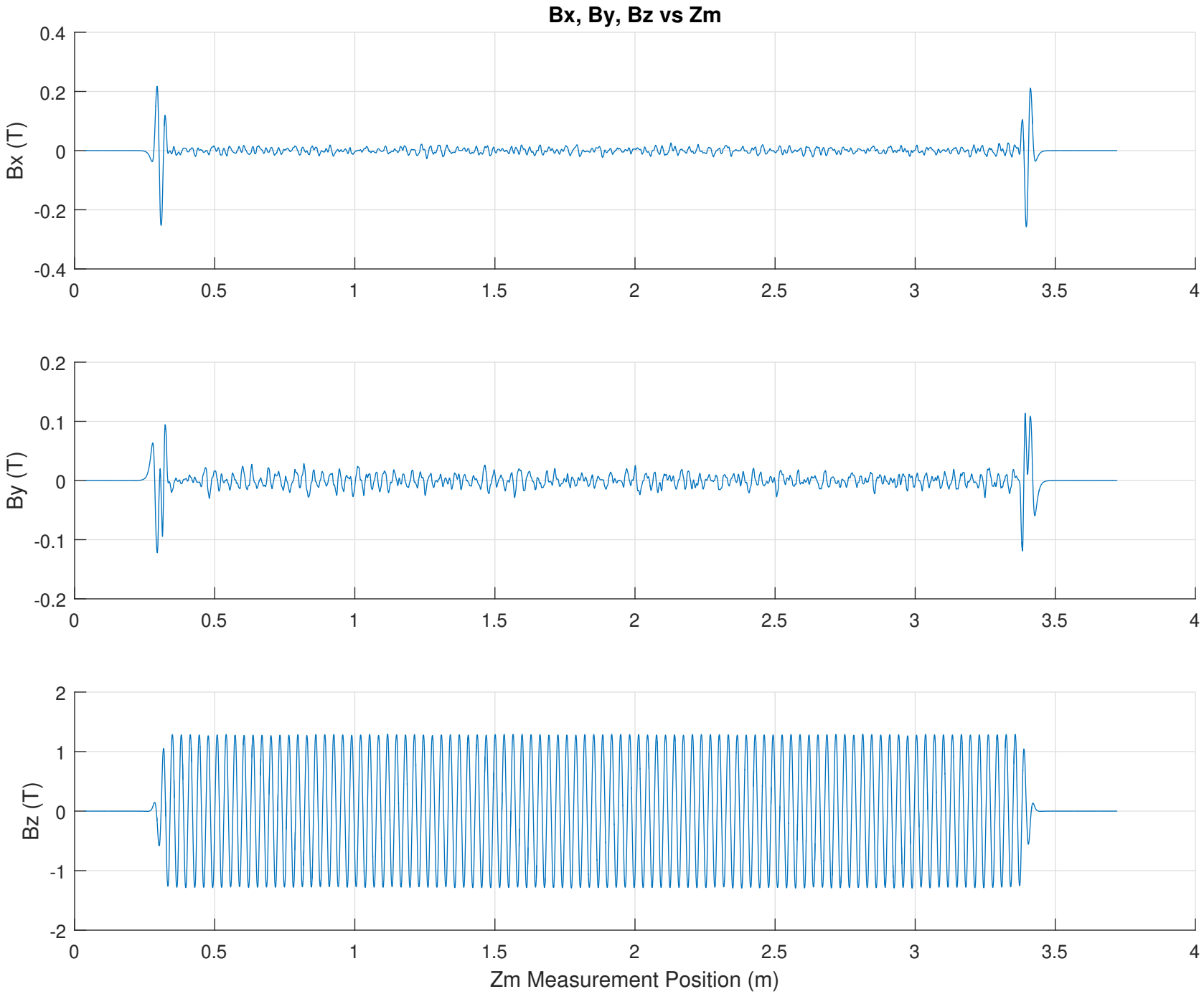
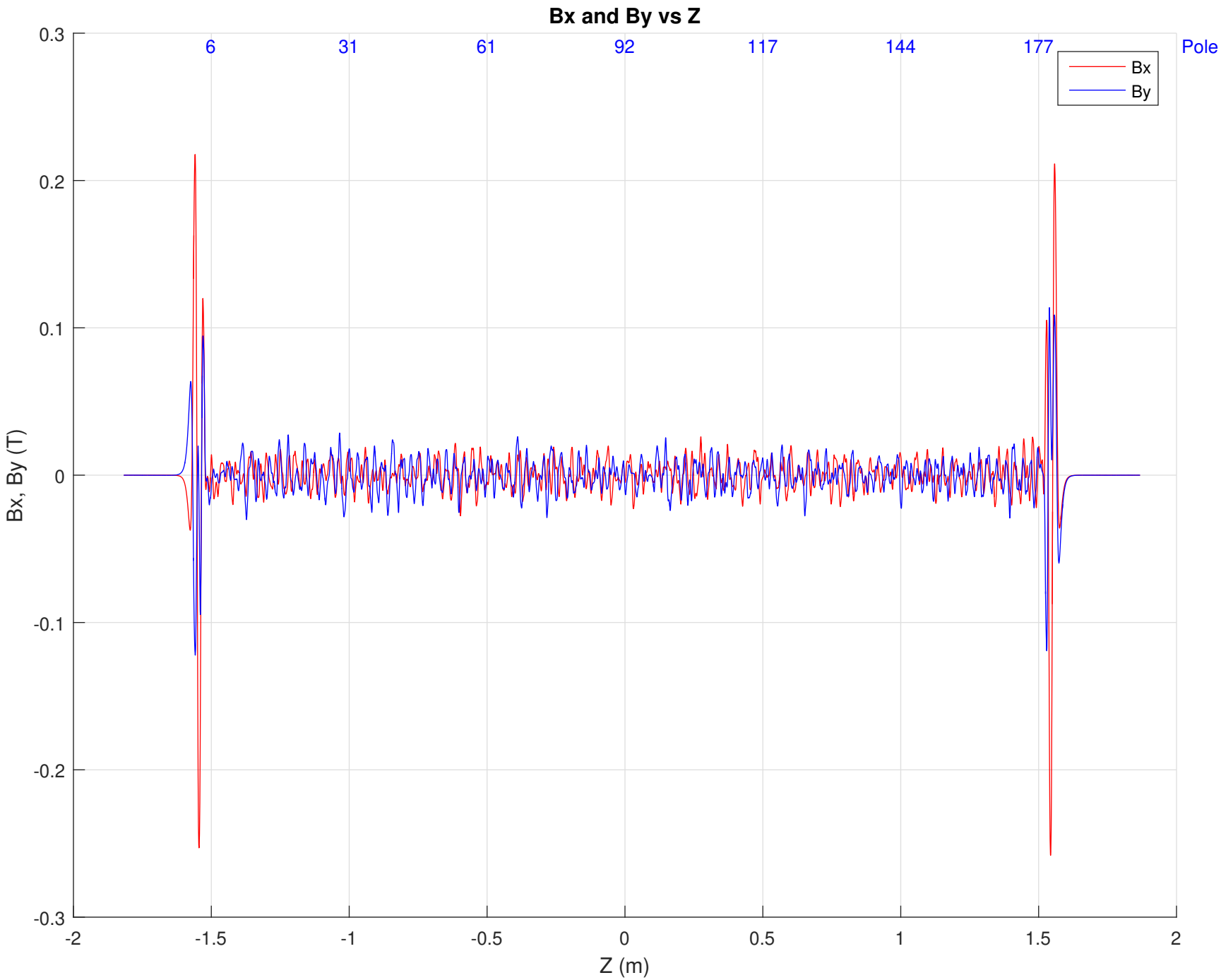
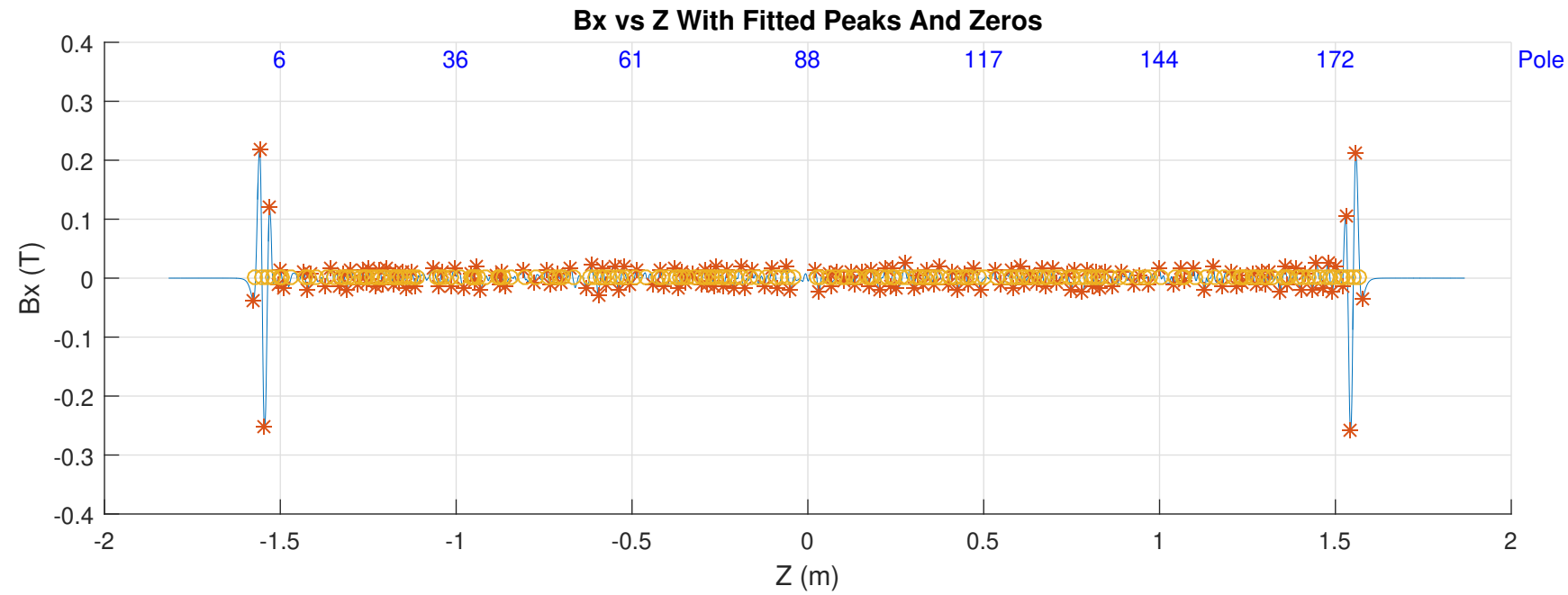
SLAC Magnetic Measurements

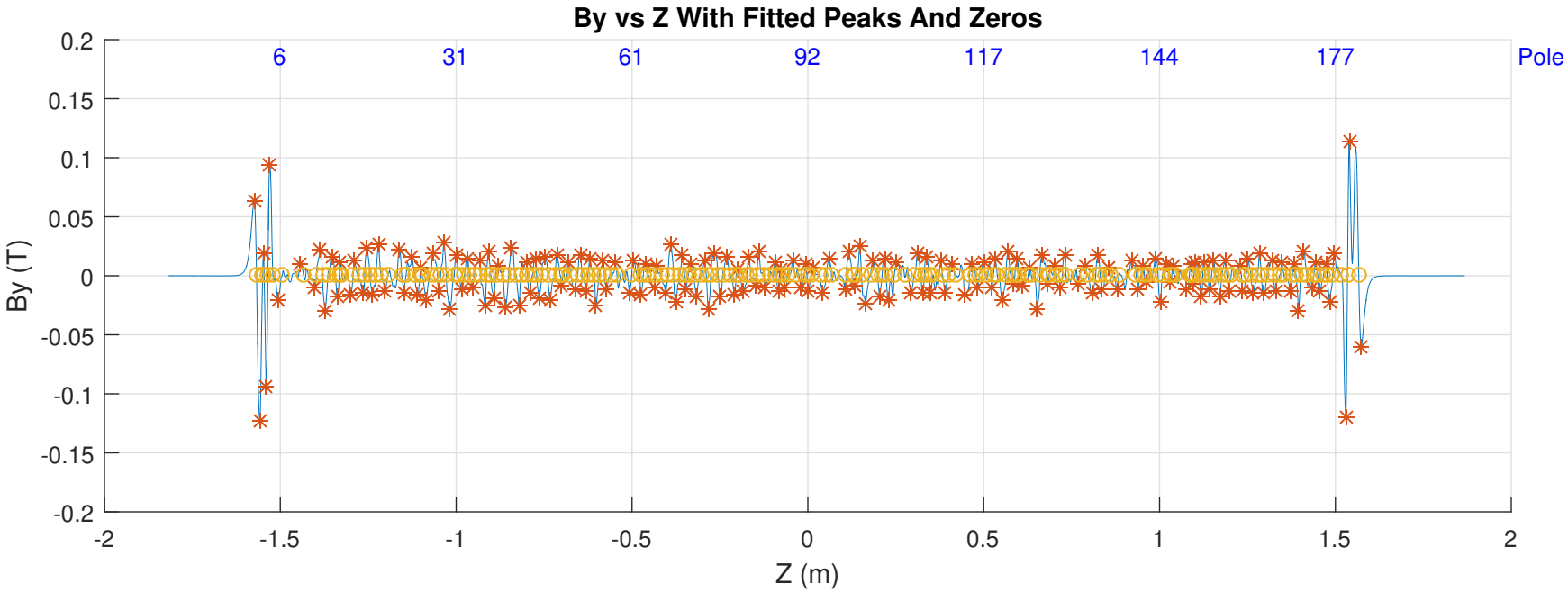
EPU Analysis

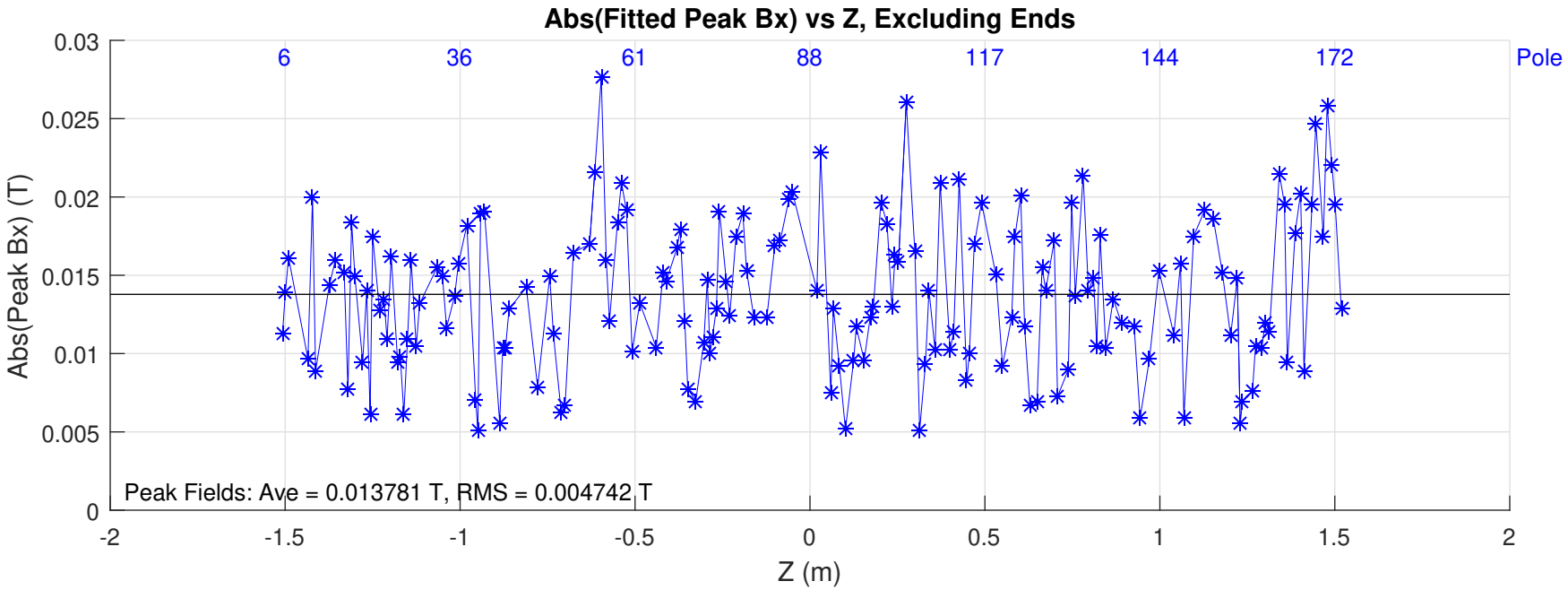
Parameters:
INPUT-FILE-DIR =V:\MET\MagServe\MagData\DELTA\Delta Data 2015\New Measurements\Run 137 HD Spreadsheet 260 Meas\\I
INPUT-FILE-NAME =hall2-anal-probe1-field.dat
INPUT-FILE-TYPE =ZBXYZH
CORR-REQUIRED =0
GAMMA =26671.59
NOM-LAMBDA-U =0
NOM-K-VALUE =0
NOM-LAMBDA-R =0
NUM-POLES =196
NUM-END-POLES =4
CELL-LENGTH =3.656

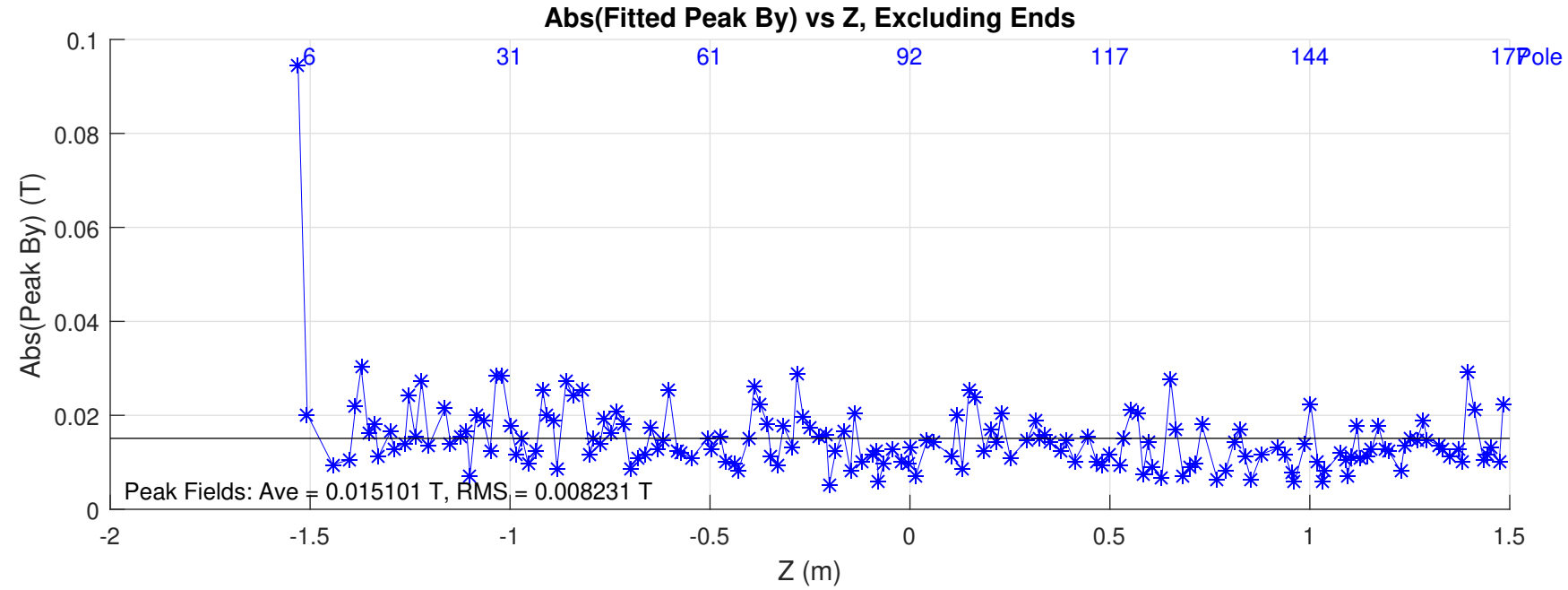

Bx, By, Bz vs Zm
Bx (T)
0.4
0.2
0
-0.2
-0.4
By (T)
0.2
0.1
0
-0.1
-0.2
Bz (T)
2
1
0
-1
-2
0
0.5
1
1.5
2
2.5
3
3.5
4
Zm Measurement Position (m)

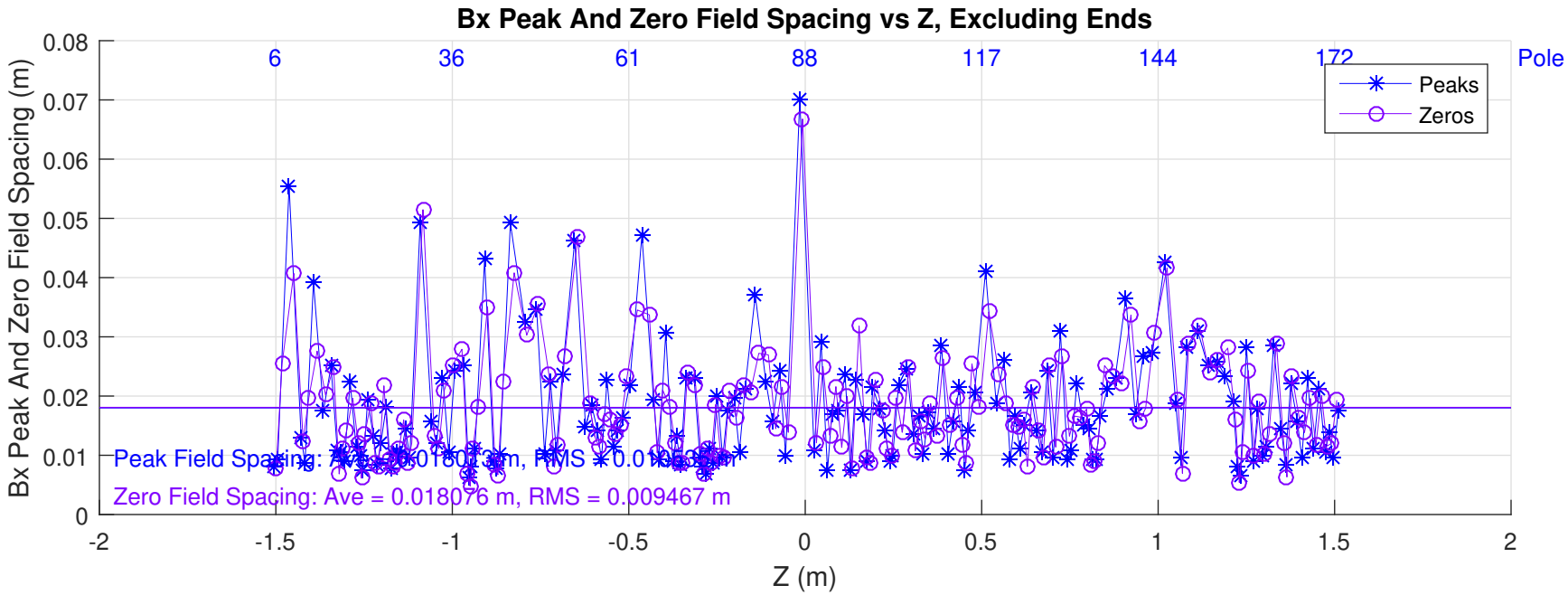

Bx and By vs Z
6
31
61
92
117
144
177
Pole
Bx
By
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
Bx, By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

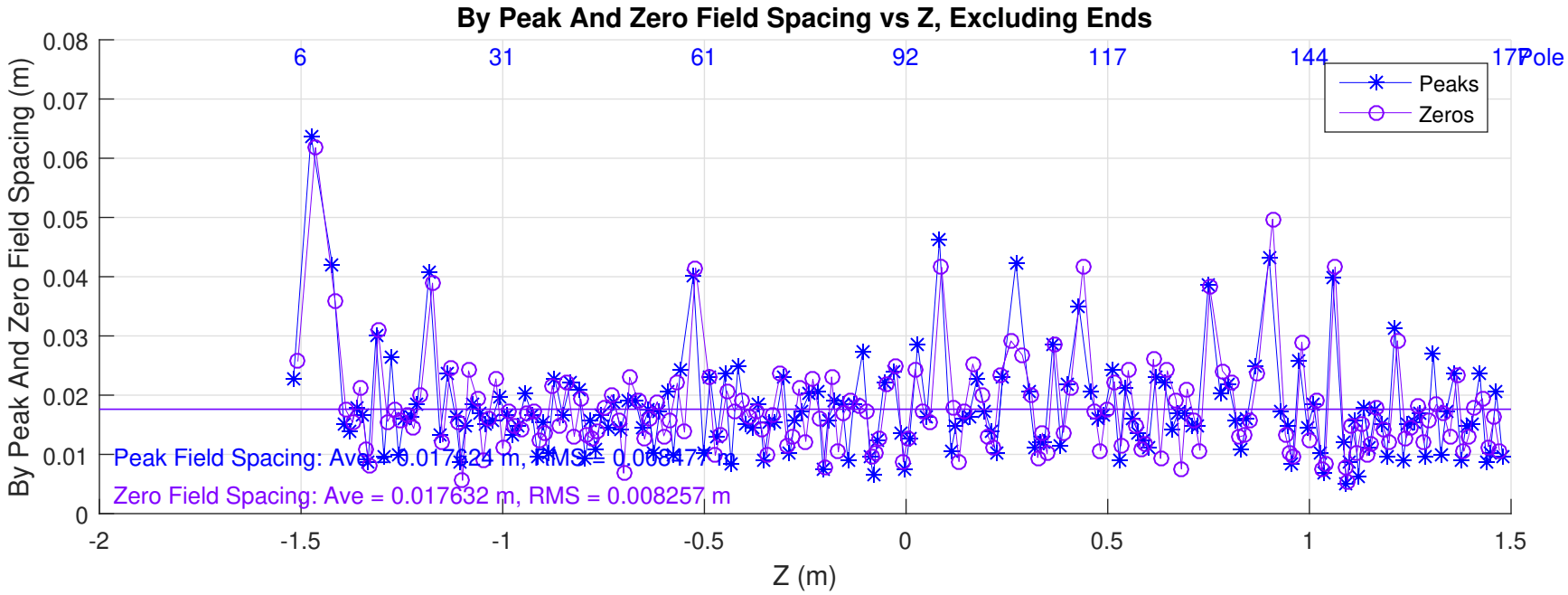

Bx vs Z With Fitted Peaks And Zeros
6
36
61
88
117
144
172
Pole
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
Bx (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

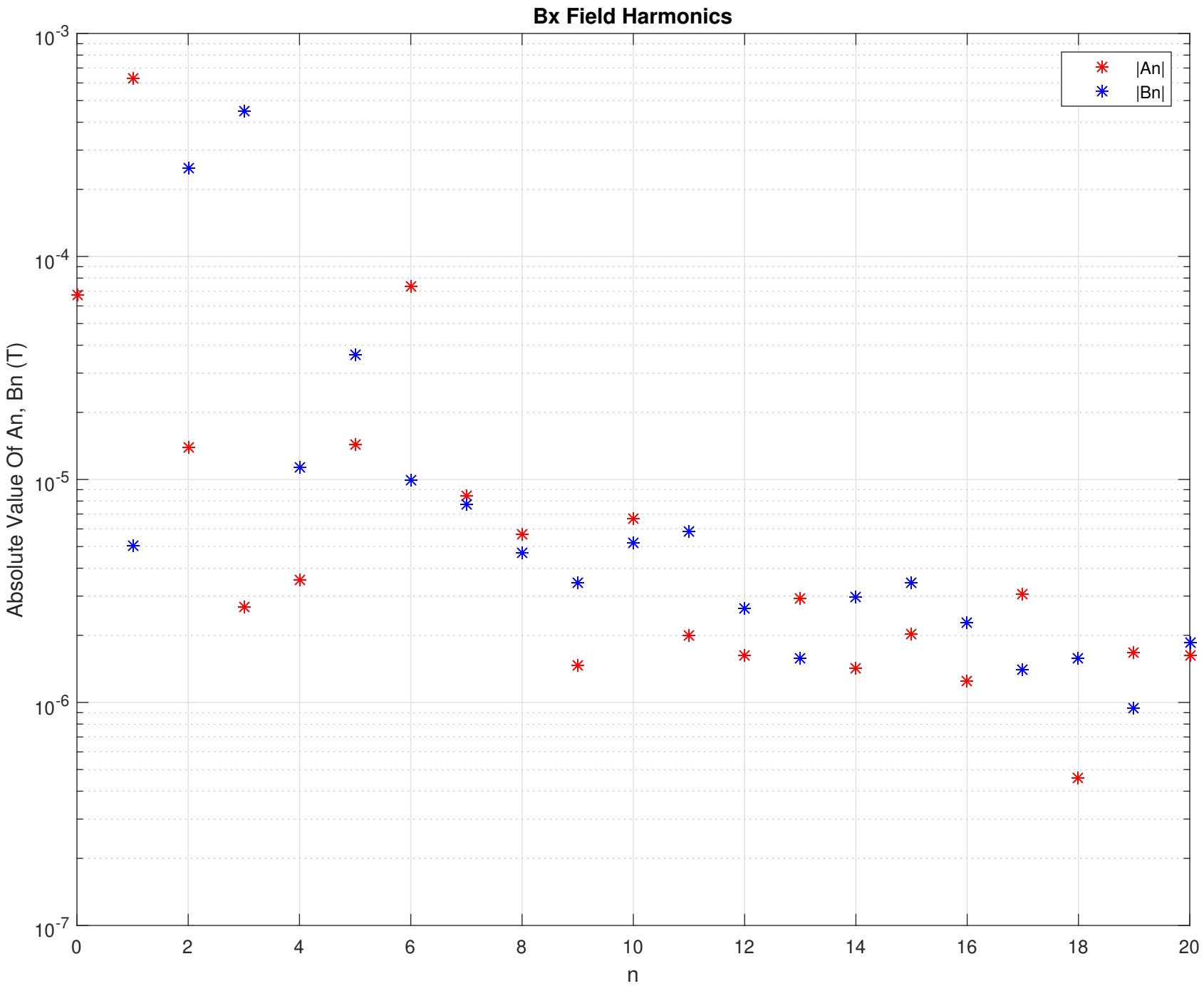

By vs Z With Fitted Peaks And Zeros
6
31
61
92
117
144
177
Pole
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

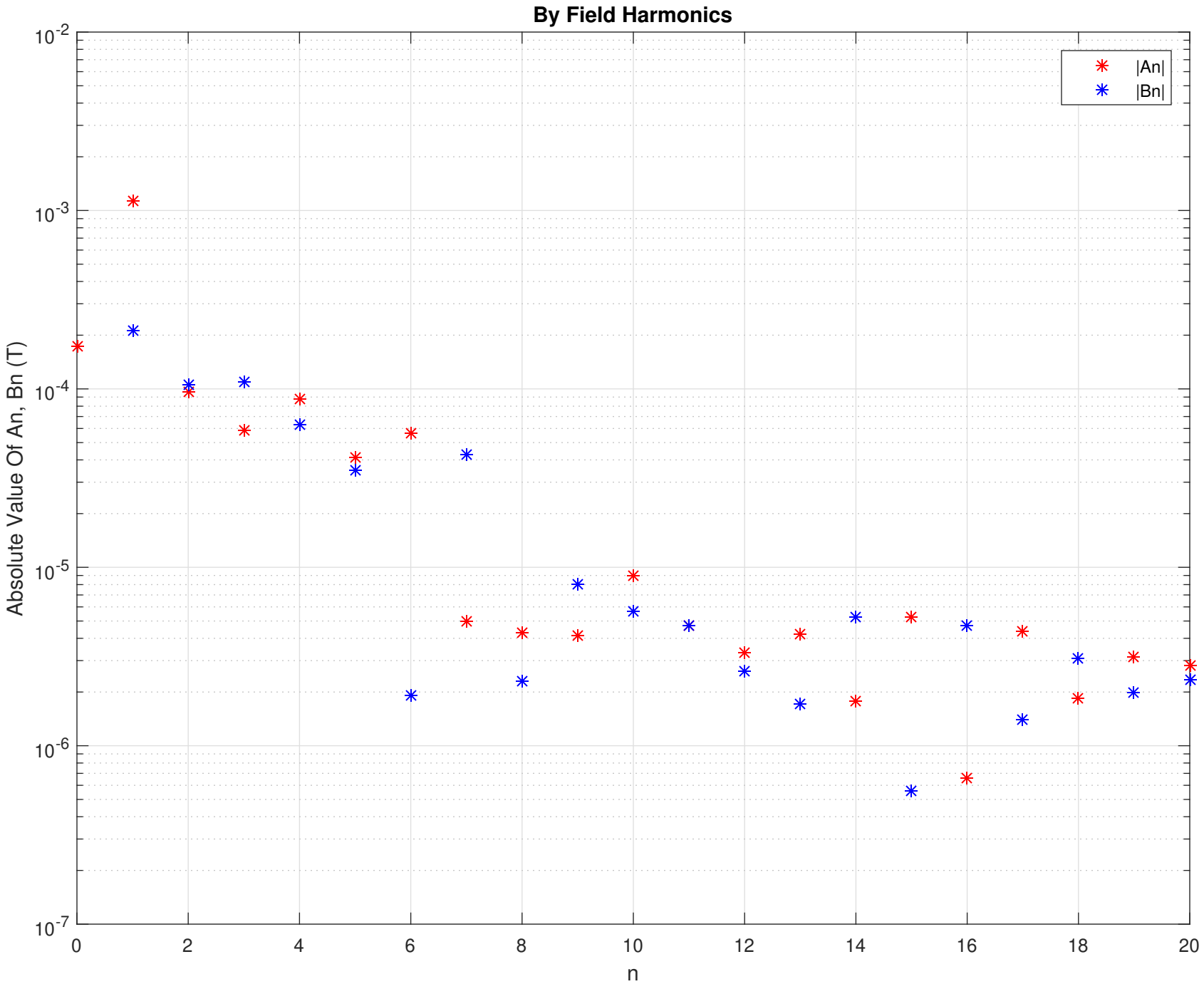

Abs(Fitted Peak Bx) vs Z, Excluding Ends
6
36
61
88
117
144
172
Pole
Abs(Peak Bx) (T)
0.03
0.025
0.02
0.015
0.01
0.005
0
Peak Fields: Ave = 0.013781 T, RMS = 0.004742 T
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

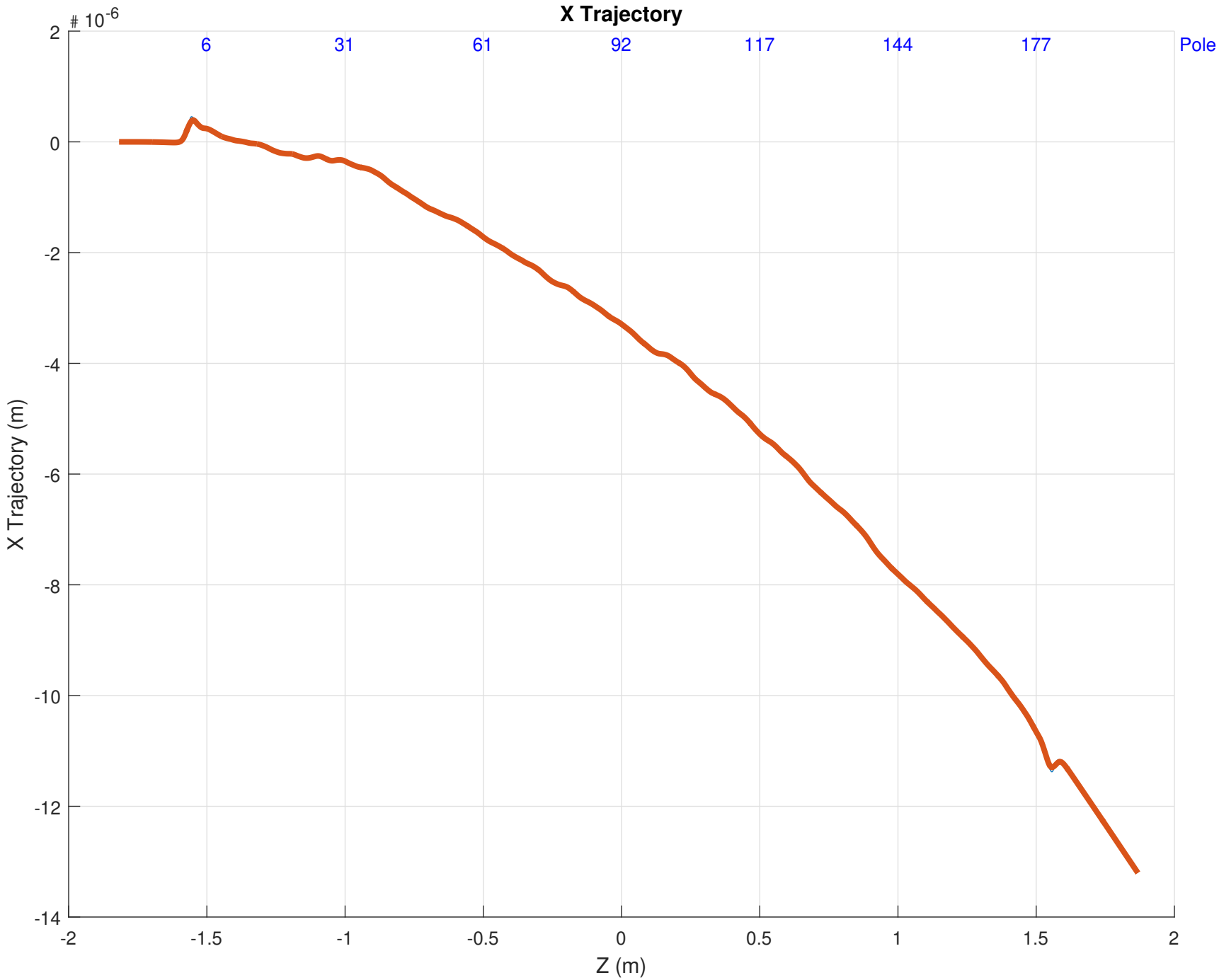

Abs(Fitted Peak By) vs Z, Excluding Ends
6
31
61
92
117
144
172
Pole
Abs(Peak By) (T)
0.1
0.08
0.06
0.04
0.02
0
Peak Fields: Ave = 0.015101 T, RMS = 0.008231 T
-2
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)

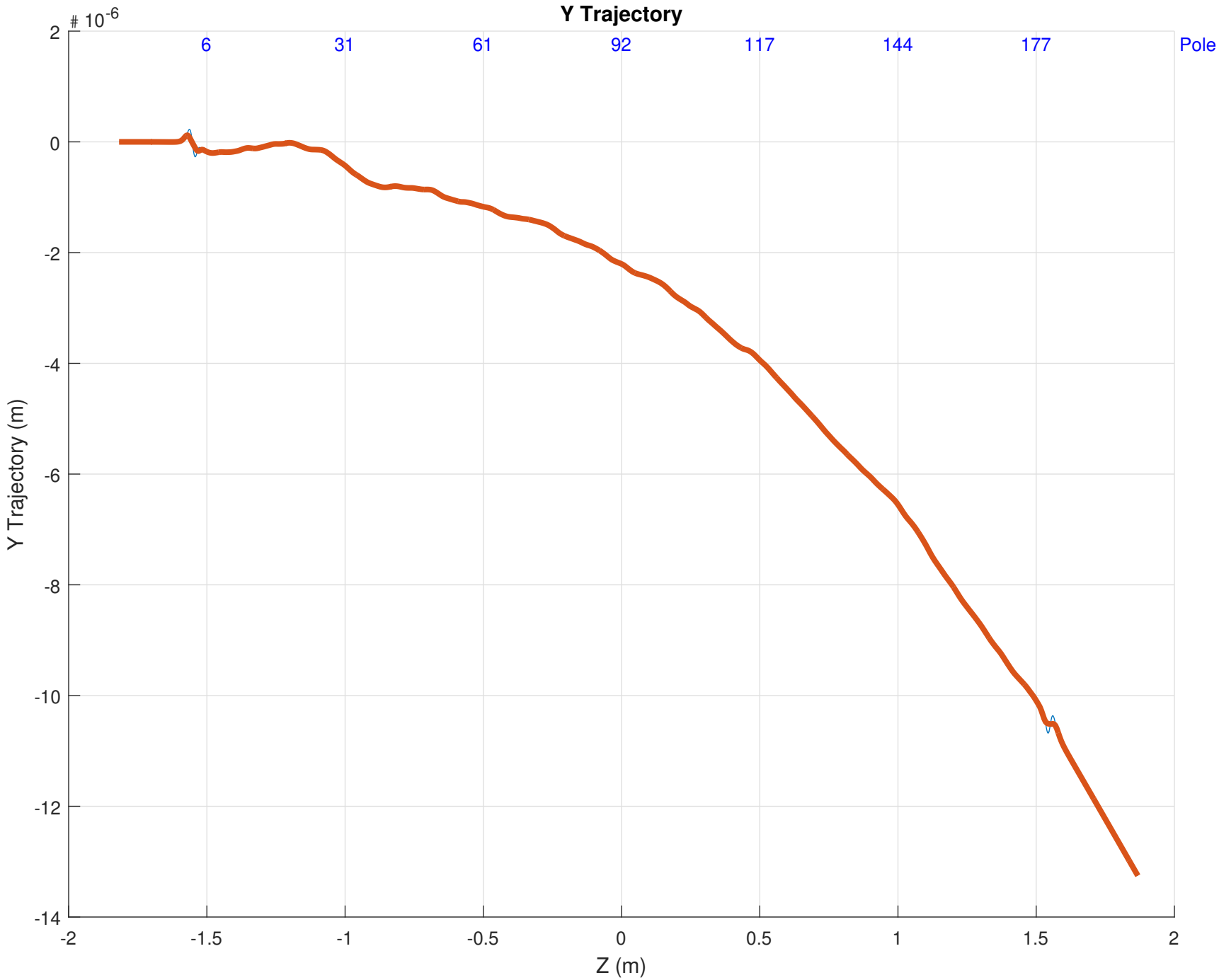

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
Z (m)
6
36
61
88
117
144
172
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.018013 m, RMS = 0.010535 m
Zero Field Spacing: Ave = 0.018076 m, RMS = 0.009467 m

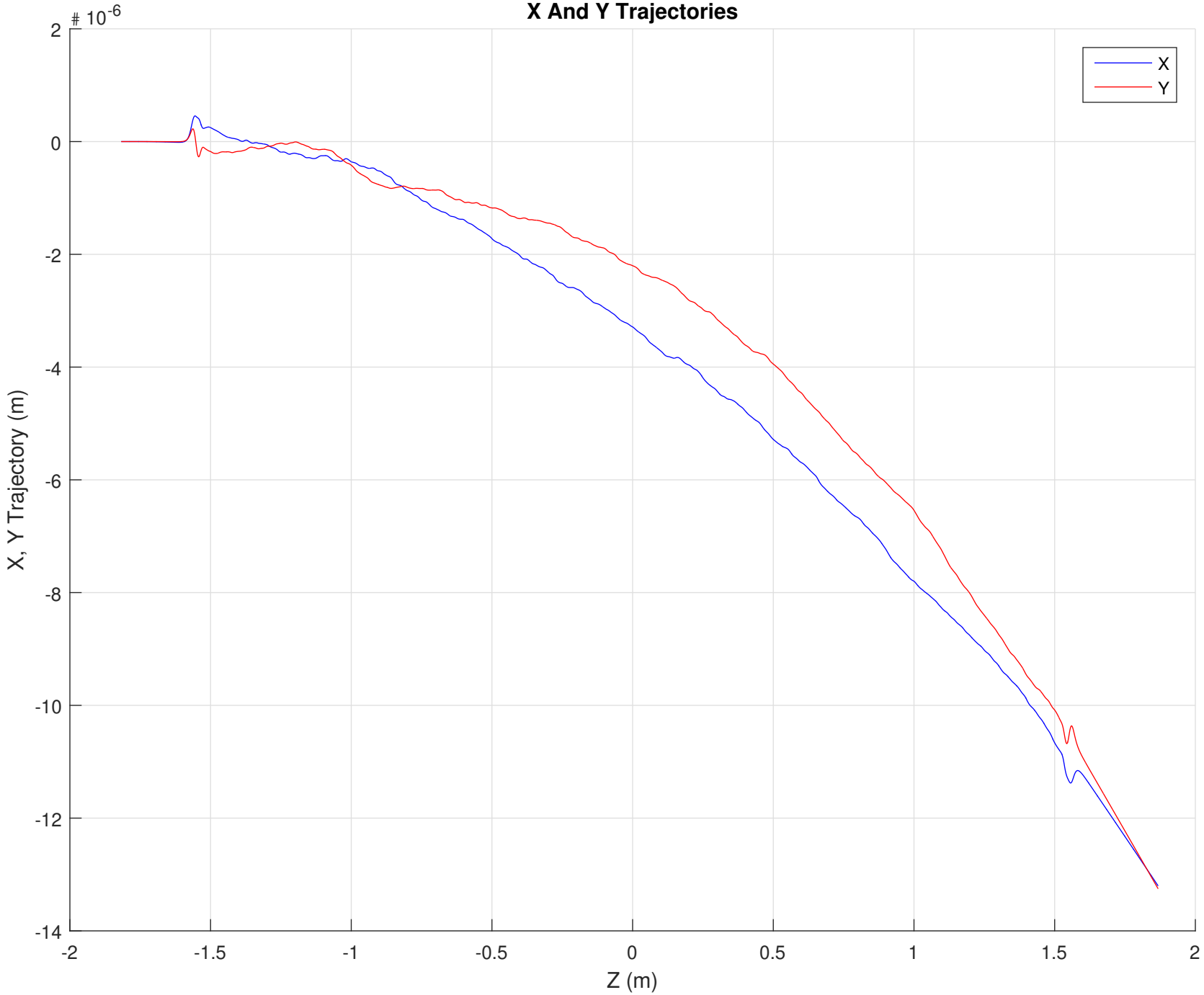

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
Z (m)
6
31
61
92
117
144
172
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.017624 m, RMS = 0.008477 m
Zero Field Spacing: Ave = 0.017632 m, RMS = 0.008257 m

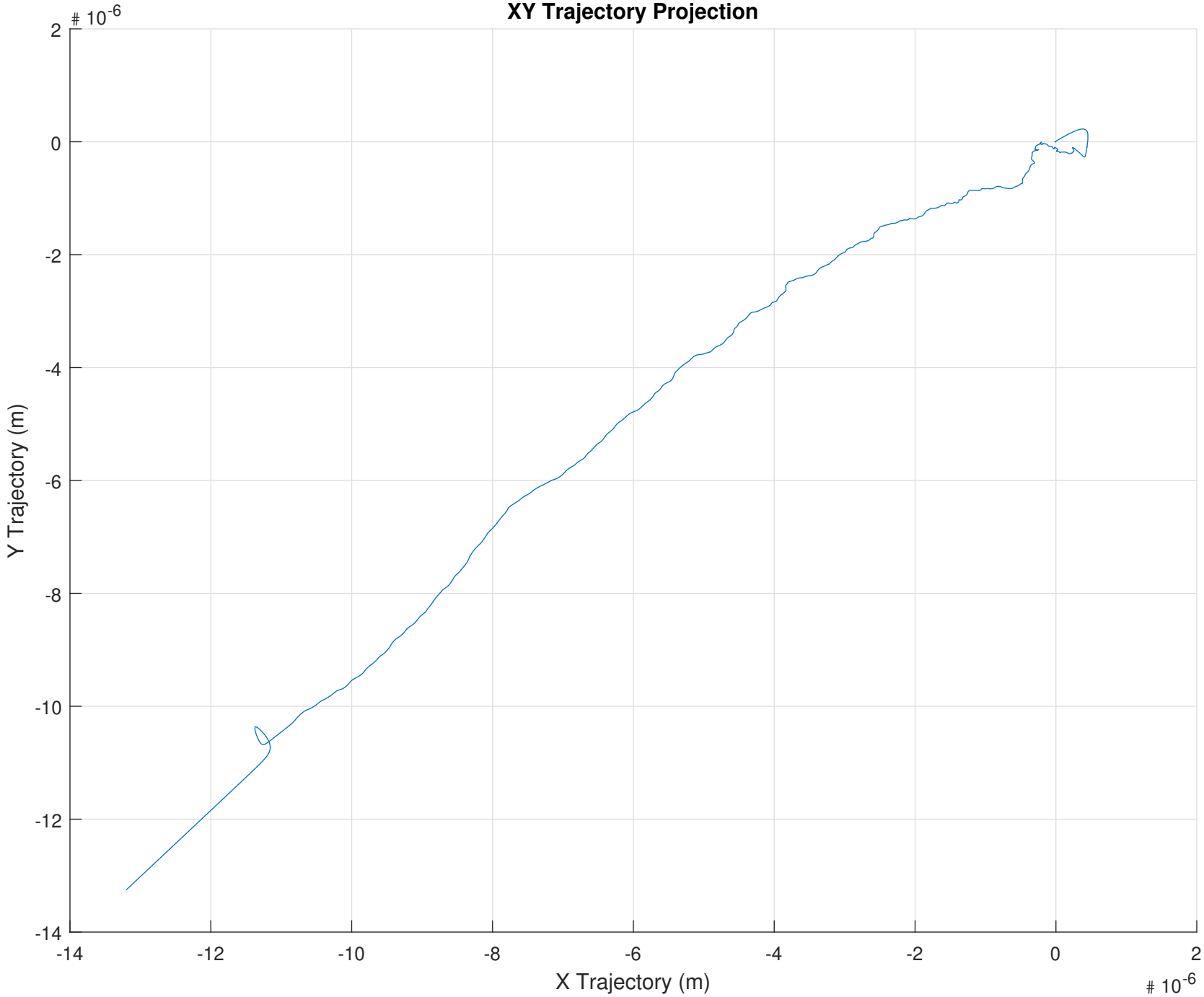

Bx Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^-3
10^-4
10^-5
10^-6
10^-7
0
2
4
6
8
10
12
14
16
18
20

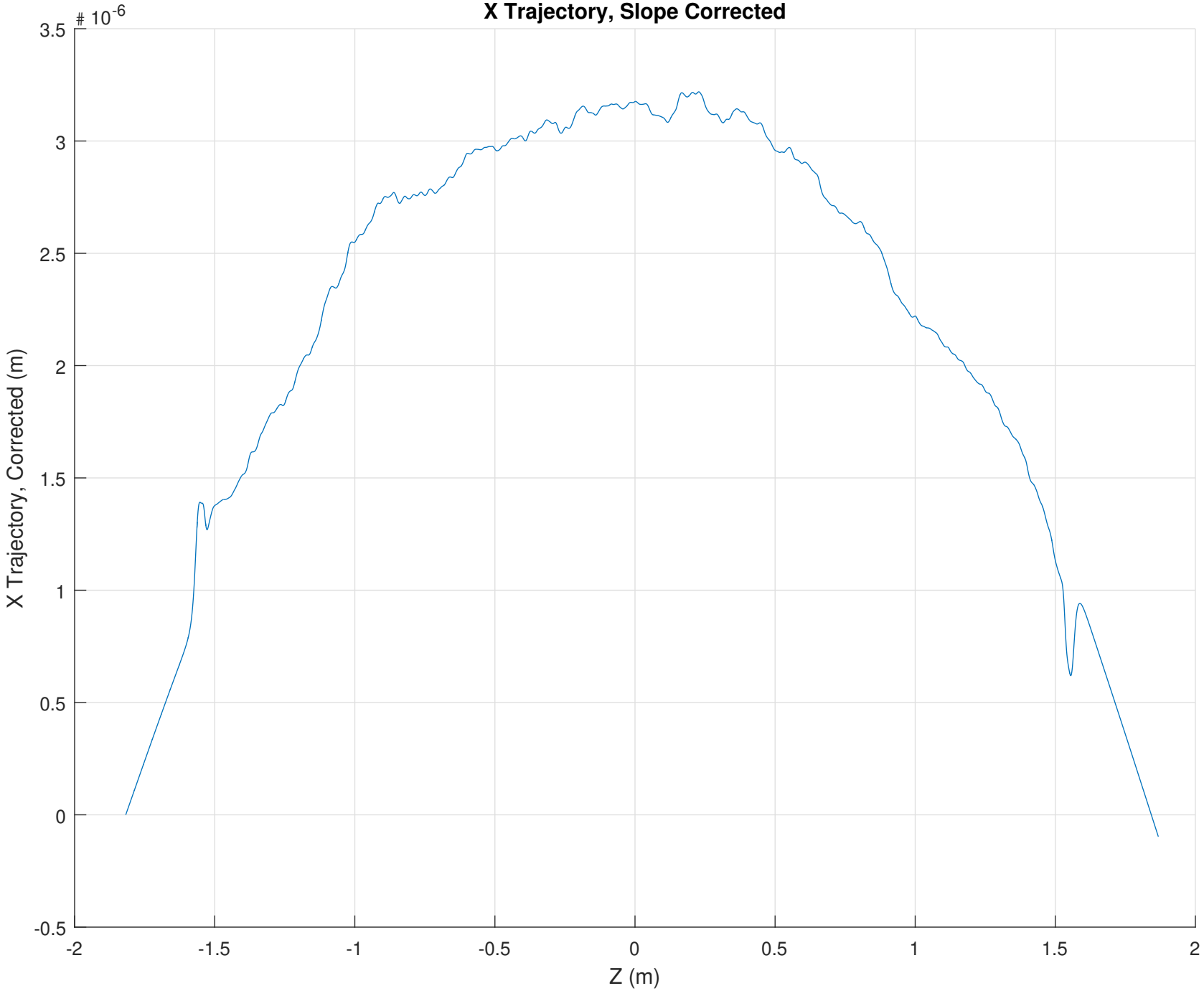

By Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10-2
10-3
10-4
10-5
10-6
10-7
0
2
4
6
8
10
12
14
16
18
20

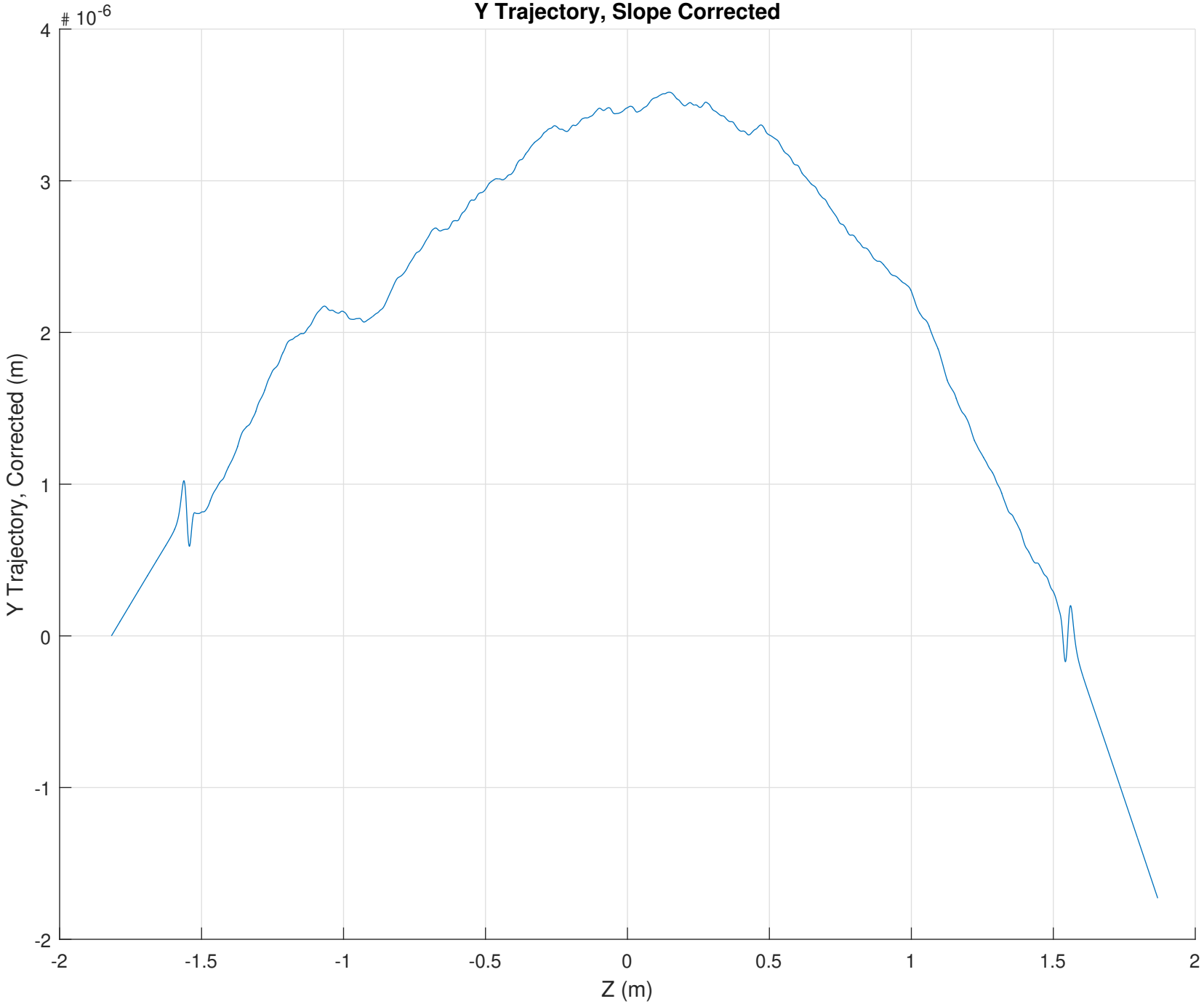

X Trajectory
10-6
6
31
61
92
117
144
177
Pole
2
0
-2
-4
-6
-8
-10
-12
-14
X Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

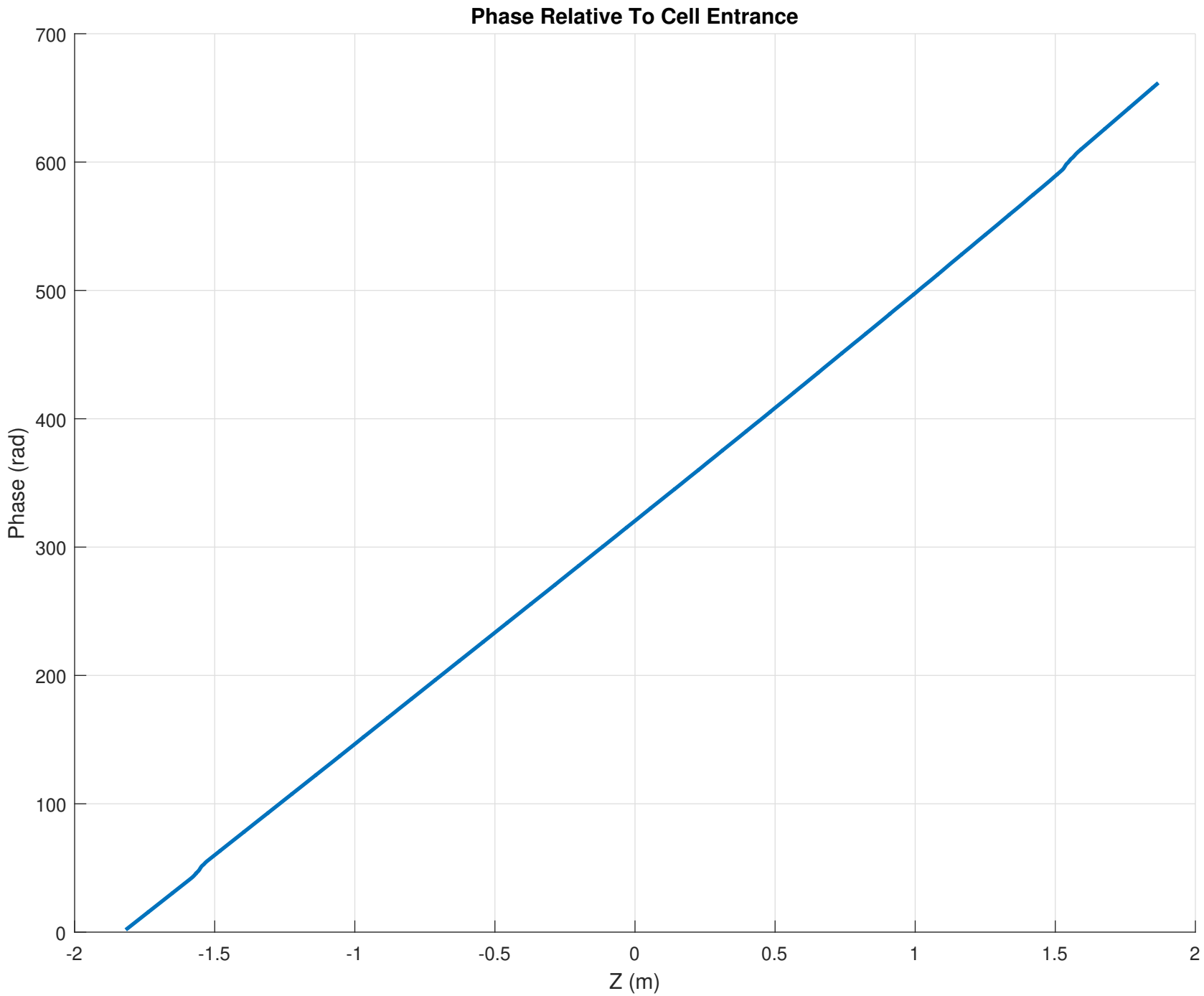

Y Trajectory
10^-6
6
31
61
92
117
144
177
Pole
2
0
-2
-4
-6
-8
-10
-12
-14
Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

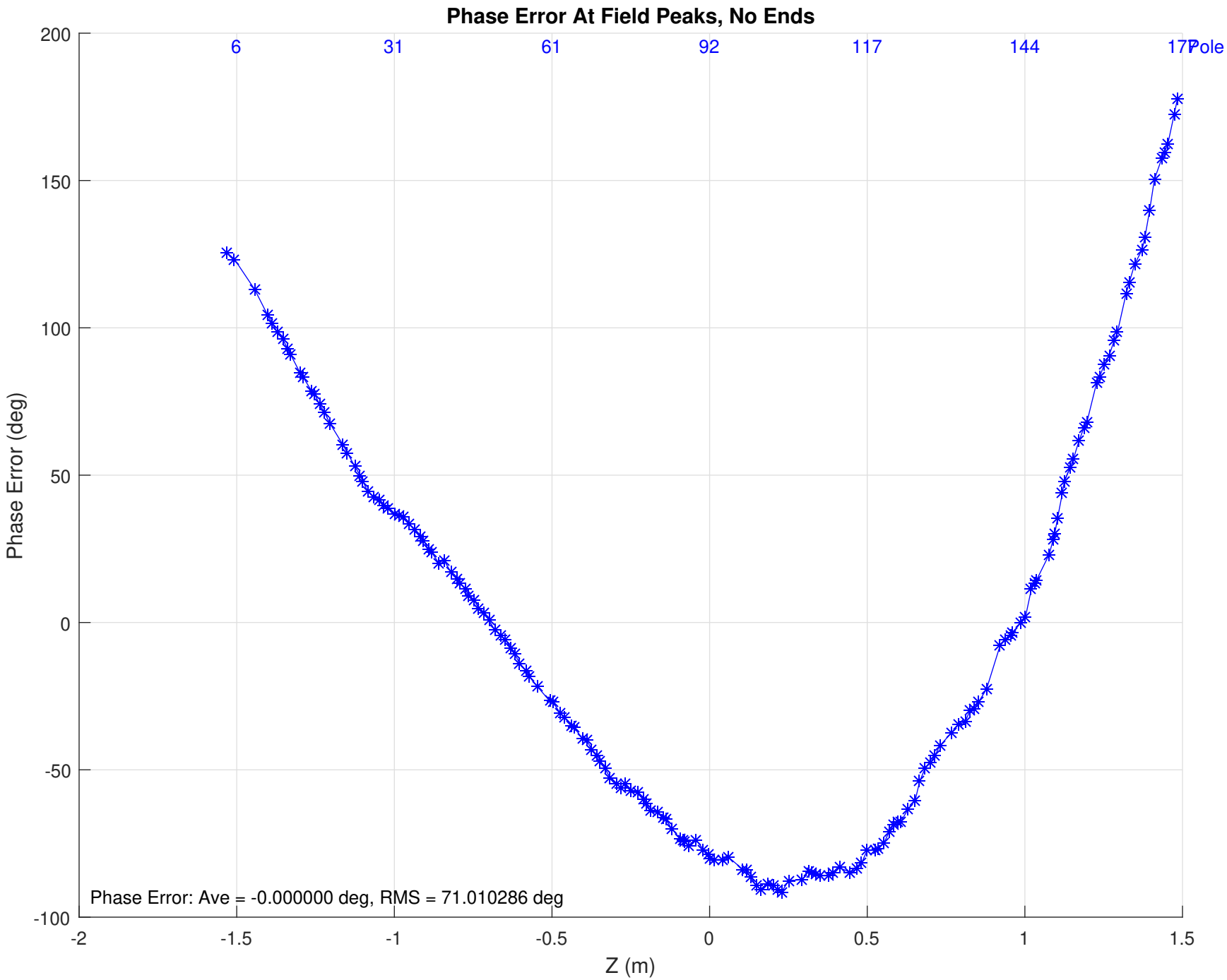

X And Y Trajectories
10^-6
2
0
-2
-4
-6
-8
-10
-12
-14
X, Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
X
Y

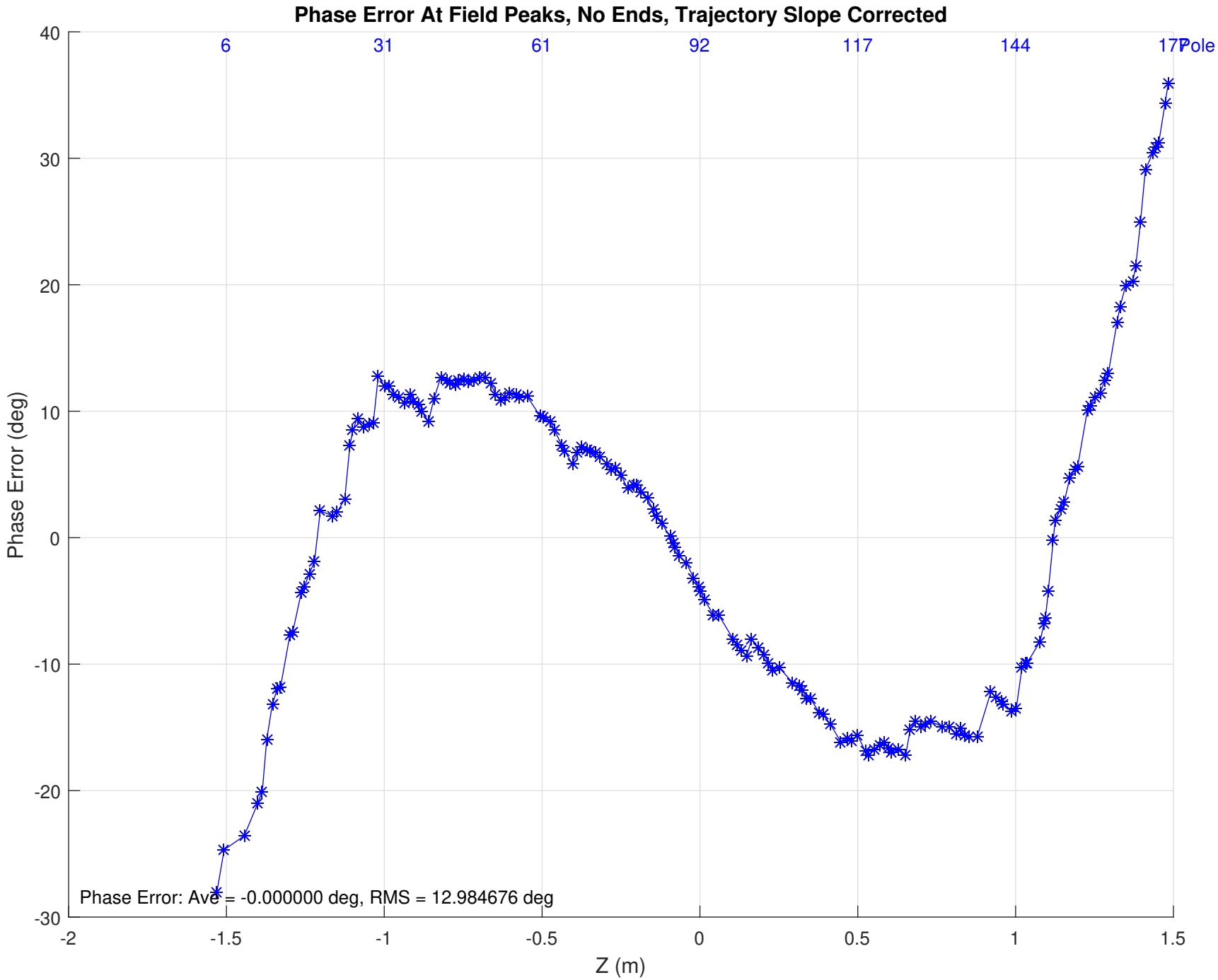

XY Trajectory Projection
10-6
2
0
-2
-4
-6
-8
-10
-12
-14
Y Trajectory (m)
-14
-12
-10
-8
-6
-4
-2
0
2
X Trajectory (m)
10-6

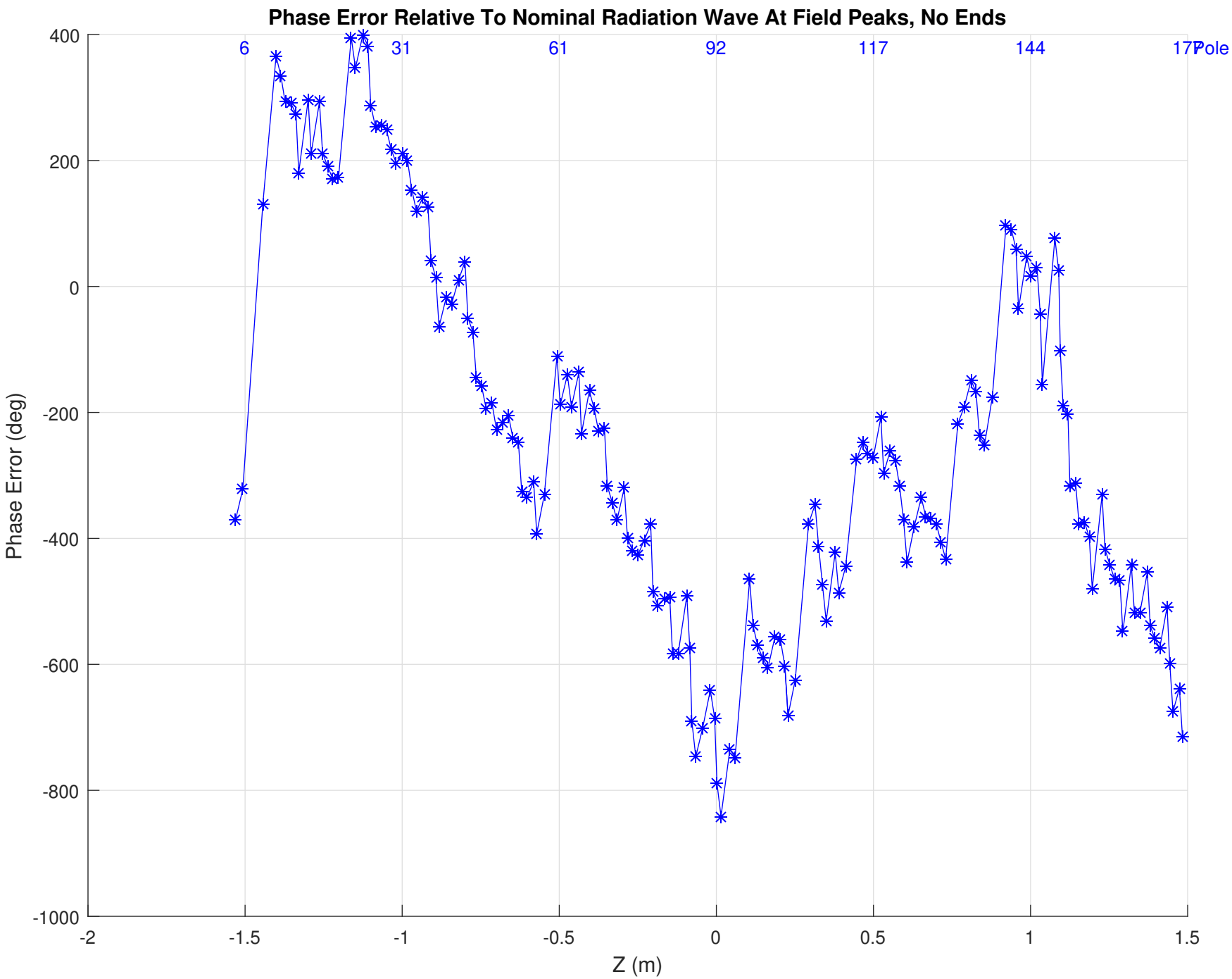

X Trajectory, Slope Corrected
10^-6
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
X Trajectory, Corrected (m)
Z (m)

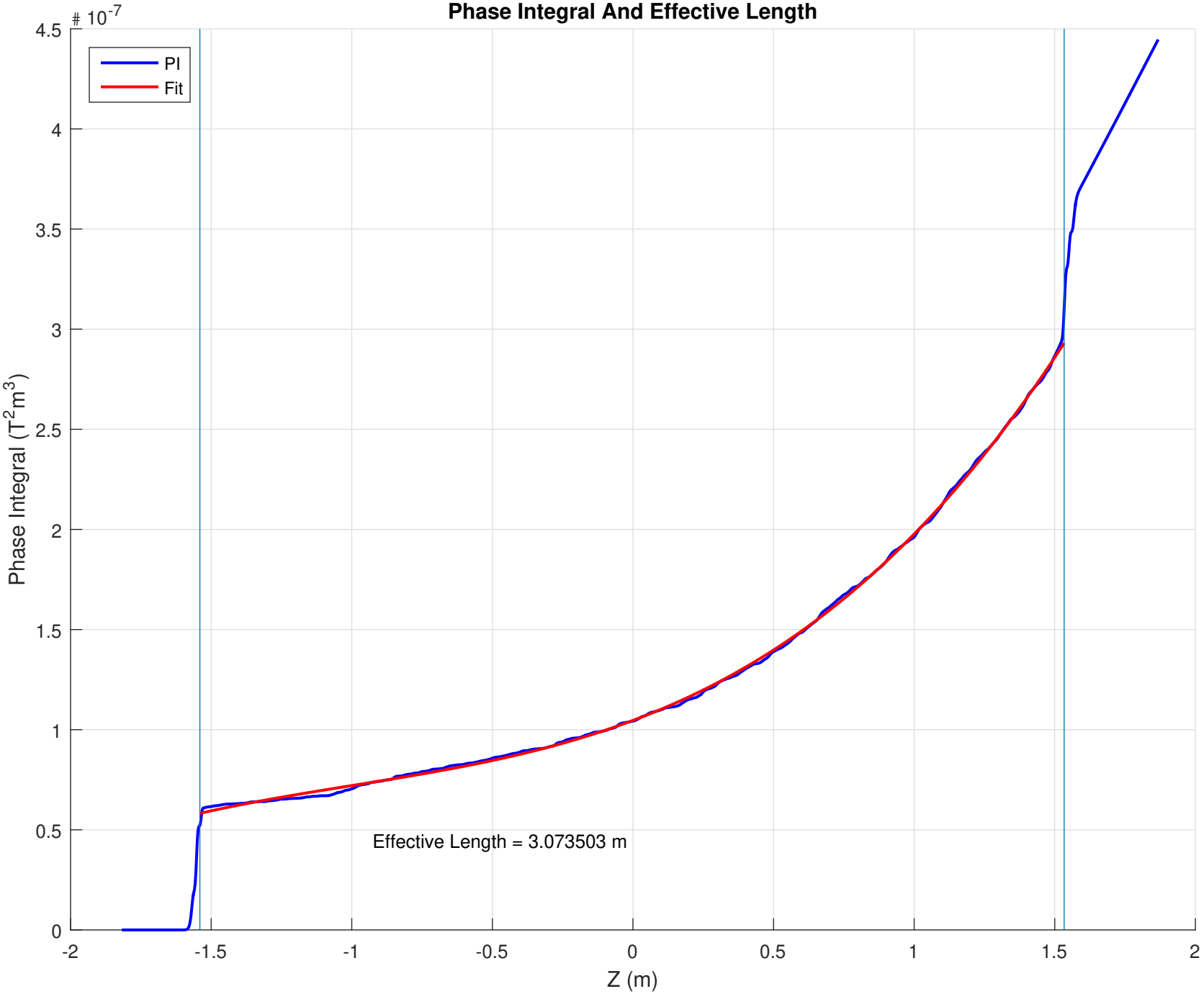

Y Trajectory, Slope Corrected
10^-6
4
3
2
1
0
-1
-2
Y Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

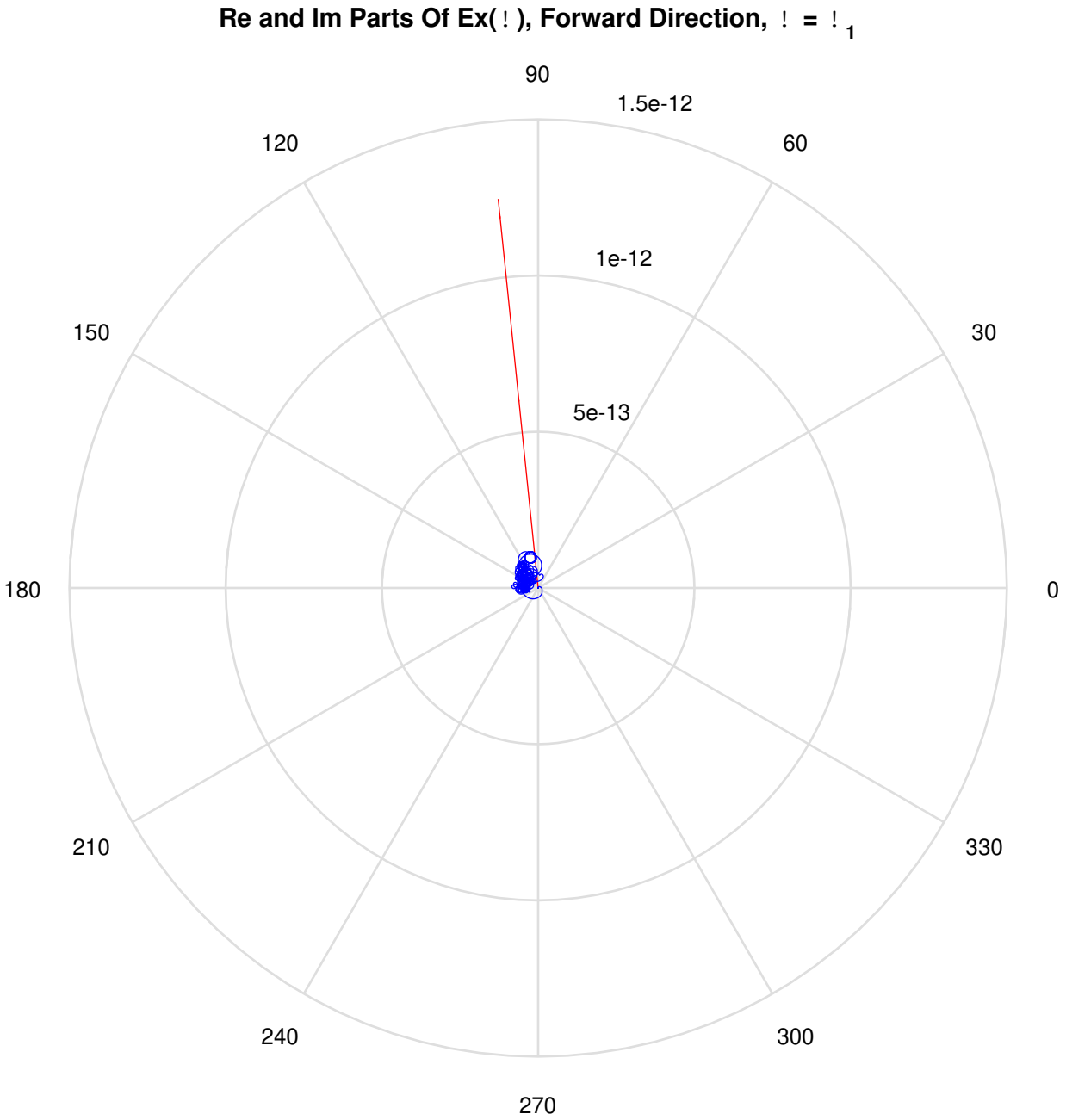

Phase Relative To Cell Entrance
Phase (rad)
Z (m)
700
600
500
400
300
200
100
0
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2

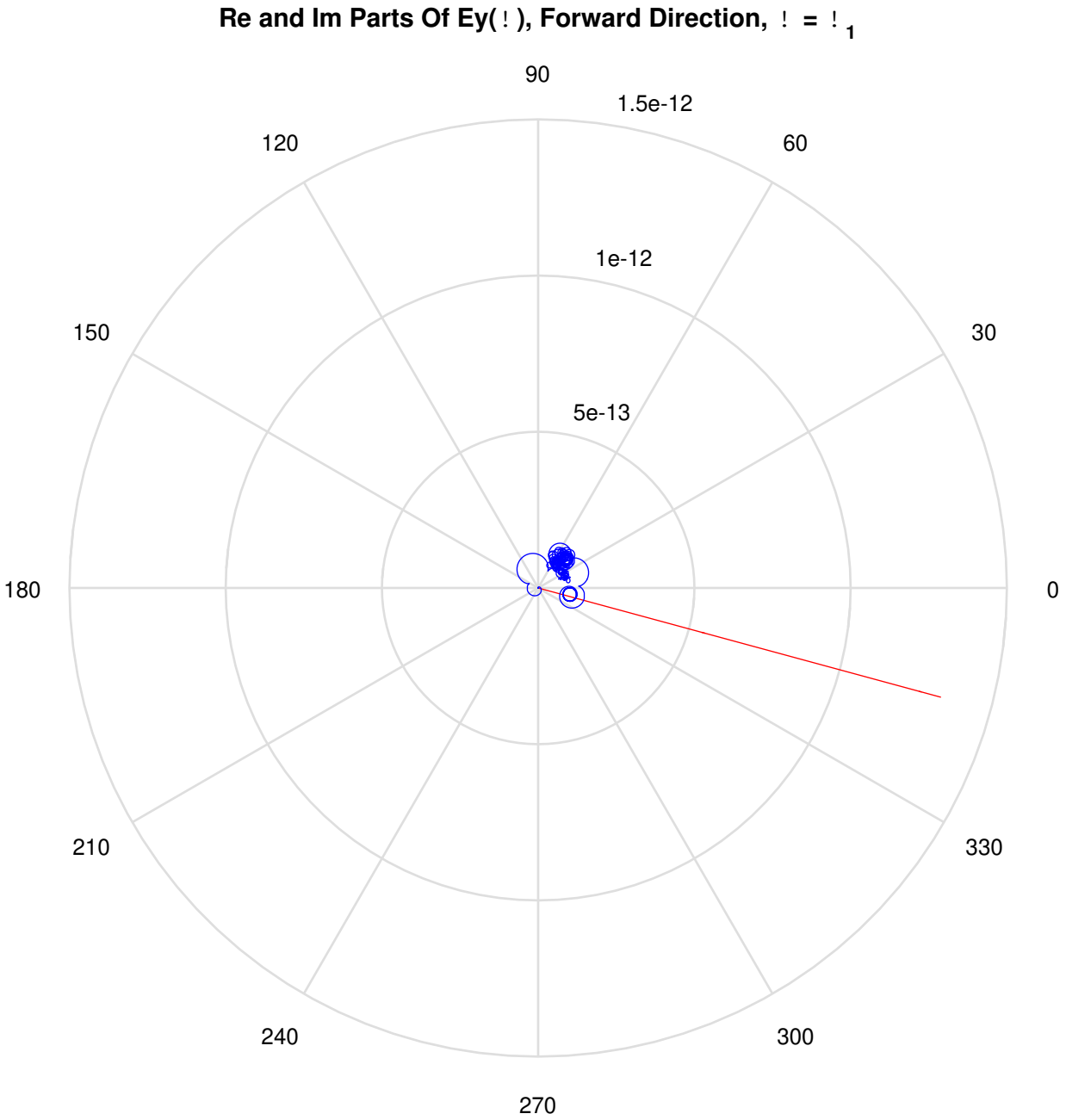

Phase Error At Field Peaks, No Ends
6
31
61
92
117
144
171
Pole
200
150
100
50
0
-50
-100
Phase Error (deg)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)
Phase Error: Ave = -0.000000 deg, RMS = 71.010286 deg

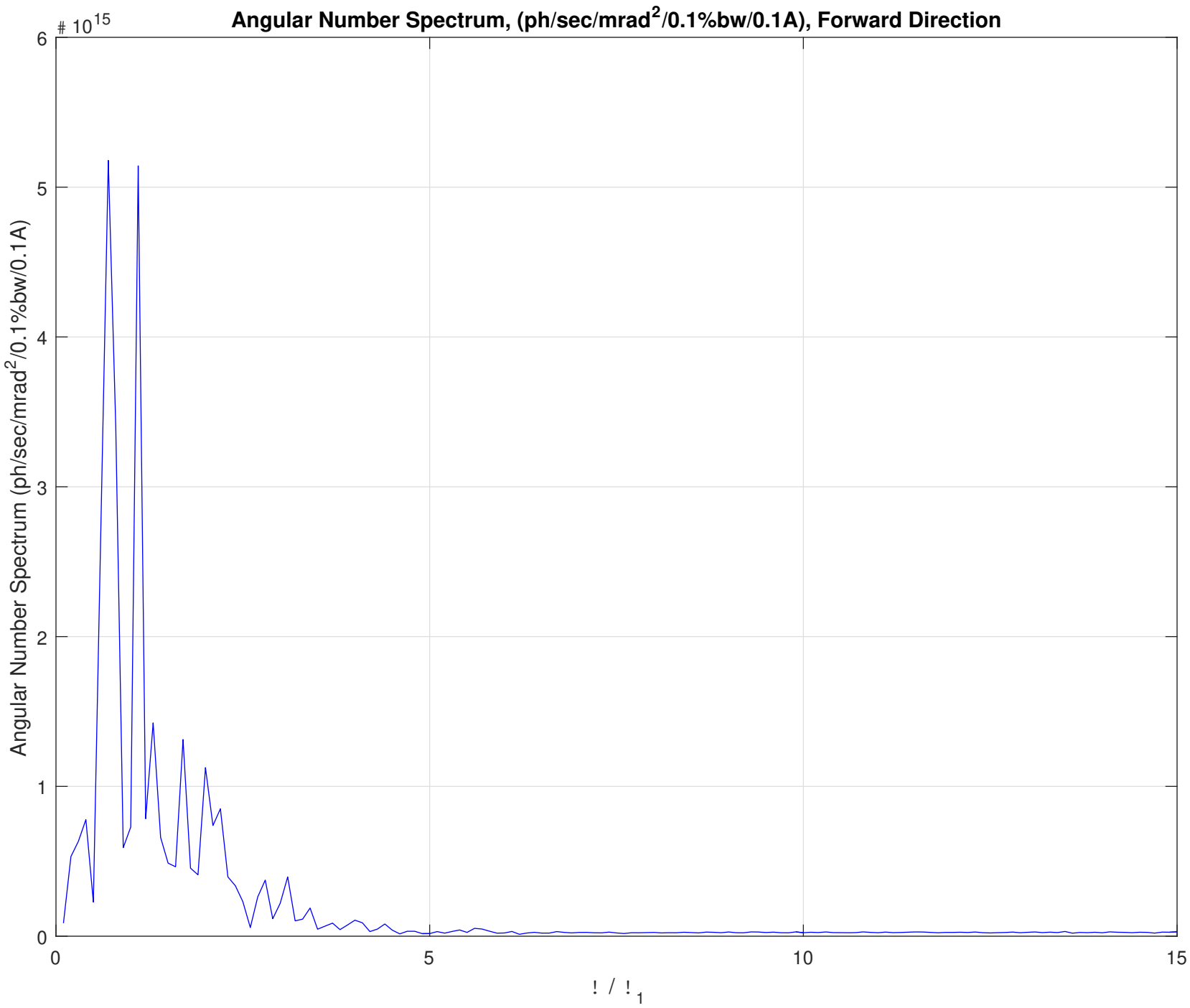

Phase Error At Field Peaks, No Ends, Trajectory Slope Corrected
6
31
61
92
117
144
171
Pole
40
30
20
10
0
-10
-20
-30
Phase Error (deg)
Phase Error: Ave = -0.000000 deg, RMS = 12.984676 deg
-2
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)

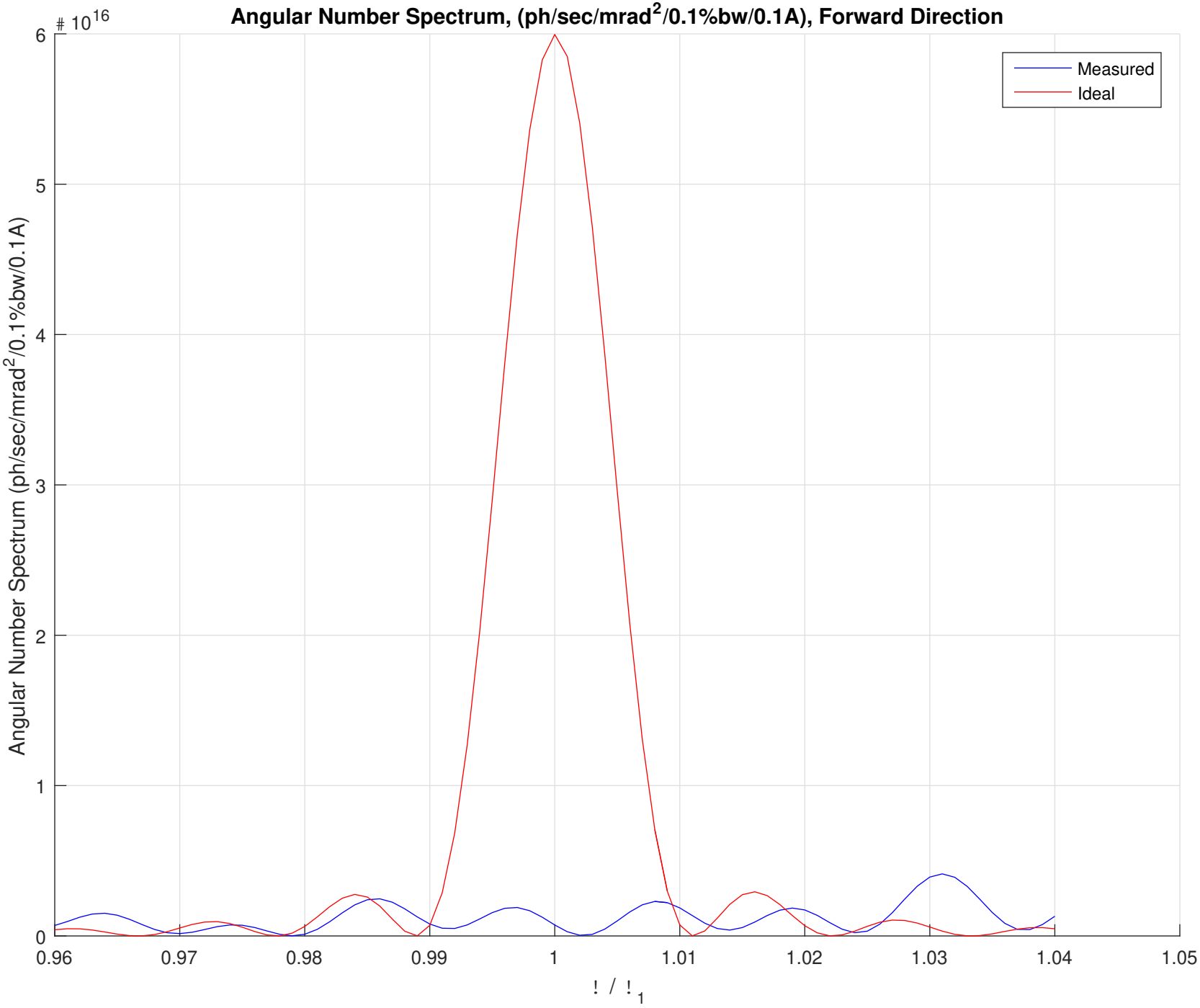

Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
6
31
61
92
117
144
172
Pole
400
200
0
-200
-400
-600
-800
-1000
Phase Error (deg)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)

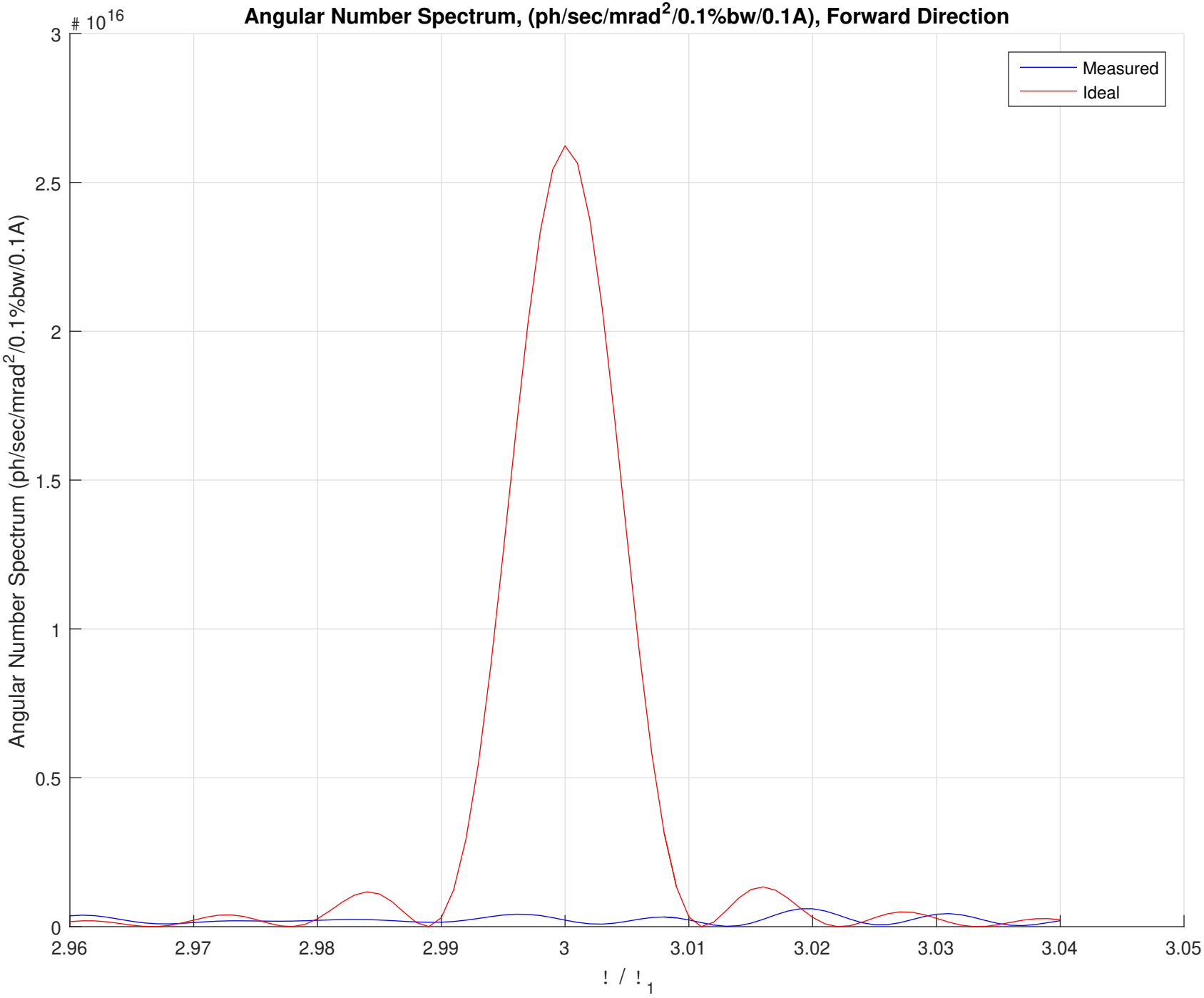

Phase Integral And Effective Length
10^-7
PI
Fit
Phase Integral (T^2m^3)
Z (m)
Effective Length = 3.073503 m
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2

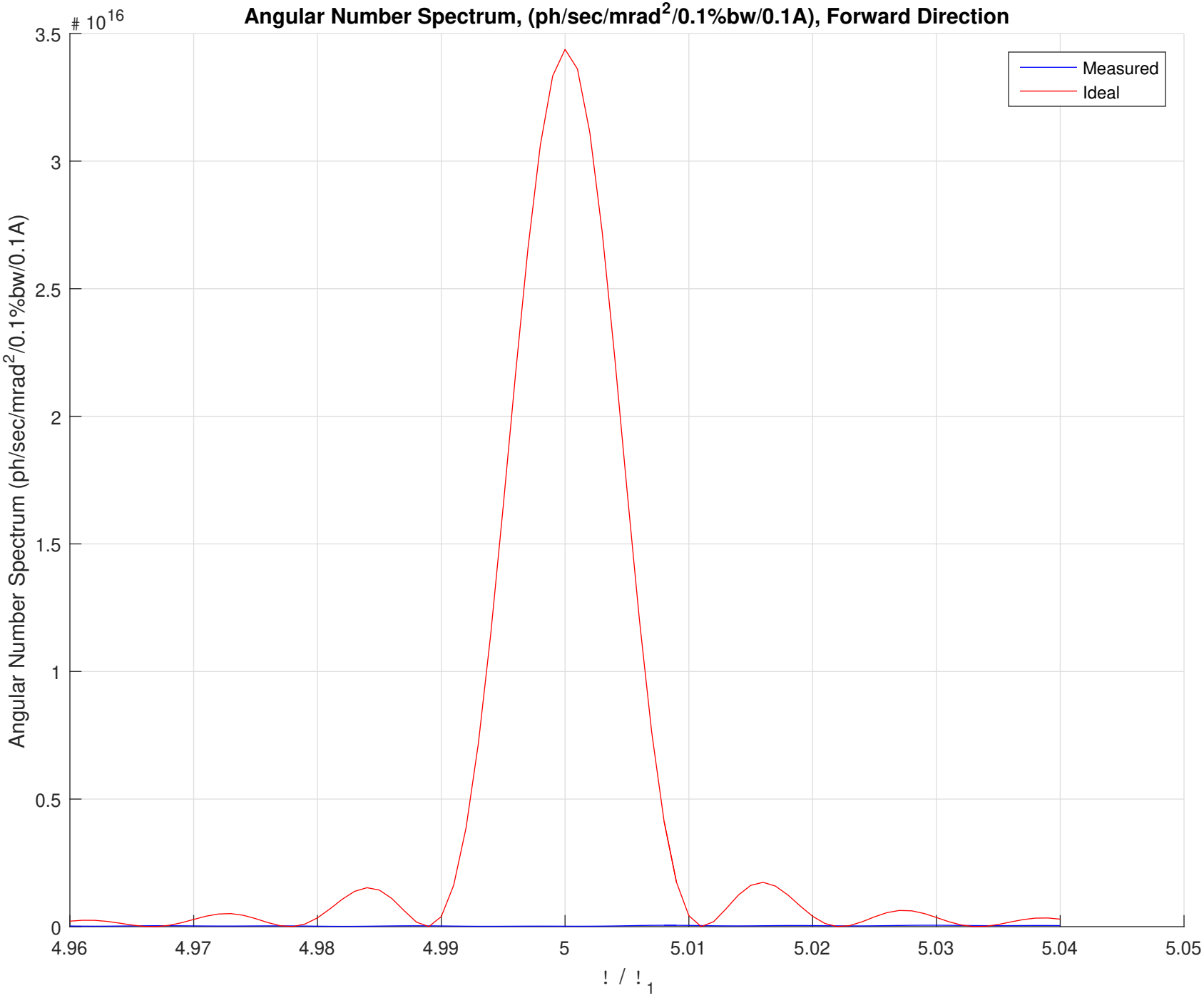

Re and Im Parts Of Ex(!), Forward Direction, ! = !1
90
1.5e-12
120
60
1e-12
150
30
5e-13
180
0
210
330
240
300
270


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


Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{15}
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
0
1
2
3
4
5
6
0
5
10
15
! / $!_1$


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)
0
1
2
3
4
5
6
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)
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}
3.5
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
! / !$_1$
Measured
Ideal