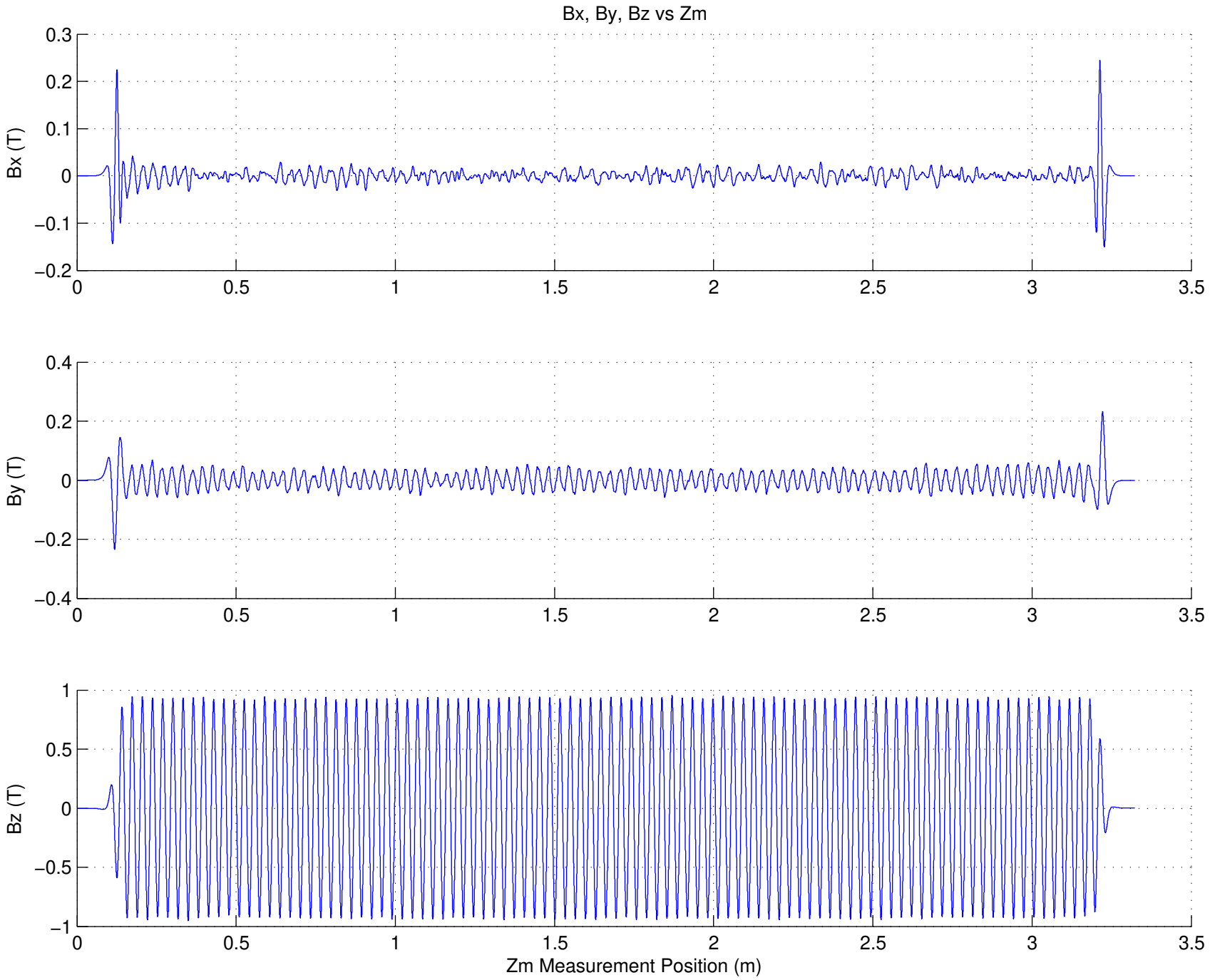
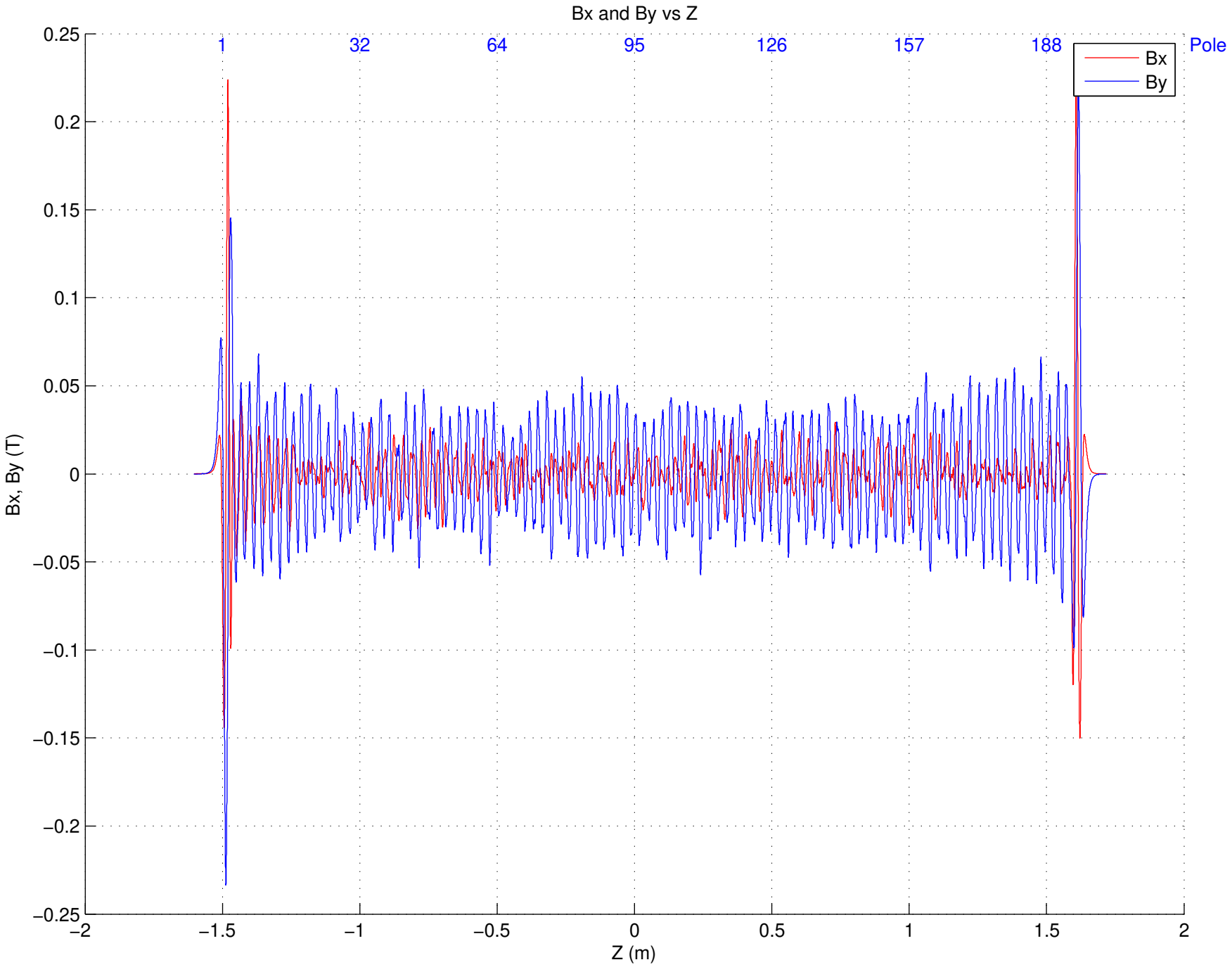
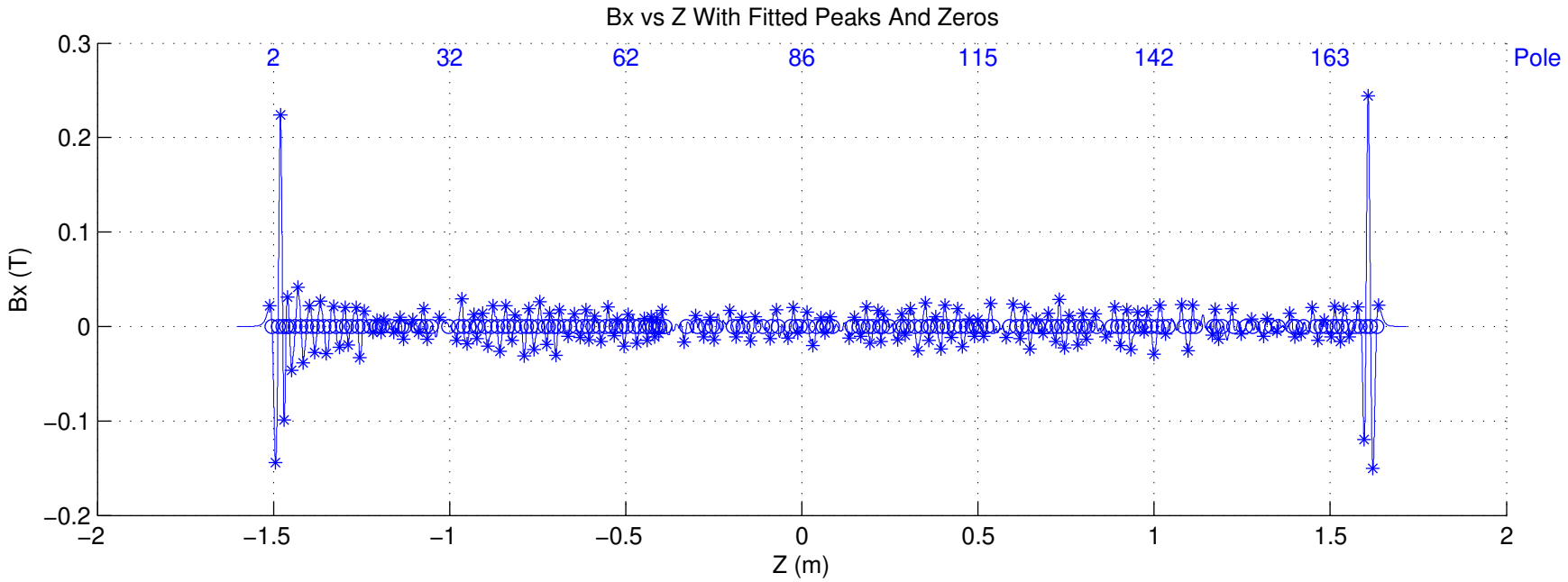
SLAC Magnetic Measurements

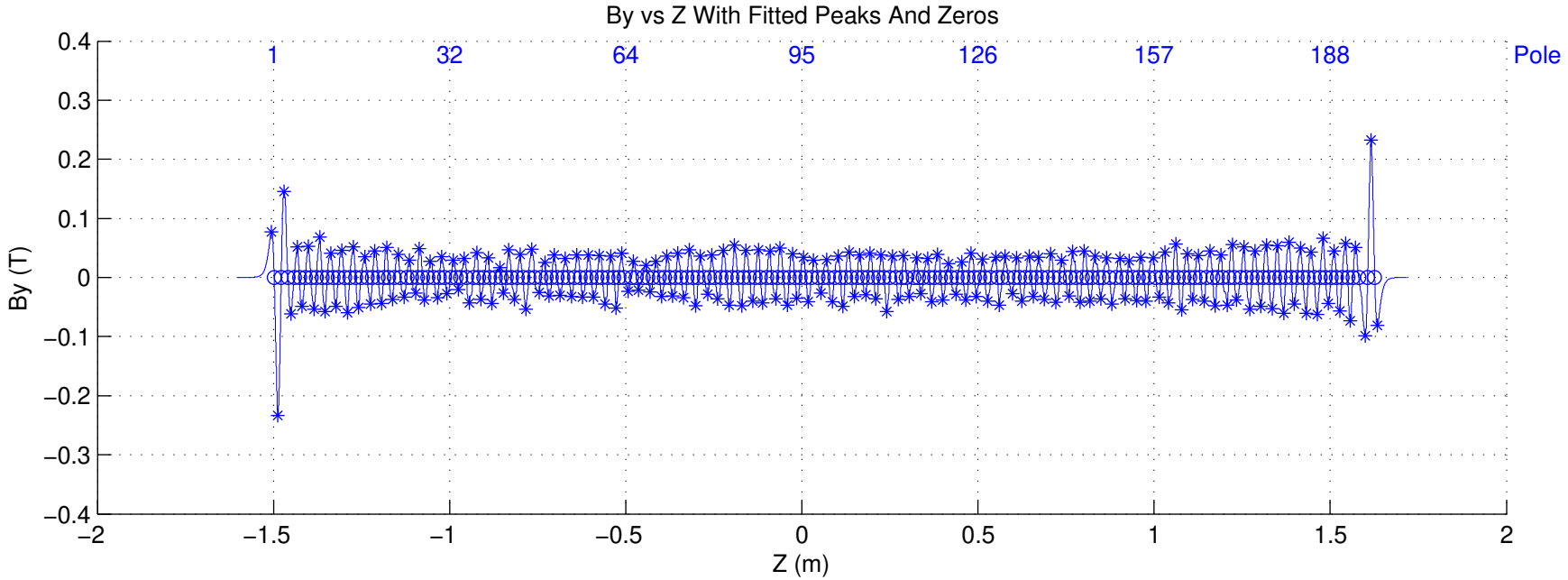
EPU Analysis
−−−−−−−−−−−

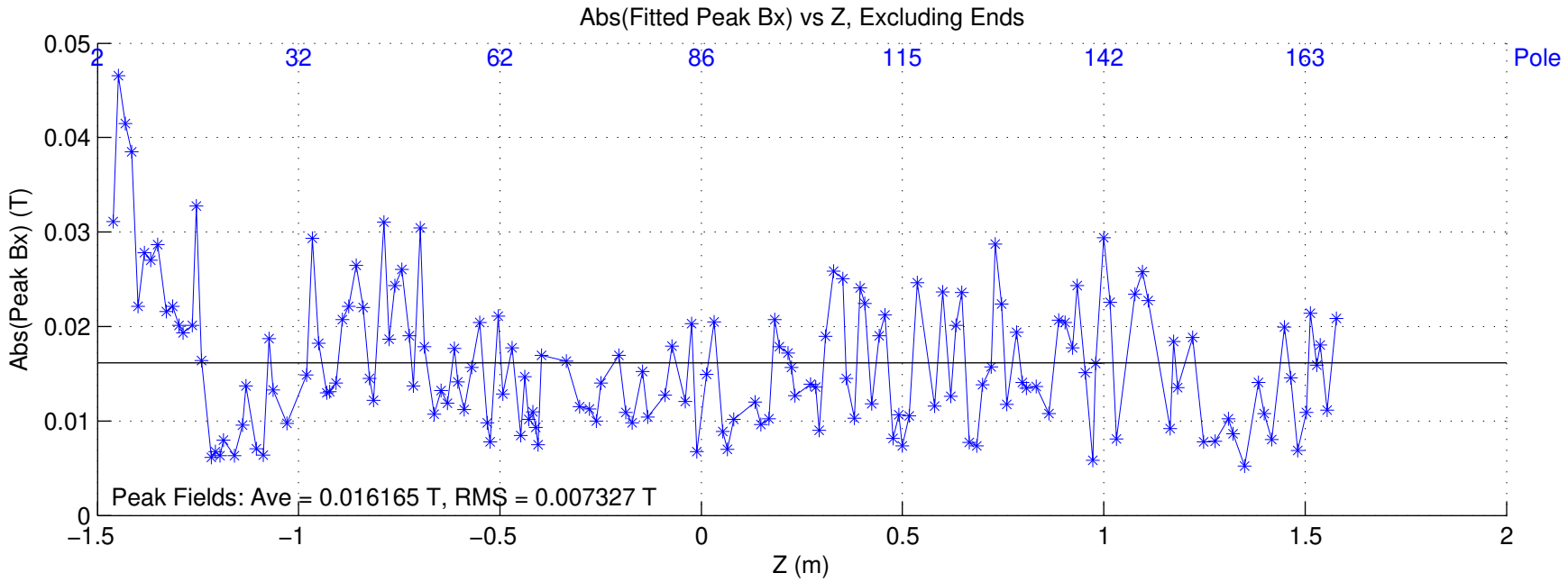
Parameters:
INPUT−FILE−DIR =V:\MET\MagServe\MagData\DELTA\Delta data\Assembled Measurements\Final Measurements\CPRMF\KR0
INPUT−FILE−NAME =hall2−anal−probe1−field.dat
INPUT−FILE−TYPE =ZBXYZH
CORR−REQUIRED =0
GAMMA =26671.59
NOM−LAMBDA−U =0
NOM−K−VALUE =0
NOM−LAMBDA−R =0
NUM−POLES =196
NUM−END−POLES =4
CELL−LENGTH =3.656

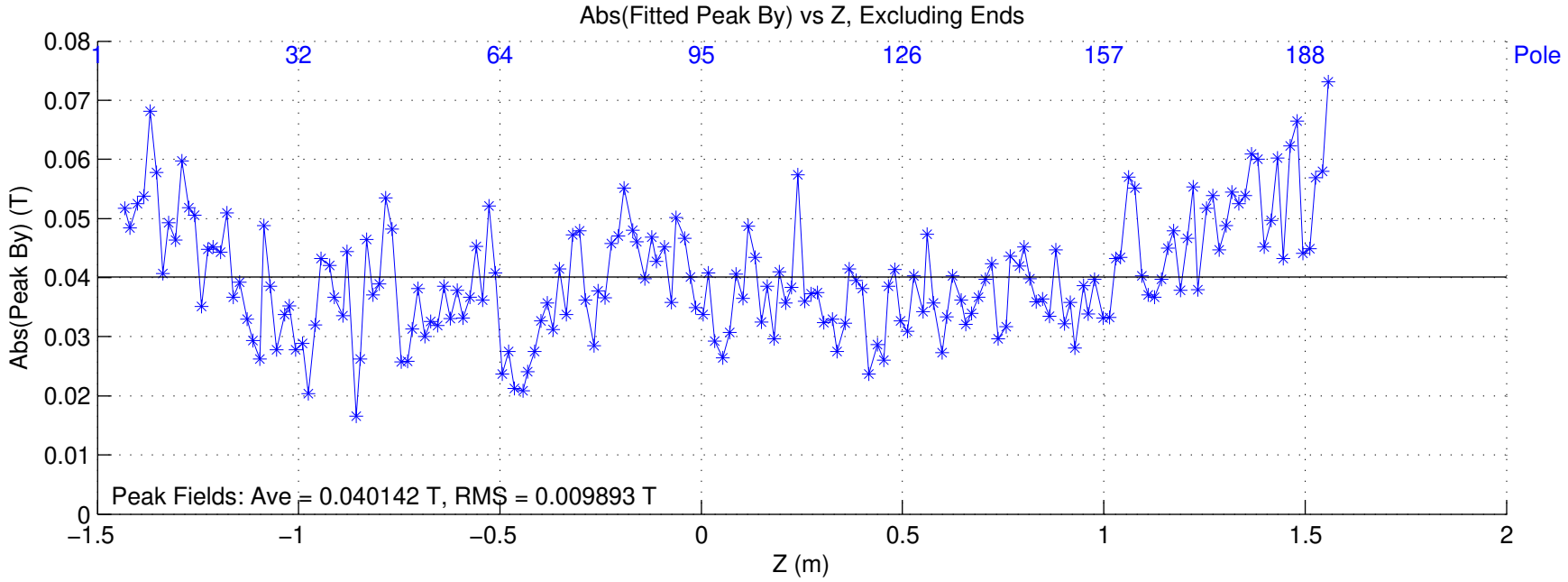

Bx, By, Bz vs Zm
Bx (T)
0.3
0.2
0.1
0
−0.1
−0.2
By (T)
0.4
0.2
0
−0.2
−0.4
Bz (T)
1
0.5
0
−0.5
−1
0
0.5
1
1.5
2
2.5
3
3.5
Zm Measurement Position (m)

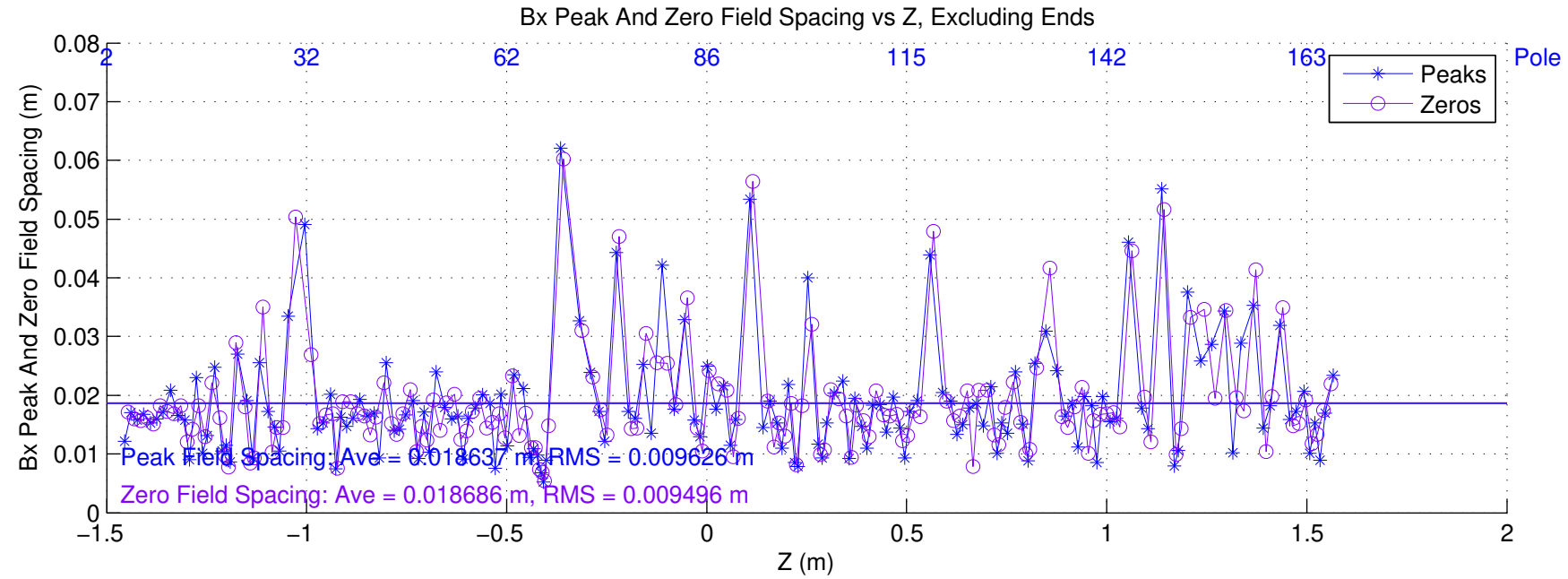

Bx and By vs Z
1
32
64
95
126
157
188
Pole
Bx
By
0.25
0.2
0.15
0.1
0.05
0
−0.05
−0.1
−0.15
−0.2
−0.25
Bx, By (T)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

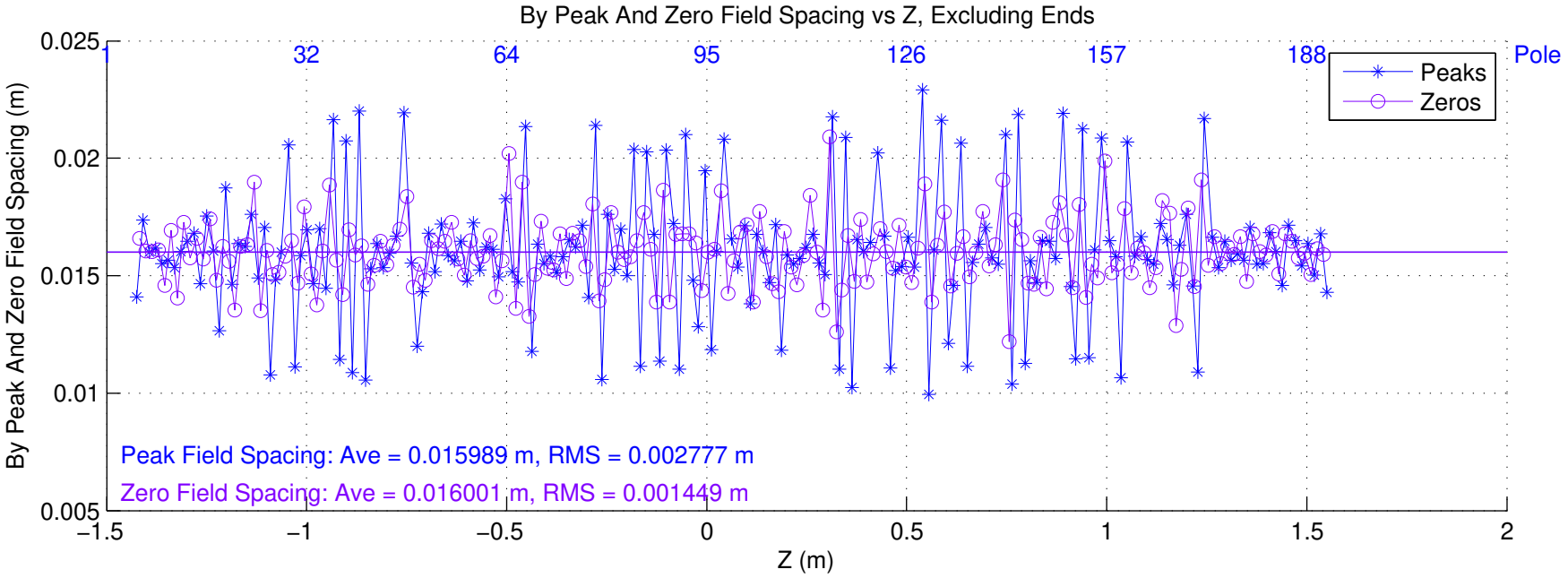

Bx vs Z With Fitted Peaks And Zeros
2
32
62
86
115
142
163
Pole
0.3
0.2
0.1
0
−0.1
−0.2
Bx (T)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

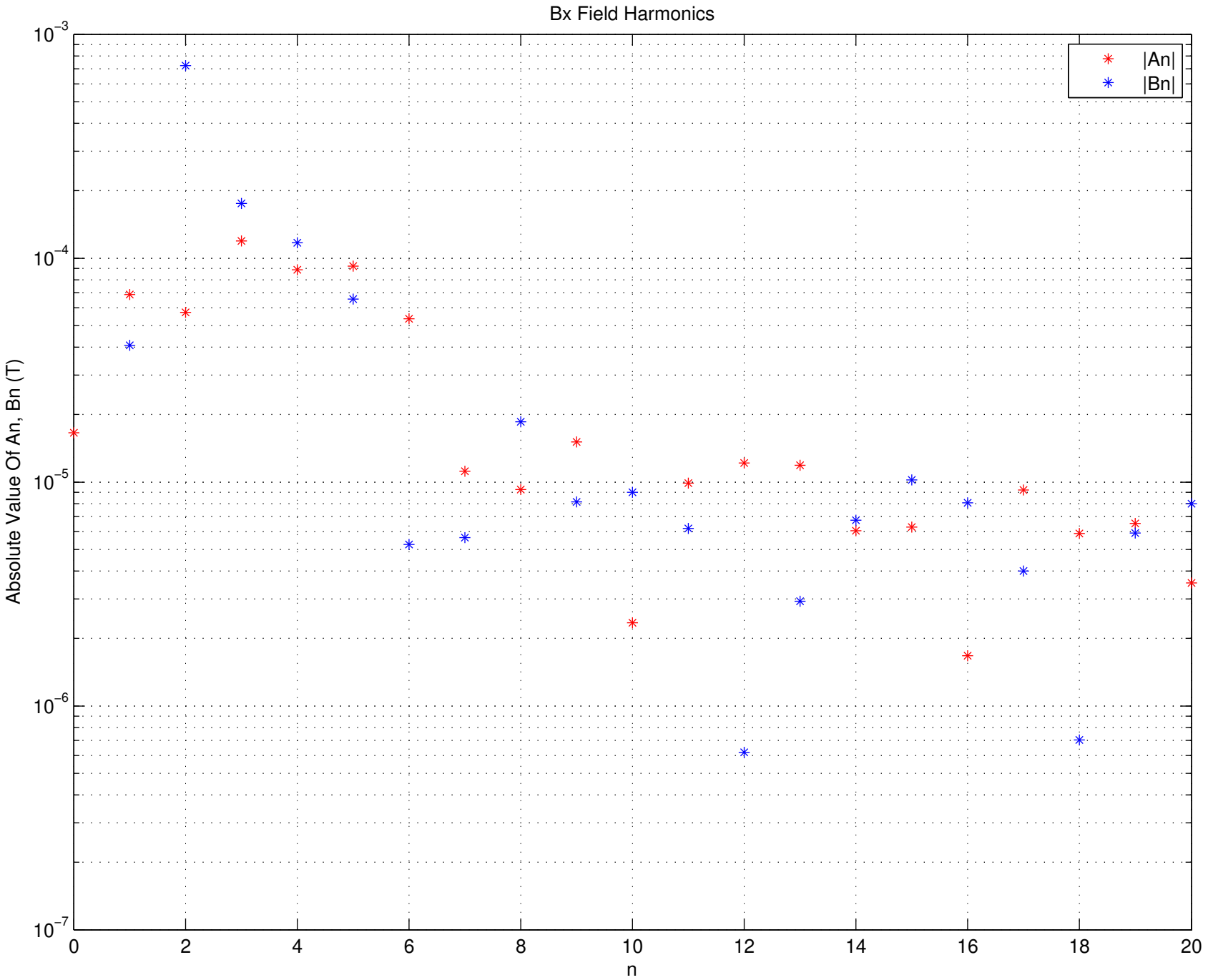

By vs Z With Fitted Peaks And Zeros
1
32
64
95
126
157
188
Pole
0.4
0.3
0.2
0.1
0
−0.1
−0.2
−0.3
−0.4
By (T)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

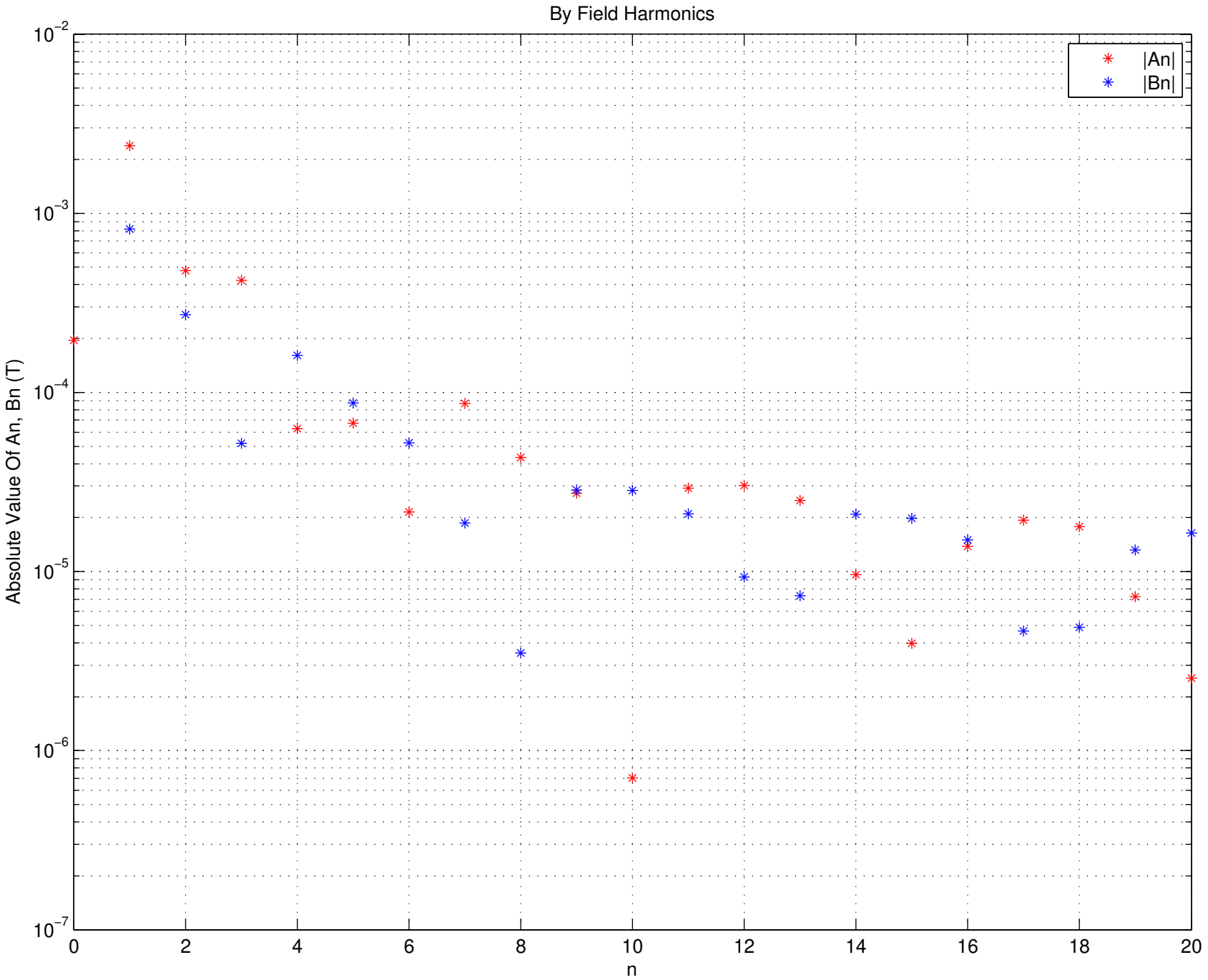

Abs(Fitted Peak Bx) vs Z, Excluding Ends
2
32
62
86
115
142
163
Pole
0.05
0.04
0.03
0.02
0.01
0
Abs(Peak Bx) (T)
Peak Fields: Ave = 0.016165 T, RMS = 0.007327 T
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

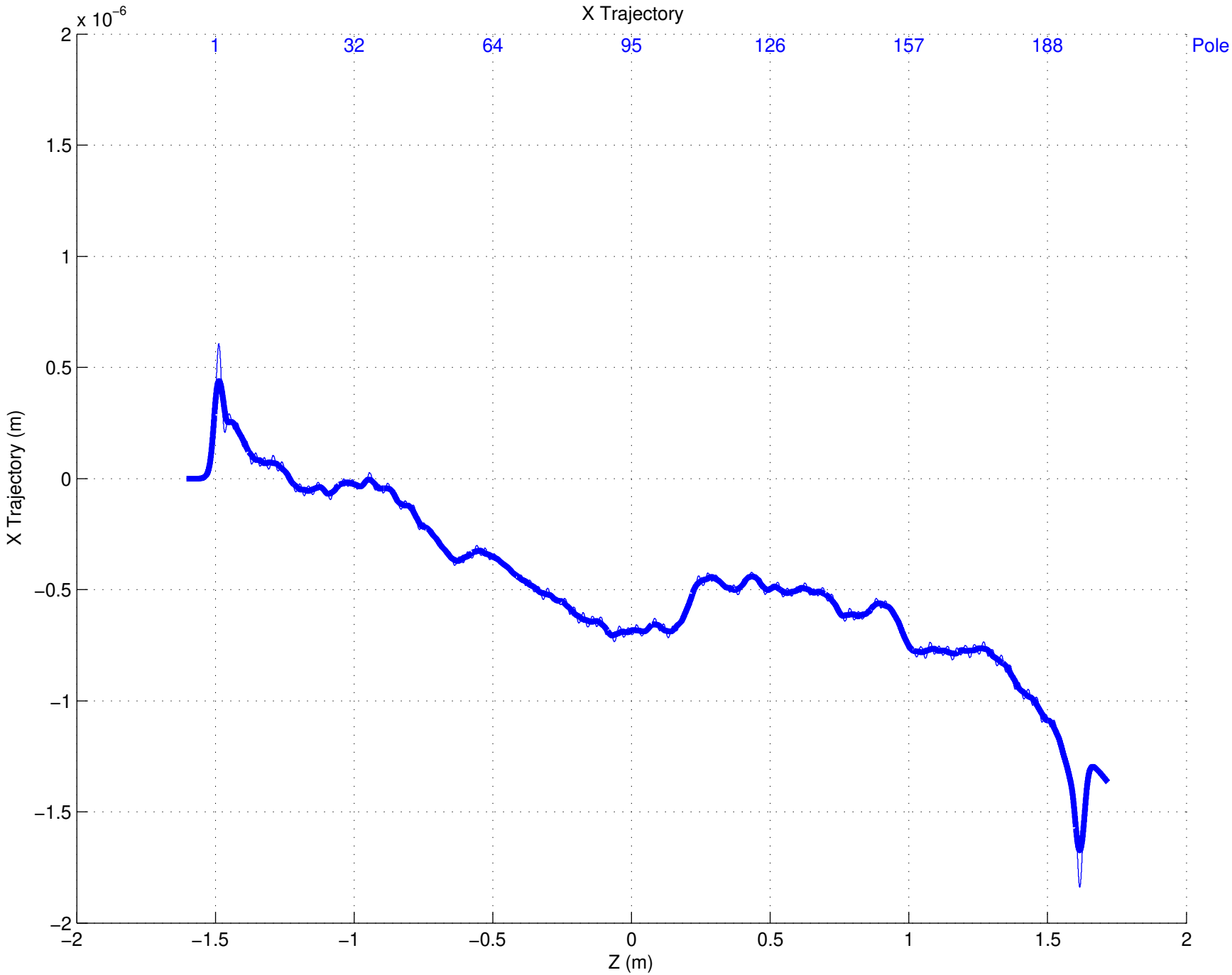

Abs(Fitted Peak By) vs Z, Excluding Ends
1
32
64
95
126
157
188
Pole
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
Abs(Peak By) (T)
Peak Fields: Ave = 0.040142 T, RMS = 0.009893 T
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

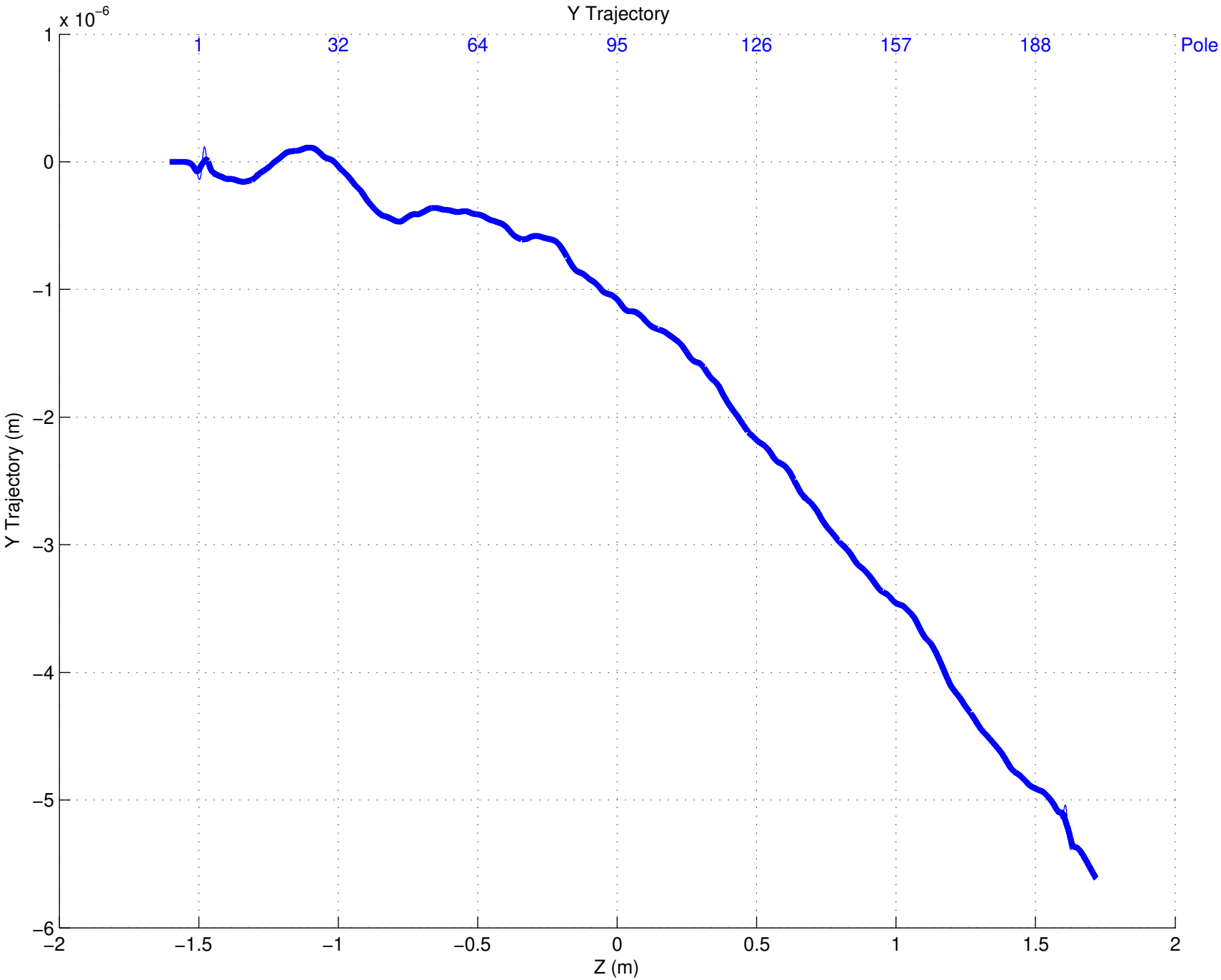

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
Z (m)
2
32
62
86
115
142
163
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.018637 m, RMS = 0.009626 m
Zero Field Spacing: Ave = 0.018686 m, RMS = 0.009496 m

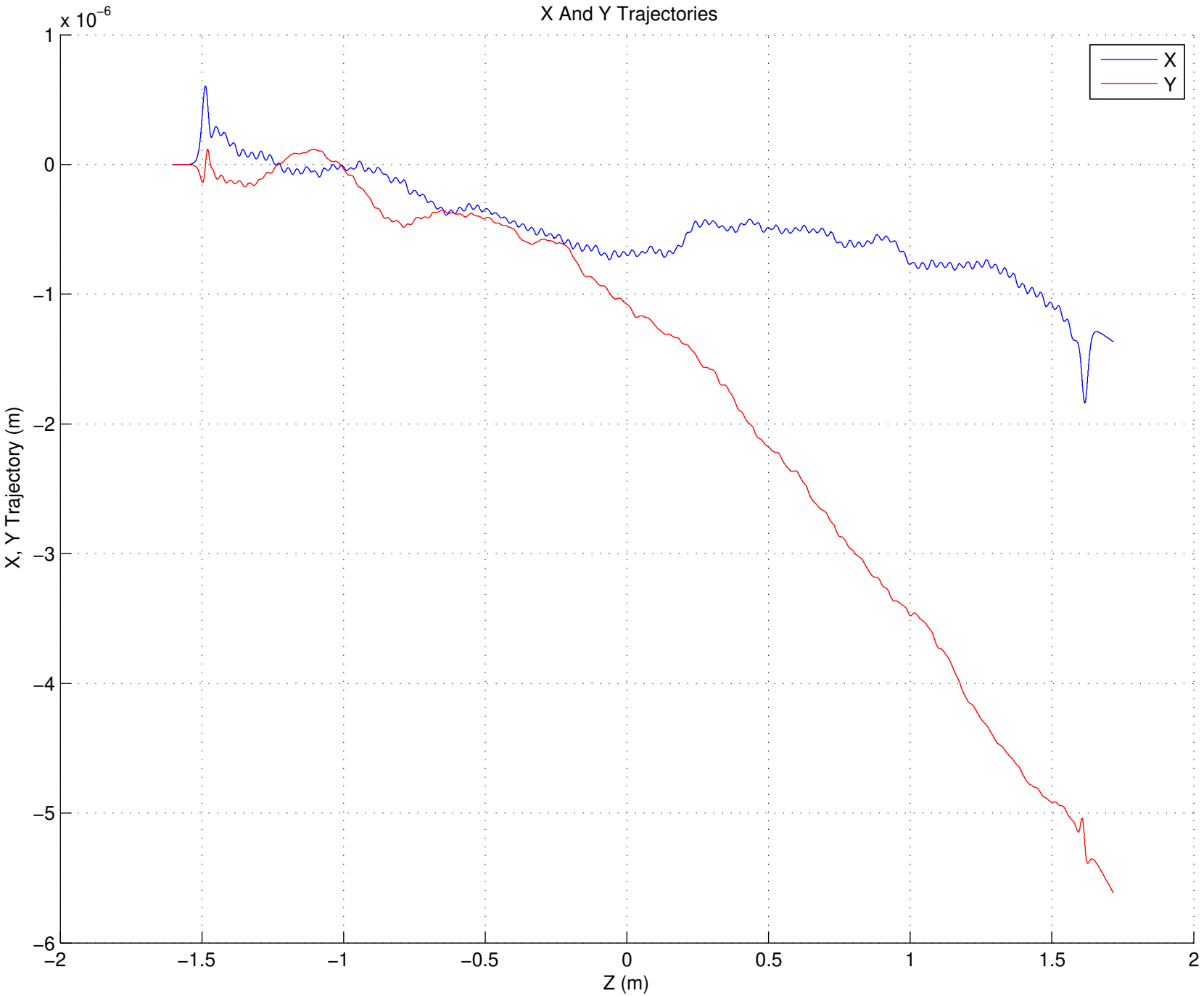

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
Z (m)
1
32
64
95
126
157
188
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.015989 m, RMS = 0.002777 m
Zero Field Spacing: Ave = 0.016001 m, RMS = 0.001449 m

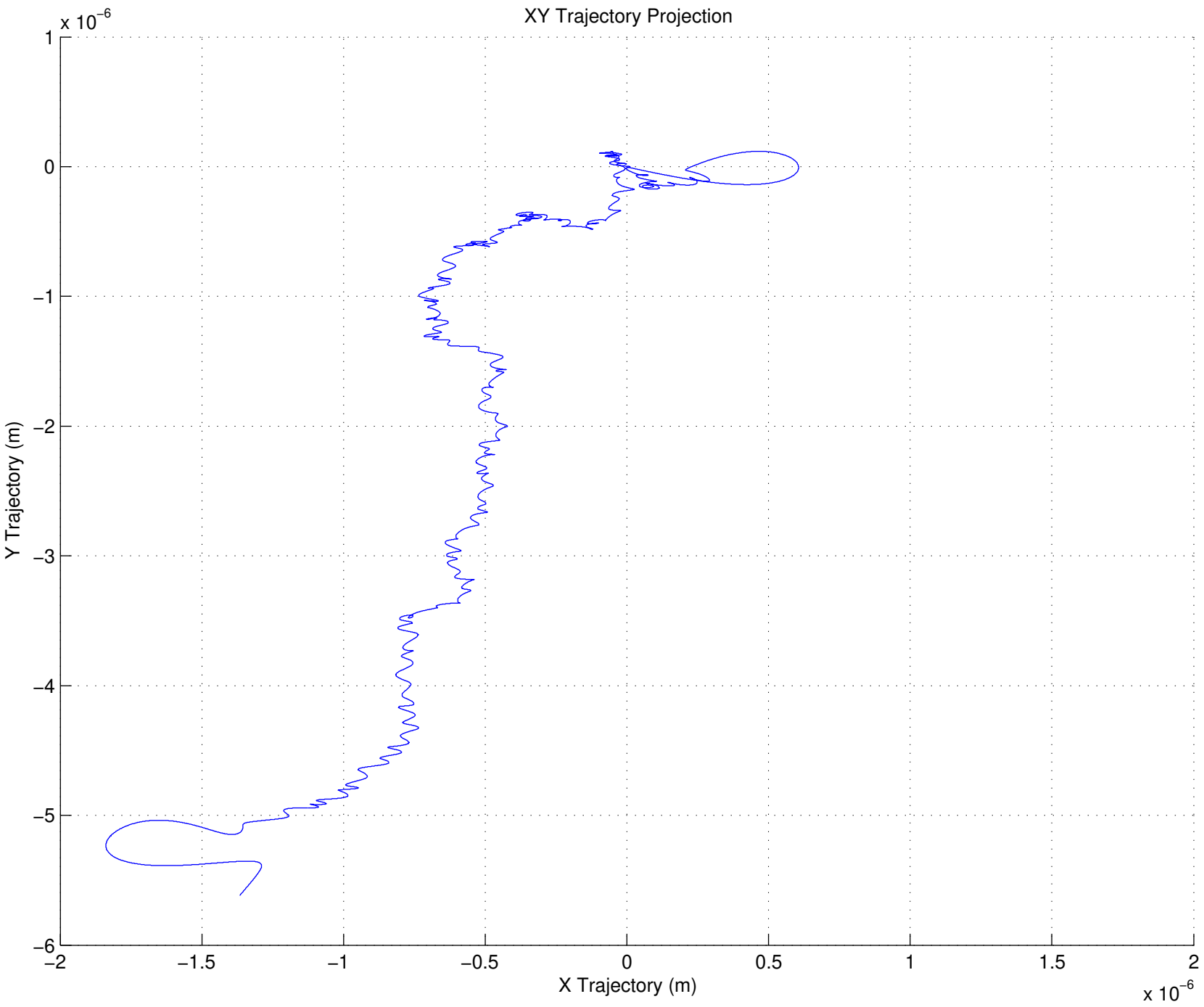

Bx Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
0
2
4
6
8
10
12
14
16
18
20

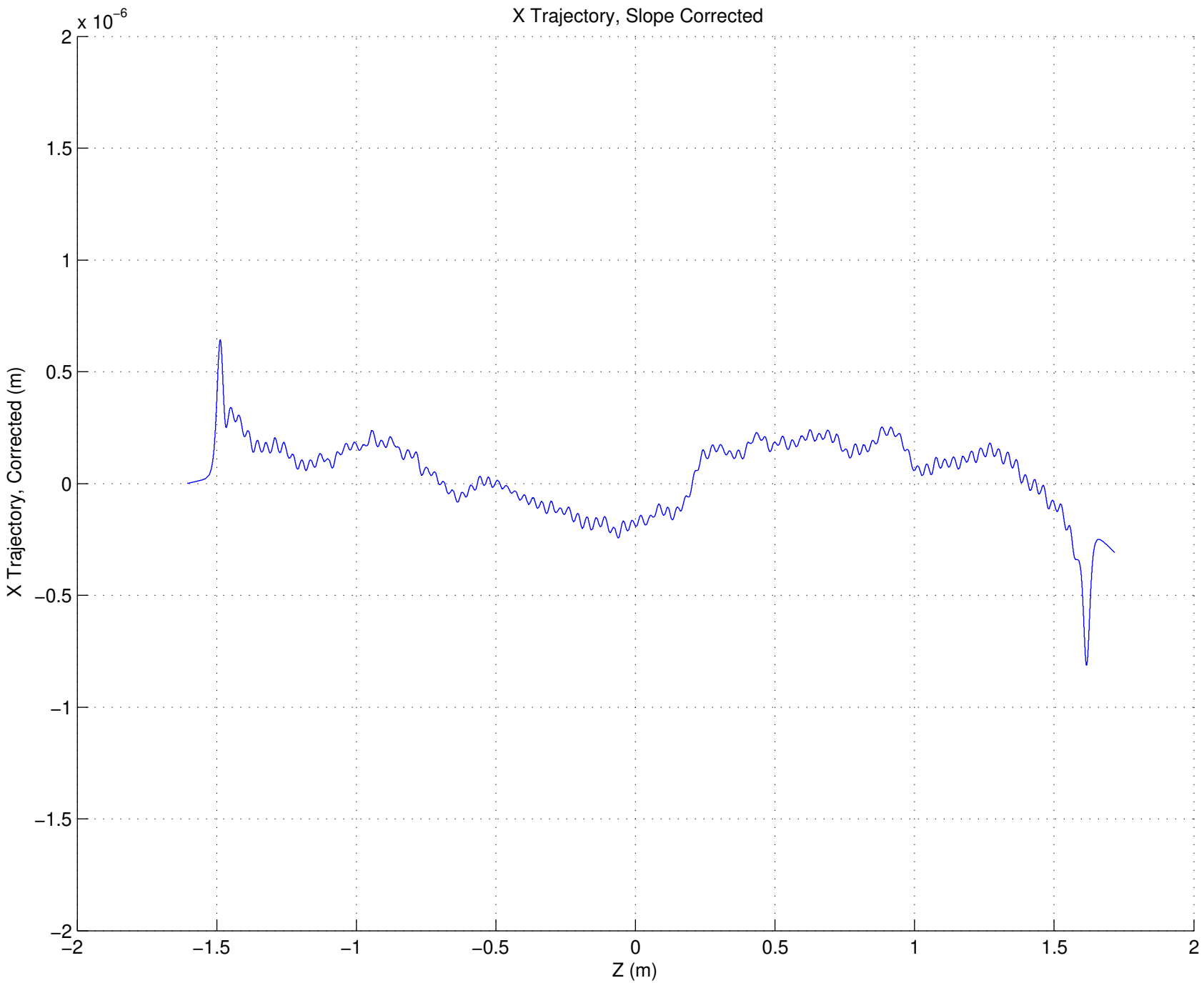

By Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
0
2
4
6
8
10
12
14
16
18
20

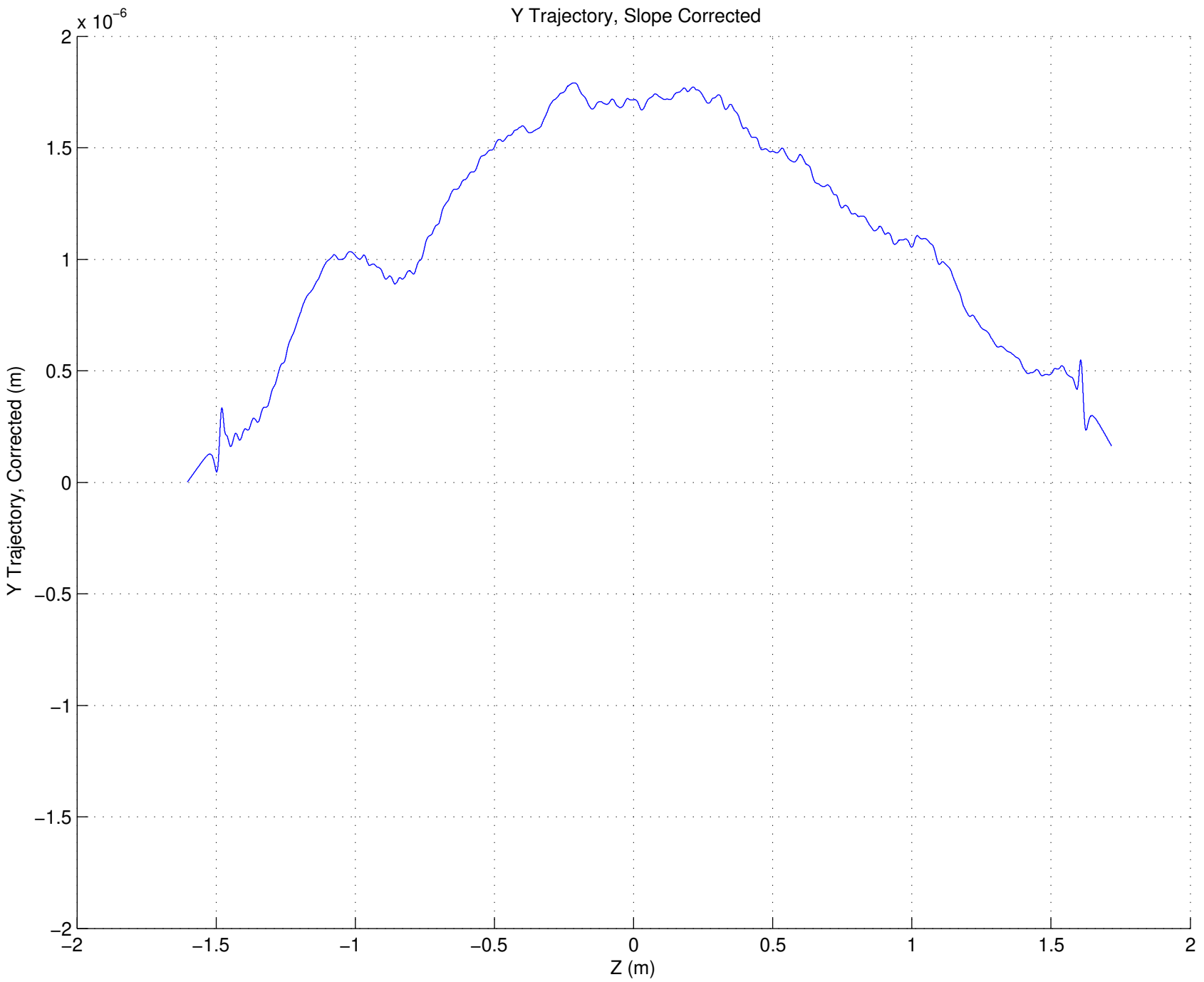

X Trajectory
x 10^-6
1
32
64
95
126
157
188
Pole
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
X Trajectory (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

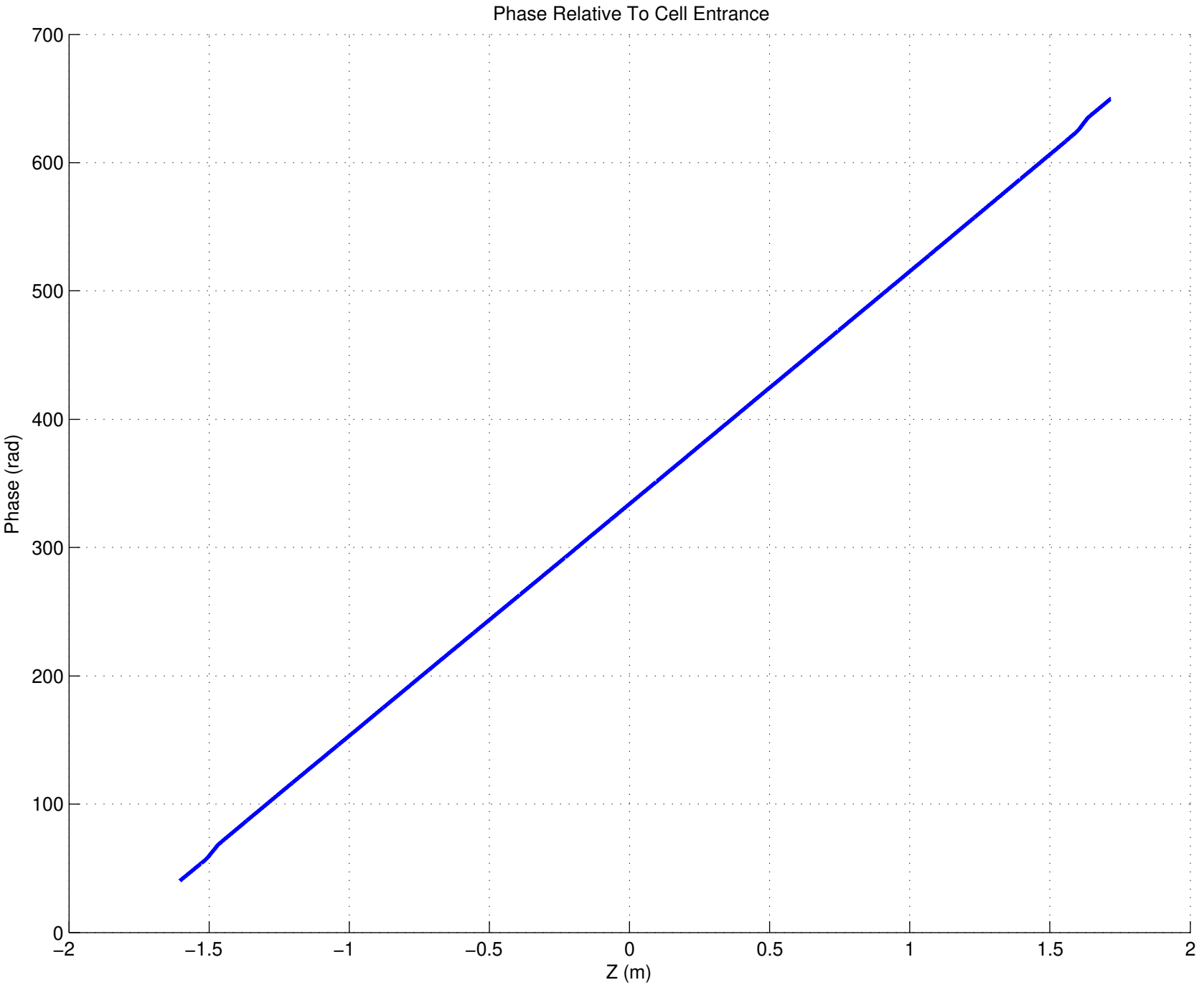

Y Trajectory
x 10^-6
1
32
64
95
126
157
188
Pole
1
0
−1
−2
−3
−4
−5
−6
Y Trajectory (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

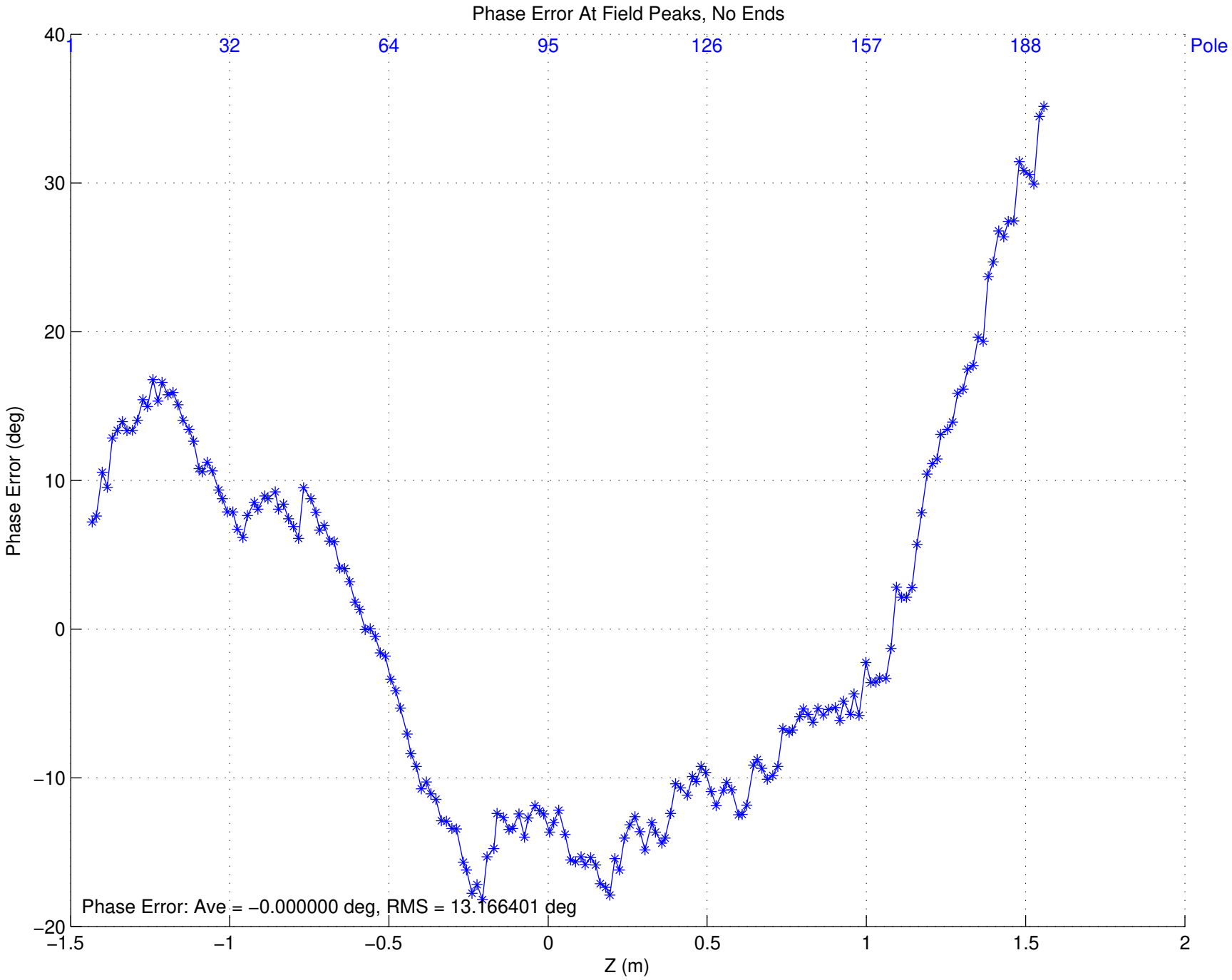

X And Y Trajectories
x 10^-6
1
0
−1
−2
−3
−4
−5
−6
X, Y Trajectory (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)
X
Y

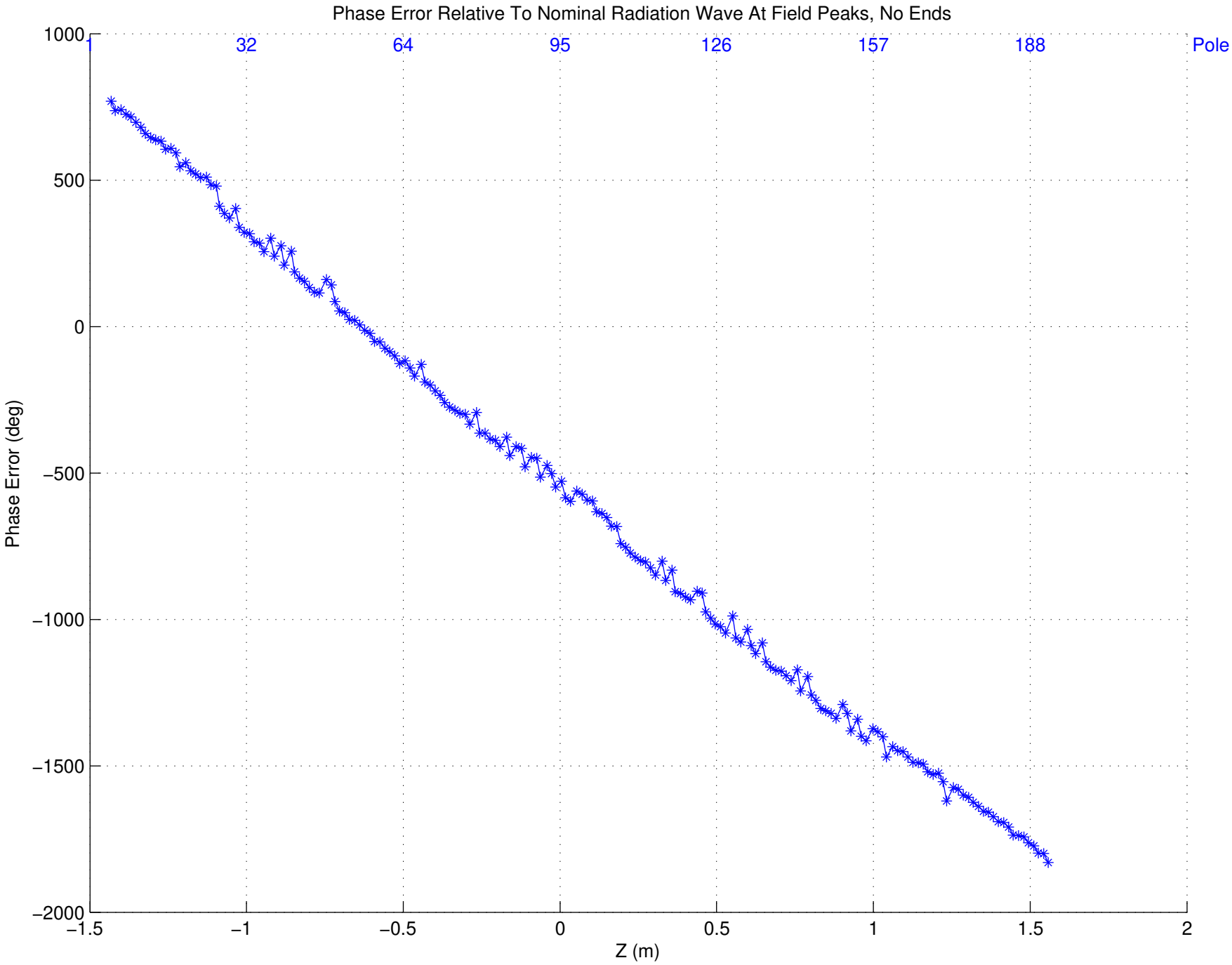

XY Trajectory Projection
x 10^-6
1
0
−1
−2
−3
−4
−5
−6
Y Trajectory (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
X Trajectory (m)
x 10^-6

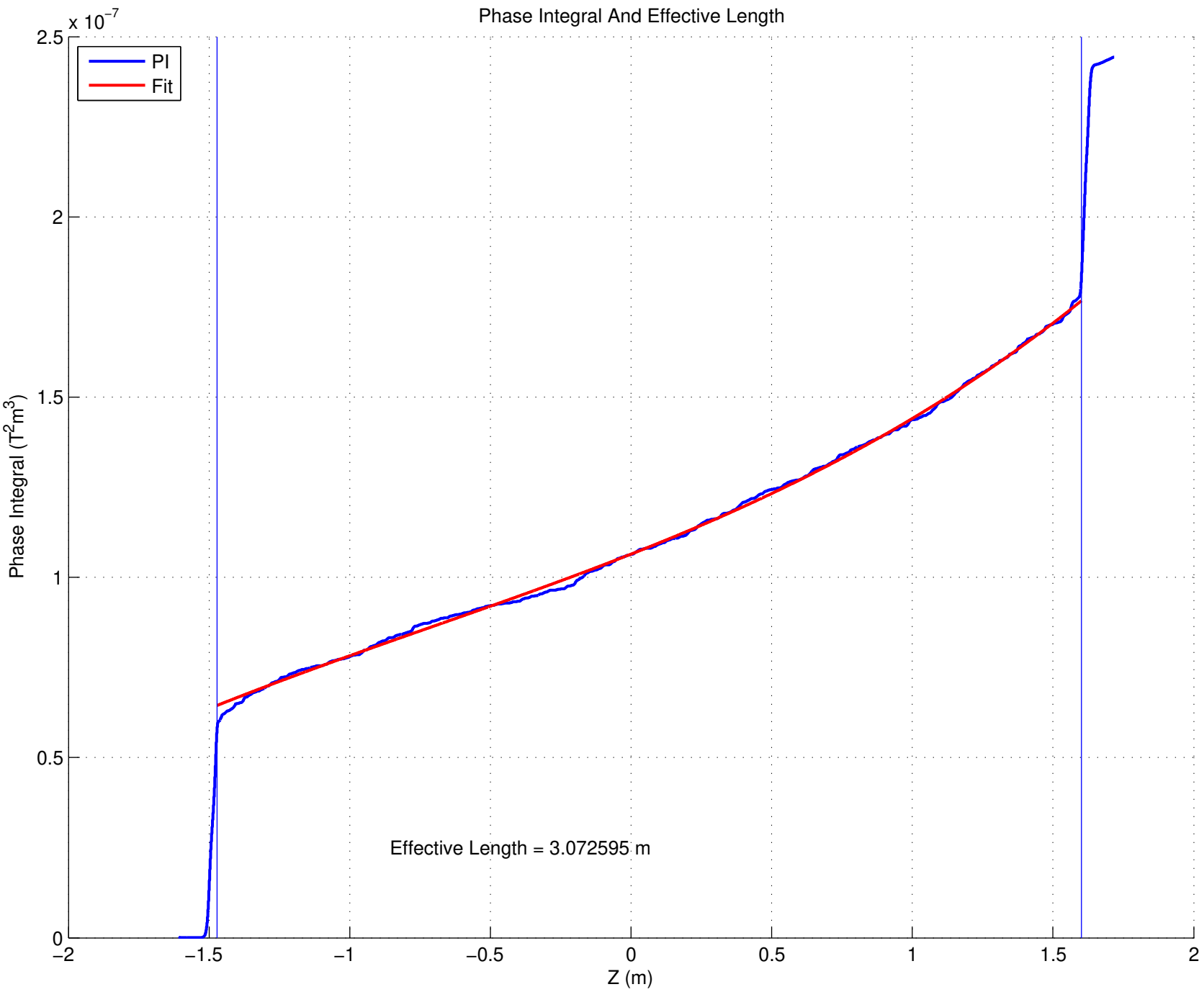

X Trajectory, Slope Corrected
x 10^-6
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
X Trajectory, Corrected (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

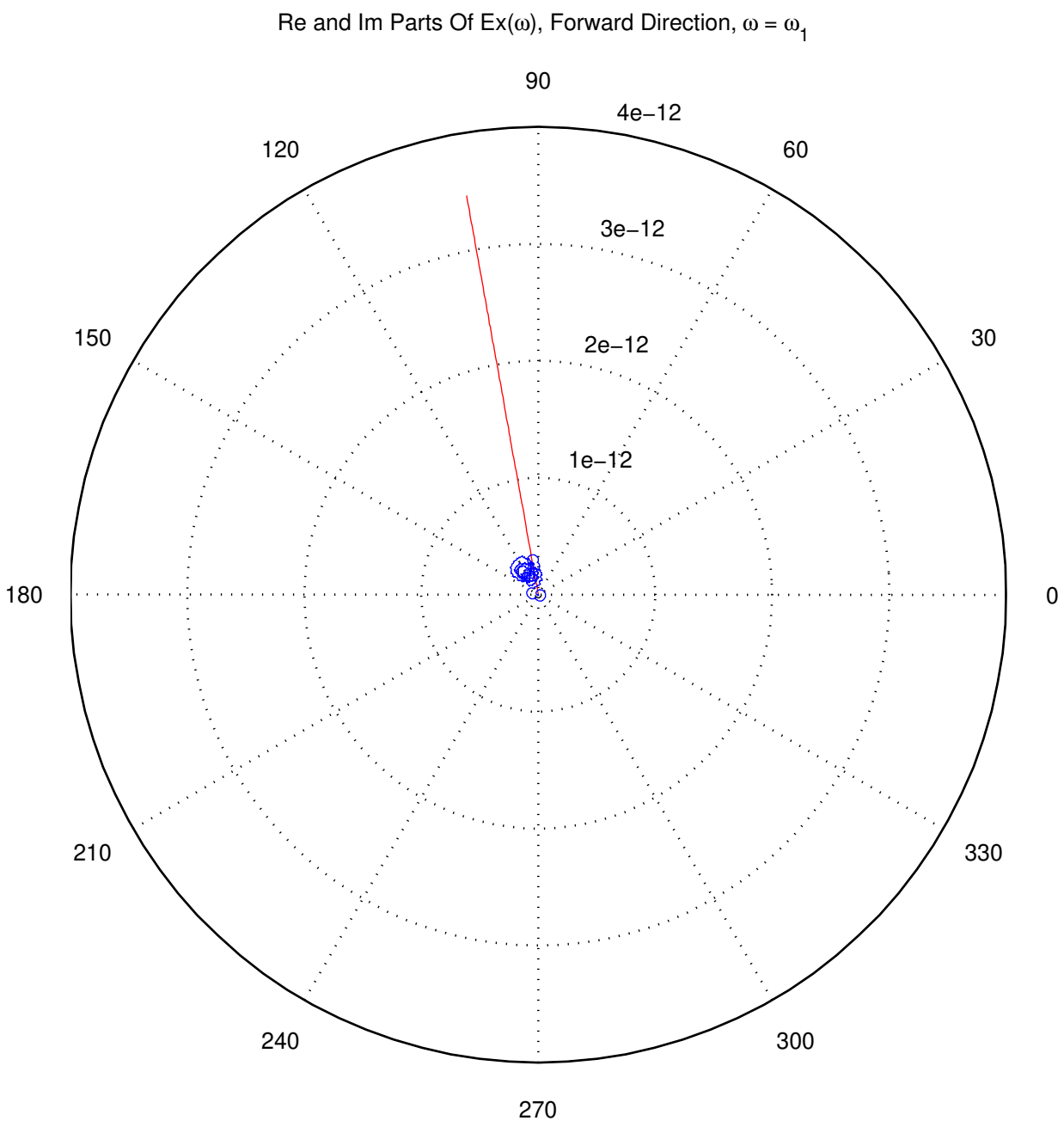

Y Trajectory, Slope Corrected
x 10^-6
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
Y Trajectory, Corrected (m)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

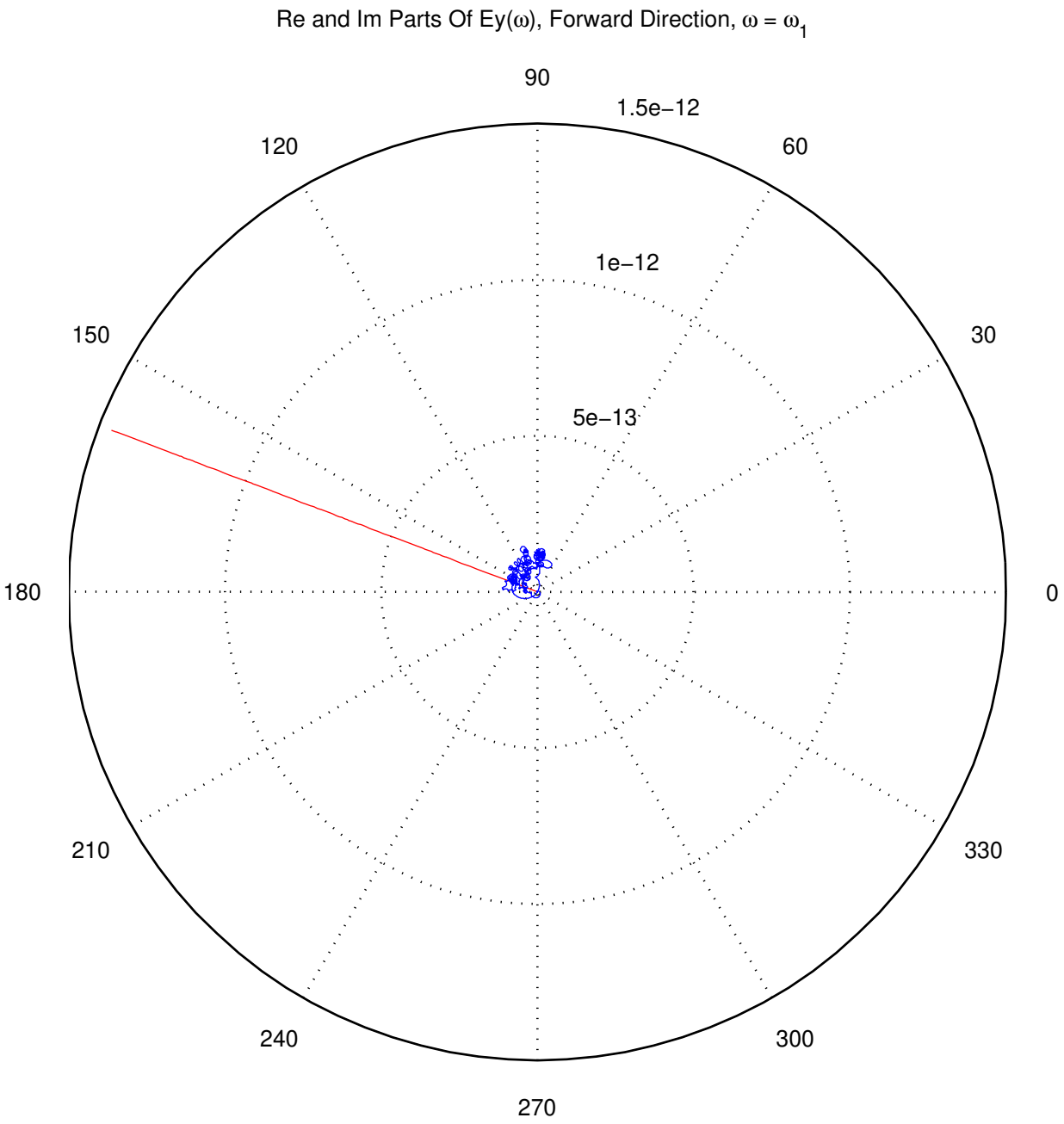

Phase Relative To Cell Entrance
Phase (rad)
Z (m)
700
600
500
400
300
200
100
0
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2

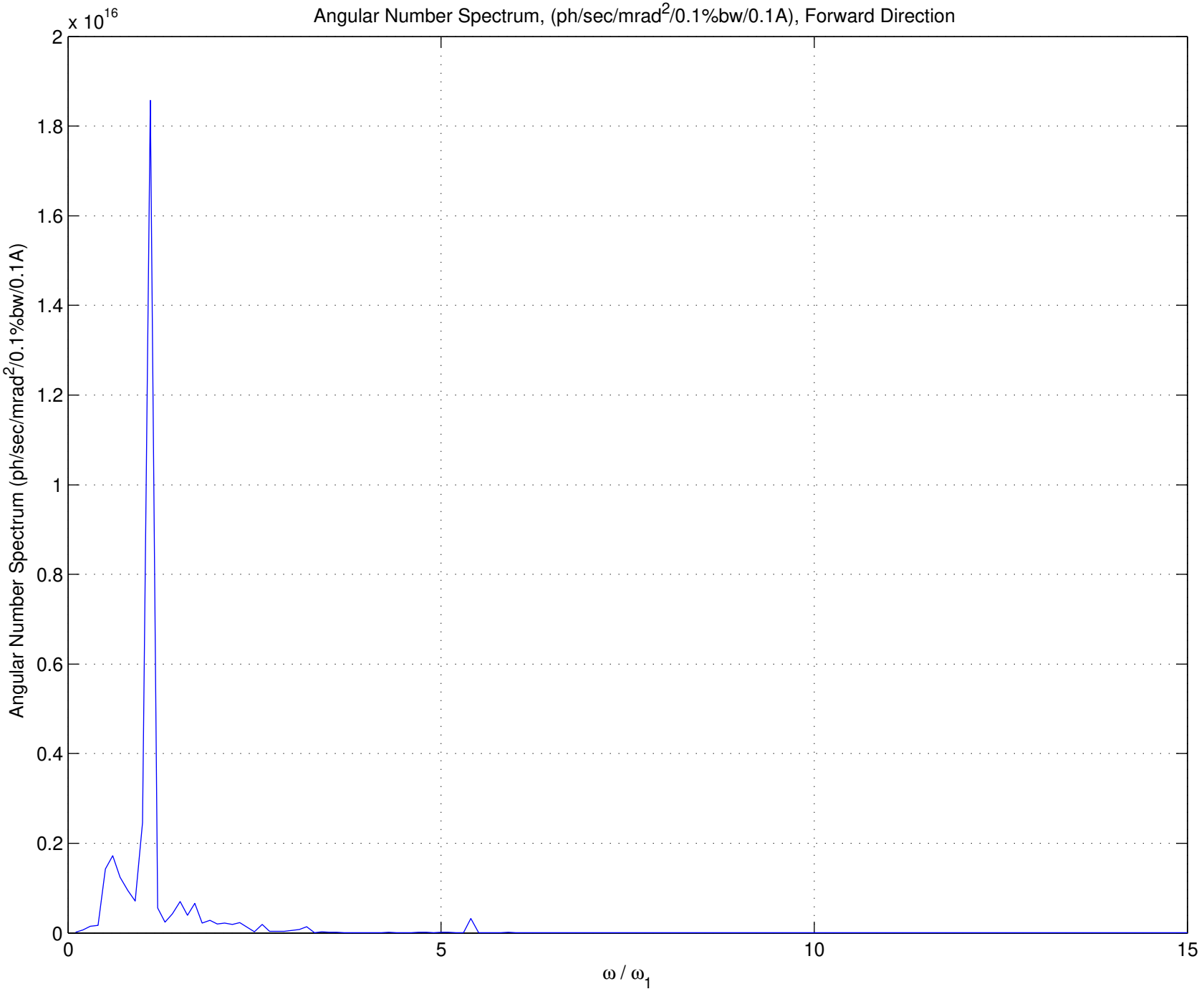

Phase Error At Field Peaks, No Ends
1
32
64
95
126
157
188
Pole
40
30
20
10
0
−10
−20
Phase Error (deg)
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)
Phase Error: Ave = −0.000000 deg, RMS = 13.166401 deg

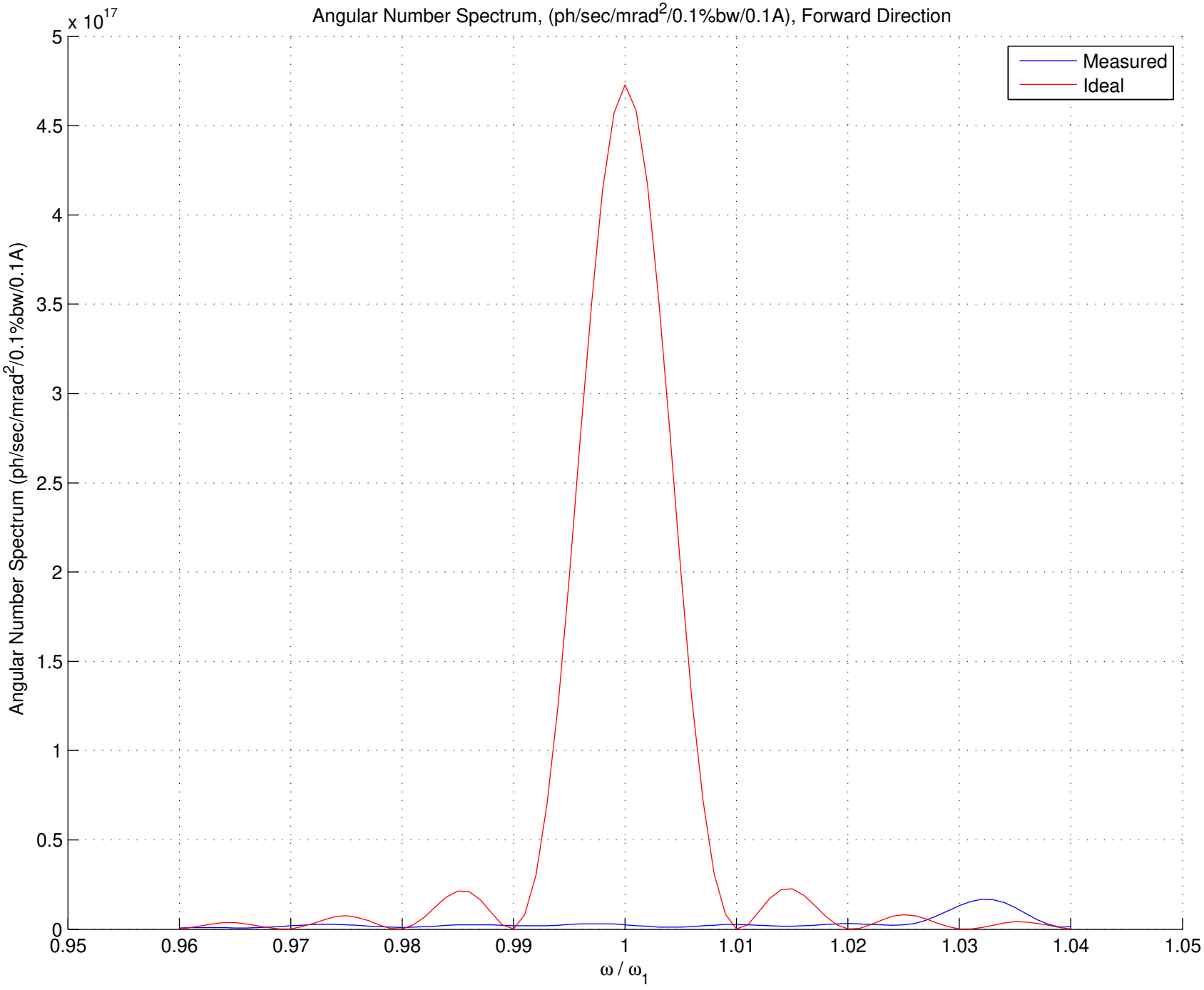

Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
1
32
64
95
126
157
188
Pole
1000
500
0
−500
−1000
−1500
−2000
Phase Error (deg)
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)

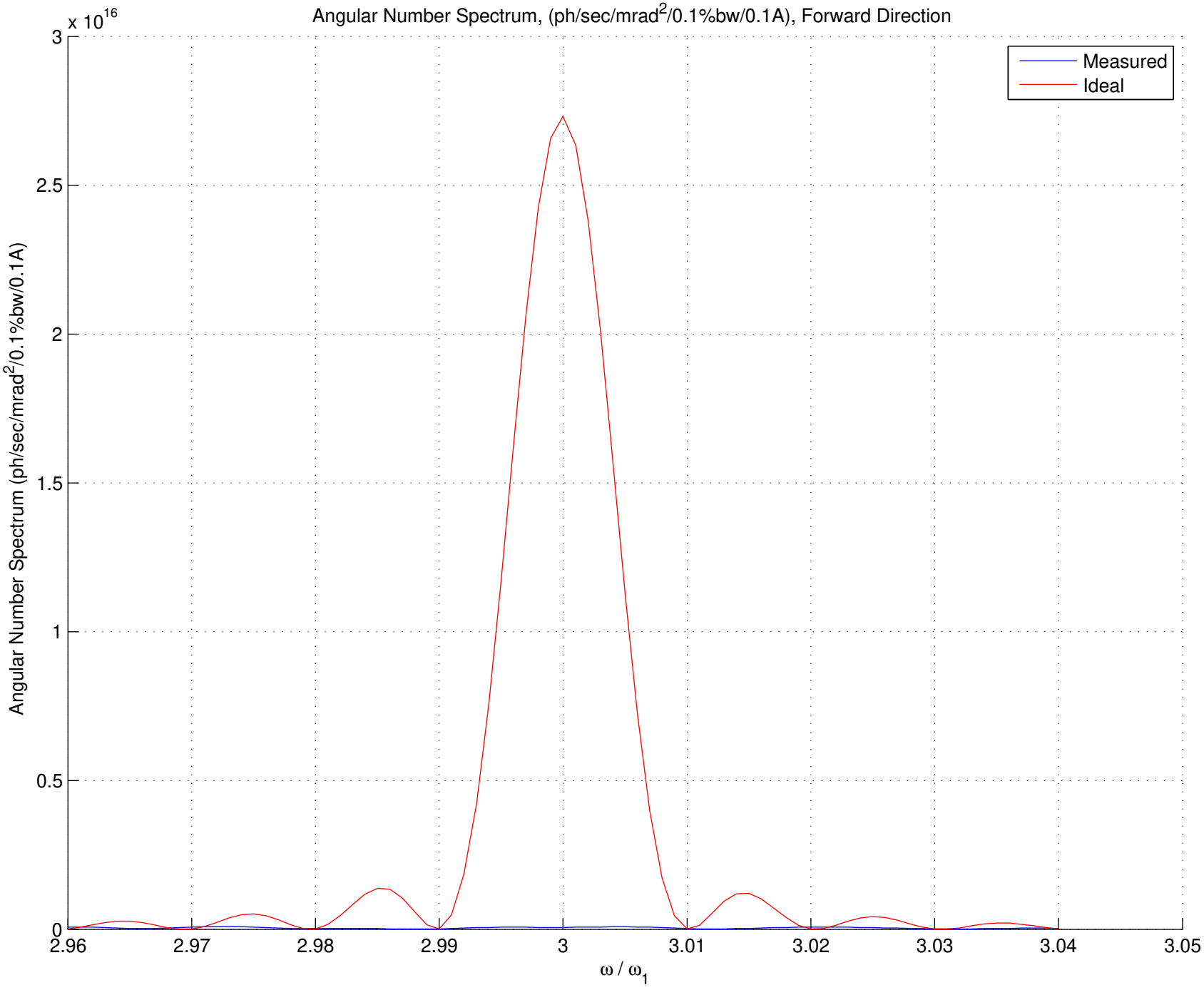

Phase Integral And Effective Length
x 10^-7
PI
Fit
2.5
2
1.5
1
0.5
0
Phase Integral (T^2m^3)
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z (m)
Effective Length = 3.072595 m

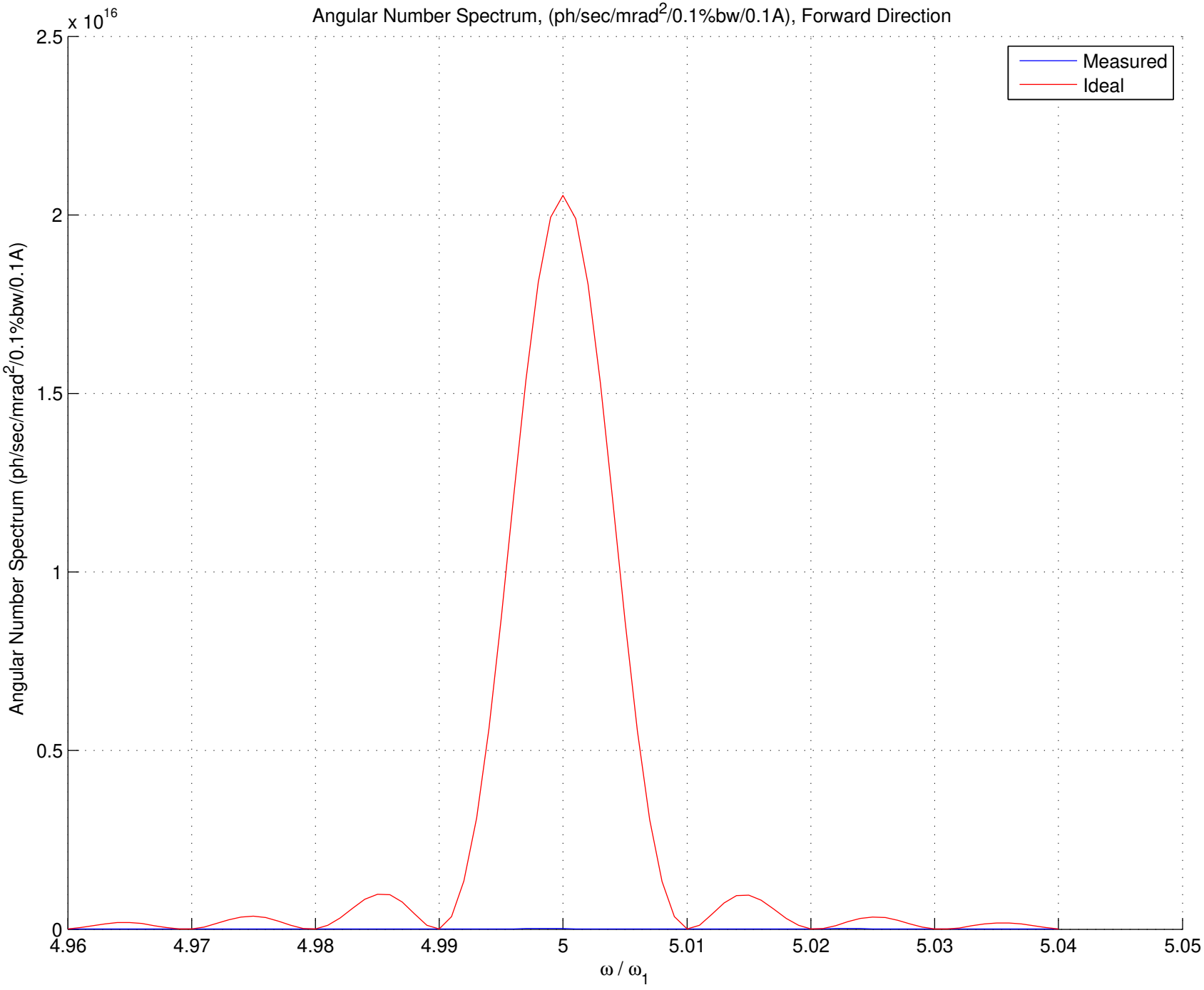

Re and Im Parts Of Ex(ω), Forward Direction, ω = ω1
90
4e−12
120
60
3e−12
150
30
2e−12
1e−12
180
0
210
330
240
300
270


Re and Im Parts Of Ey(ω), Forward Direction, ω = ω1
90
1.5e−12
120
60
1e−12
150
30
5e−13
180
0
210
330
240
300
270


Angular Number Spectrum, (ph/sec/mrad2/0.1%bw/0.1A), Forward Direction
x 10^16
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
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 10^17
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
4.5
5
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 10^16
Angular Number Spectrum (ph/sec/mrad2/0.1%bw/0.1A)
Measured
Ideal
3
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 / ω1


Angular Number Spectrum, (ph/sec/mrad2/0.1%bw/0.1A), Forward Direction
x 10^16
2.5
2
1.5
1
0.5
0
Angular Number Spectrum (ph/sec/mrad2/0.1%bw/0.1A)
4.96
4.97
4.98
4.99
5
5.01
5.02
5.03
5.04
5.05
ω / ω1
Measured
Ideal