SLAC Magnetic Measurements

EPU Analysis
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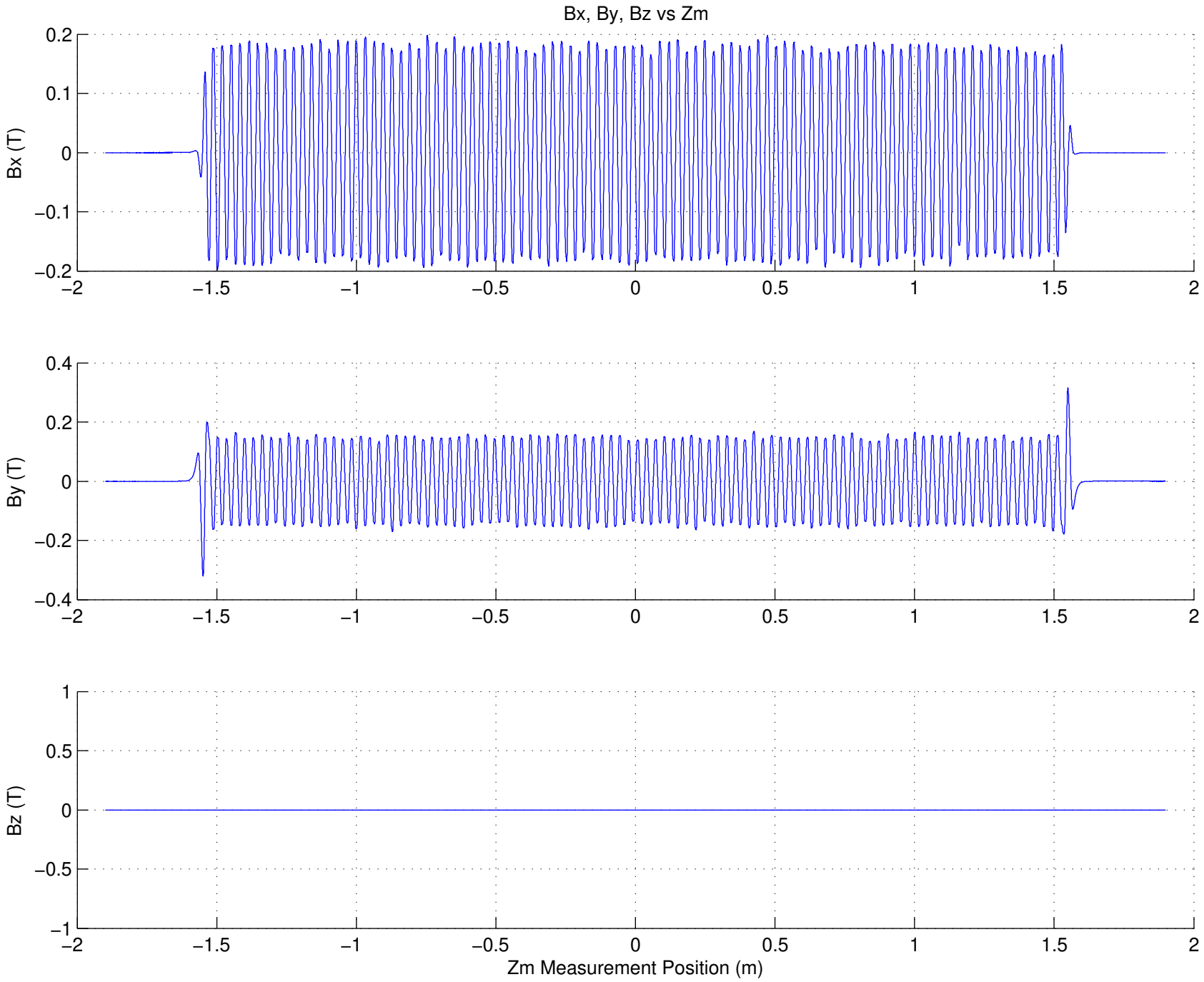
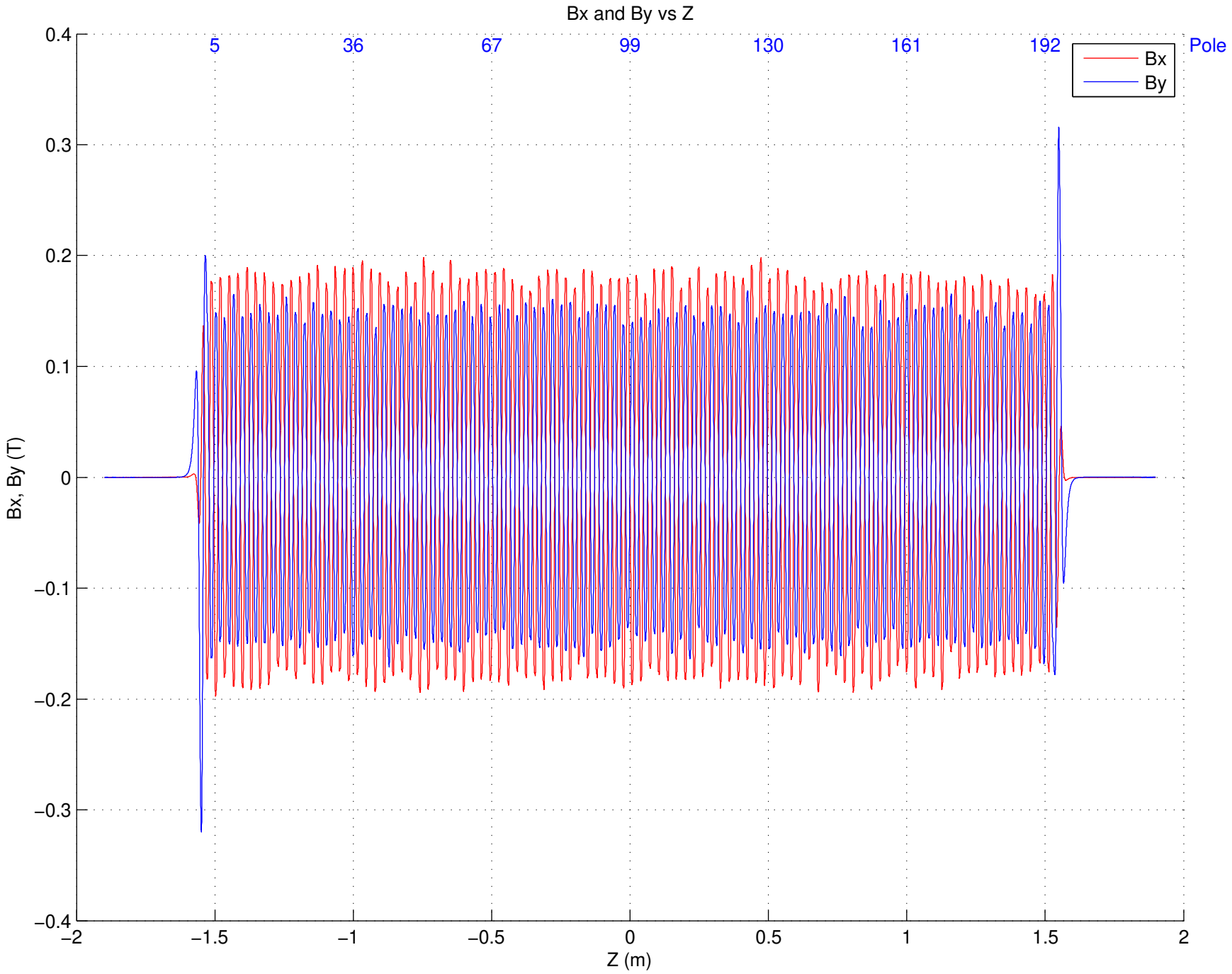
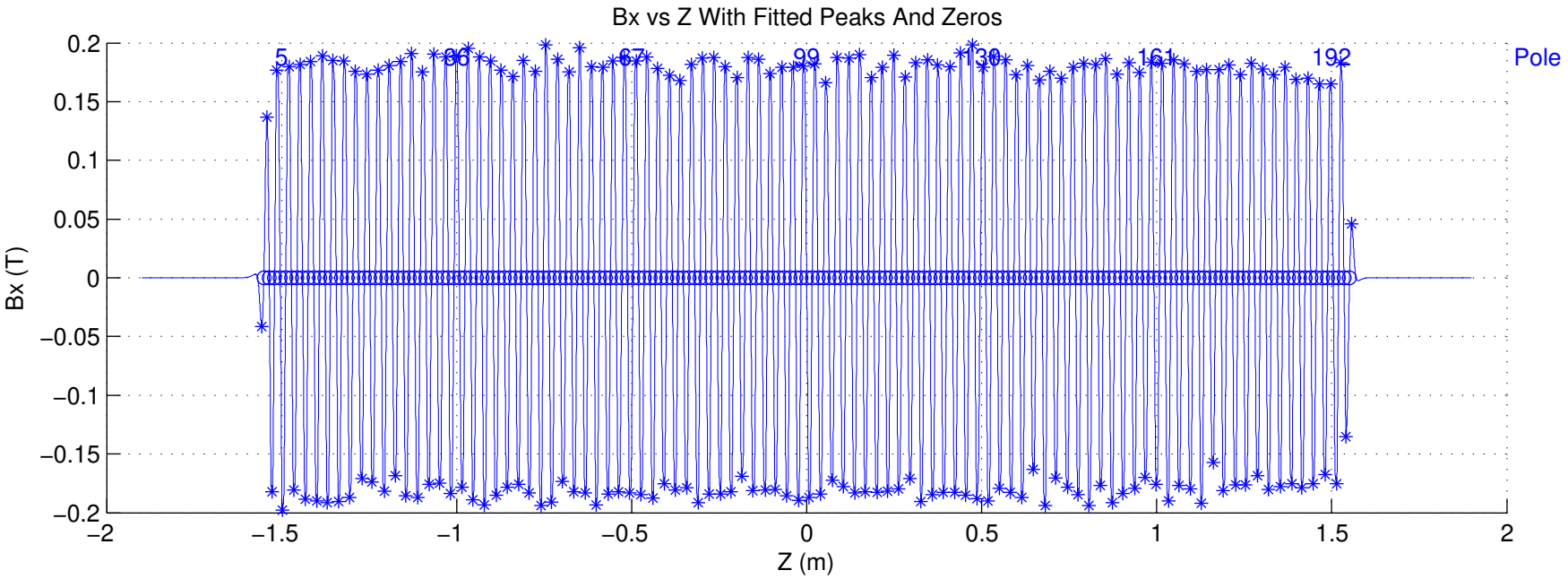
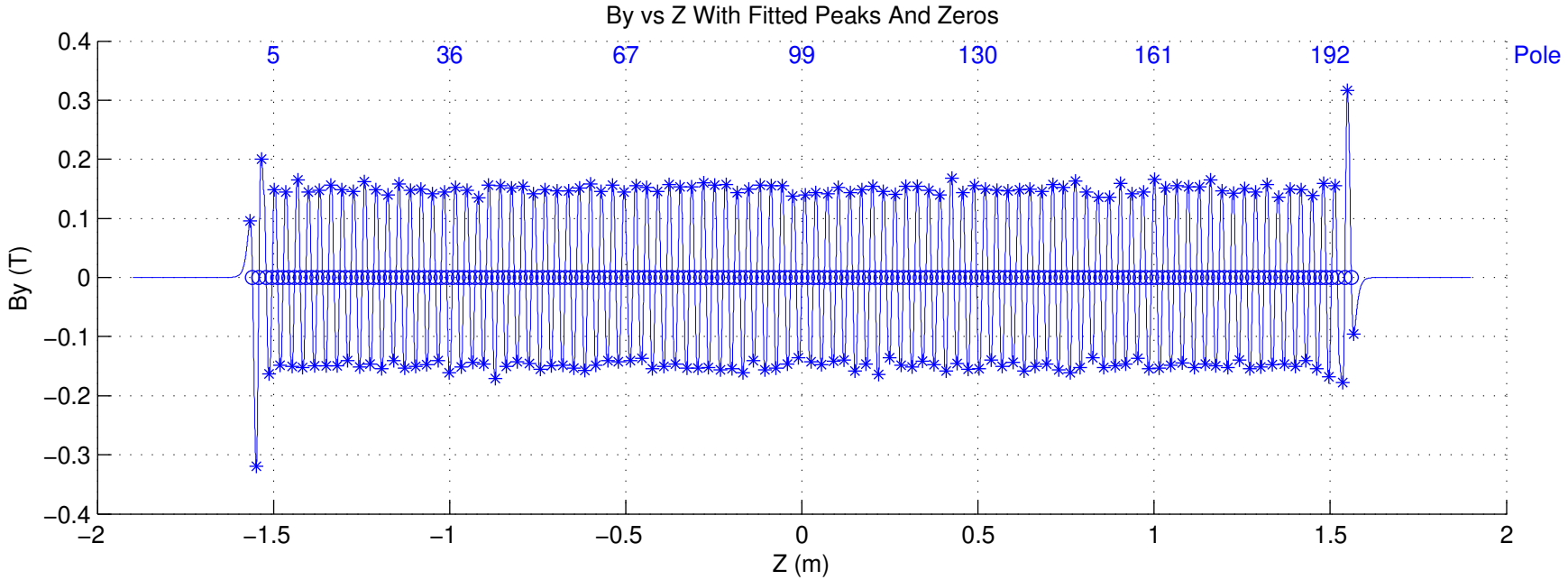
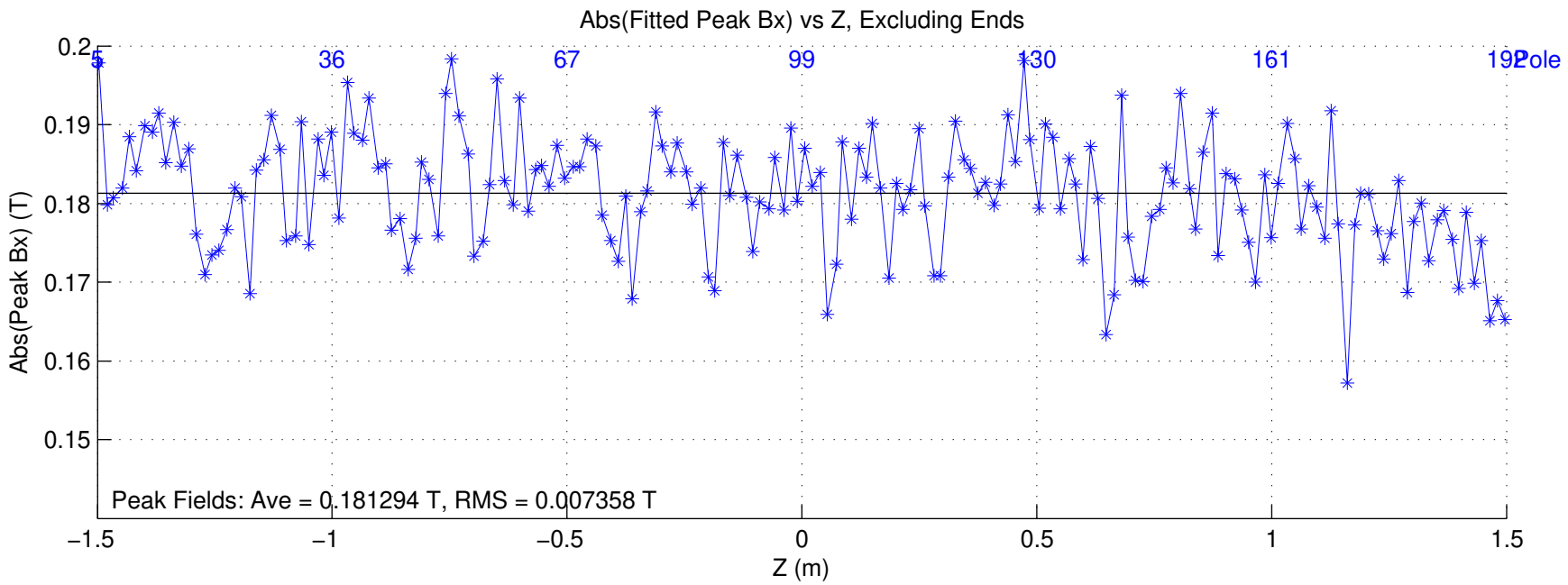
Parameters:
INPUT–FILE–DIR =V:\MET\MagServe\MagData\DELTA\Superpose Quadrants Q1 300microns\LP24N\KR021
INPUT–FILE–NAME =superpose–quadrants.dat
INPUT–FILE–TYPE =ZBXYZH
CORR–REQUIRED =0
GAMMA =26671.59
NOM–LAMBDA–U =0
NOM–K–VALUE =0
NOM–LAMBDA–R =0
NUM–POLES =196
NUM–END–POLES =4
CELL–LENGTH =3.656

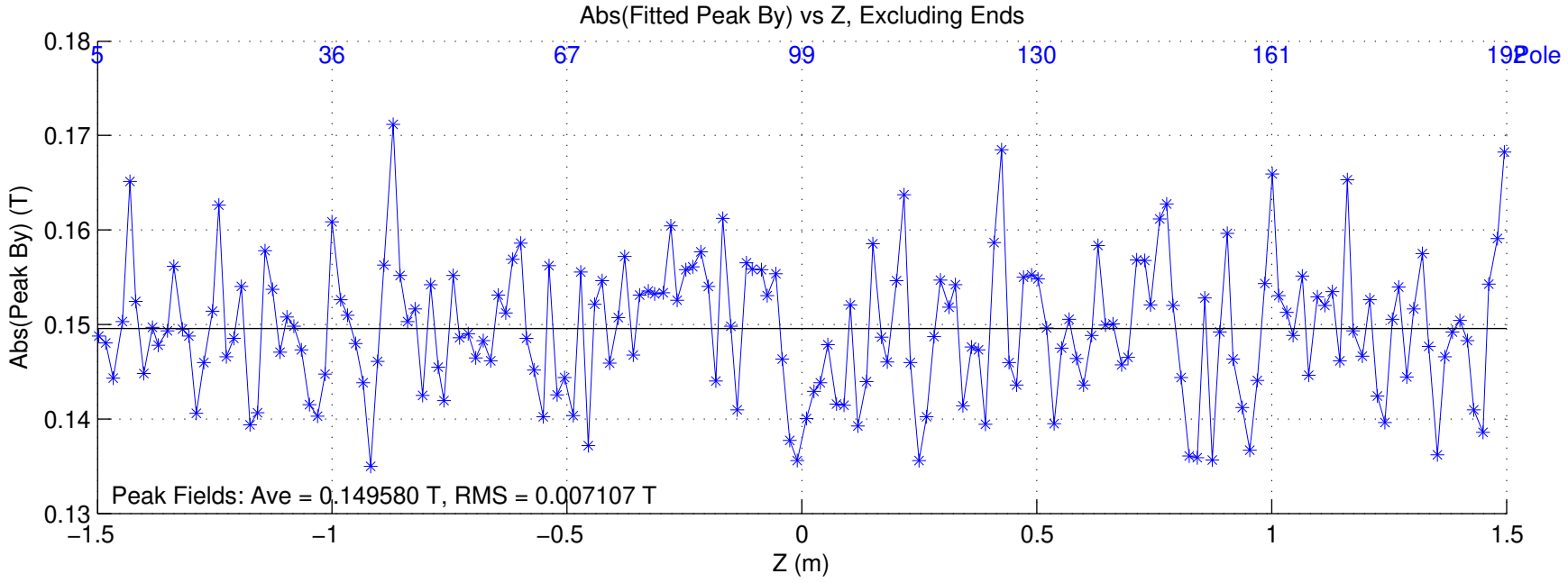

Bx, By, Bz vs Zm
Bx (T)
By (T)
Bz (T)
Zm Measurement Position (m)
0.2
0.1
0
−0.1
−0.2
0.4
0.2
0
−0.2
−0.4
1
0.5
0
−0.5
−1
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2

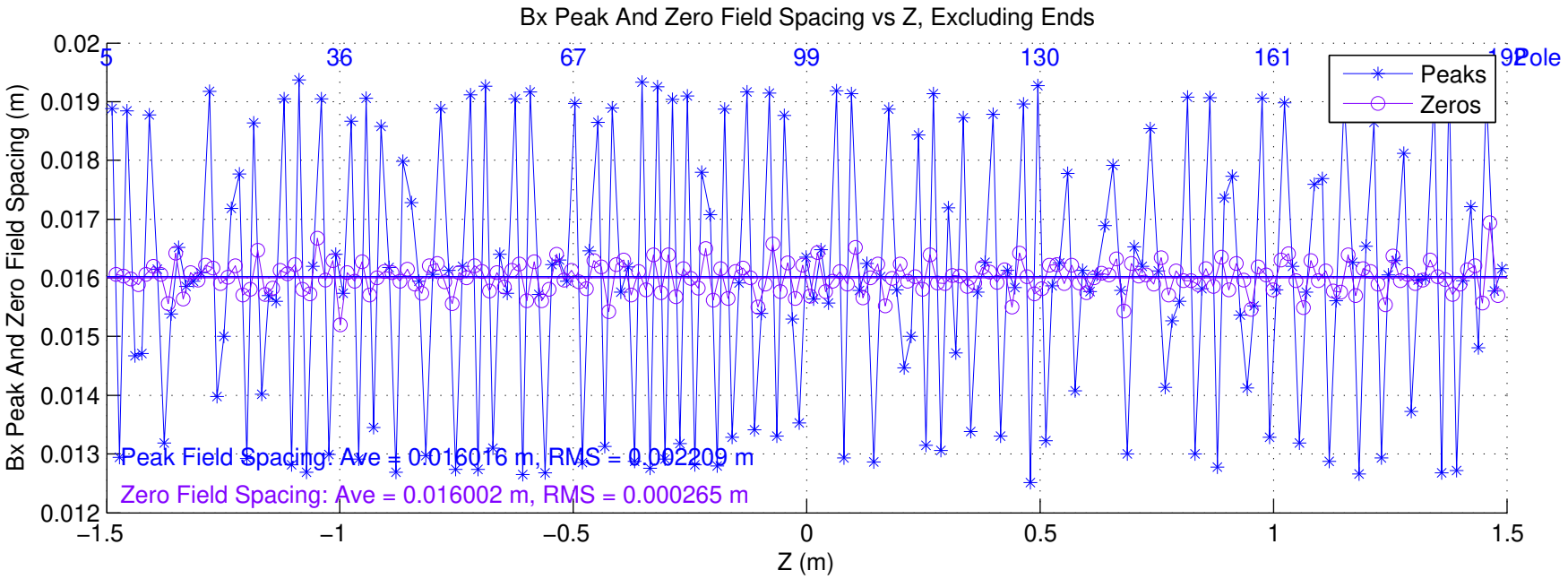

Bx and By vs Z
5
36
67
99
130
161
192
Pole
Bx
By
0.4
0.3
0.2
0.1
0
−0.1
−0.2
−0.3
−0.4
Bx, By (T)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

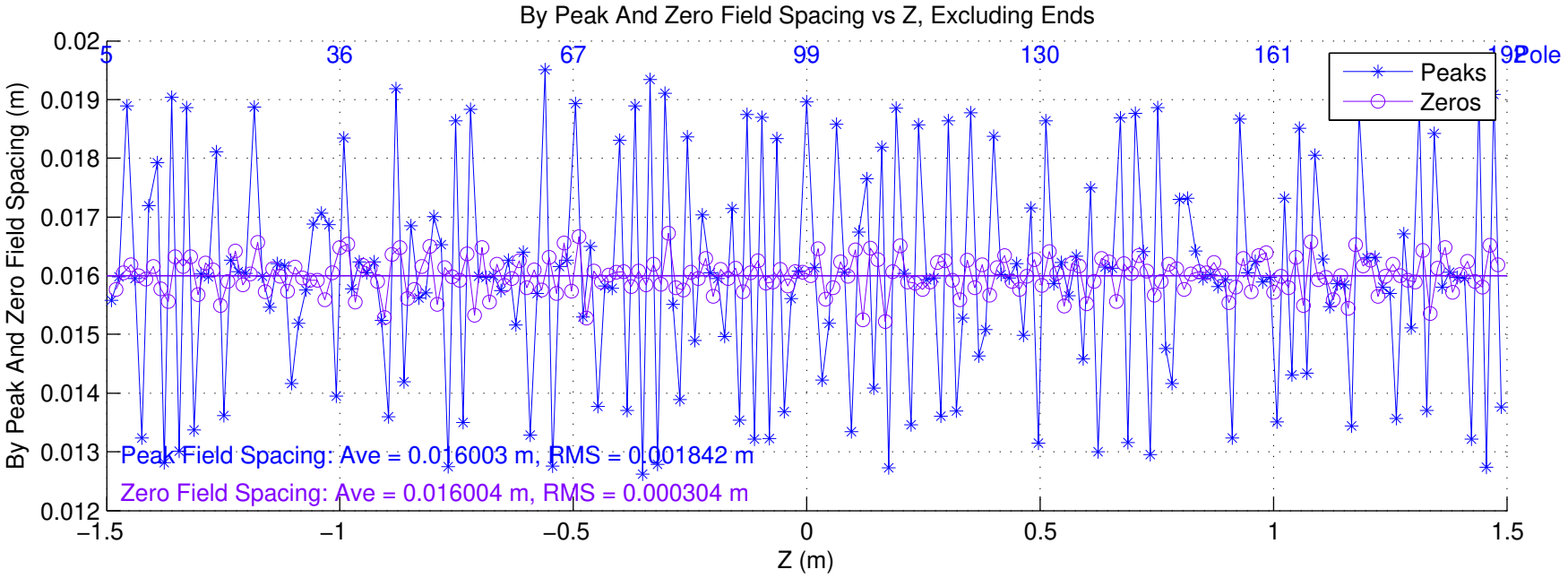

Bx vs Z With Fitted Peaks And Zeros
5
36
67
99
130
161
192
Pole
0.2
0.15
0.1
0.05
0
−0.05
−0.1
−0.15
−0.2
Bx (T)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

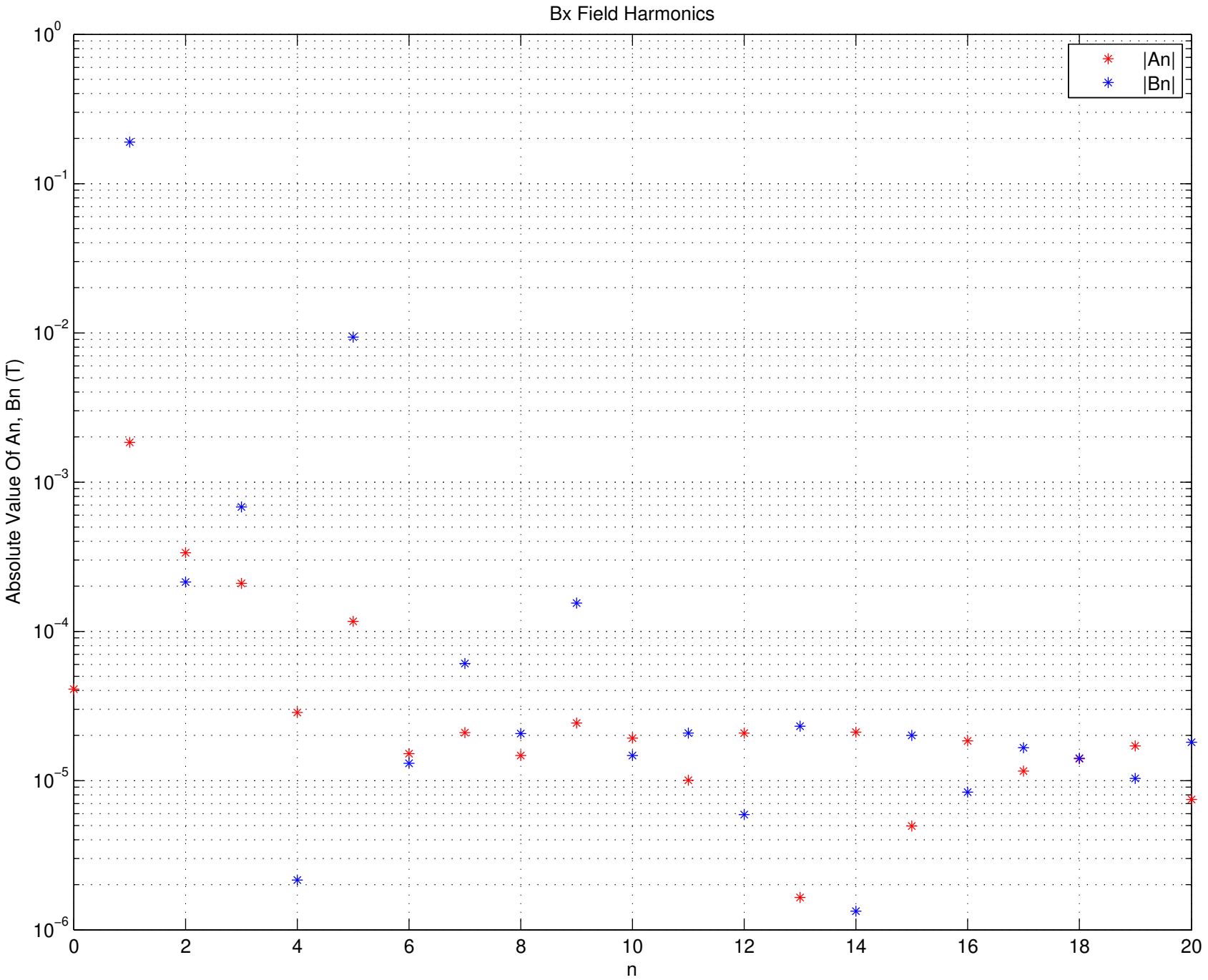

By vs Z With Fitted Peaks And Zeros
5
36
67
99
130
161
192
Pole
0.4
0.3
0.2
0.1
0
−0.1
−0.2
−0.3
−0.4
By (T)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

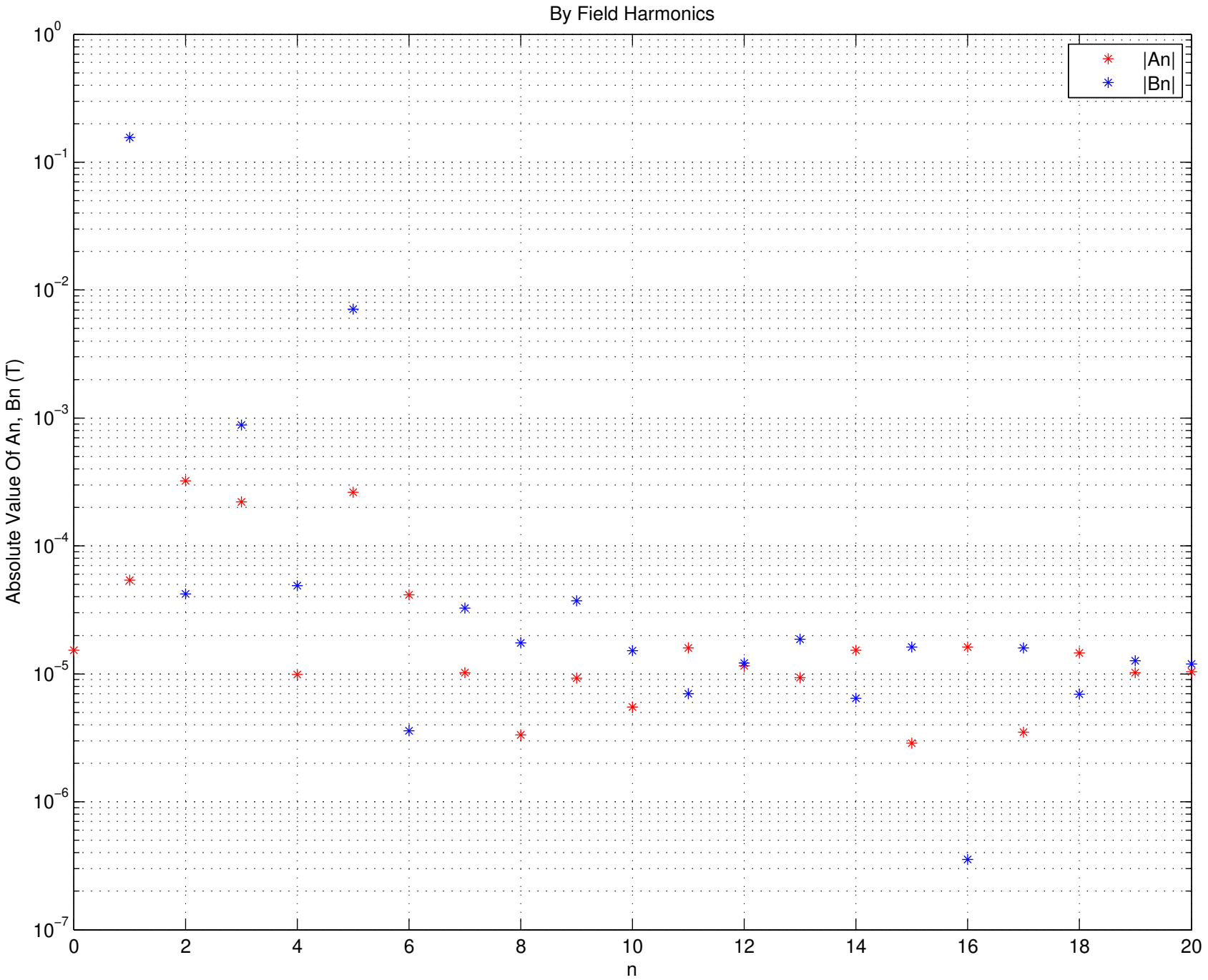

Abs(Fitted Peak Bx) vs Z, Excluding Ends
5
36
67
99
130
161
192
Pole
0.2
0.19
0.18
0.17
0.16
0.15
Abs(Peak Bx) (T)
Peak Fields: Ave = 0.181294 T, RMS = 0.007358 T
−1.5
−1
−0.5
0
0.5
1
1.5
Z (m)

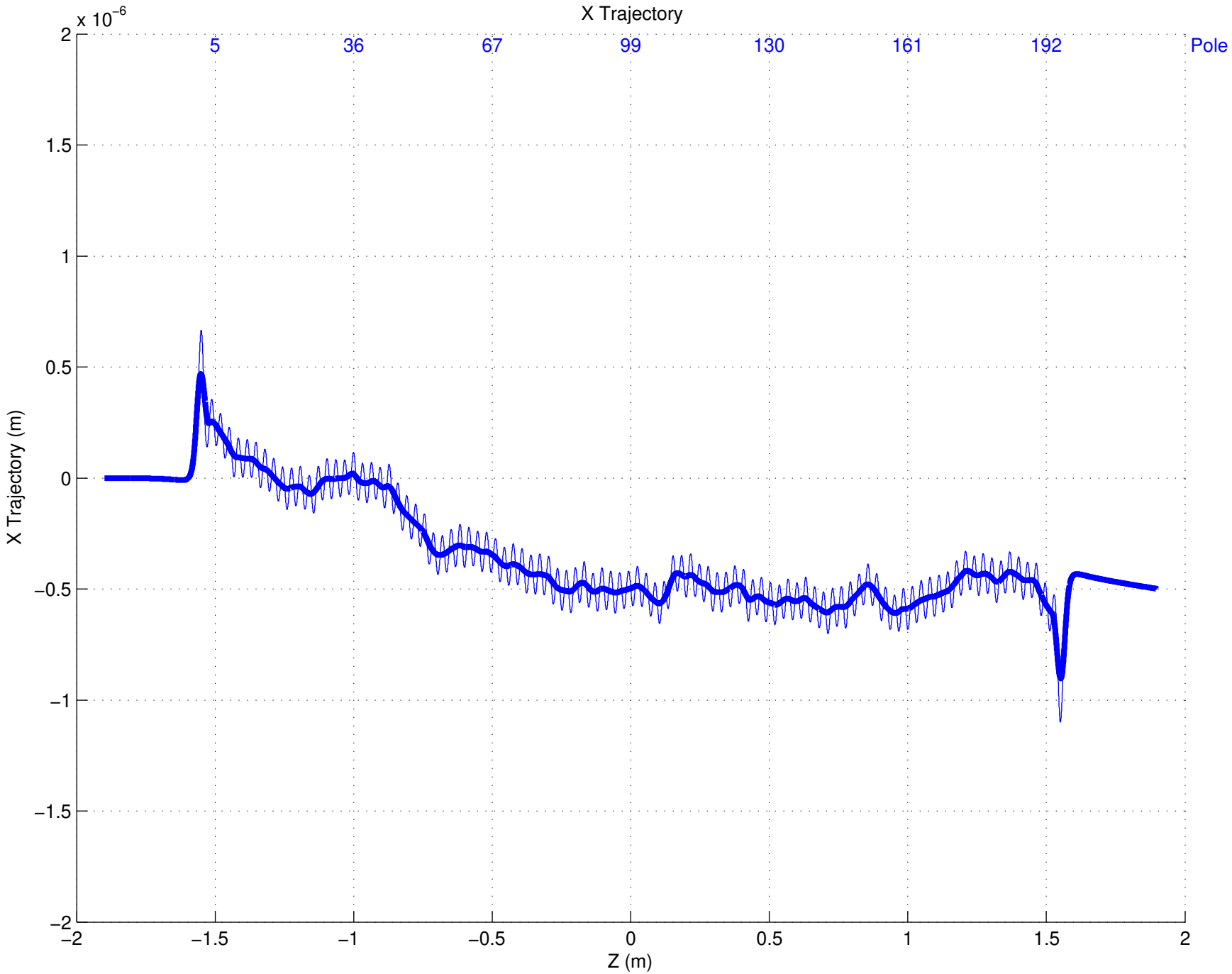

Abs(Fitted Peak By) vs Z, Excluding Ends
5
36
67
99
130
161
192
Pole
0.18
0.17
0.16
0.15
0.14
0.13
Abs(Peak By) (T)
Peak Fields: Ave = 0.149580 T, RMS = 0.007107 T
−1.5
−1
−0.5
0
0.5
1
1.5
Z (m)

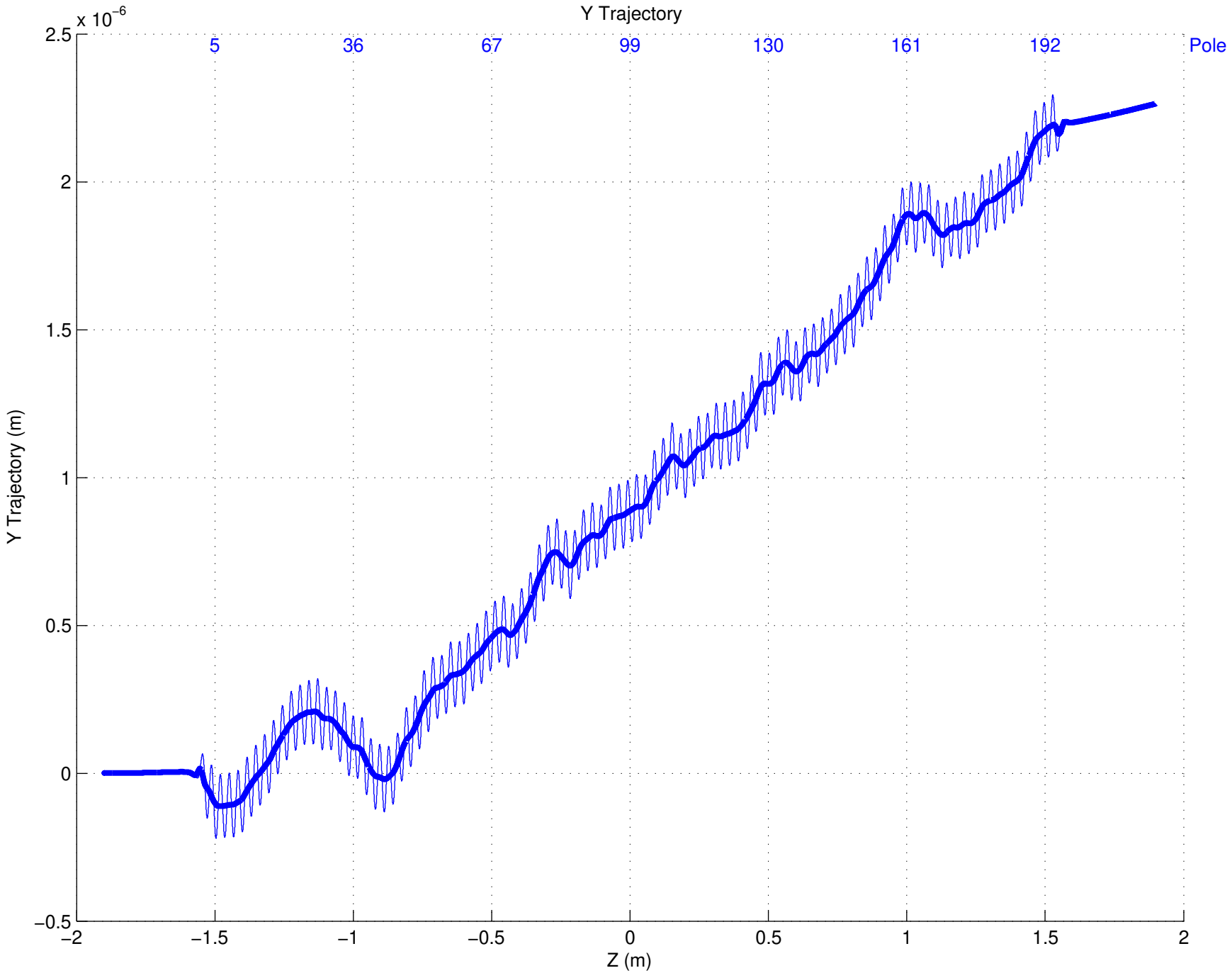

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
Z (m)
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016016 m, RMS = 0.002209 m
Zero Field Spacing: Ave = 0.016002 m, RMS = 0.000265 m

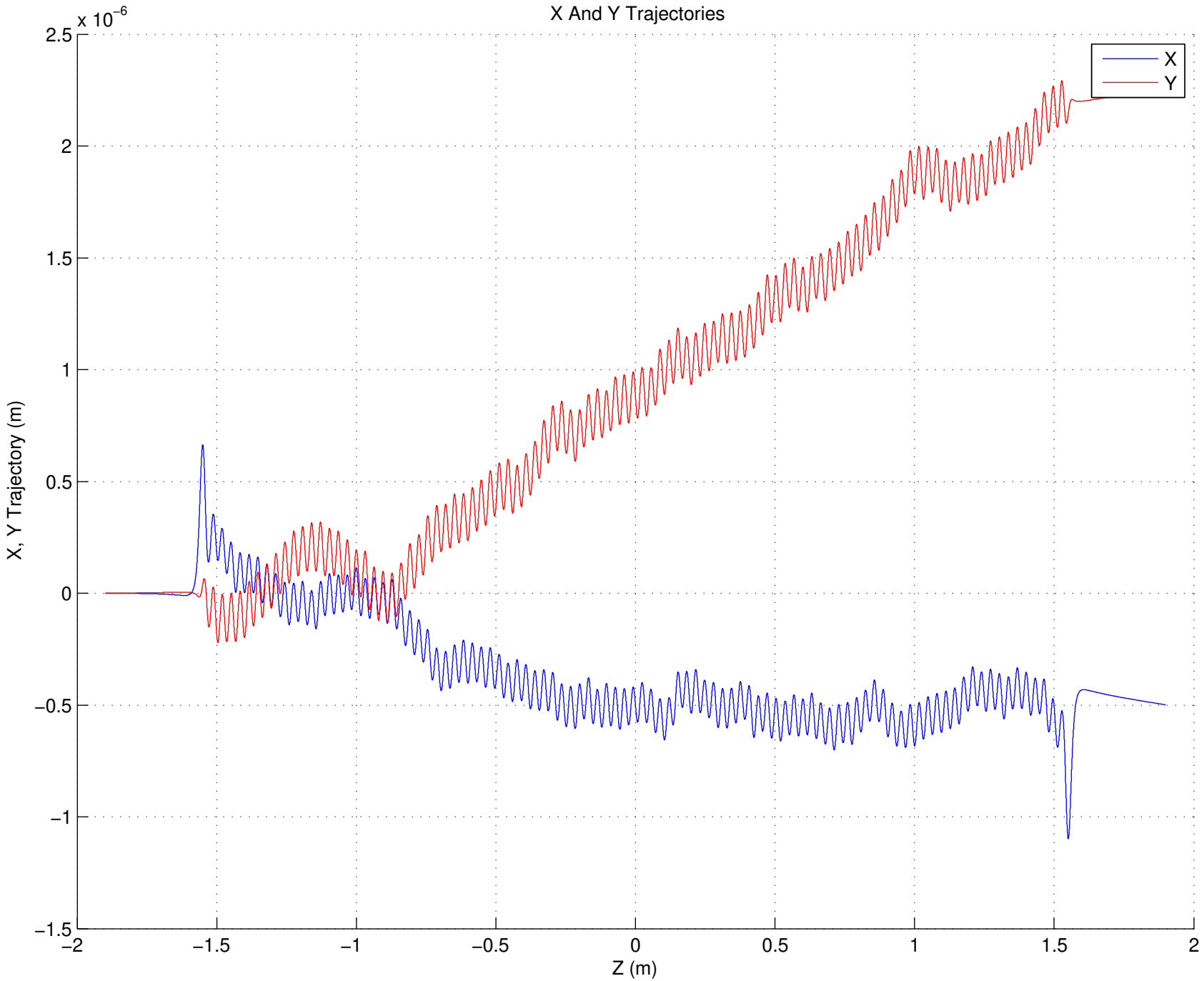

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
Z (m)
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016003 m, RMS = 0.001842 m
Zero Field Spacing: Ave = 0.016004 m, RMS = 0.000304 m

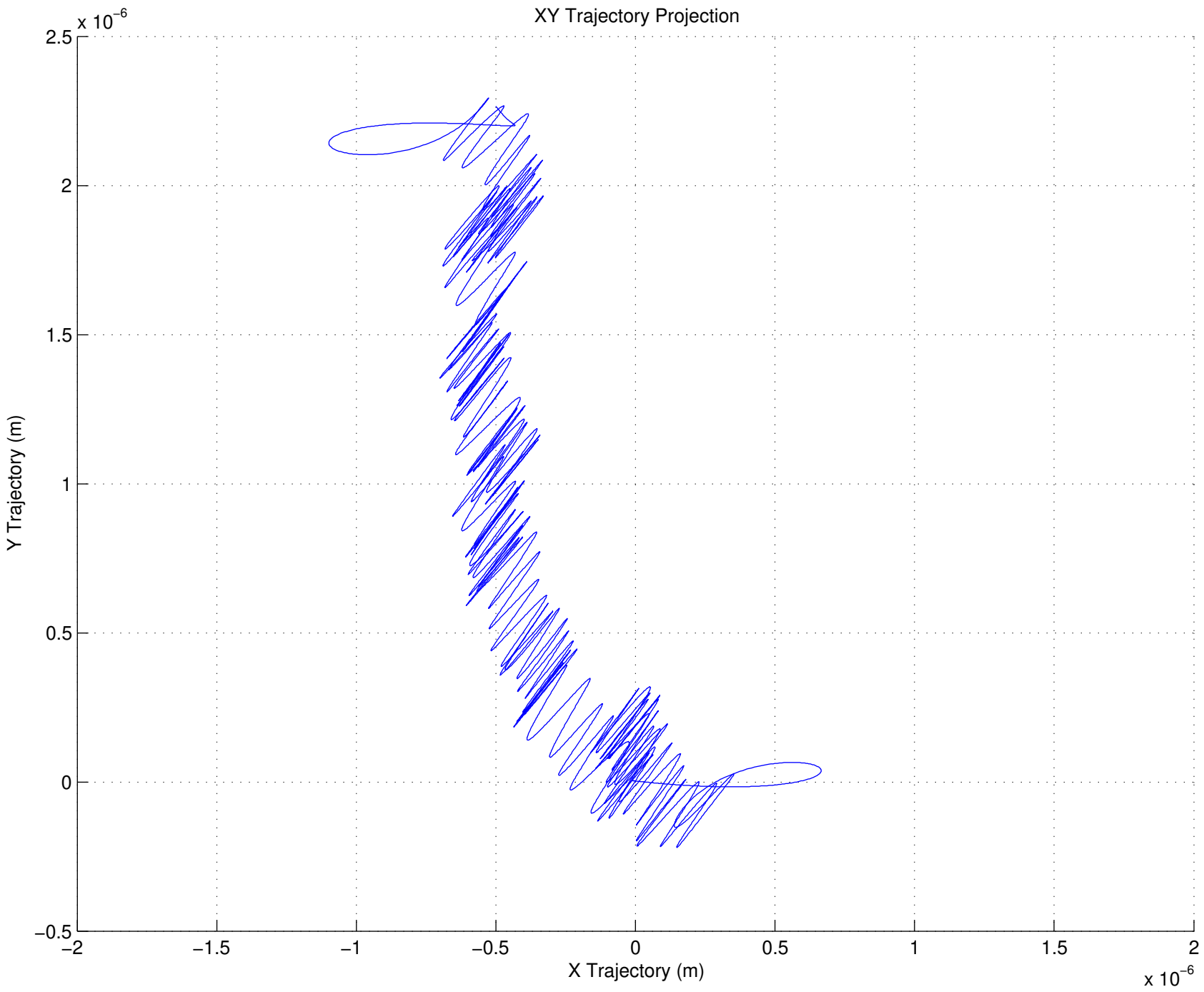

Bx Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
0
2
4
6
8
10
12
14
16
18
20

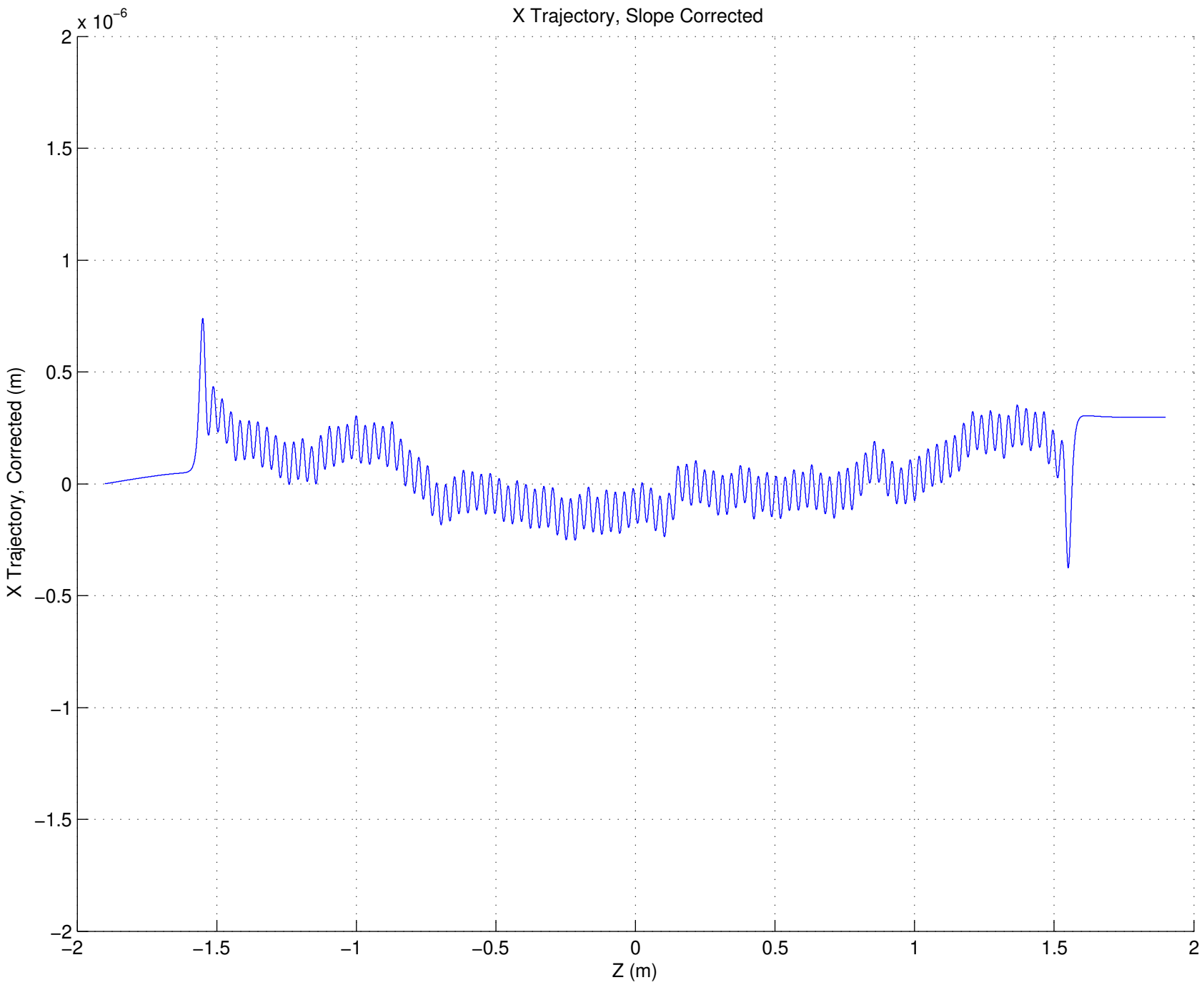

By Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
0
2
4
6
8
10
12
14
16
18
20

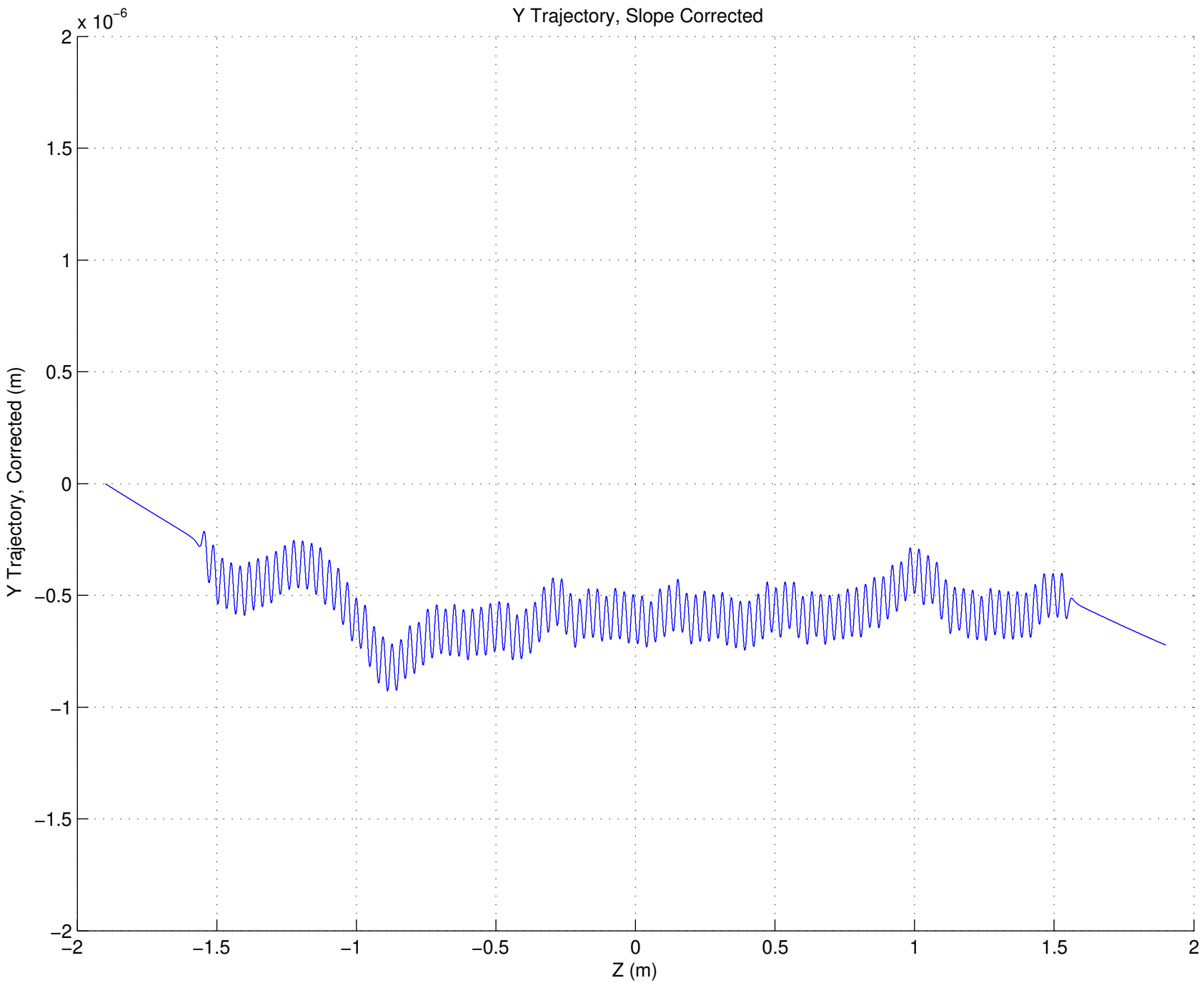

X Trajectory
x 10^-6
5
36
67
99
130
161
192
Pole
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
X Trajectory (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

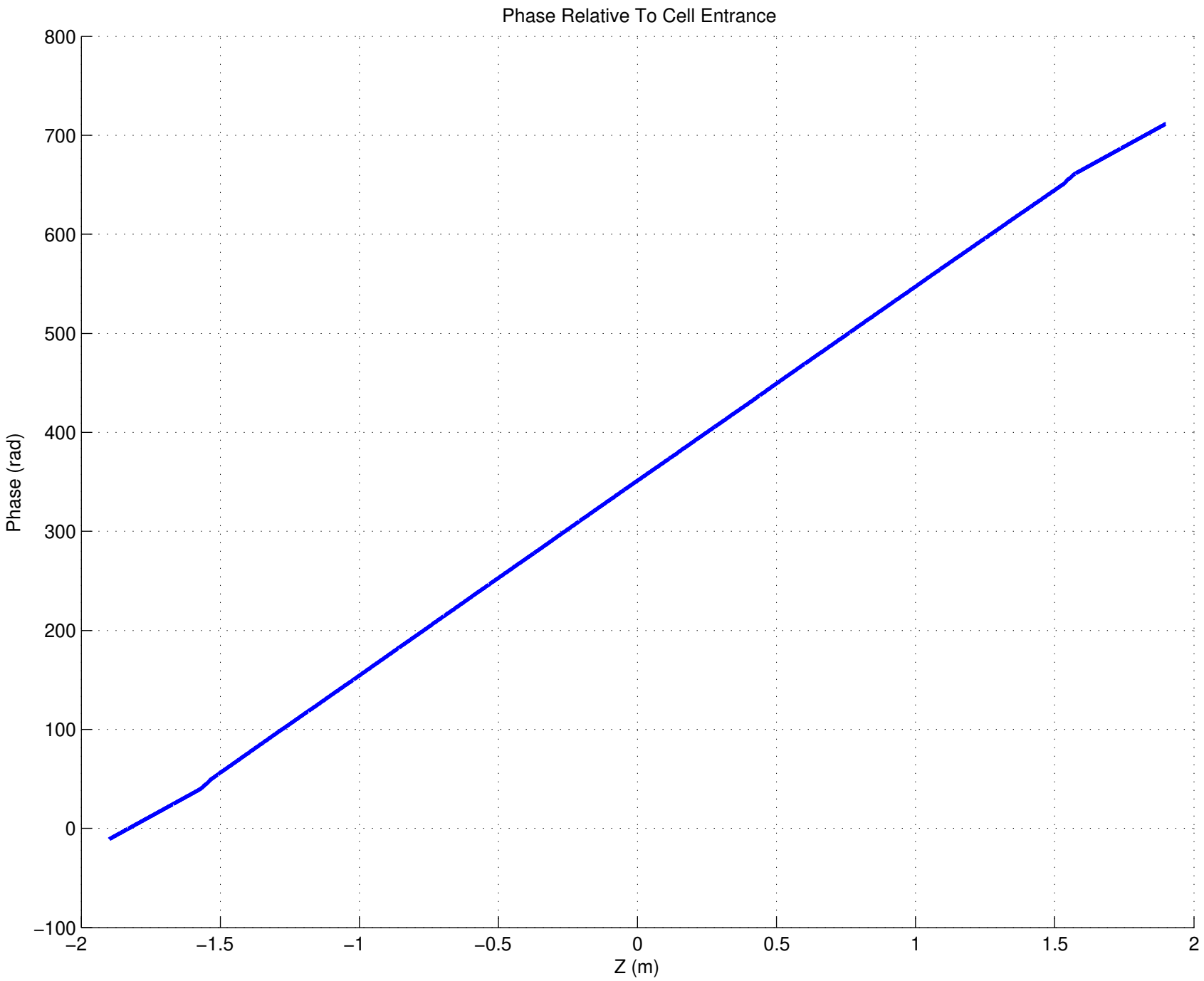

Y Trajectory
x 10^-6
5
36
67
99
130
161
192
Pole
2.5
2
1.5
1
0.5
0
−0.5
Y Trajectory (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

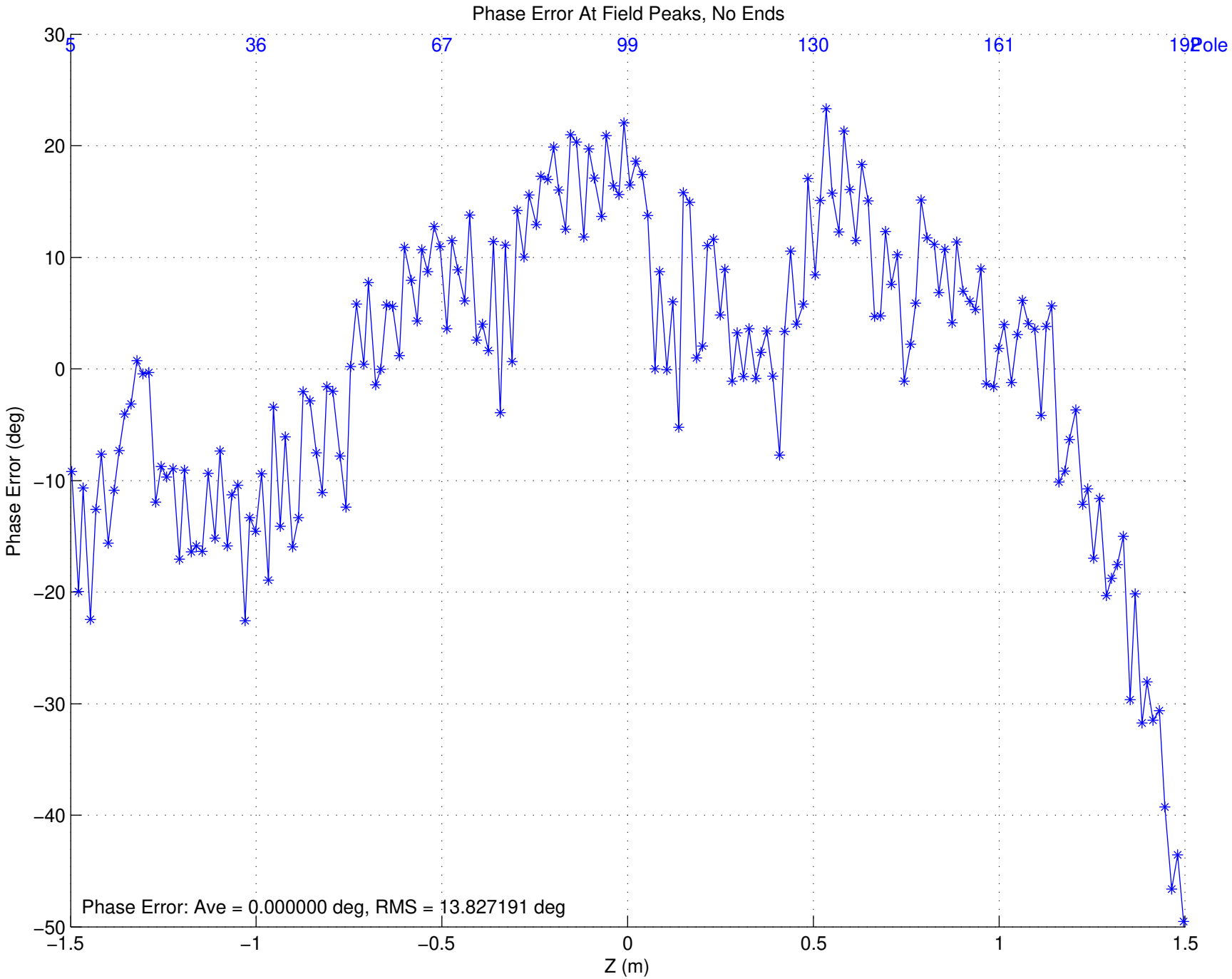

X And Y Trajectories
x 10^-6
2.5
2
1.5
1
0.5
0
−0.5
−1
−1.5
X, Y Trajectory (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)
X
Y

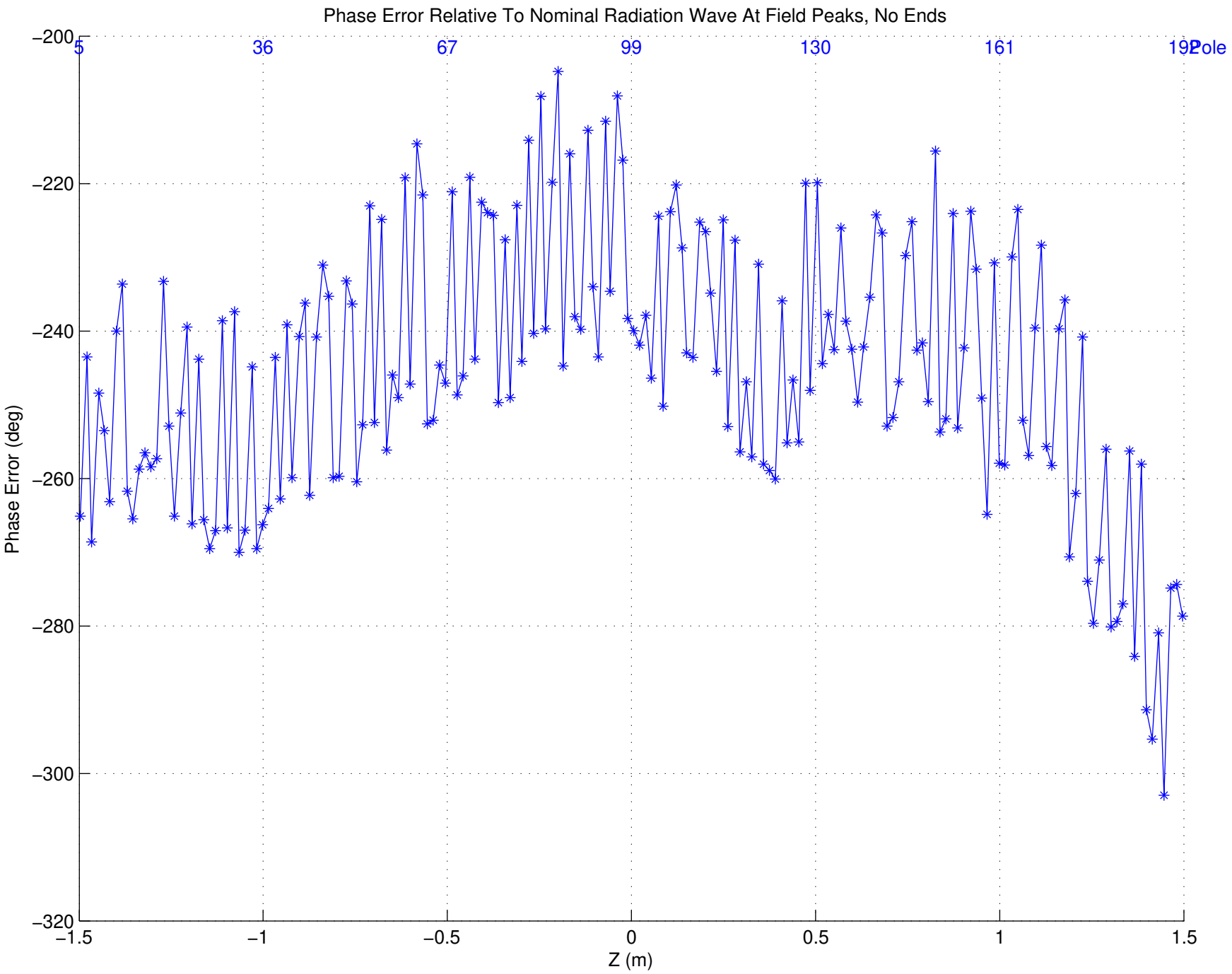

XY Trajectory Projection
x 10^-6
2.5
2
1.5
1
0.5
0
−0.5
Y Trajectory (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
X Trajectory (m)
x 10^-6

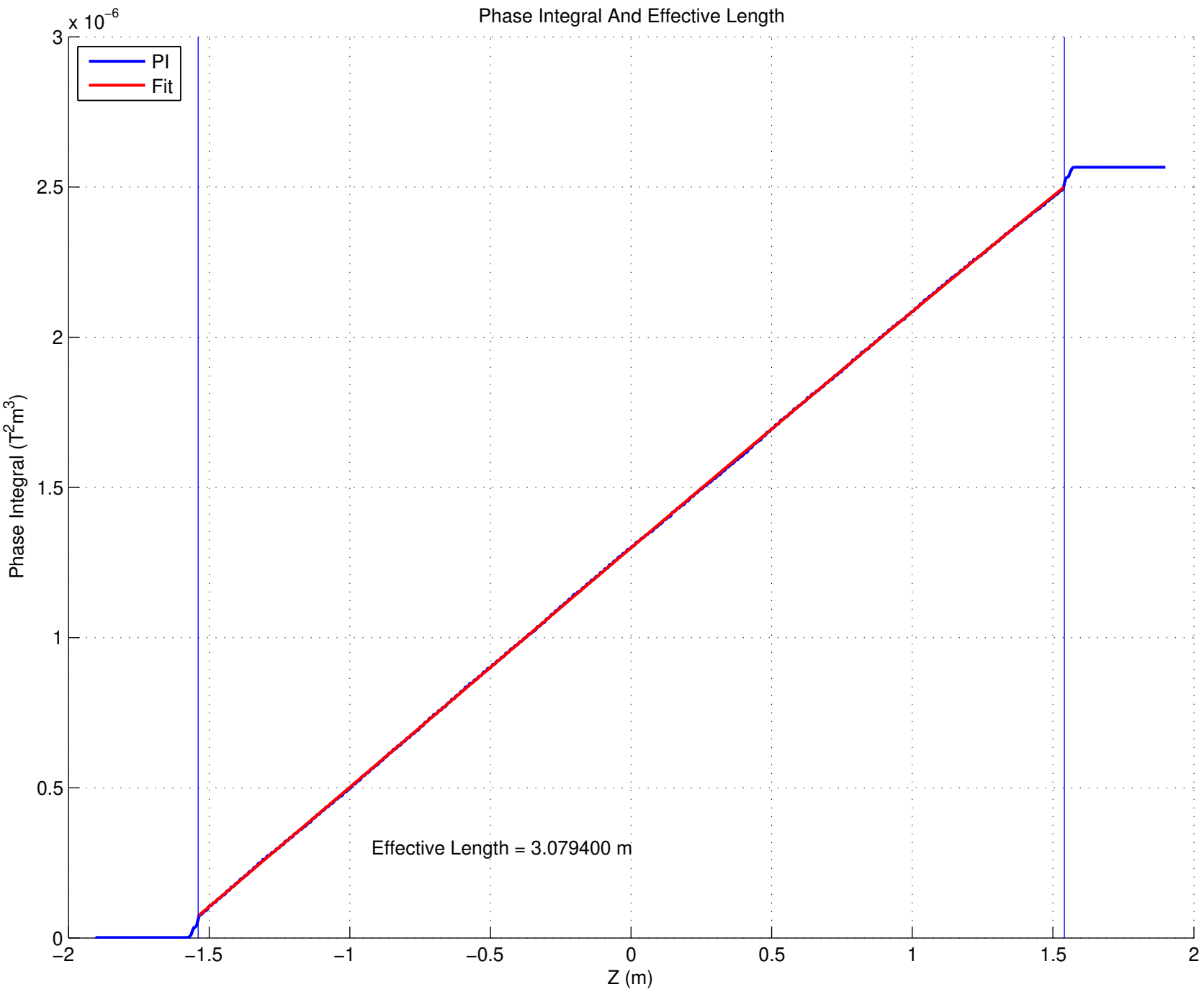

X Trajectory, Slope Corrected
x 10^-6
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
X Trajectory, Corrected (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

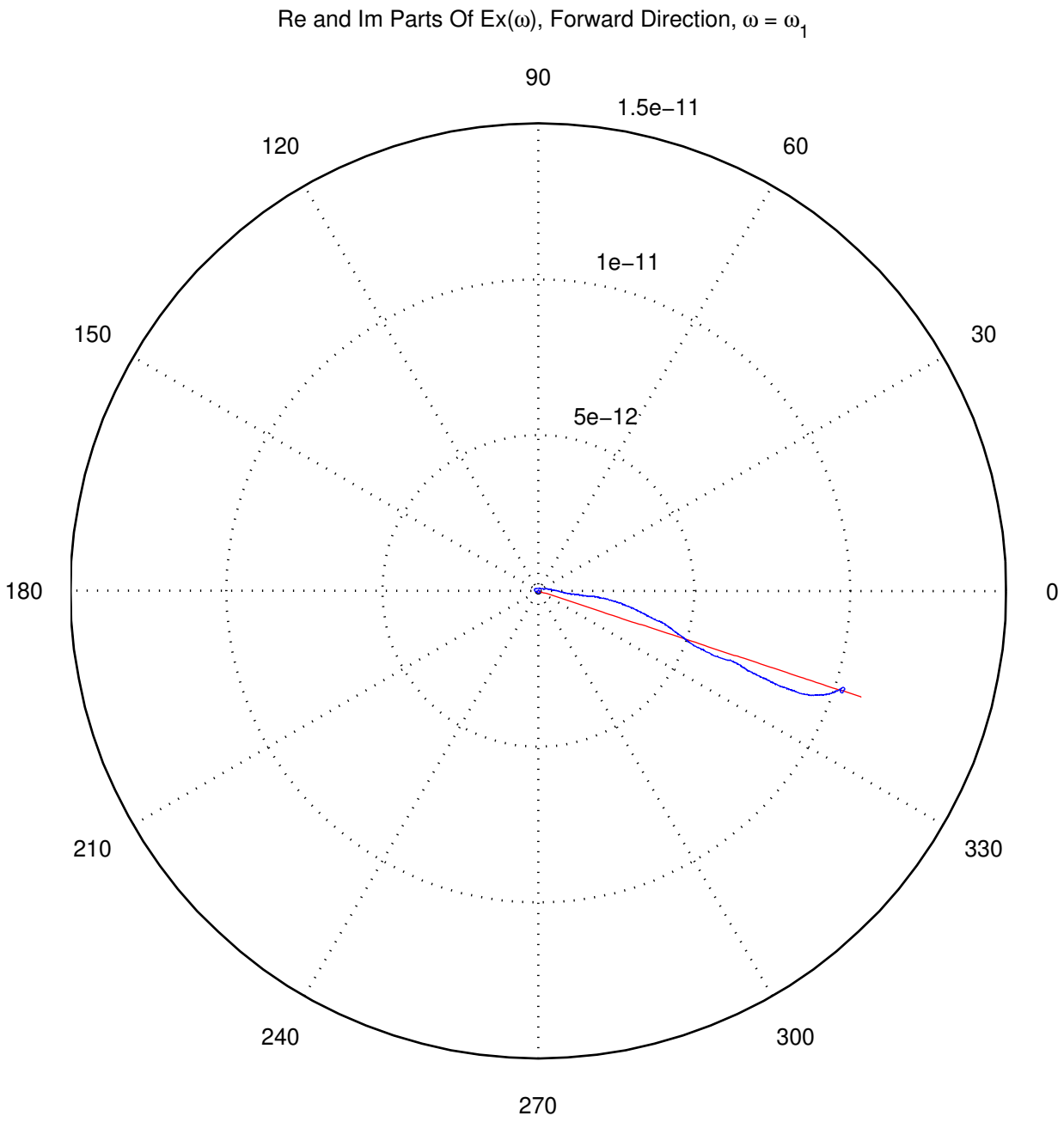

Y Trajectory, Slope Corrected
x 10^-6
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
Y Trajectory, Corrected (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

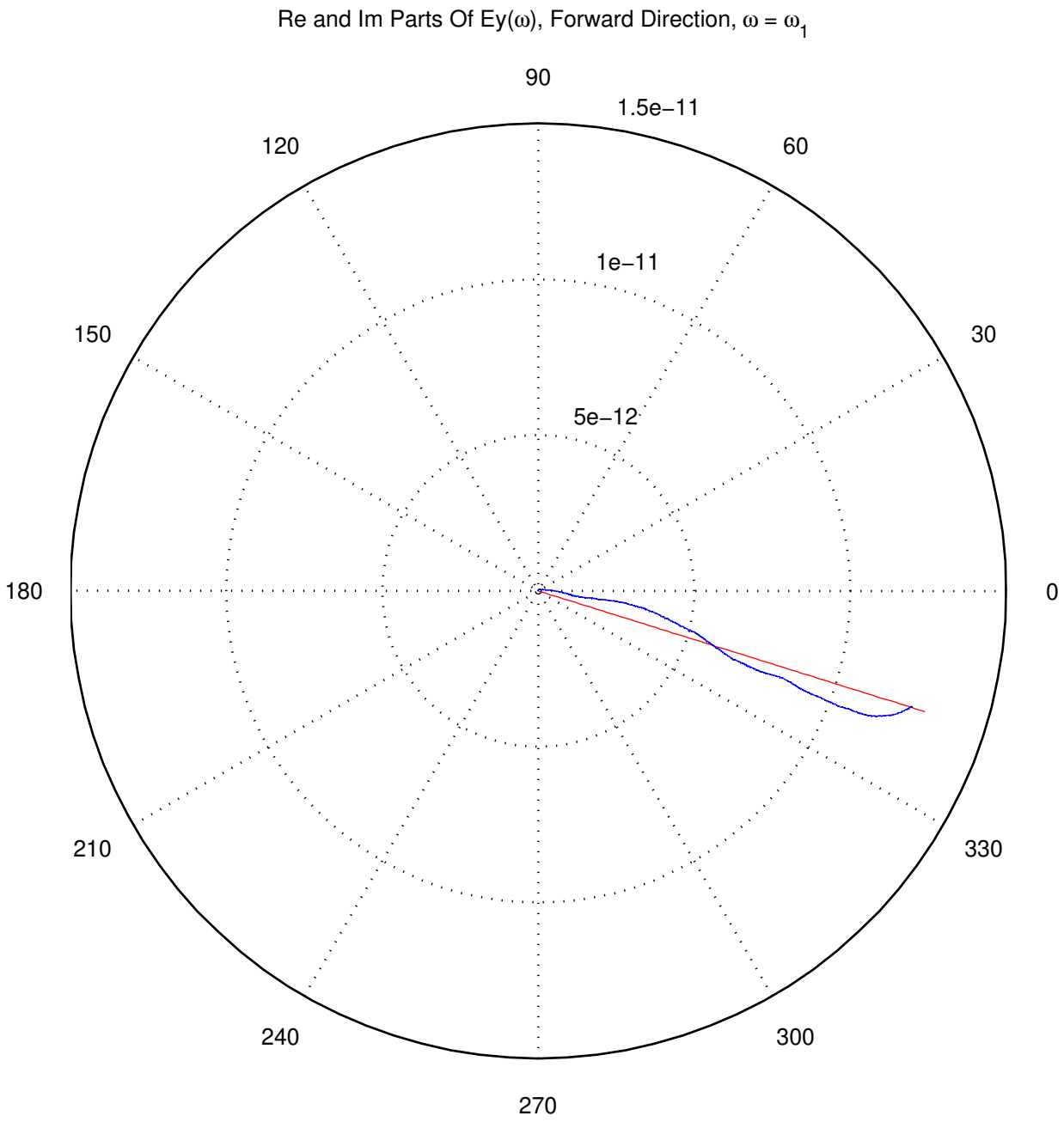

Phase Relative To Cell Entrance
Phase (rad)
800
700
600
500
400
300
200
100
0
−100
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

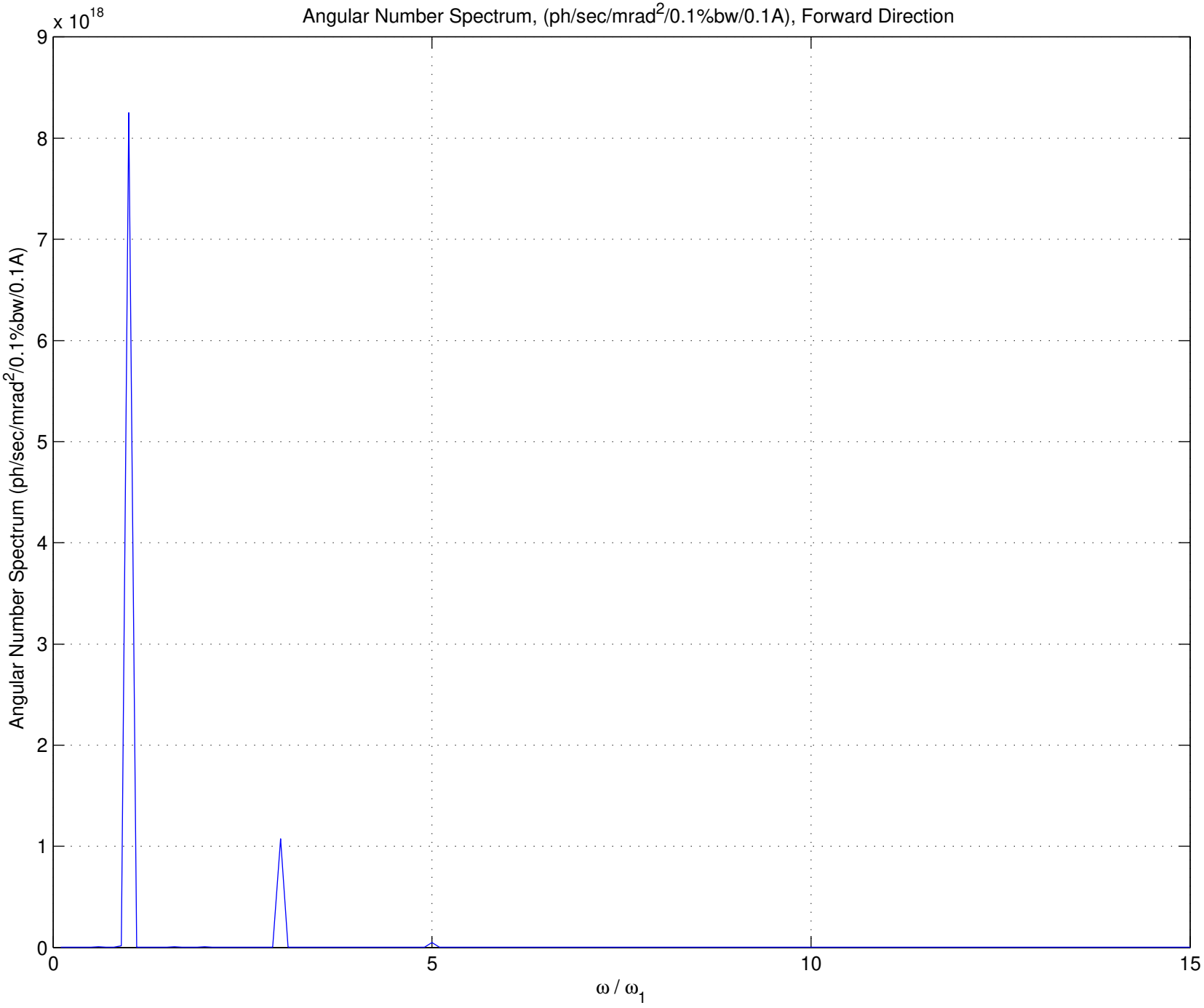

Phase Error At Field Peaks, No Ends
5
36
67
99
130
161
192
Pole
30
20
10
0
−10
−20
−30
−40
−50
Phase Error (deg)
−1.5
−1
−0.5
0
0.5
1
1.5
Z (m)
Phase Error: Ave = 0.000000 deg, RMS = 13.827191 deg

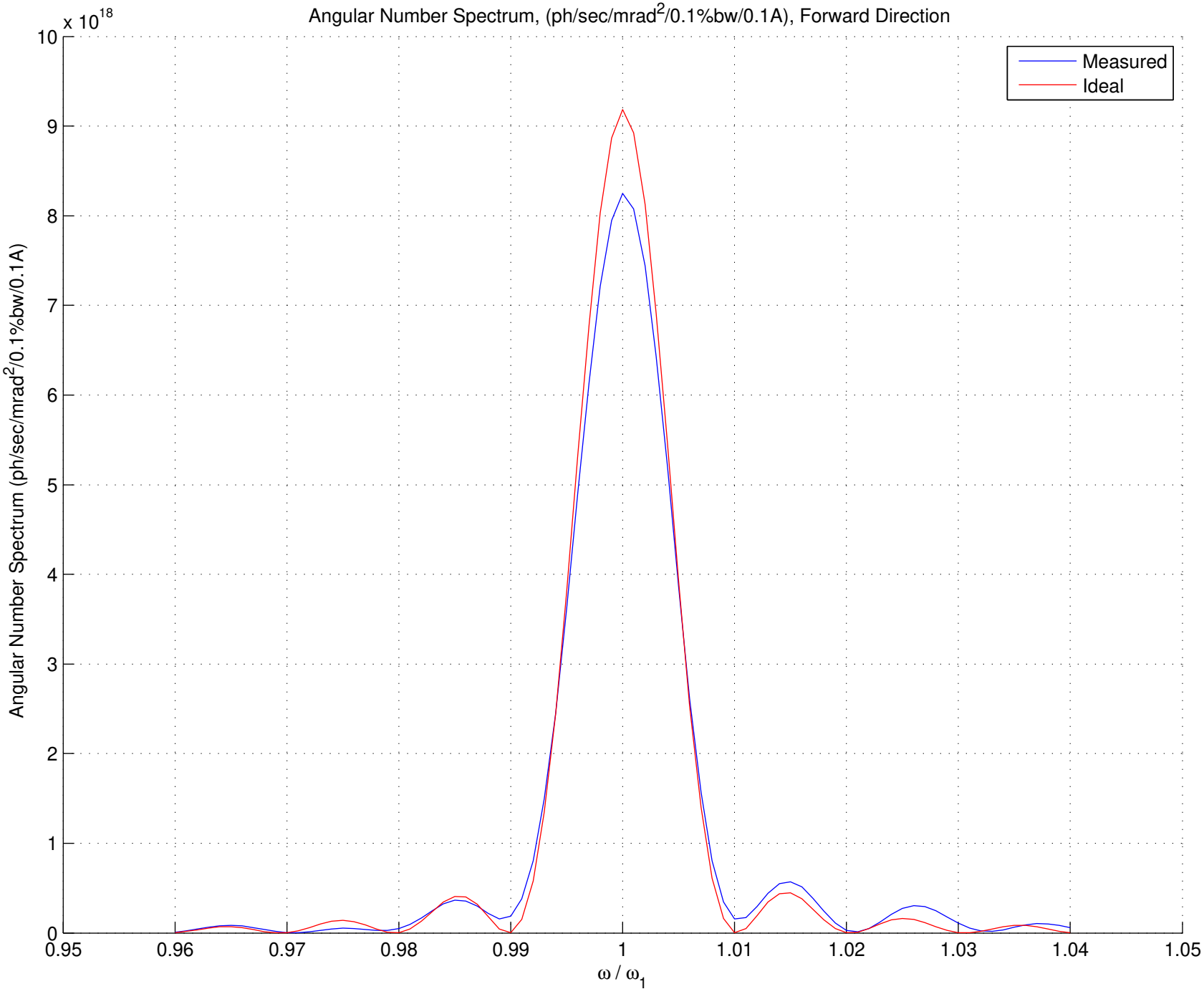

Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
5
36
67
99
130
161
192
Pole
−200
−220
−240
−260
−280
−300
−320
Phase Error (deg)
−1.5
−1
−0.5
0
0.5
1
1.5
Z (m)

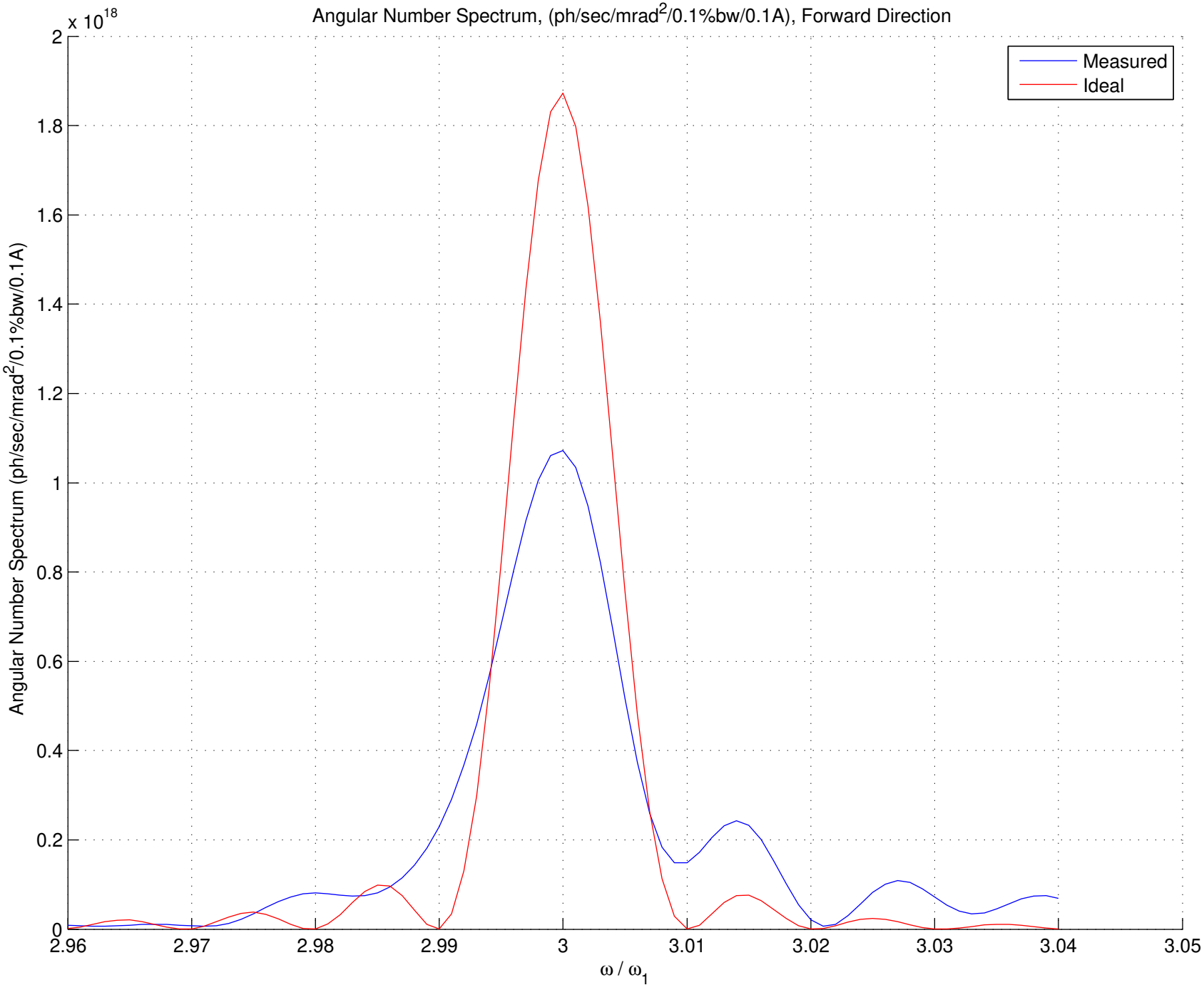

Phase Integral And Effective Length
x 10^-6
PI
Fit
Phase Integral (T^2m^3)
Z (m)
Effective Length = 3.079400 m
3
2.5
2
1.5
1
0.5
0
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2

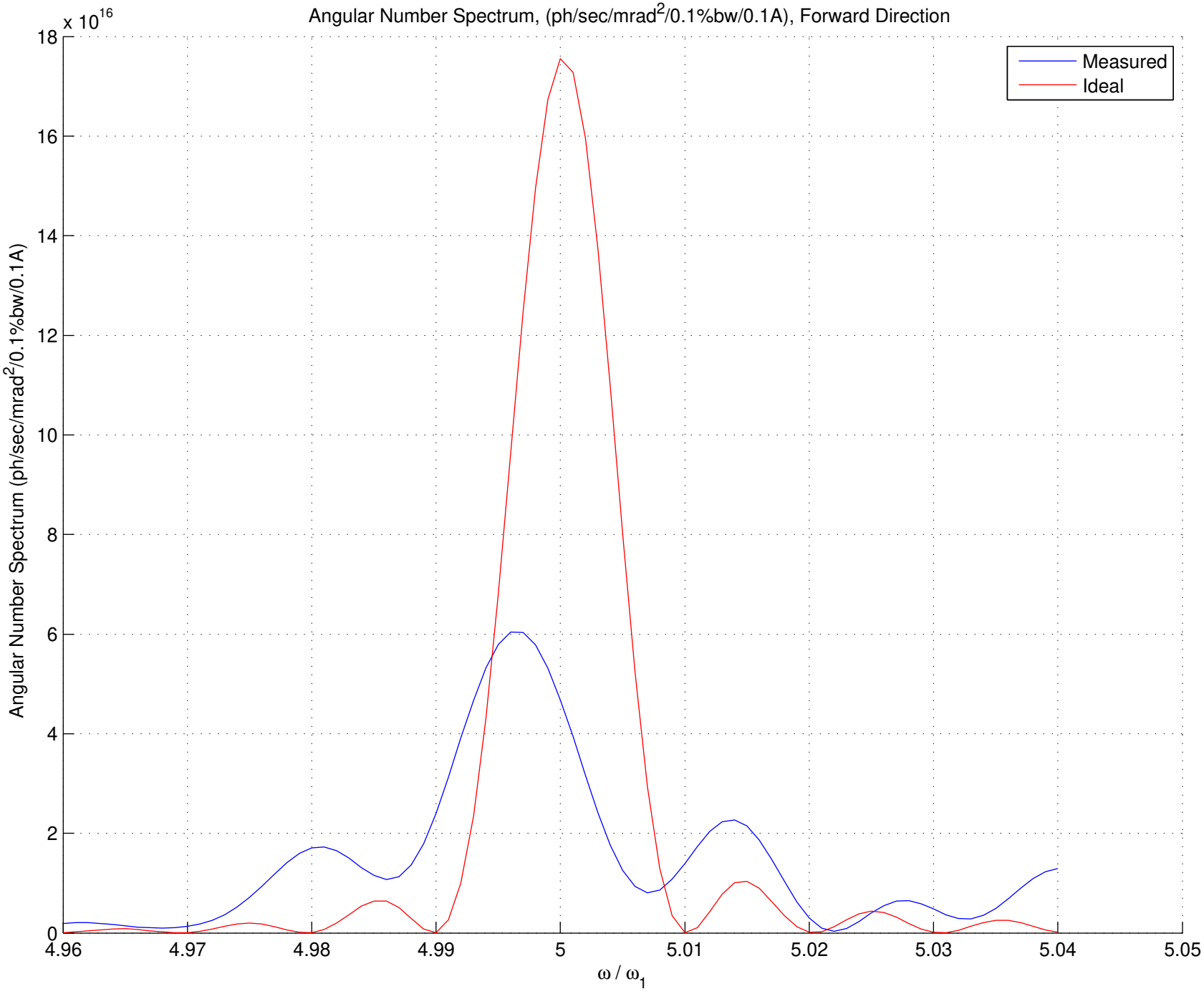

Re and Im Parts Of Ex(ω), Forward Direction, ω = ω1
90
1.5e−11
120
60
1e−11
150
30
5e−12
180
0
210
330
240
300
270


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


Angular Number Spectrum, (ph/sec/mrad2/0.1%bw/0.1A), Forward Direction
x 10^18
9
8
7
6
5
4
3
2
1
0
Angular Number Spectrum (ph/sec/mrad2/0.1%bw/0.1A)
0
5
10
15
ω / ω1


Angular Number Spectrum, (ph/sec/mrad2/0.1%bw/0.1A), Forward Direction
x 10^18
Measured
Ideal
Angular Number Spectrum (ph/sec/mrad2/0.1%bw/0.1A)
ω / ω1
0
1
2
3
4
5
6
7
8
9
10
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/mrad2/0.1%bw/0.1A), Forward Direction
x 10^18
Measured
Ideal
Angular Number Spectrum (ph/sec/mrad2/0.1%bw/0.1A)
ω / ω1
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.96
2.97
2.98
2.99
3
3.01
3.02
3.03
3.04
3.05


Angular Number Spectrum, (ph/sec/mrad2/0.1%bw/0.1A), Forward Direction
x 10^16
Measured
Ideal
Angular Number Spectrum (ph/sec/mrad2/0.1%bw/0.1A)
ω / ω1
18
16
14
12
10
8
6
4
2
0
4.96
4.97
4.98
4.99
5
5.01
5.02
5.03
5.04
5.05