SLAC Magnetic Measurements

EPU Analysis
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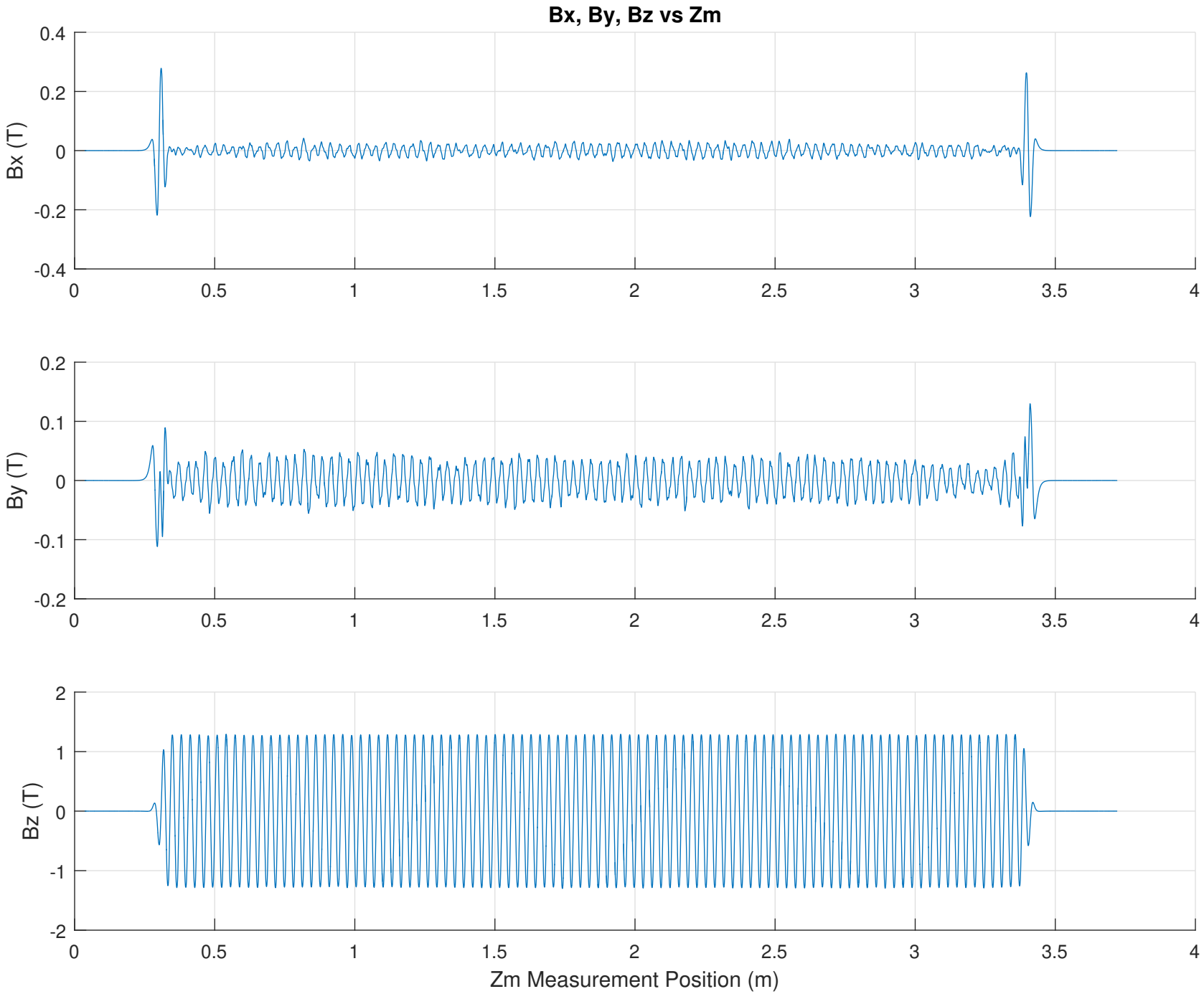
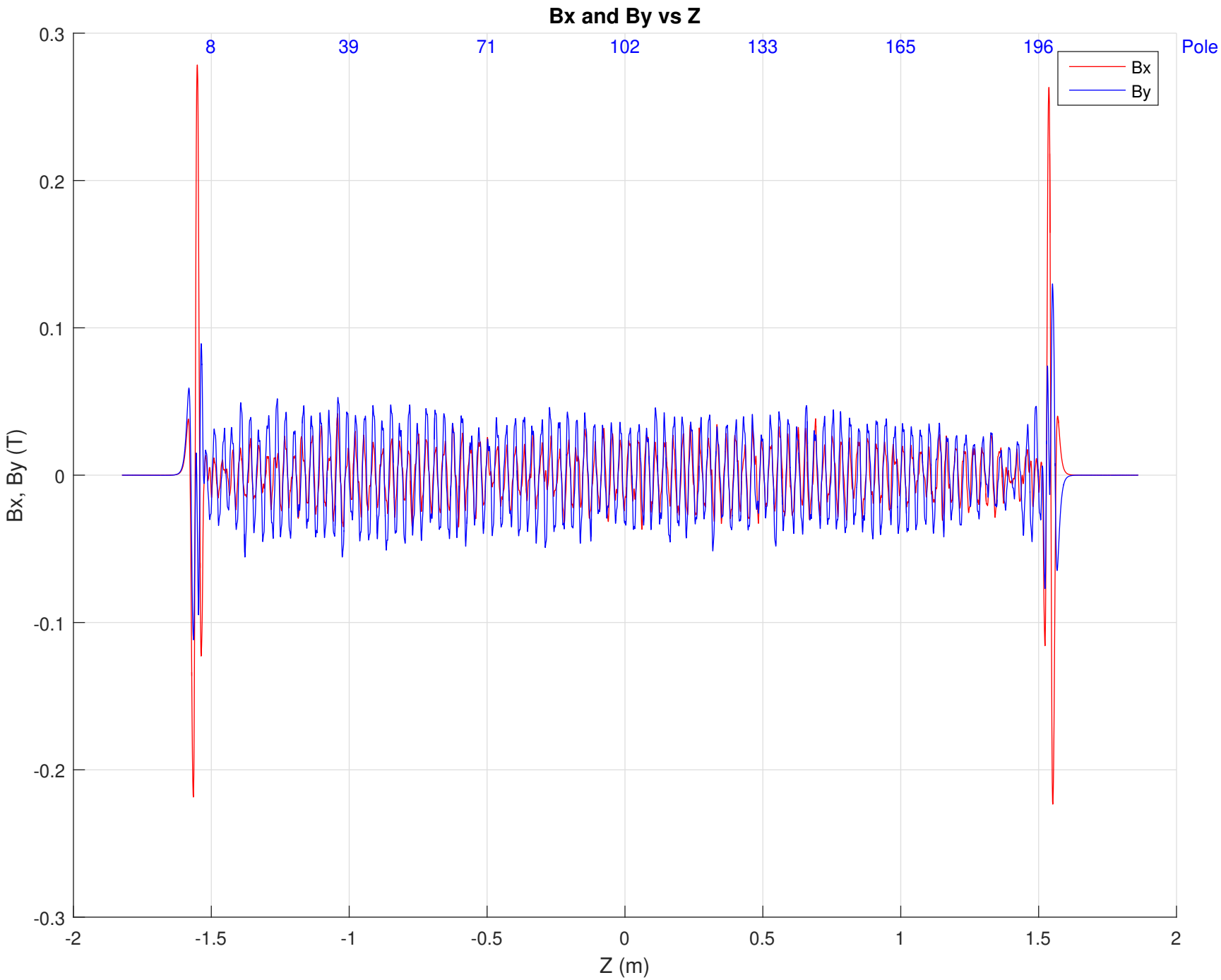
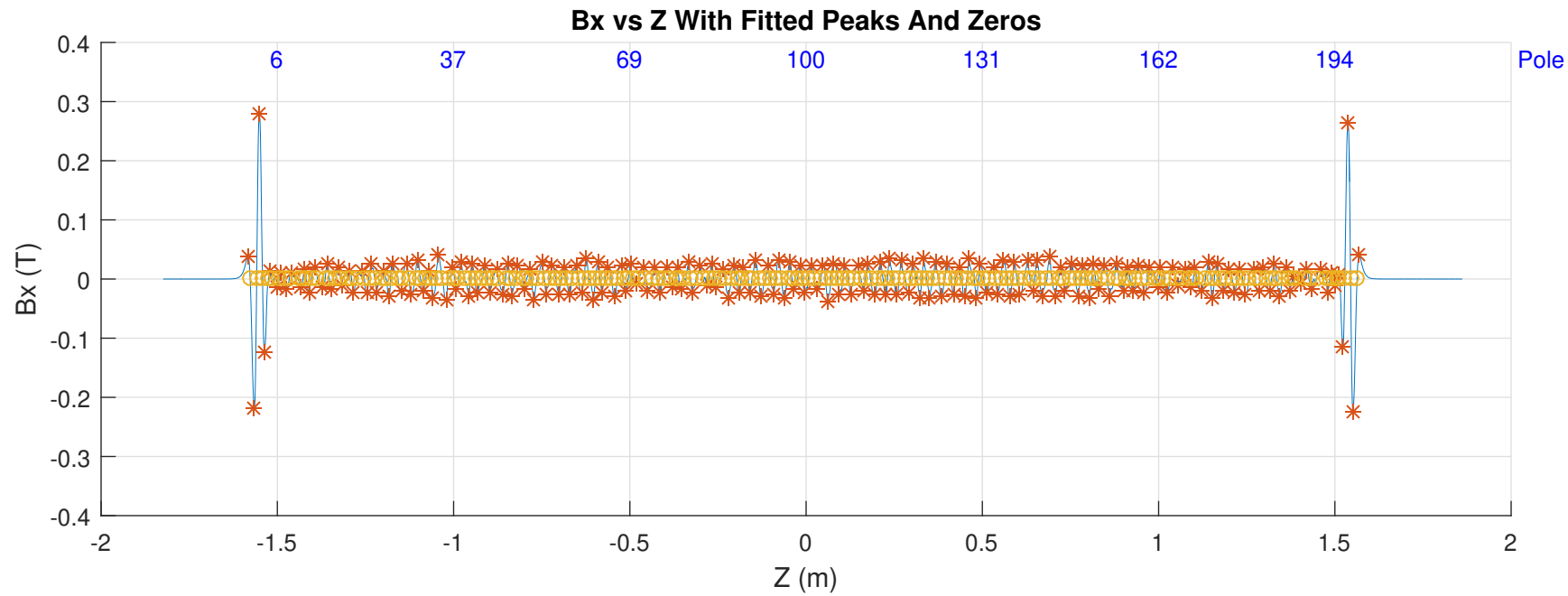
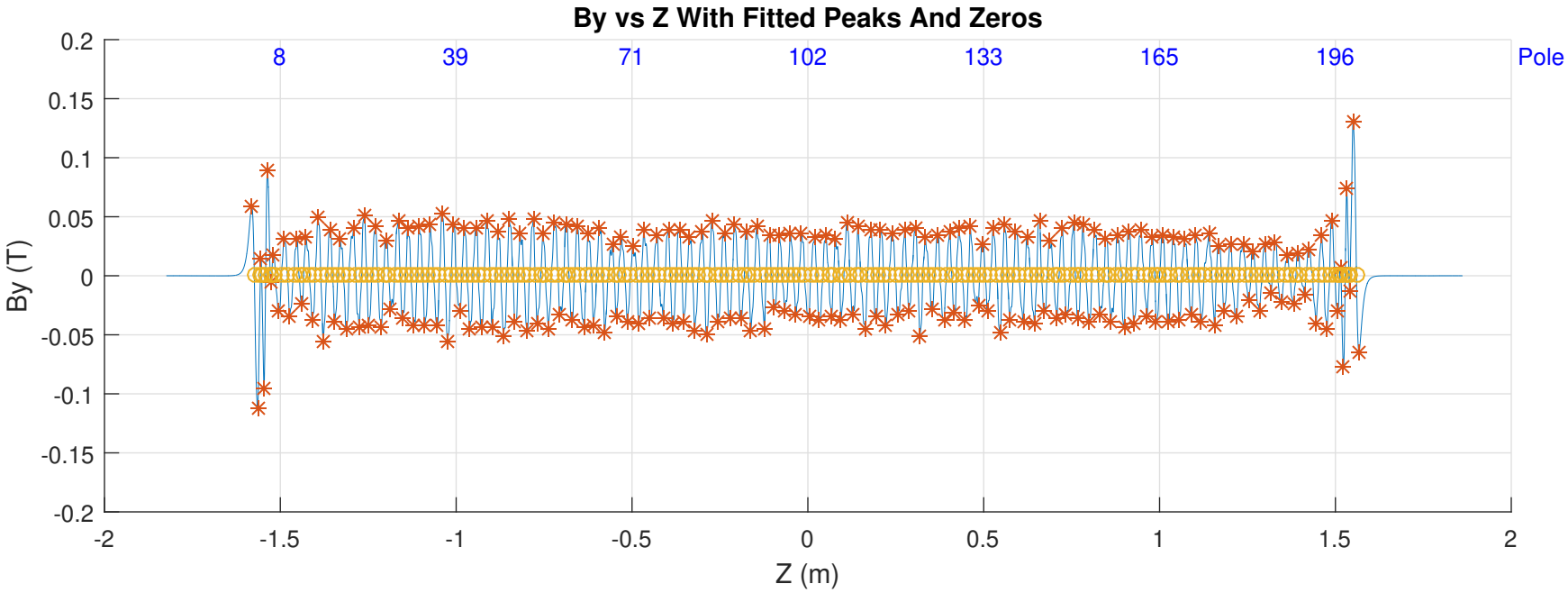
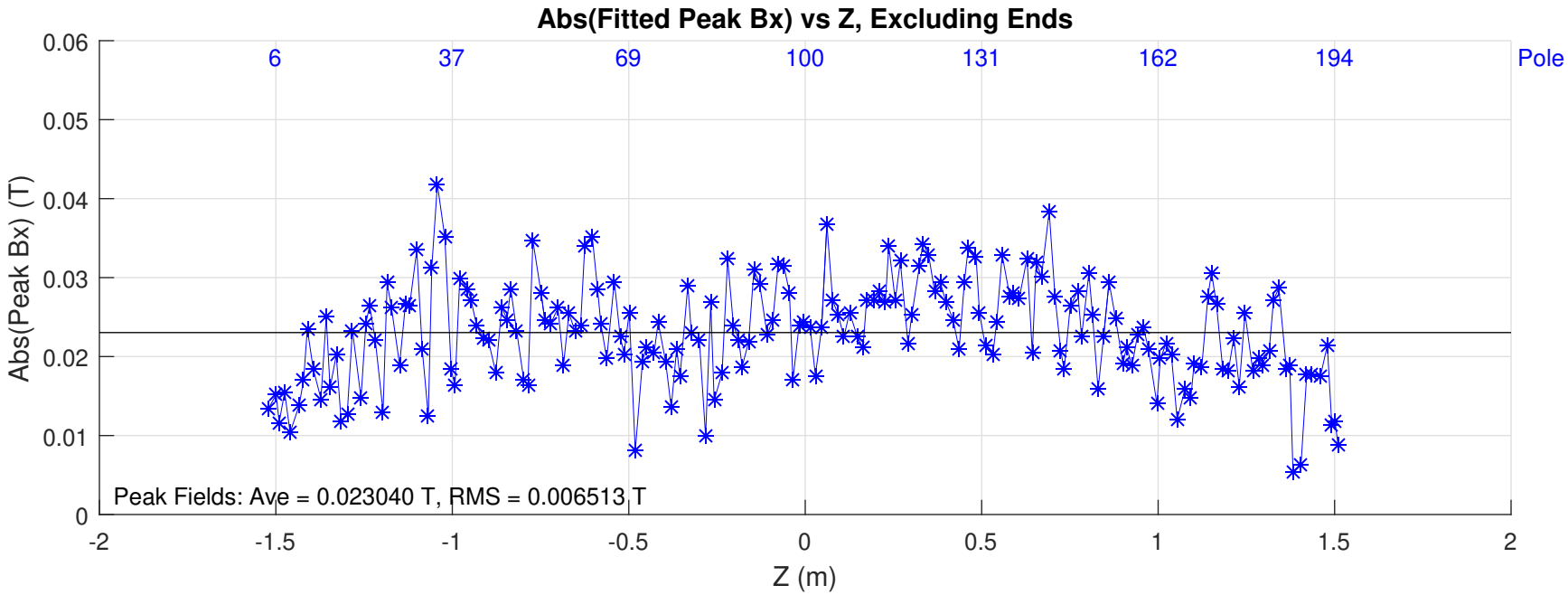
Parameters:
INPUT-FILE-DIR =V:\MET\MagServe\MagData\DELTA\Delta Data 2015\New Measurements\Run 137 HD Spreadsheet 260 Meas\\
INPUT-FILE-NAME =hall2-anal-probe2-field.dat
INPUT-FILE-TYPE =ZBXYZH
CORR-REQUIRED =0
GAMMA =26671.59
NOM-LAMBDA-U =0
NOM-K-VALUE =0
NOM-LAMBDA-R =0
NUM-POLES =196
NUM-END-POLES =4
CELL-LENGTH =3.656

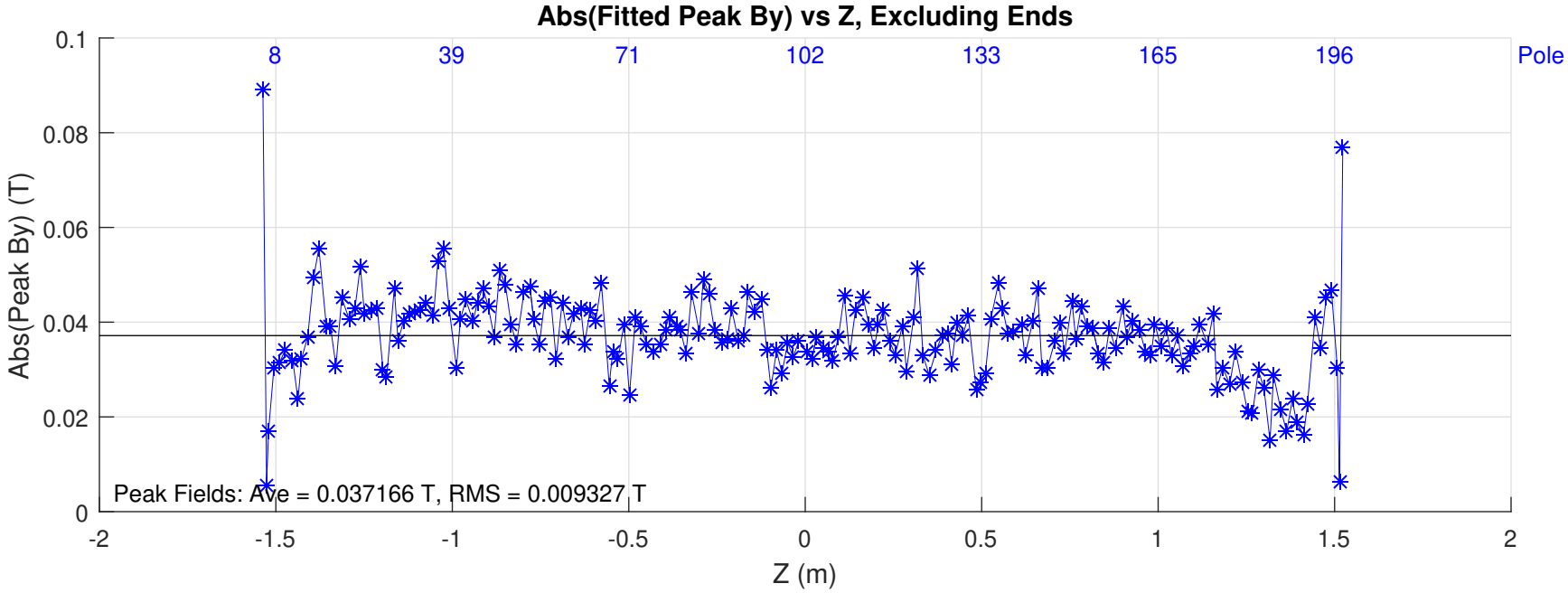

Bx, By, Bz vs Zm
Bx (T)
0.4
0.2
0
-0.2
-0.4
By (T)
0.2
0.1
0
-0.1
-0.2
Bz (T)
2
1
0
-1
-2
0
0.5
1
1.5
2
2.5
3
3.5
4
Zm Measurement Position (m)

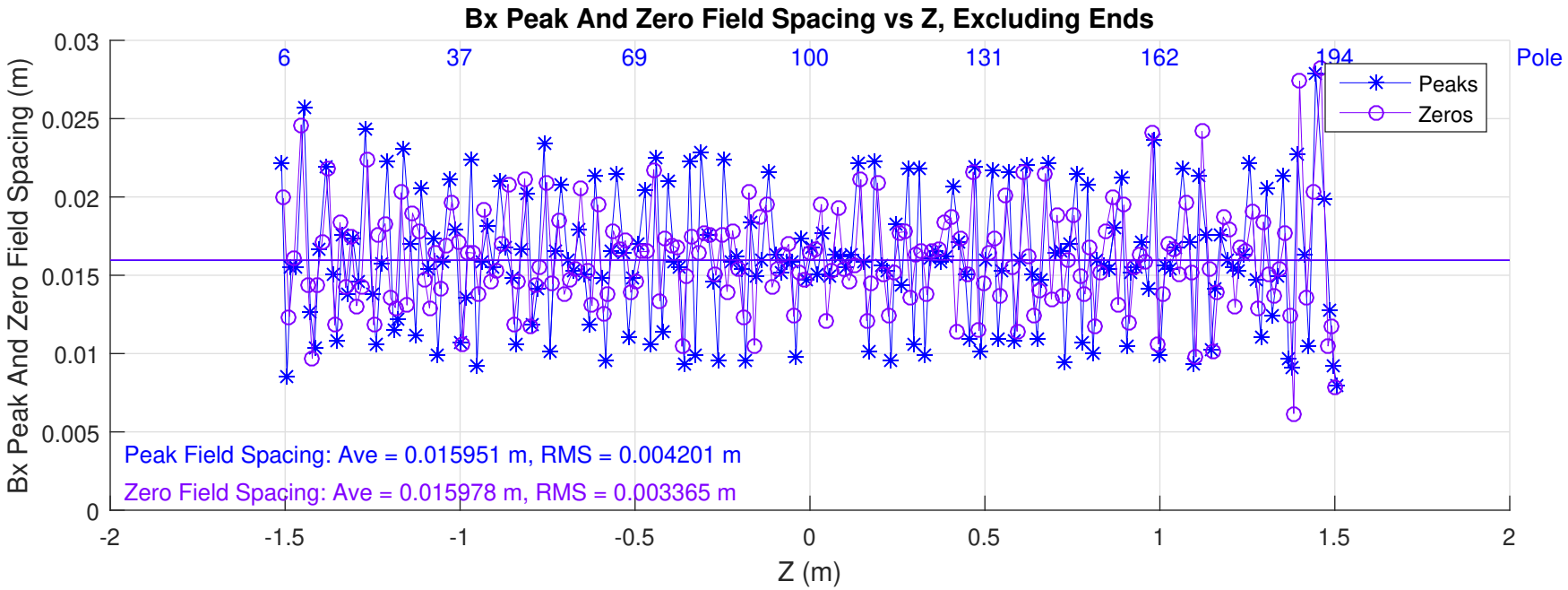

Bx and By vs Z
8
39
71
102
133
165
196
Pole
Bx
By
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
Bx, By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

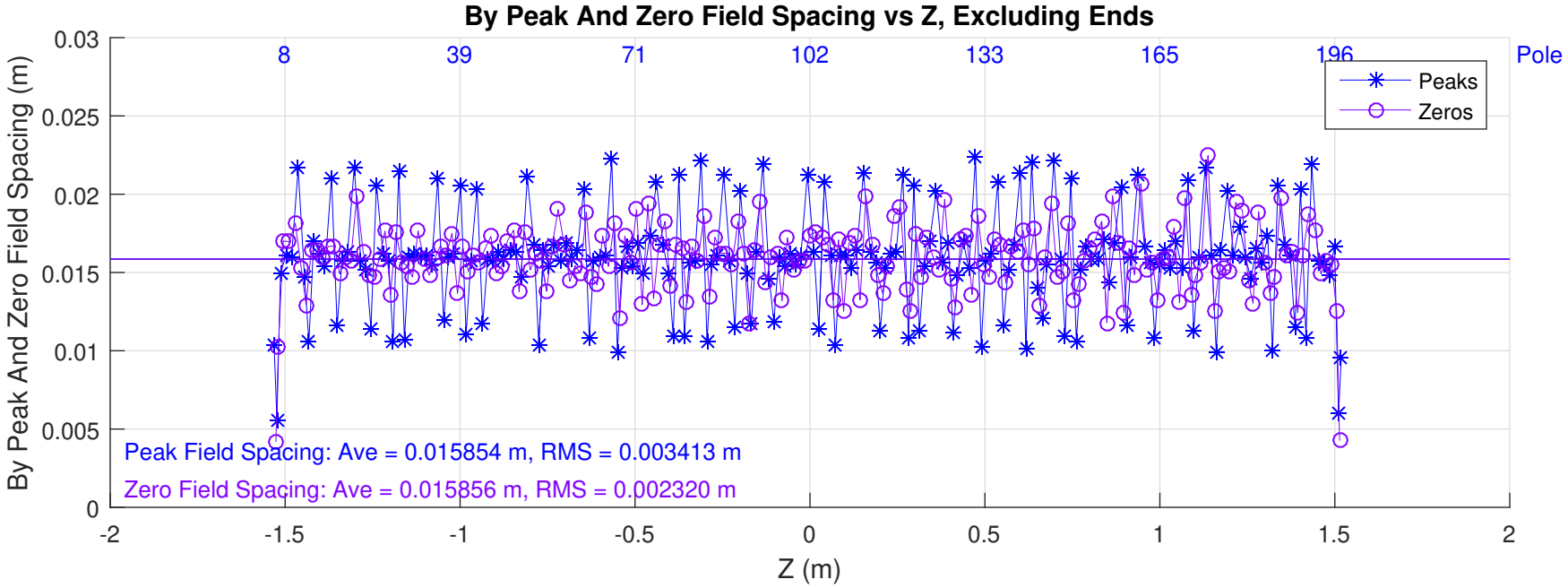

Bx vs Z With Fitted Peaks And Zeros
6
37
69
100
131
162
194
Pole
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Bx (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

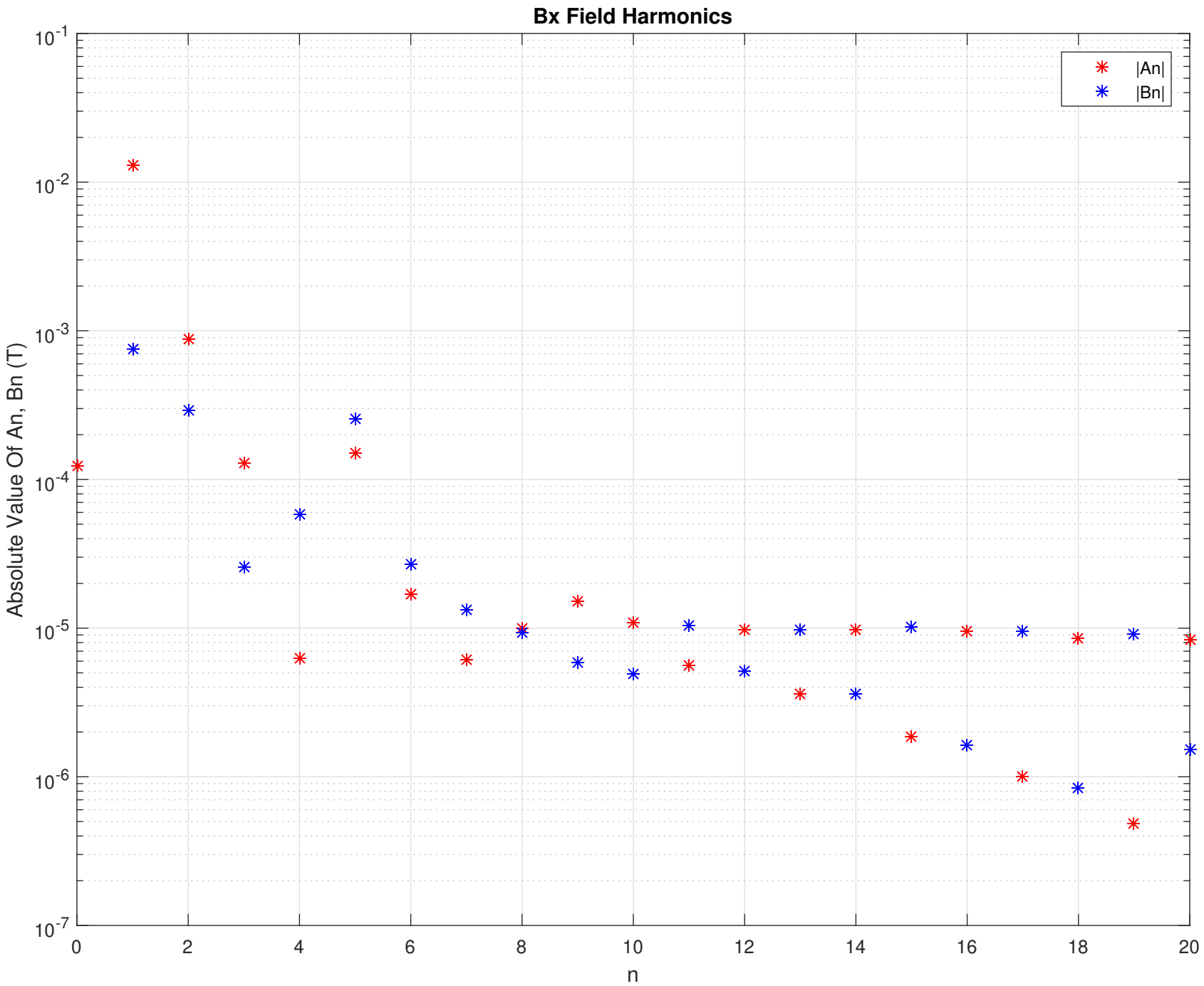

By vs Z With Fitted Peaks And Zeros
8
39
71
102
133
165
196
Pole
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

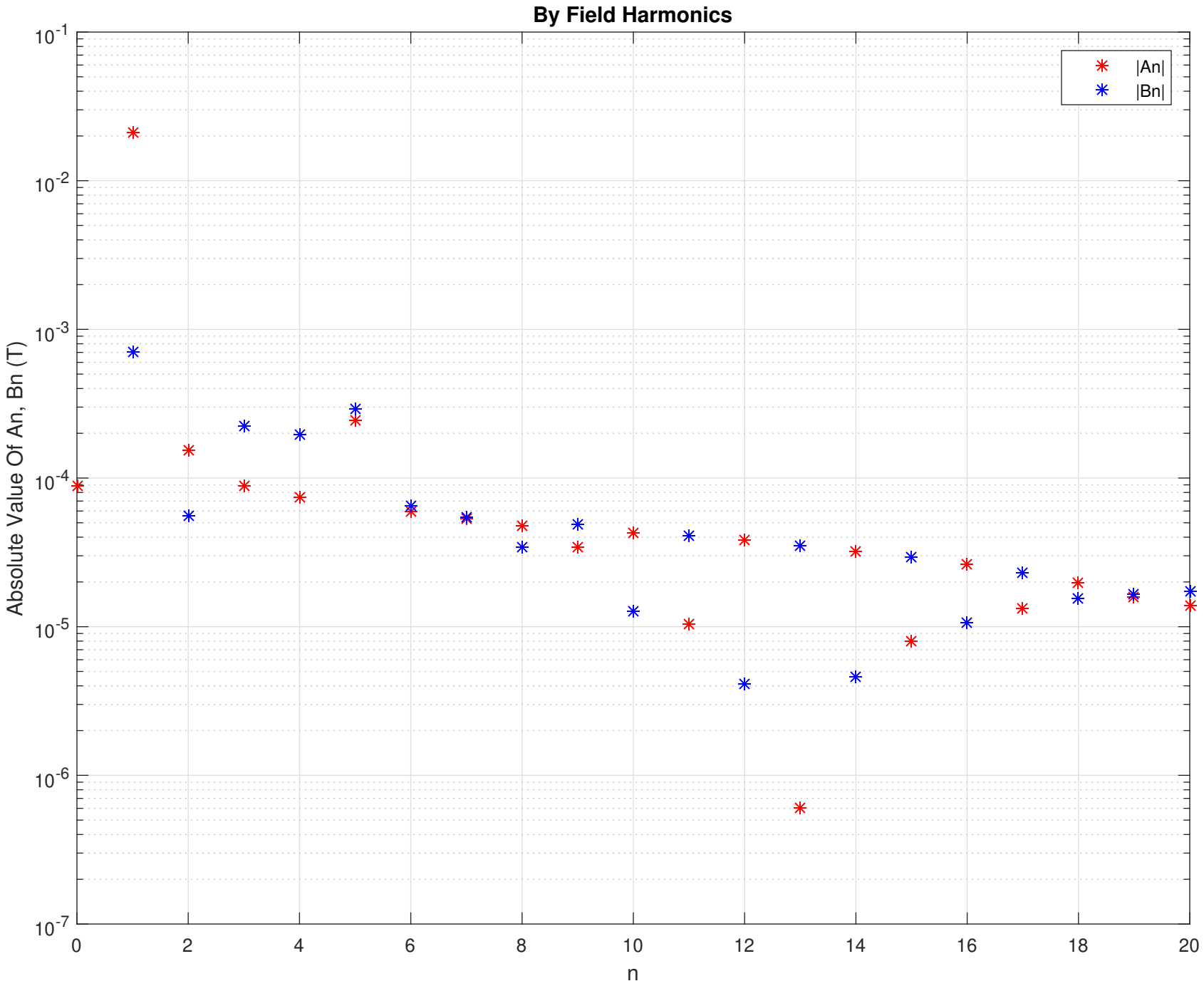

Abs(Fitted Peak Bx) vs Z, Excluding Ends
6
37
69
100
131
162
194
Pole
0.06
0.05
0.04
0.03
0.02
0.01
0
Abs(Peak Bx) (T)
Peak Fields: Ave = 0.023040 T, RMS = 0.006513 T
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

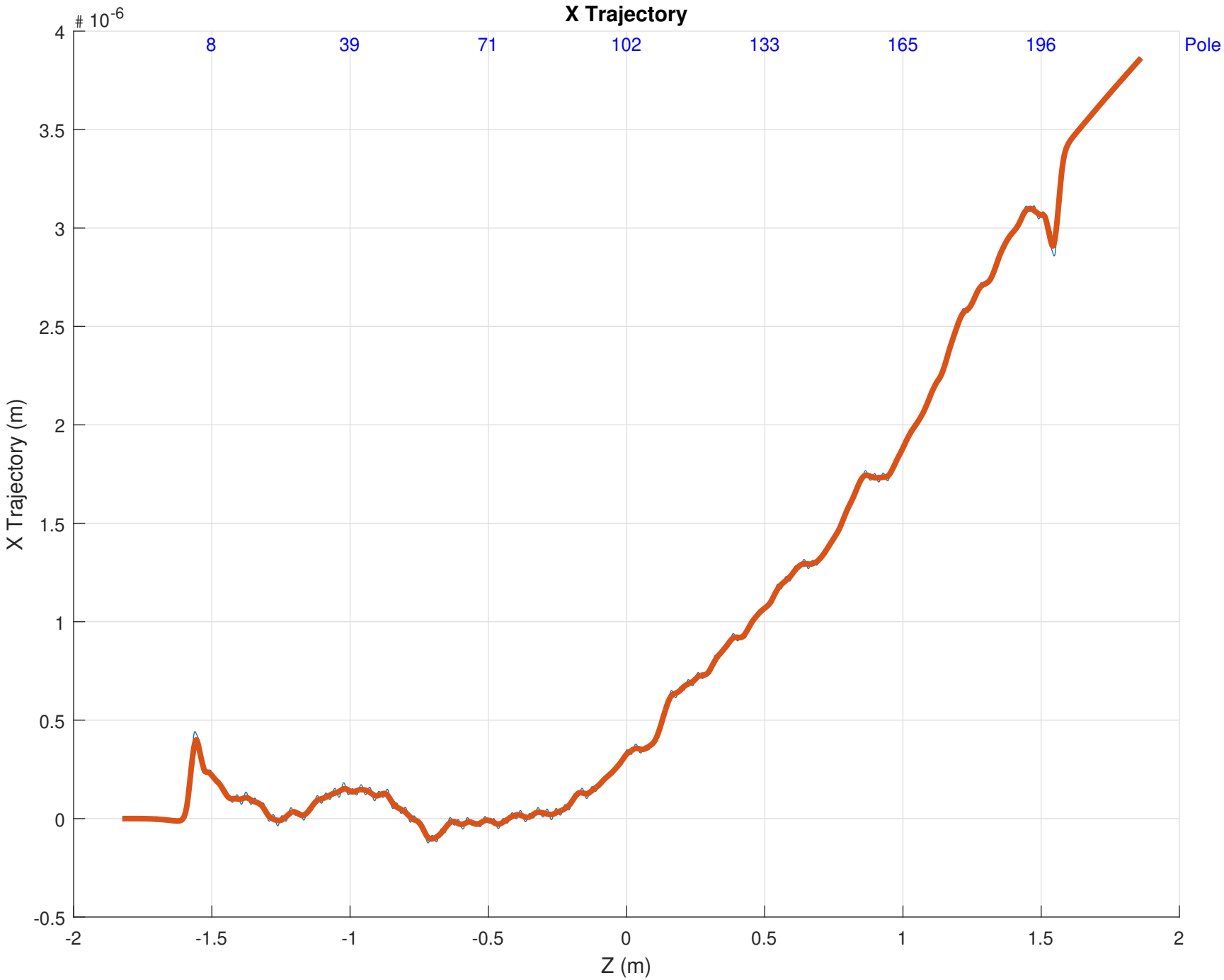

Abs(Fitted Peak By) vs Z, Excluding Ends
8
39
71
102
133
165
196
Pole
0.1
0.08
0.06
0.04
0.02
0
Abs(Peak By) (T)
Peak Fields: Ave = 0.037166 T, RMS = 0.009327 T
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

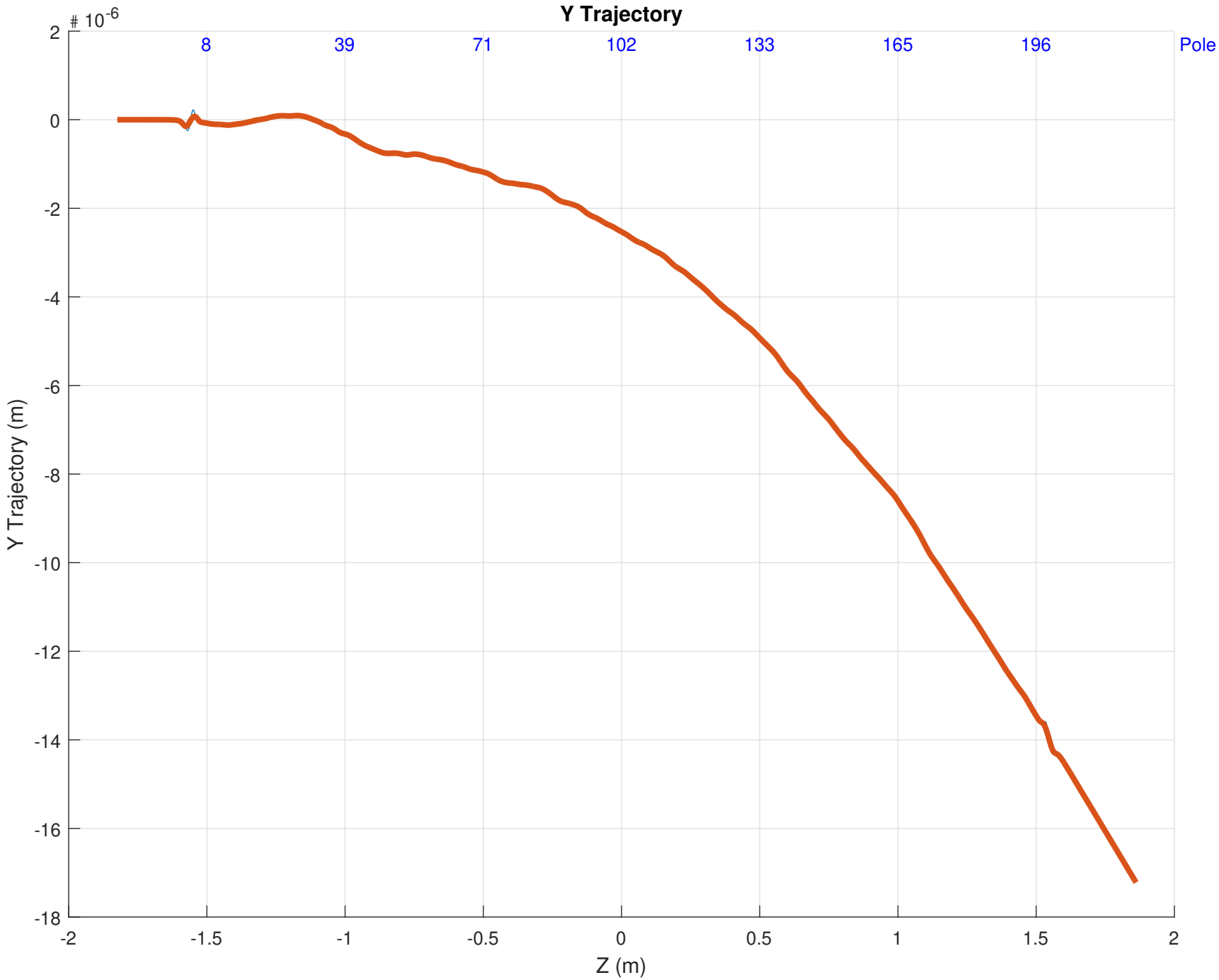

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
Z (m)
Pole
6
37
69
100
131
162
194
Peaks
Zeros
Peak Field Spacing: Ave = 0.015951 m, RMS = 0.004201 m
Zero Field Spacing: Ave = 0.015978 m, RMS = 0.003365 m

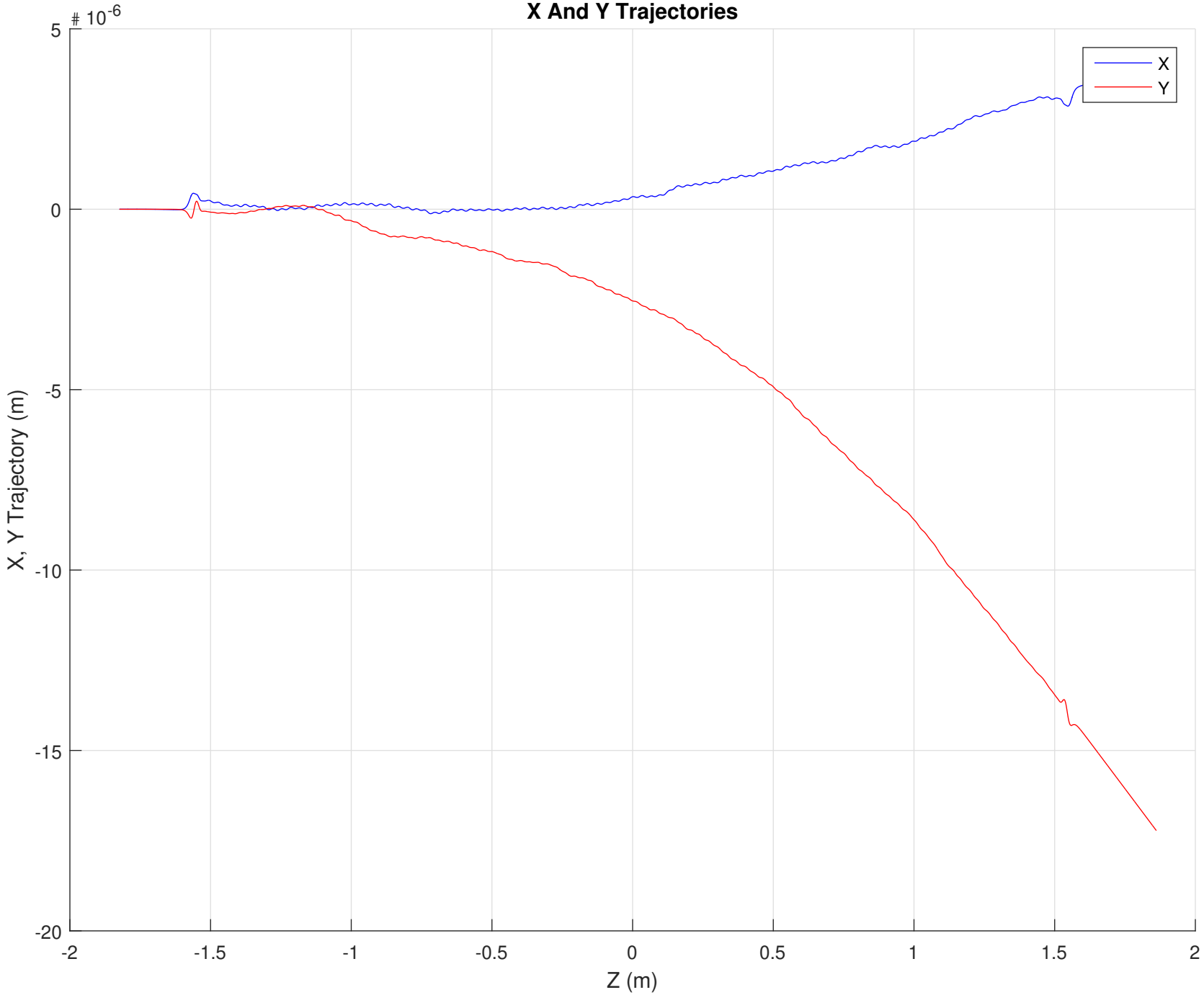

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
Z (m)
Pole
8
39
71
102
133
165
196
Peaks
Zeros
Peak Field Spacing: Ave = 0.015854 m, RMS = 0.003413 m
Zero Field Spacing: Ave = 0.015856 m, RMS = 0.002320 m

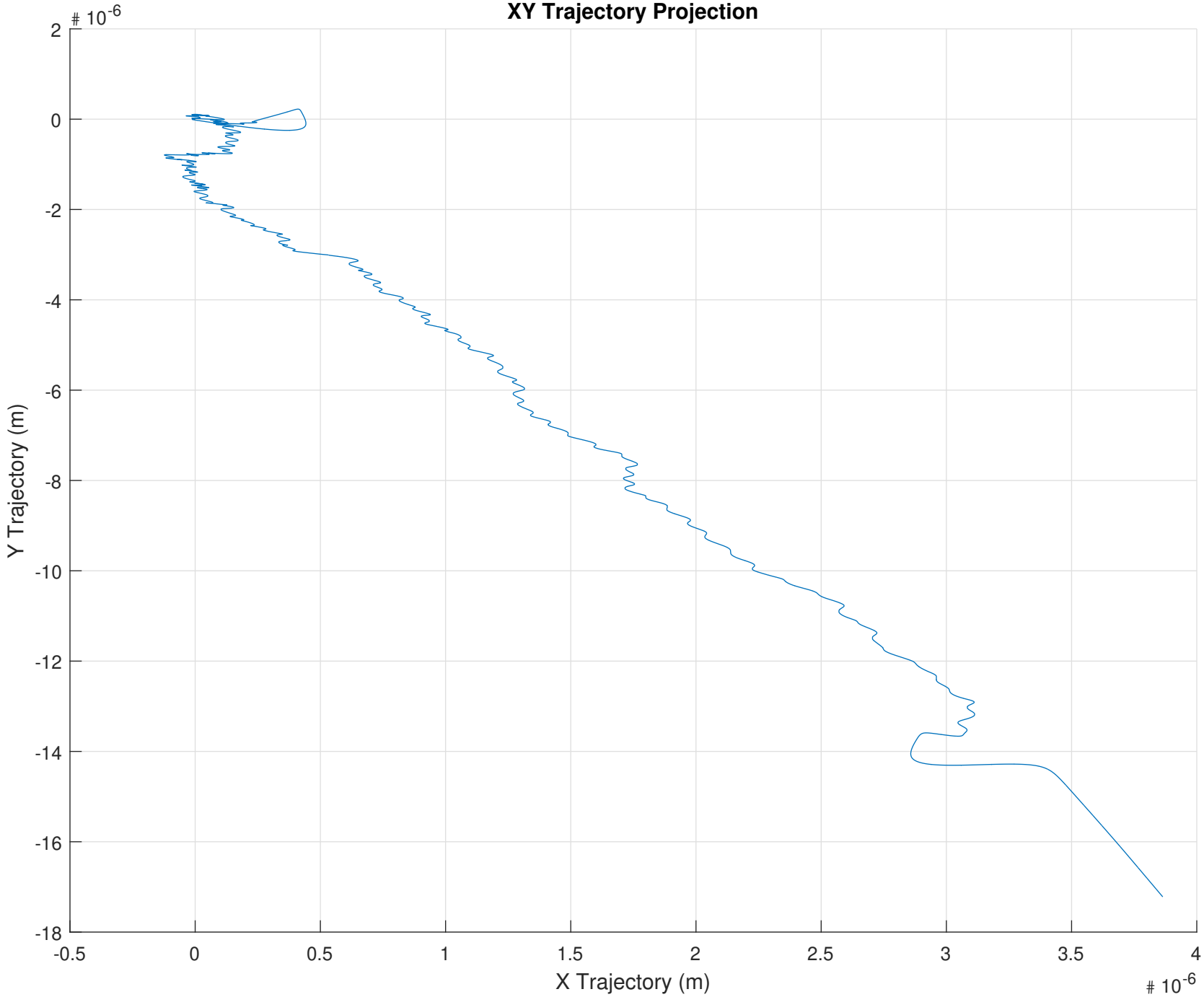

Bx Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
10^-7
0
2
4
6
8
10
12
14
16
18
20

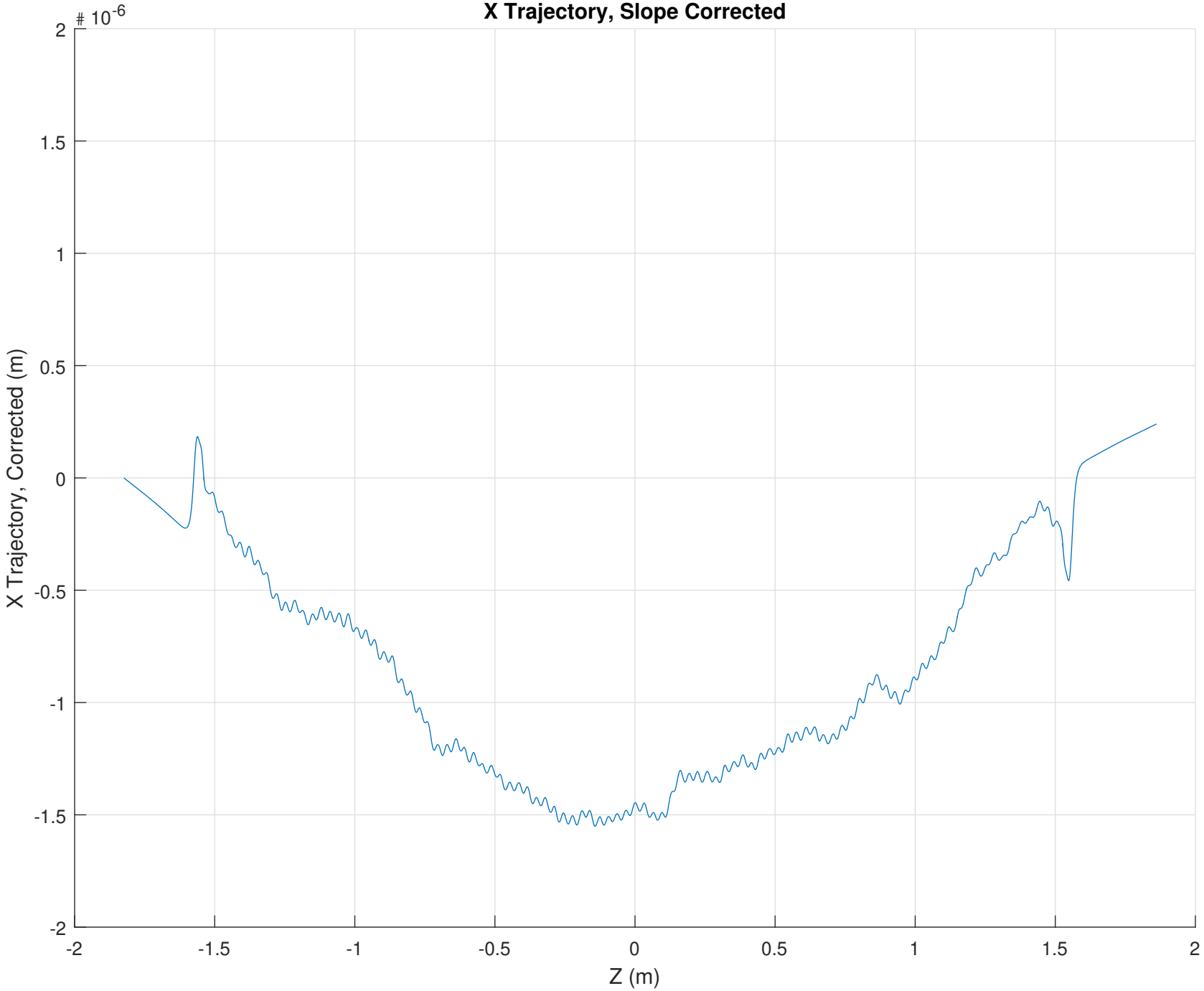

By Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
10^-7
0
2
4
6
8
10
12
14
16
18
20

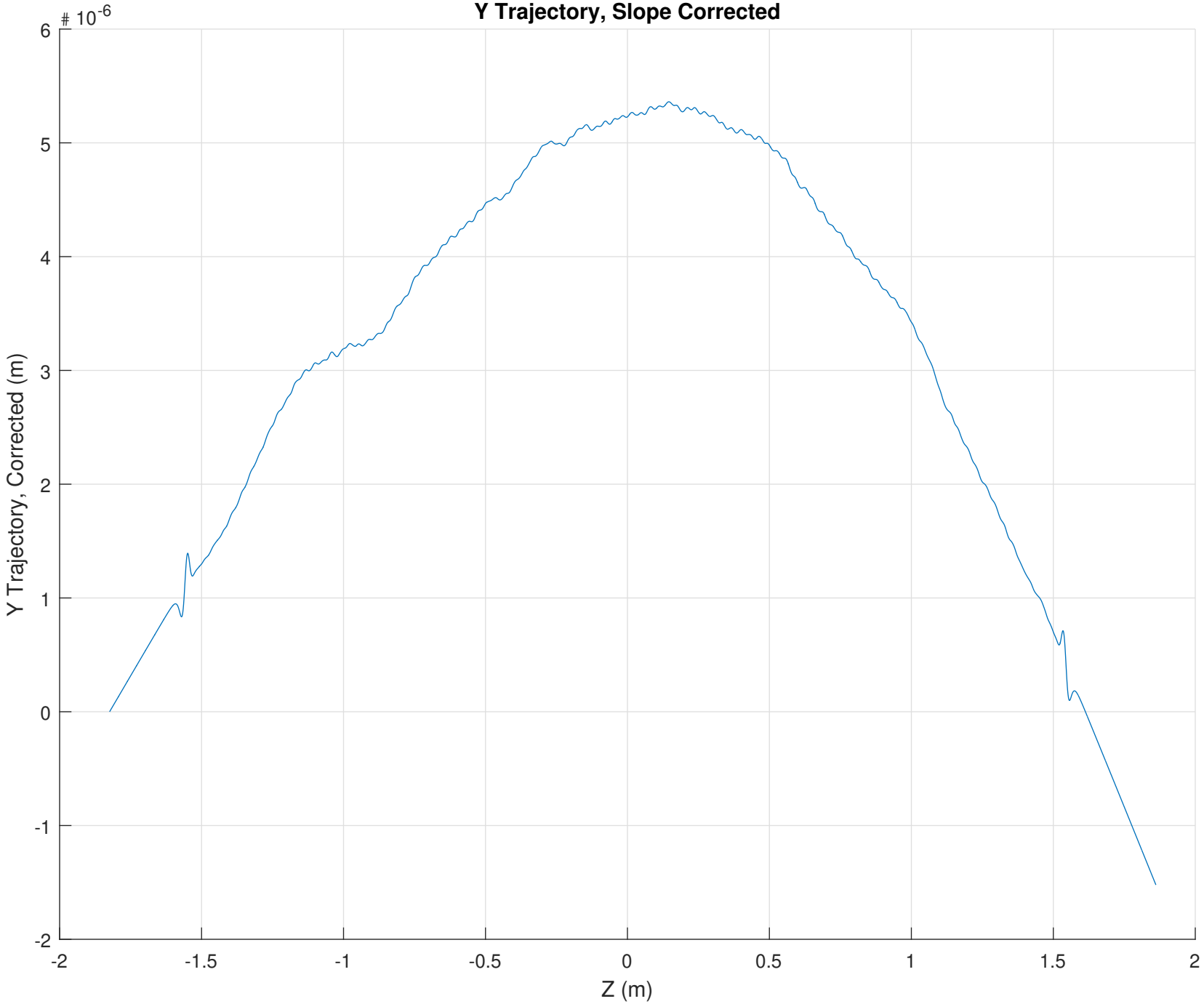

X Trajectory
# 10-6
8
39
71
102
133
165
196
Pole
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
X Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

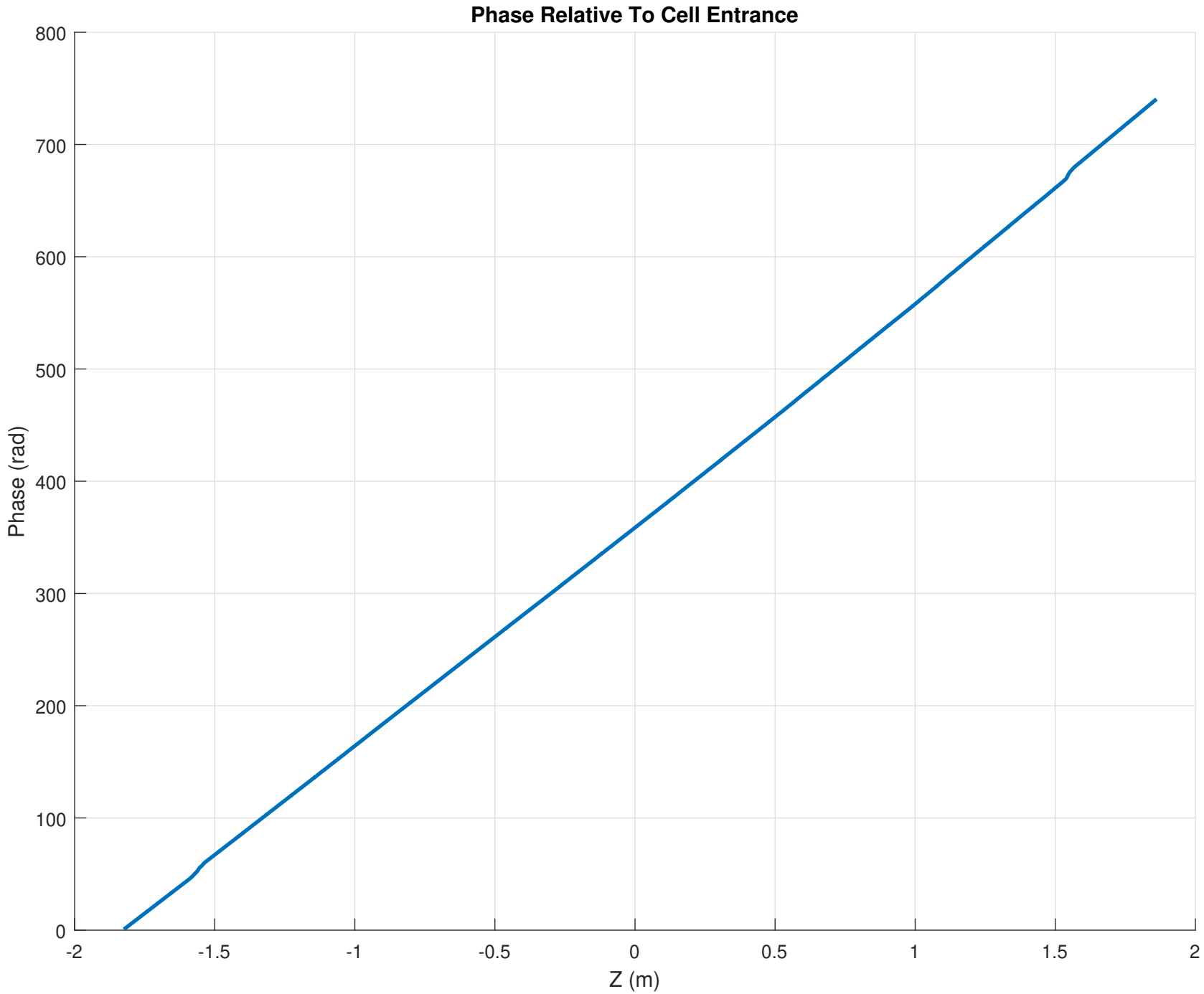

Y Trajectory
# 10^-6
8
39
71
102
133
165
196
Pole
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

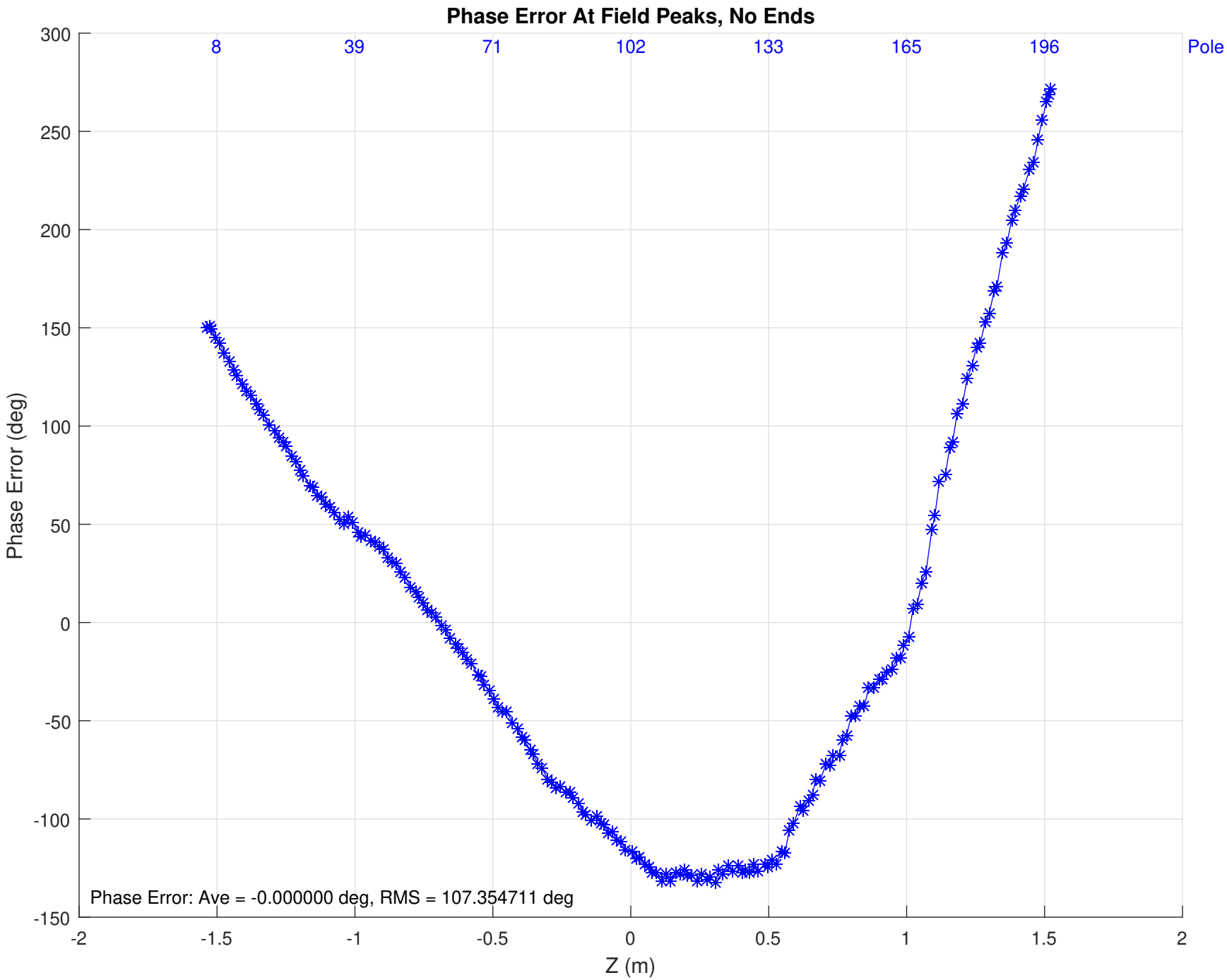

X And Y Trajectories
# 10^-6
5
0
-5
-10
-15
-20
X, Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
X
Y

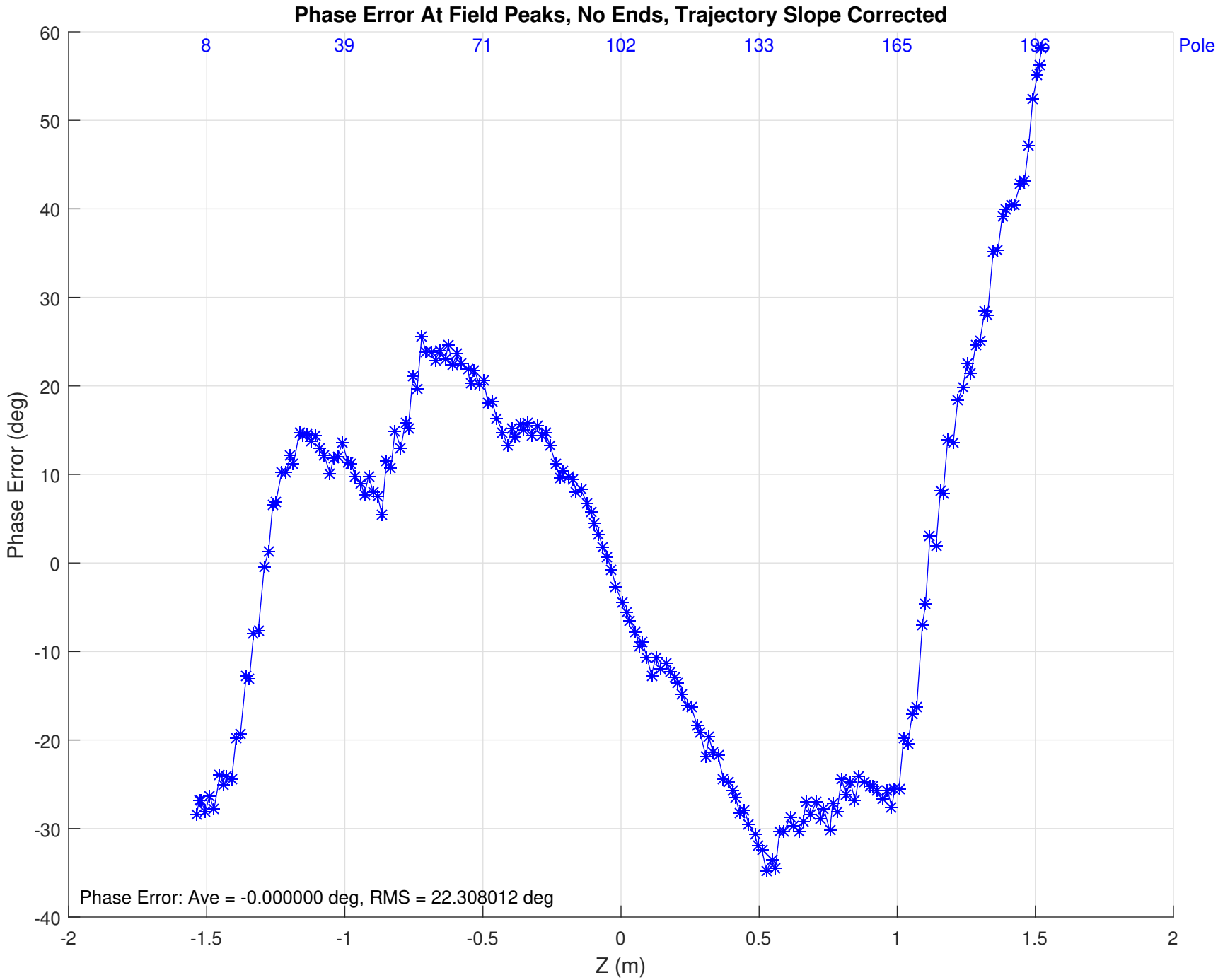

XY Trajectory Projection
# 10^-6
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
Y Trajectory (m)
-0.5
0
0.5
1
1.5
2
2.5
3
3.5
4
X Trajectory (m)
# 10^-6

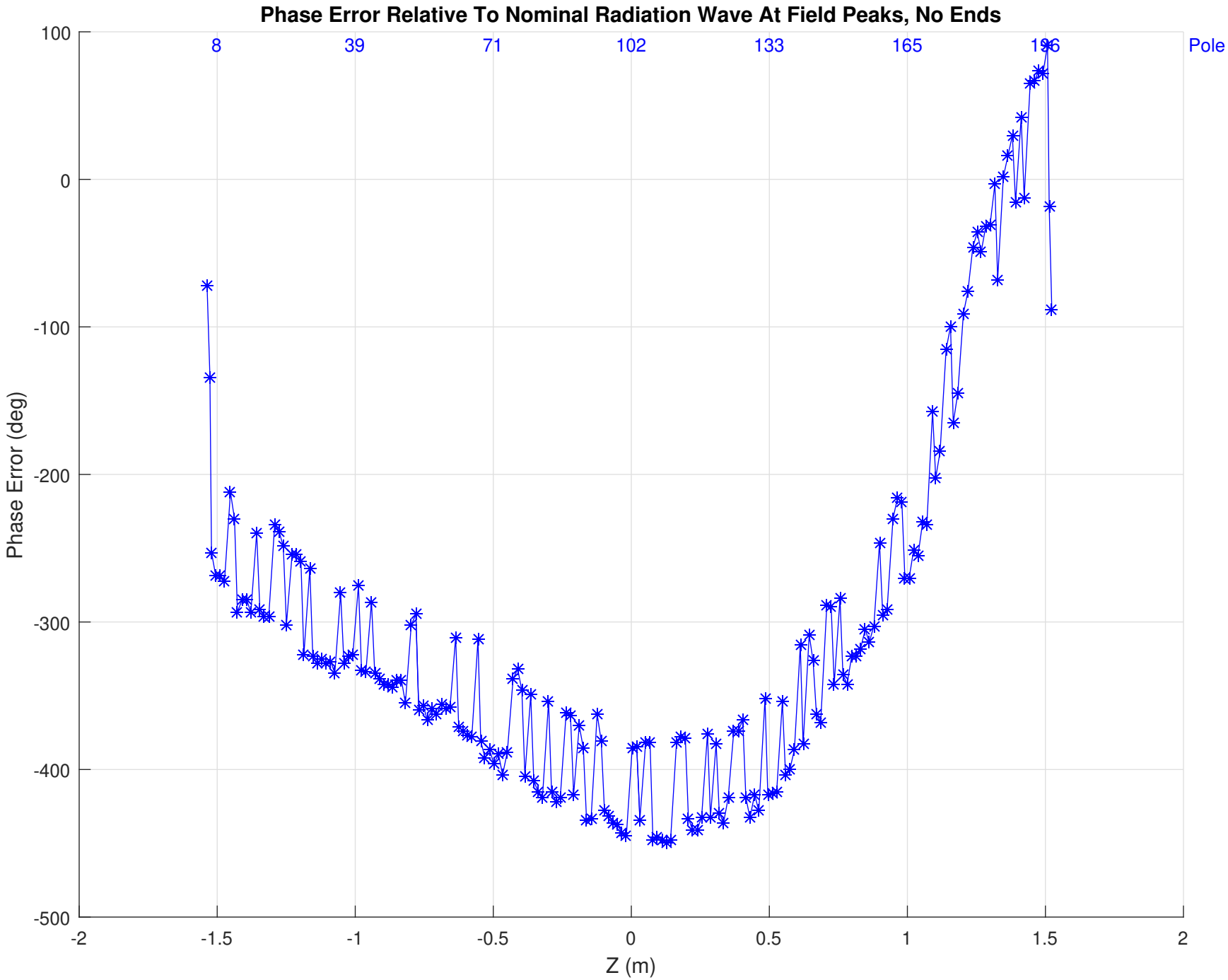

X Trajectory, Slope Corrected
# 10^-6
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
X Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

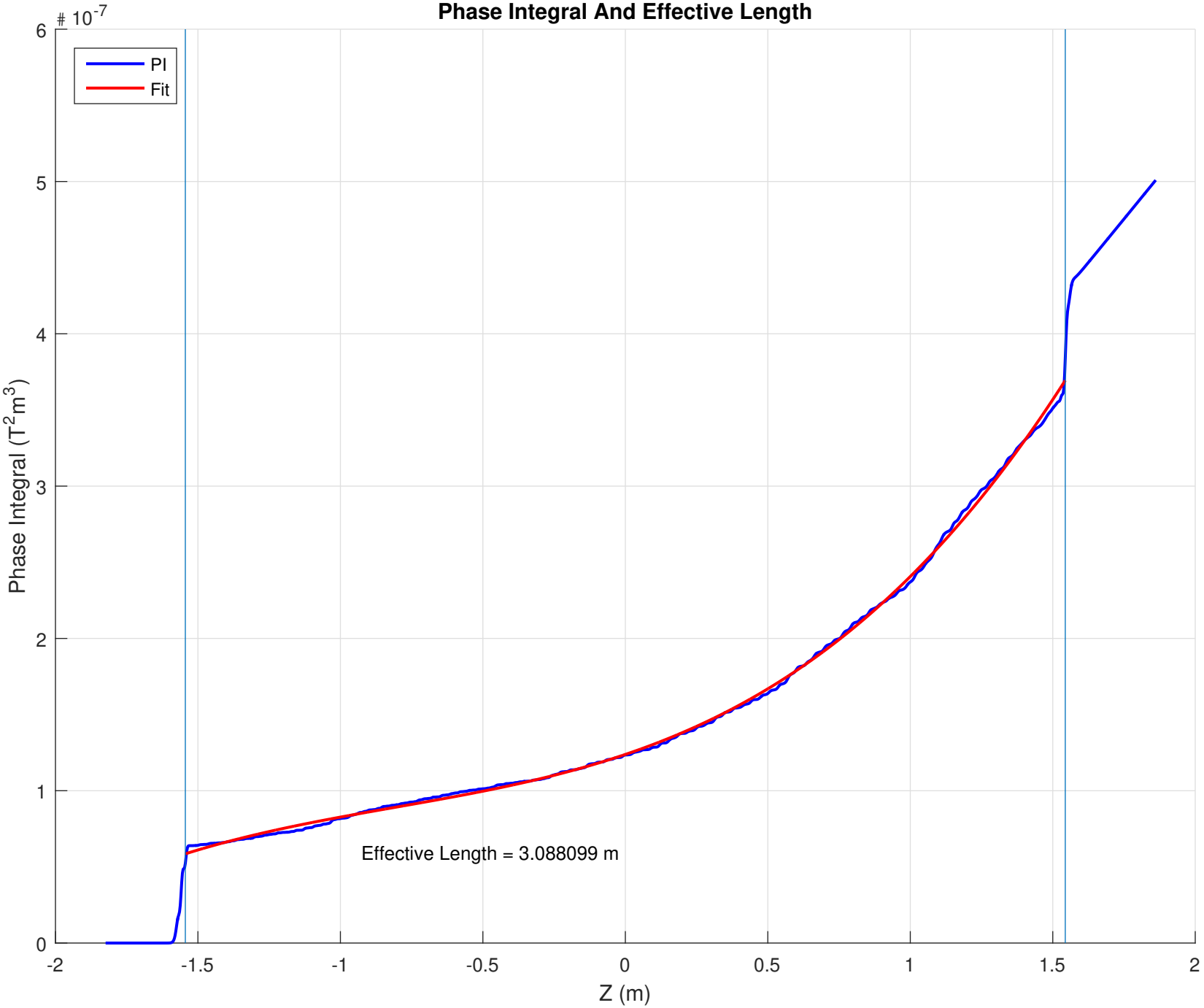

Y Trajectory, Slope Corrected
# 10^-6
6
5
4
3
2
1
0
-1
-2
Y Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

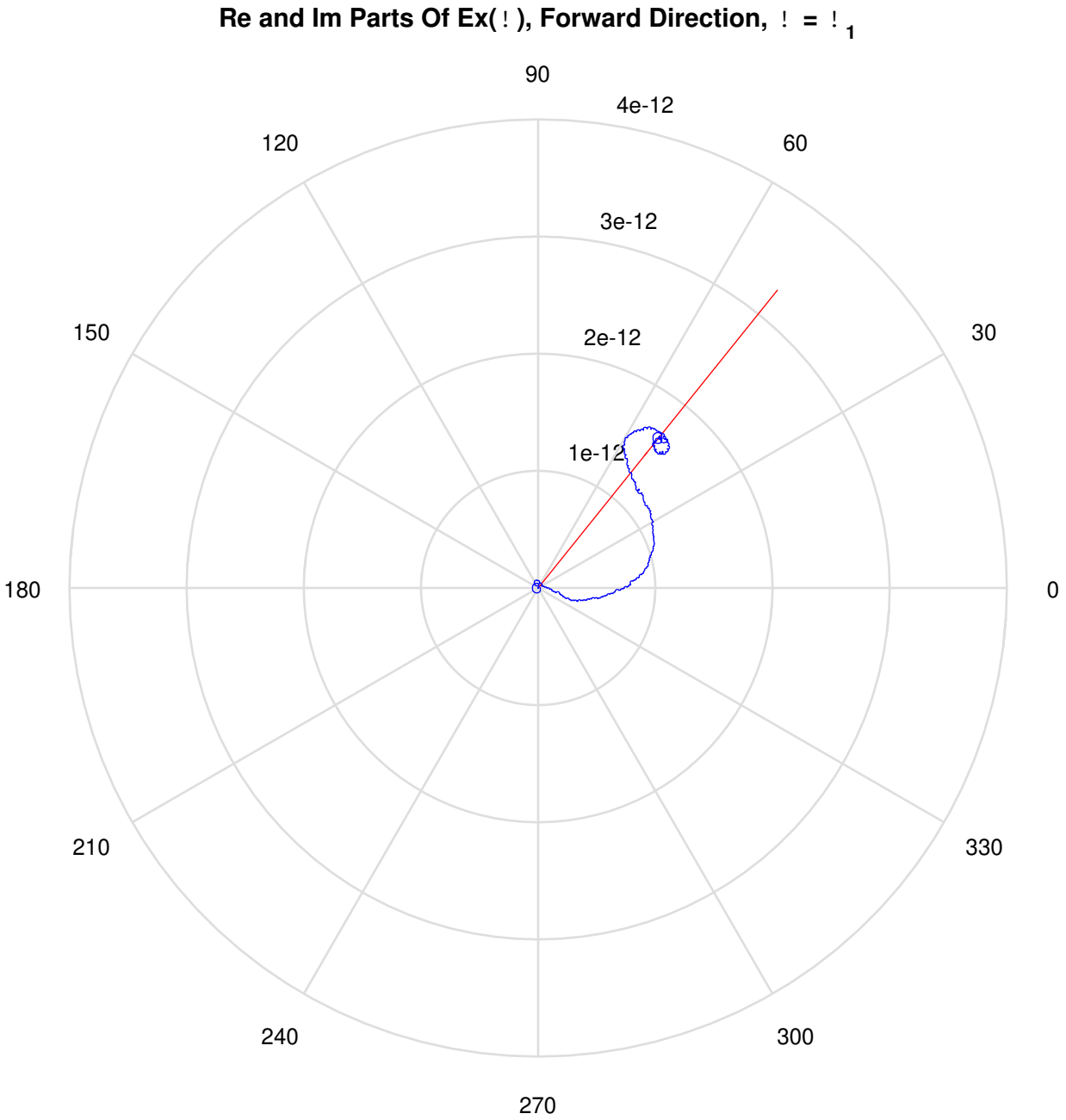

Phase Relative To Cell Entrance
800
700
600
500
400
300
200
100
0
Phase (rad)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

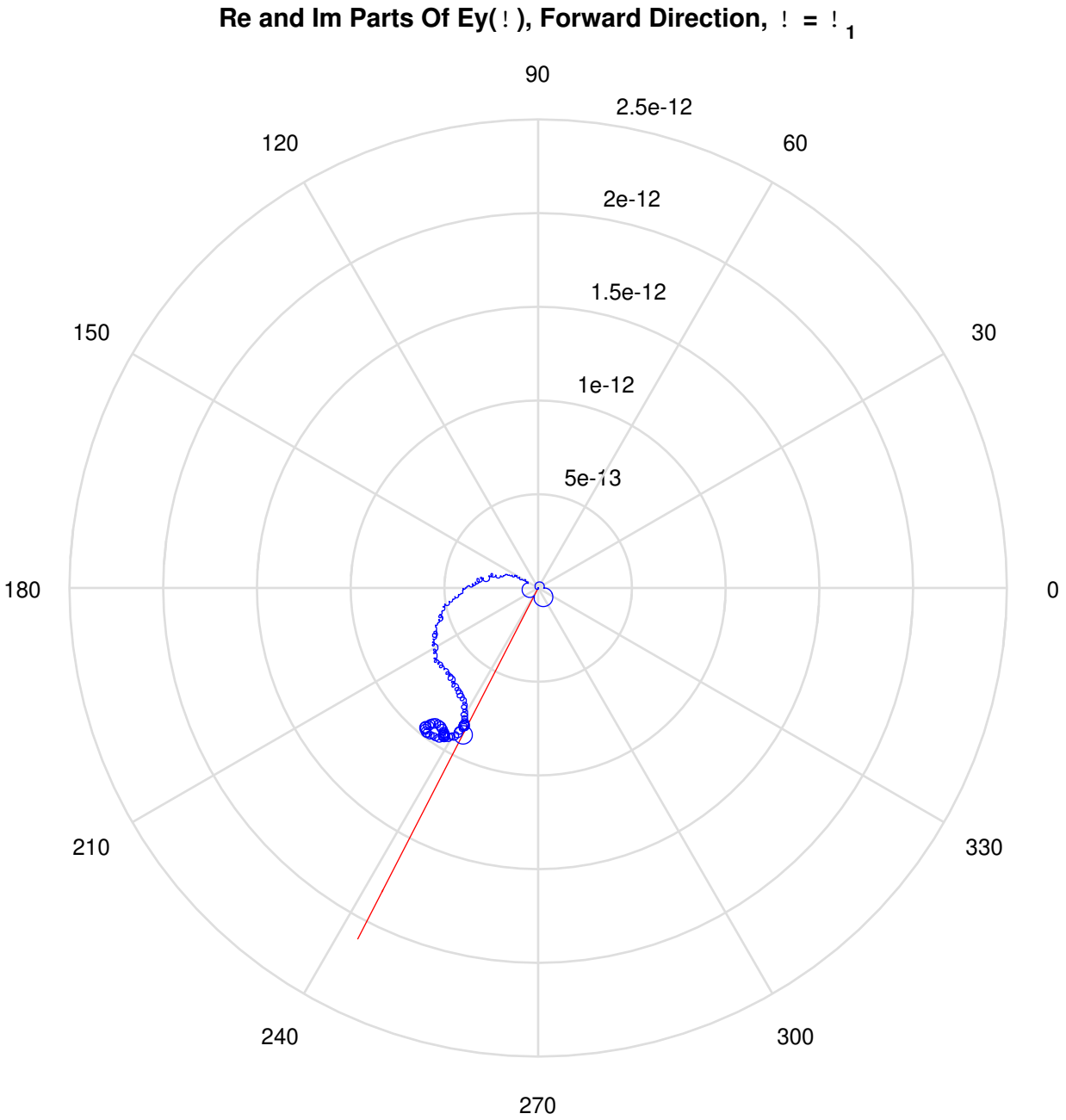

Phase Error At Field Peaks, No Ends
8
39
71
102
133
165
196
Pole
300
250
200
150
100
50
0
-50
-100
-150
Phase Error (deg)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
Phase Error: Ave = -0.000000 deg, RMS = 107.354711 deg

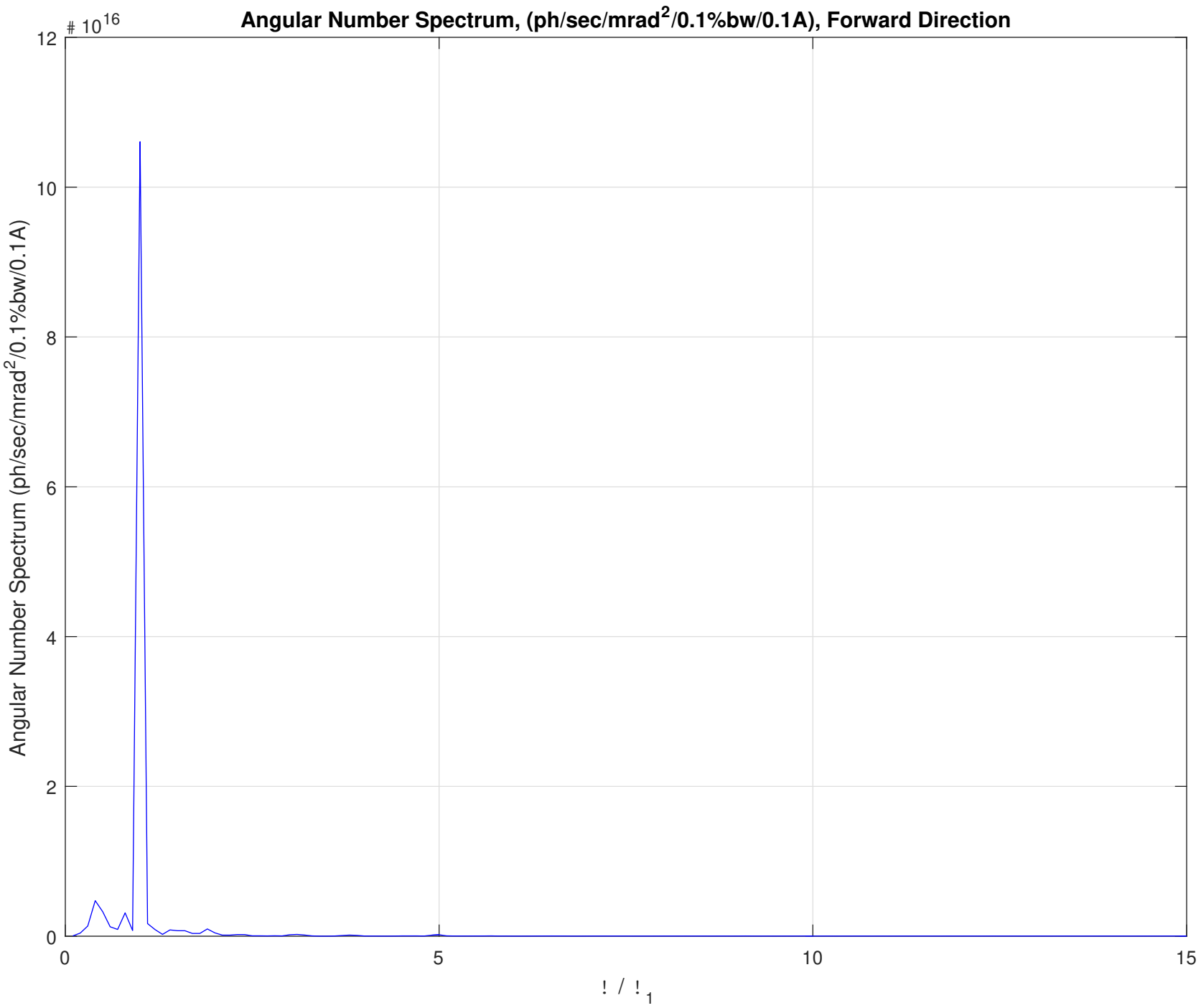

Phase Error At Field Peaks, No Ends, Trajectory Slope Corrected
8
39
71
102
133
165
196
Pole
60
50
40
30
20
10
0
-10
-20
-30
-40
Phase Error (deg)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
Phase Error: Ave = -0.000000 deg, RMS = 22.308012 deg

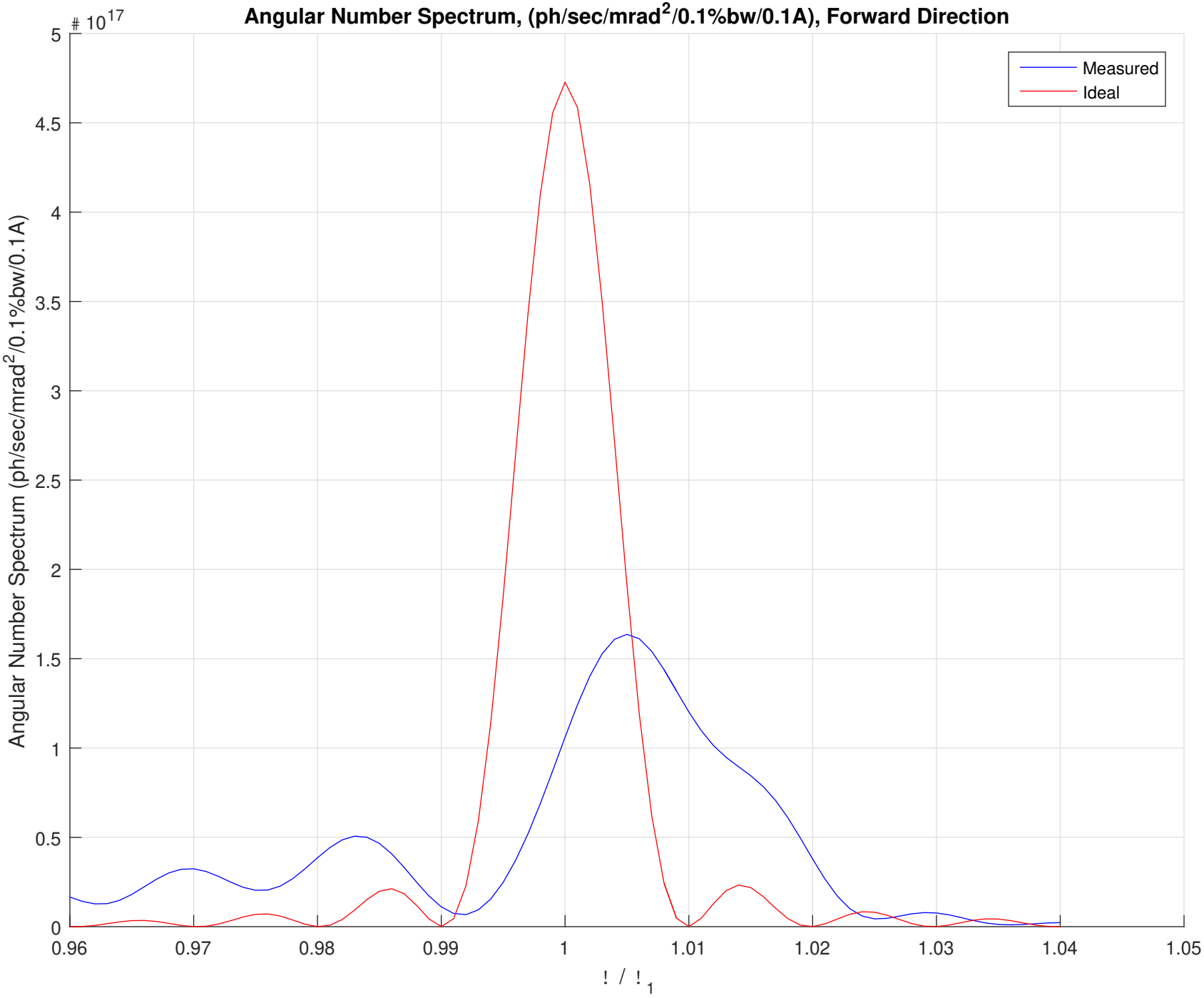

Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
8
39
71
102
133
165
196
Pole
100
0
-100
-200
-300
-400
-500
Phase Error (deg)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

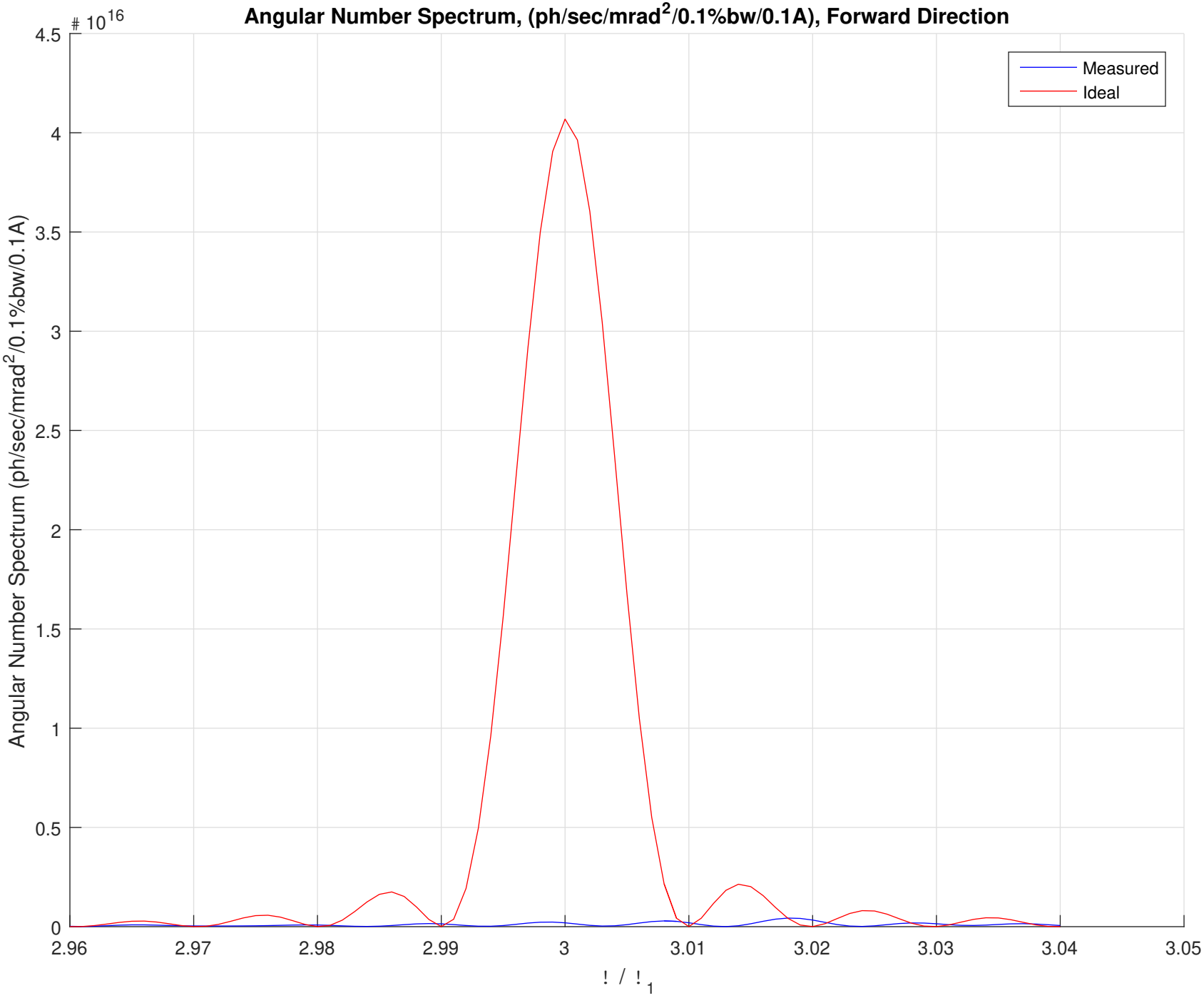

Phase Integral And Effective Length
# 10^-7
PI
Fit
Phase Integral (T^2m^3)
Z (m)
Effective Length = 3.088099 m
6
5
4
3
2
1
0
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2

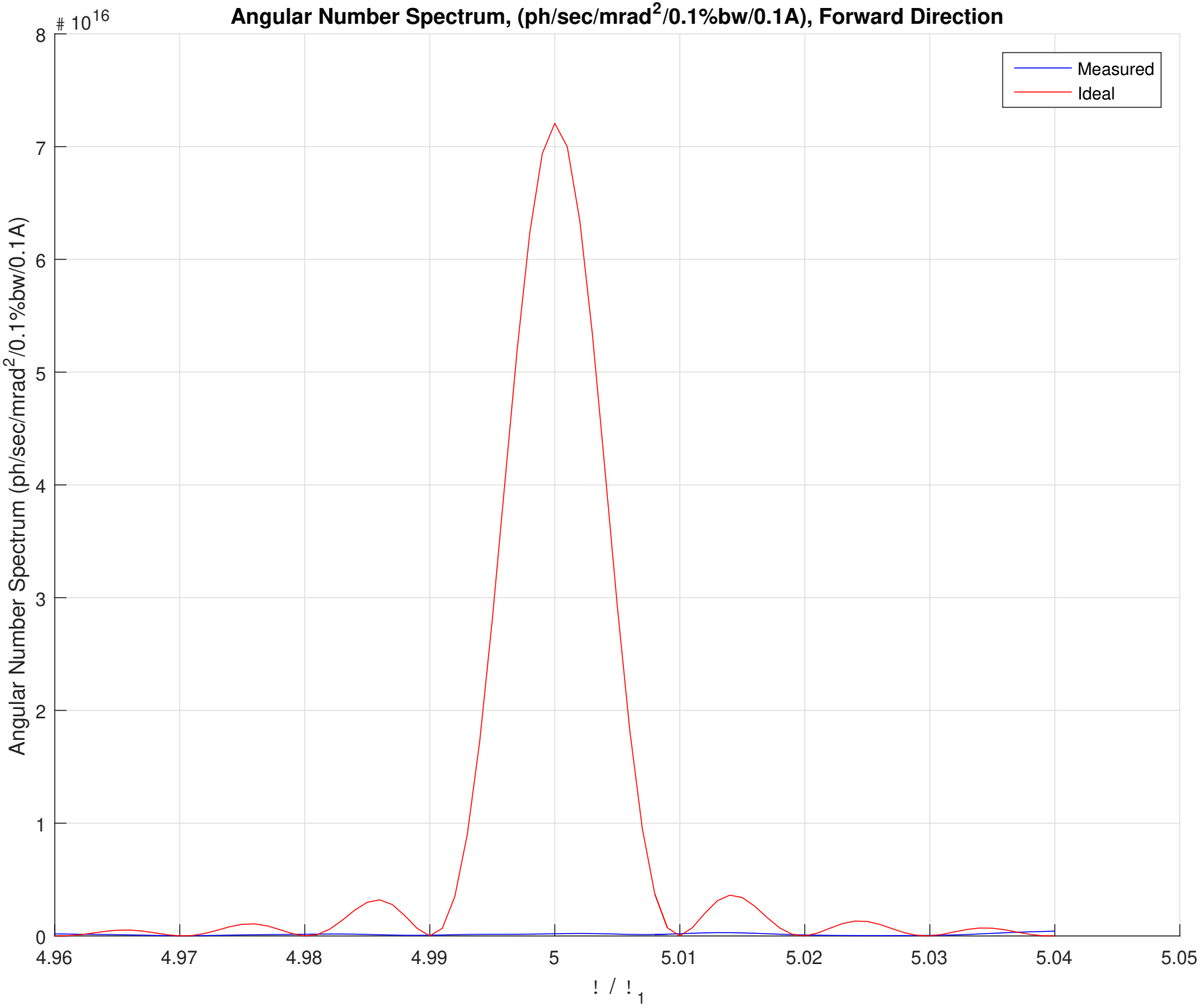

Re and Im Parts Of Ex(!), Forward Direction, ! = !1
90
4e-12
120
60
3e-12
150
30
2e-12
1e-12
180
0
210
330
240
300
270


Re and Im Parts Of Ey(!), Forward Direction, ! = !1
90
2.5e-12
120
60
2e-12
1.5e-12
150
30
1e-12
5e-13
180
0
210
330
240
300
270


Angular Number Spectrum, (ph/sec/mrad$^2$/0.1%bw/0.1A), Forward Direction
# $10^{16}$
Angular Number Spectrum (ph/sec/mrad$^2$/0.1%bw/0.1A)
12
10
8
6
4
2
0
0
5
10
15
! / !$_1$


Angular Number Spectrum, (ph/sec/mrad$^2$/0.1%bw/0.1A), Forward Direction
# $10^{17}$
Measured
Ideal
Angular Number Spectrum (ph/sec/mrad$^2$/0.1%bw/0.1A)
5
4.5
4
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
! / !$_1$


Angular Number Spectrum, (ph/sec/mrad$^2$/0.1%bw/0.1A), Forward Direction
# $10^{16}$
Measured
Ideal
Angular Number Spectrum (ph/sec/mrad$^2$/0.1%bw/0.1A)
4.5
4
3.5
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
! / !$_1$


Angular Number Spectrum, (ph/sec/mrad$^2$/0.1%bw/0.1A), Forward Direction
# $10^{16}$
Angular Number Spectrum (ph/sec/mrad$^2$/0.1%bw/0.1A)
Measured
Ideal
8
7
6
5
4
3
2
1
0
4.96
4.97
4.98
4.99
5
5.01
5.02
5.03
5.04
5.05
! / !$_1$