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SLAC Magnetic Measurements

EPU Analysis
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Parameters:
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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
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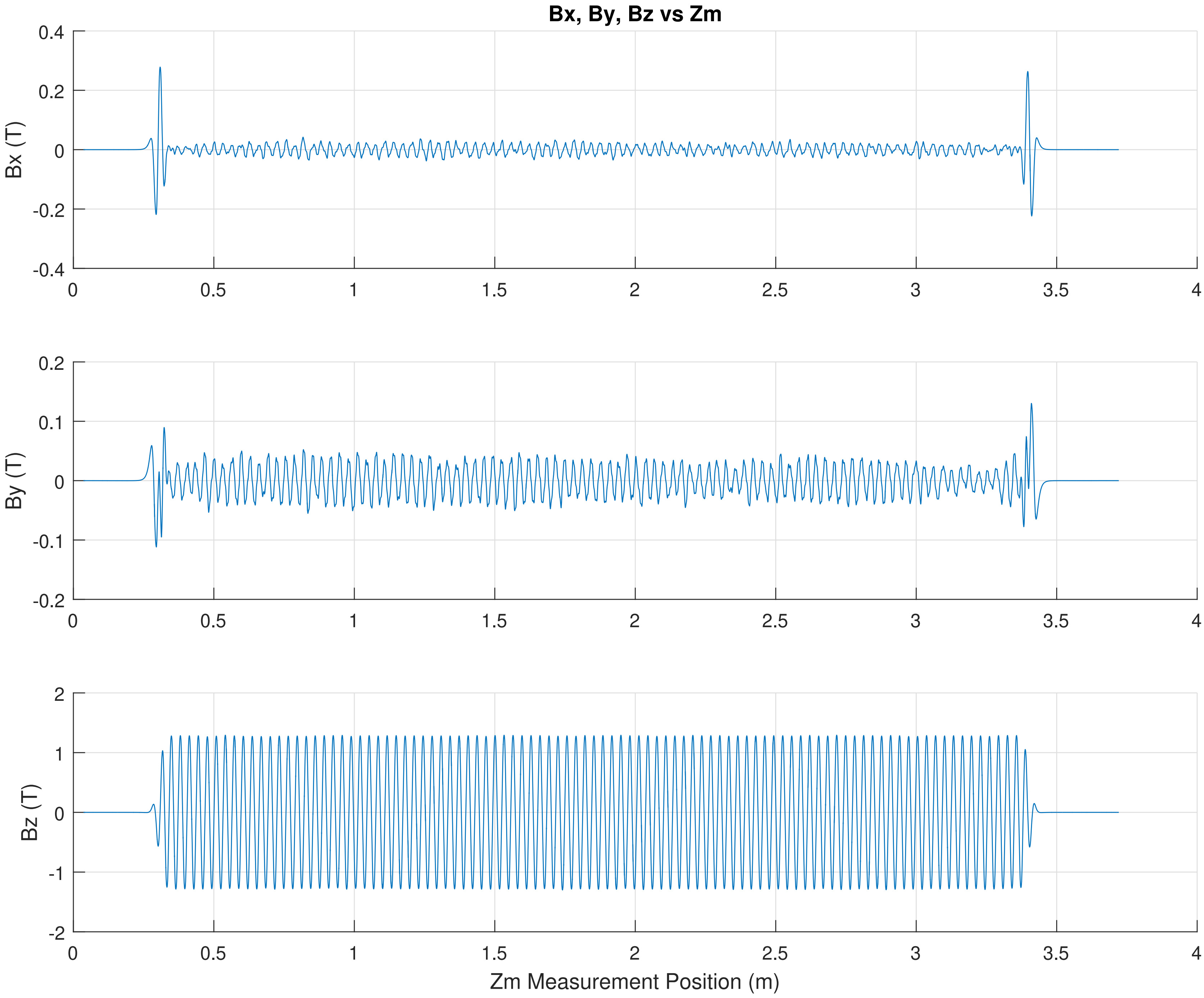
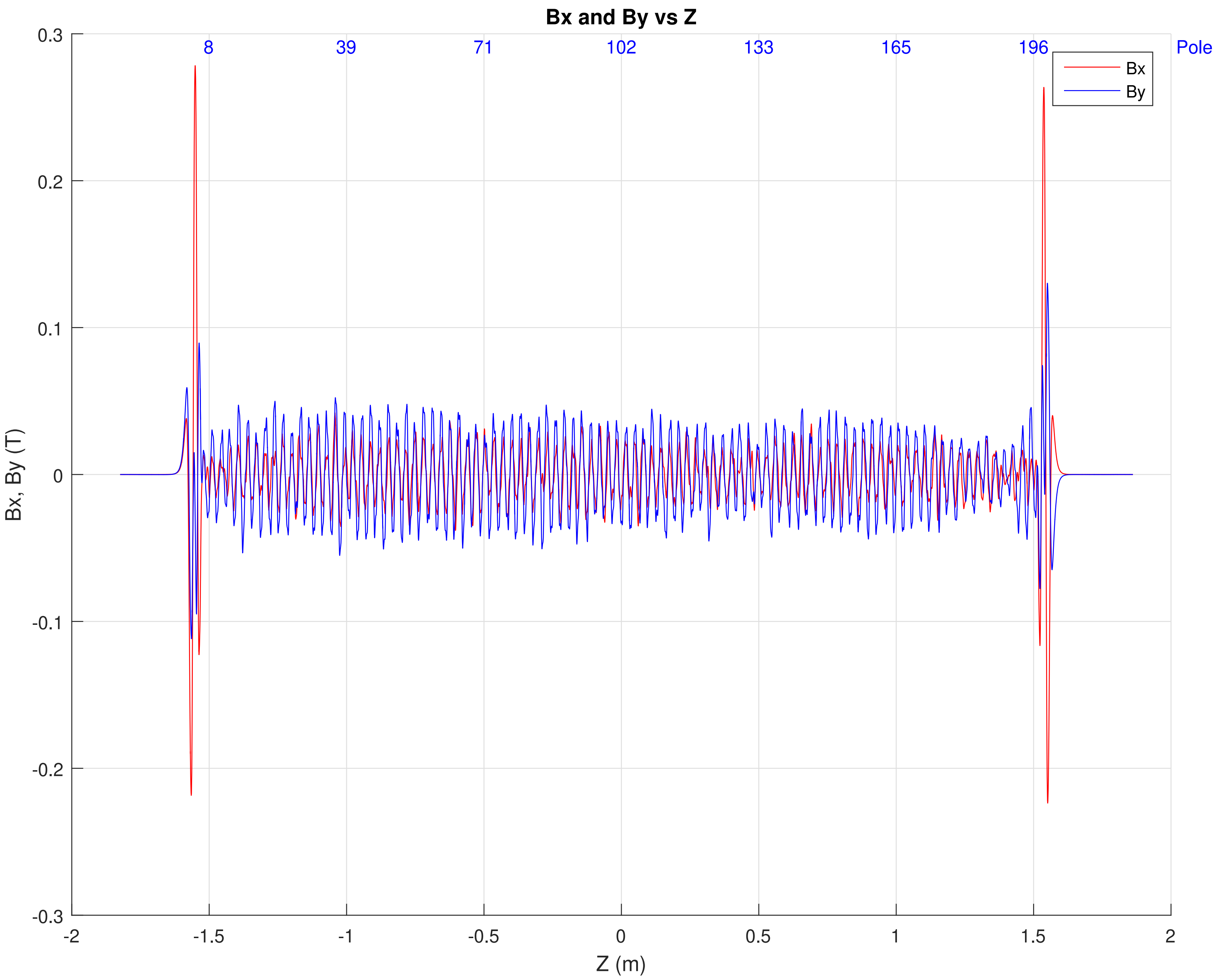
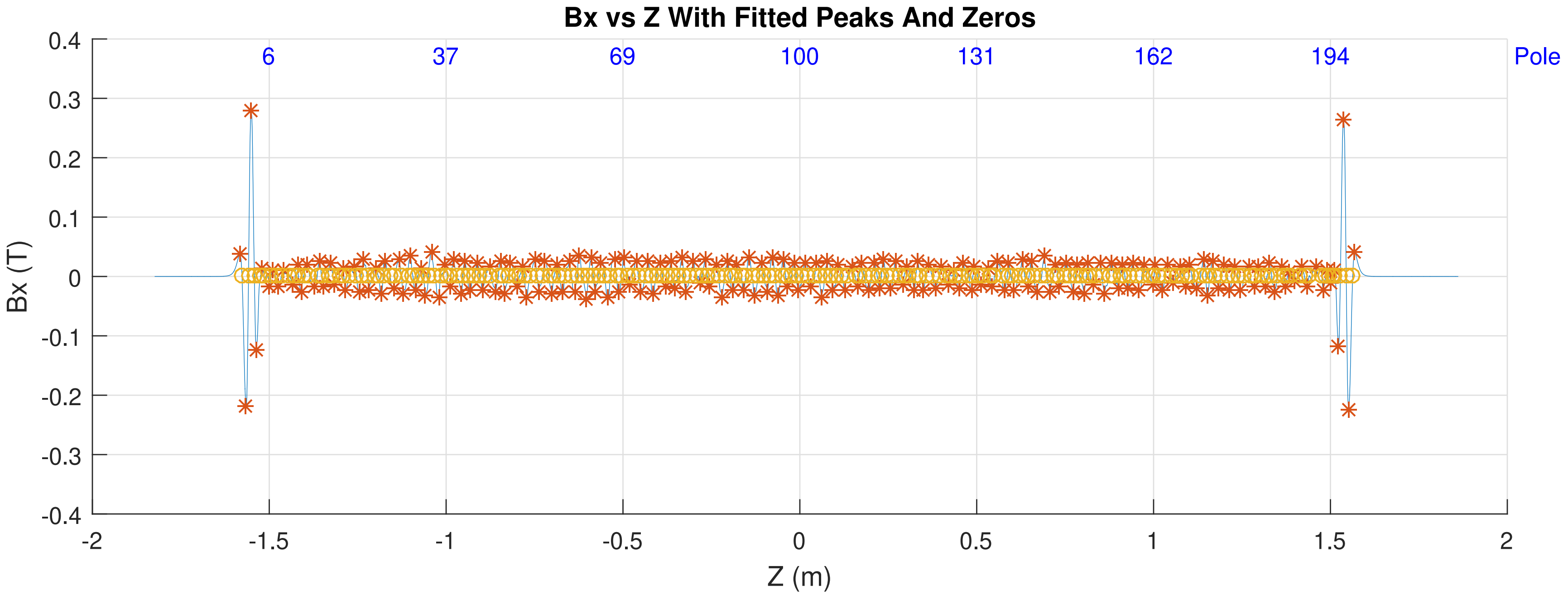
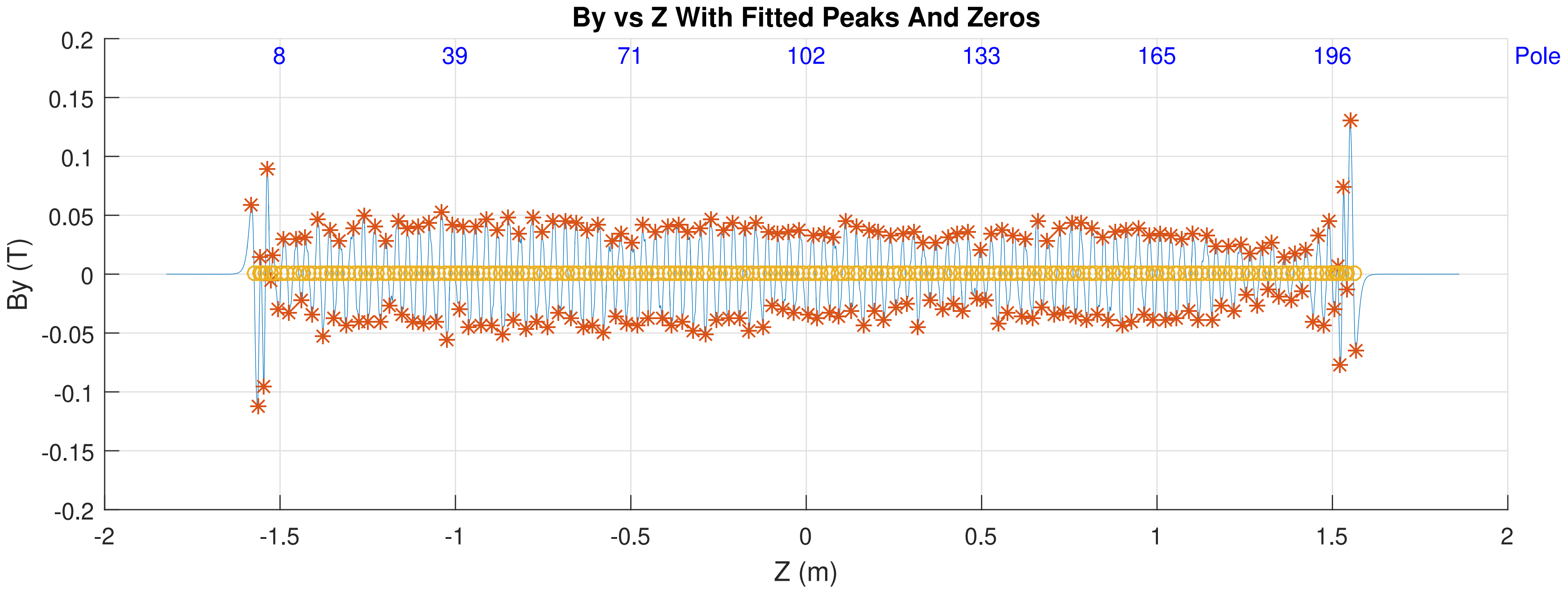
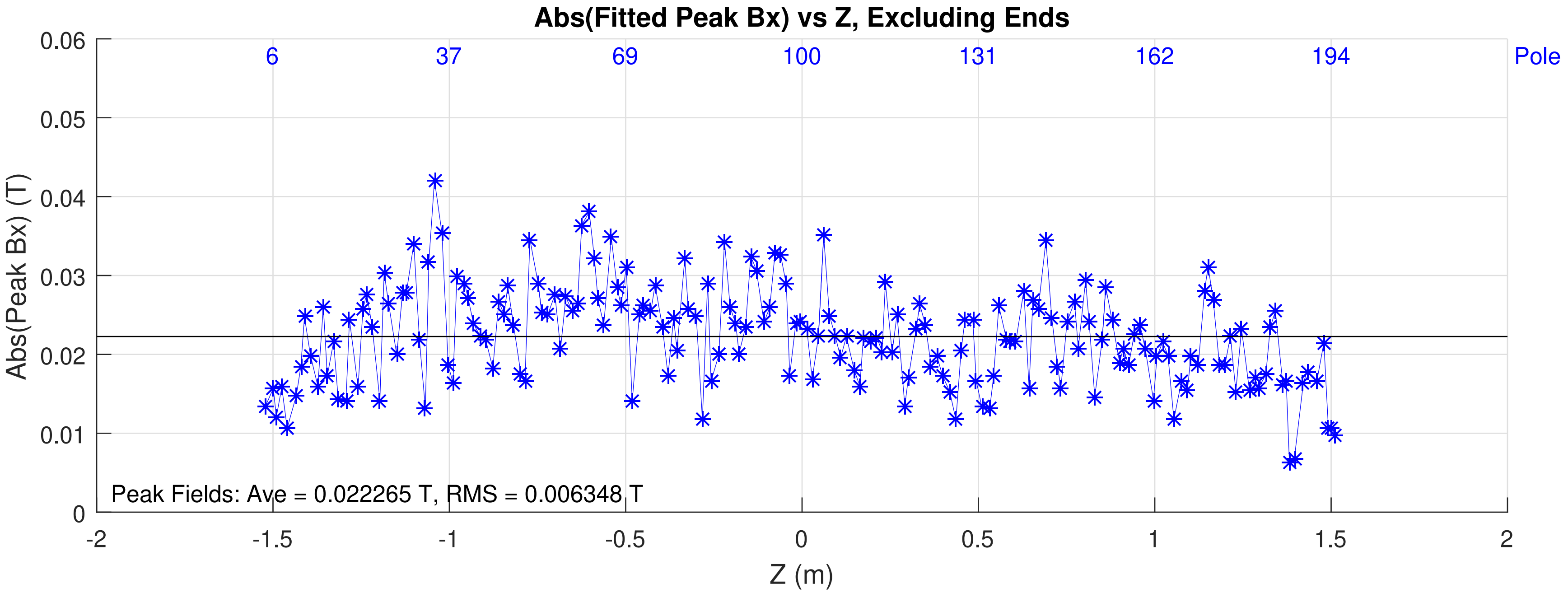


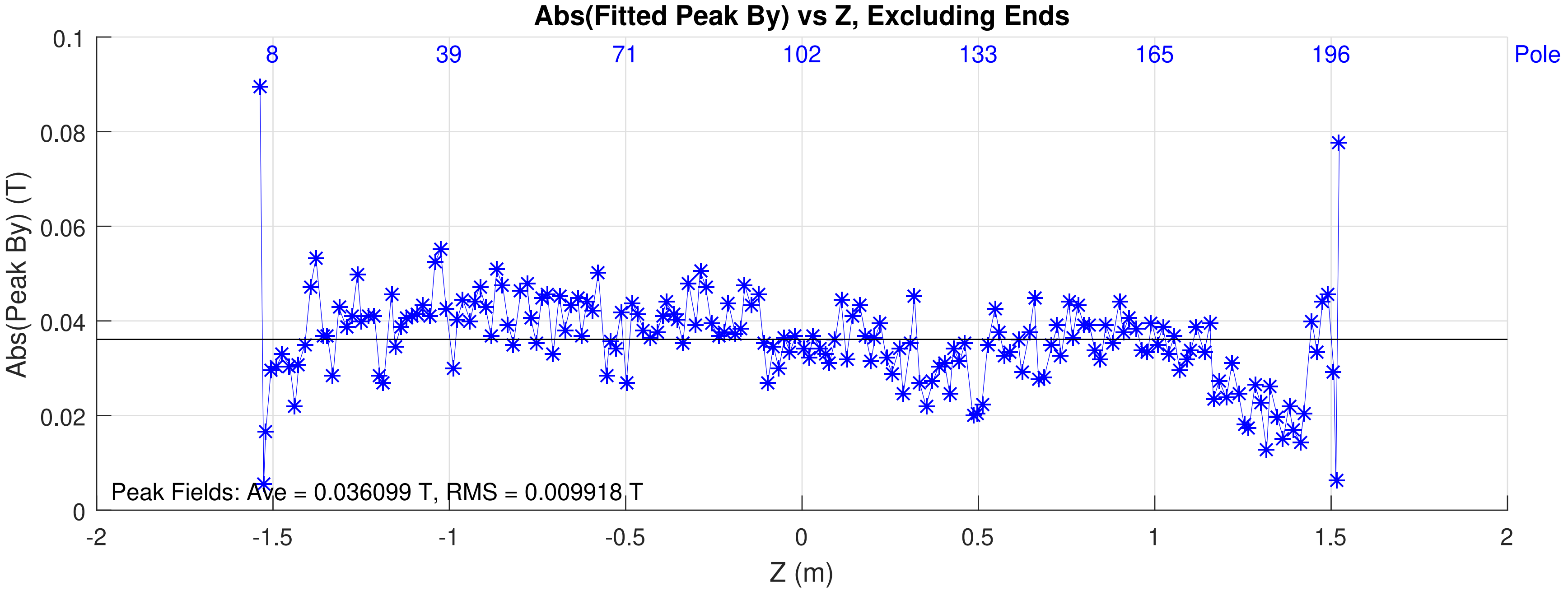
Bx, By, Bz vs Zm
Bx (T)
0.4
0.2
0
-0.2
-0.4
By (T)
0.2
0.1
0
-0.1
-0.2
Bz (T)
2
1
0
-1
-2
0
0.5
1
1.5
2
2.5
3
3.5
4
Zm Measurement Position (m)

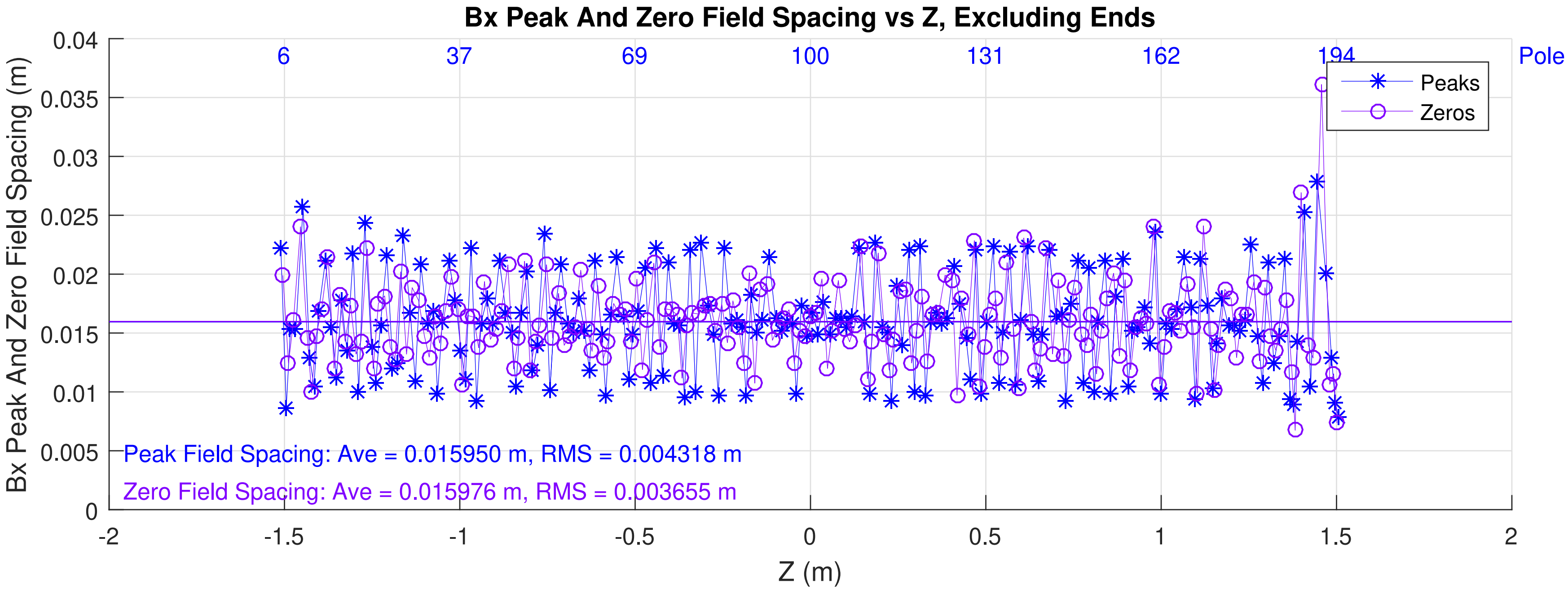

Bx and By vs Z
8
39
71
102
133
165
196
Pole
Bx
By
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
Bx, By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

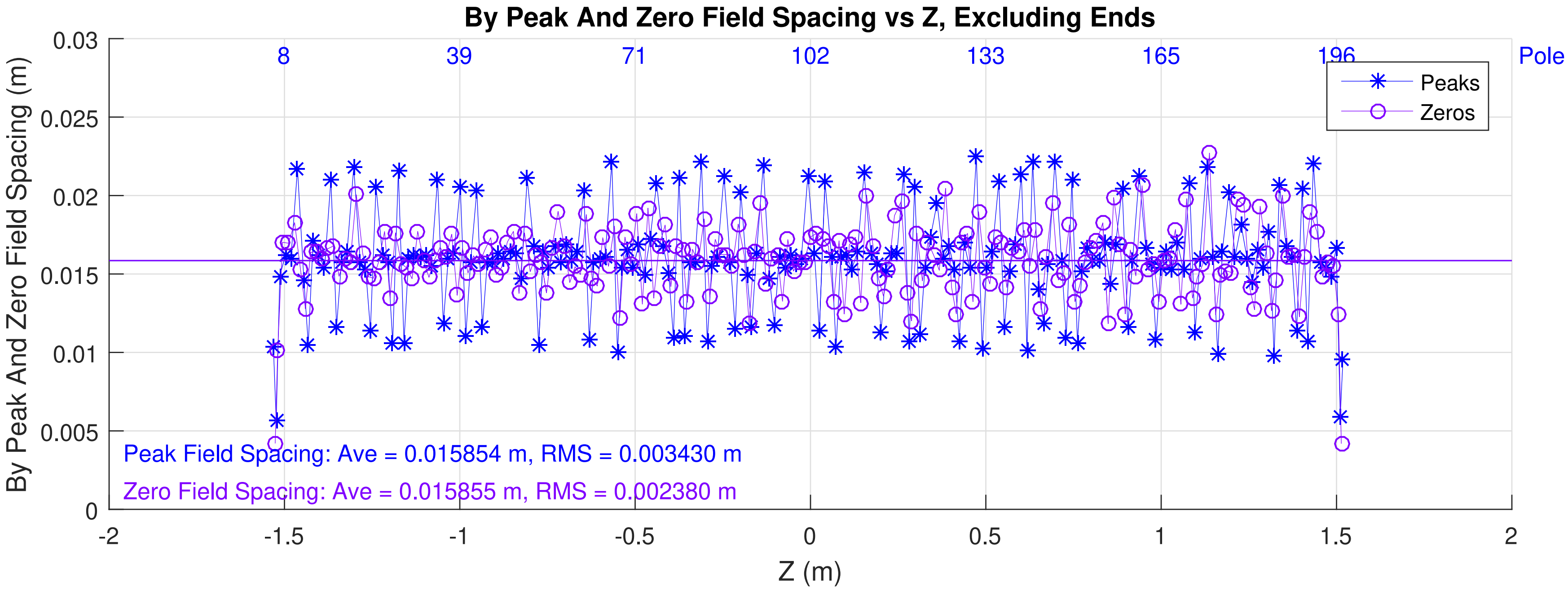

Bx vs Z With Fitted Peaks And Zeros
6
37
69
100
131
162
194
Pole
Bx (T)
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

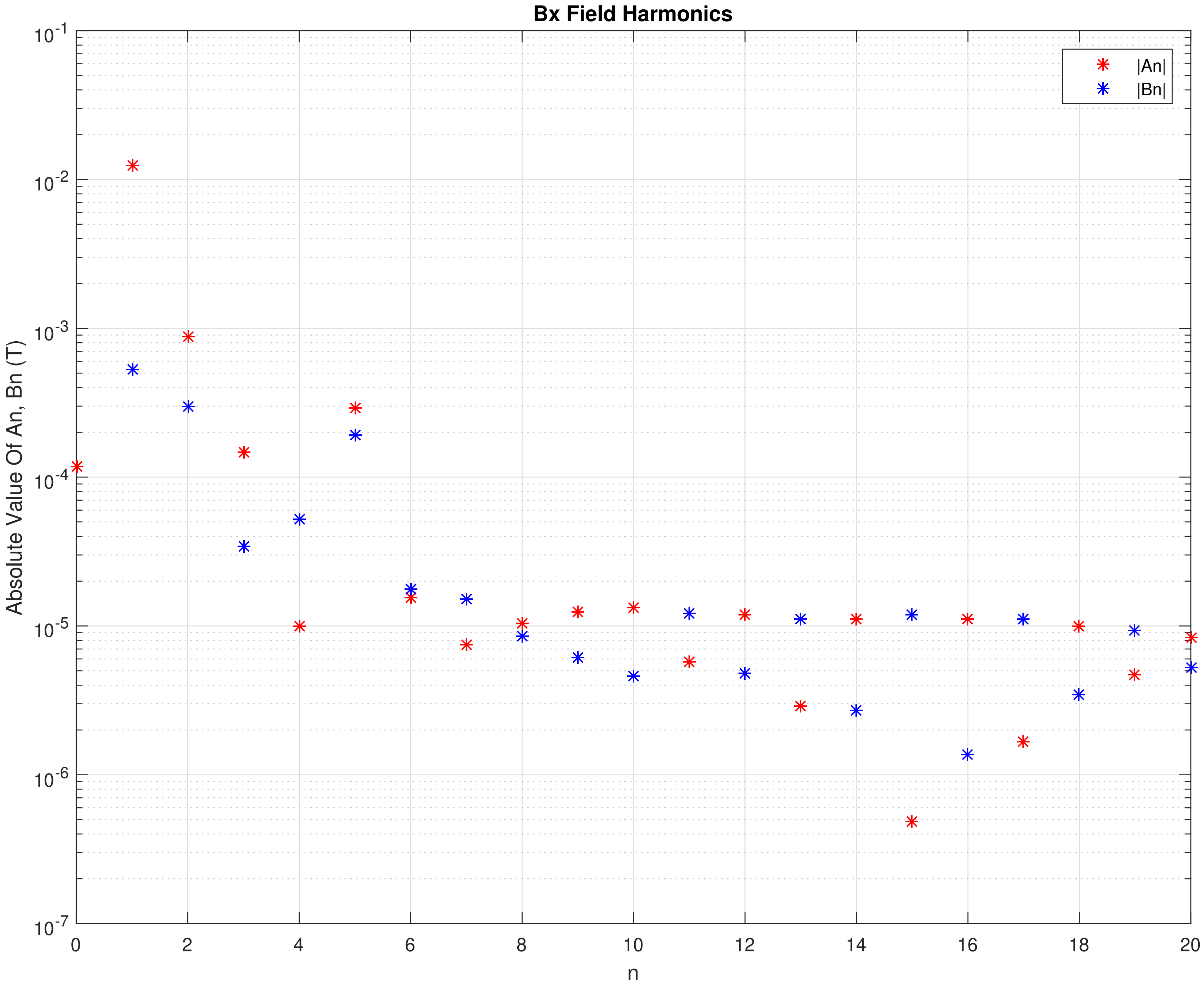

By vs Z With Fitted Peaks And Zeros
8
39
71
102
133
165
196
Pole
By (T)
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

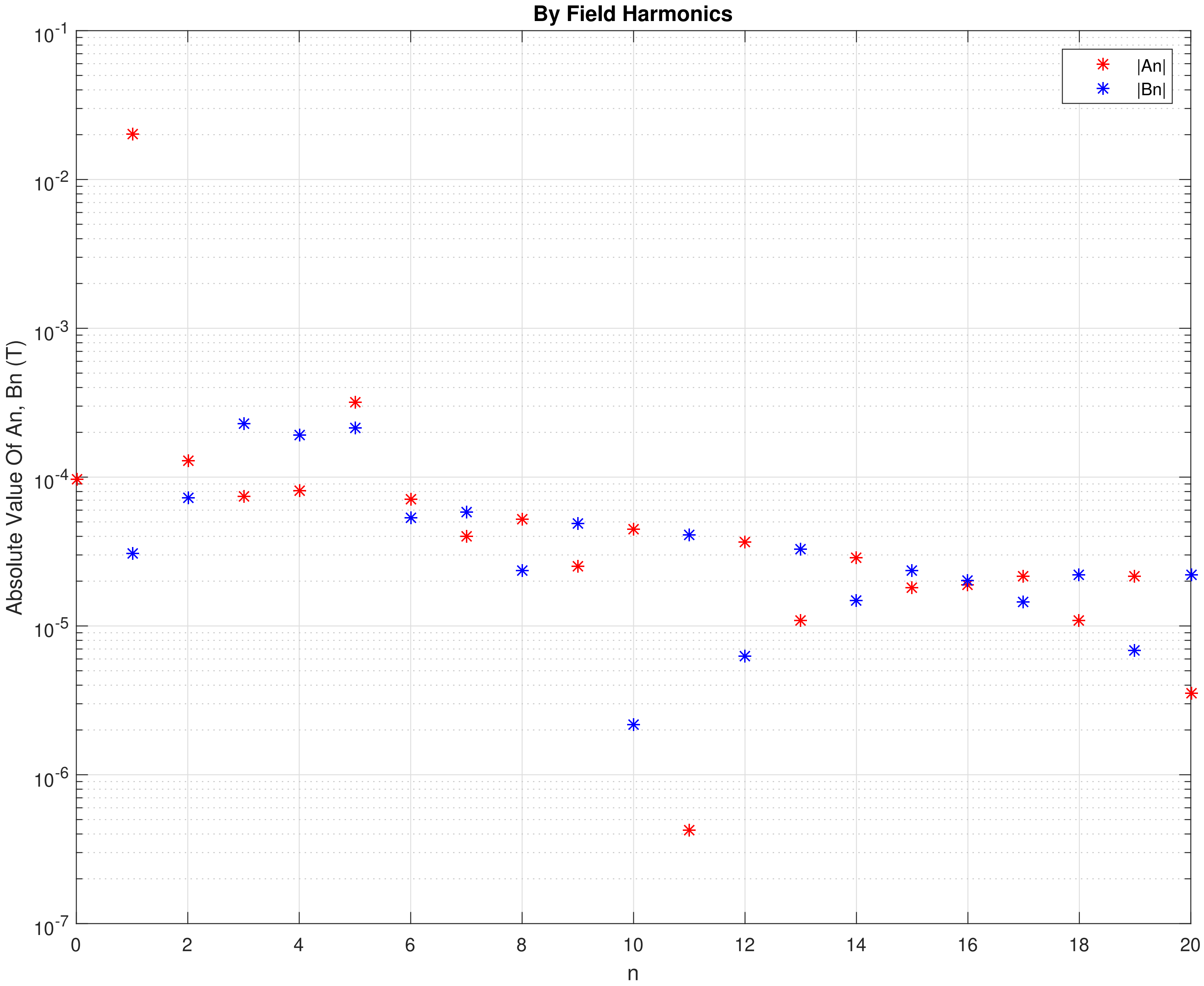

Abs(Fitted Peak Bx) vs Z, Excluding Ends
6
37
69
100
131
162
194
Pole
Abs(Peak Bx) (T)
0.06
0.05
0.04
0.03
0.02
0.01
0
Peak Fields: Ave = 0.022265 T, RMS = 0.006348 T
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

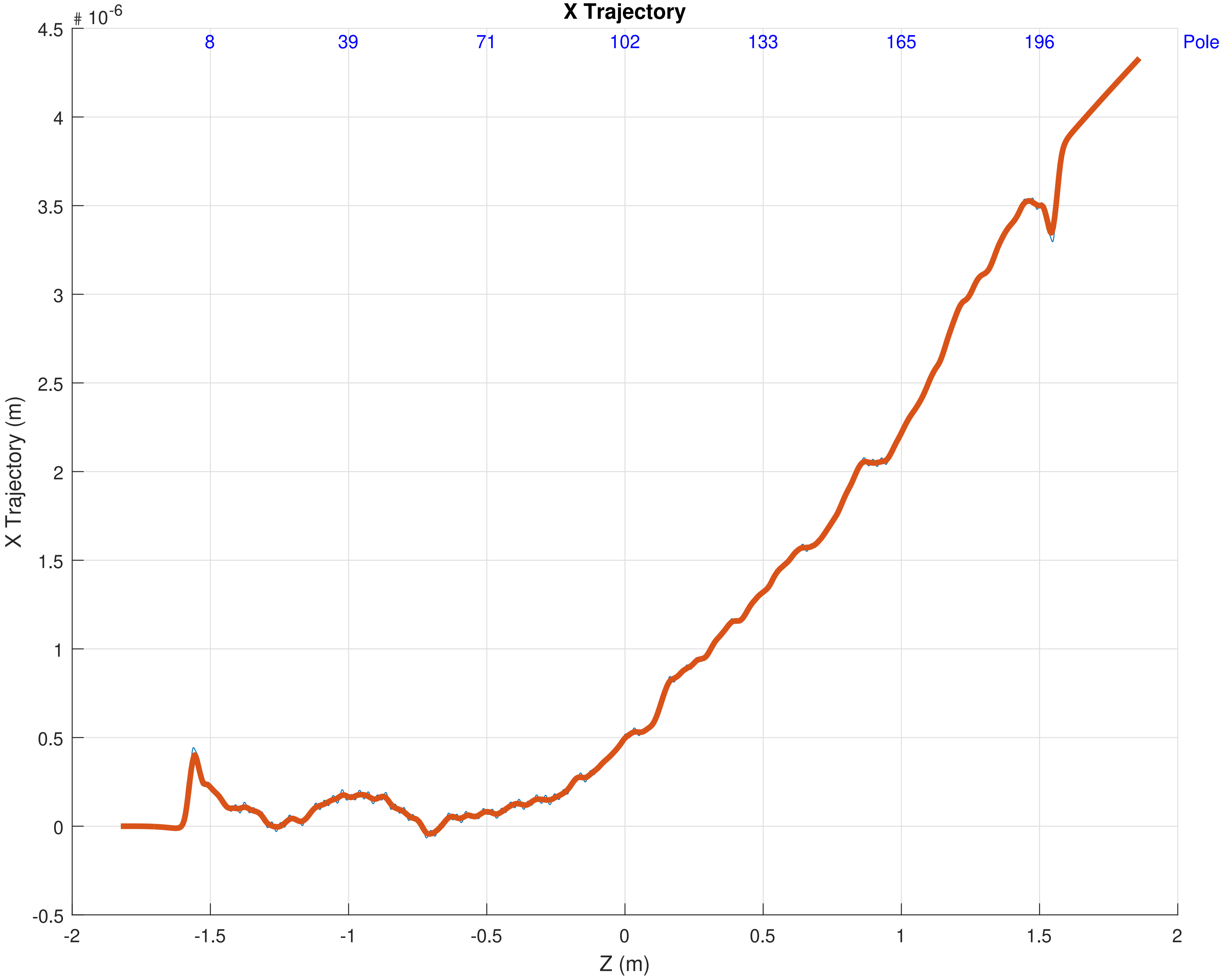

Abs(Fitted Peak By) vs Z, Excluding Ends
8
39
71
102
133
165
196
Pole
Abs(Peak By) (T)
0.1
0.08
0.06
0.04
0.02
0
Peak Fields: Ave = 0.036099 T, RMS = 0.009918 T
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

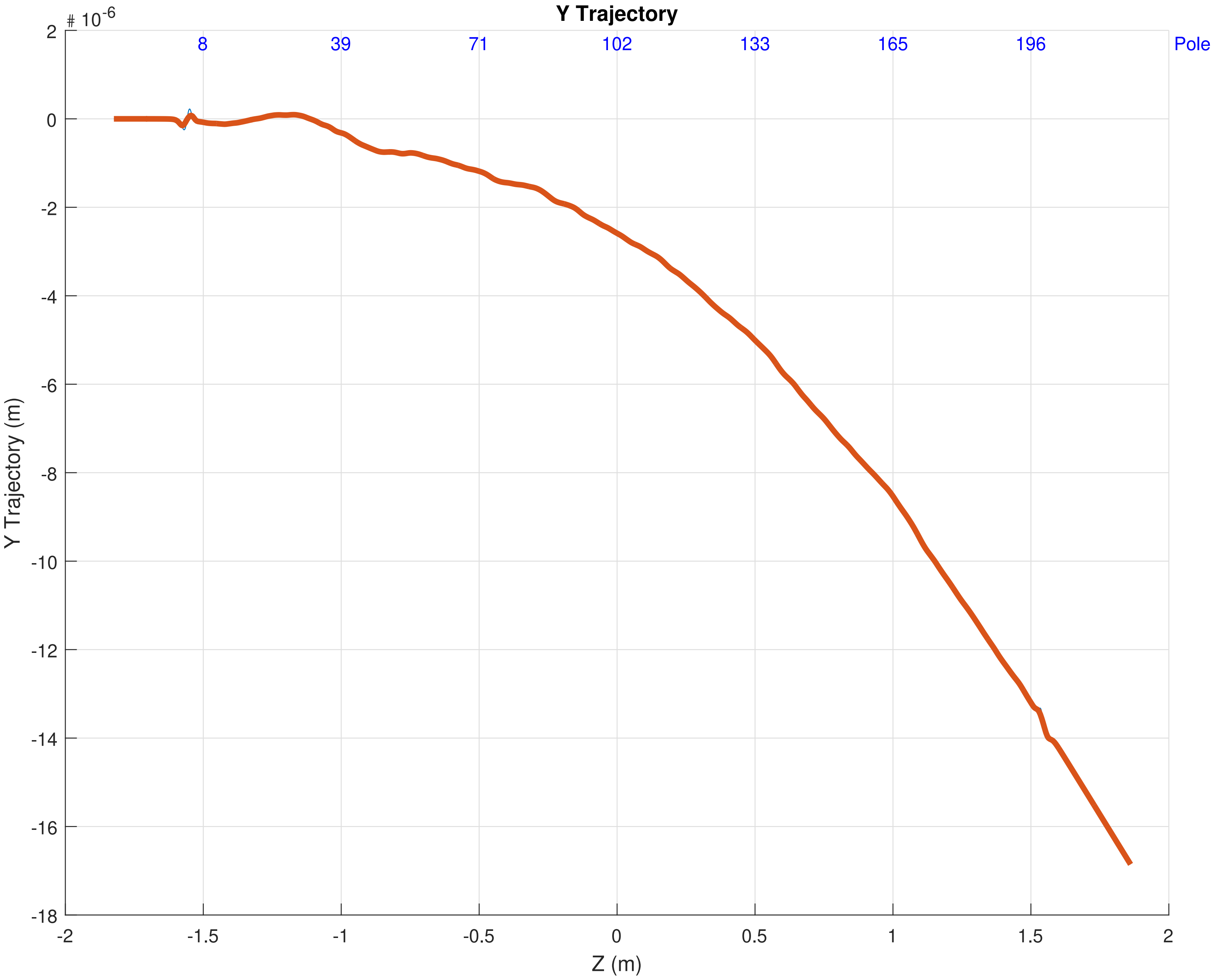

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
6
37
69
100
131
162
194
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.015950 m, RMS = 0.004318 m
Zero Field Spacing: Ave = 0.015976 m, RMS = 0.003655 m
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

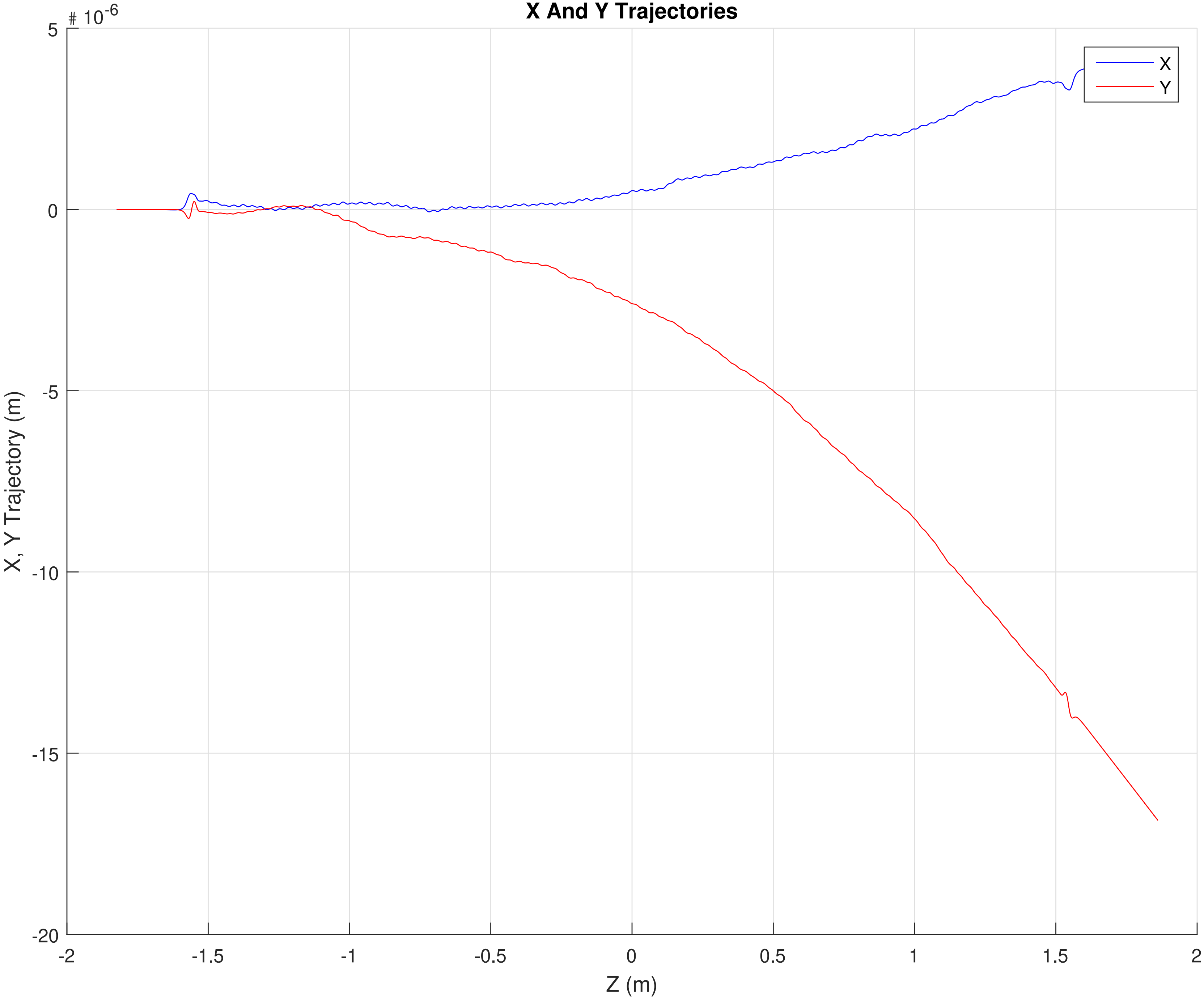

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
0.03
0.025
0.02
0.015
0.01
0.005
0
8
39
71
102
133
165
196
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.015854 m, RMS = 0.003430 m
Zero Field Spacing: Ave = 0.015855 m, RMS = 0.002380 m
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

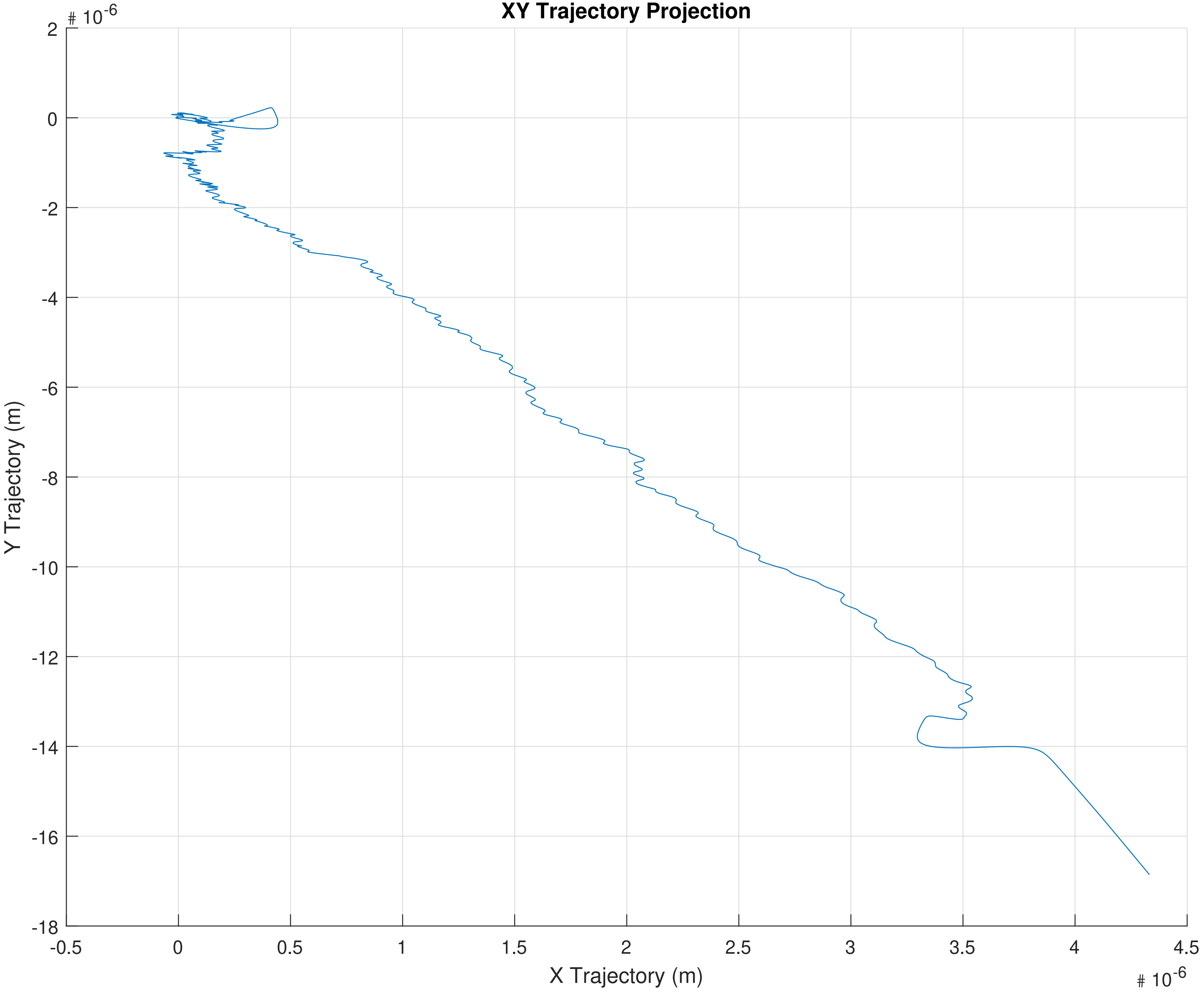

Bx Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
0
2
4
6
8
10
12
14
16
18
20


By Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
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
n

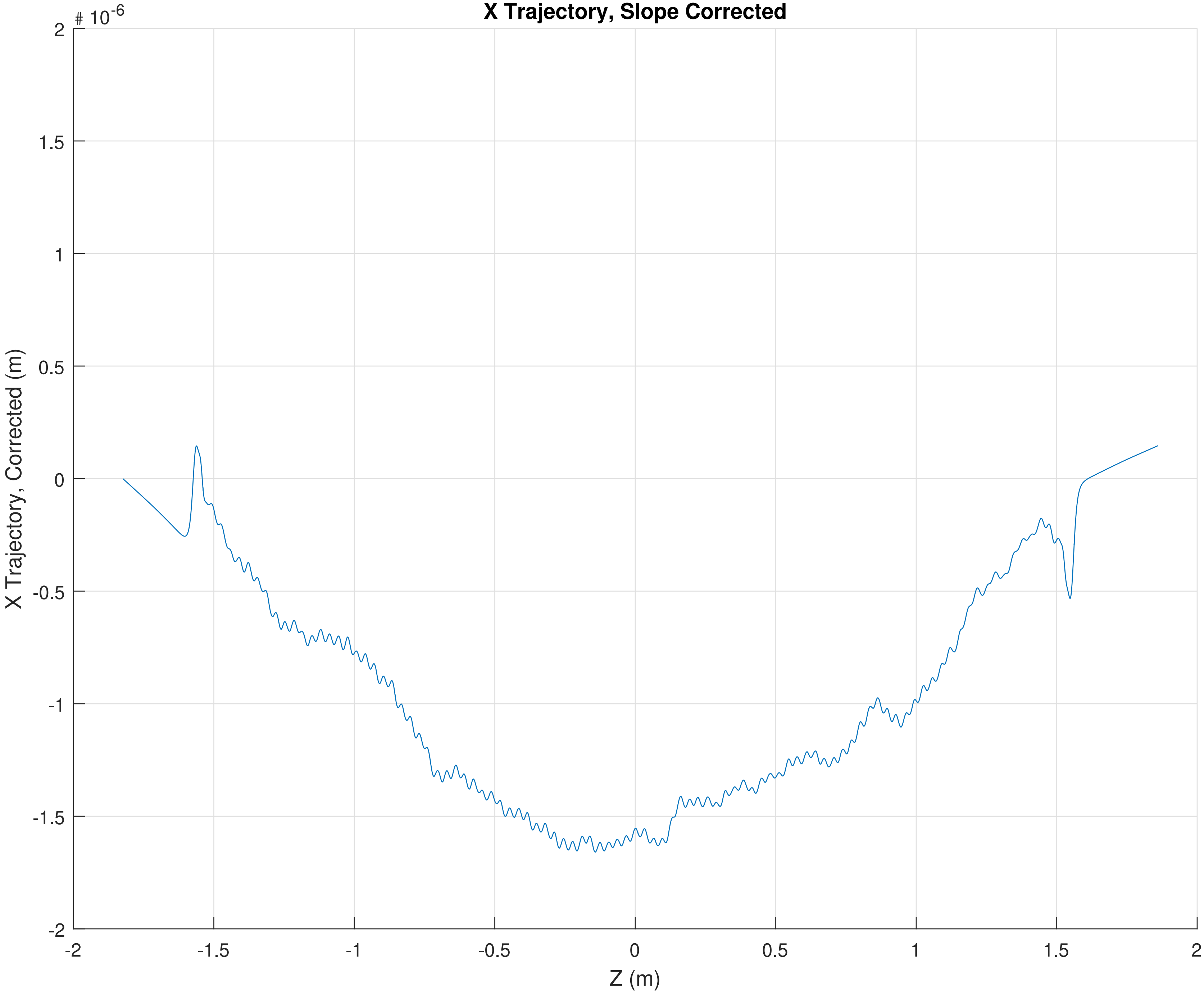

X Trajectory
10^-6
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
X Trajectory (m)
8
39
71
102
133
165
196
Pole
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

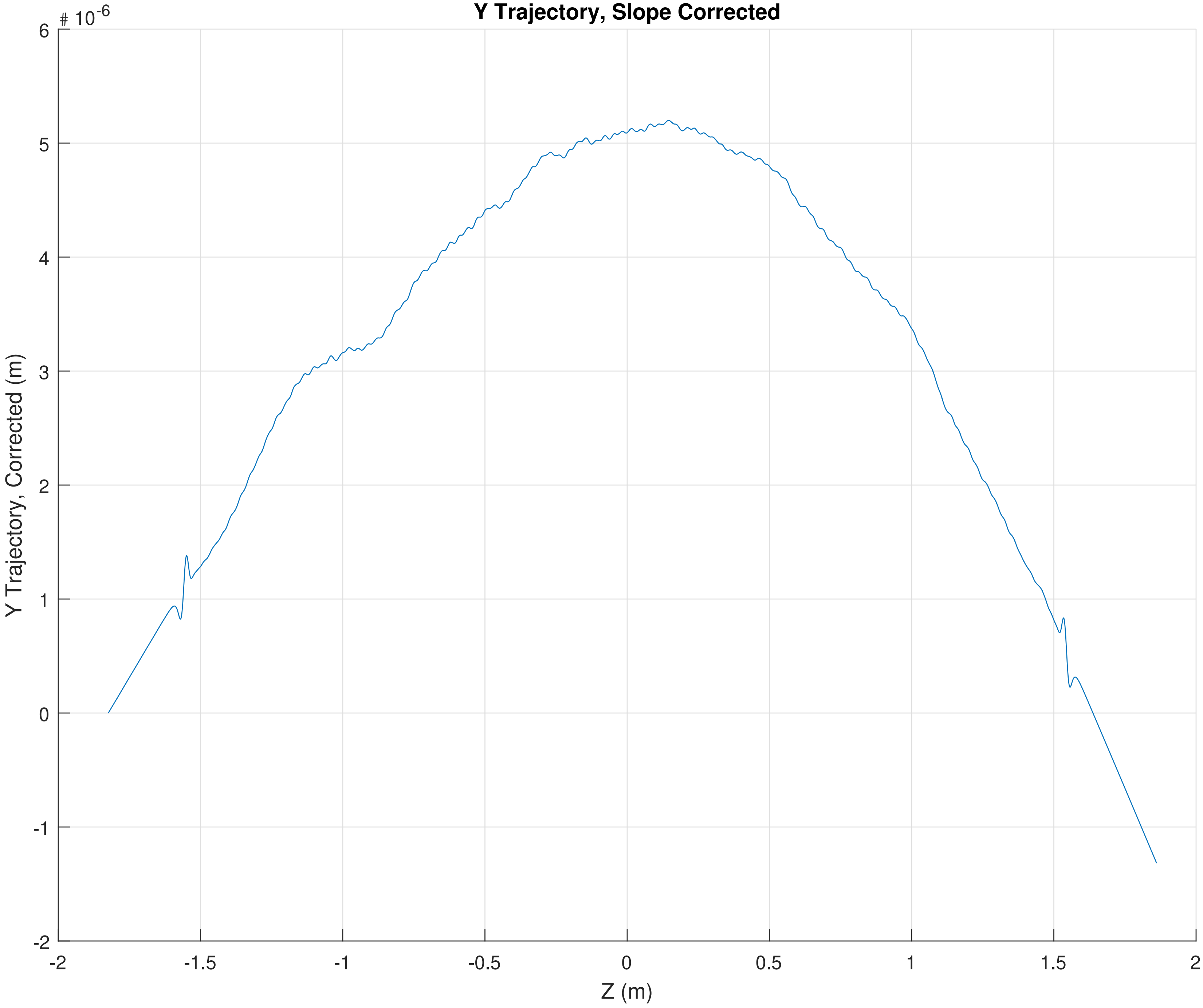

Y Trajectory
10^-6
8
39
71
102
133
165
196
Pole
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

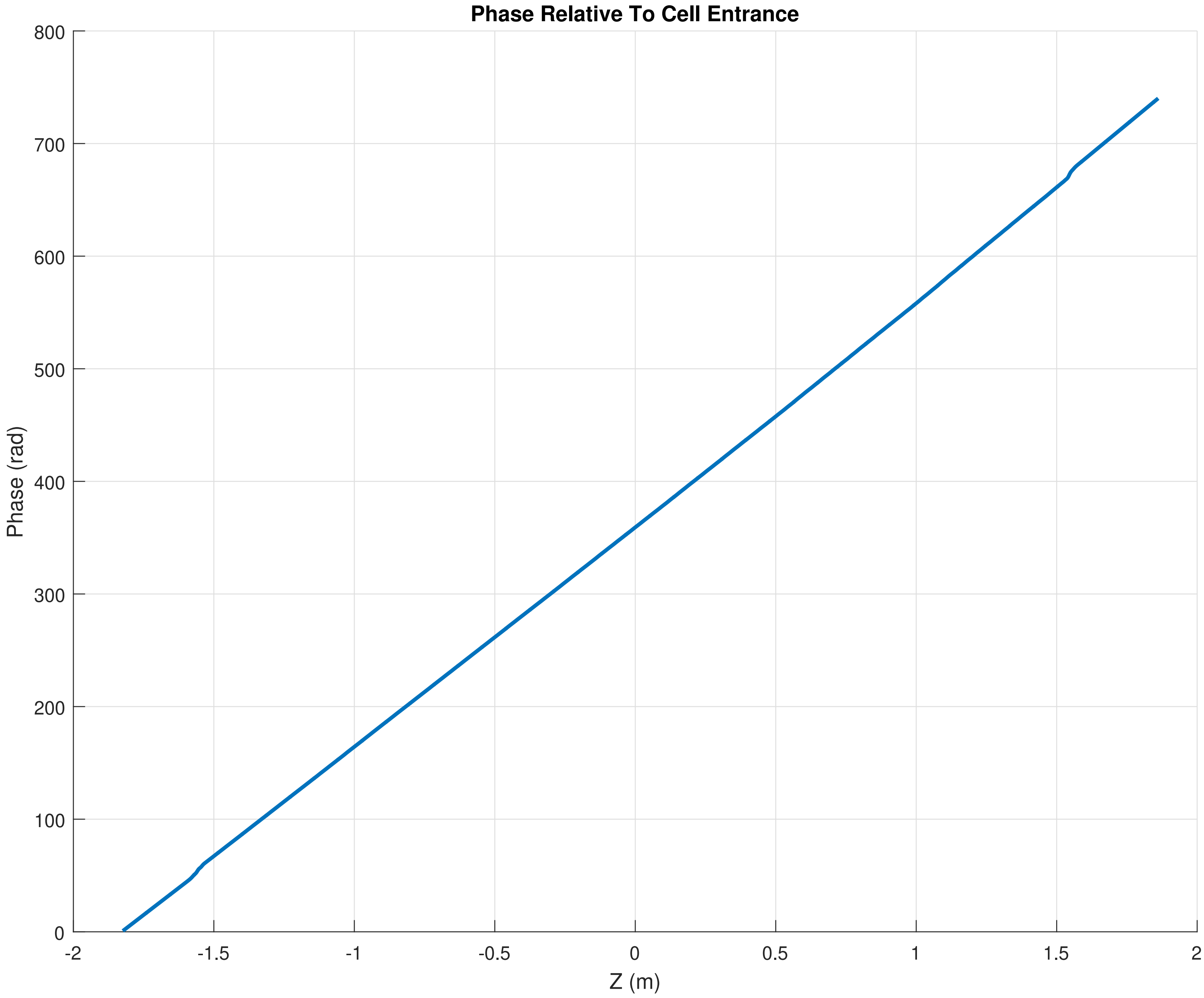

X And Y Trajectories
10^-6
5
0
-5
-10
-15
-20
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
X, Y Trajectory (m)
X
Y

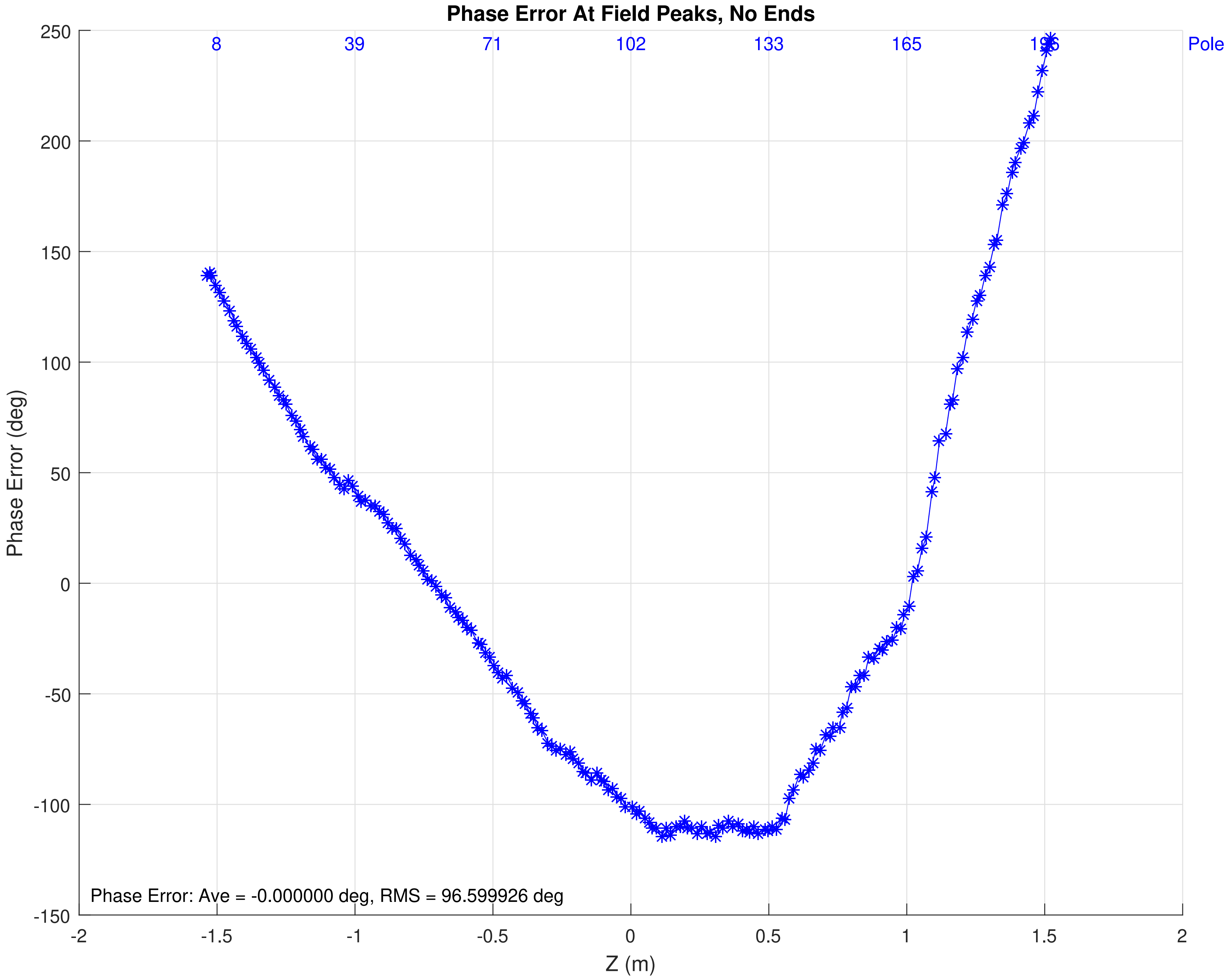


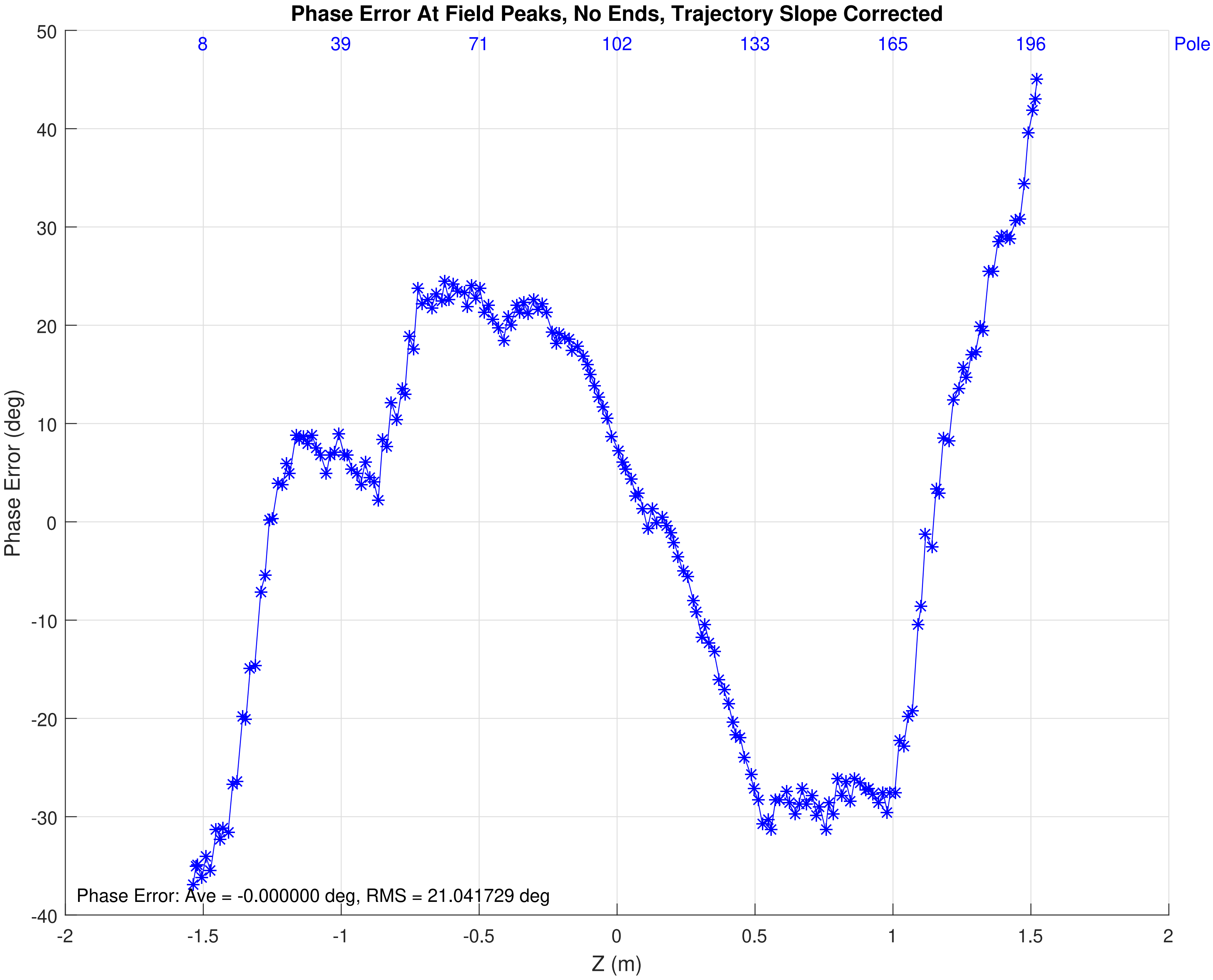
XY Trajectory Projection
10^-6
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
Y Trajectory (m)
-0.5
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
X Trajectory (m)
10^-6

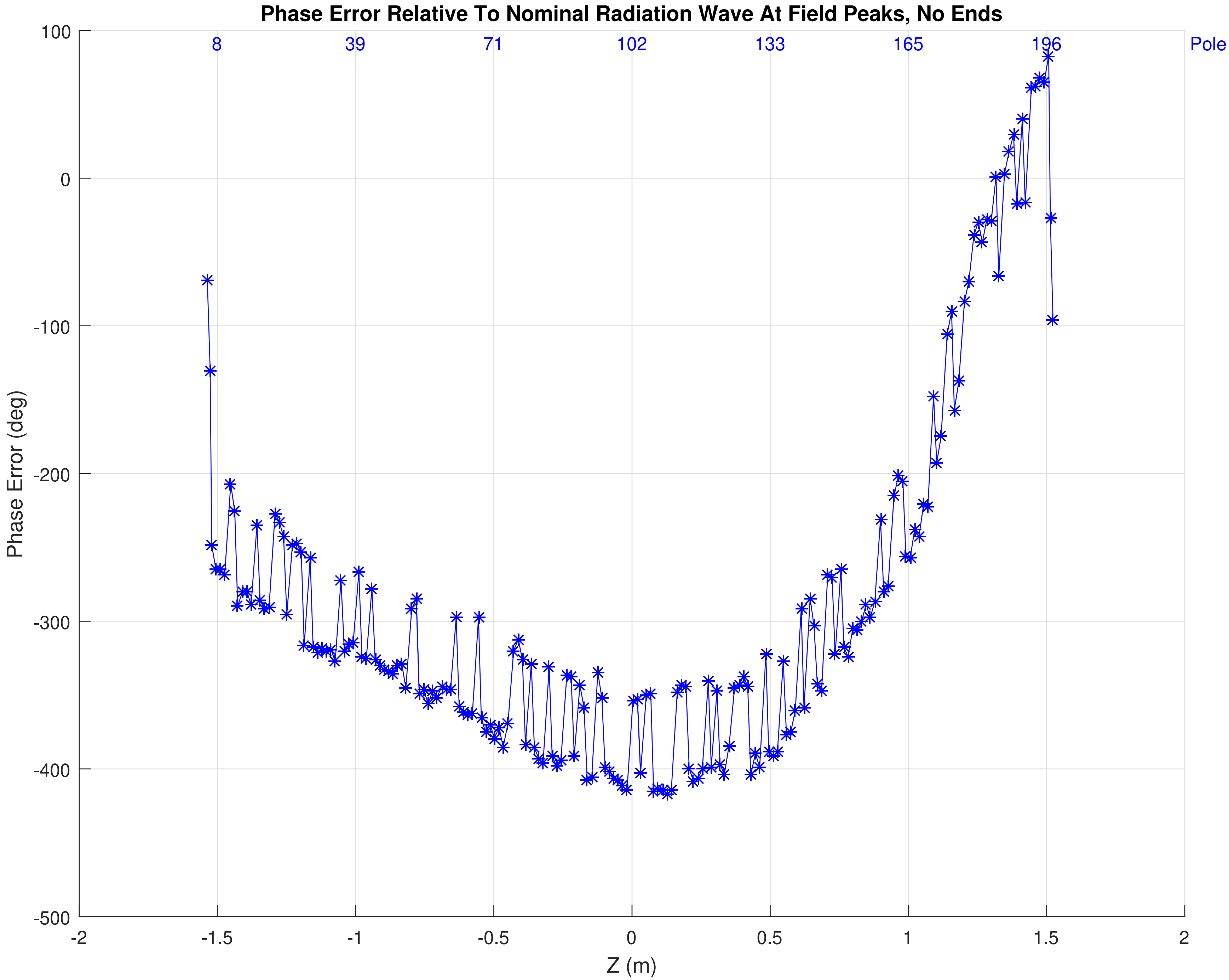

X Trajectory, Slope Corrected
10^-6
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
X Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

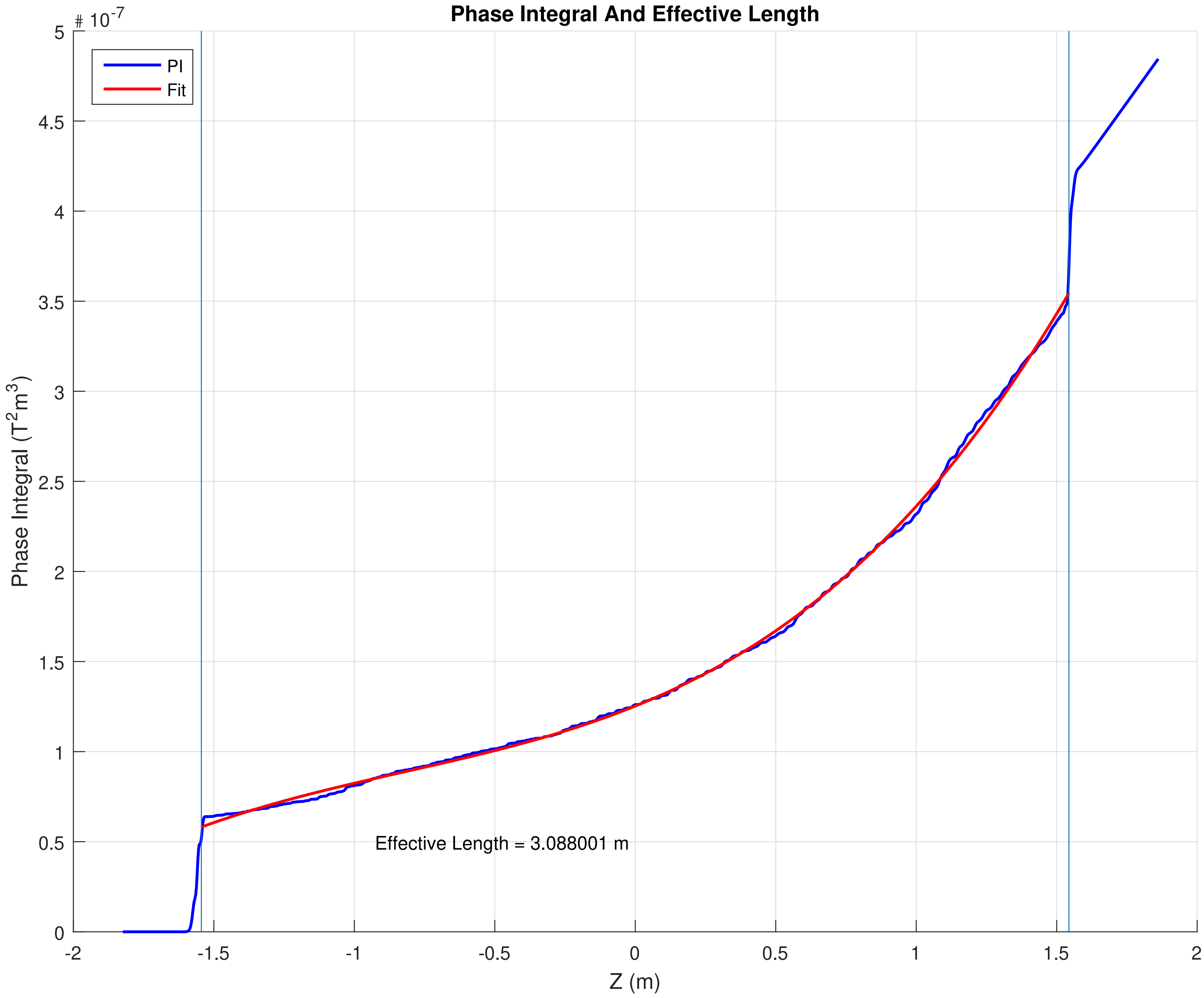

Y Trajectory, Slope Corrected
10^-6
6
5
4
3
2
1
0
-1
-2
Y Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)


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

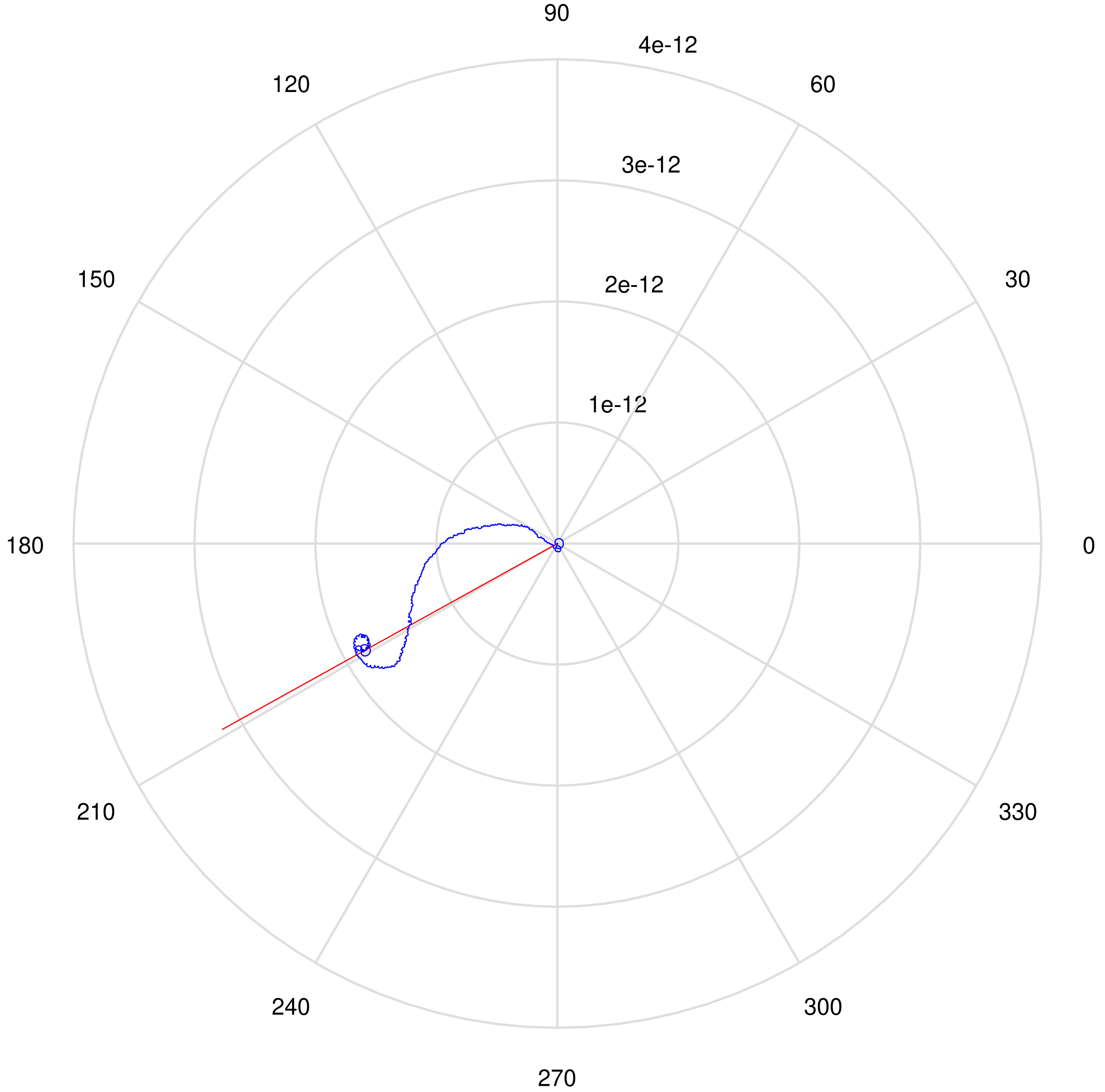

Phase Error At Field Peaks, No Ends
Phase Error (deg)
Z (m)
250
200
150
100
50
0
-50
-100
-150
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
8
39
71
102
133
165
196
Pole
Phase Error: Ave = -0.000000 deg, RMS = 96.599926 deg


Phase Error At Field Peaks, No Ends, Trajectory Slope Corrected
8
39
71
102
133
165
196
Pole
50
40
30
20
10
0
-10
-20
-30
-40
Phase Error (deg)
Phase Error: Ave = -0.000000 deg, RMS = 21.041729 deg
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)


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

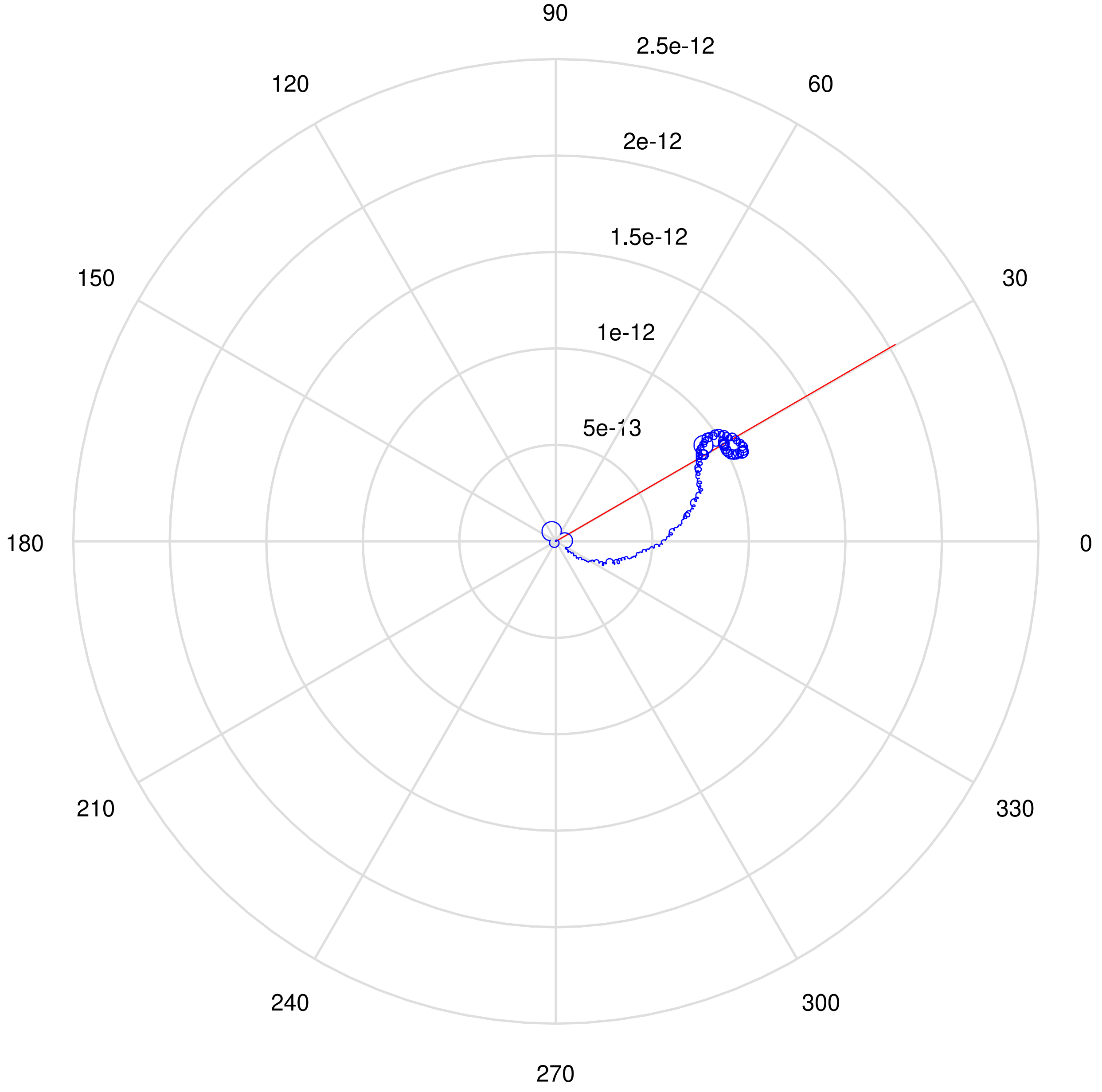


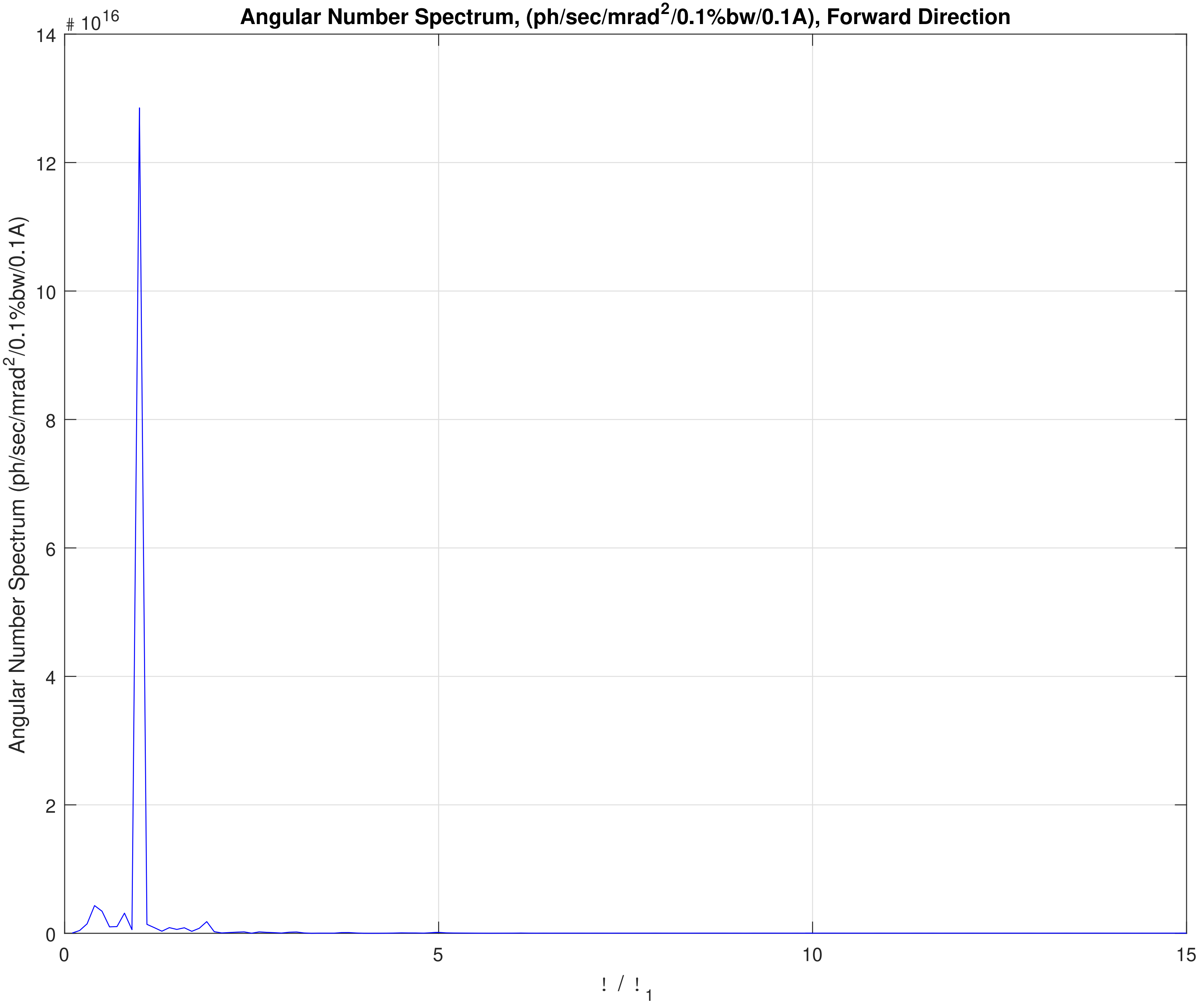
Phase Integral And Effective Length
10-7
PI
Fit
Phase Integral (T2m3)
Z (m)
Effective Length = 3.088001 m
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2

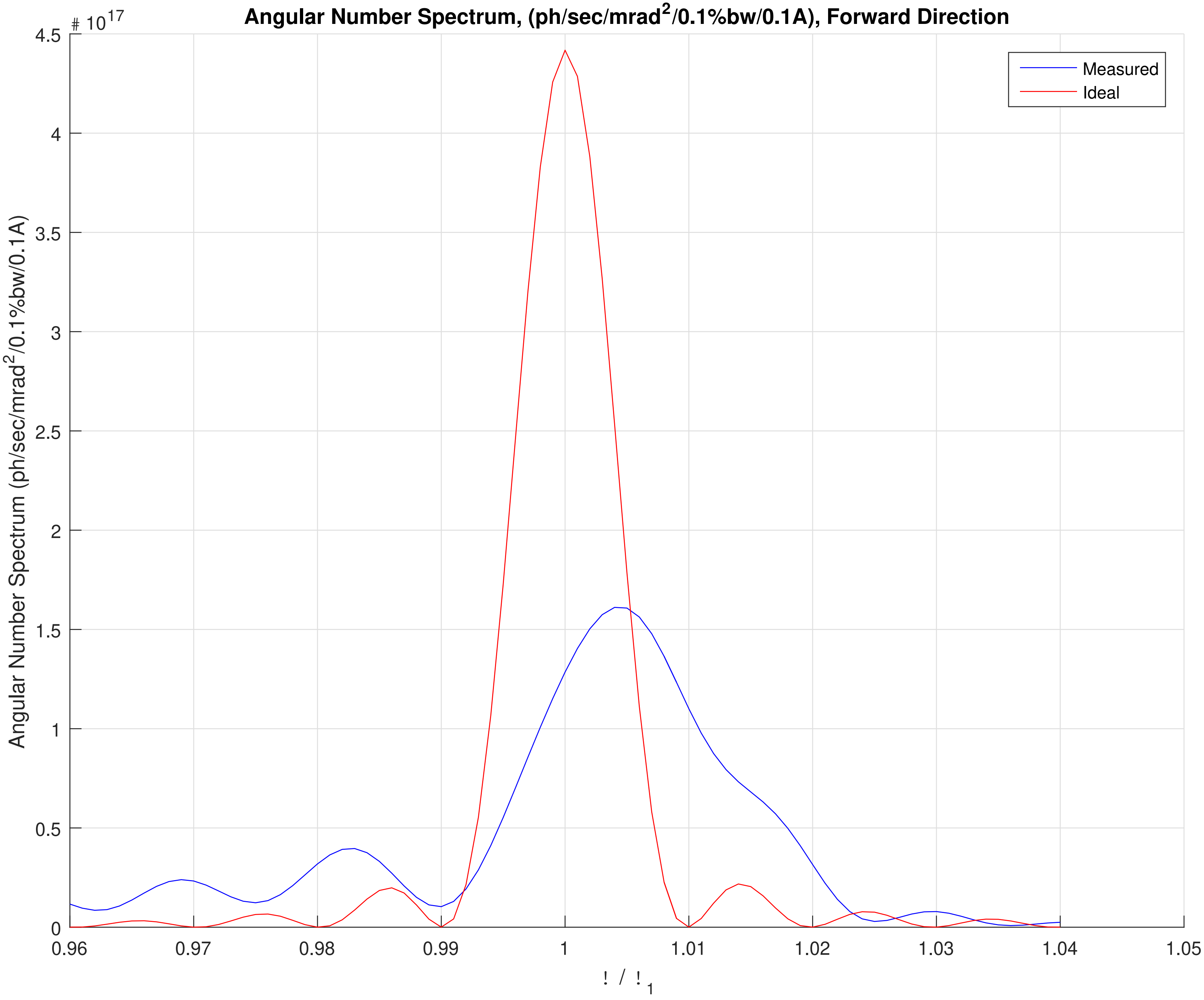


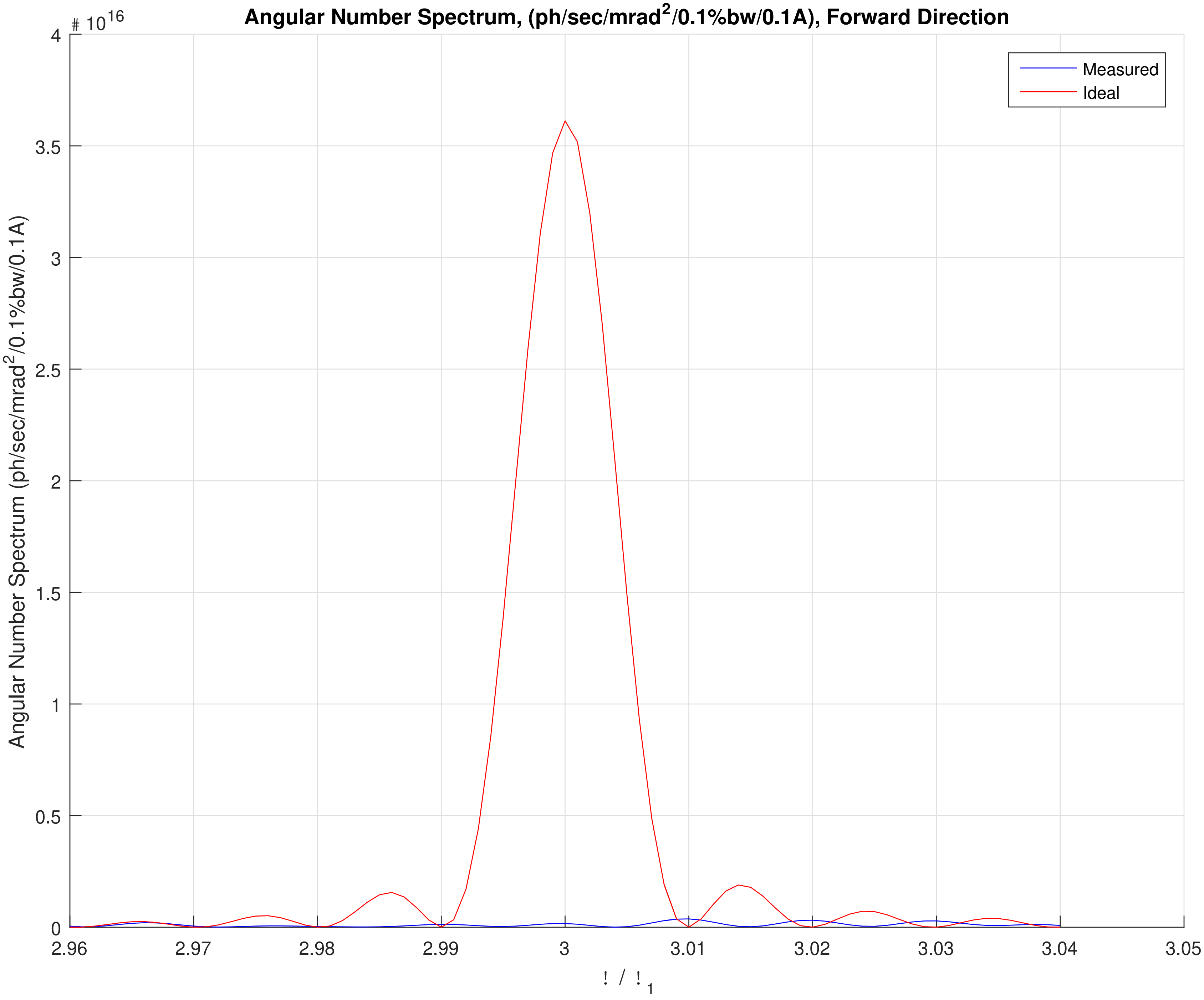
Re and Im Parts Of Ex(!), Forward Direction, ! = !$_1$

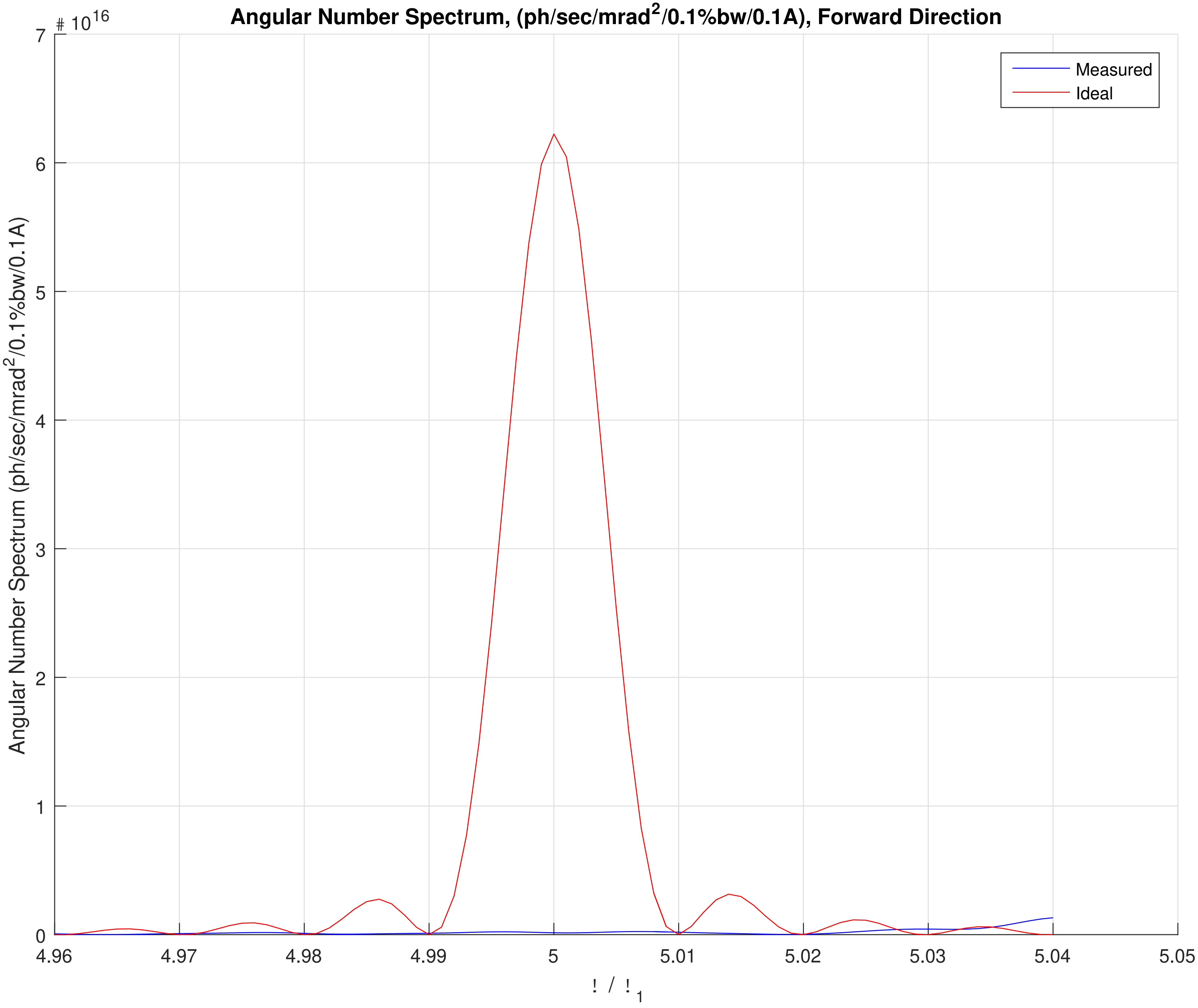
Re and Im Parts Of Ey(!), Forward Direction, $! = !_1$




Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{16}
14
12
10
8
6
4
2
0
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
0
5
10
15
! / !$_1$


Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{17}
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
0.96
0.97
0.98
0.99
1
1.01
1.02
1.03
1.04
1.05
! / !$_1$
Measured
Ideal


Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{16}
4
3.5
3
2.5
2
1.5
1
0.5
0
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
Measured
Ideal
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