SLAC Magnetic Measurements

EPU Analysis
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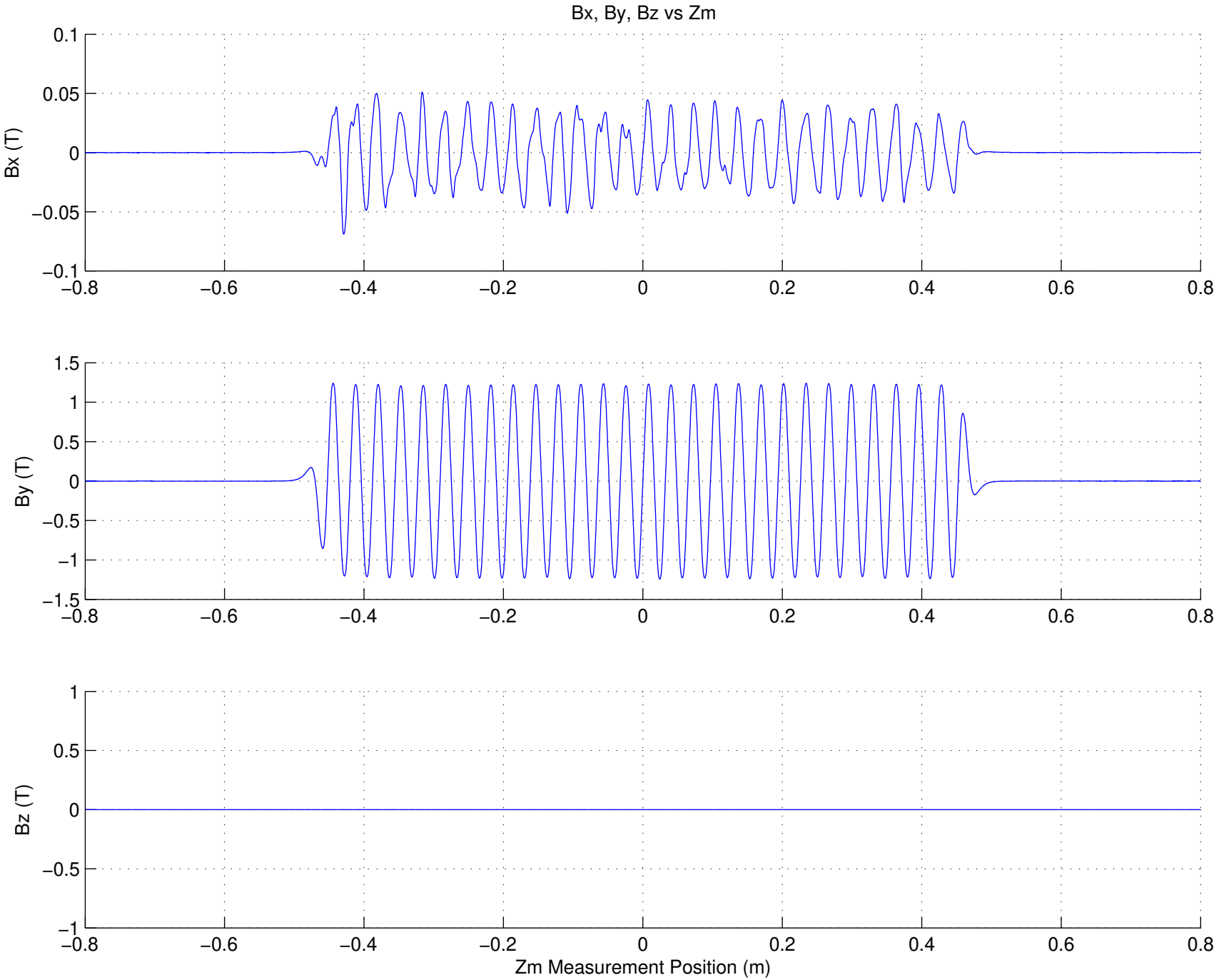
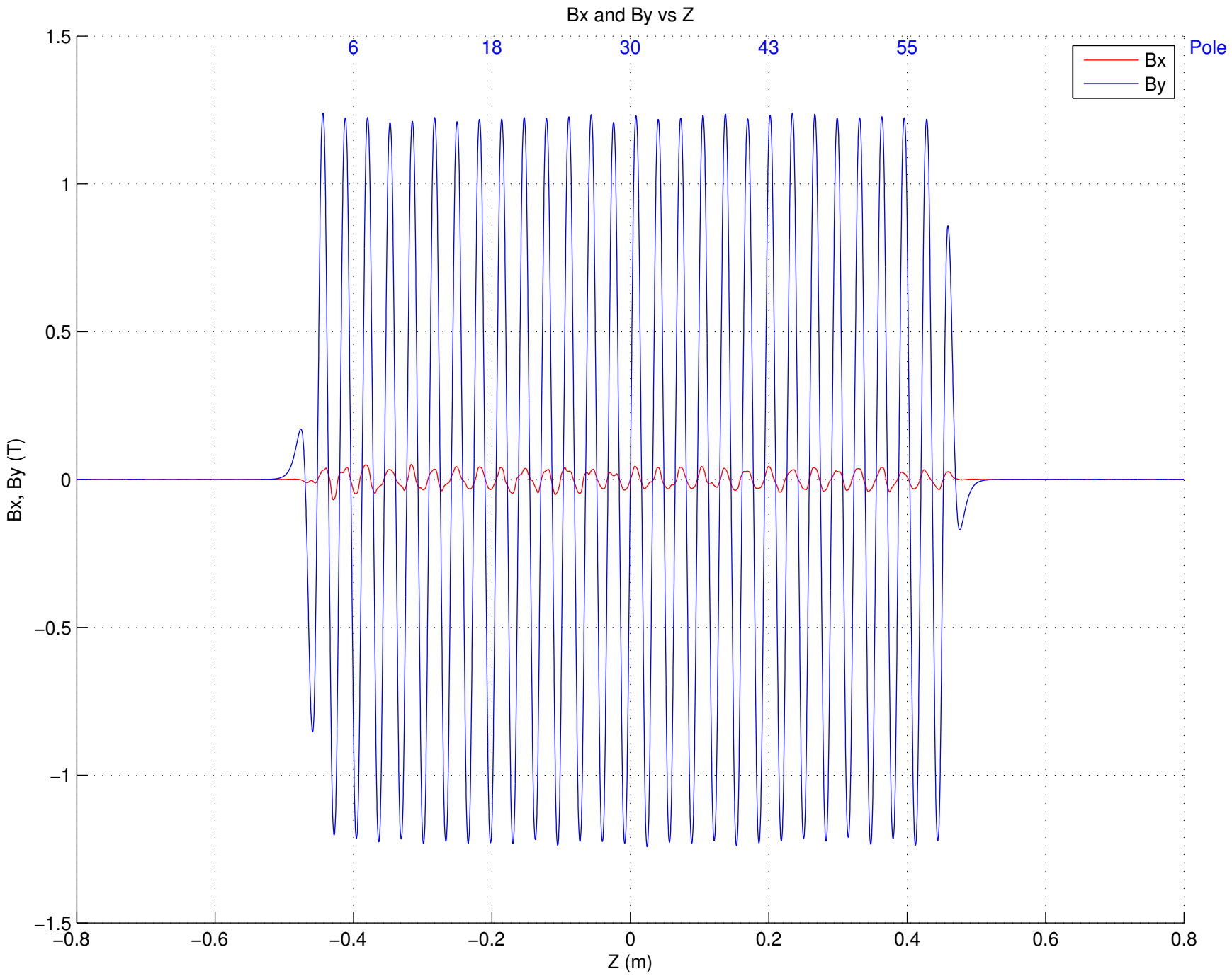
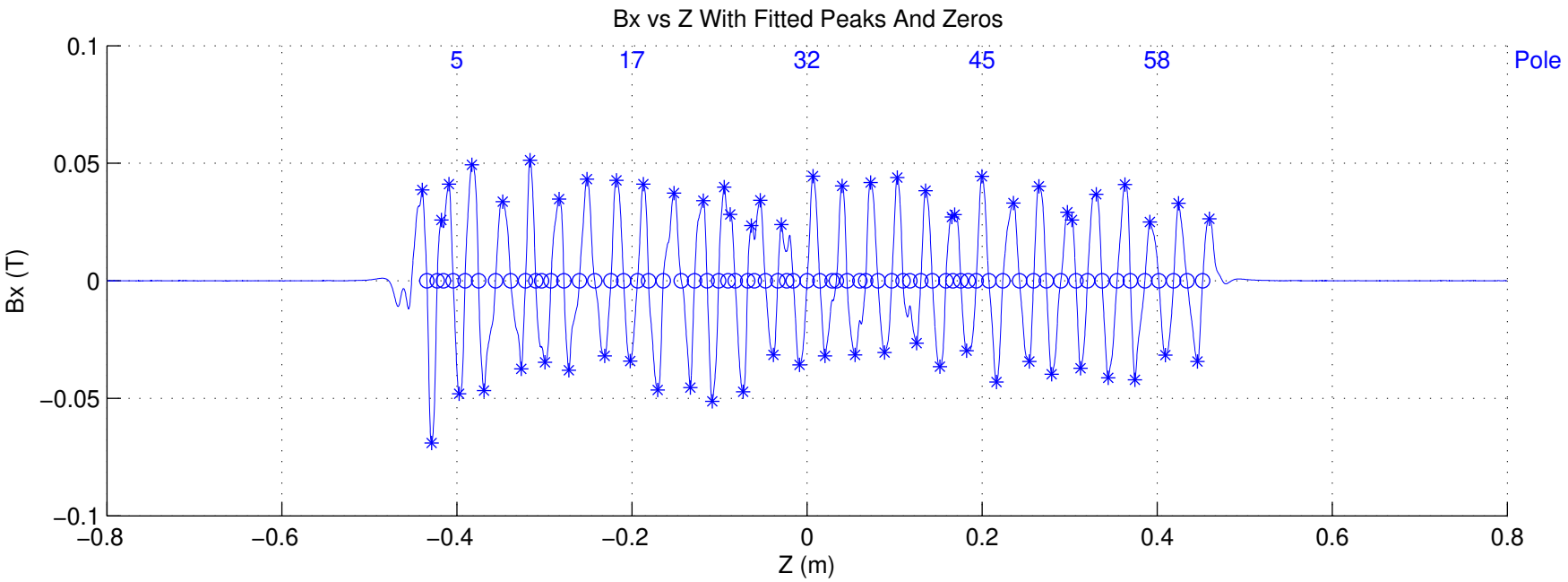
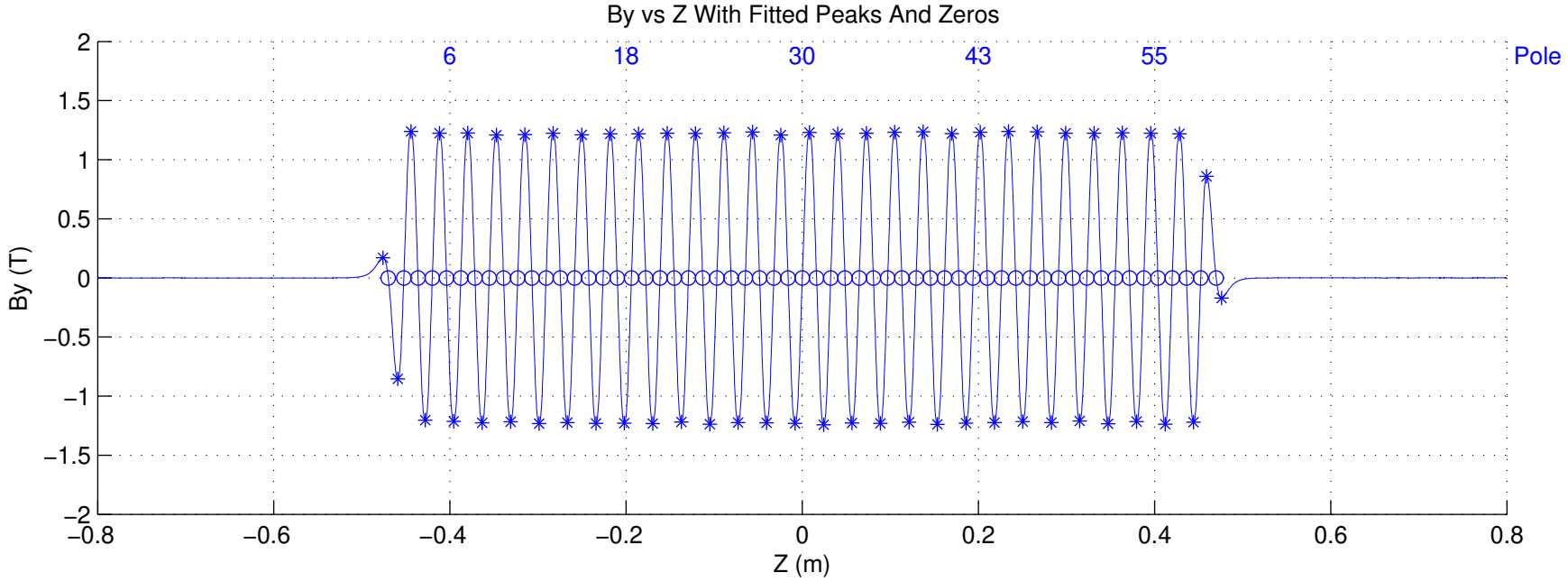
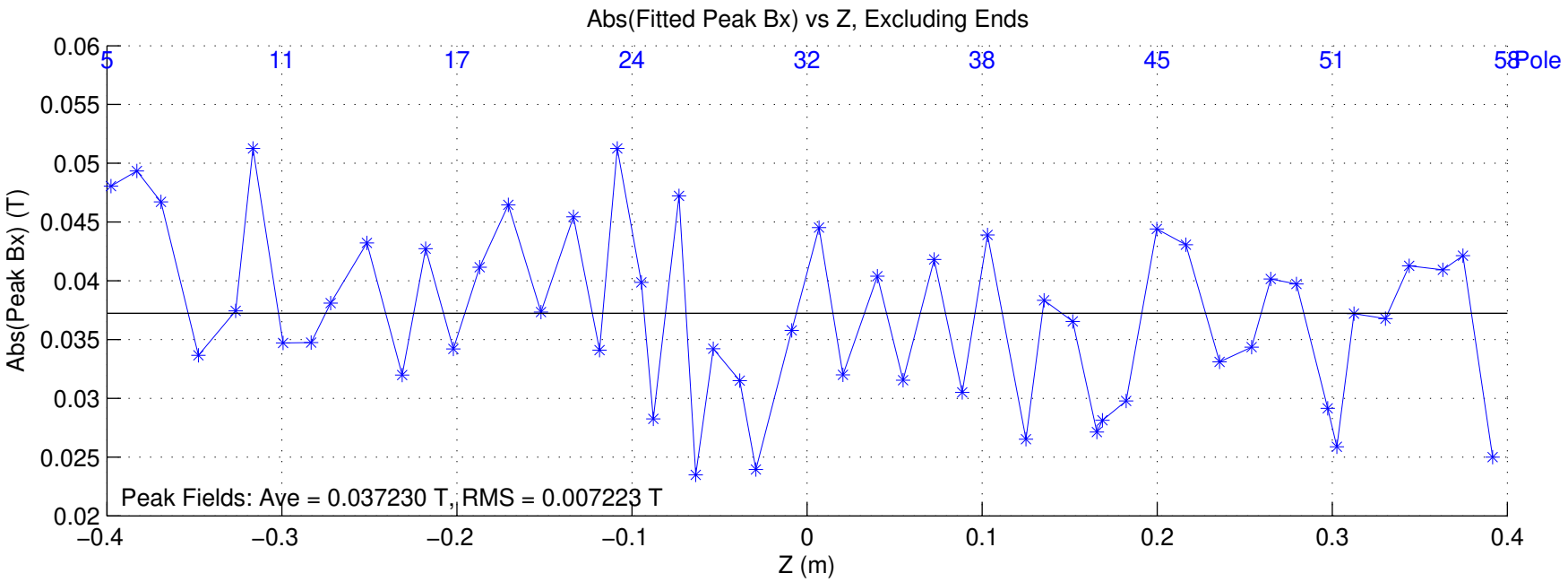
Parameters:
INPUT–FILE–DIR =C:\Magdata\Delta Superpose Quadrants\
INPUT–FILE–NAME =superpose–quadrants.dat
INPUT–FILE–TYPE =ZBXYZH
CORR–REQUIRED =0
GAMMA =26627.1
NOM–LAMBDA–U =0
NOM–K–VALUE =0
NOM–LAMBDA–R =0
NUM–POLES =60
NUM–END–POLES =4
CELL–LENGTH =3.126

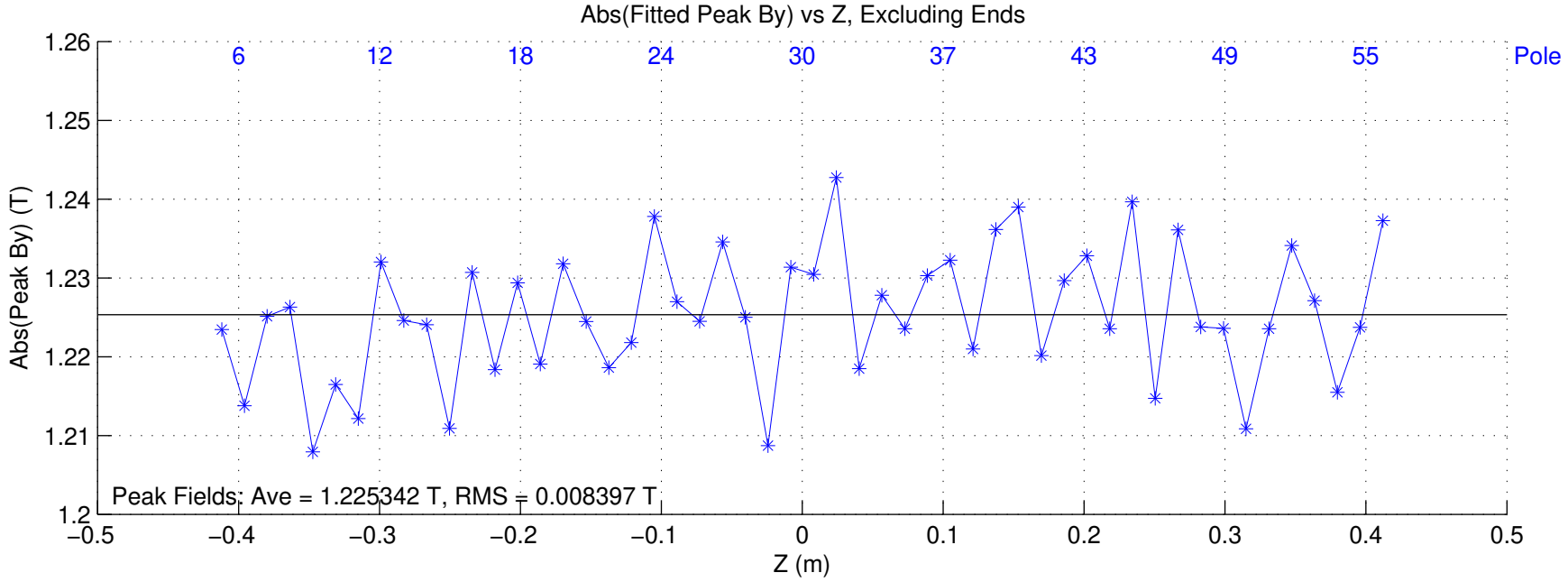

Bx, By, Bz vs Zm
Bx (T)
0.1
0.05
0
−0.05
−0.1
By (T)
1.5
1
0.5
0
−0.5
−1
−1.5
Bz (T)
1
0.5
0
−0.5
−1
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
Zm Measurement Position (m)

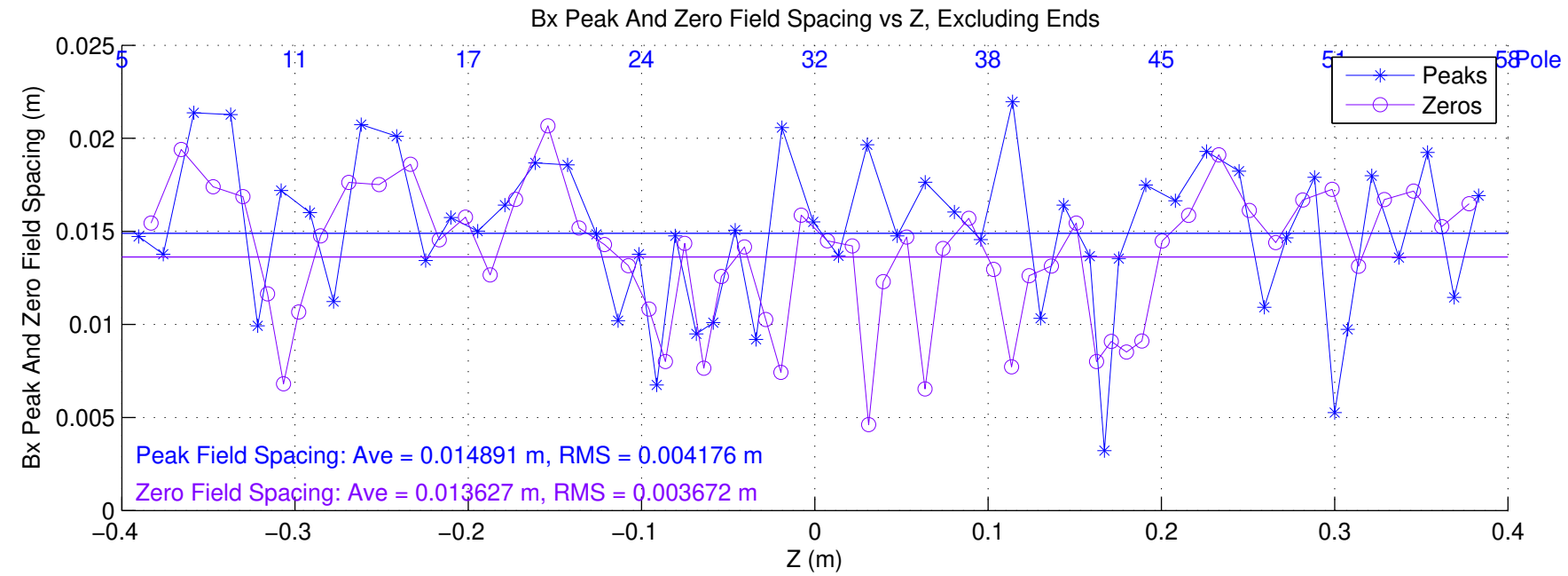

Bx and By vs Z
6
18
30
43
55
Pole
Bx
By
1.5
1
0.5
0
−0.5
−1
−1.5
Bx, By (T)
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
Z (m)

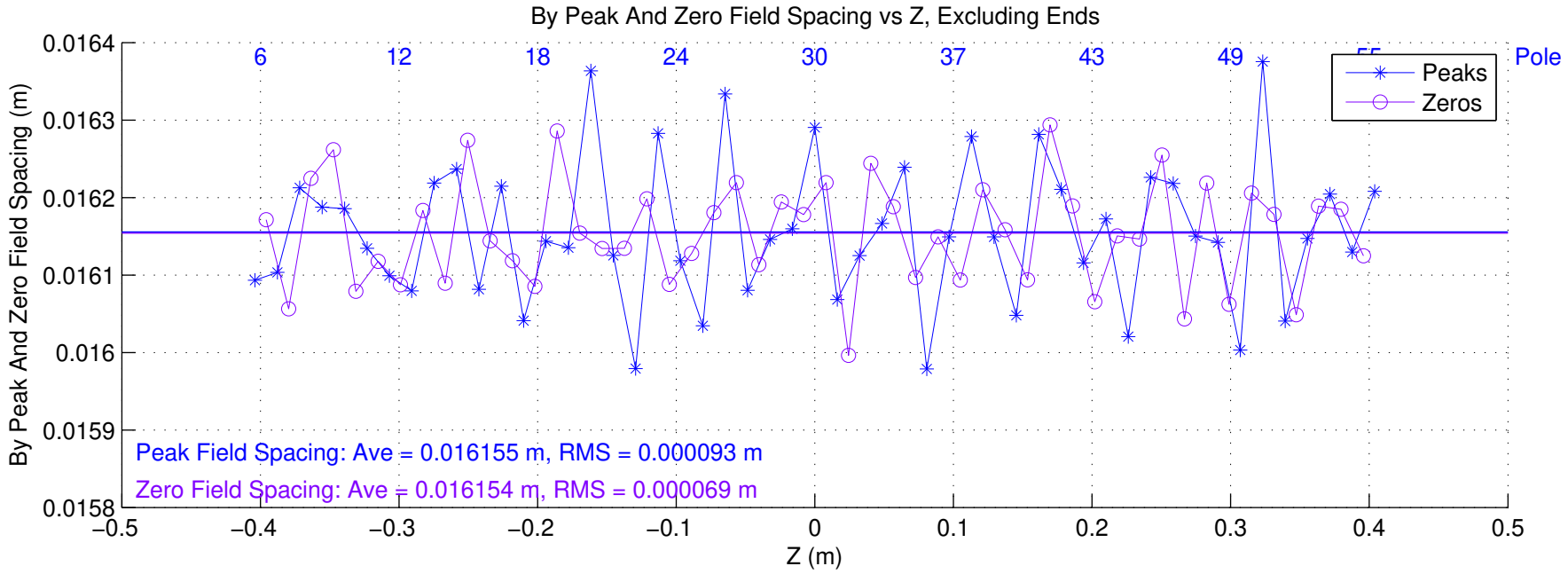

Bx vs Z With Fitted Peaks And Zeros
5
17
32
45
58
Pole
0.1
0.05
0
−0.05
−0.1
Bx (T)
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
Z (m)

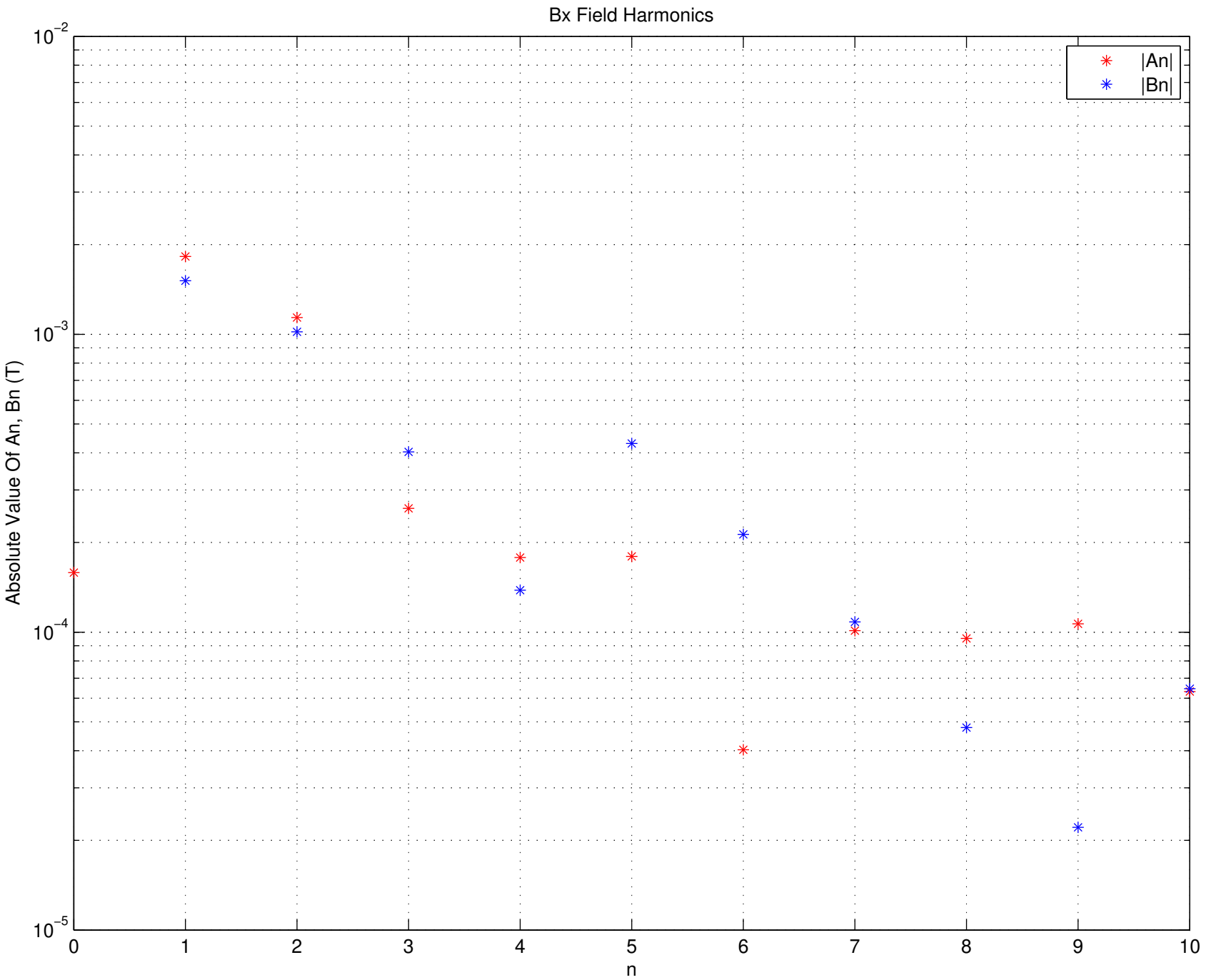

By vs Z With Fitted Peaks And Zeros
6
18
30
43
55
Pole
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
By (T)
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
Z (m)

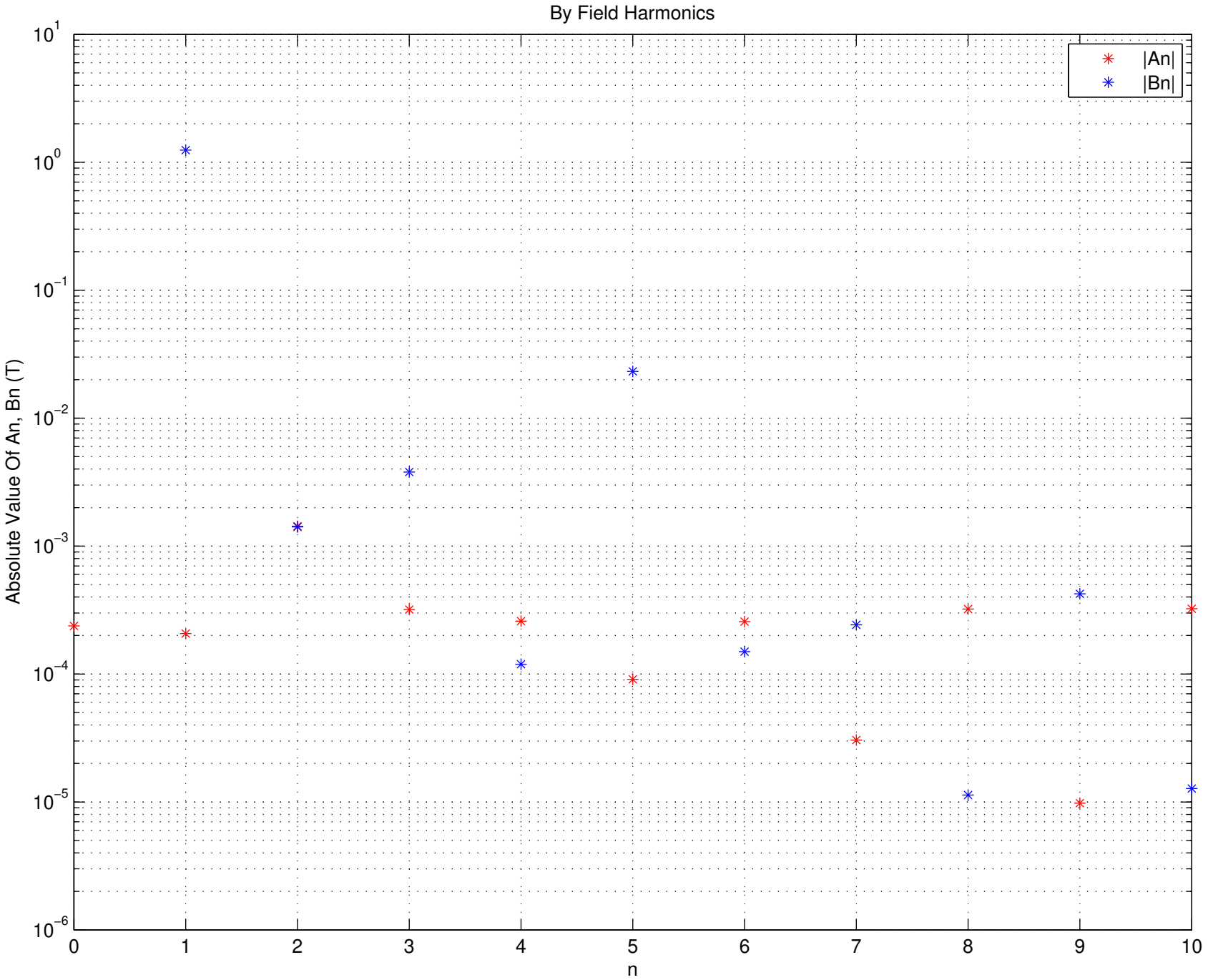

Abs(Fitted Peak Bx) vs Z, Excluding Ends
5
11
17
24
32
38
45
51
58
Pole
0.06
0.055
0.05
0.045
0.04
0.035
0.03
0.025
0.02
Abs(Peak Bx) (T)
Peak Fields: Ave = 0.037230 T, RMS = 0.007223 T
−0.4
−0.3
−0.2
−0.1
0
0.1
0.2
0.3
0.4
Z (m)

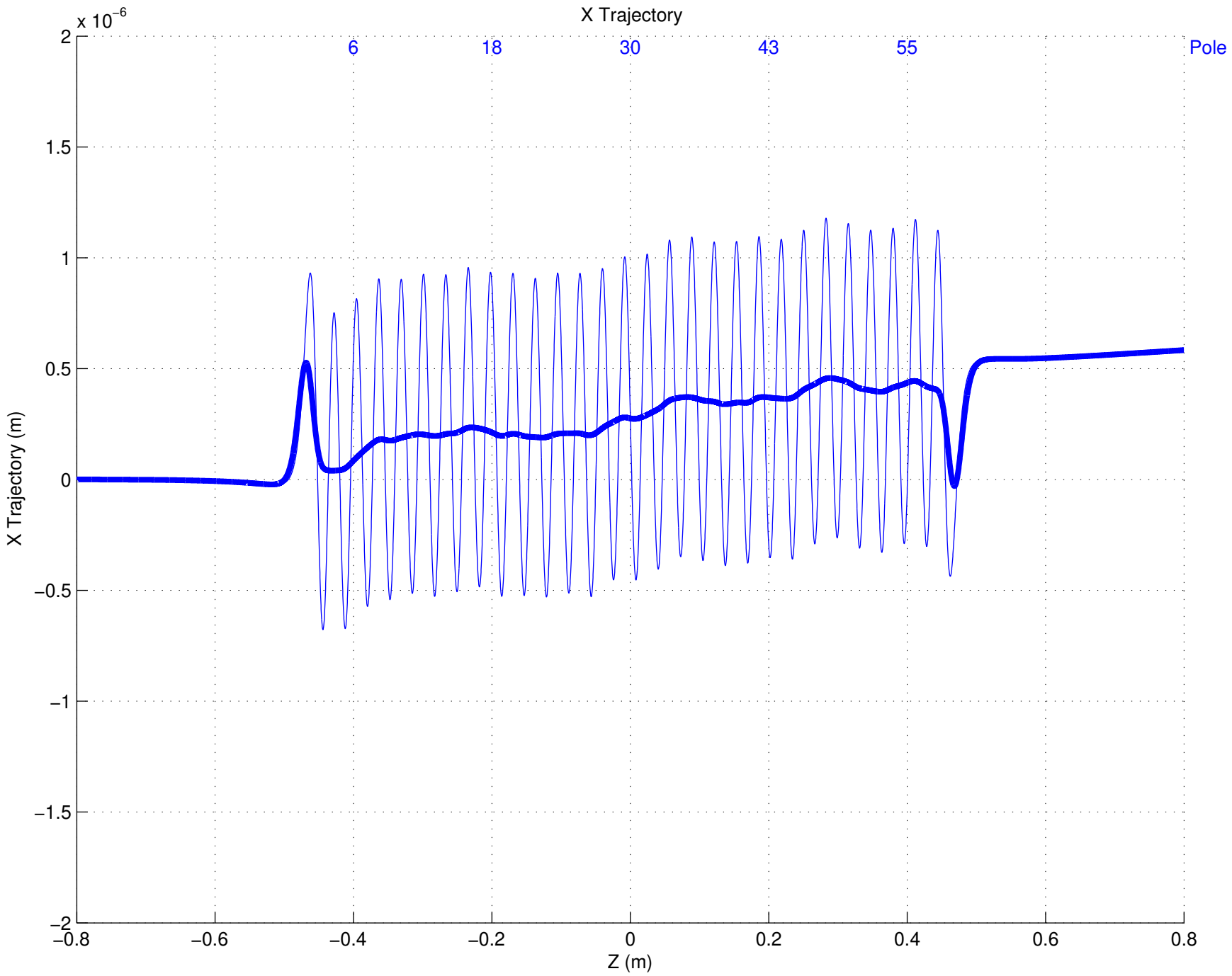

Abs(Fitted Peak By) vs Z, Excluding Ends
6
12
18
24
30
37
43
49
55
Pole
1.26
1.25
1.24
1.23
1.22
1.21
1.2
Abs(Peak By) (T)
Peak Fields: Ave = 1.225342 T, RMS = 0.008397 T
−0.5
−0.4
−0.3
−0.2
−0.1
0
0.1
0.2
0.3
0.4
0.5
Z (m)

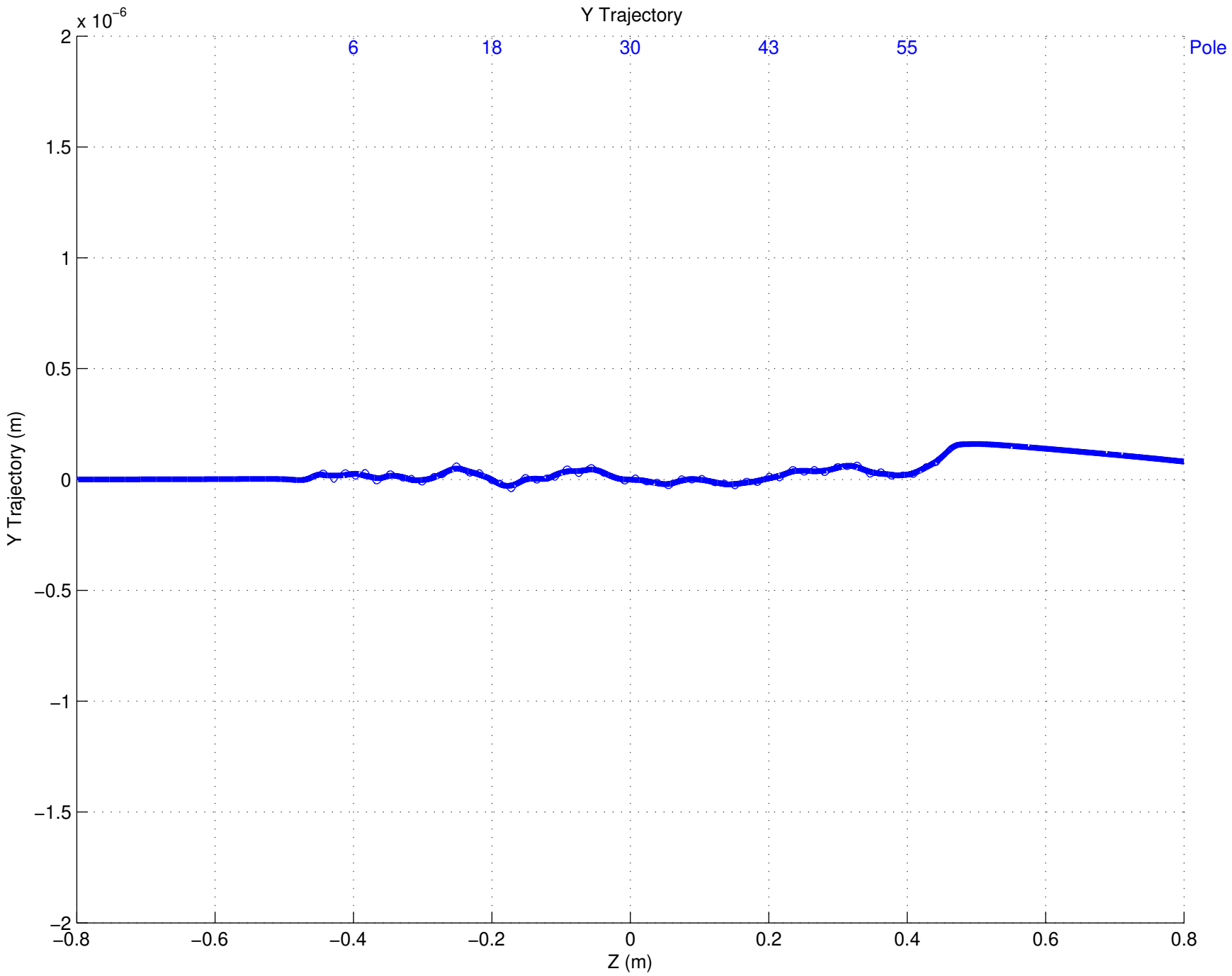

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
Z (m)
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.014891 m, RMS = 0.004176 m
Zero Field Spacing: Ave = 0.013627 m, RMS = 0.003672 m

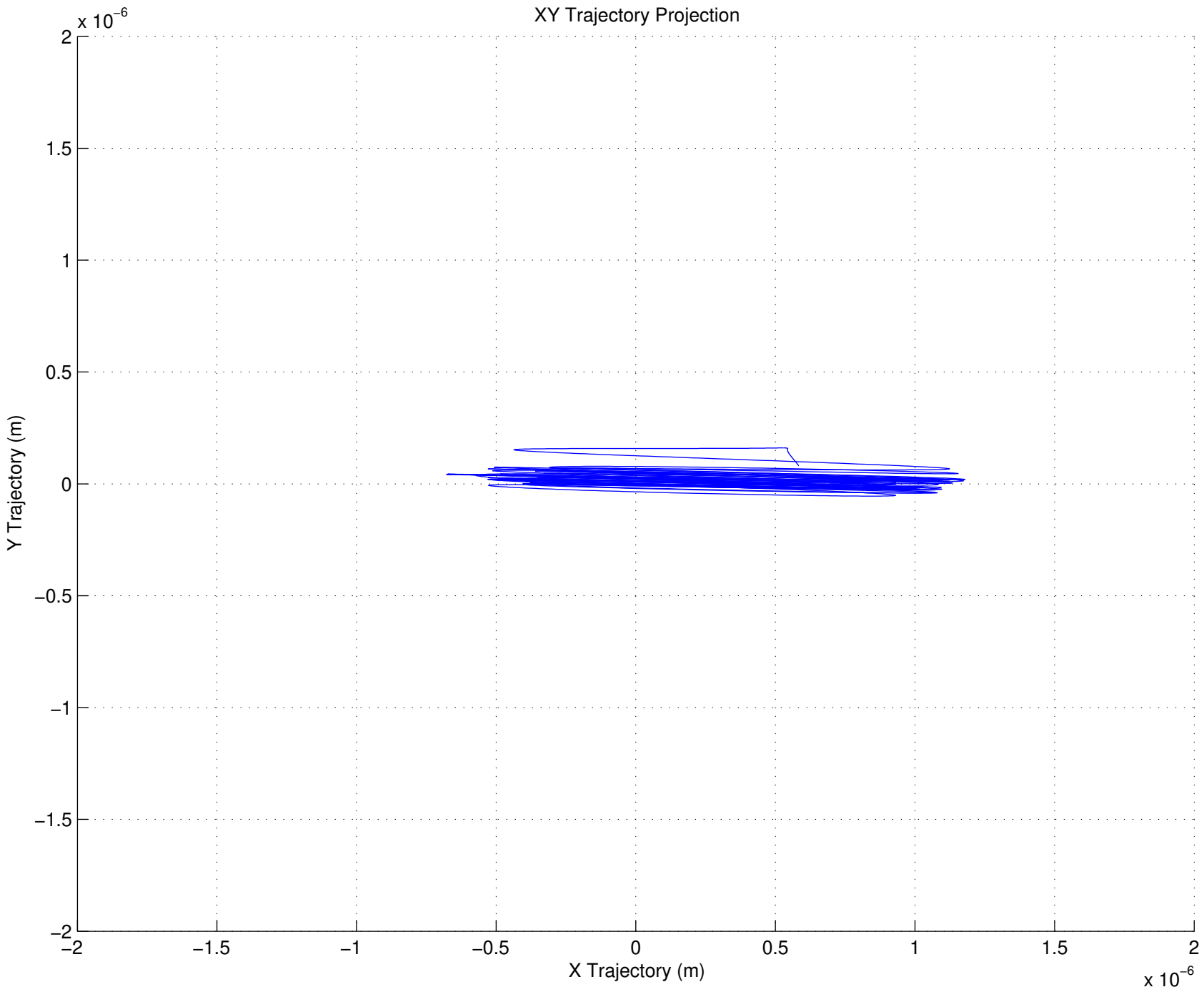

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
Z (m)
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016155 m, RMS = 0.000093 m
Zero Field Spacing: Ave = 0.016154 m, RMS = 0.000069 m

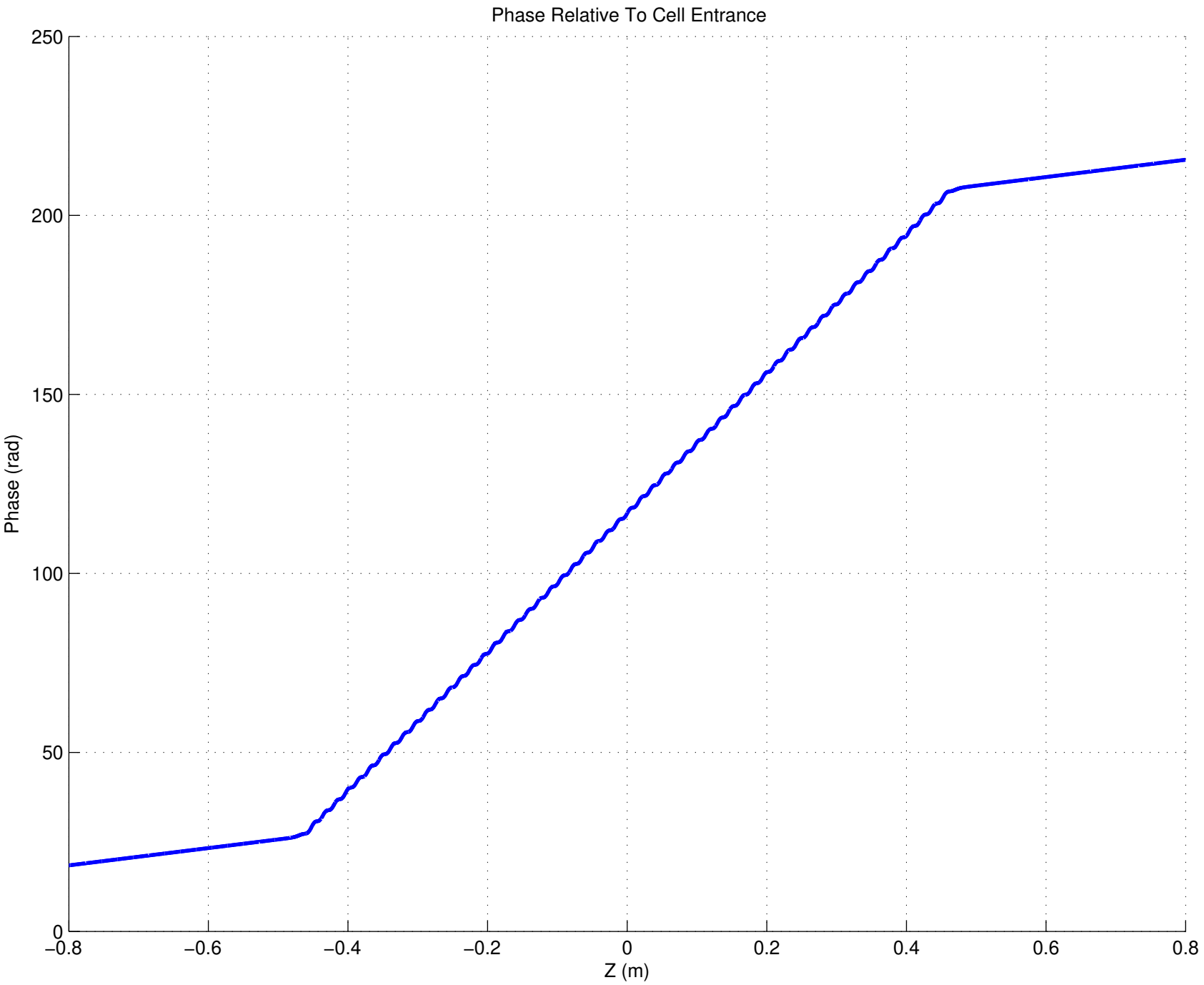

Bx Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
$10^{-2}$
$10^{-3}$
$10^{-4}$
$10^{-5}$
0
1
2
3
4
5
6
7
8
9
10

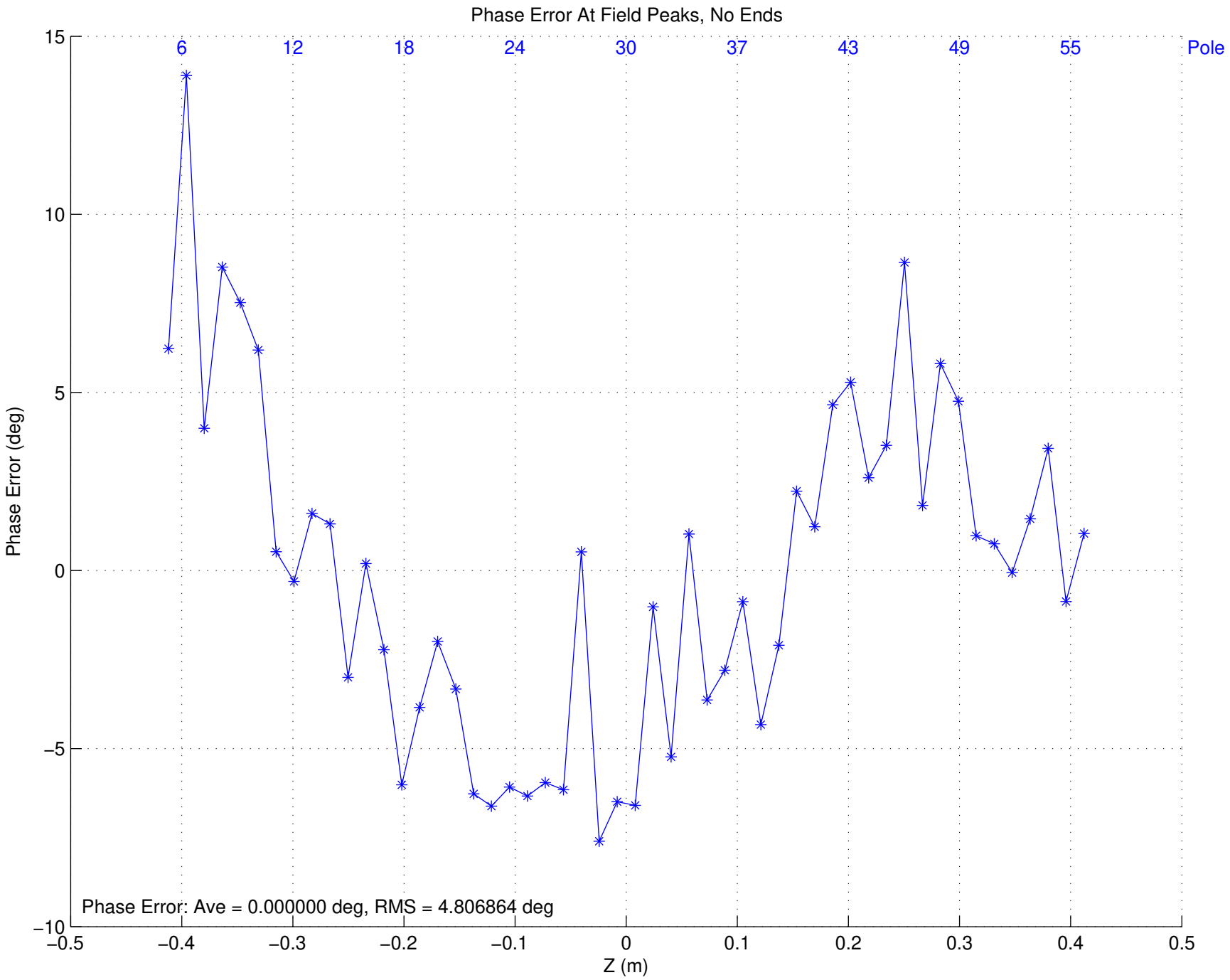

By Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
$10^{1}$
$10^{0}$
$10^{-1}$
$10^{-2}$
$10^{-3}$
$10^{-4}$
$10^{-5}$
$10^{-6}$
0
1
2
3
4
5
6
7
8
9
10

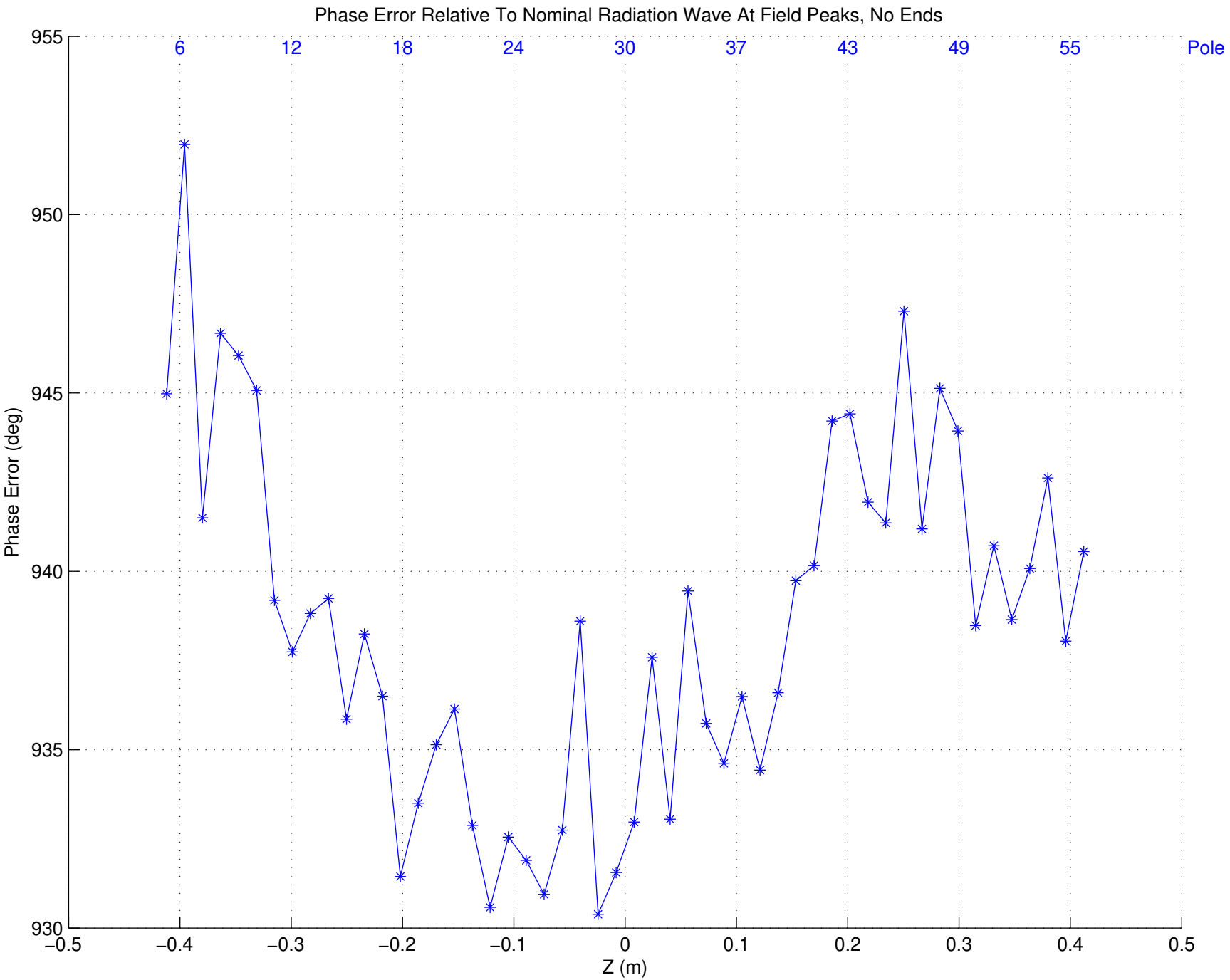

X Trajectory
x 10^-6
6
18
30
43
55
Pole
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
X Trajectory (m)
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
Z (m)

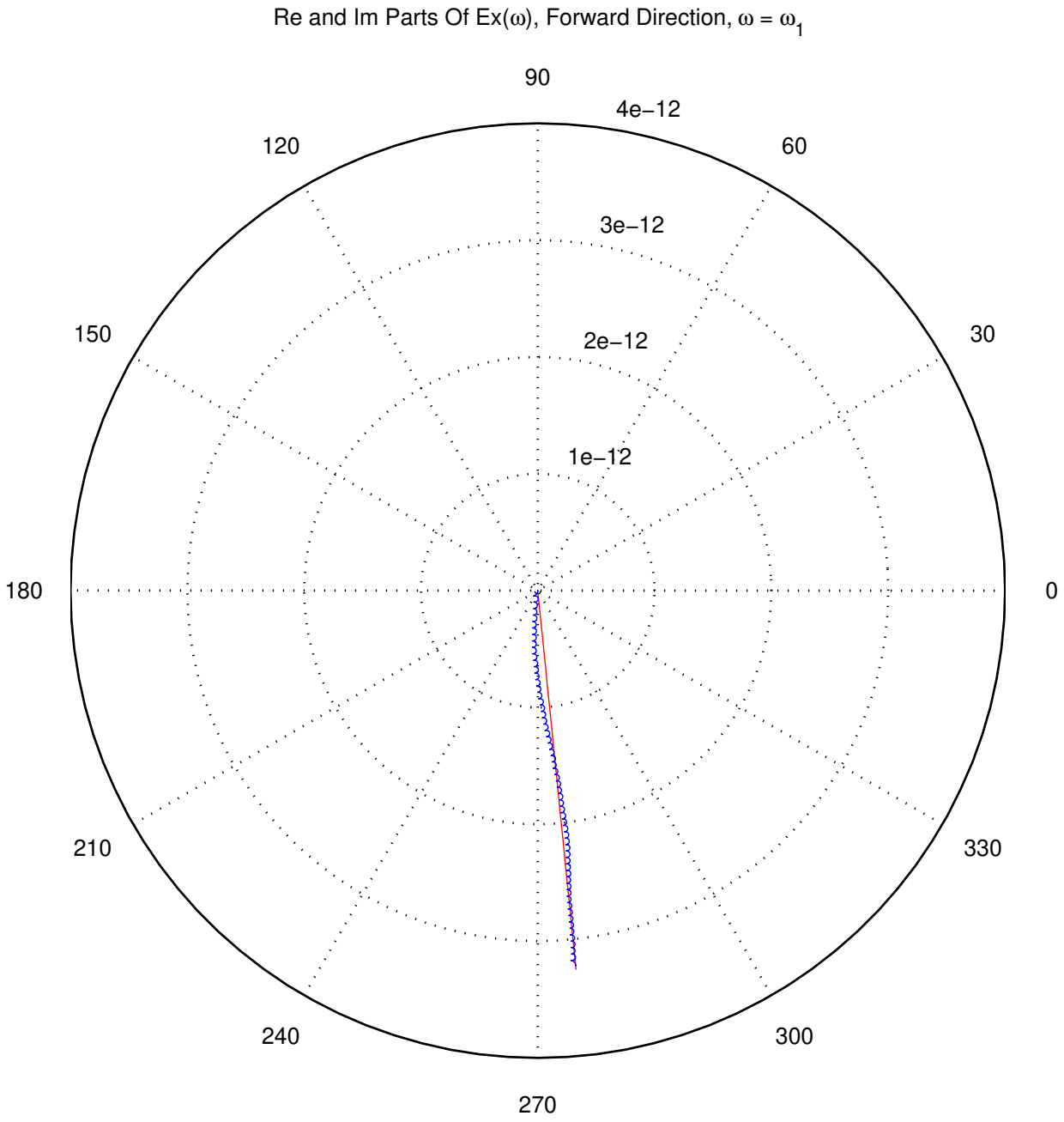

Y Trajectory
x 10^-6
6
18
30
43
55
Pole
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
Y Trajectory (m)
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8
Z (m)

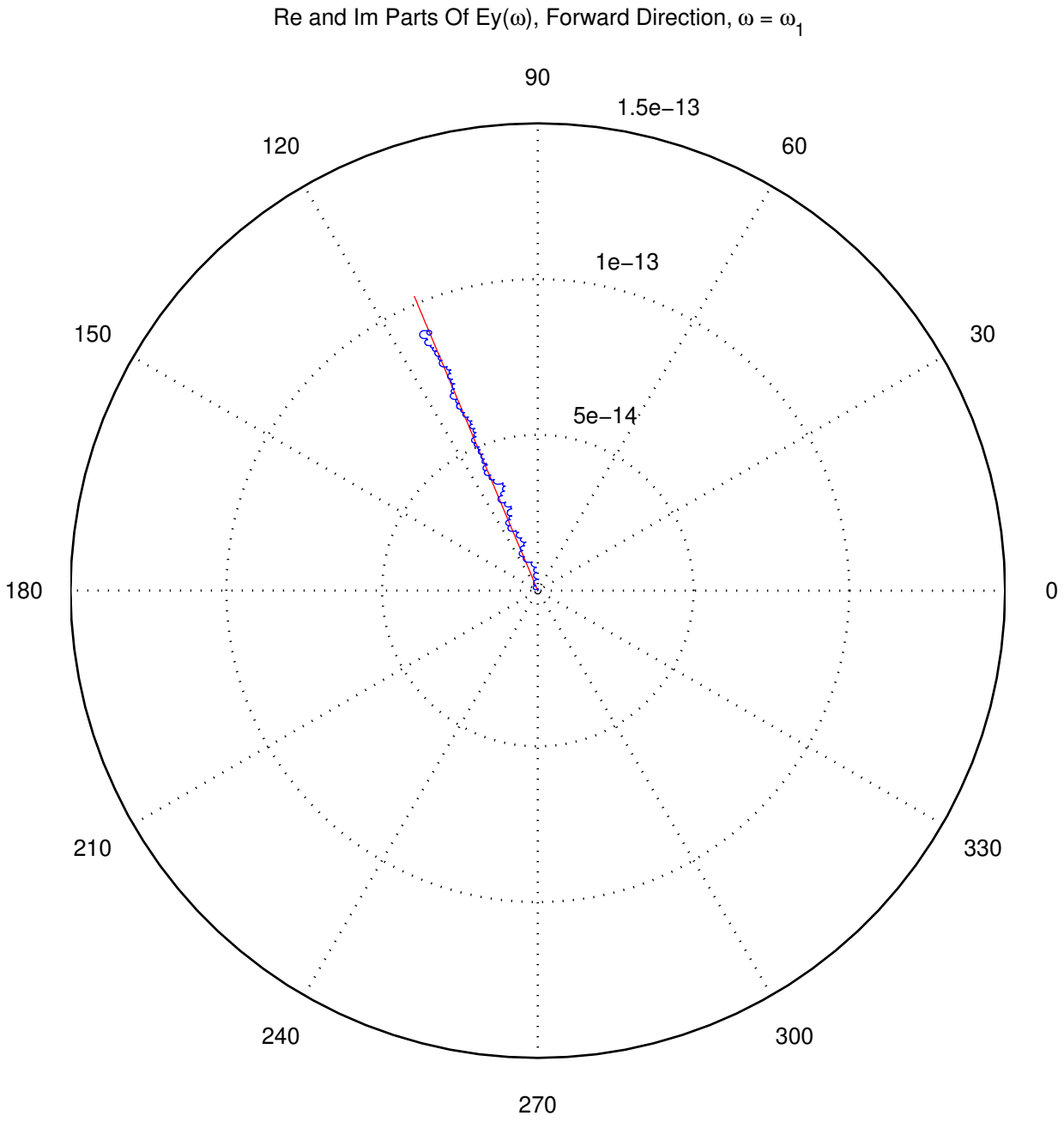

XY Trajectory Projection
x 10^-6
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
Y Trajectory (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
X Trajectory (m)
x 10^-6

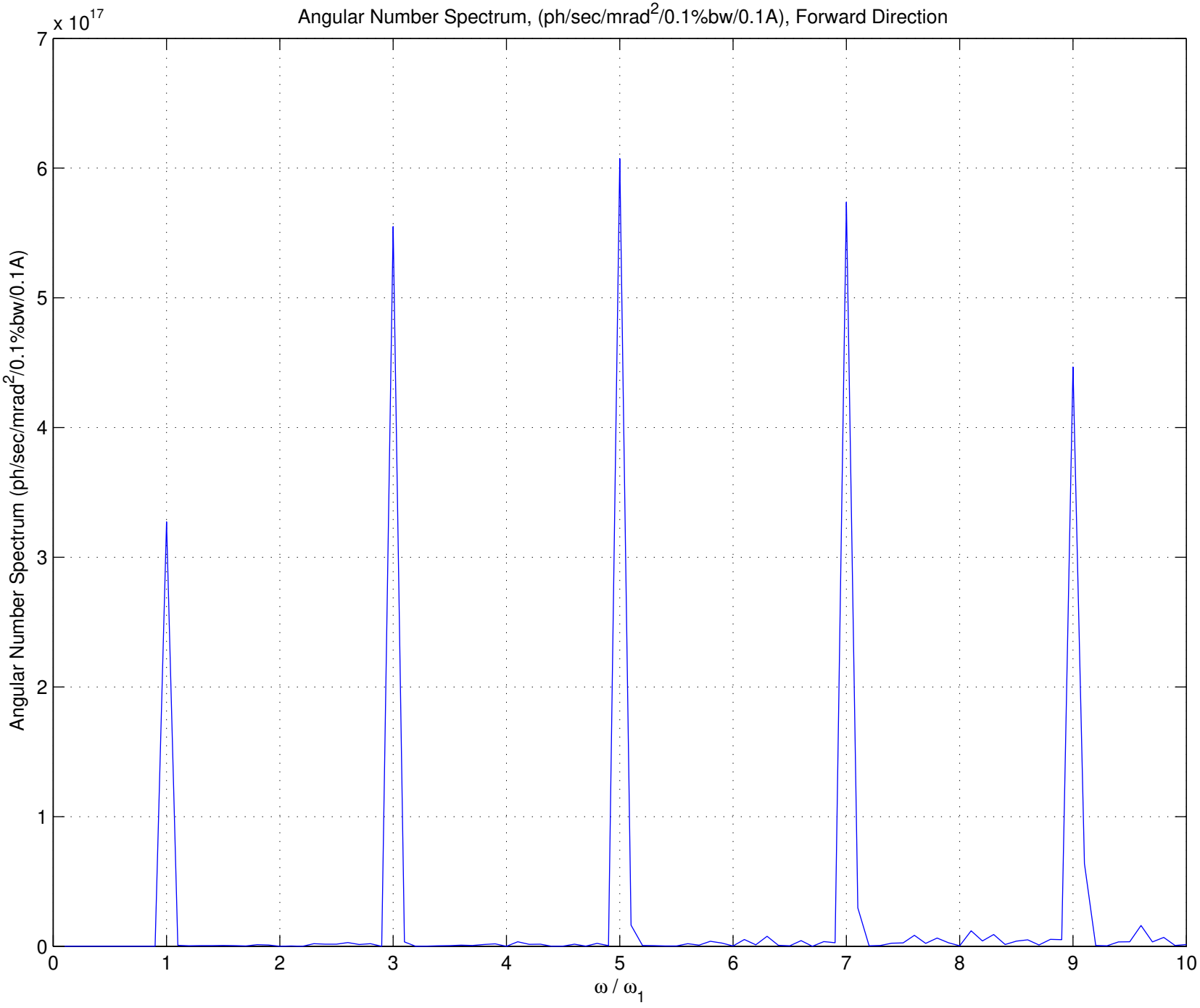

Phase Relative To Cell Entrance
Phase (rad)
Z (m)
250
200
150
100
50
0
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
0.8

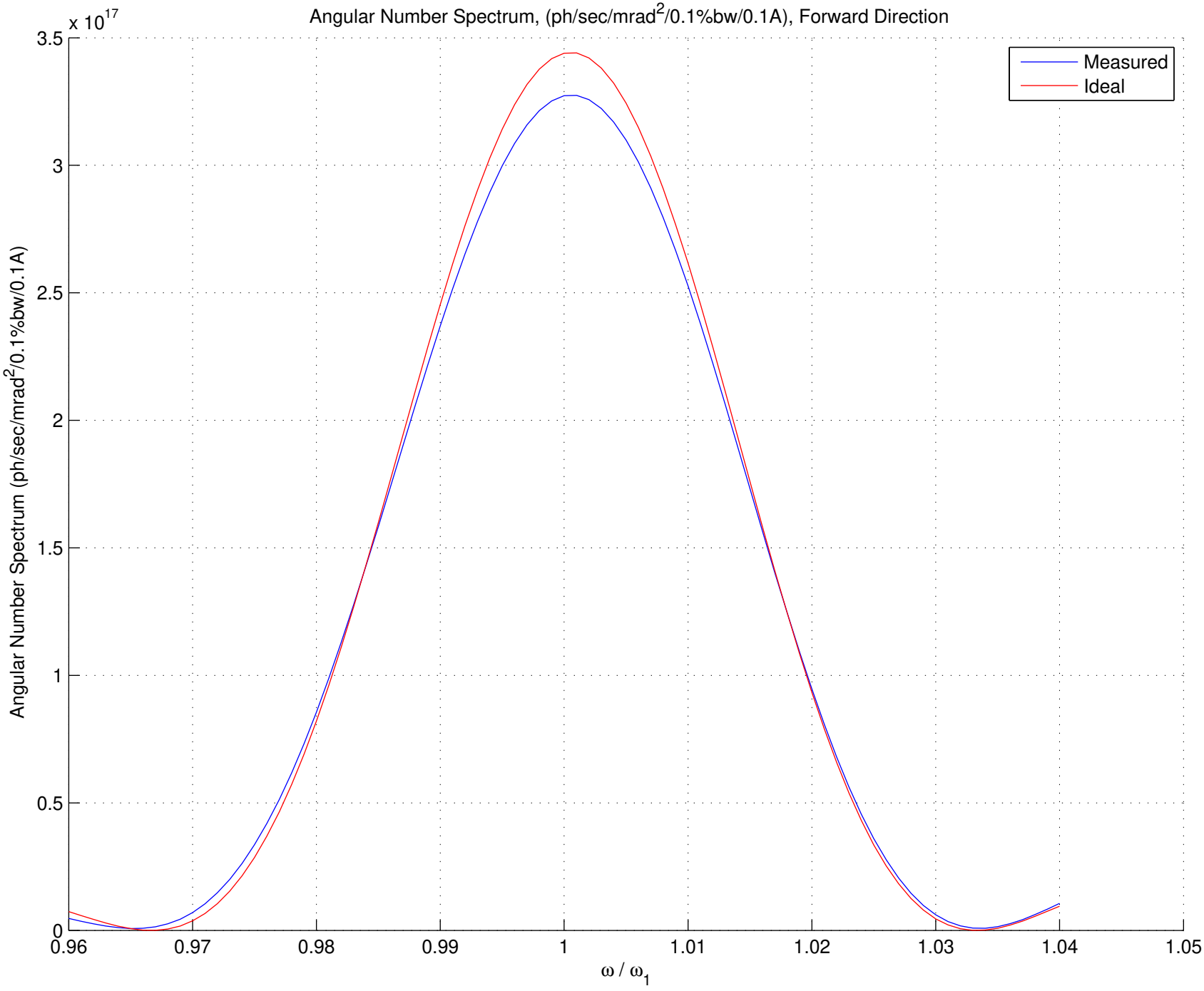

Phase Error At Field Peaks, No Ends
6
12
18
24
30
37
43
49
55
Pole
15
10
5
0
−5
−10
Phase Error (deg)
−0.5
−0.4
−0.3
−0.2
−0.1
0
0.1
0.2
0.3
0.4
0.5
Z (m)
Phase Error: Ave = 0.000000 deg, RMS = 4.806864 deg

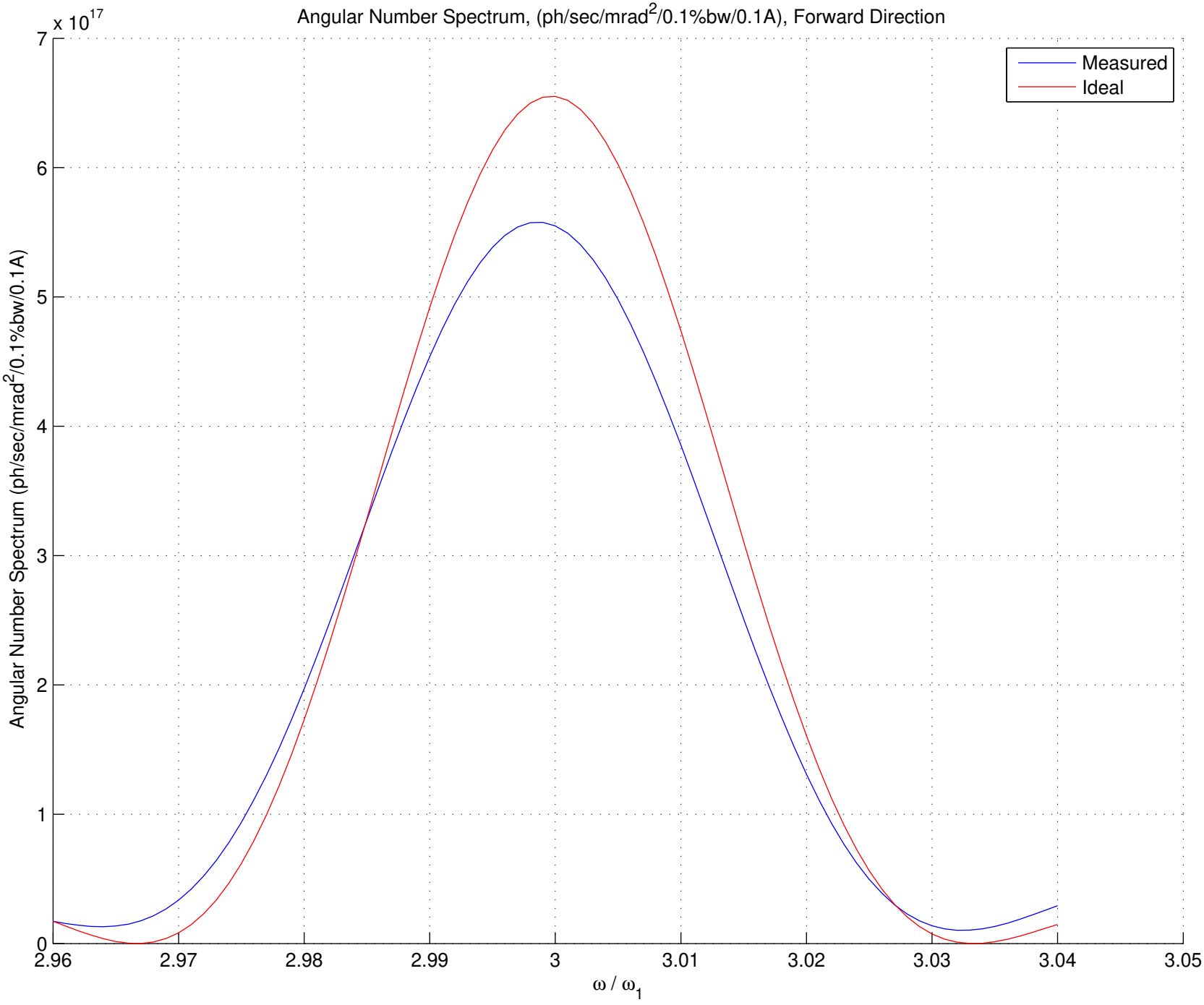

Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
6
12
18
24
30
37
43
49
55
Pole
955
950
945
940
935
930
Phase Error (deg)
−0.5
−0.4
−0.3
−0.2
−0.1
0
0.1
0.2
0.3
0.4
0.5
Z (m)

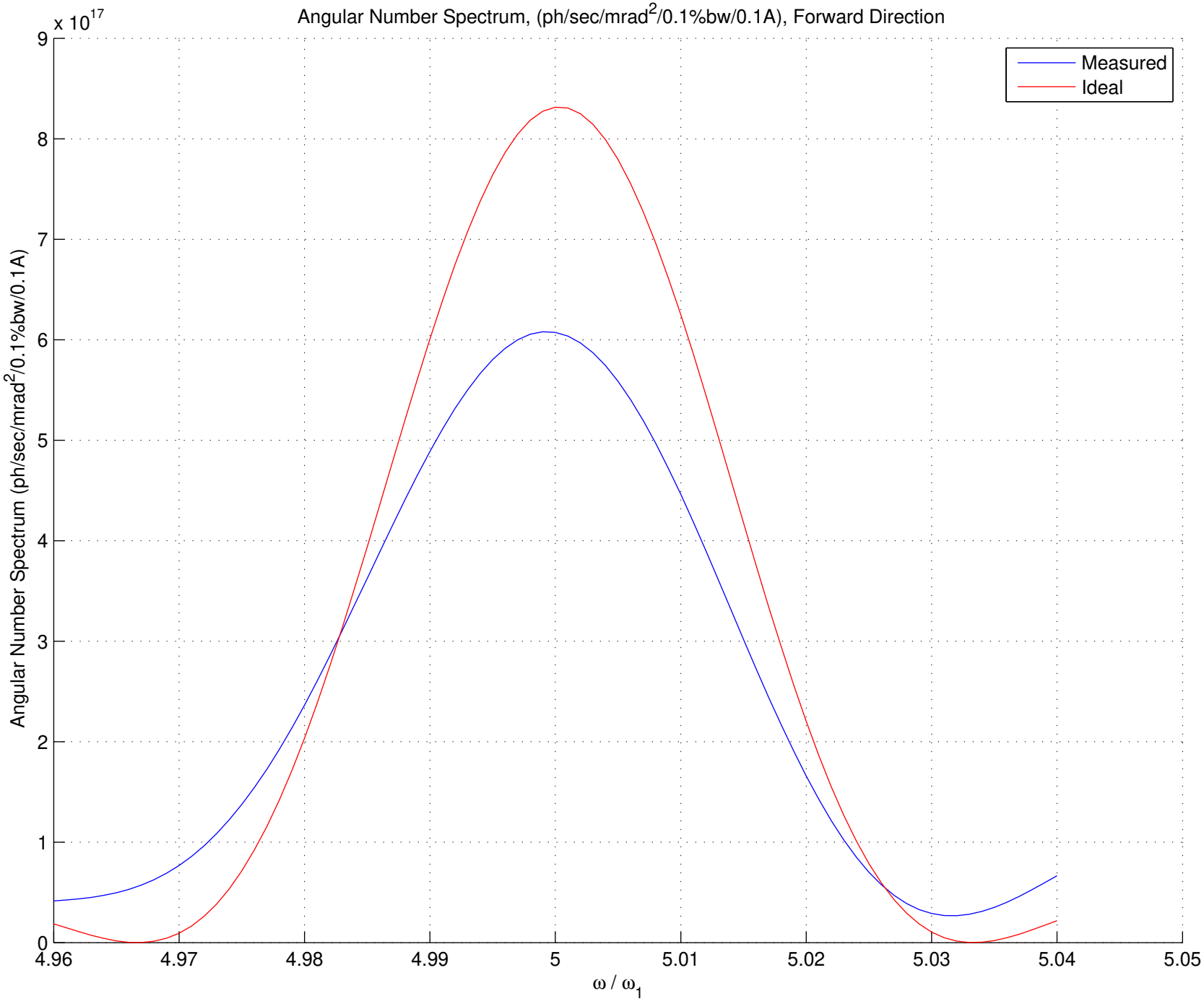

Re and Im Parts Of Ex(ω), Forward Direction, ω = ω1
90
4e−12
120
60
3e−12
150
30
2e−12
1e−12
180
0
210
330
240
300
270


Re and Im Parts Of Ey(ω), Forward Direction, ω = ω1
90
1.5e−13
120
60
1e−13
150
30
5e−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
1
2
3
4
5
6
7
8
9
10


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)
3.5
3
2.5
2
1.5
1
0.5
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 $10^{17}$
Measured
Ideal
Angular Number Spectrum (ph/sec/mrad$^2$/0.1%bw/0.1A)
0
1
2
3
4
5
6
7
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
4.96
4.97
4.98
4.99
5
5.01
5.02
5.03
5.04
5.05