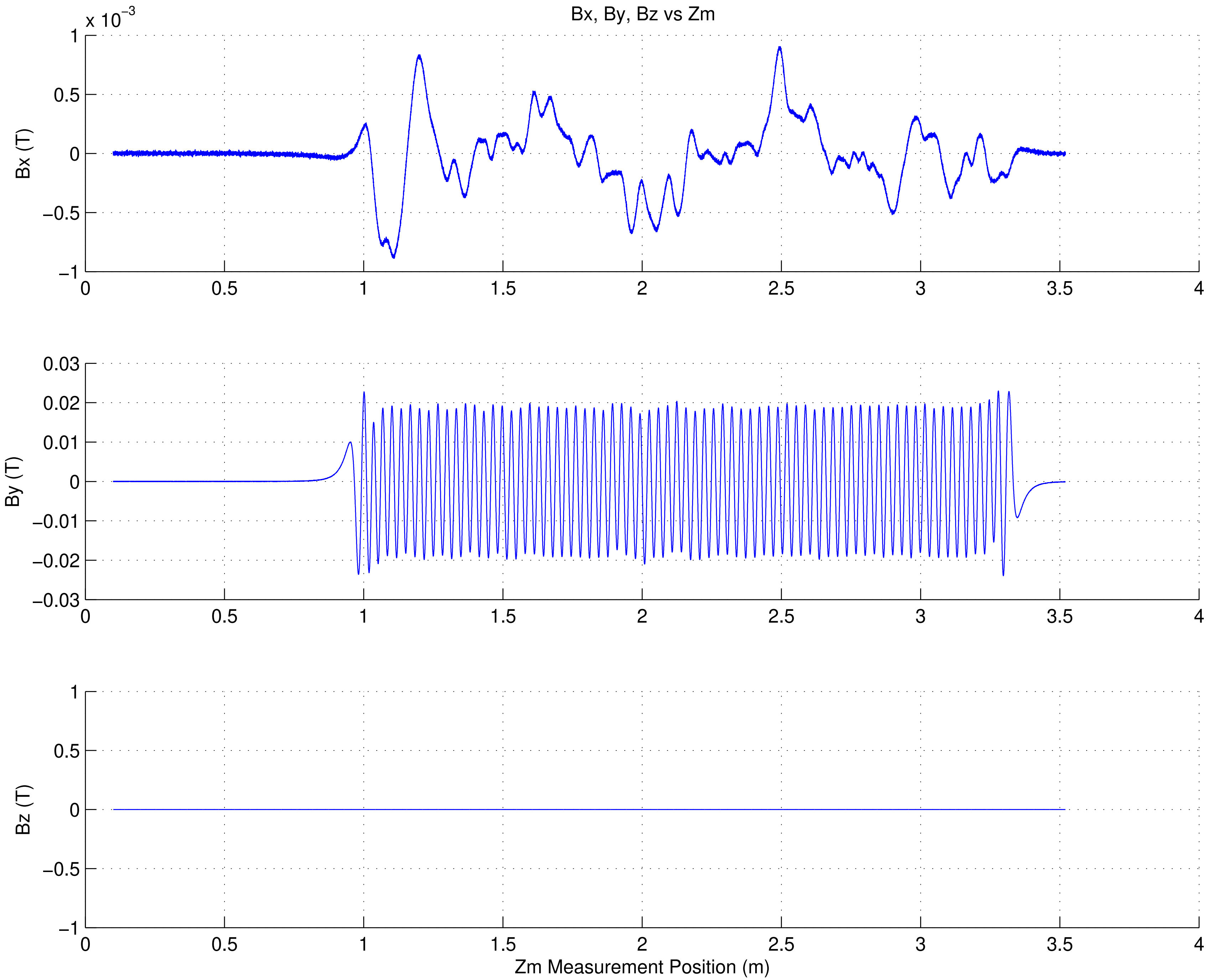
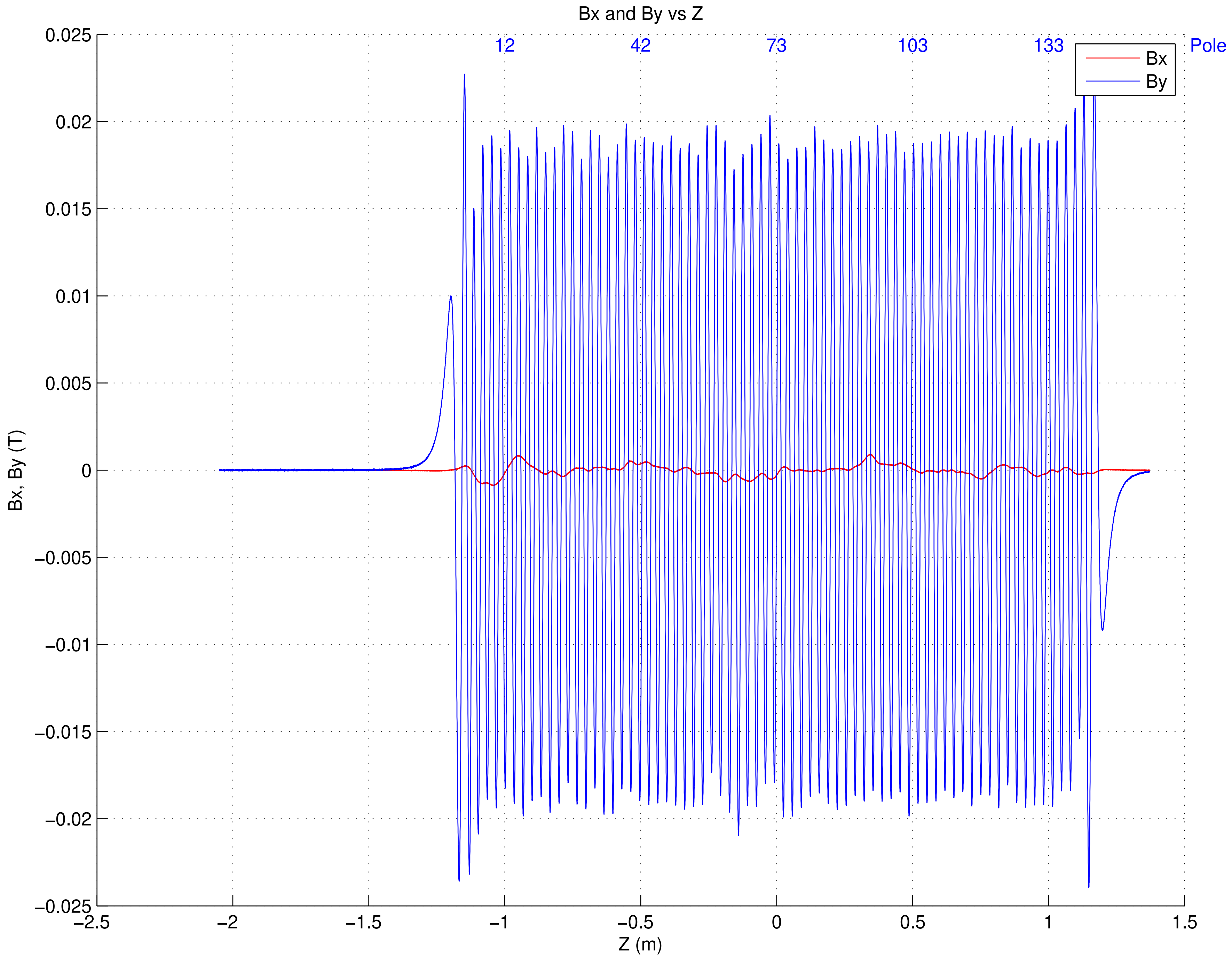
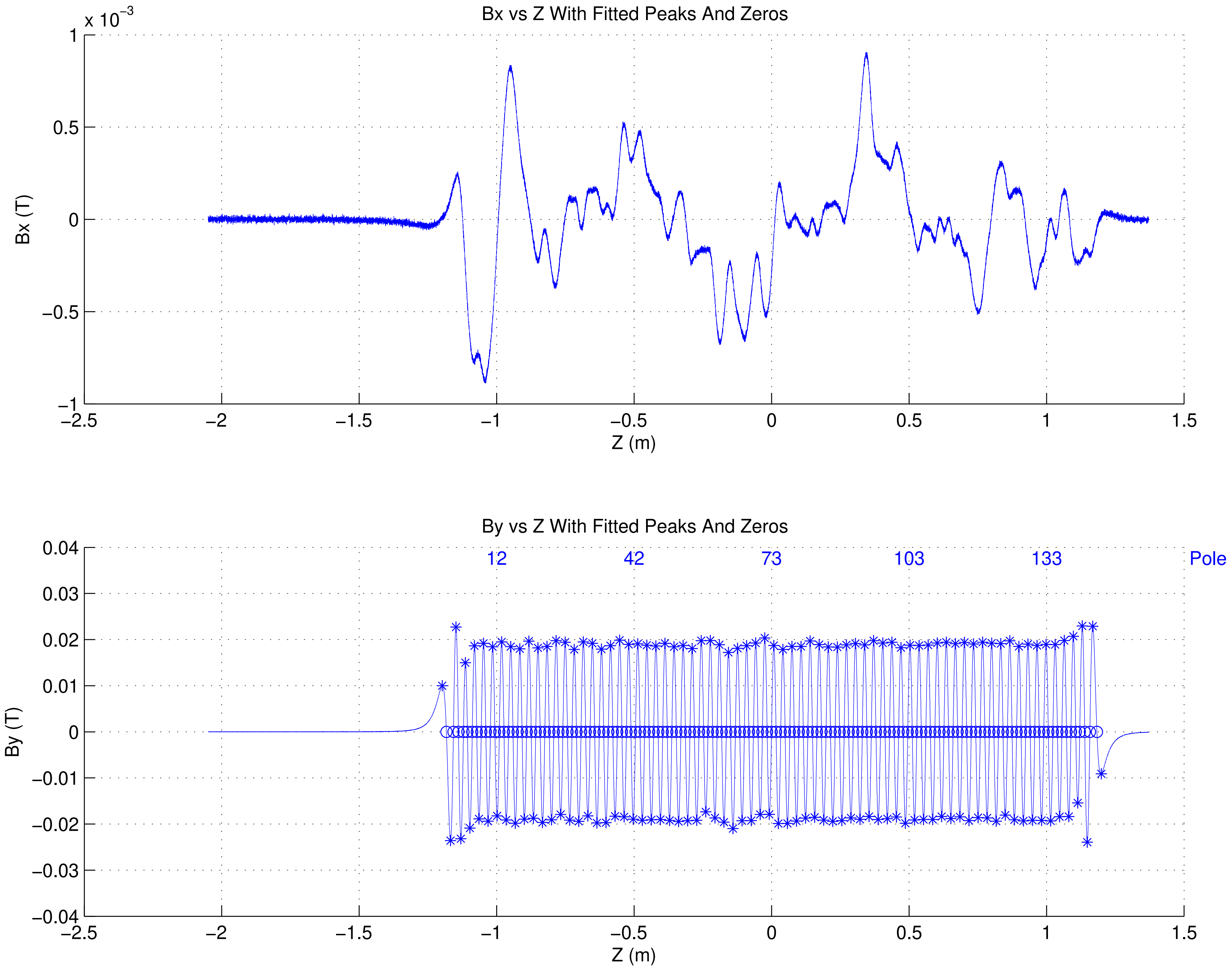
SLAC Magnetic Measurements

EPU Analysis

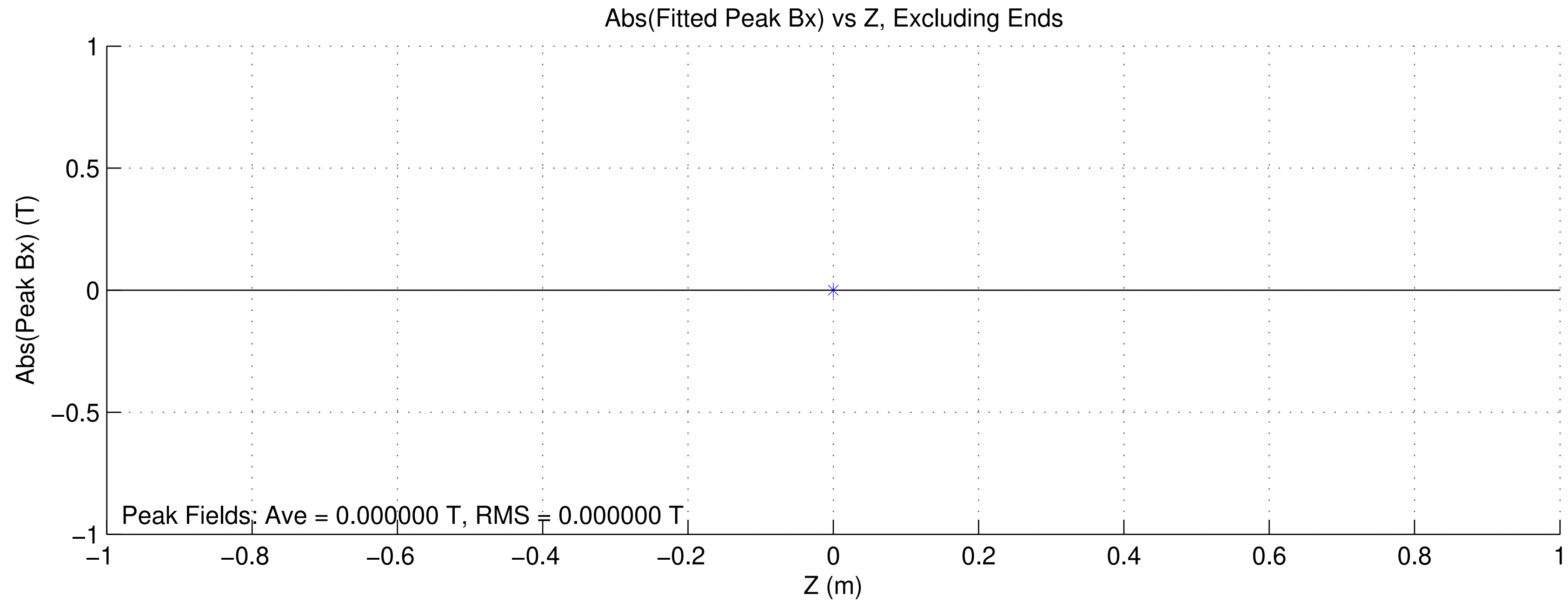
Parameters:
INPUT-FILE-DIR =S:\MagData\LCLS\Undulator\A1-ANL\DATASET0001\Rough Tuning\Z Scans\Run 040\
INPUT-FILE-NAME =x+00000-y+000-bscanz.dat
INPUT-FILE-TYPE =ZVXYBXYH
CORR-REQUIRED =0
GAMMA =26627.1
NOM-LAMBDA-U =0.033
NOM-K-VALUE =1.047
NOM-LAMBDA-R =3.6028e-011
NUM-POLES =144
NUM-END-POLES =4
CELL-LENGTH =4


Bx, By, Bz vs Zm
x 10^-3
Bx (T)
By (T)
Bz (T)
1
0.5
0
−0.5
−1
0.03
0.02
0.01
0
−0.01
−0.02
−0.03
0
0.5
1
1.5
2
2.5
3
3.5
4
Zm Measurement Position (m)

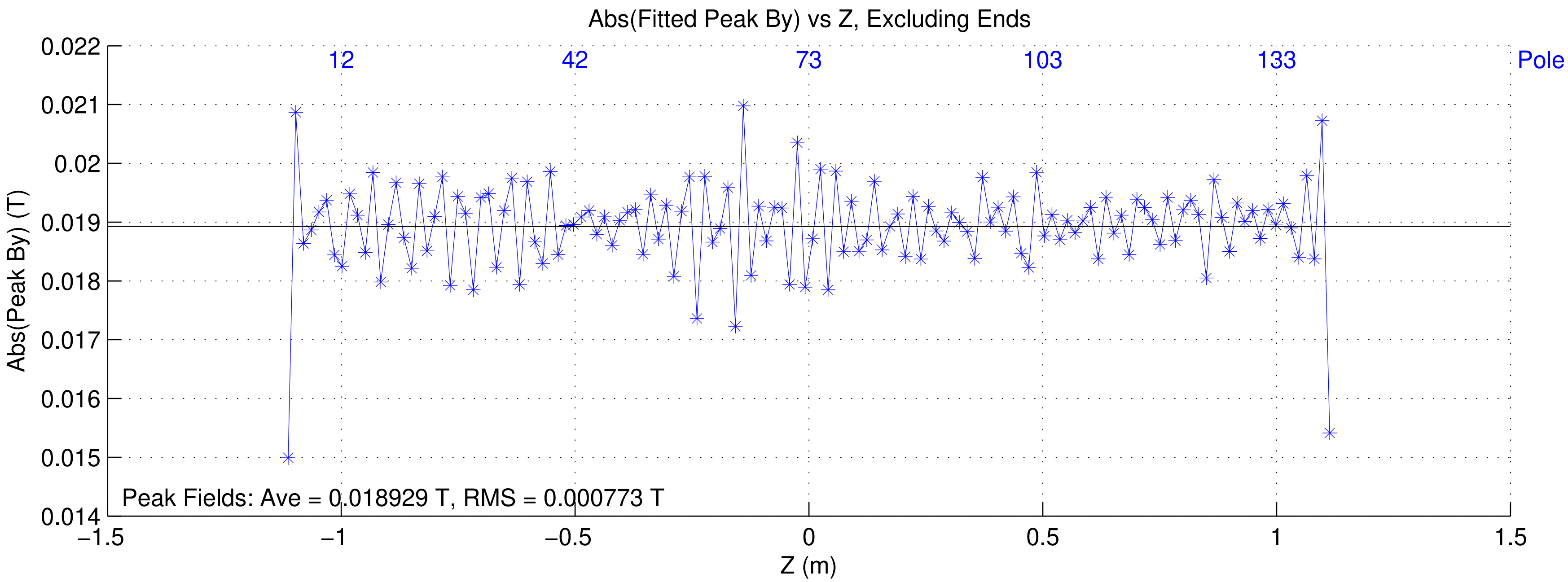

Bx and By vs Z
12
42
73
103
133
Pole
Bx
By
0.025
0.02
0.015
0.01
0.005
0
−0.005
−0.01
−0.015
−0.02
−0.025
Bx, By (T)
−2.5
−2
−1.5
−1
−0.5
0
0.5
1
1.5
Z (m)



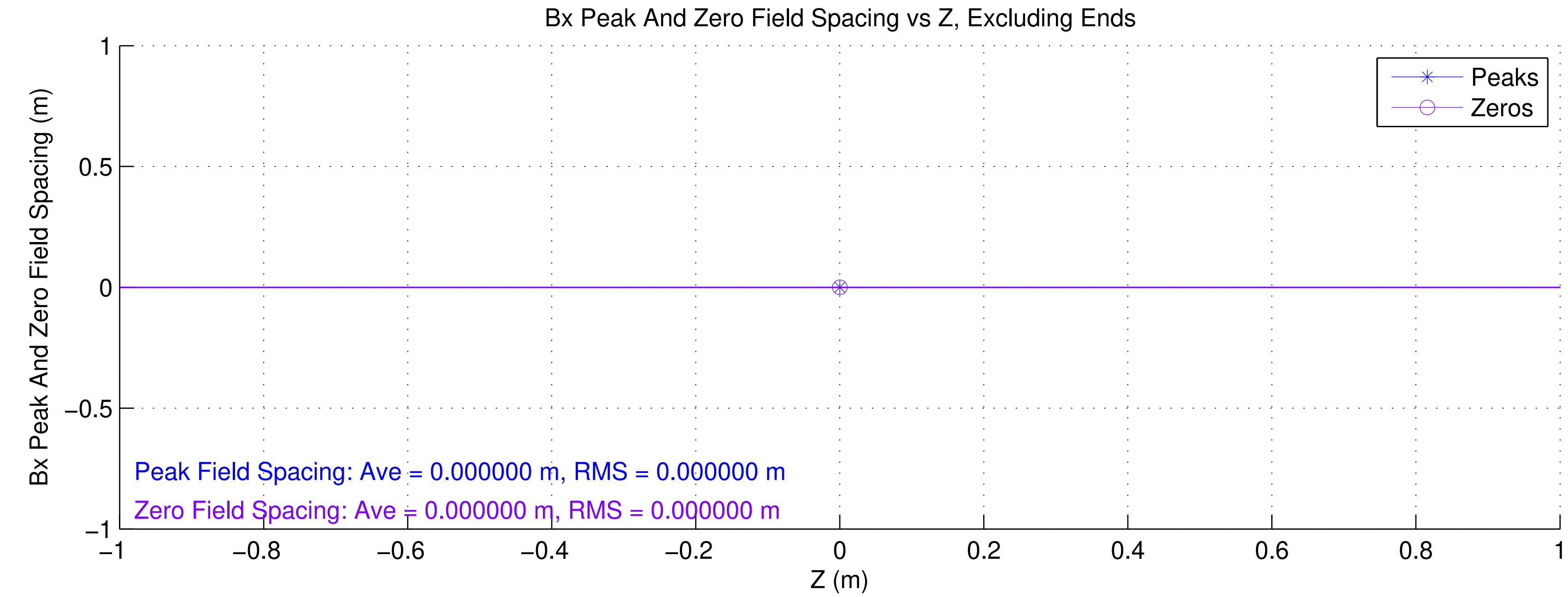
Bx vs Z With Fitted Peaks And Zeros
x 10^-3
Bx (T)
Z (m)
By vs Z With Fitted Peaks And Zeros
12
42
73
103
133
Pole
By (T)
Z (m)

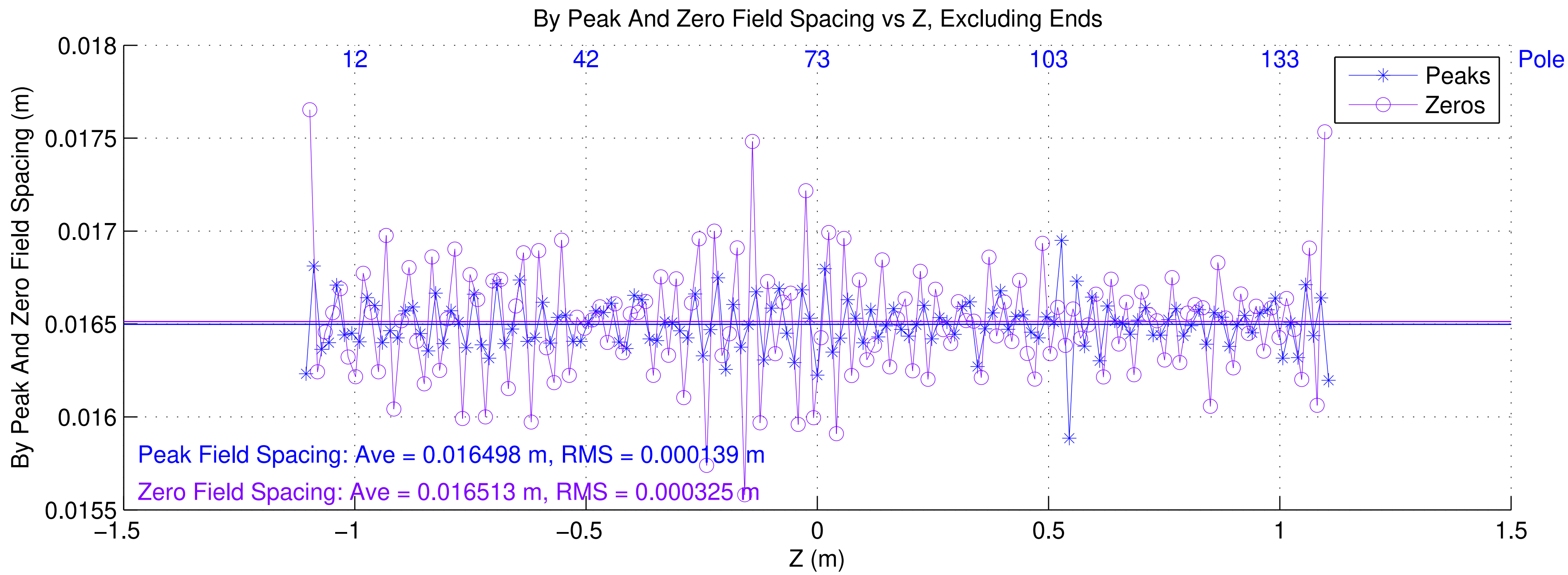


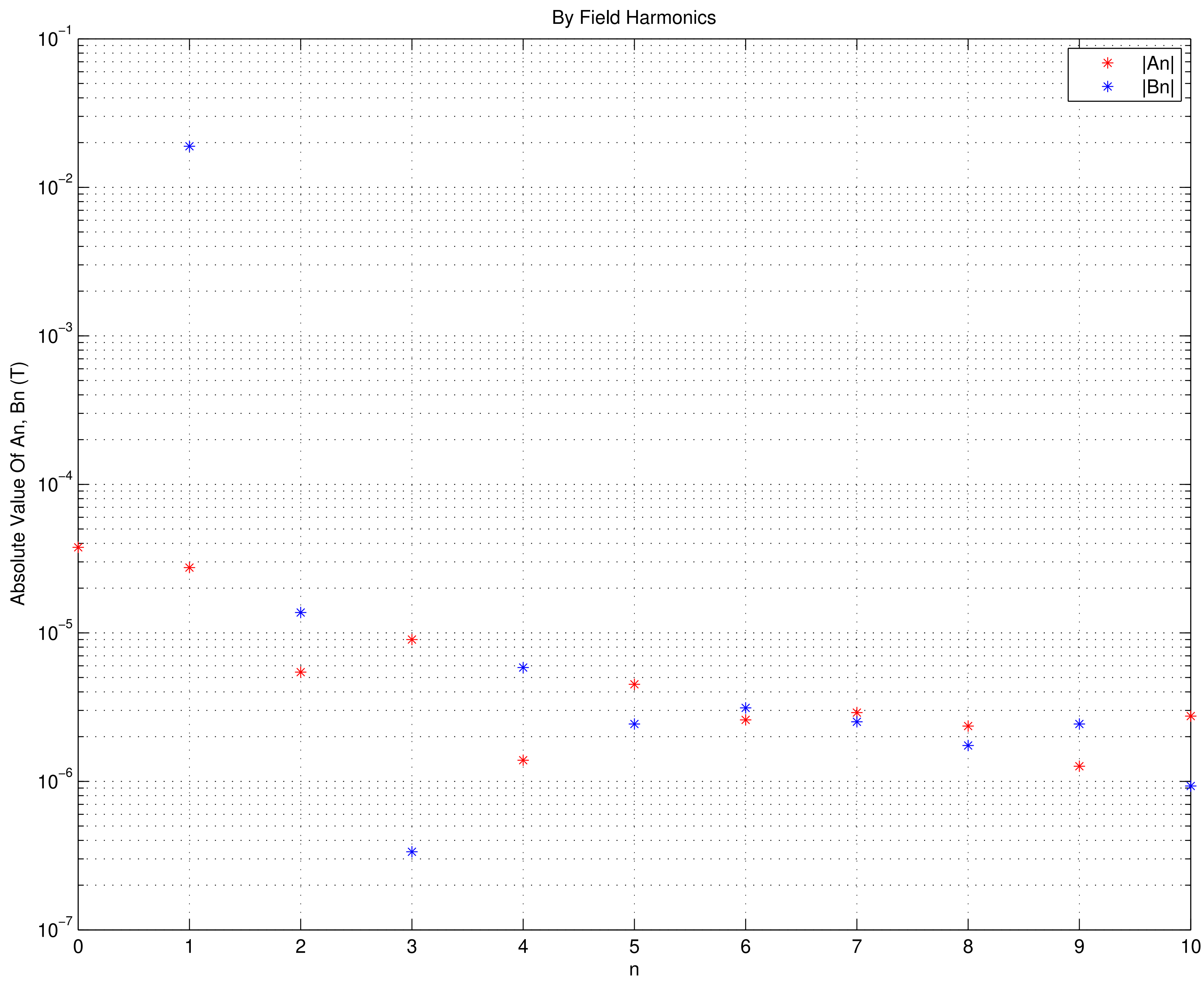
Abs(Fitted Peak Bx) vs Z, Excluding Ends
Abs(Peak Bx) (T)
Z (m)
Peak Fields: Ave = 0.000000 T, RMS = 0.000000 T

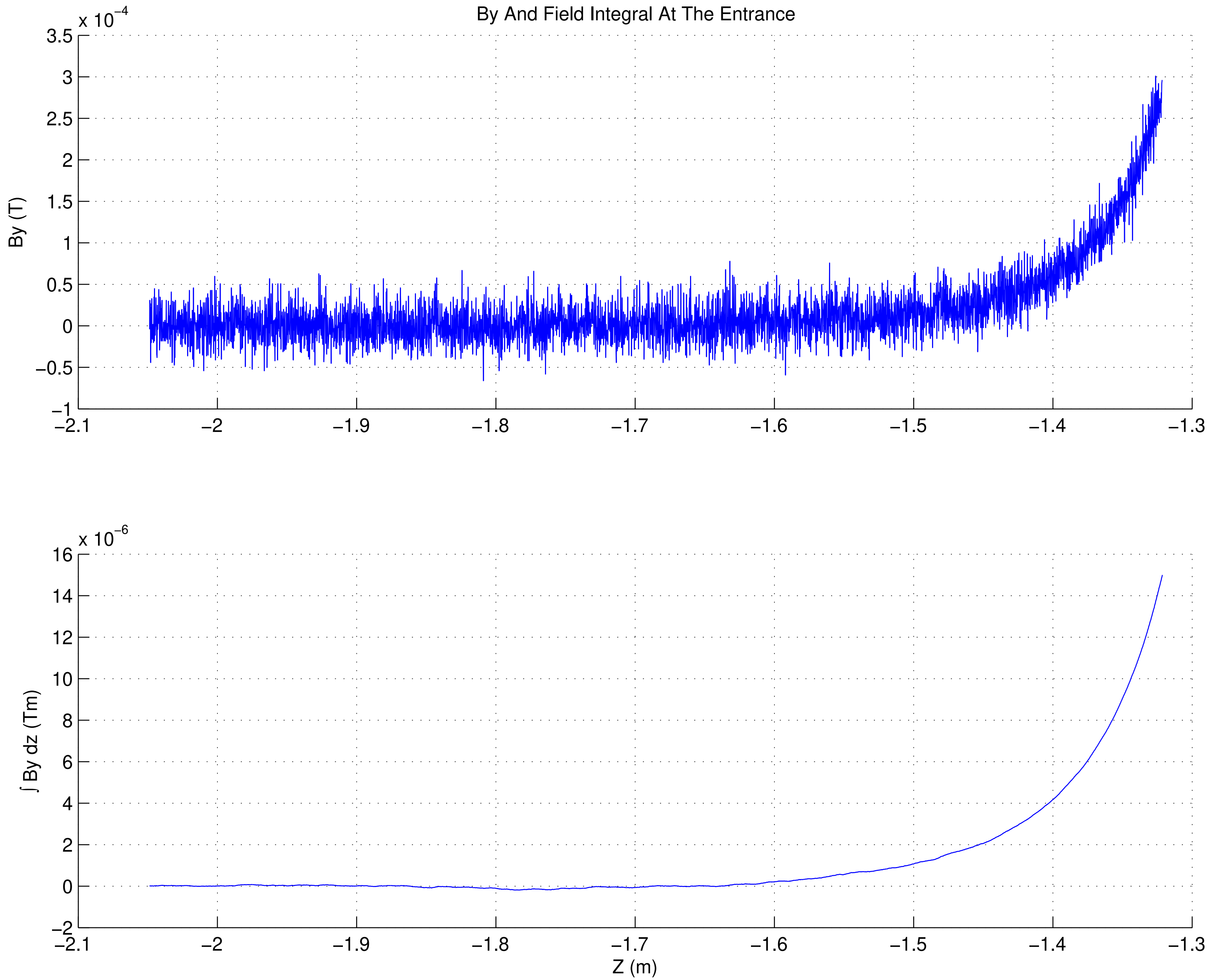


Abs(Fitted Peak By) vs Z, Excluding Ends
Abs(Peak By) (T)
Z (m)
12
42
73
103
133
Pole
Peak Fields: Ave = 0.018929 T, RMS = 0.000773 T

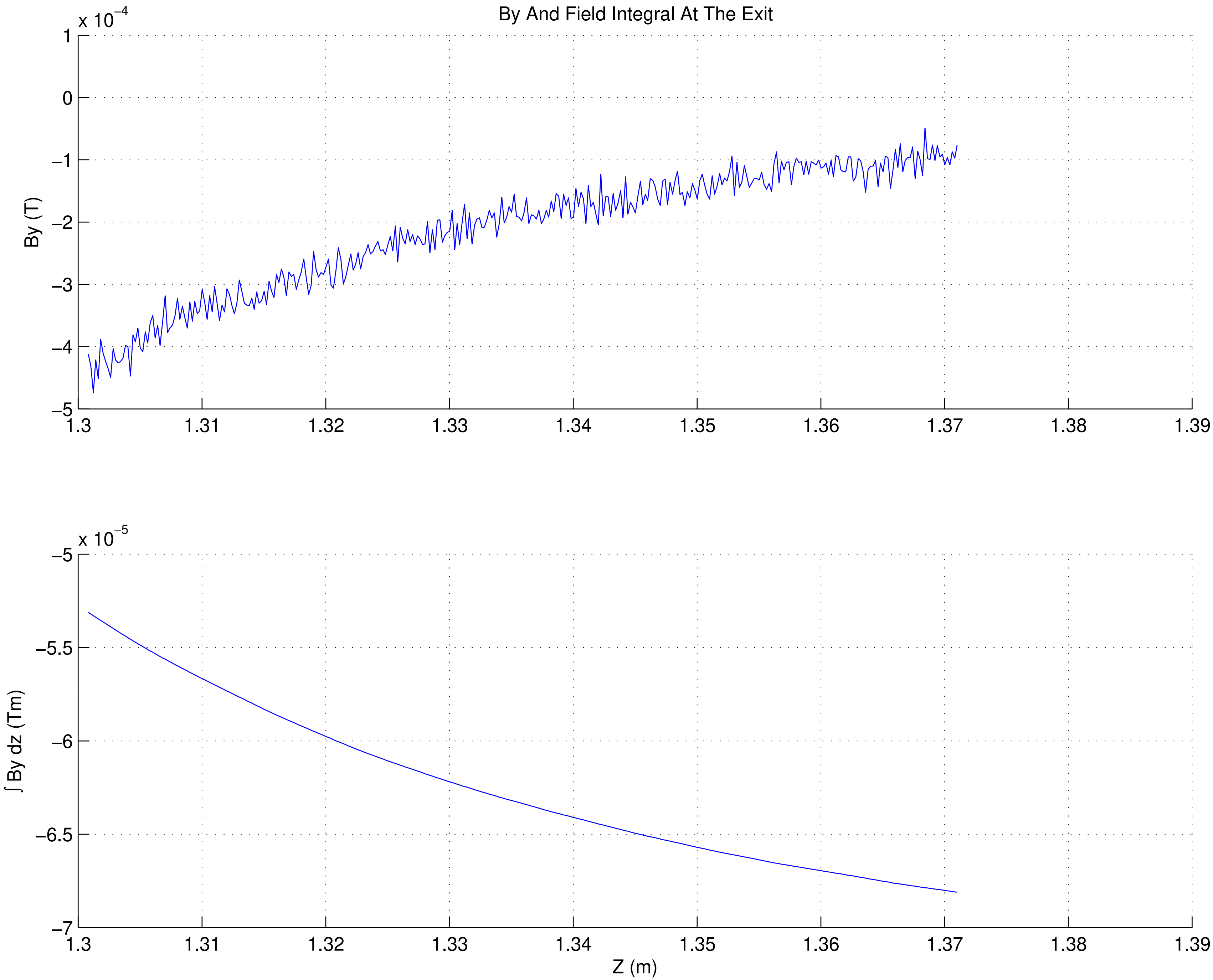

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
Z (m)
Peaks
Zeros
Peak Field Spacing: Ave = 0.000000 m, RMS = 0.000000 m
Zero Field Spacing: Ave = 0.000000 m, RMS = 0.000000 m


By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
Z (m)
12
42
73
103
133
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016498 m, RMS = 0.000139 m
Zero Field Spacing: Ave = 0.016513 m, RMS = 0.000325 m

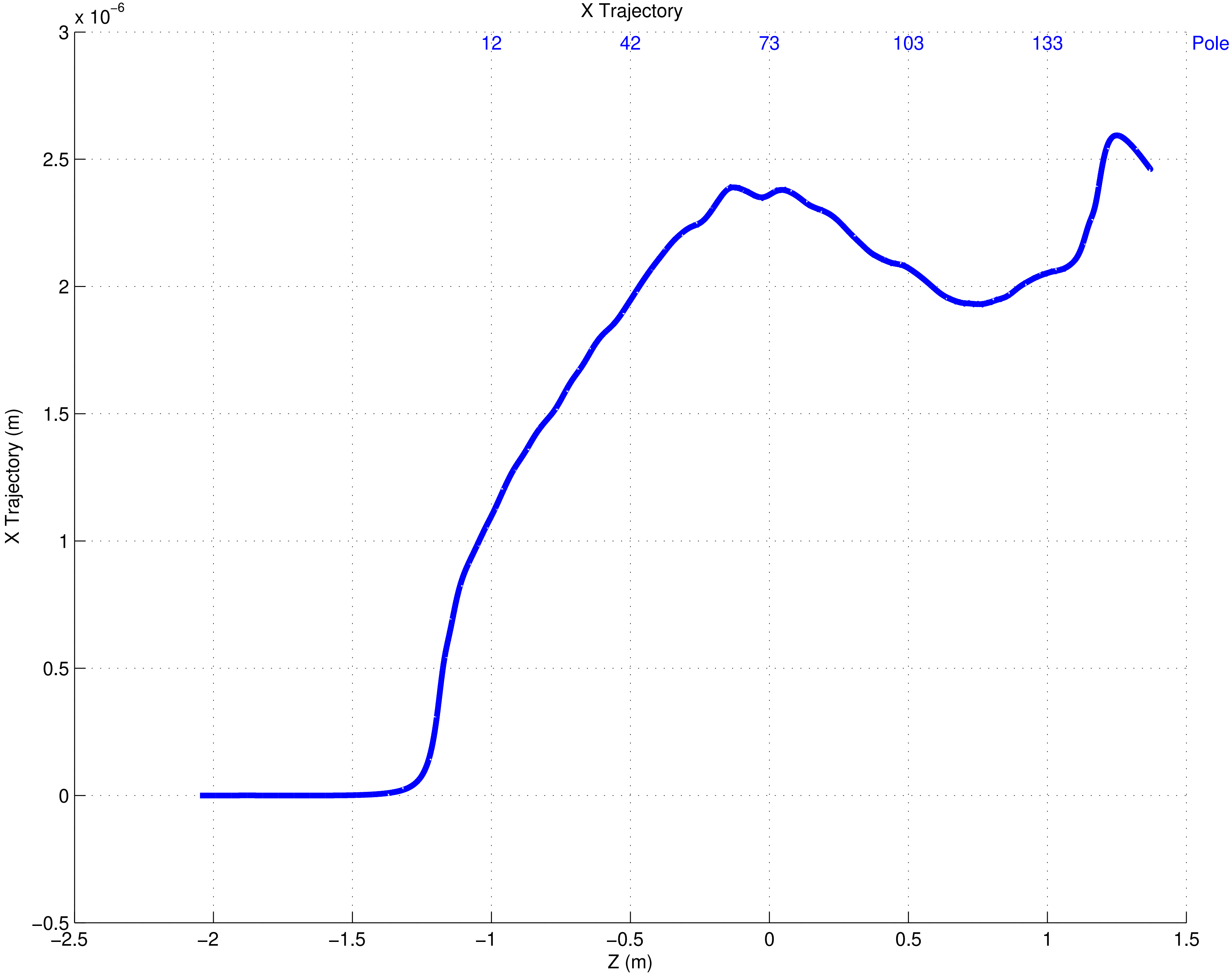

By Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
10^-7
0
1
2
3
4
5
6
7
8
9
10

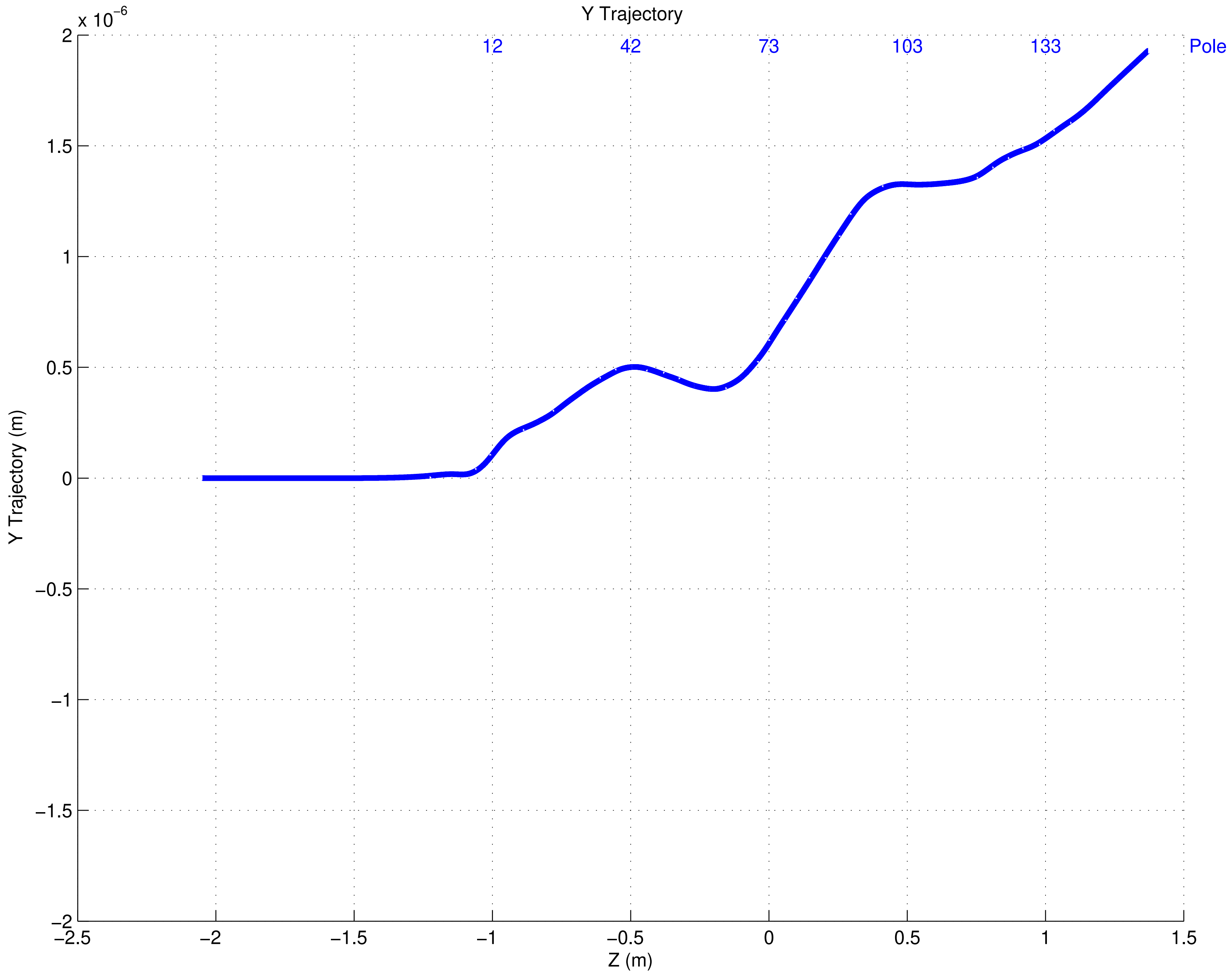


By And Field Integral At The Entrance
x 10^−4
By (T)
3.5
3
2.5
2
1.5
1
0.5
0
−0.5
−1
−2.1
−2
−1.9
−1.8
−1.7
−1.6
−1.5
−1.4
−1.3
x 10^−6
∫ By dz (Tm)
16
14
12
10
8
6
4
2
0
−2
Z (m)

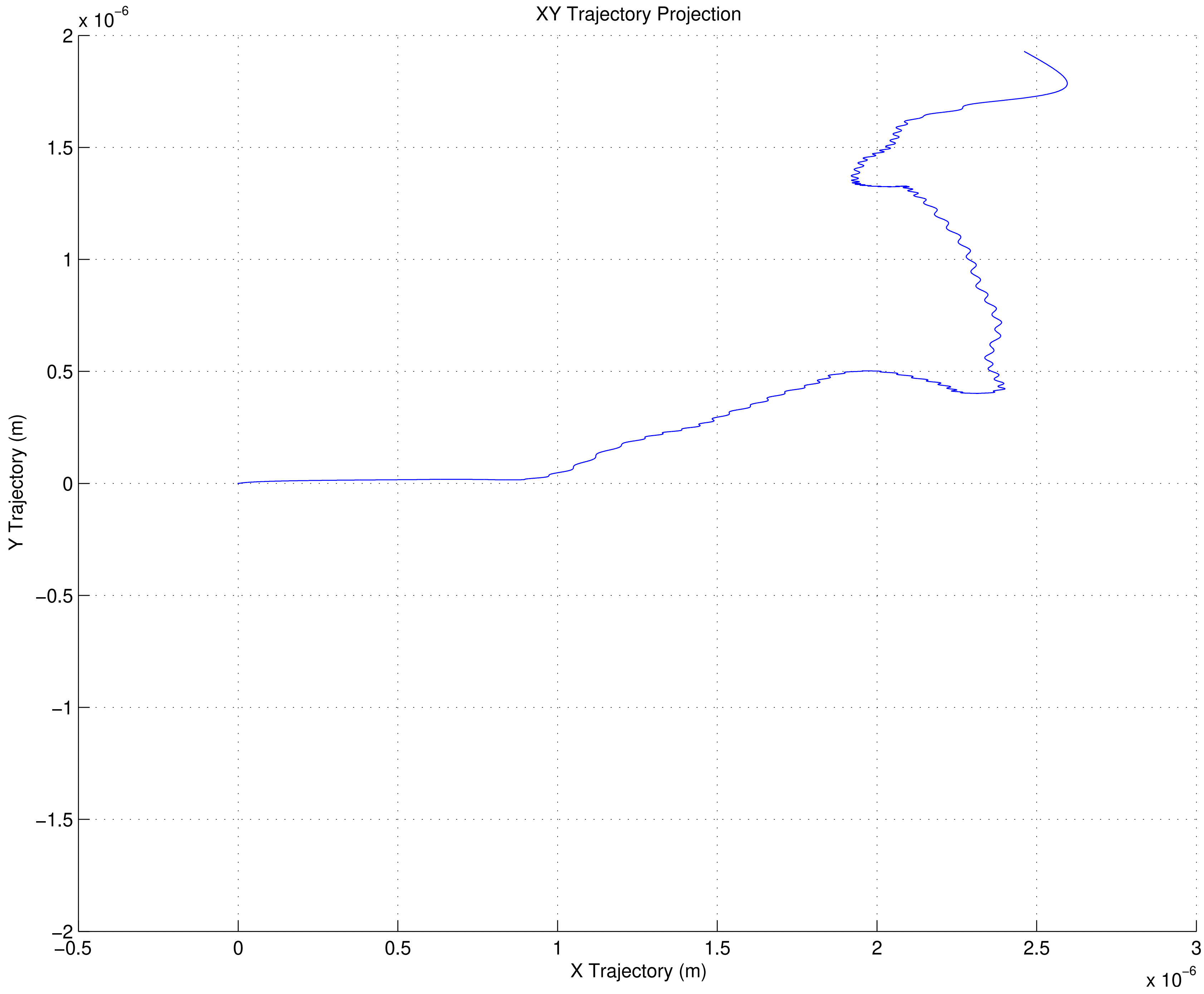


By And Field Integral At The Exit
x 10^−4
By (T)
1
0
−1
−2
−3
−4
−5
1.3
1.31
1.32
1.33
1.34
1.35
1.36
1.37
1.38
1.39
x 10^−5
∫ By dz (Tm)
−5
−5.5
−6
−6.5
−7
Z (m)

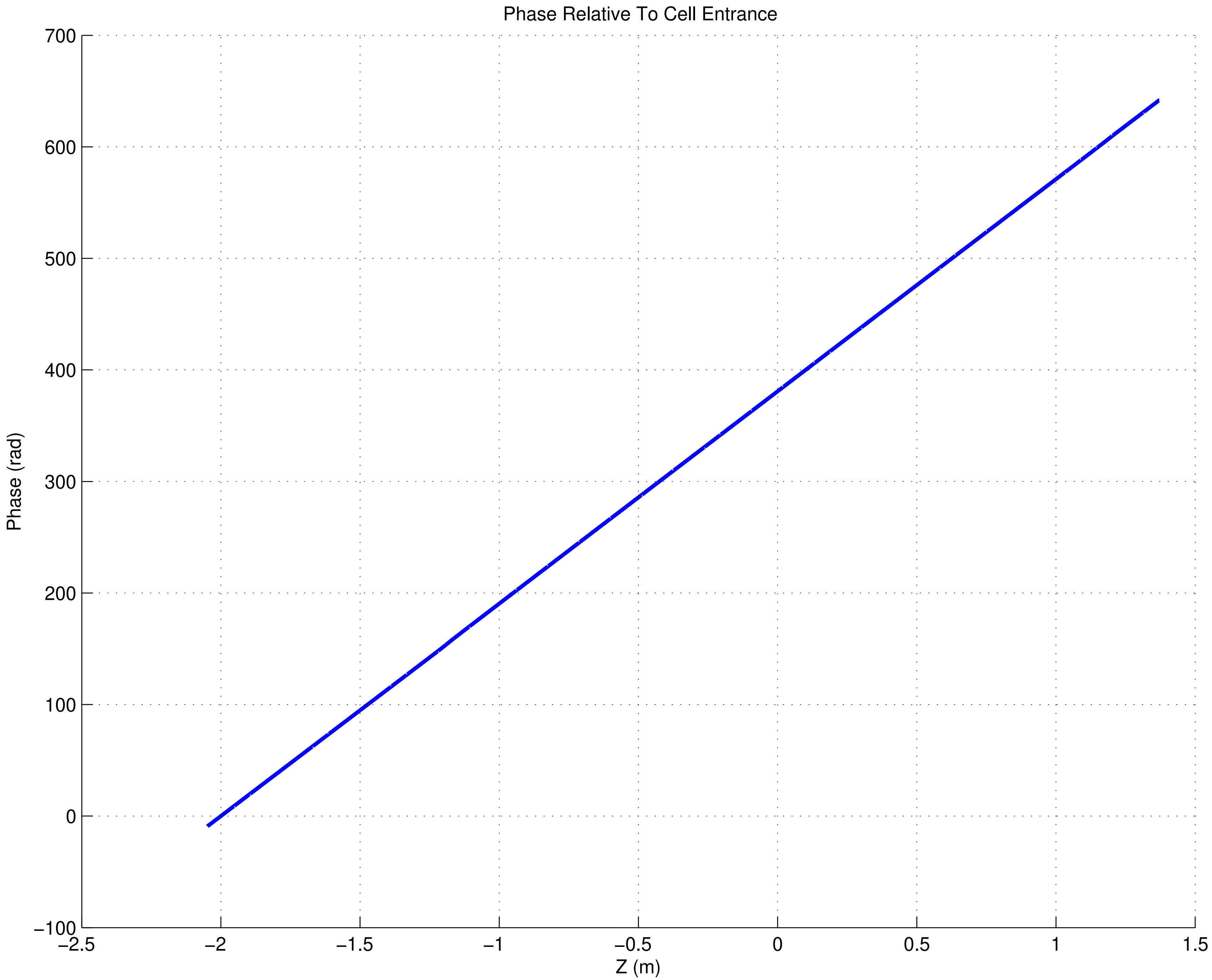

X Trajectory
x 10^−6
12
42
73
103
133
Pole
X Trajectory (m)
Z (m)
3
2.5
2
1.5
1
0.5
0
−0.5
−2.5
−2
−1.5
−1
−0.5
0
0.5
1
1.5



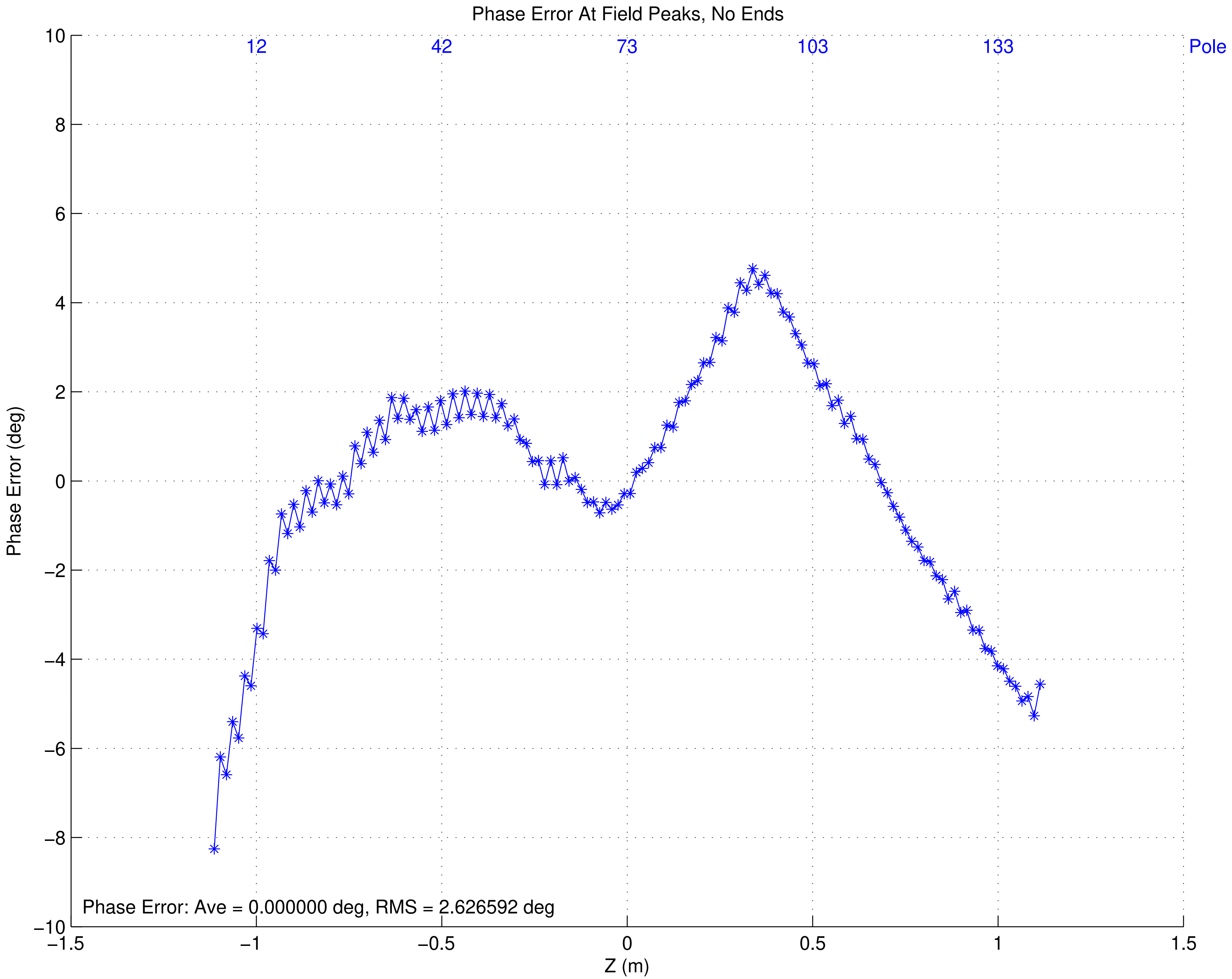
Y Trajectory
x 10^−6
12
42
73
103
133
Pole
Y Trajectory (m)
Z (m)
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
−2.5
−2
−1.5
−1
−0.5
0
0.5
1
1.5

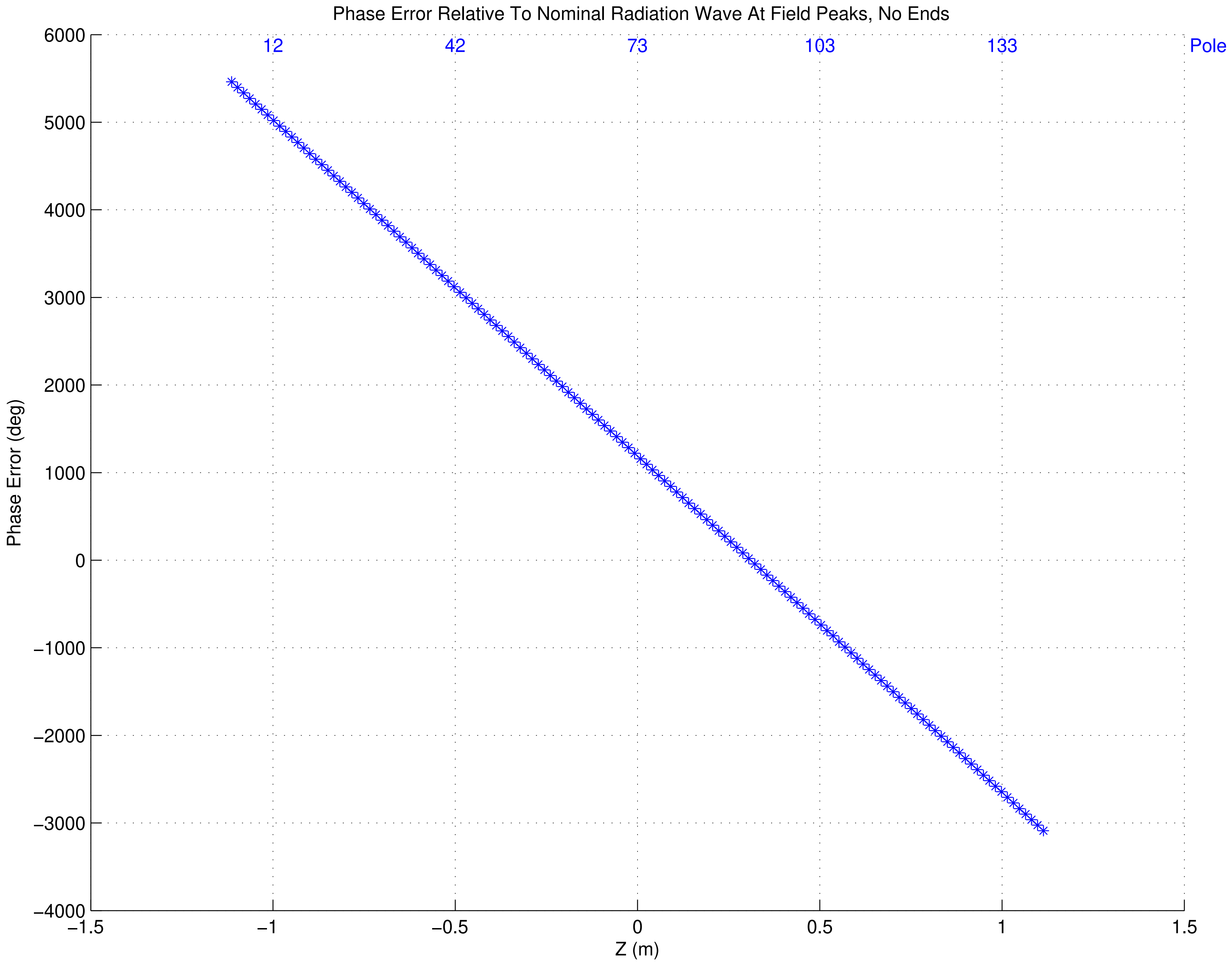


XY Trajectory Projection
x 10^−6
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
Y Trajectory (m)
−0.5
0
0.5
1
1.5
2
2.5
3
X Trajectory (m)
x 10^−6

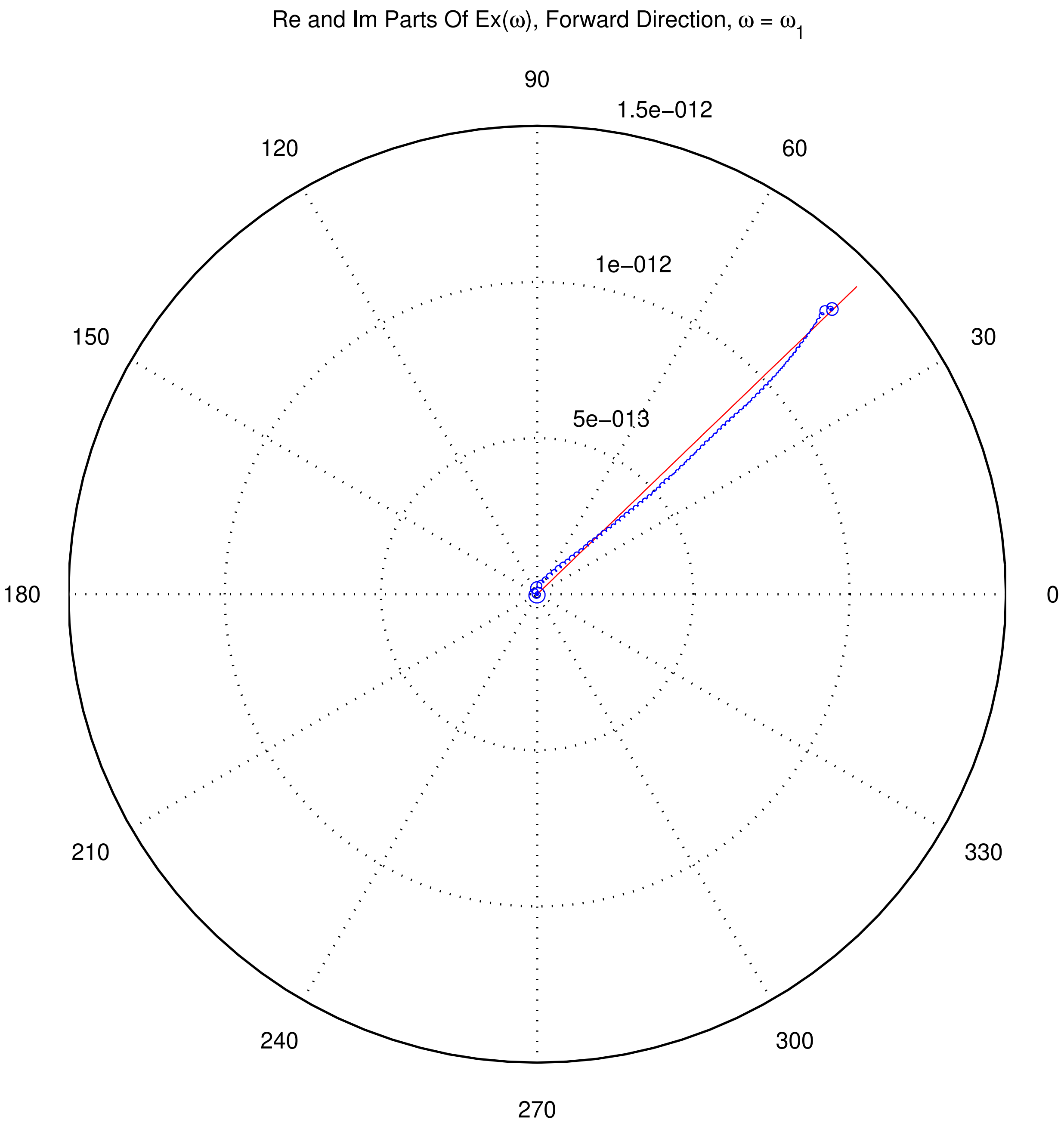


Phase Relative To Cell Entrance
Phase (rad)
Z (m)
700
600
500
400
300
200
100
0
−100
−2.5
−2
−1.5
−1
−0.5
0
0.5
1
1.5

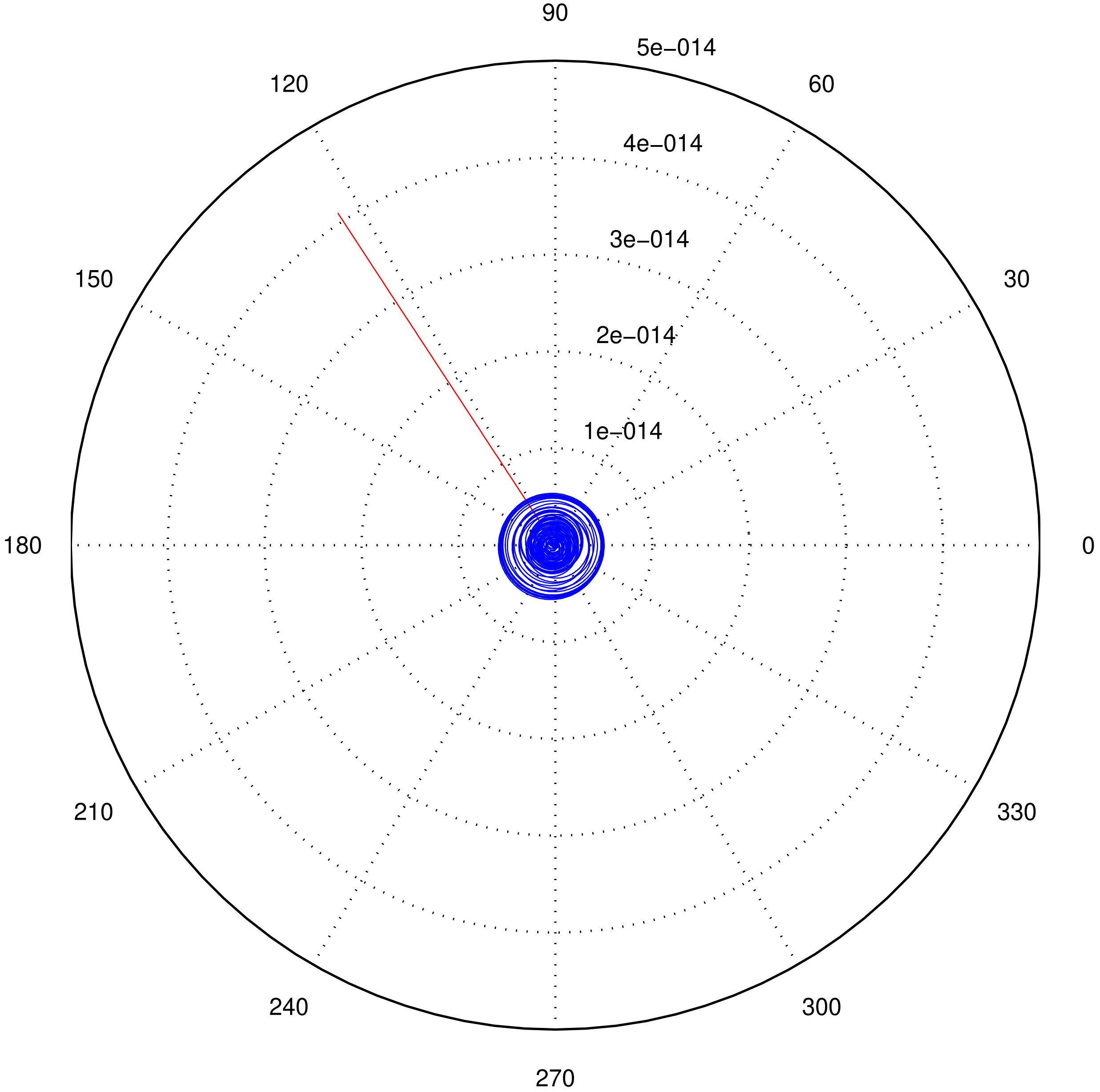

Phase Error At Field Peaks, No Ends
12
42
73
103
133
Pole
Phase Error (deg)
Z (m)
Phase Error: Ave = 0.000000 deg, RMS = 2.626592 deg
10
8
6
4
2
0
−2
−4
−6
−8
−10
−1.5
−1
−0.5
0
0.5
1
1.5

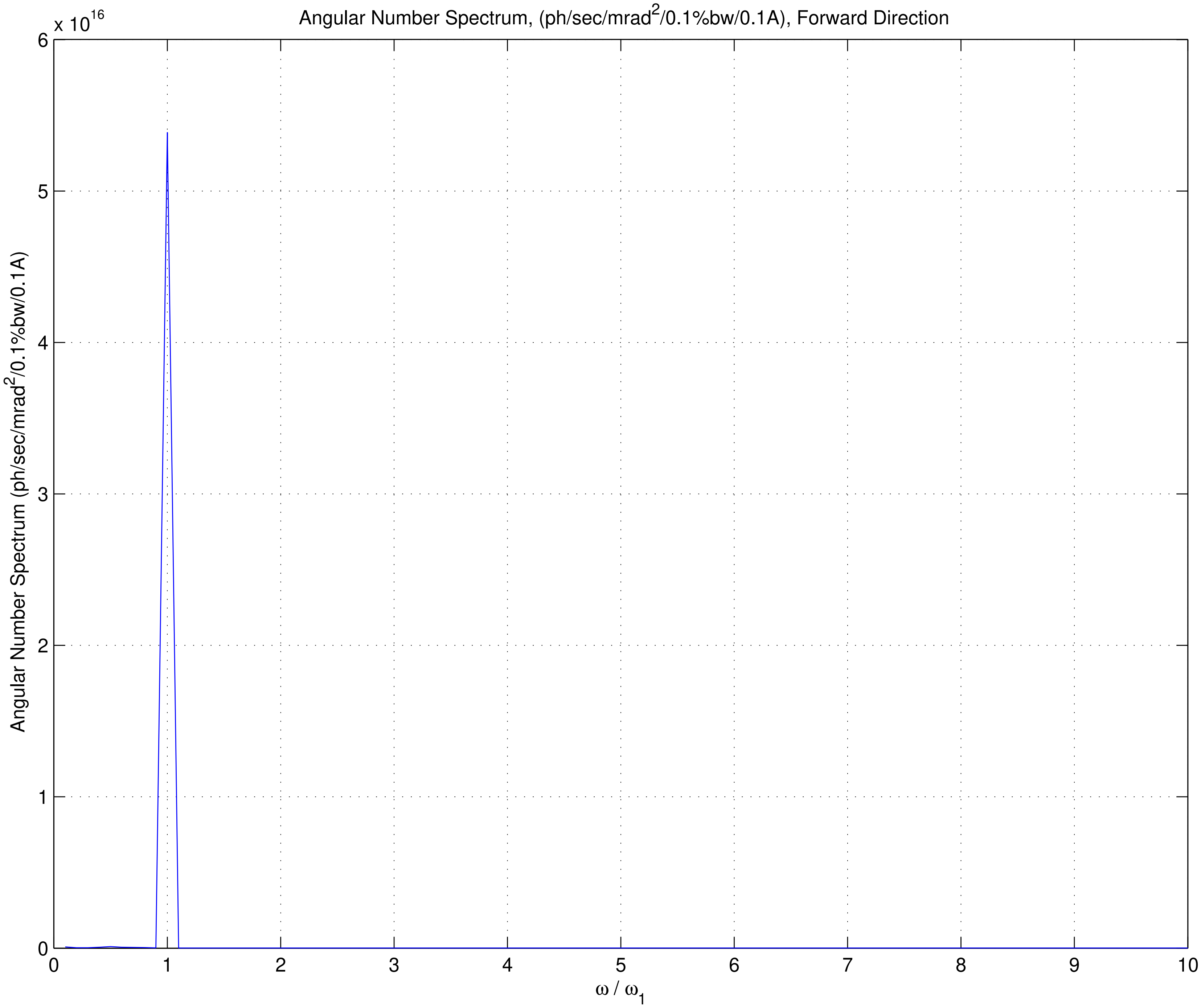


Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
Phase Error (deg)
Z (m)
Pole
12
42
73
103
133
6000
5000
4000
3000
2000
1000
0
−1000
−2000
−3000
−4000
−1.5
−1
−0.5
0
0.5
1
1.5

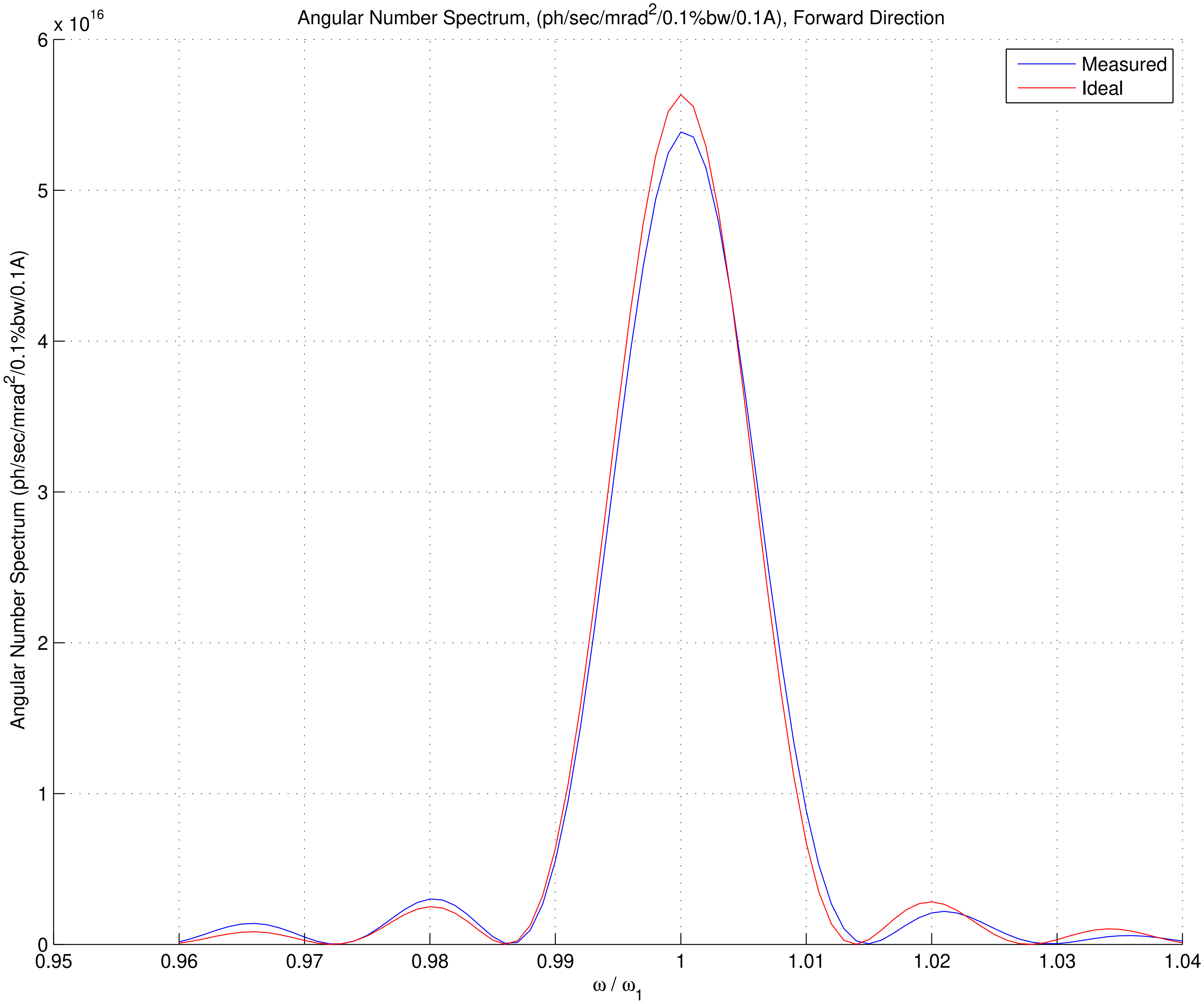

Re and Im Parts Of Ex(ω), Forward Direction, ω = ω1
90
1.5e−012
60
120
1e−012
30
150
5e−013
180
0
210
330
240
300
270

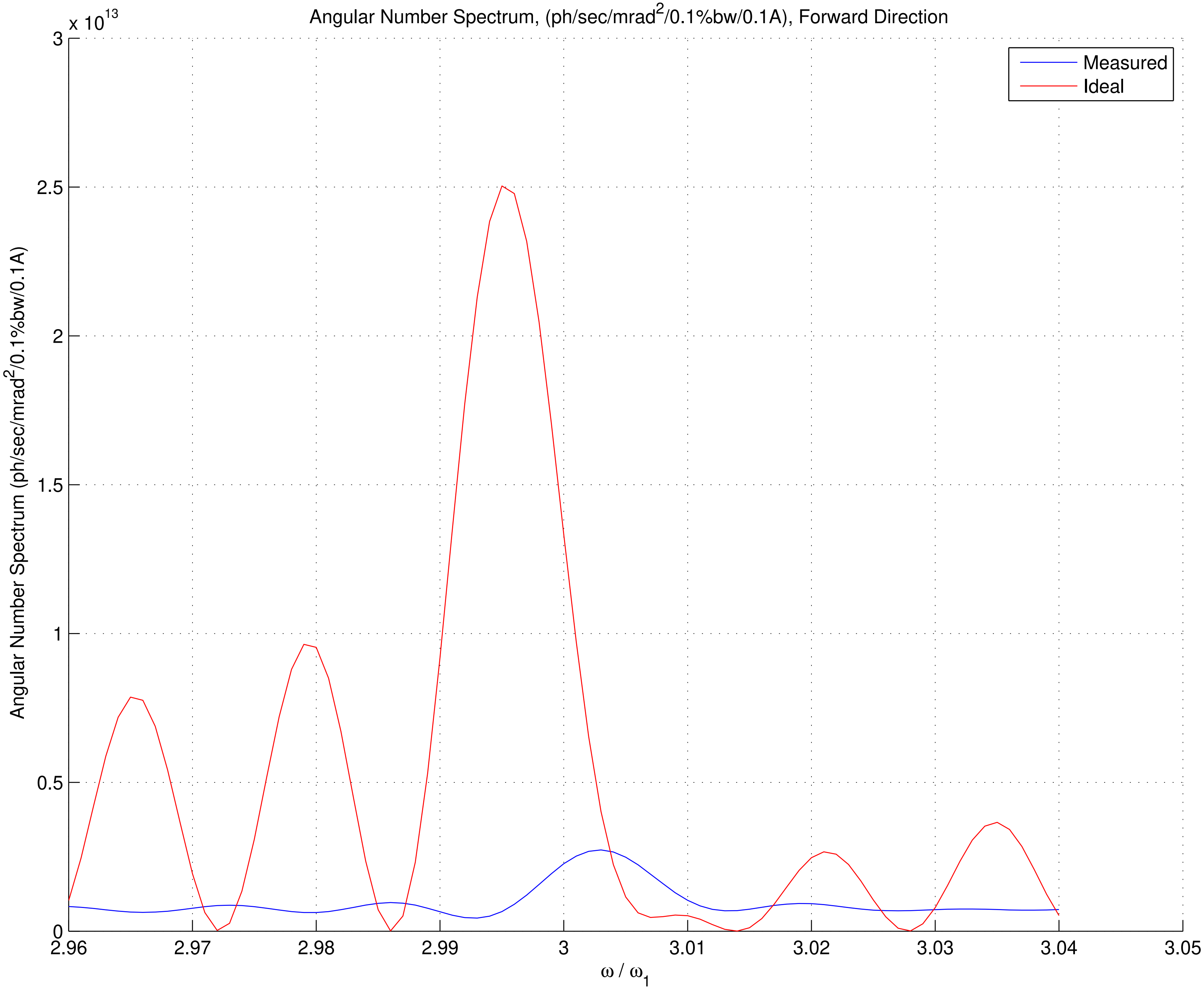
Re and Im Parts Of Ey(ω), Forward Direction, $\omega = \omega_1$



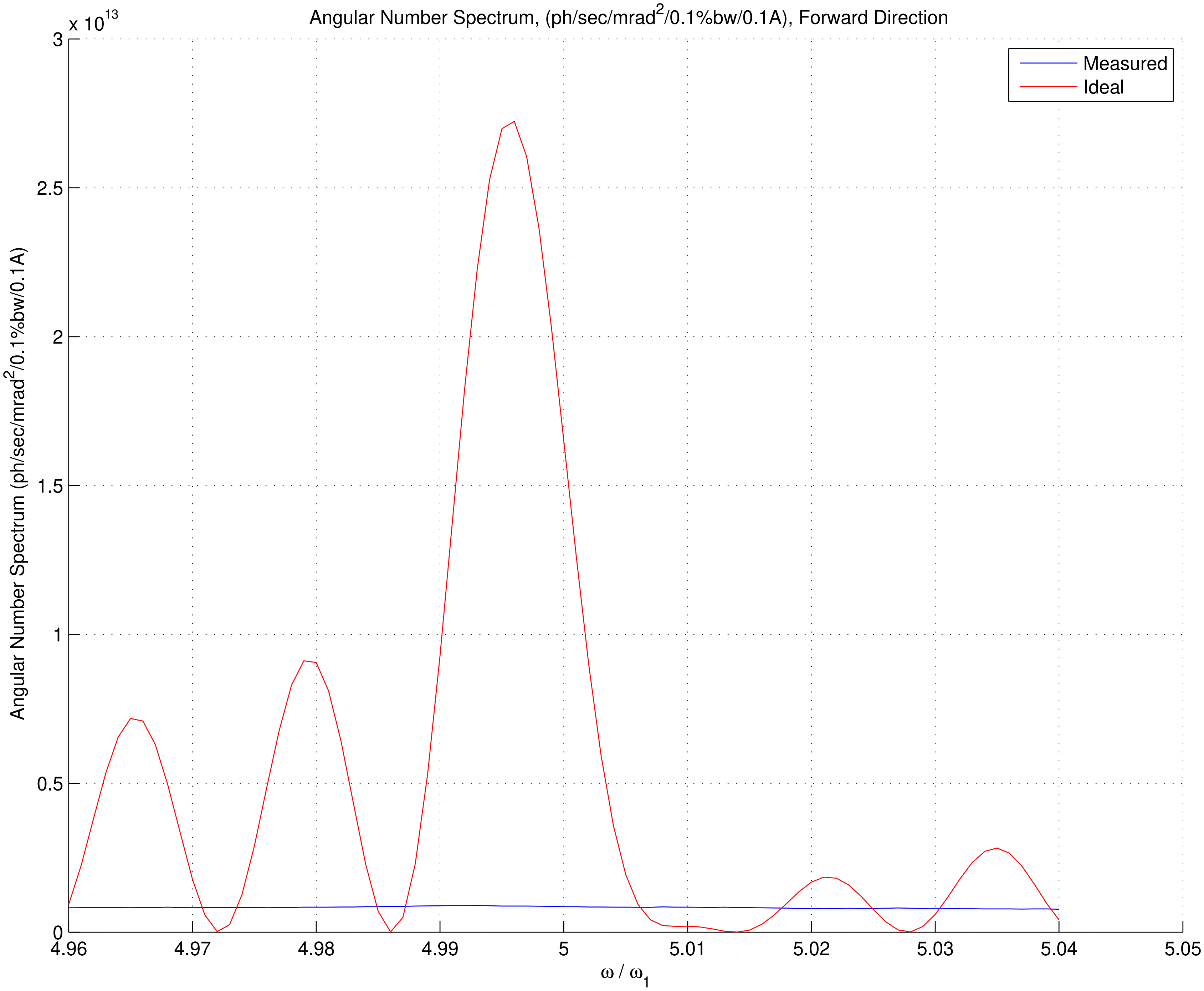


Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
x 10^{16}
6
5
4
3
2
1
0
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
0 1 2 3 4 5 6 7 8 9 10
ω / ω_1


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)
ω / ω_1
0
1
2
3
4
5
6
0.95
0.96
0.97
0.98
0.99
1
1.01
1.02
1.03
1.04



Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
x 10^{13}
3
2.5
2
1.5
1
0.5
0
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
2.96
2.97
2.98
2.99
3
3.01
3.02
3.03
3.04
3.05
ω / ω_1
Measured
Ideal


Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
x 10^{13}
3
2.5
2
1.5
1
0.5
0
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
4.96
4.97
4.98
4.99
5
5.01
5.02
5.03
5.04
5.05
ω / ω_1
Measured
Ideal