SLAC Magnetic Measurements

EPU Analysis
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Parameters:
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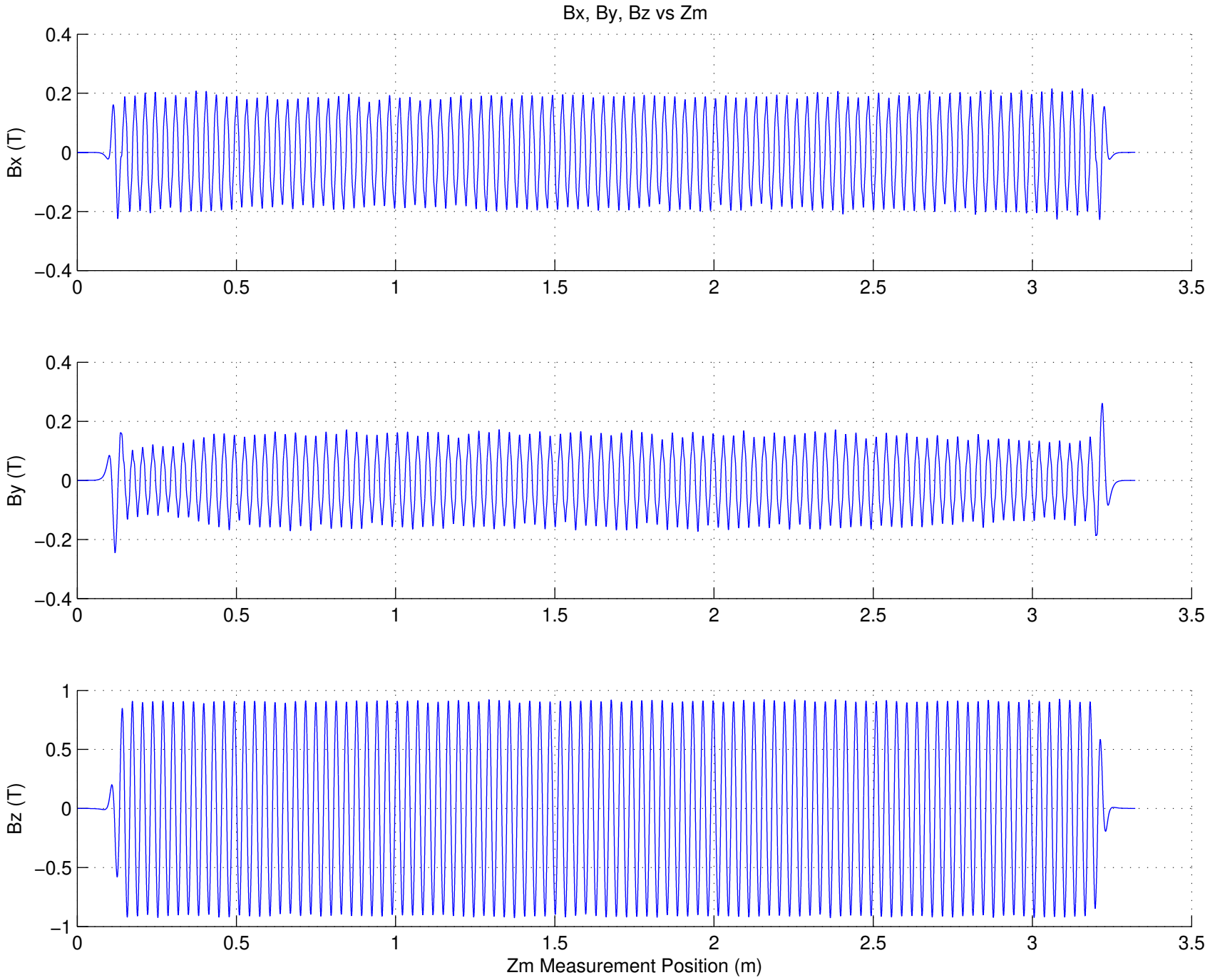
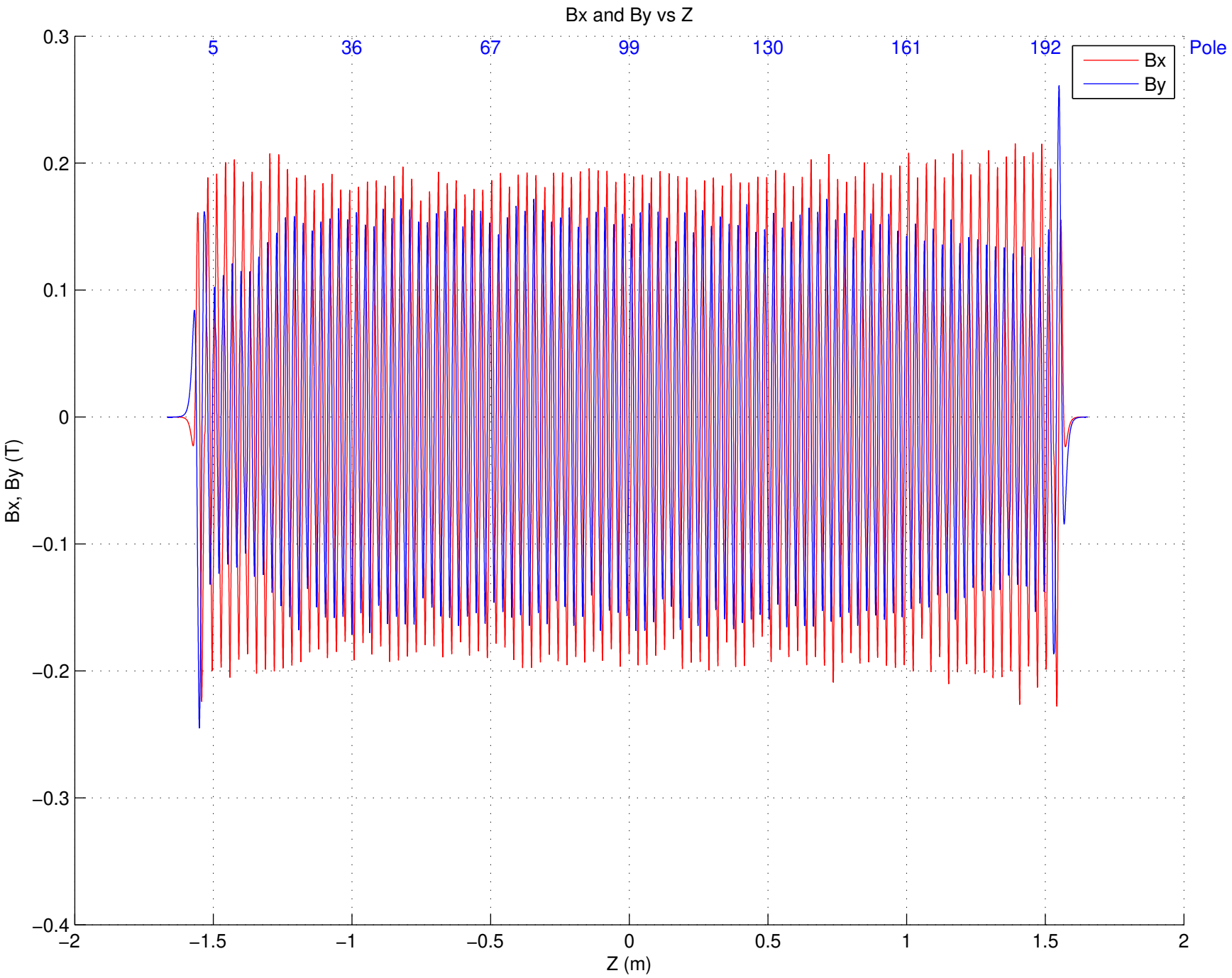
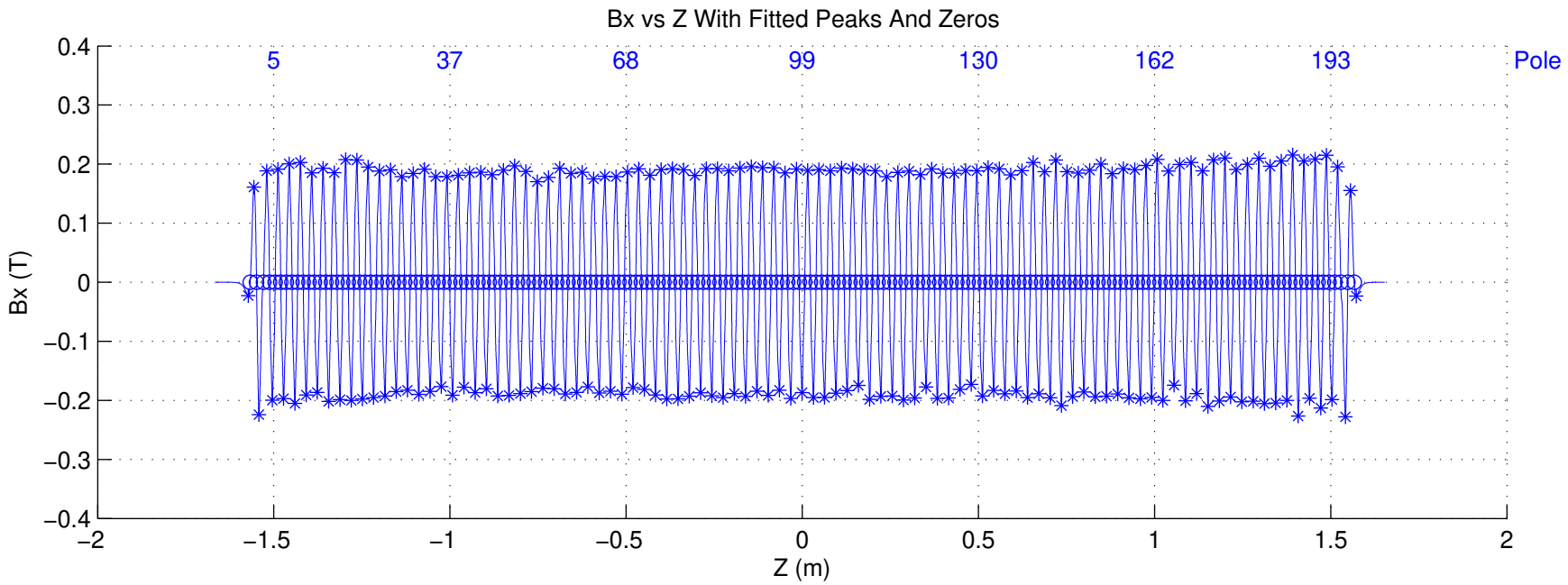
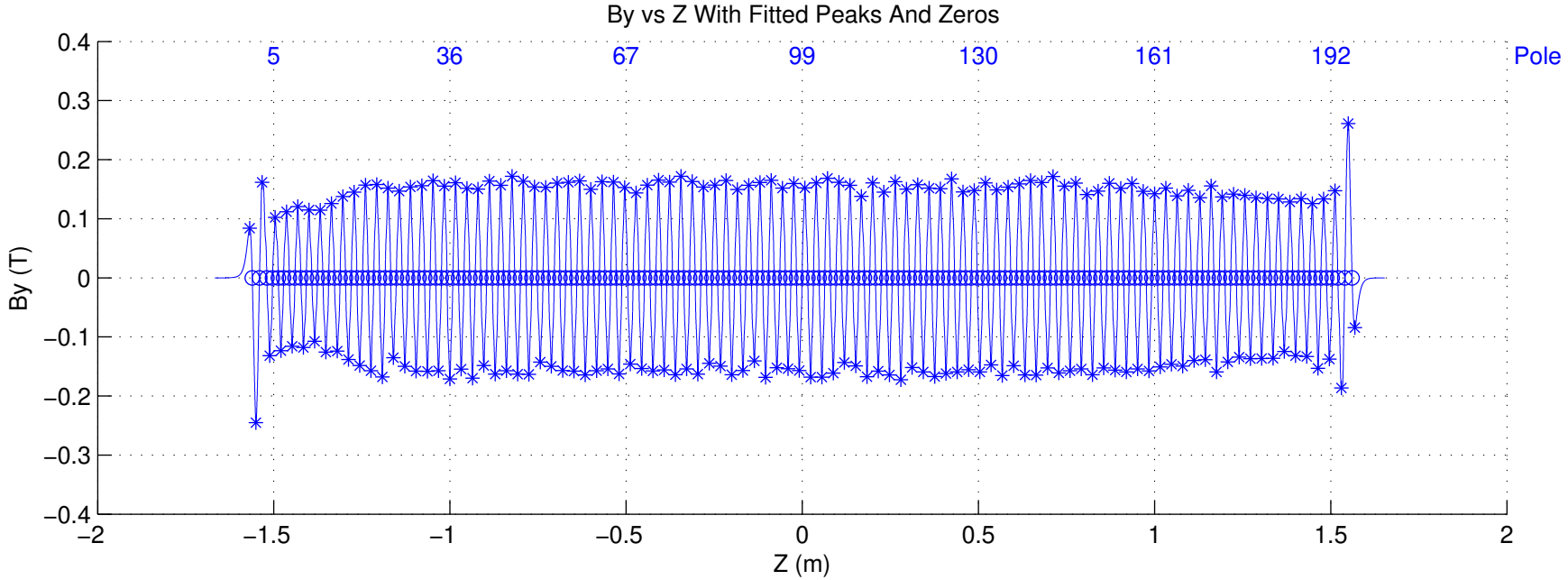
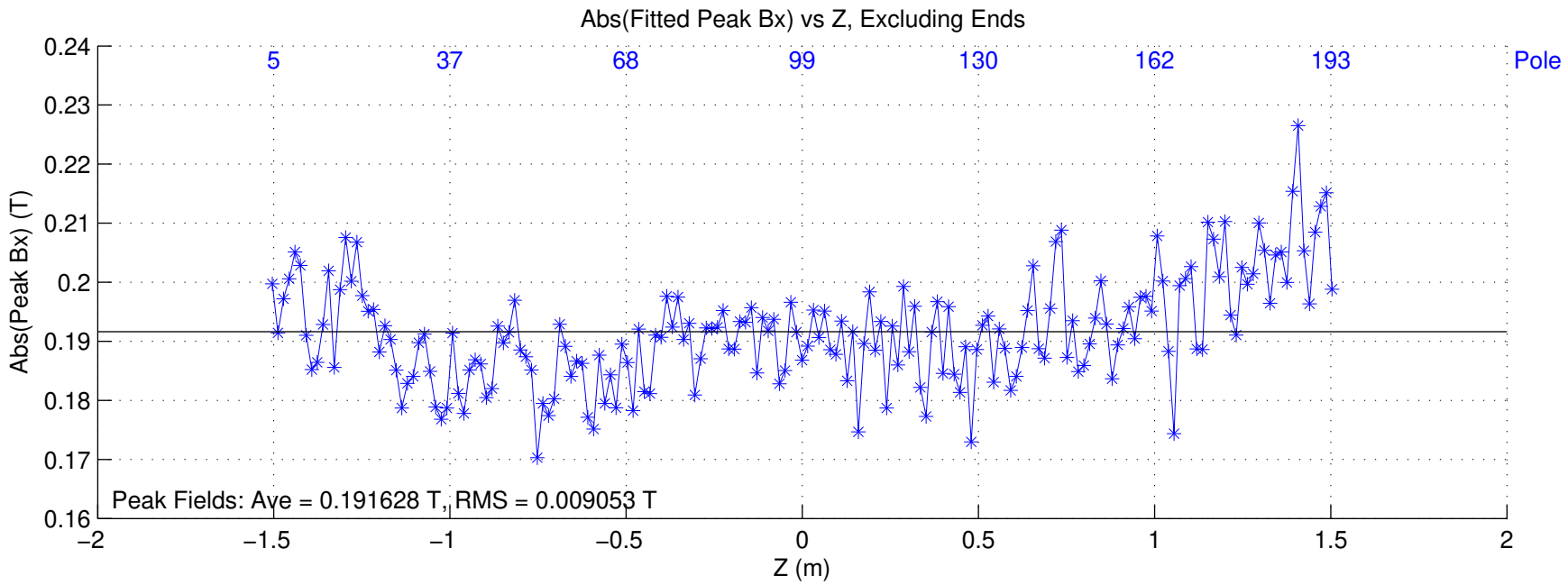
INPUT–FILE–NAME =hall2–anal–meas–field.dat
INPUT–FILE–TYPE =ZBXYZH
CORR–REQUIRED =0
GAMMA =26627.1
NOM–LAMBDA–U =0
NOM–K–VALUE =0
NOM–LAMBDA–R =0
NUM–POLES =196
NUM–END–POLES =4
CELL–LENGTH =3.126

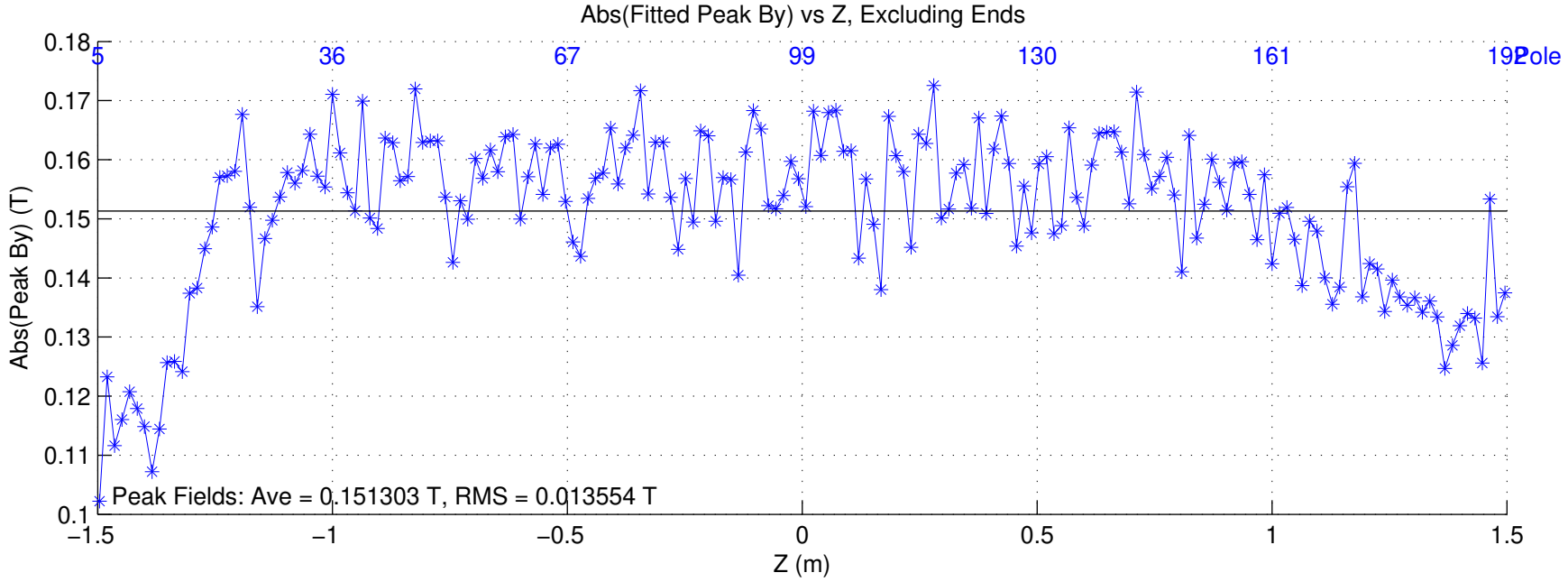

Bx, By, Bz vs Zm
Bx (T)
By (T)
Bz (T)
0.4
0.2
0
−0.2
−0.4
1
0.5
−0.5
−1
0
0.5
1
1.5
2
2.5
3
3.5
Zm Measurement Position (m)

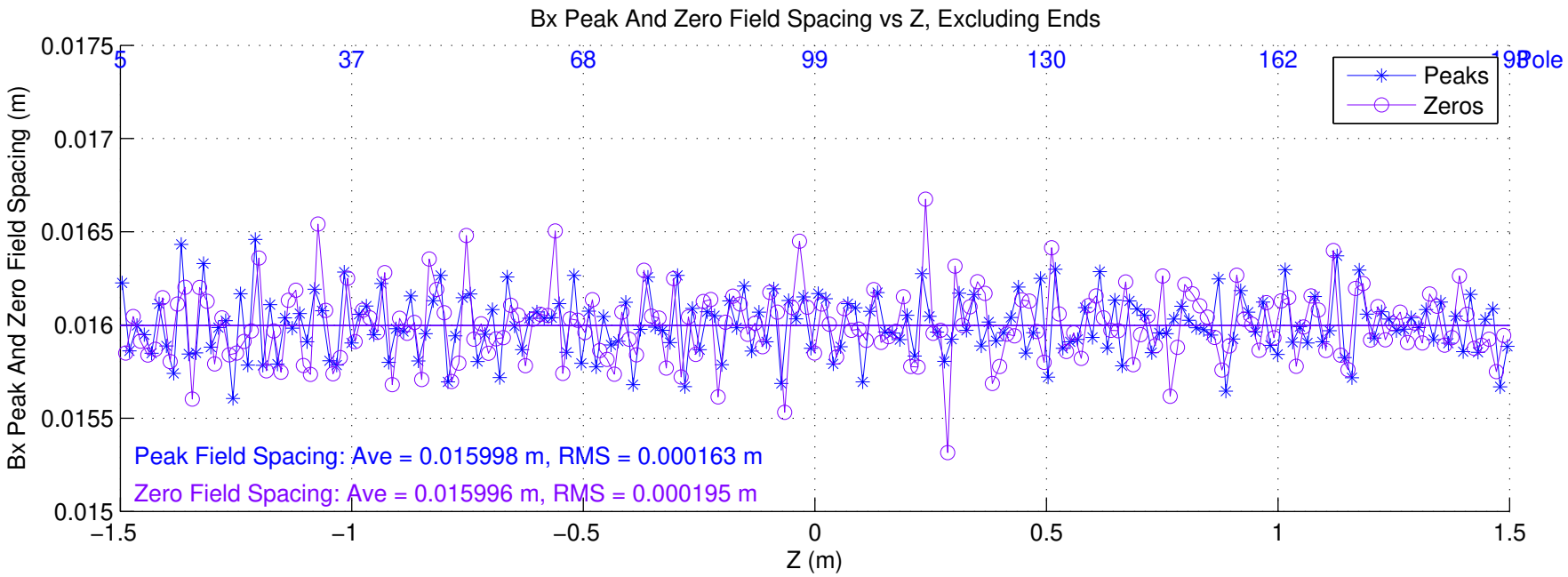

Bx and By vs Z
5
36
67
99
130
161
192
Pole
Bx
By
0.3
0.2
0.1
0
−0.1
−0.2
−0.3
−0.4
Bx, By (T)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

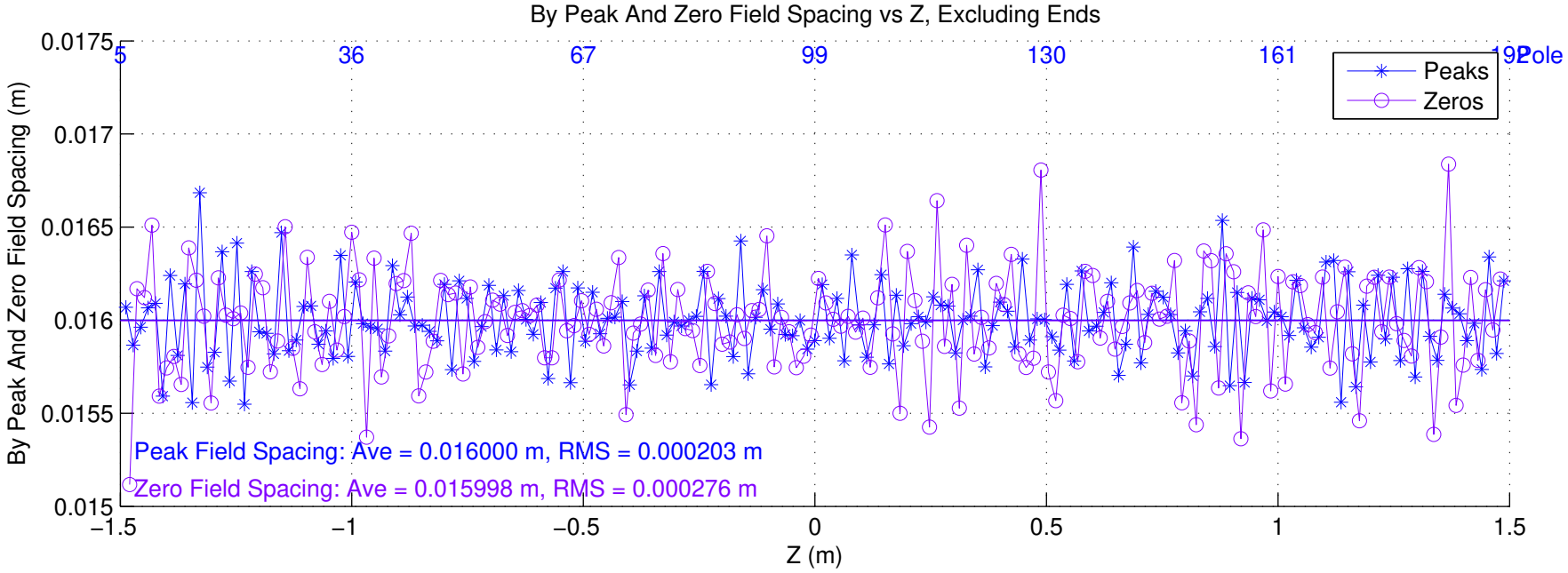

Bx vs Z With Fitted Peaks And Zeros
5
37
68
99
130
162
193
Pole
0.4
0.3
0.2
0.1
0
−0.1
−0.2
−0.3
−0.4
Bx (T)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

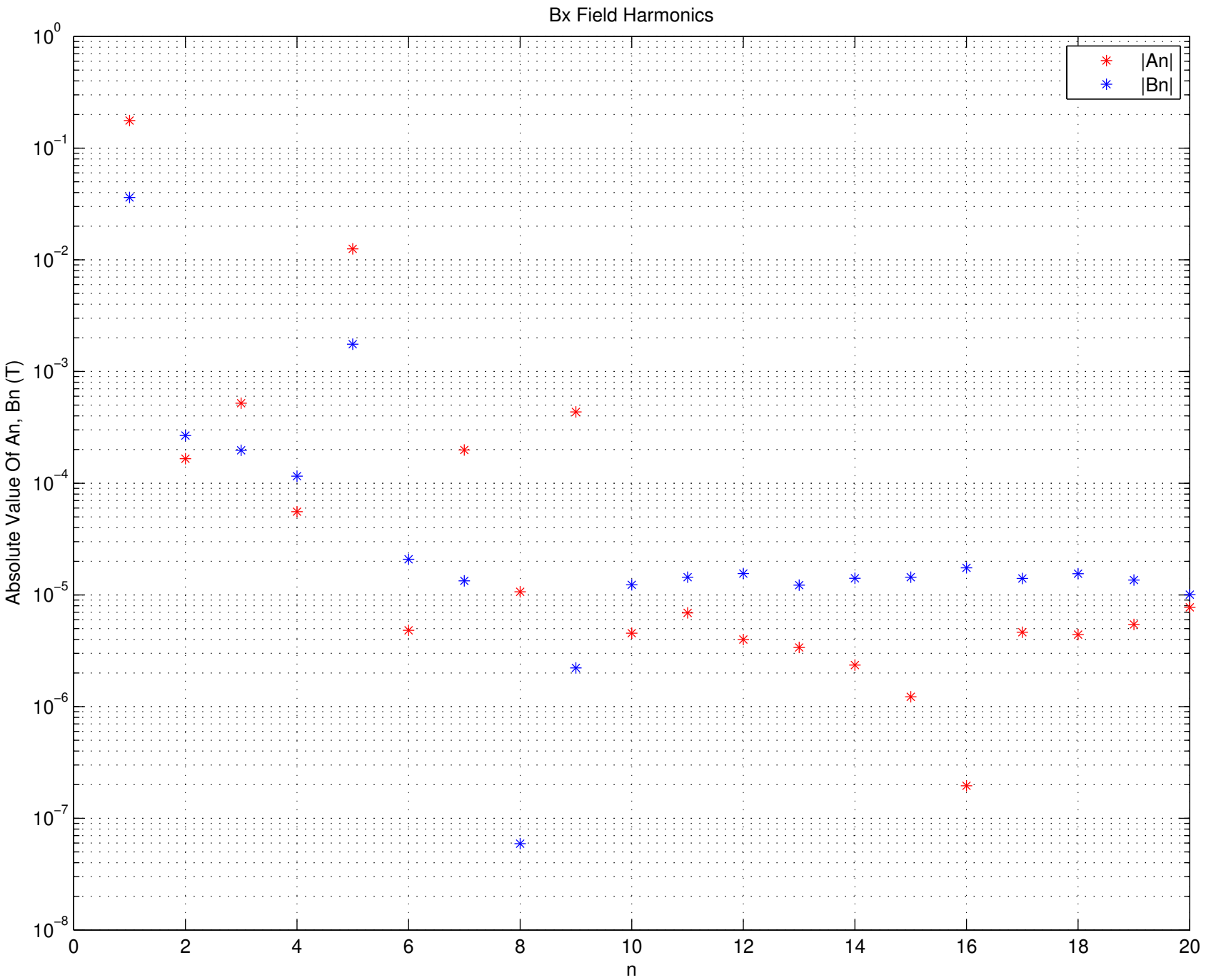

By vs Z With Fitted Peaks And Zeros
5
36
67
99
130
161
192
Pole
0.4
0.3
0.2
0.1
0
−0.1
−0.2
−0.3
−0.4
By (T)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

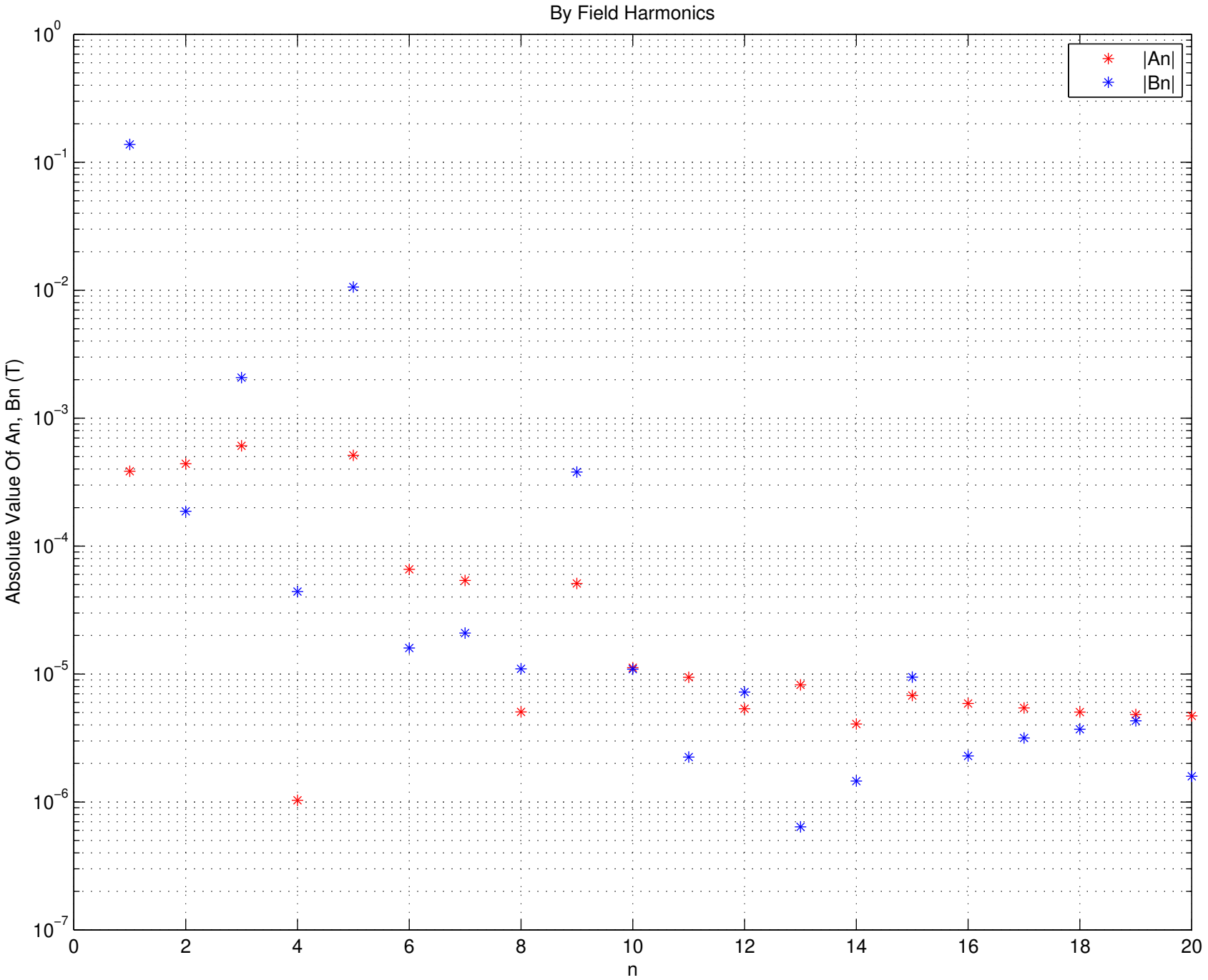

Abs(Fitted Peak Bx) vs Z, Excluding Ends
5
37
68
99
130
162
193
Pole
0.24
0.23
0.22
0.21
0.2
0.19
0.18
0.17
0.16
Abs(Peak Bx) (T)
Peak Fields: Ave = 0.191628 T, RMS = 0.009053 T
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

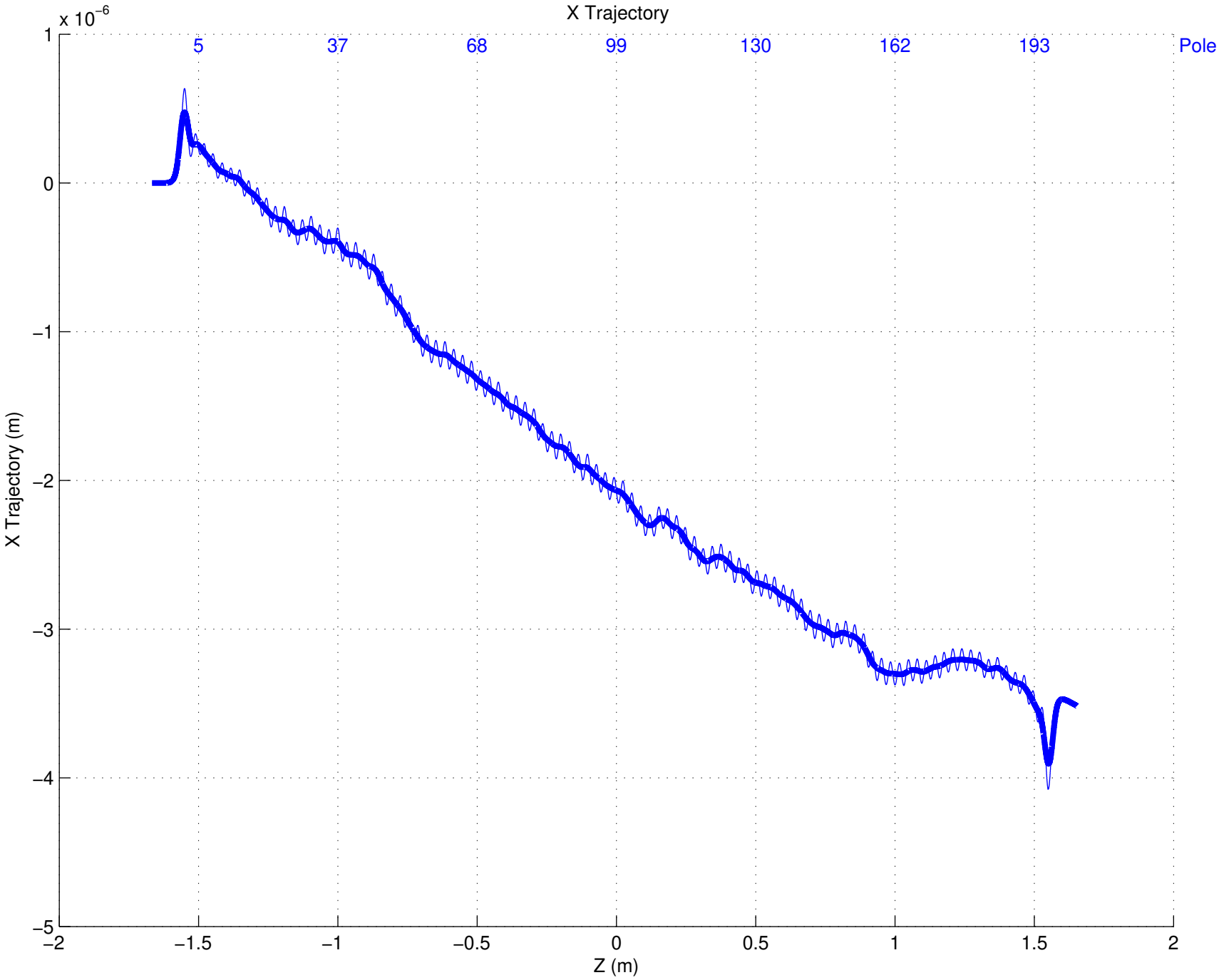

Abs(Fitted Peak By) vs Z, Excluding Ends
5
36
67
99
130
161
192
Pole
0.18
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.1
Abs(Peak By) (T)
Peak Fields: Ave = 0.151303 T, RMS = 0.013554 T
−1.5
−1
−0.5
0
0.5
1
1.5
Z (m)

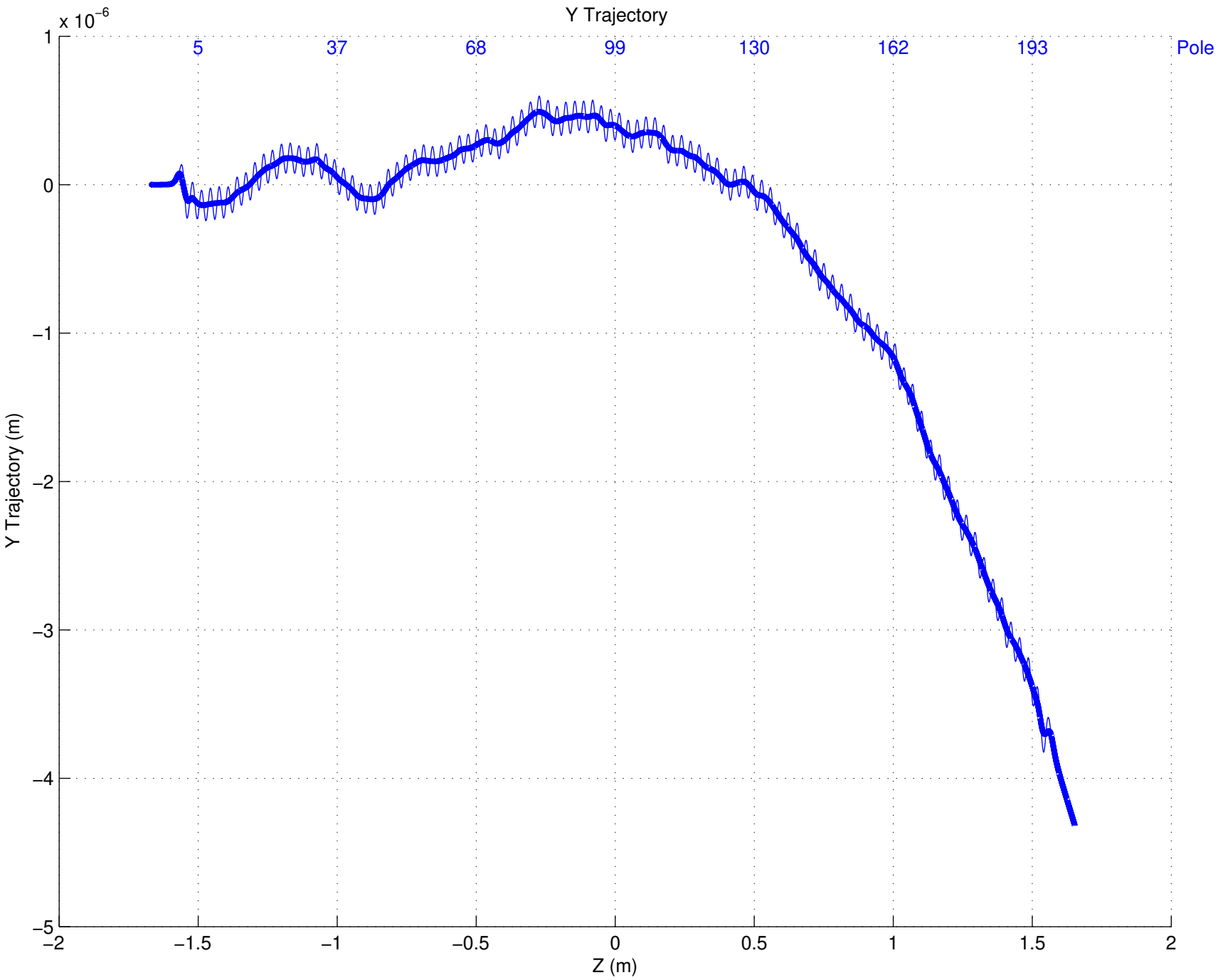

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
Z (m)
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.015998 m, RMS = 0.000163 m
Zero Field Spacing: Ave = 0.015996 m, RMS = 0.000195 m
0.0175
0.017
0.0165
0.016
0.0155
0.015
5
37
68
99
130
162
193
−1.5
−1
−0.5
0
0.5
1
1.5

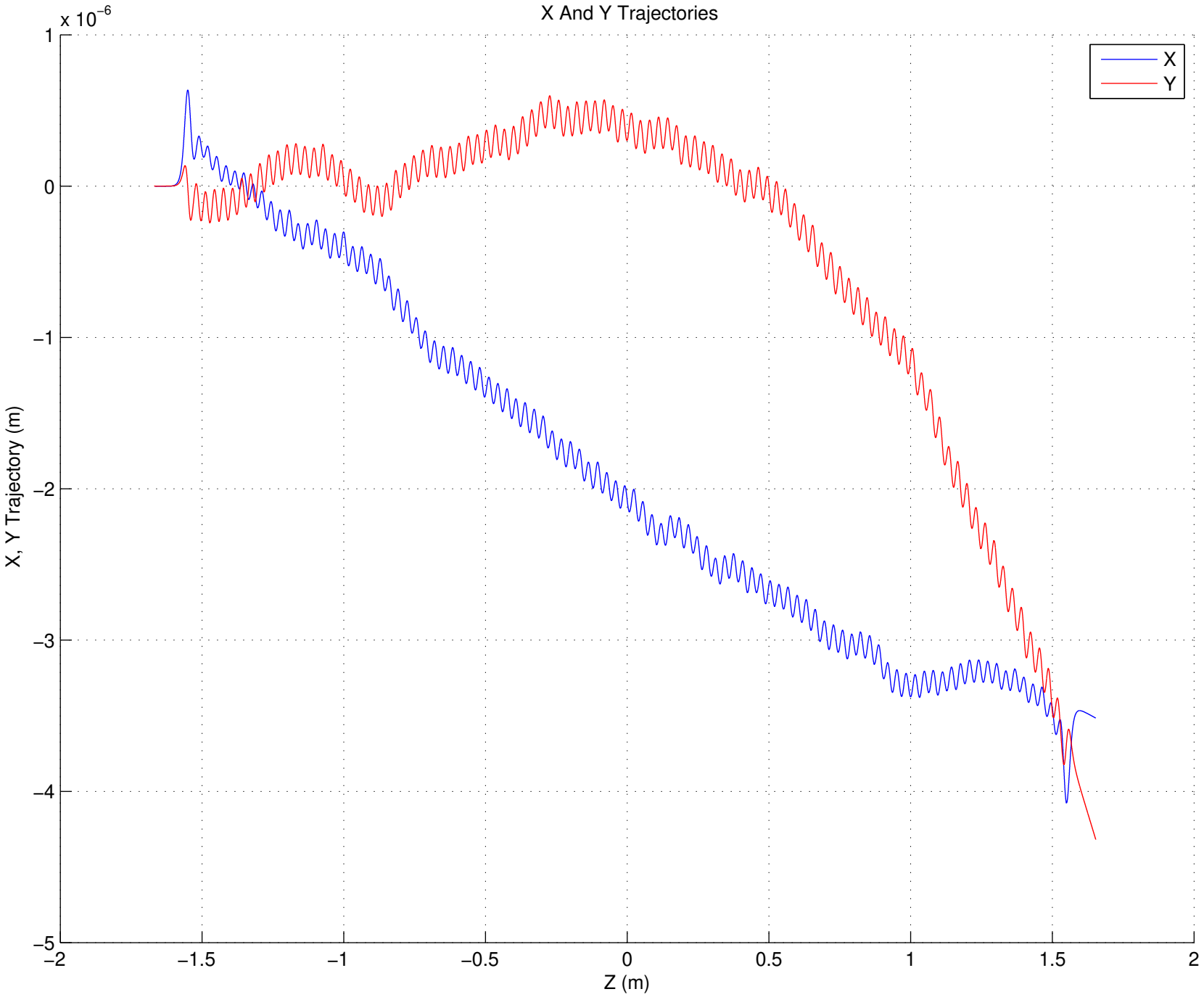

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
Z (m)
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016000 m, RMS = 0.000203 m
Zero Field Spacing: Ave = 0.015998 m, RMS = 0.000276 m
0.0175
0.017
0.0165
0.016
0.0155
0.015
5
36
67
99
130
161
192
−1.5
−1
−0.5
0
0.5
1
1.5

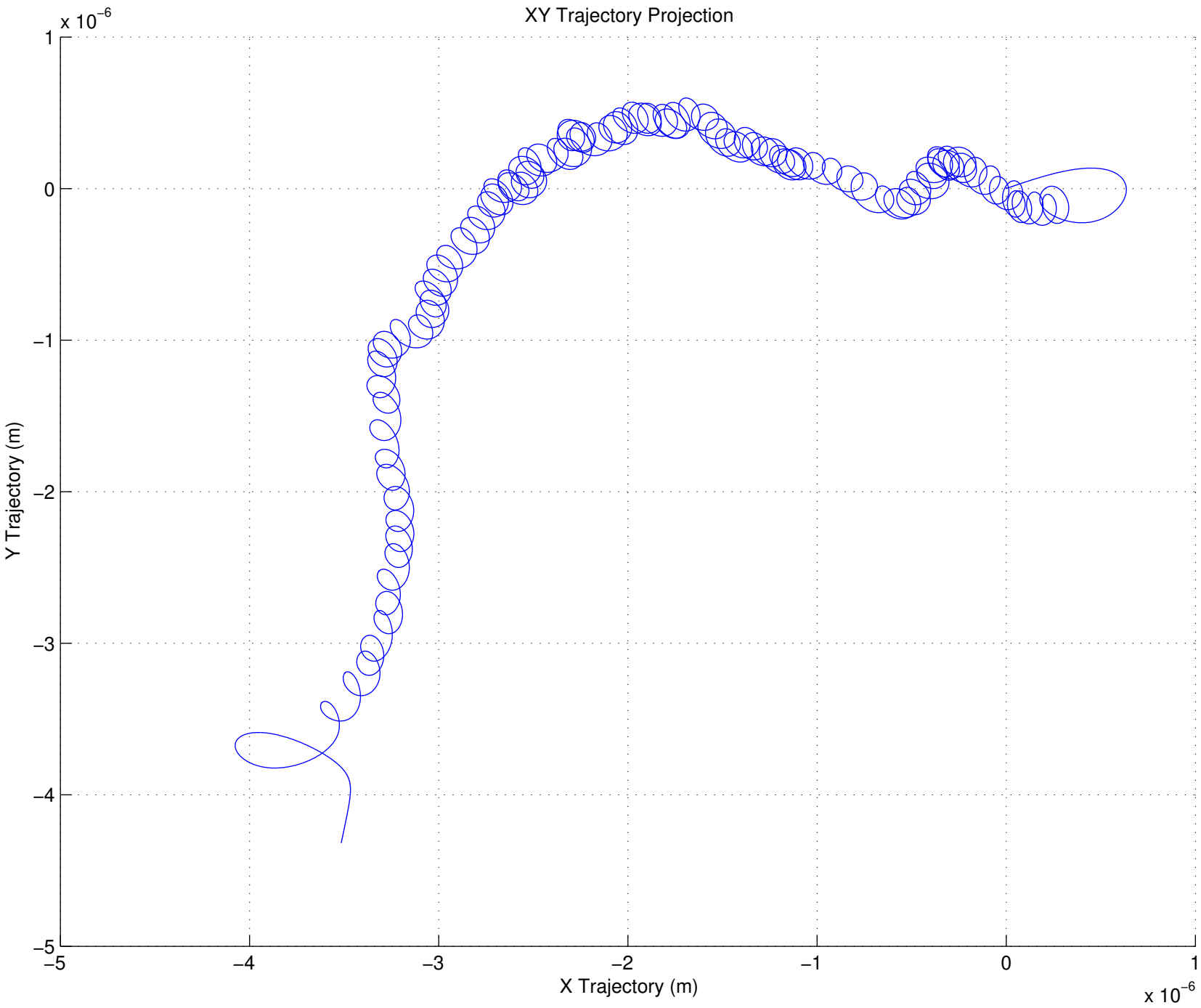

Bx Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
10^{-8}
0
2
4
6
8
10
12
14
16
18
20

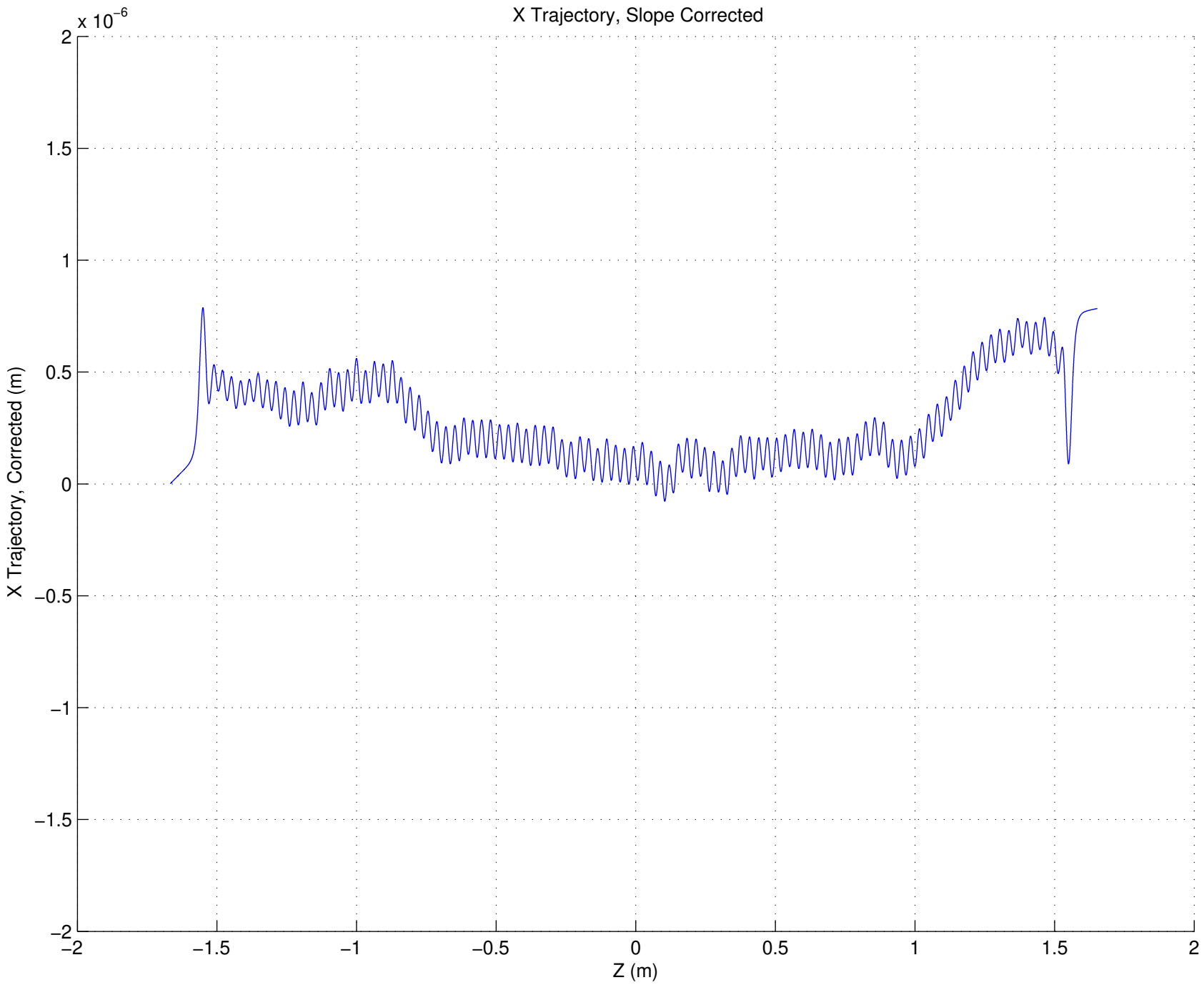

By Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
0
2
4
6
8
10
12
14
16
18
20

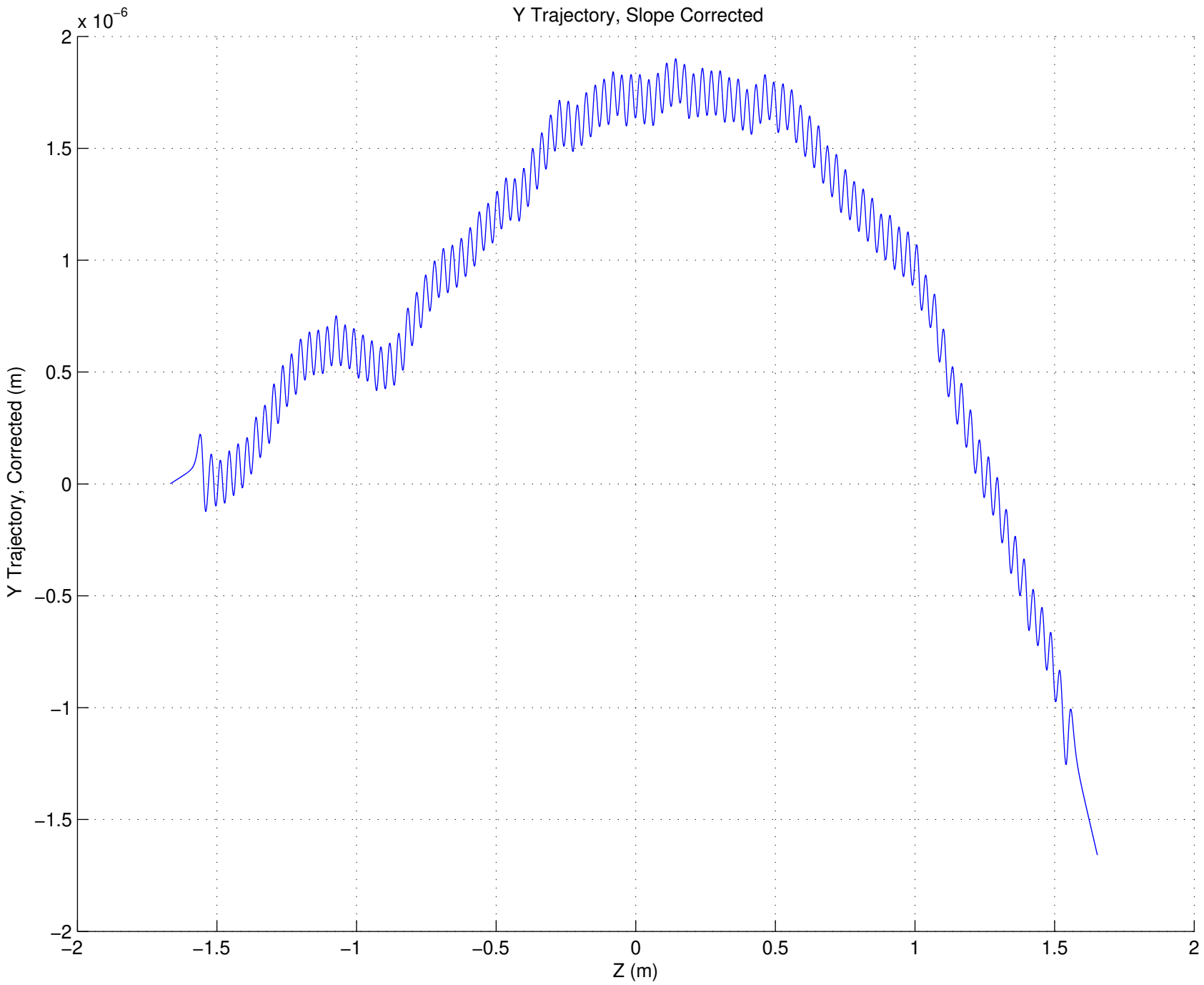

X Trajectory
x 10^-6
5
37
68
99
130
162
193
Pole
1
0
−1
−2
−3
−4
−5
X Trajectory (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

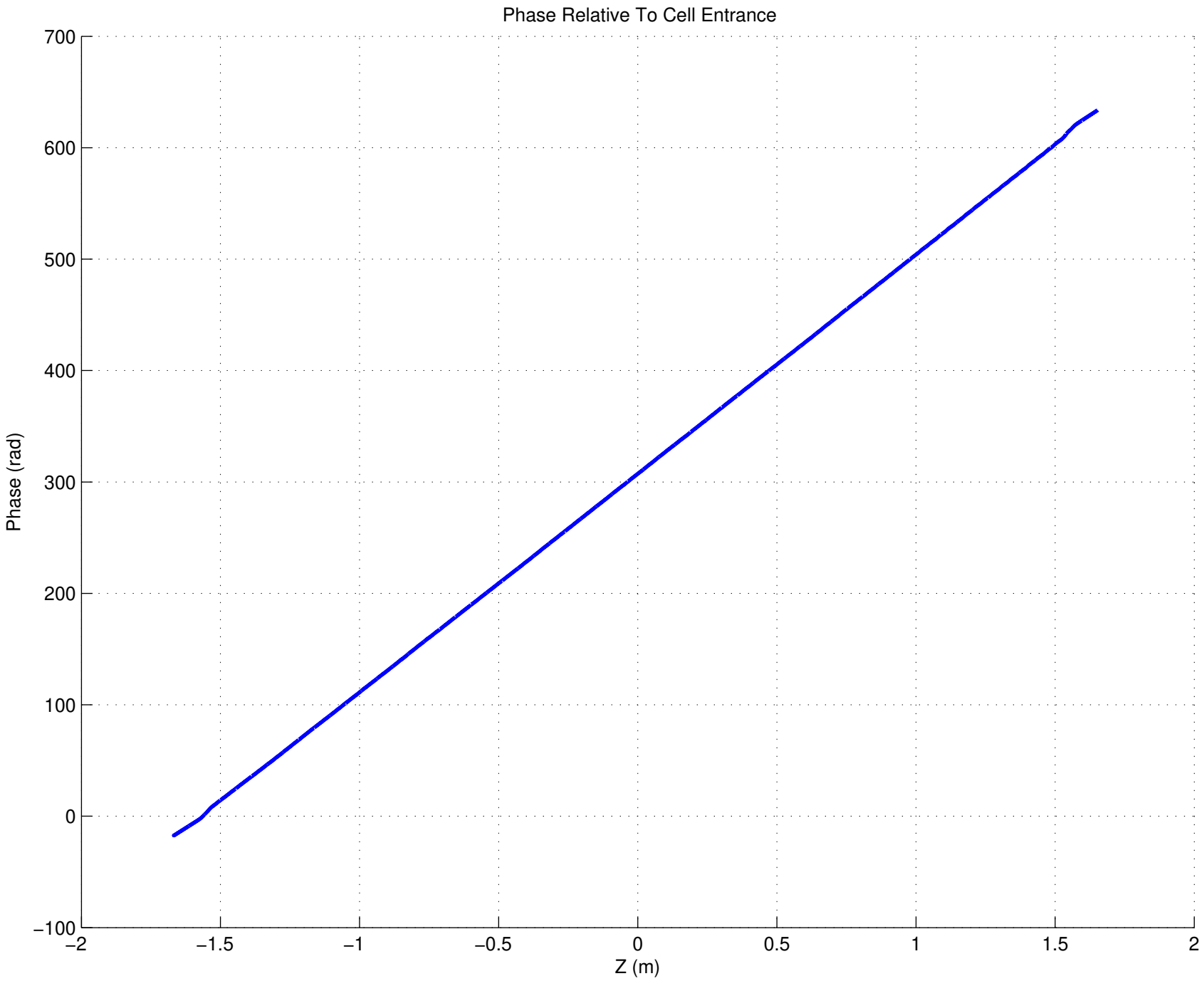

Y Trajectory
x 10^-6
1
0
−1
−2
−3
−4
−5
Y Trajectory (m)
5
37
68
99
130
162
193
Pole
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

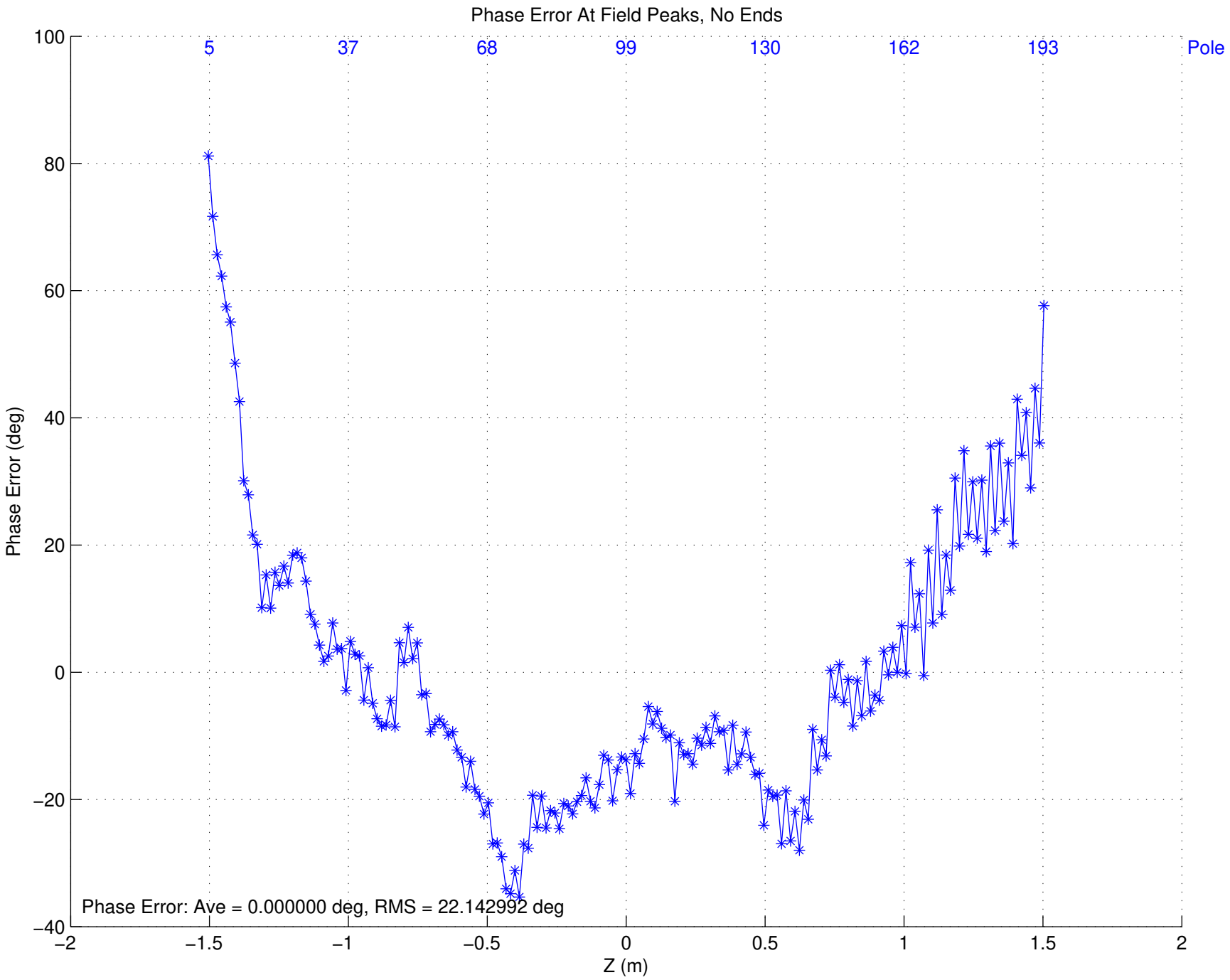

X And Y Trajectories
x 10^-6
X
Y
X, Y Trajectory (m)
Z (m)
1
0
−1
−2
−3
−4
−5
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2

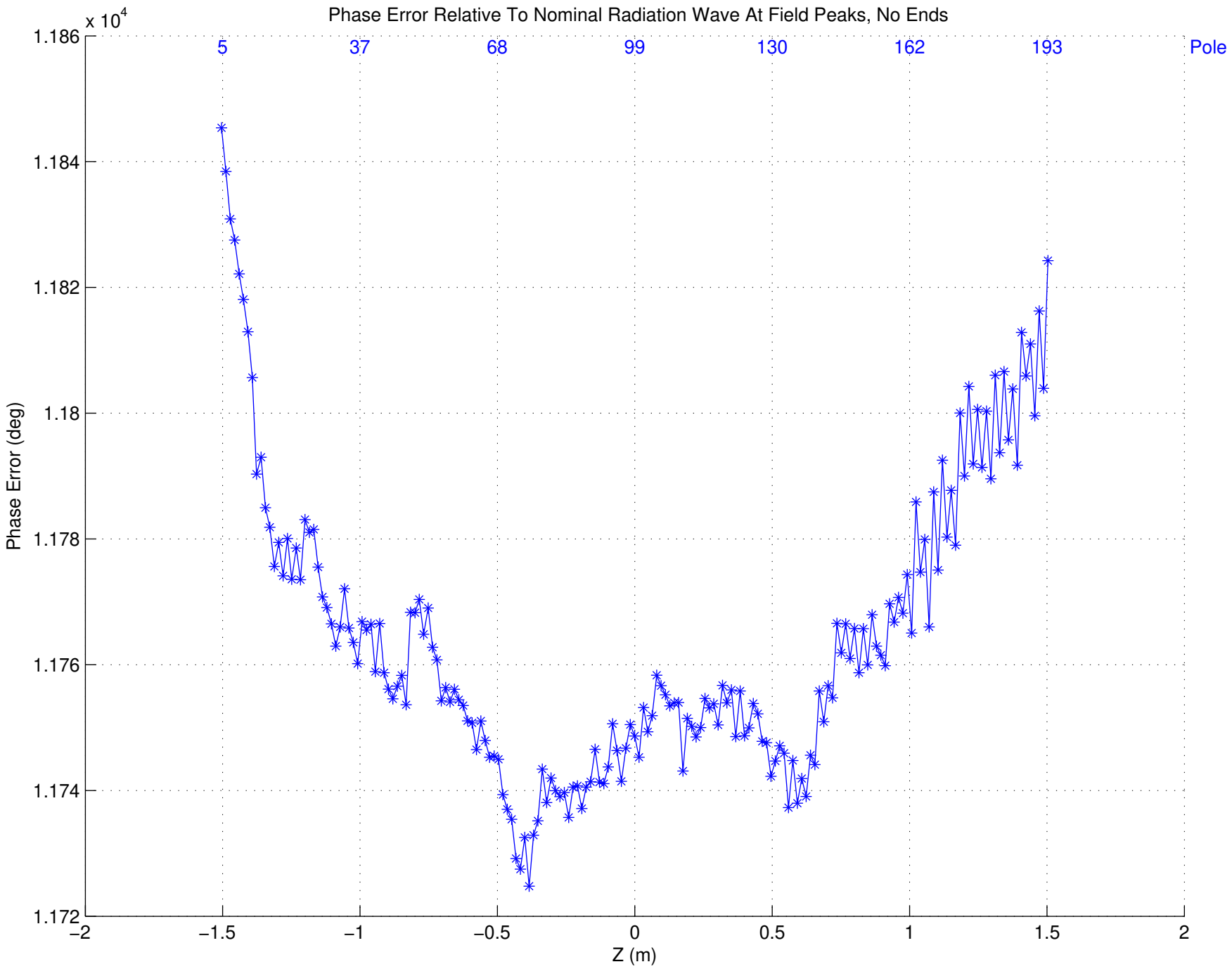

XY Trajectory Projection
x 10^-6
1
0
−1
−2
−3
−4
−5
Y Trajectory (m)
−5
−4
−3
−2
−1
0
1
X Trajectory (m)
x 10^-6

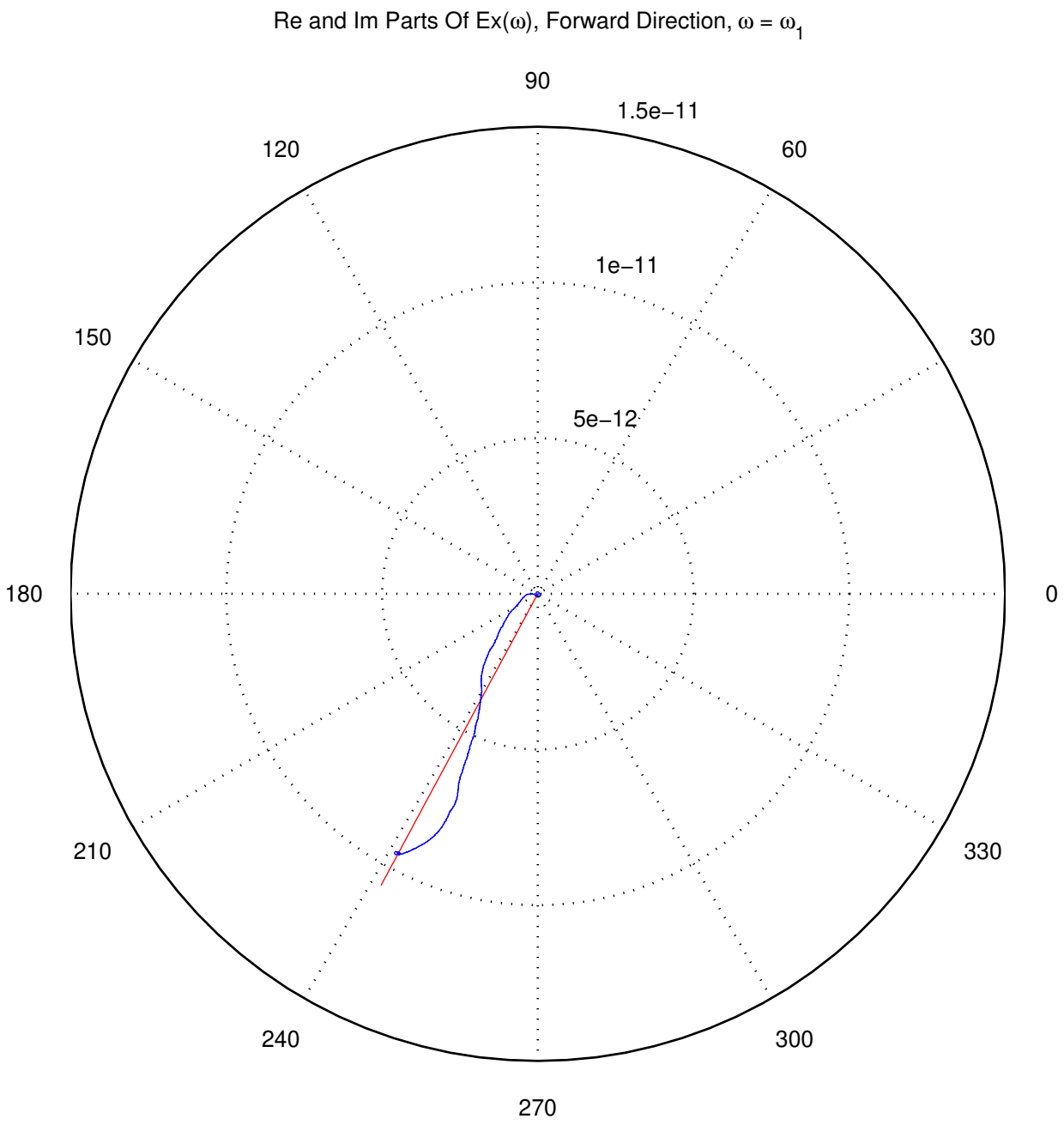

X Trajectory, Slope Corrected
x 10^-6
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
X Trajectory, Corrected (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

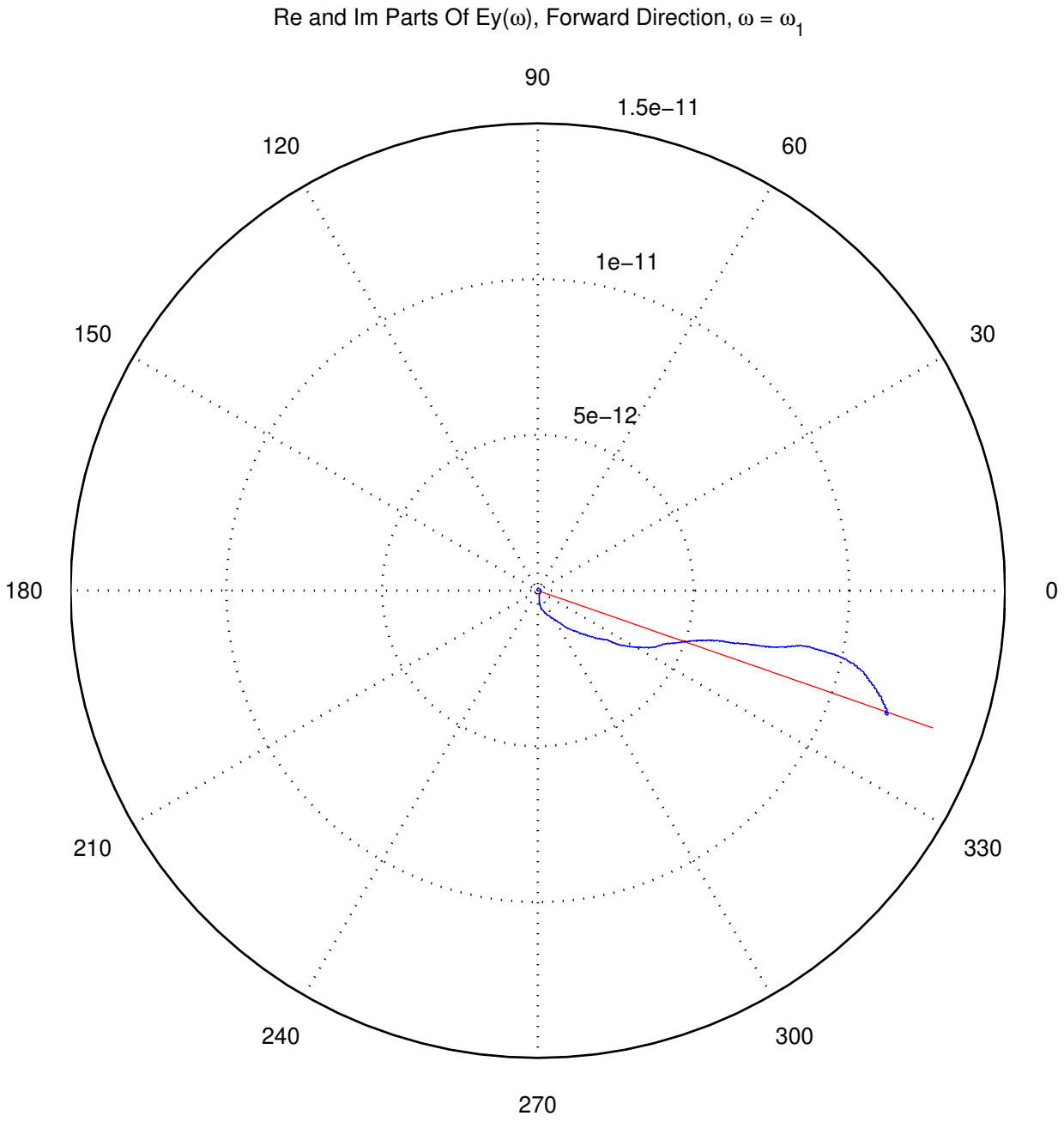

Y Trajectory, Slope Corrected
x 10^-6
Y Trajectory, Corrected (m)
Z (m)
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2

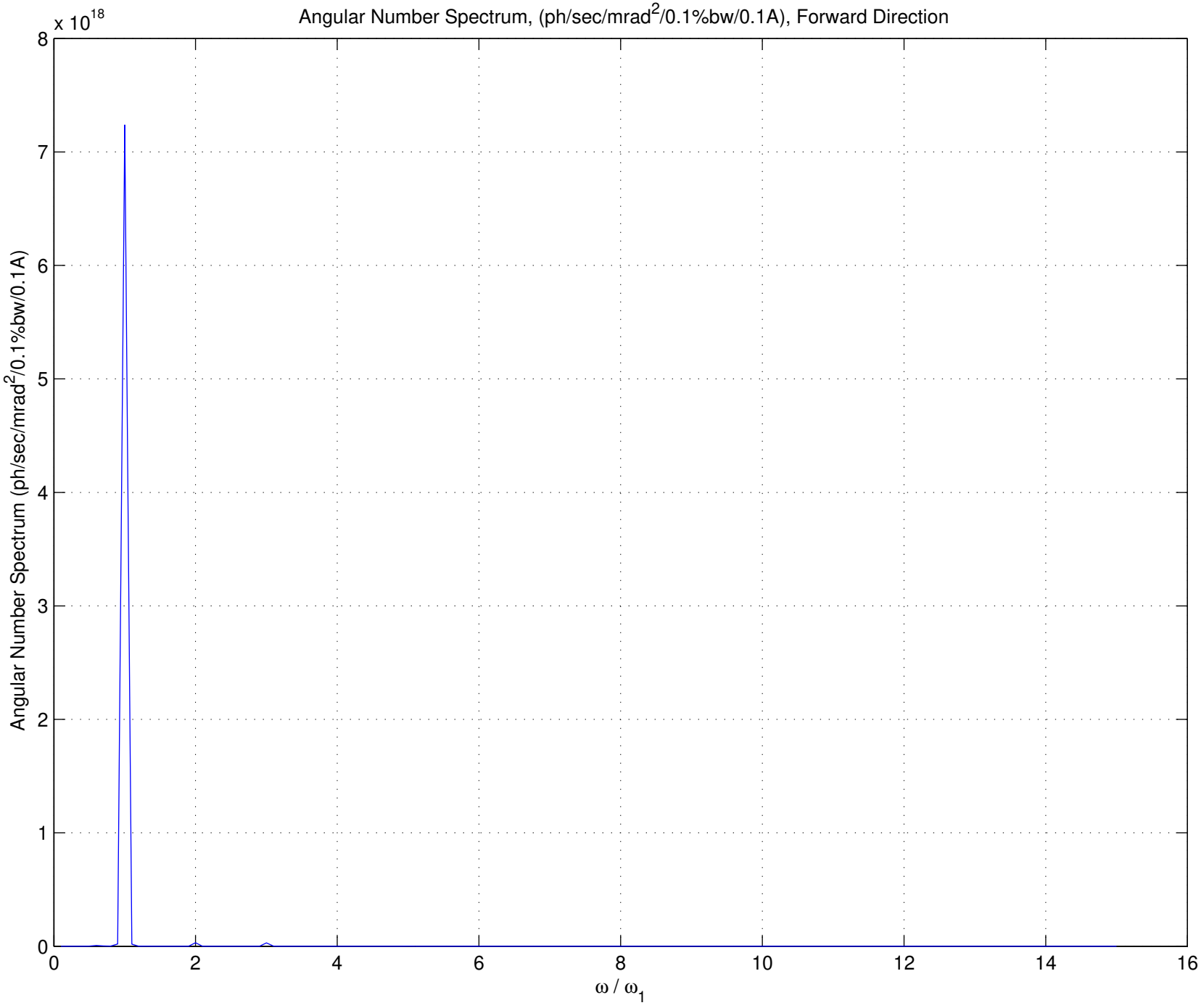

Phase Relative To Cell Entrance
Phase (rad)
Z (m)
700
600
500
400
300
200
100
0
−100
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2

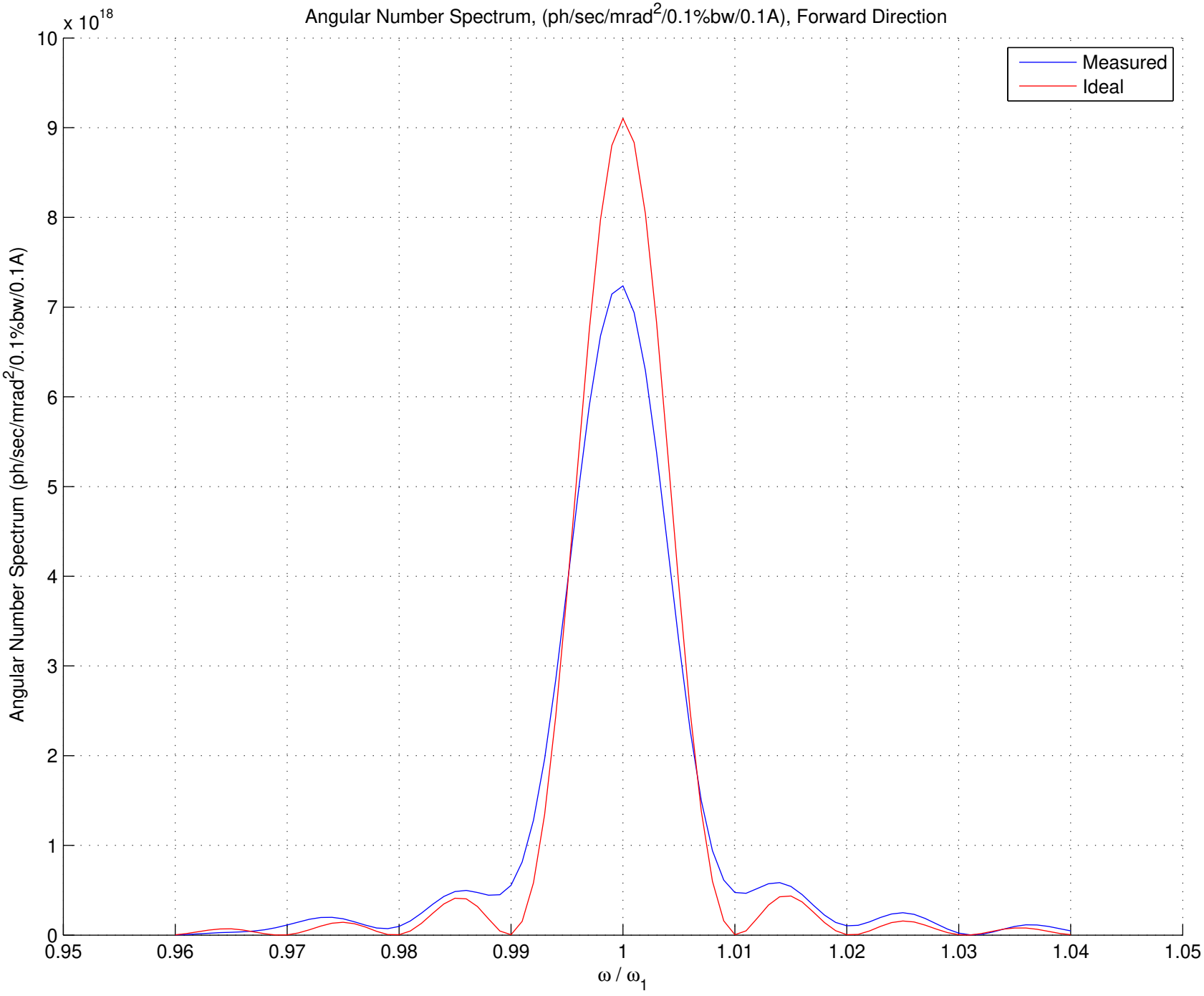

Phase Error At Field Peaks, No Ends
5
37
68
99
130
162
193
Pole
100
80
60
40
20
0
−20
−40
Phase Error (deg)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)
Phase Error: Ave = 0.000000 deg, RMS = 22.142992 deg

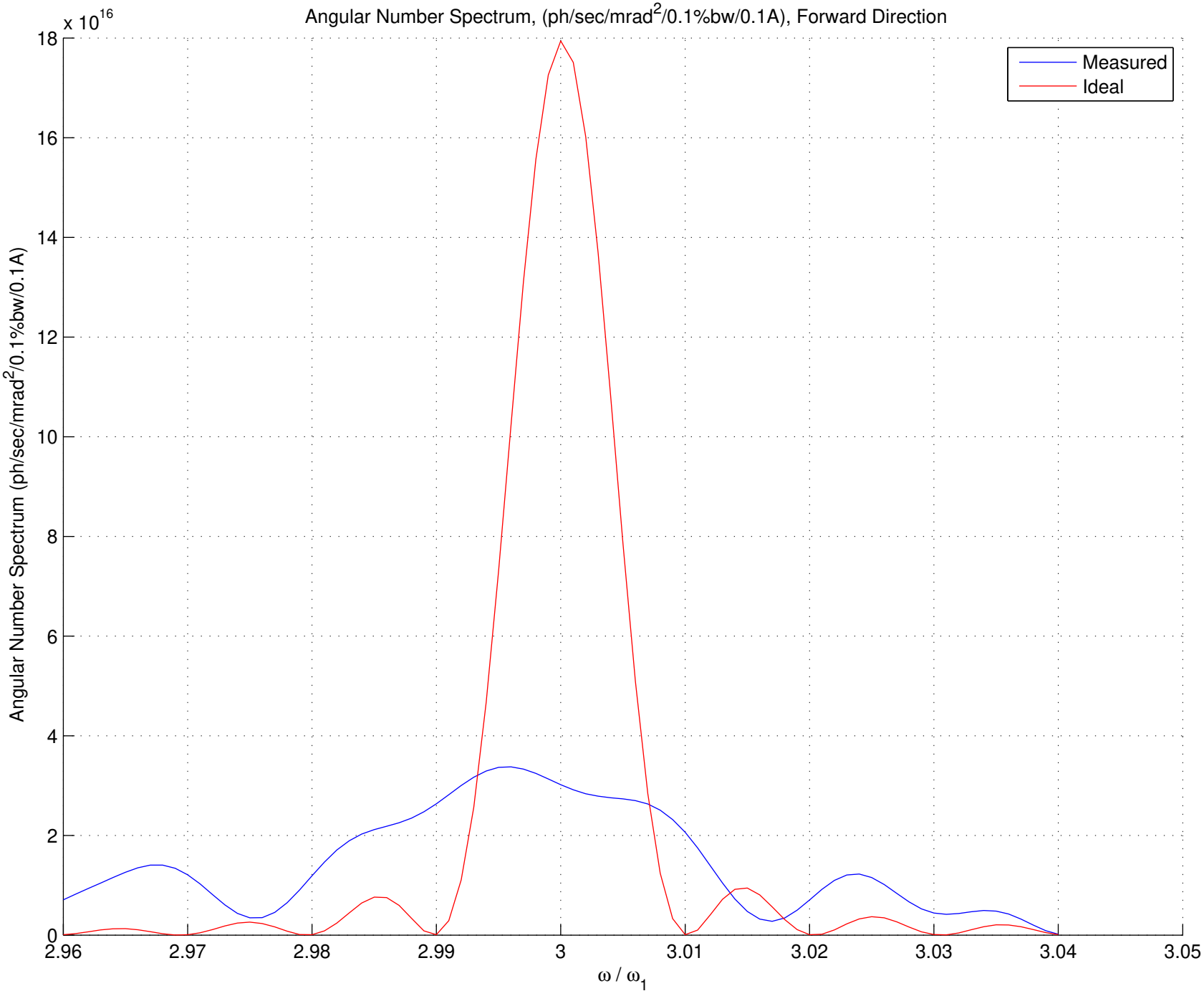

Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
x 10^4
1.186
1.184
1.182
1.18
1.178
1.176
1.174
1.172
Phase Error (deg)
5
37
68
99
130
162
193
Pole
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

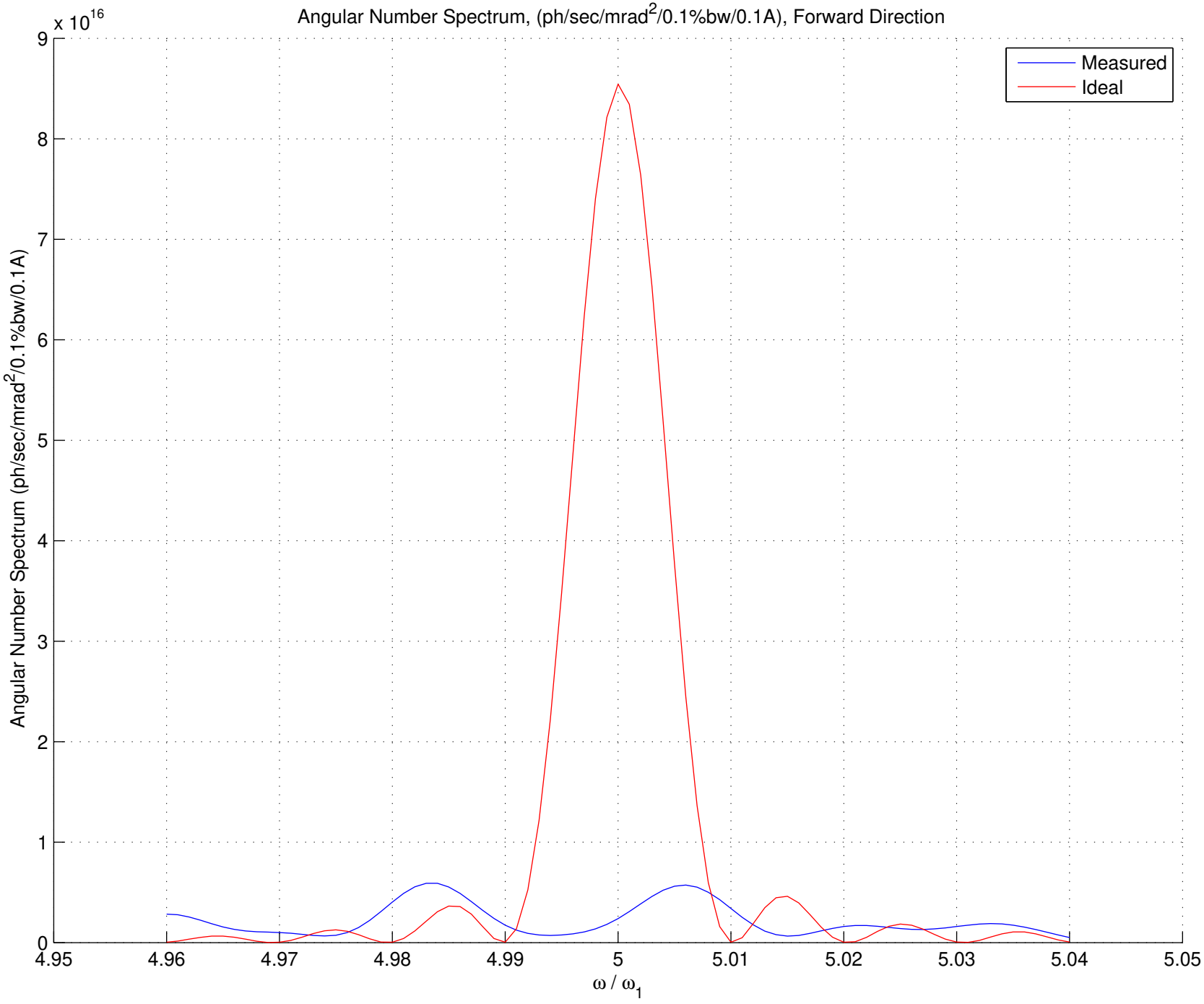

Re and Im Parts Of Ex(ω), Forward Direction, ω = ω1
90
1.5e−11
120
60
1e−11
150
30
5e−12
180
0
210
330
240
300
270


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/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
0
1
2
3
4
5
6
7
8
0
2
4
6
8
10
12
14
16


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)
ω / ω_1
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/mrad^2/0.1%bw/0.1A), Forward Direction
x 10^{16}
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
ω / $ω_1$
Measured
Ideal
0
2
4
6
8
10
12
14
16
18
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^{16}
Measured
Ideal
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
0
1
2
3
4
5
6
7
8
9
4.95
4.96
4.97
4.98
4.99
5
5.01
5.02
5.03
5.04
5.05
ω / $ω_1$