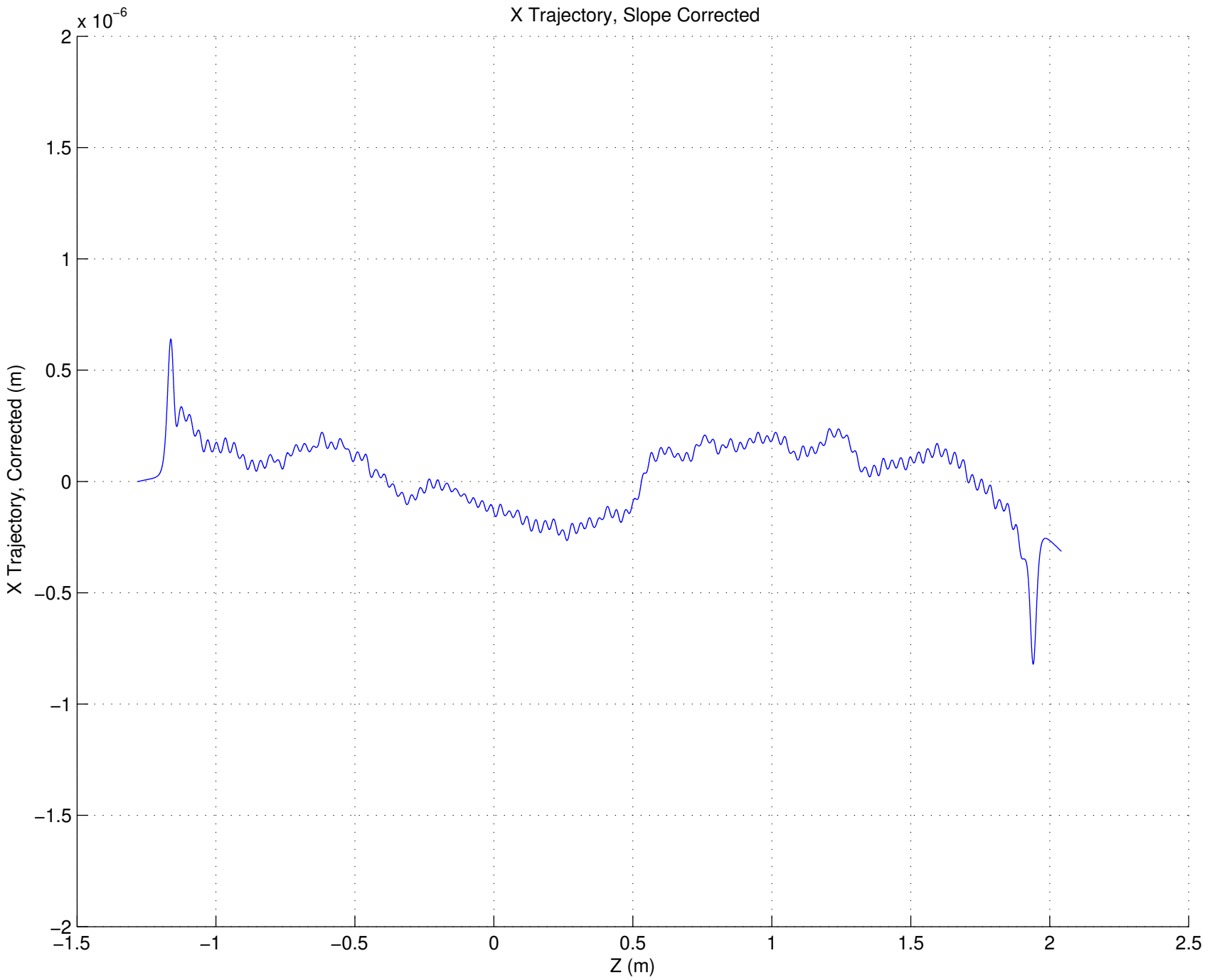

By Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
0
2
4
6
8
10
12
14
16
18
20

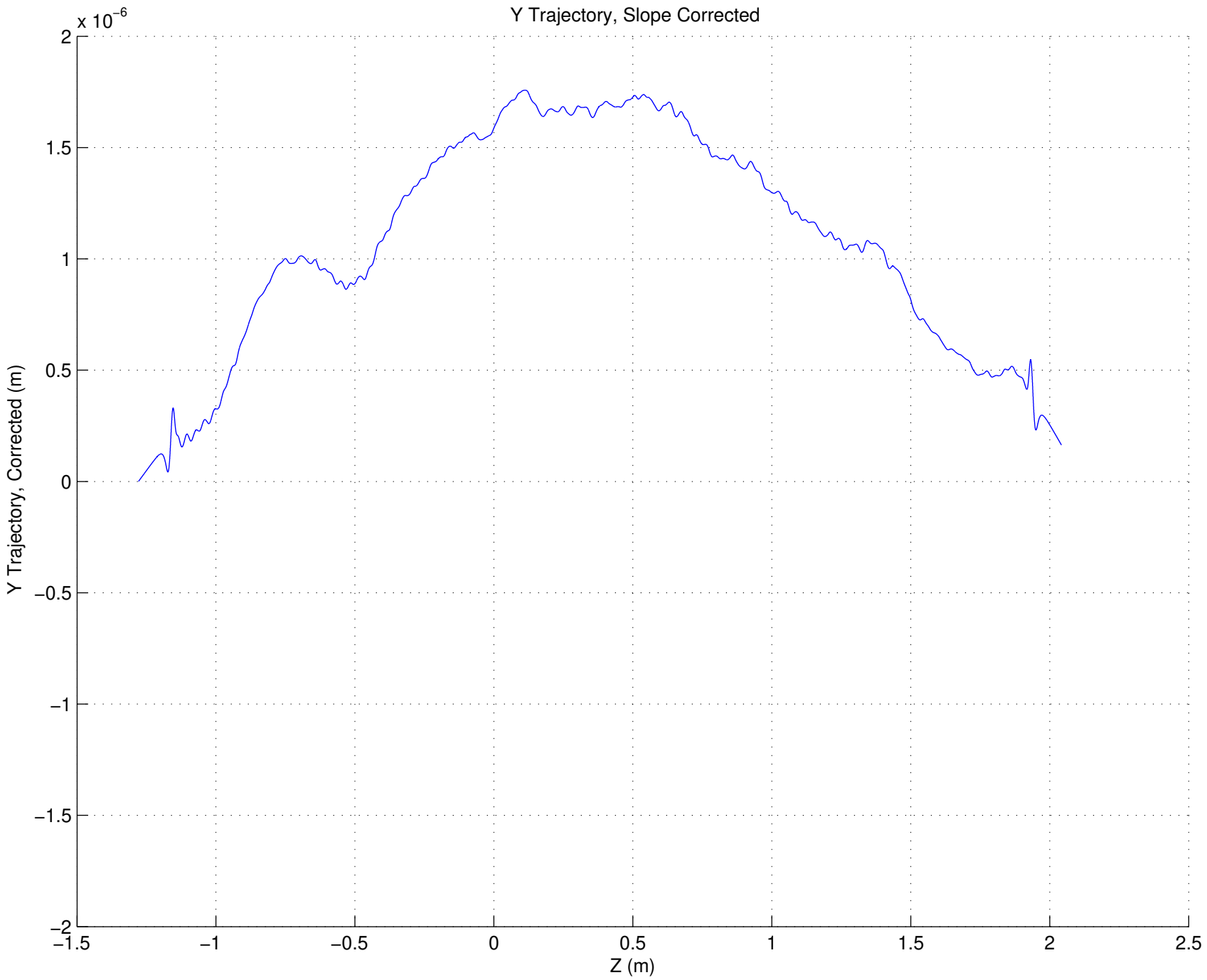

X Trajectory
x 10^-6
12
41
73
104
135
166
Pole
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
X Trajectory (m)
−1.5
−1
−0.5
0
0.5
1
1.5
2
2.5
Z (m)

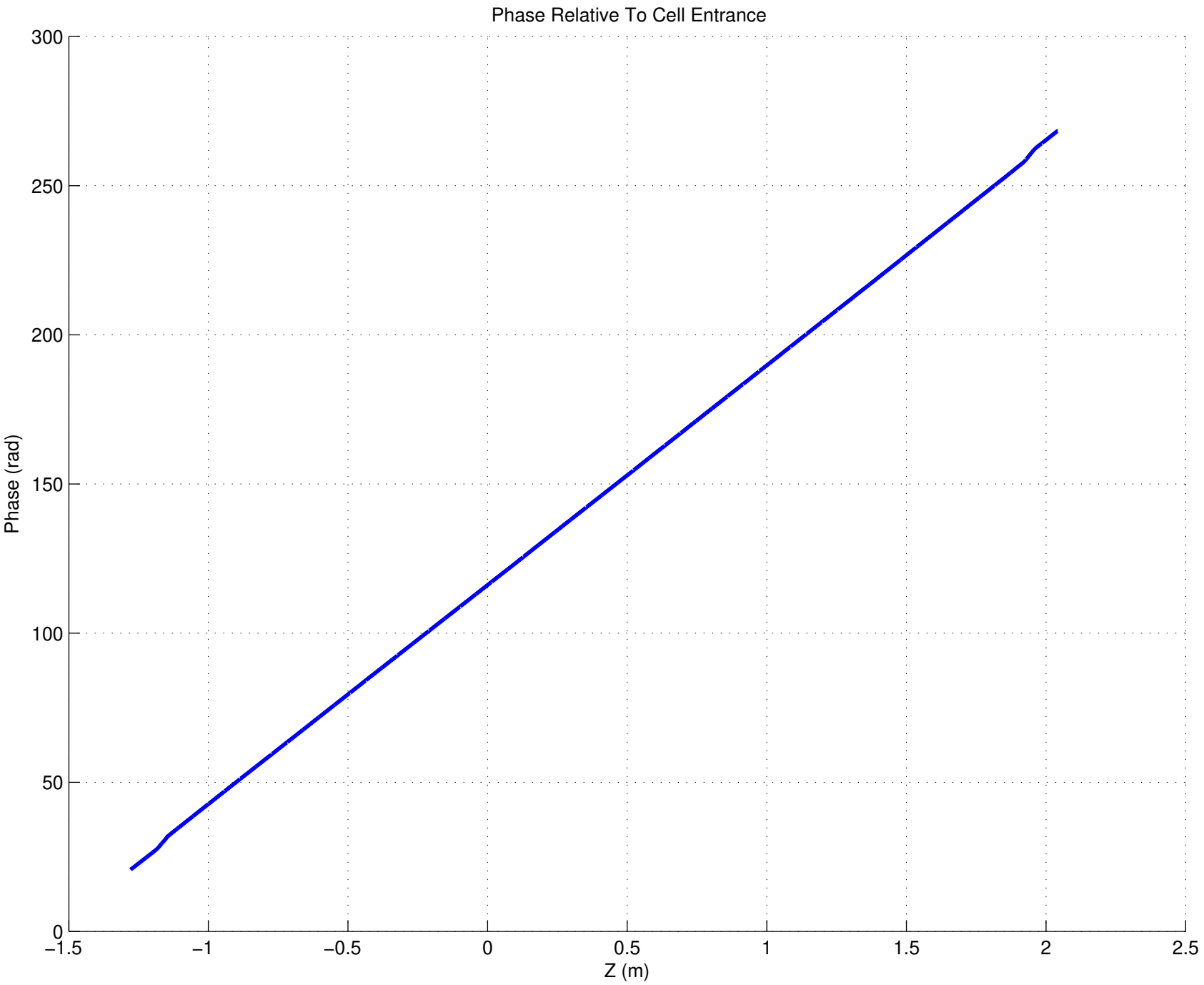

Y Trajectory
x 10^-6
12
41
73
104
135
166
Pole
1
0
−1
−2
−3
−4
−5
−6
Y Trajectory (m)
−1.5
−1
−0.5
0
0.5
1
1.5
2
2.5
Z (m)

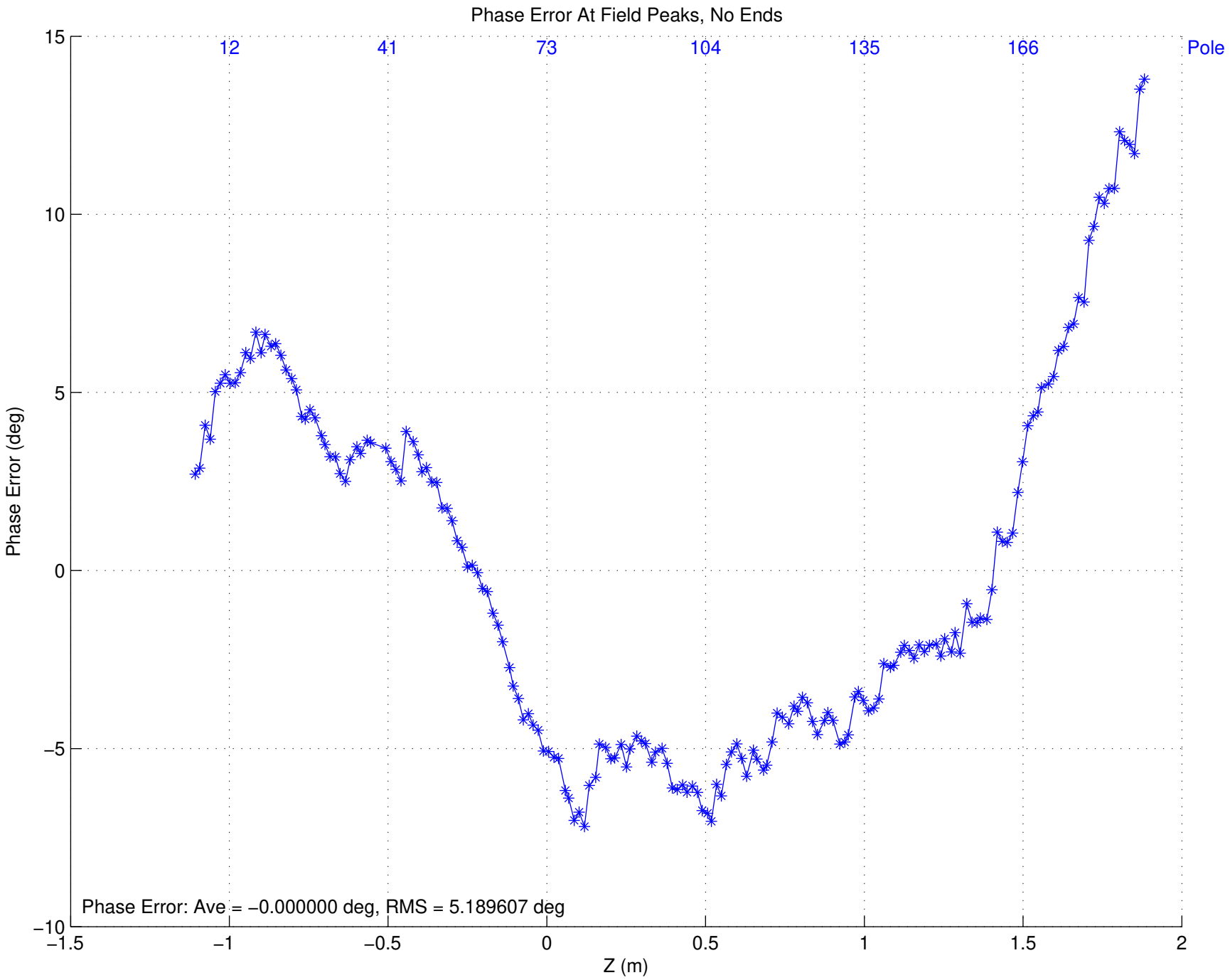

X And Y Trajectories
x 10^-6
1
0
−1
−2
−3
−4
−5
−6
X, Y Trajectory (m)
−1.5
−1
−0.5
0
0.5
1
1.5
2
2.5
Z (m)
X
Y

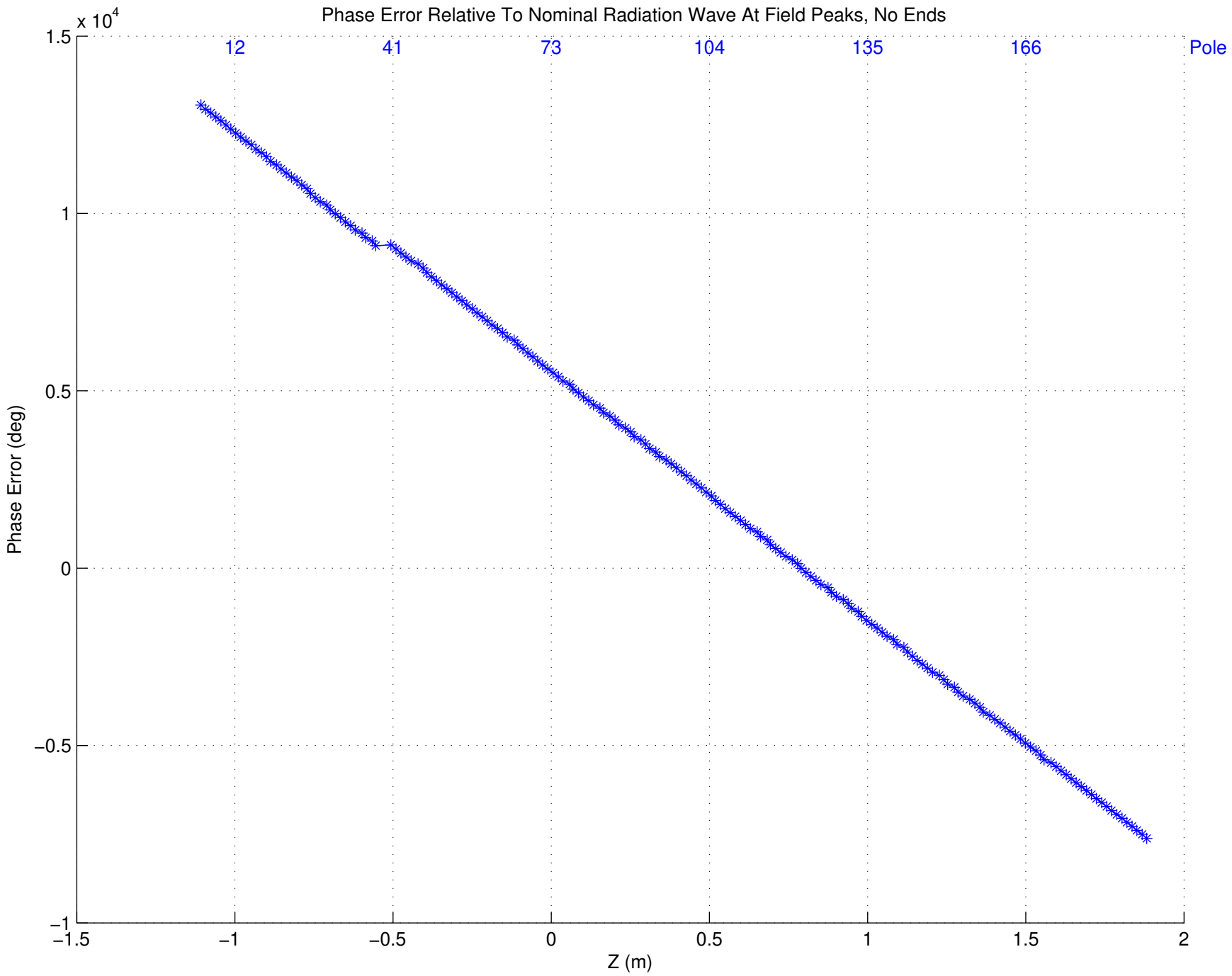

XY Trajectory Projection
x 10^-6
1
0
−1
−2
−3
−4
−5
−6
Y Trajectory (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
X Trajectory (m)
x 10^-6

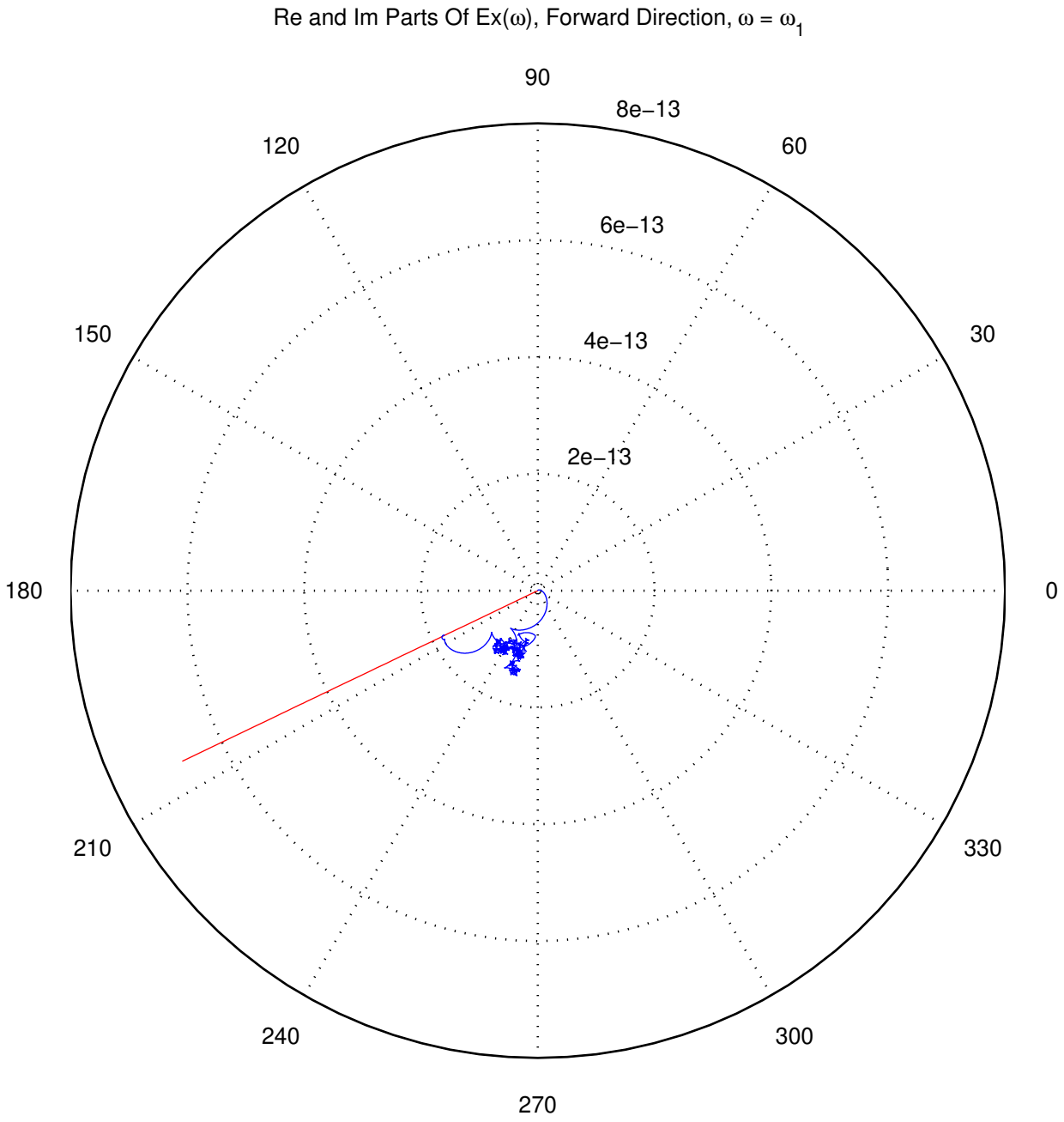

X Trajectory, Slope Corrected
x 10^-6
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
X Trajectory, Corrected (m)
−1.5
−1
−0.5
0
0.5
1
1.5
2
2.5
Z (m)

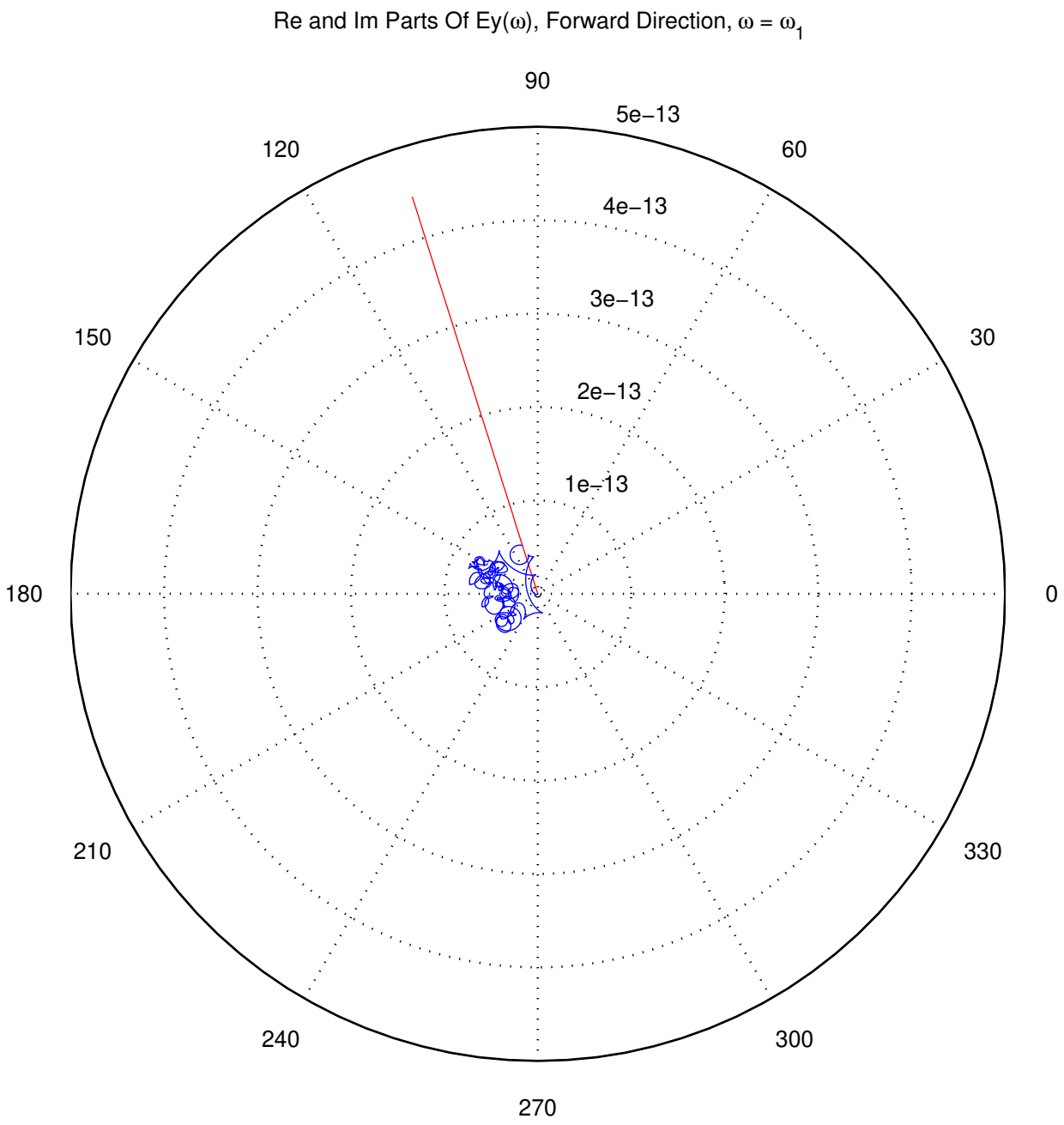

Y Trajectory, Slope Corrected
x 10^-6
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
2.5
Y Trajectory, Corrected (m)
Z (m)

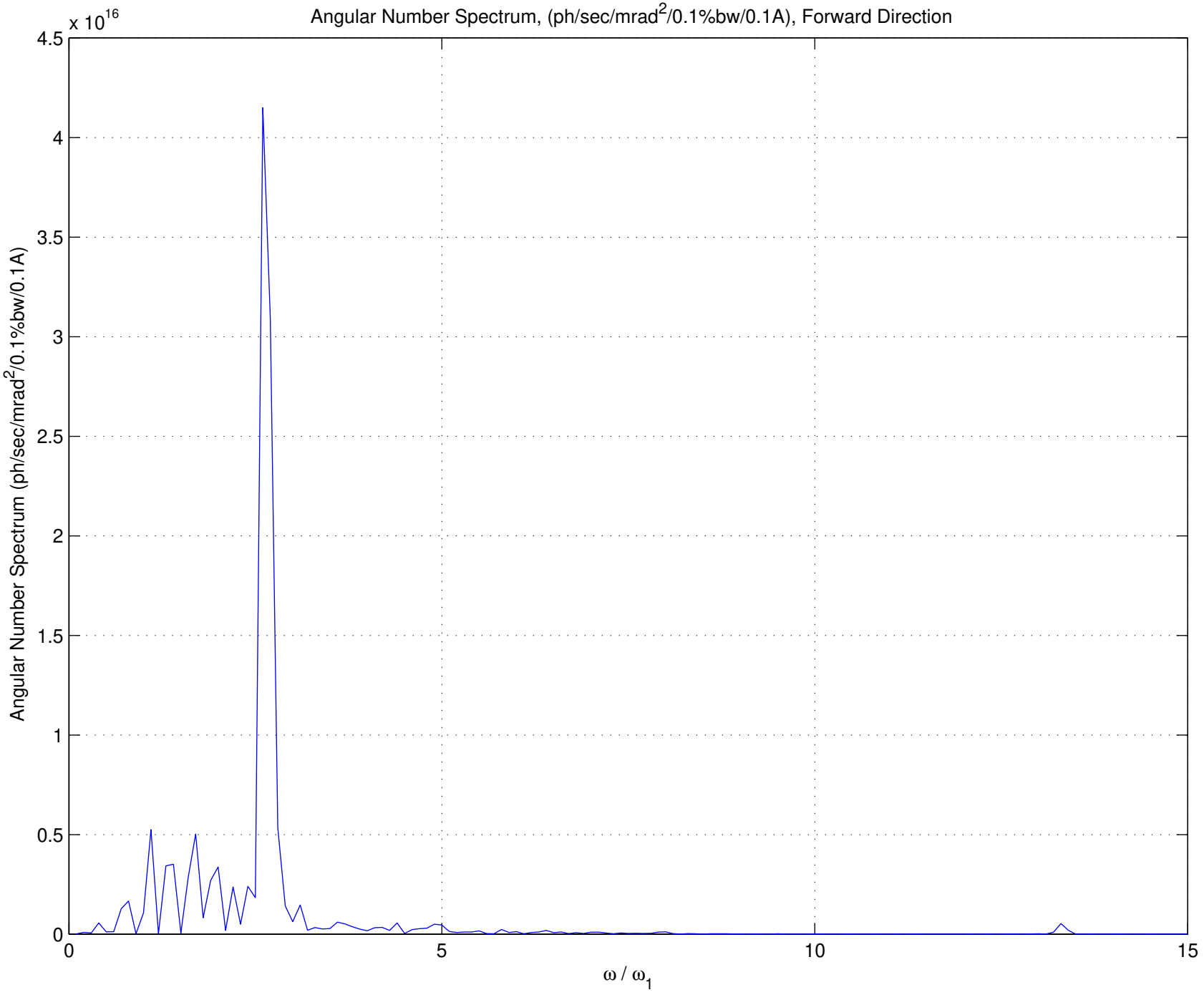

Phase Relative To Cell Entrance
Phase (rad)
Z (m)
300
250
200
150
100
50
0
−1.5
−1
−0.5
0
0.5
1
1.5
2
2.5

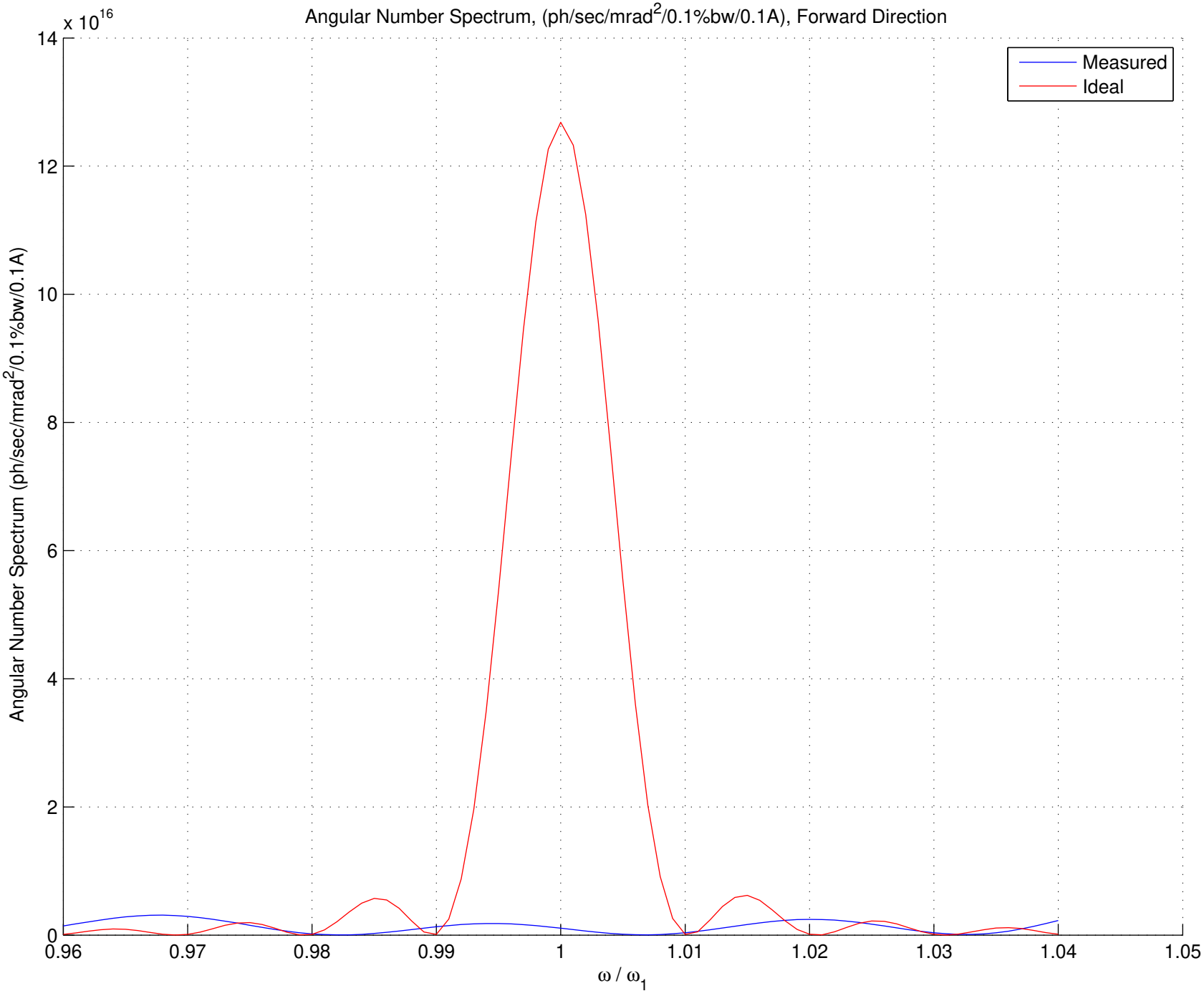

Phase Error At Field Peaks, No Ends
12
41
73
104
135
166
Pole
15
10
5
0
−5
−10
Phase Error (deg)
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)
Phase Error: Ave = −0.000000 deg, RMS = 5.189607 deg

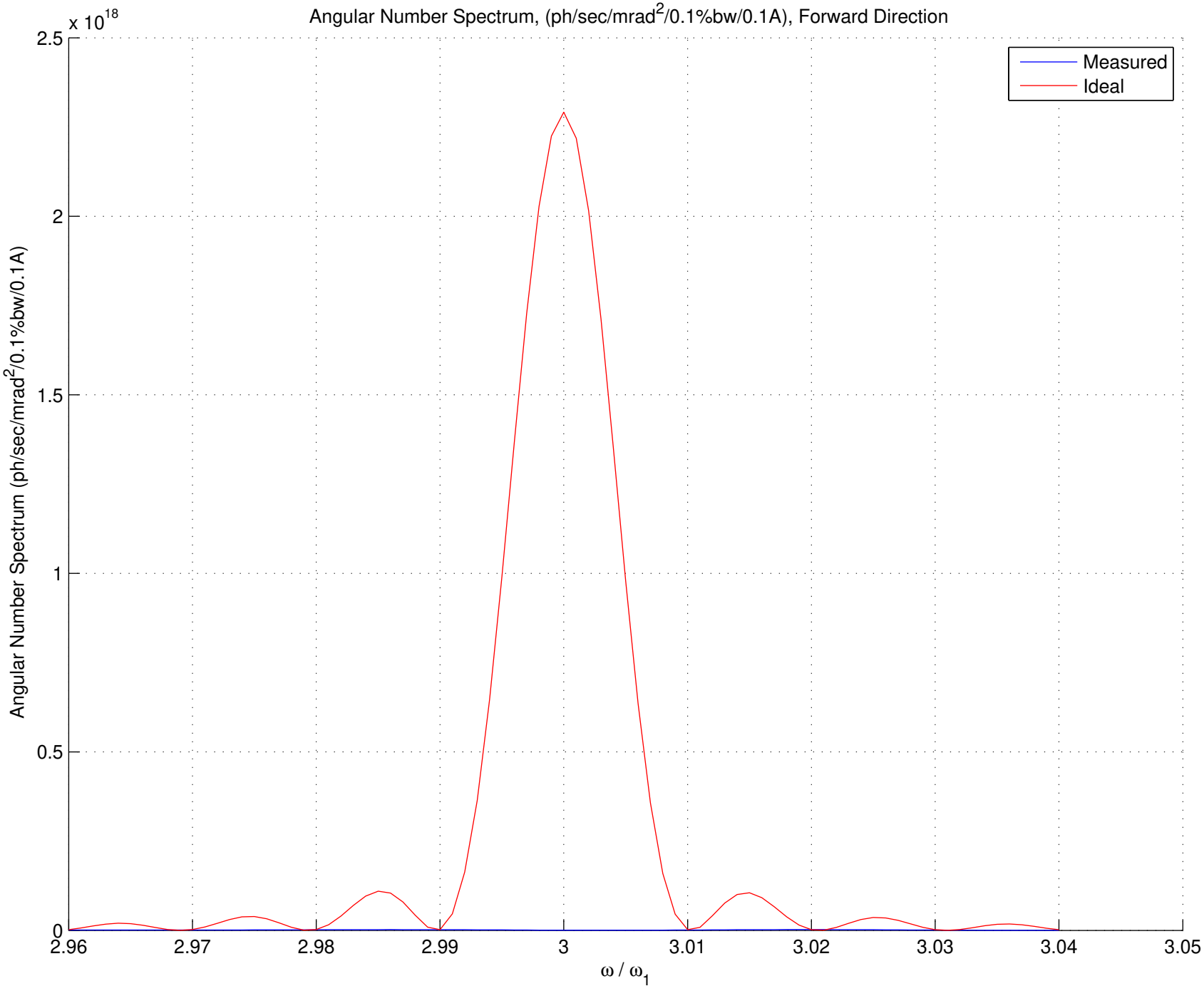

Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
x 10^4
1.5
1
0.5
0
−0.5
−1
Phase Error (deg)
12
41
73
104
135
166
Pole
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

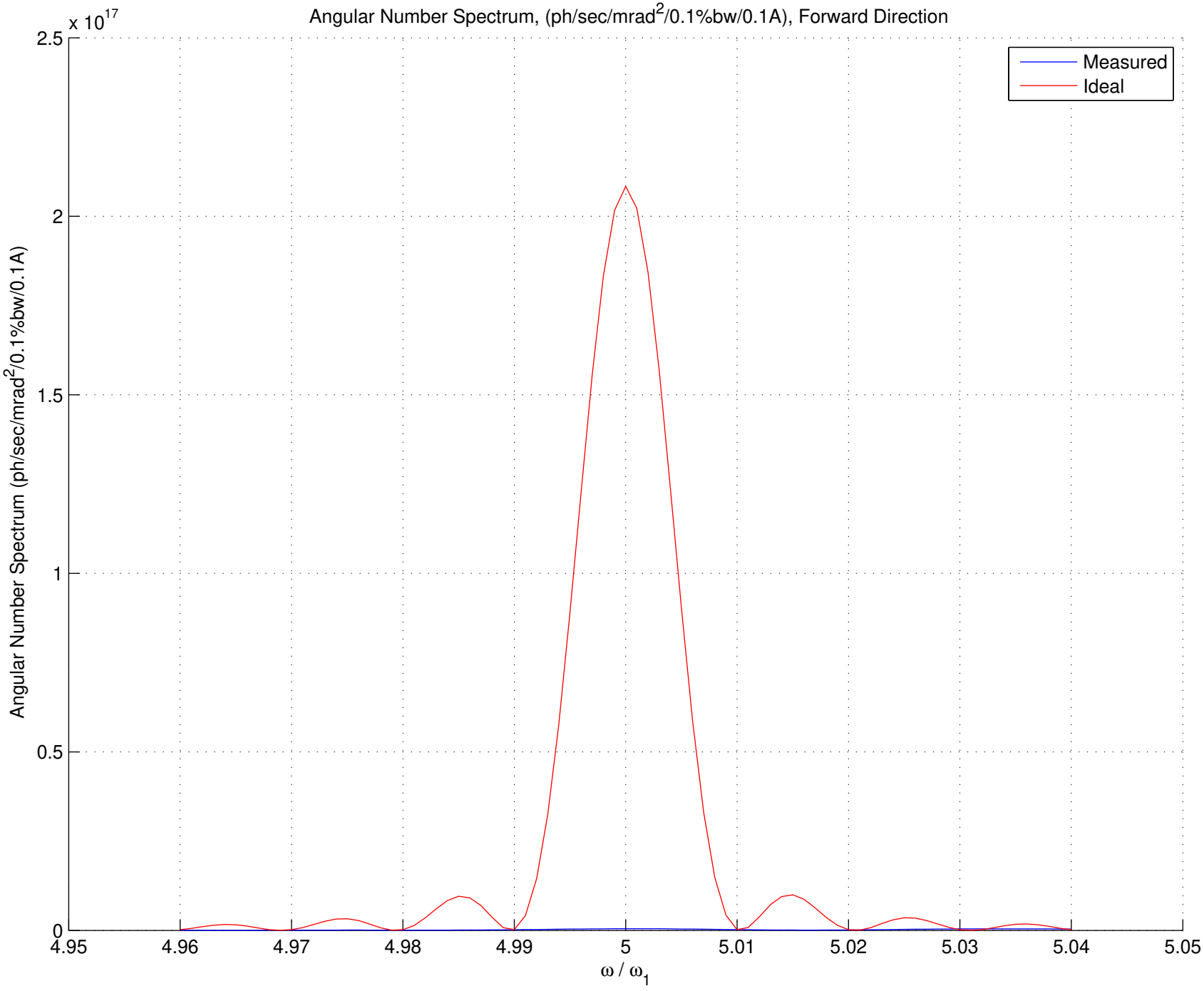

Re and Im Parts Of Ex(ω), Forward Direction, ω = ω1
90
8e−13
120
60
6e−13
150
30
4e−13
2e−13
180
0
210
330
240
300
270


Re and Im Parts Of Ey(ω), Forward Direction, ω = ω1
90
5e−13
120
60
4e−13
3e−13
150
30
2e−13
1e−13
180
0
210
330
240
300
270


Angular Number Spectrum, (ph/sec/mrad2/0.1%bw/0.1A), Forward Direction
x 10^16
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Angular Number Spectrum (ph/sec/mrad2/0.1%bw/0.1A)
0
5
10
15
ω / ω1


Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
x 10^{16}
Measured
Ideal
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
14
12
10
8
6
4
2
0
0.96
0.97
0.98
0.99
1
1.01
1.02
1.03
1.04
1.05
ω / $ω_1$


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)
2.5
2
1.5
1
0.5
0
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/mrad^2/0.1%bw/0.1A), Forward Direction
x 10^{17}
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
2.5
2
1.5
1
0.5
0
4.95
4.96
4.97
4.98
4.99
5
5.01
5.02
5.03
5.04
5.05
ω / ω$_1$
Measured
Ideal