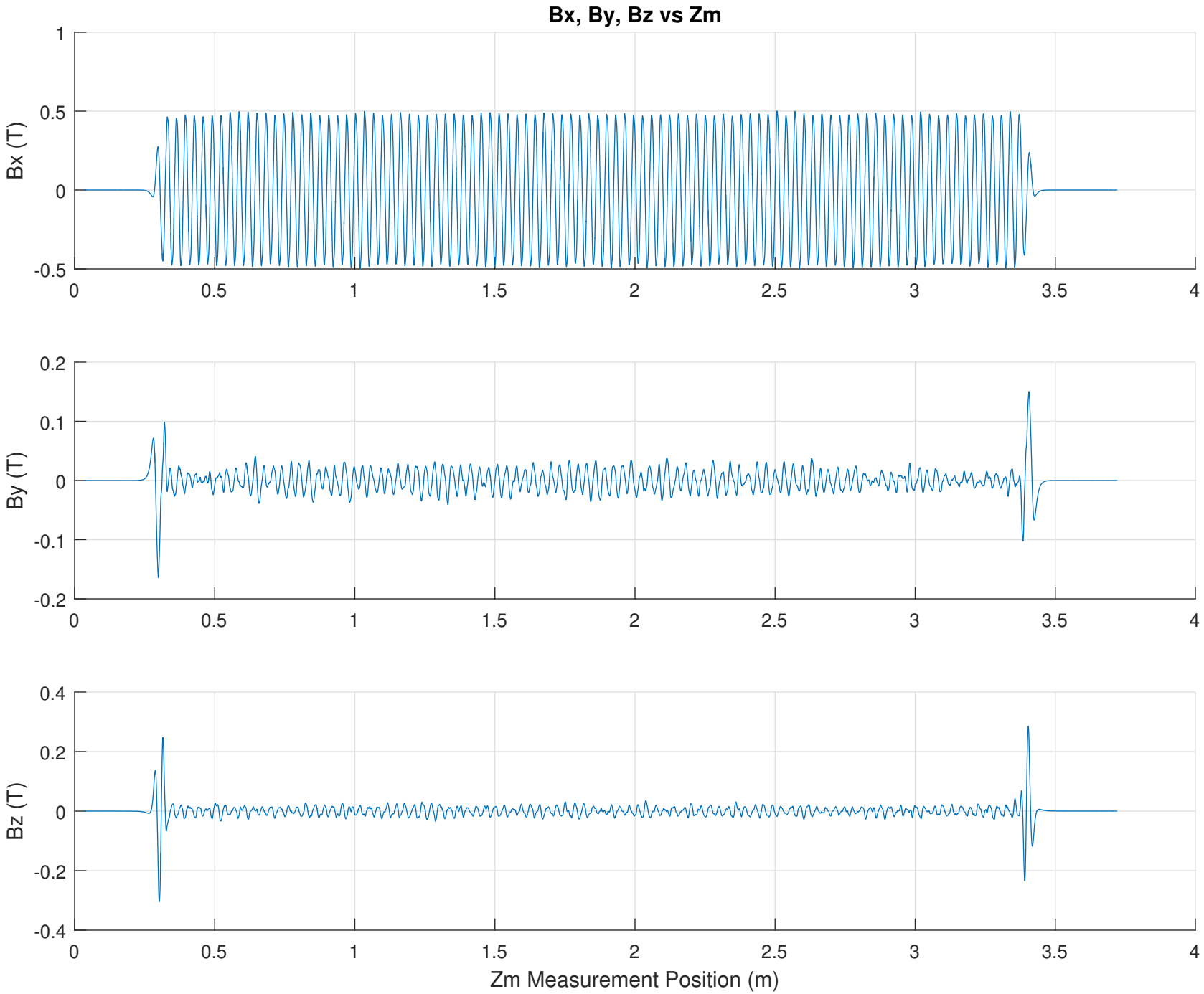
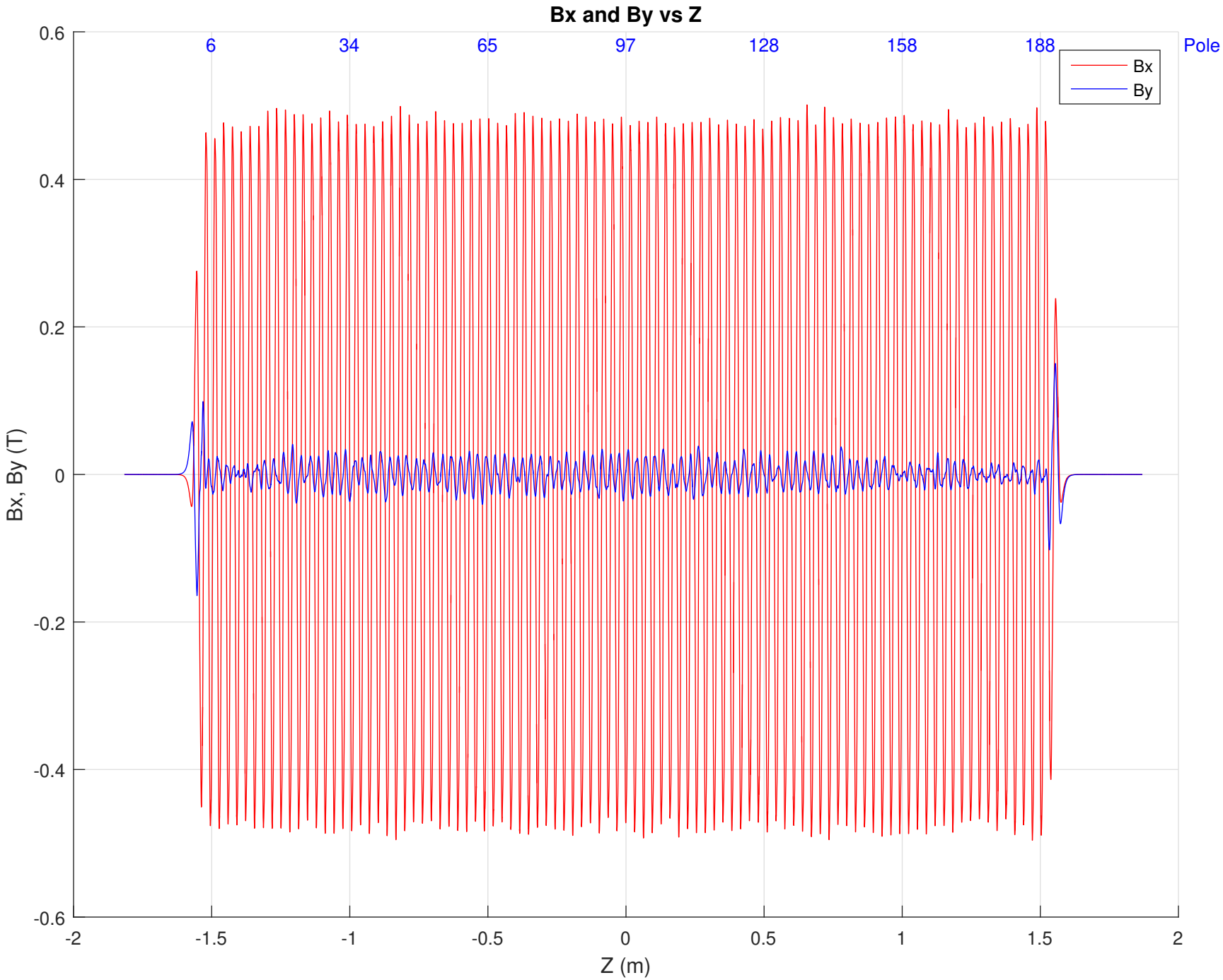
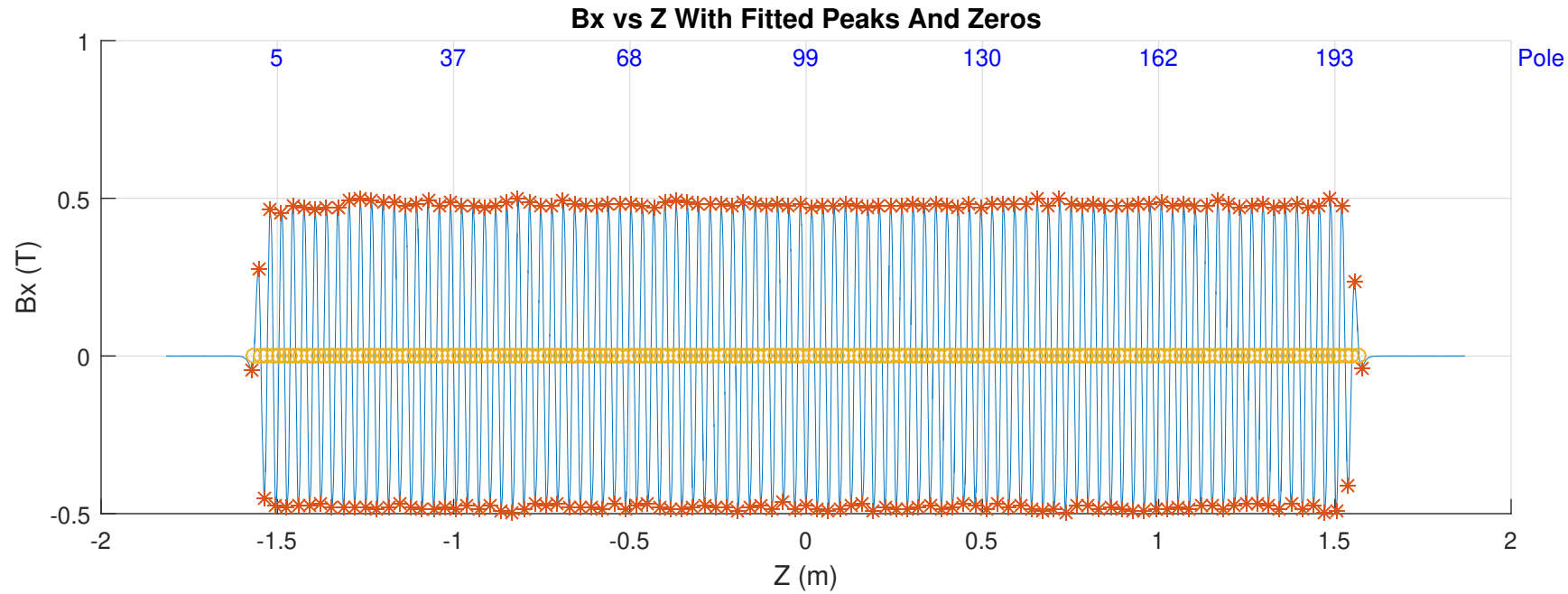
SLAC Magnetic Measurements

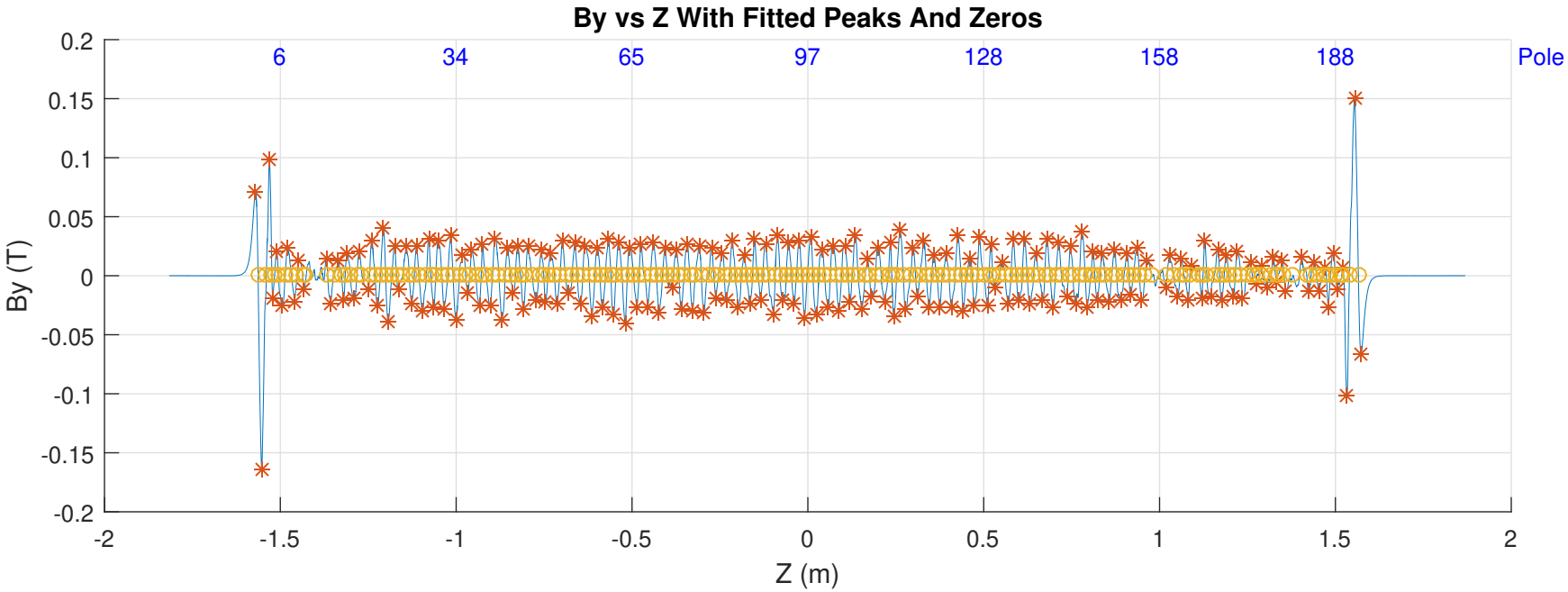
EPU Analysis

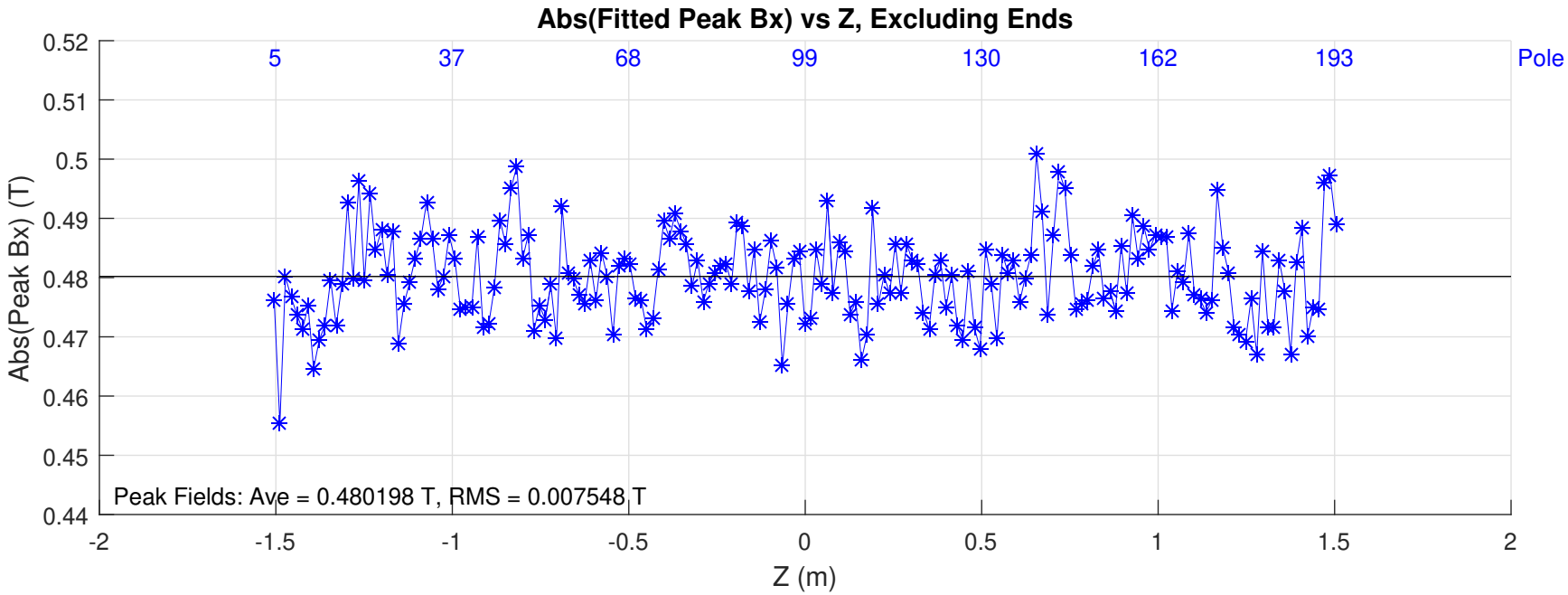
Parameters:
INPUT-FILE-DIR =V:\MET\MagServe\MagData\DELTA\Delta Data 2015\New Measurements\Run 142 Repeat 2014 Meas With New
INPUT-FILE-NAME =hall2-anal-probe2-field.dat
INPUT-FILE-TYPE =ZBXYZH
CORR-REQUIRED =0
GAMMA =26671.59
NOM-LAMBDA-U =0
NOM-K-VALUE =0
NOM-LAMBDA-R =0
NUM-POLES =196
NUM-END-POLES =4
CELL-LENGTH =3.656

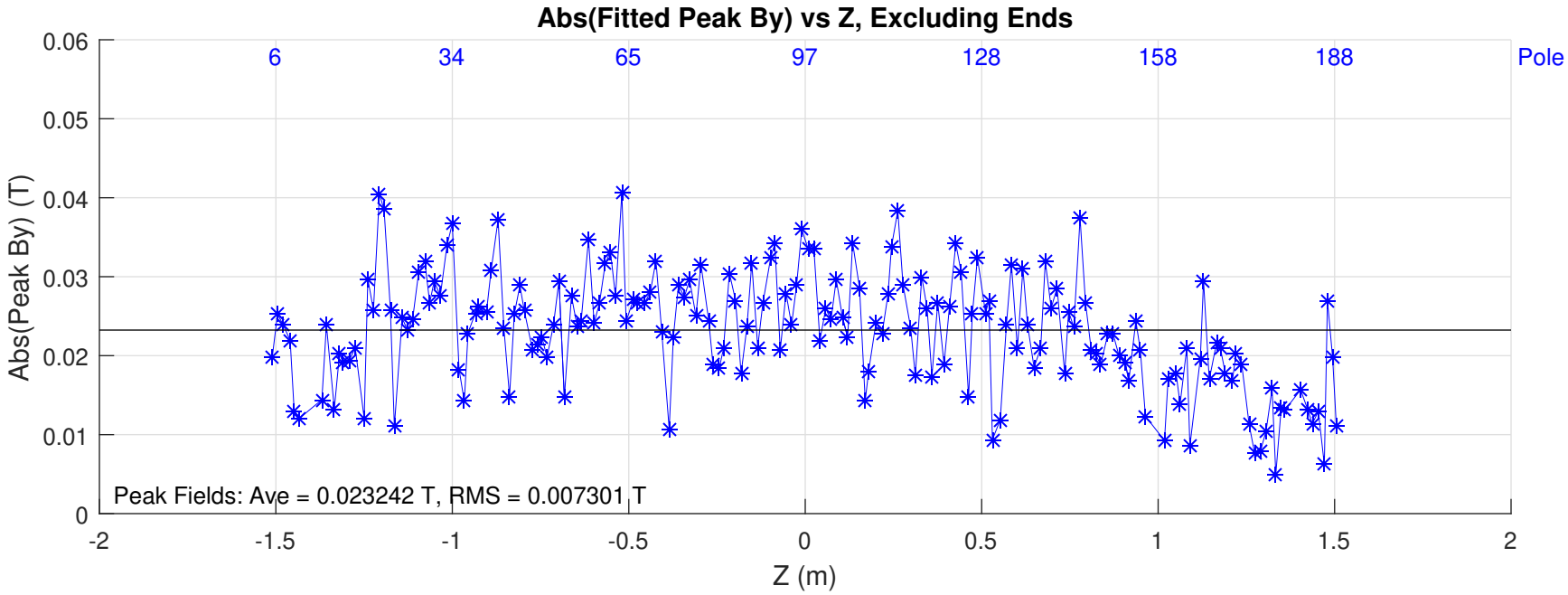

Bx, By, Bz vs Zm
Bx (T)
By (T)
Bz (T)
Zm Measurement Position (m)
1
0.5
0
-0.5
0.2
0.1
-0.1
-0.2
0.4
-0.4
0
0.5
1
1.5
2
2.5
3
3.5
4

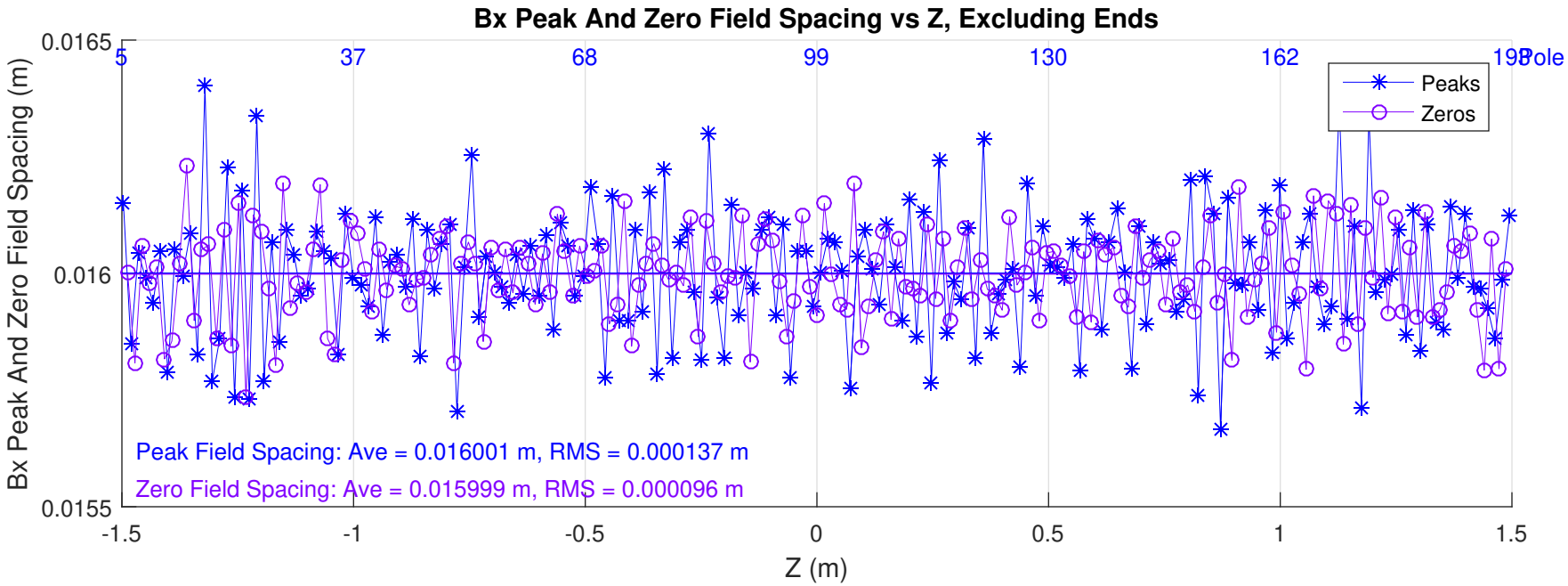

Bx and By vs Z
6
34
65
97
128
158
188
Pole
Bx
By
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
Bx, By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

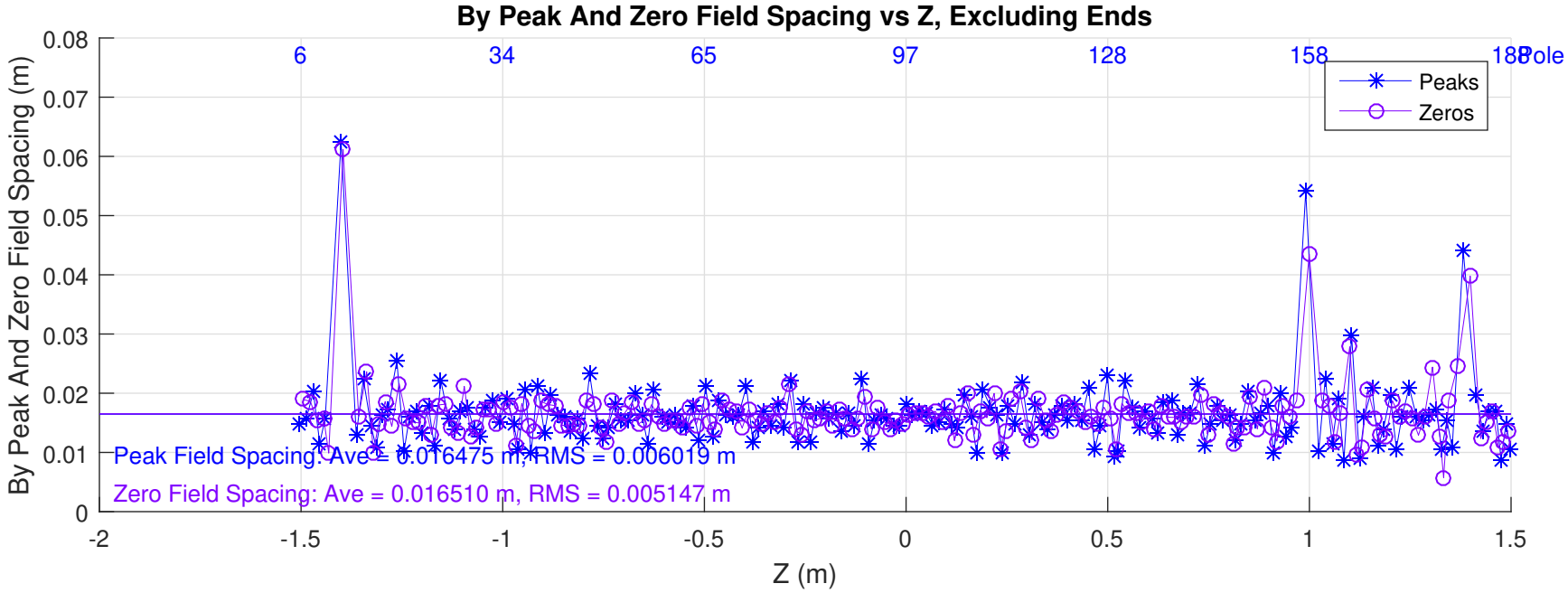

Bx vs Z With Fitted Peaks And Zeros
5
37
68
99
130
162
193
Pole
1
0.5
0
-0.5
Bx (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

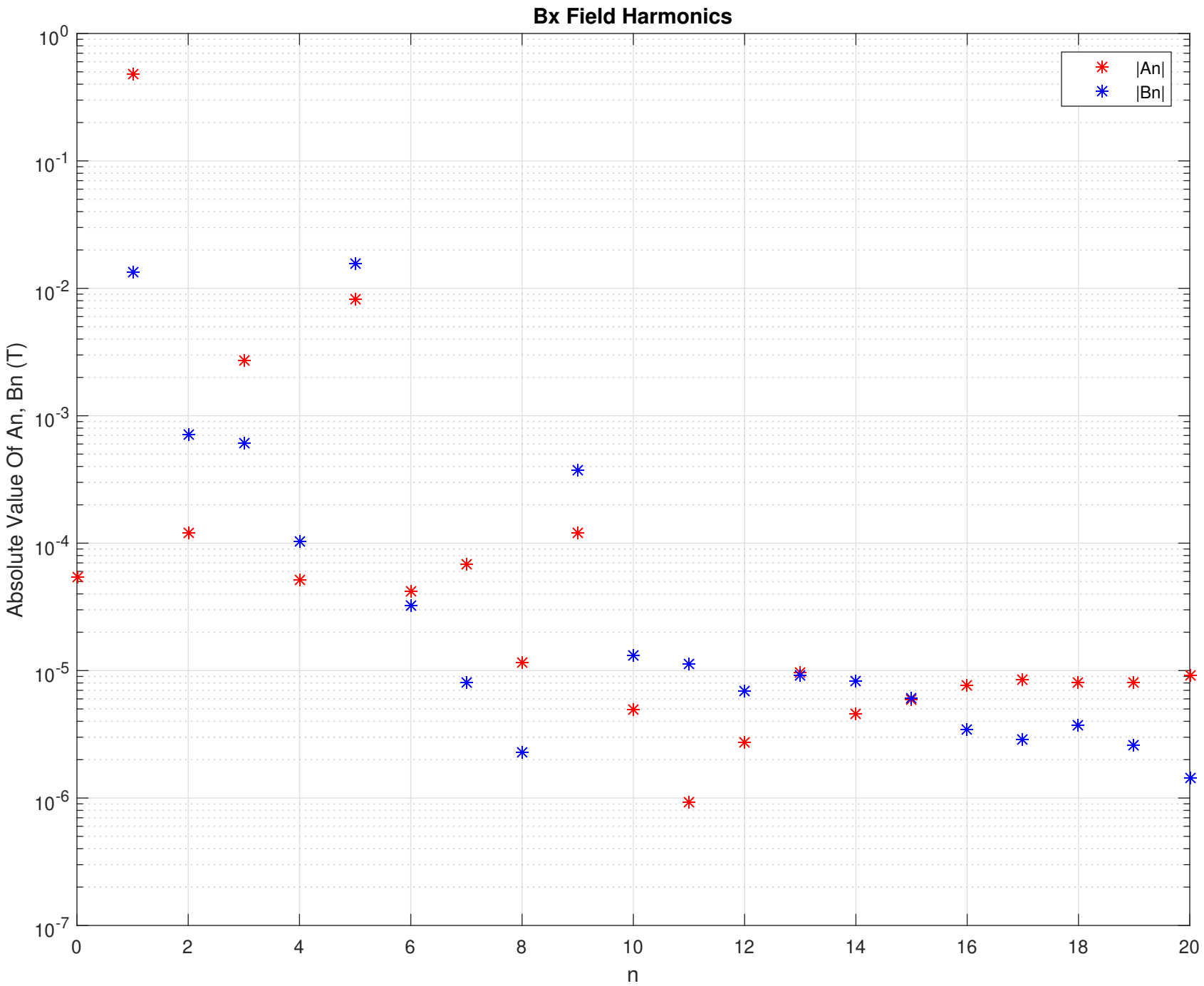

By vs Z With Fitted Peaks And Zeros
6
34
65
97
128
158
188
Pole
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

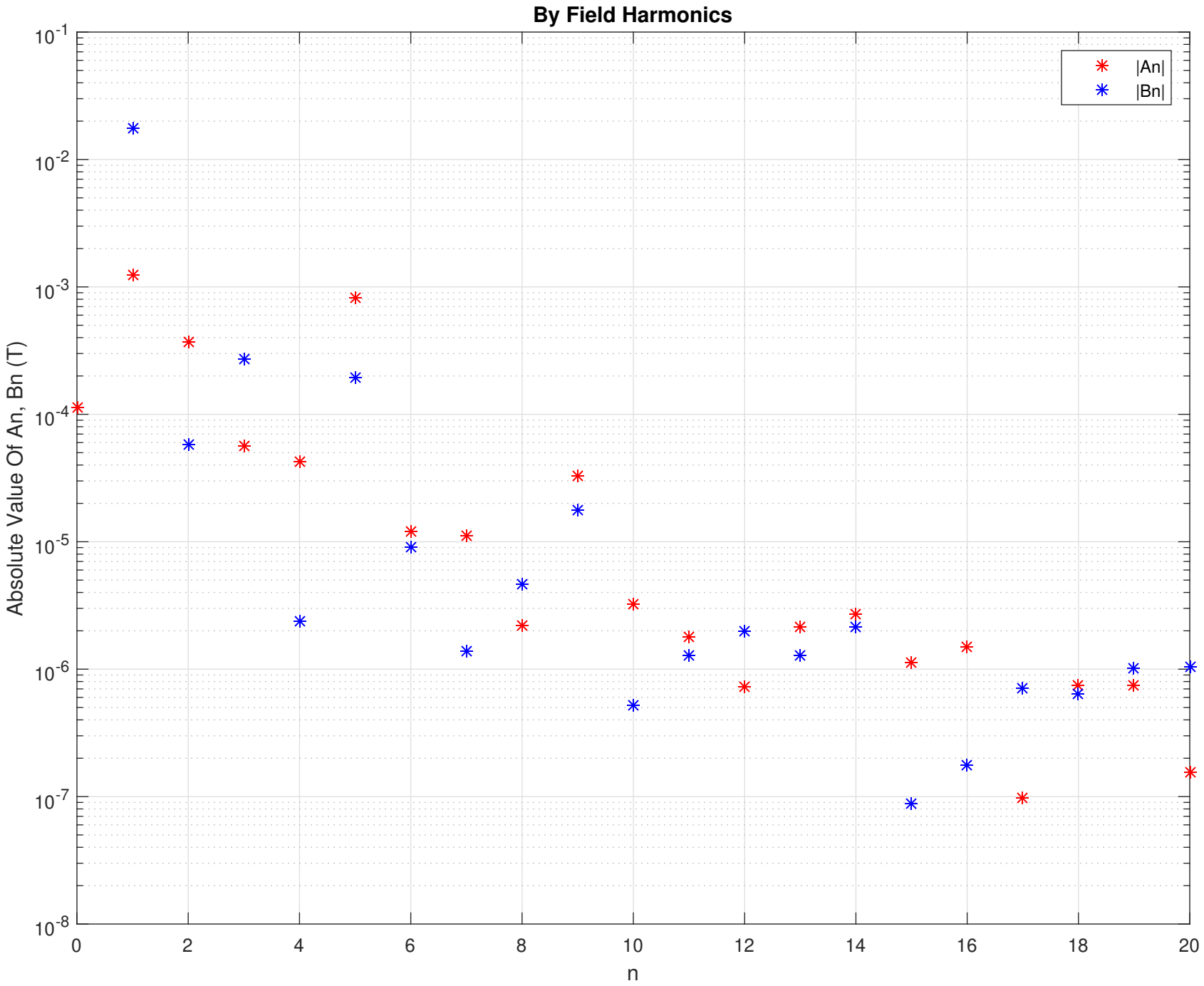

Abs(Fitted Peak Bx) vs Z, Excluding Ends
5
37
68
99
130
162
193
Pole
0.52
0.51
0.5
0.49
0.48
0.47
0.46
0.45
0.44
Abs(Peak Bx) (T)
Peak Fields: Ave = 0.480198 T, RMS = 0.007548 T
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

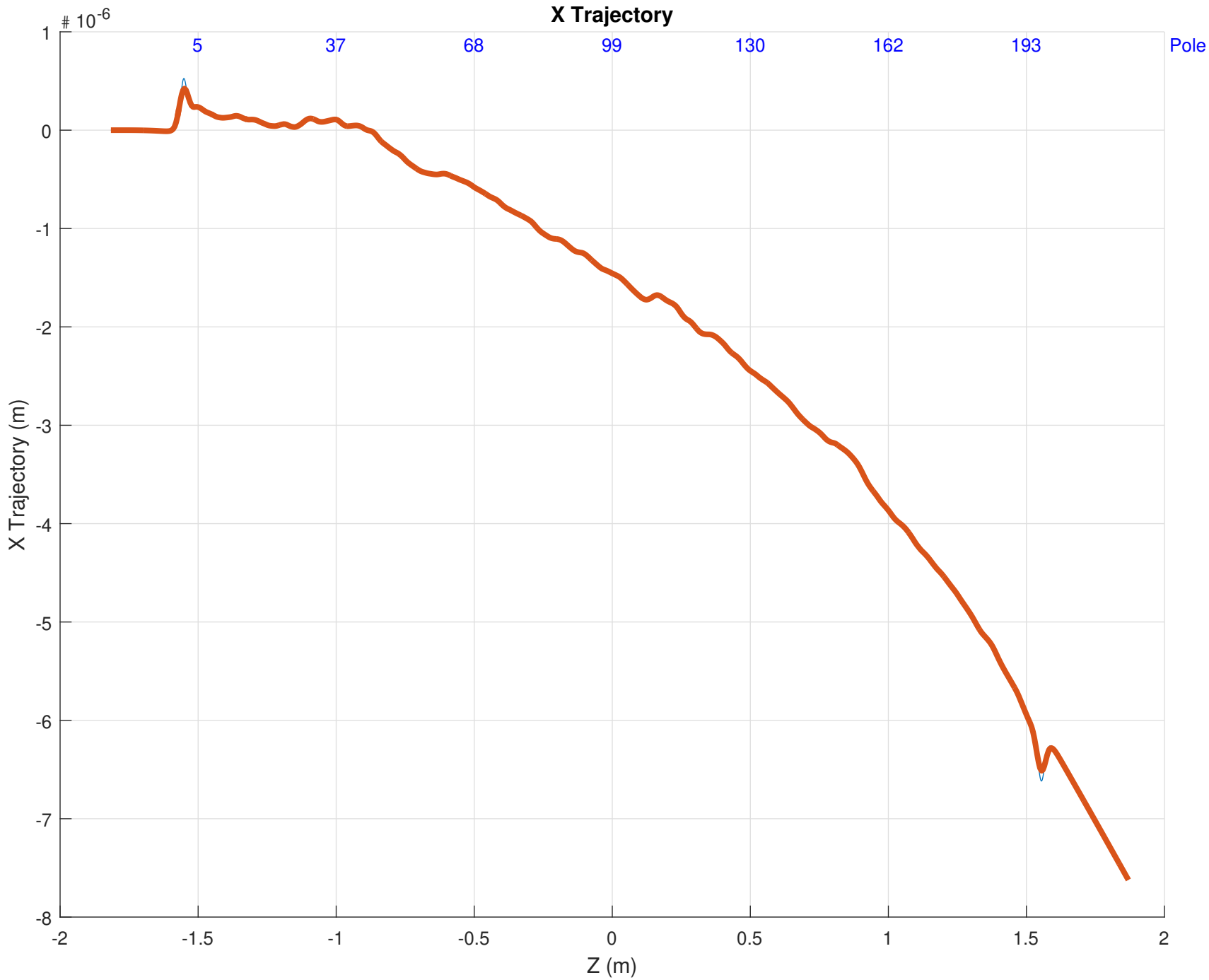

Abs(Fitted Peak By) vs Z, Excluding Ends
6
34
65
97
128
158
188
Pole
0.06
0.05
0.04
0.03
0.02
0.01
0
Abs(Peak By) (T)
Peak Fields: Ave = 0.023242 T, RMS = 0.007301 T
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

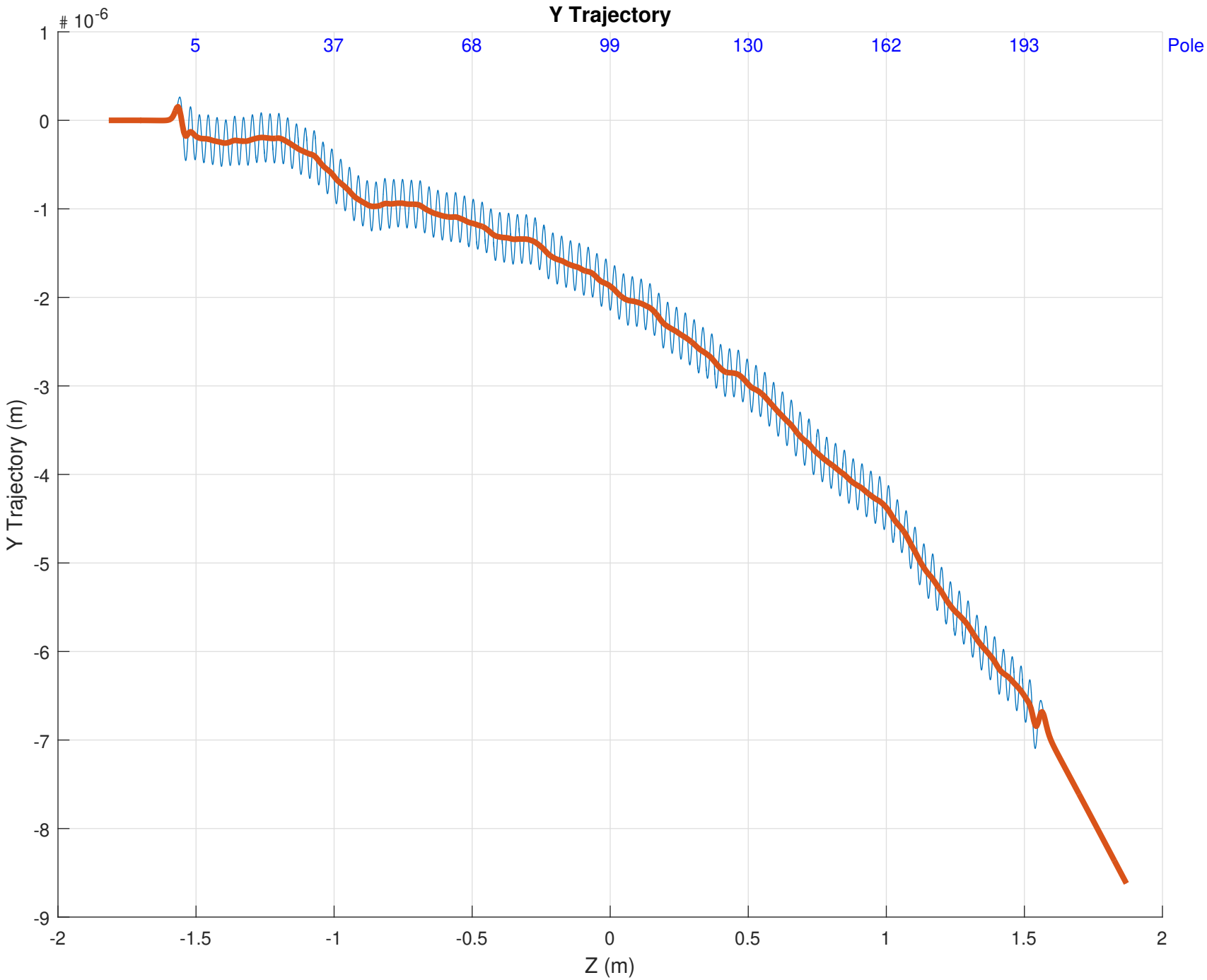

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
0.0165
0.016
0.0155
5
37
68
99
130
162
193
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016001 m, RMS = 0.000137 m
Zero Field Spacing: Ave = 0.015999 m, RMS = 0.000096 m
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)

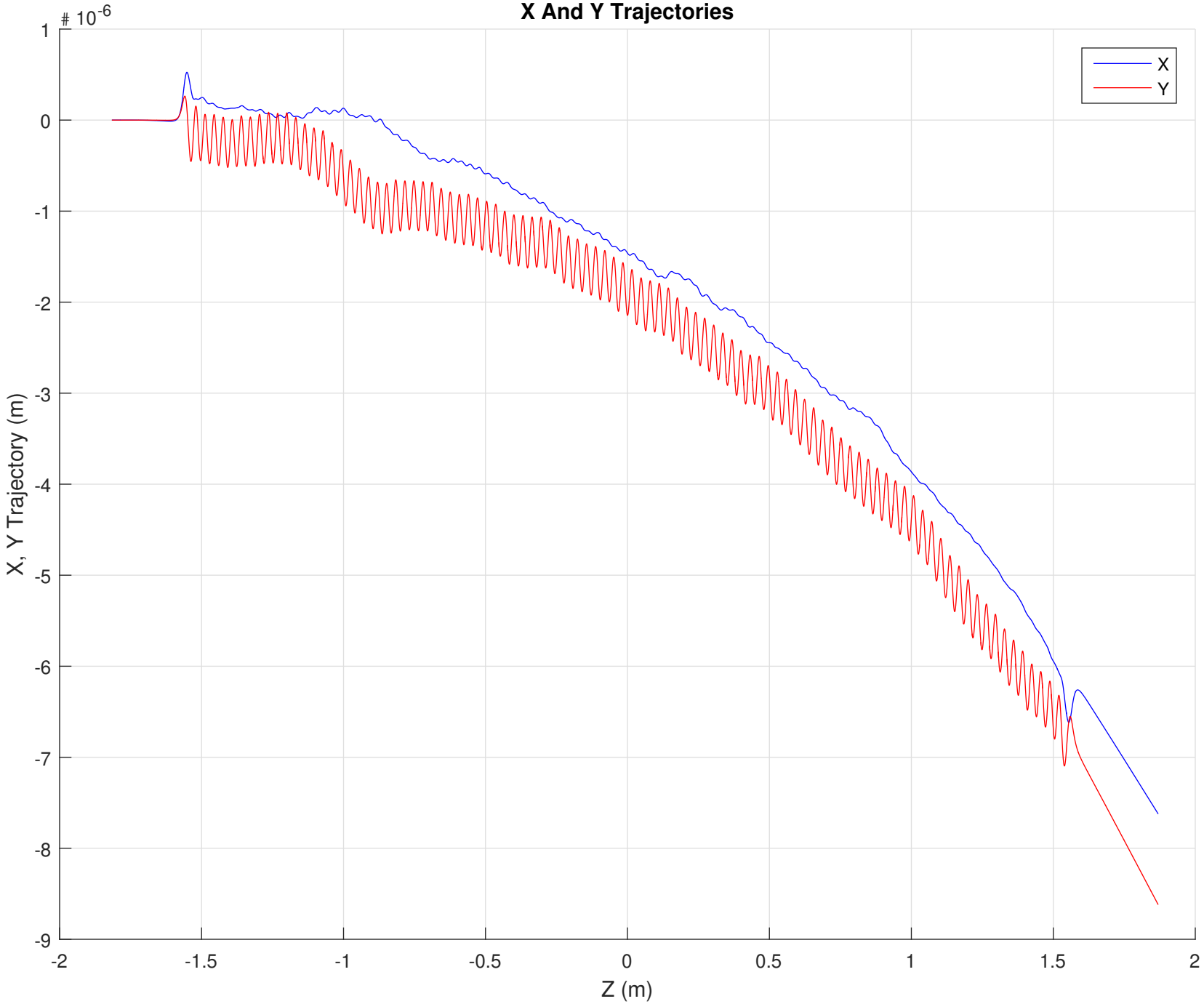

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
6
34
65
97
128
158
189
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016475 m, RMS = 0.006019 m
Zero Field Spacing: Ave = 0.016510 m, RMS = 0.005147 m
-2
-1.5
-1
-0.5
0
0.5
1
1.5
Z (m)

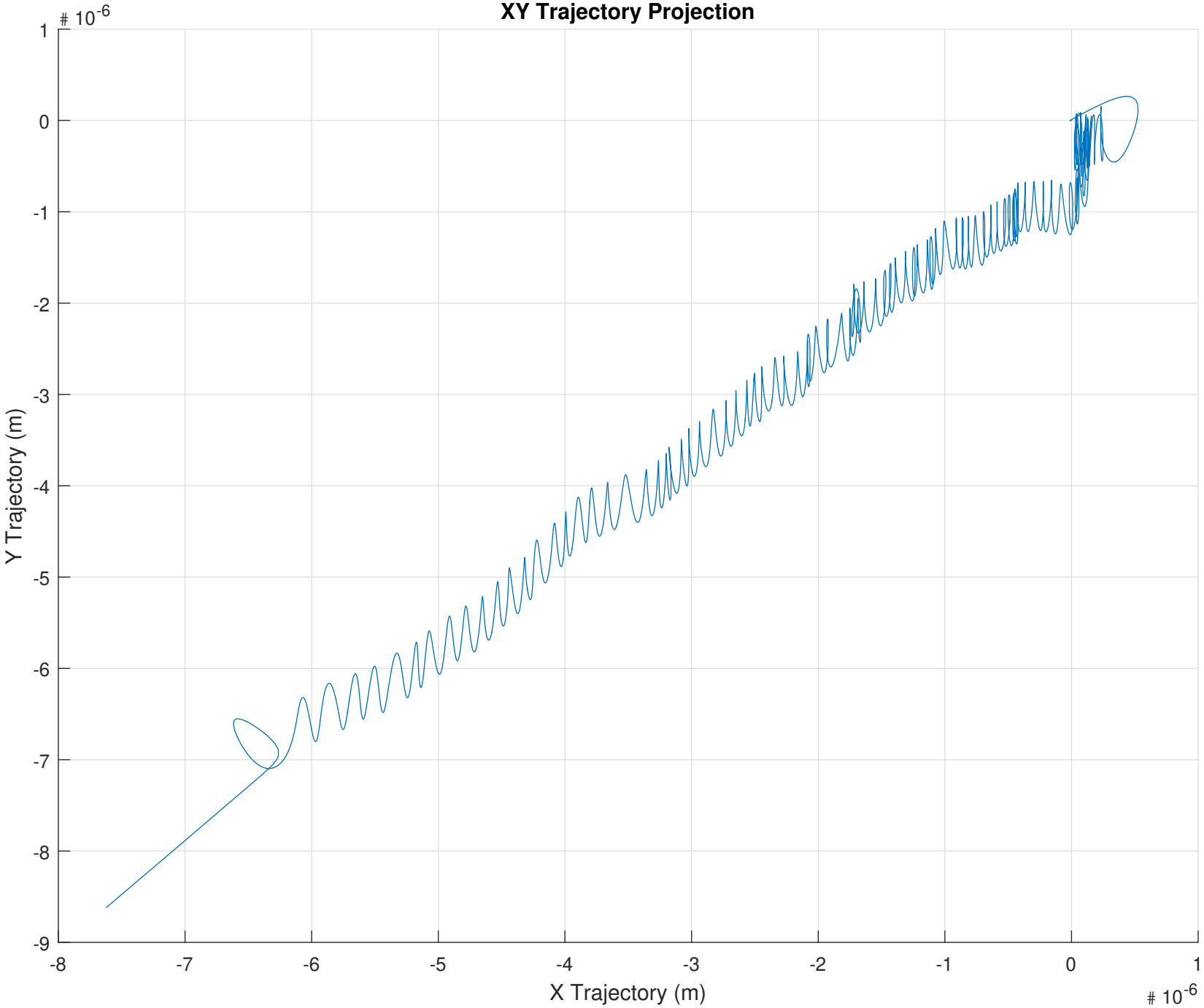

Bx Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
0
2
4
6
8
10
12
14
16
18
20

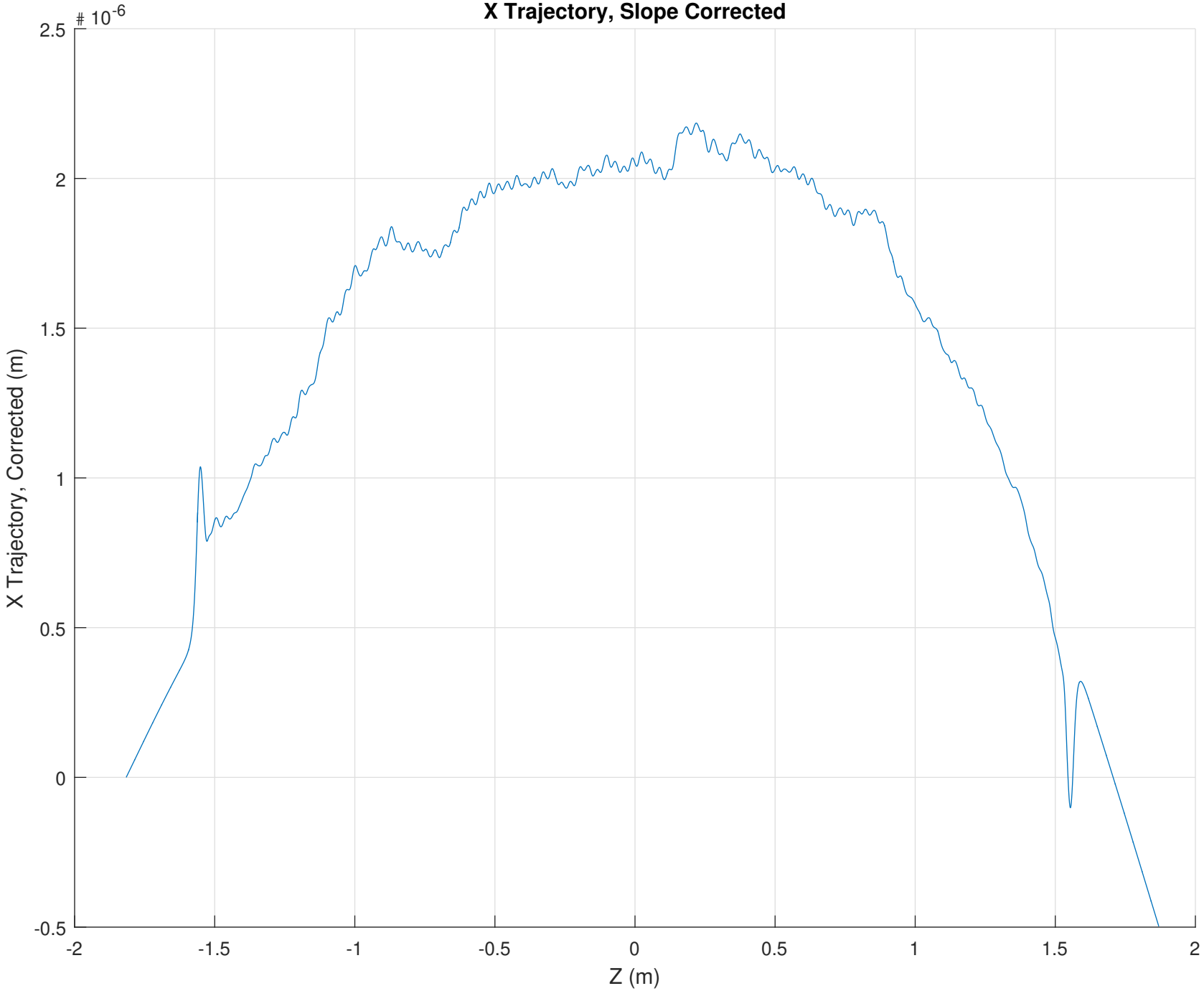

By Field Harmonics
|An|
|Bn|
Absolute Value Of An, Bn (T)
n
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
10^-7
10^-8
0
2
4
6
8
10
12
14
16
18
20

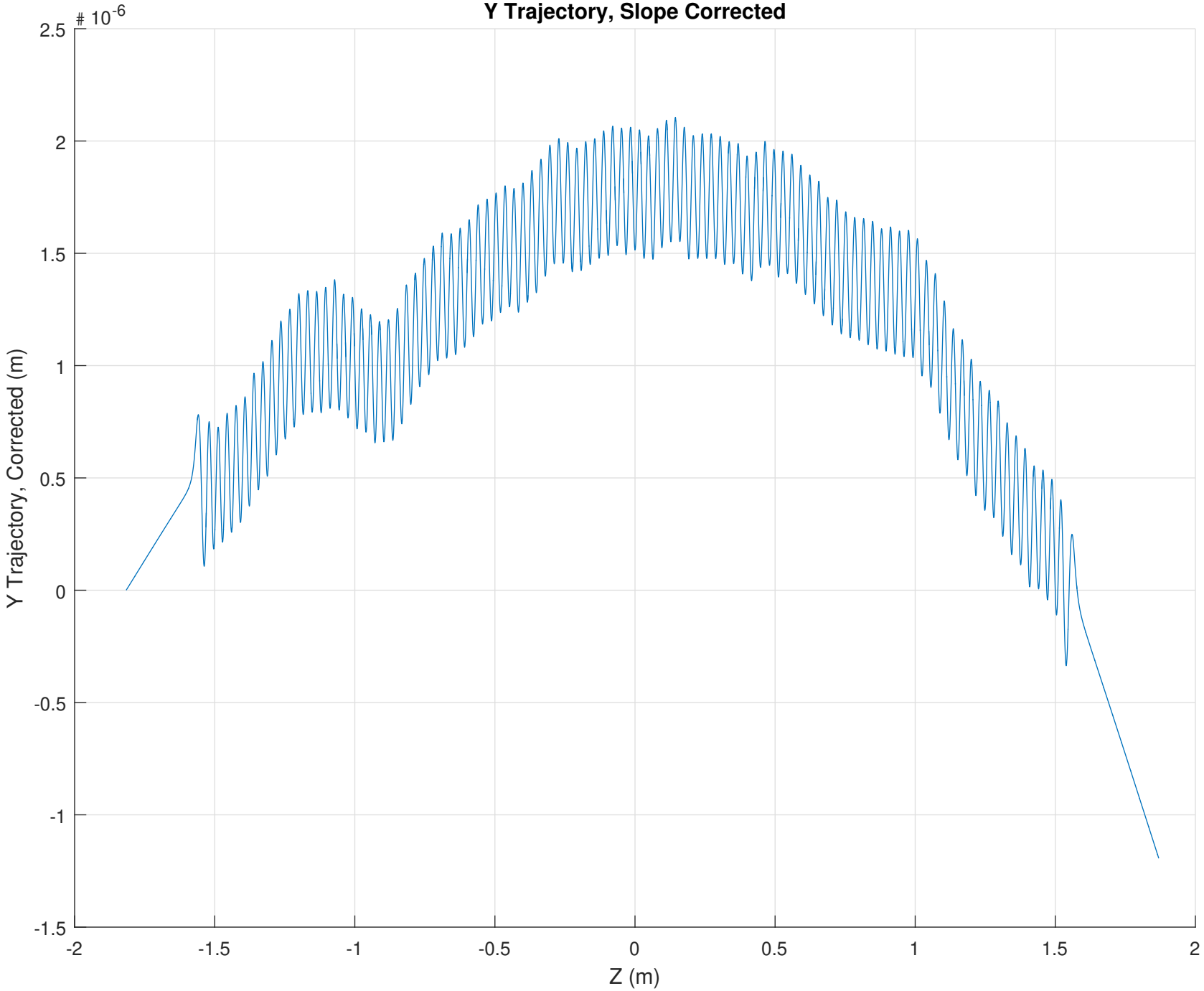

X Trajectory
10-6
5
37
68
99
130
162
193
Pole
1
0
-1
-2
-3
-4
-5
-6
-7
-8
X Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

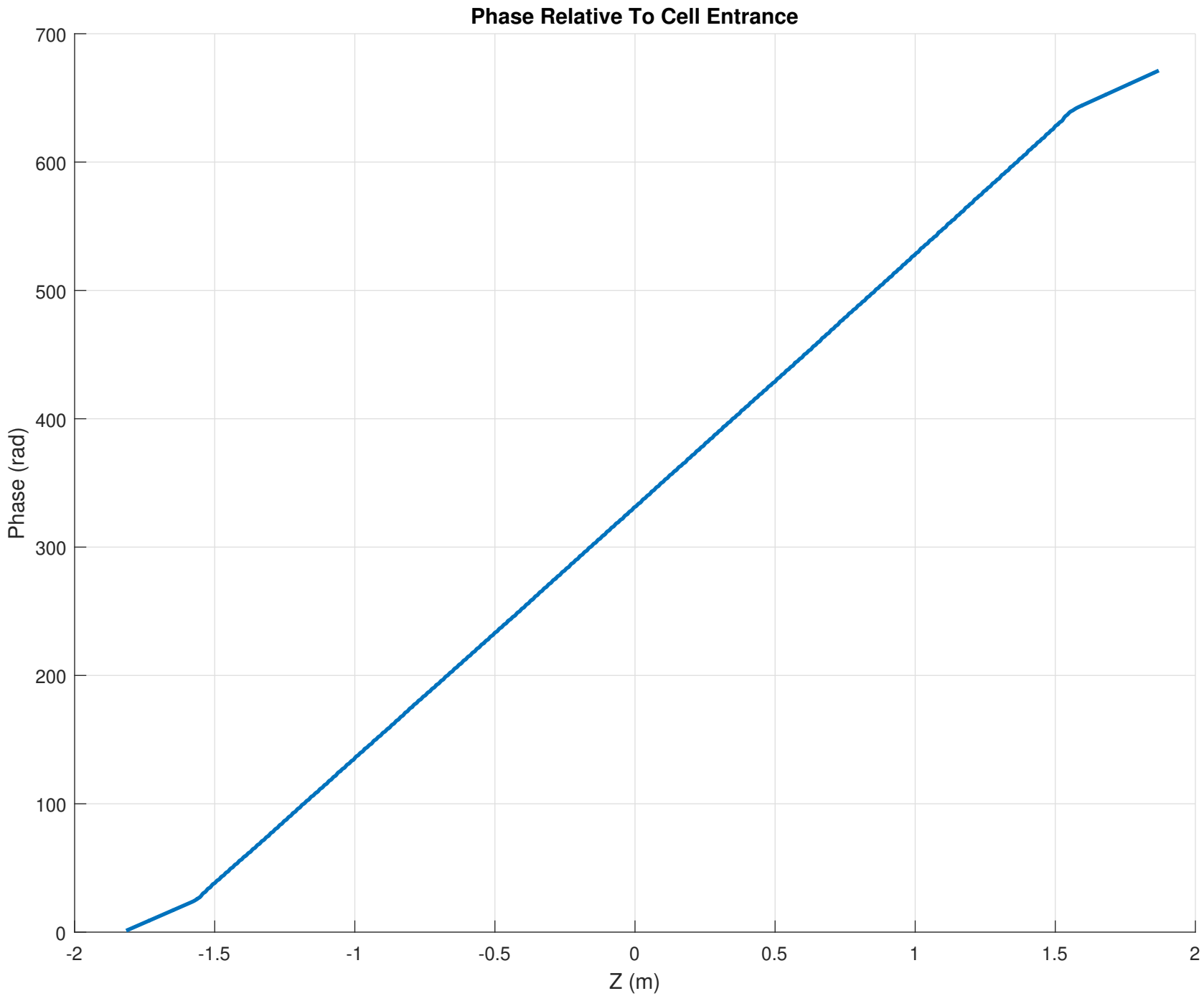

Y Trajectory
10^-6
1
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
Y Trajectory (m)
5
37
68
99
130
162
193
Pole
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

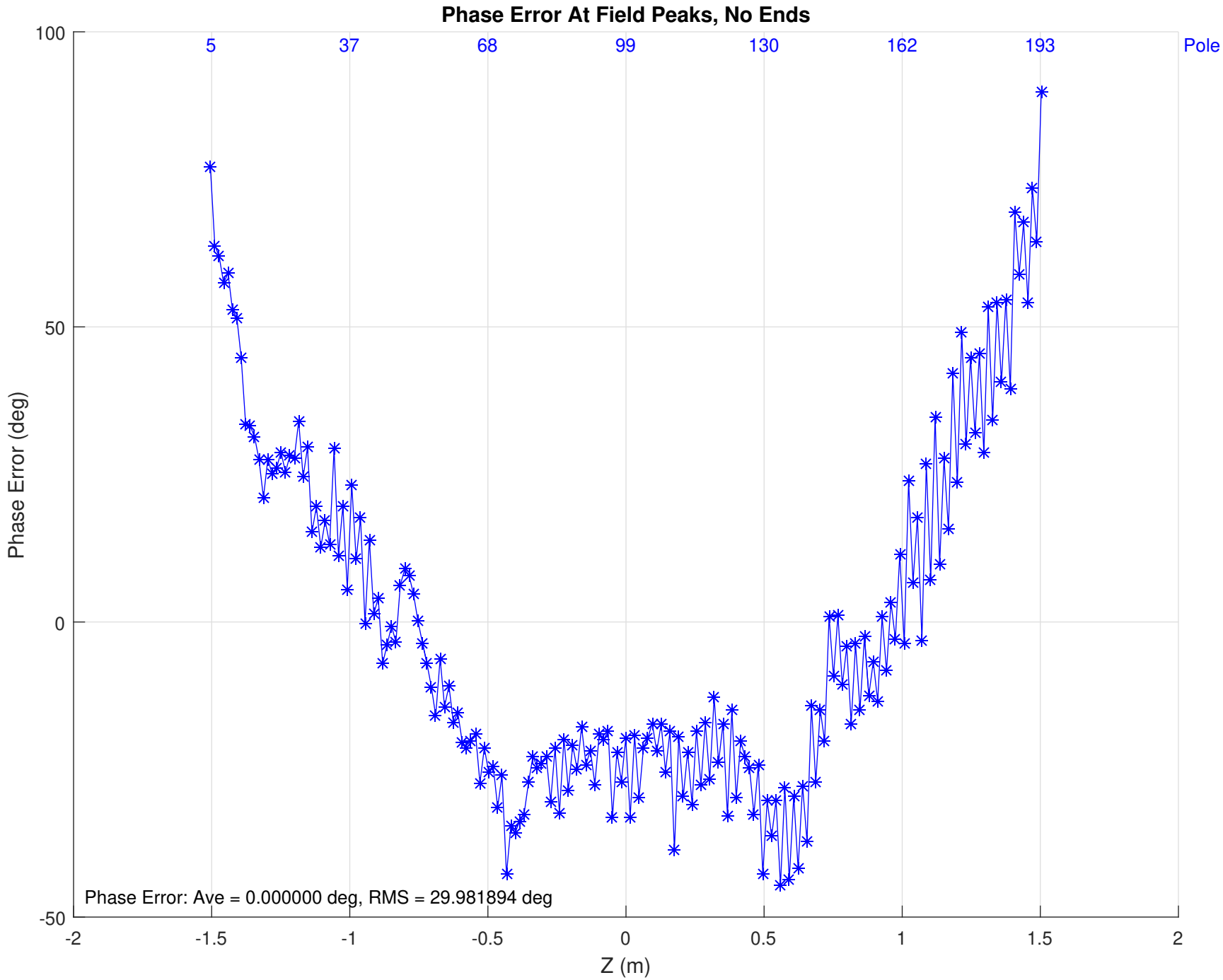

X And Y Trajectories
10^-6
1
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
X, Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
X
Y

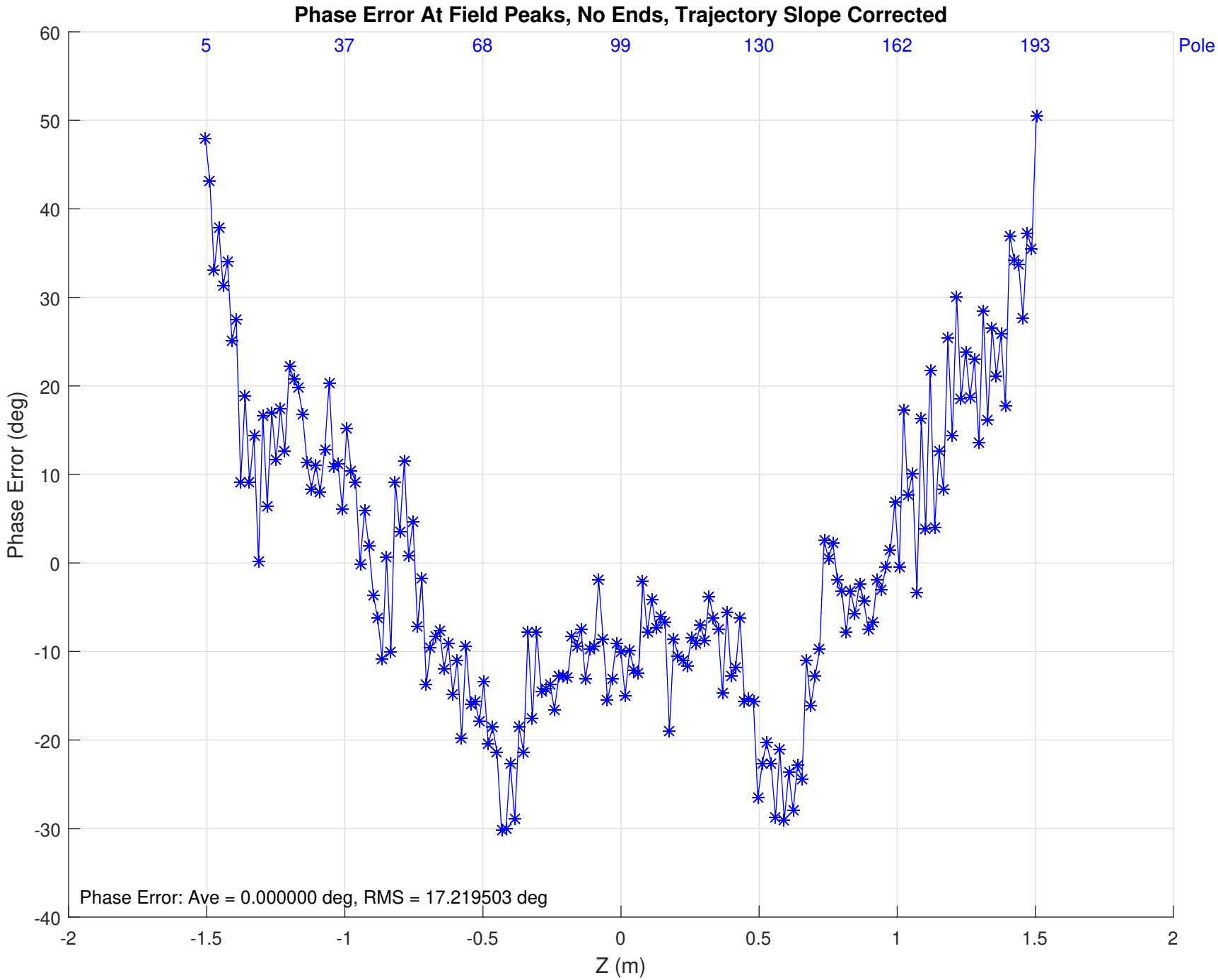

XY Trajectory Projection
10^-6
1
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
Y Trajectory (m)
-8
-7
-6
-5
-4
-3
-2
-1
0
1
X Trajectory (m)
10^-6

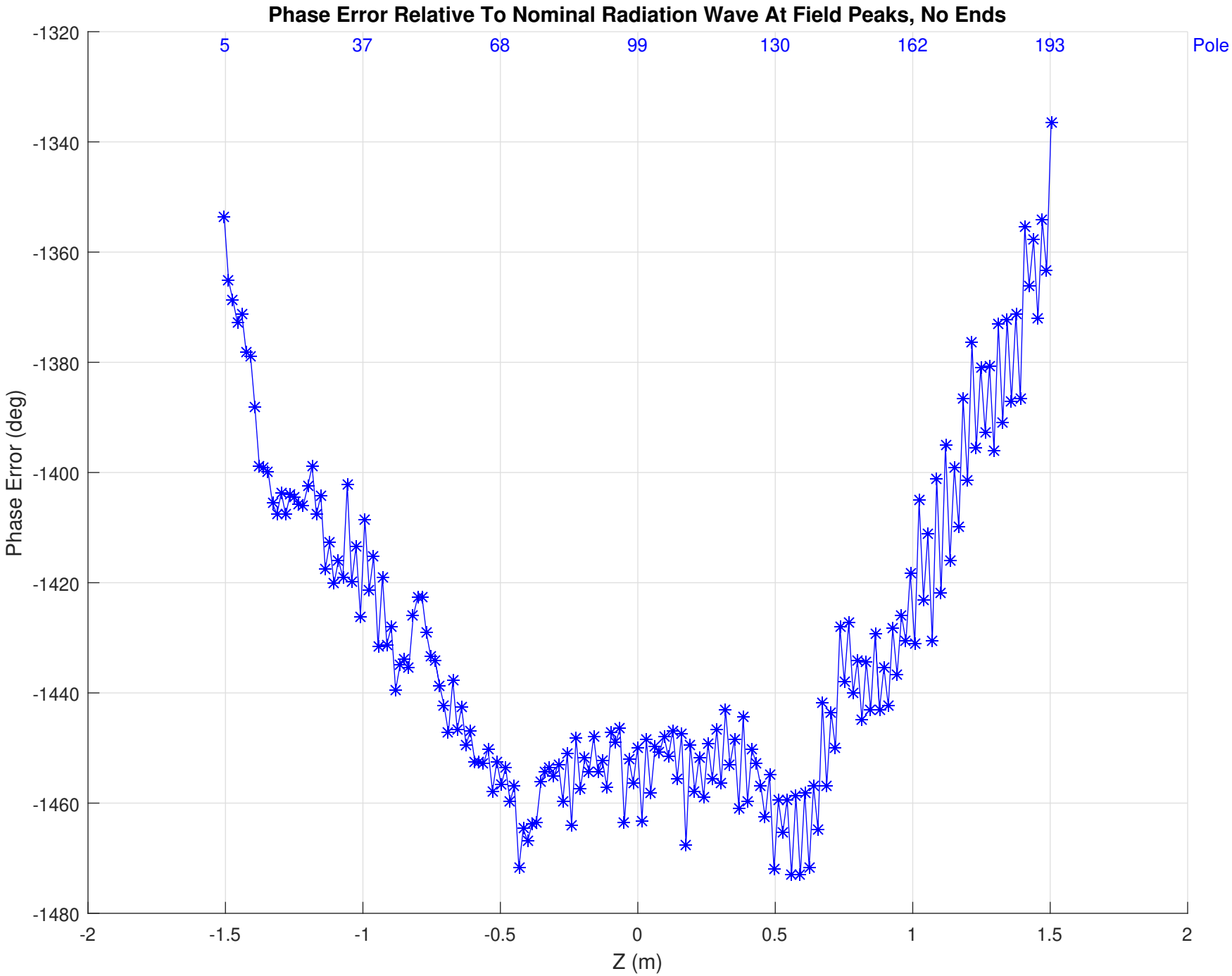

X Trajectory, Slope Corrected
10^-6
2.5
2
1.5
1
0.5
0
-0.5
X Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

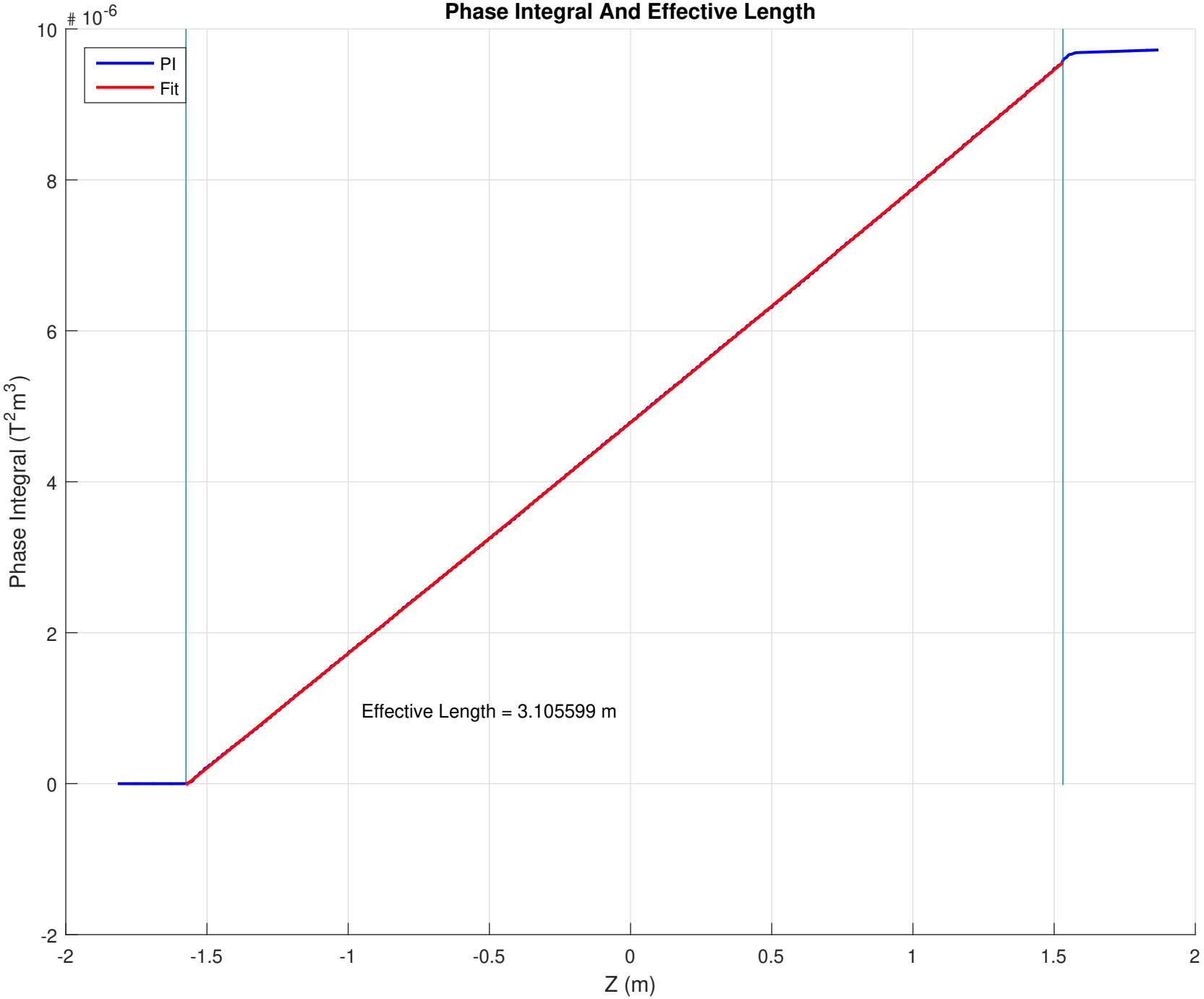

Y Trajectory, Slope Corrected
10^-6
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
Y Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

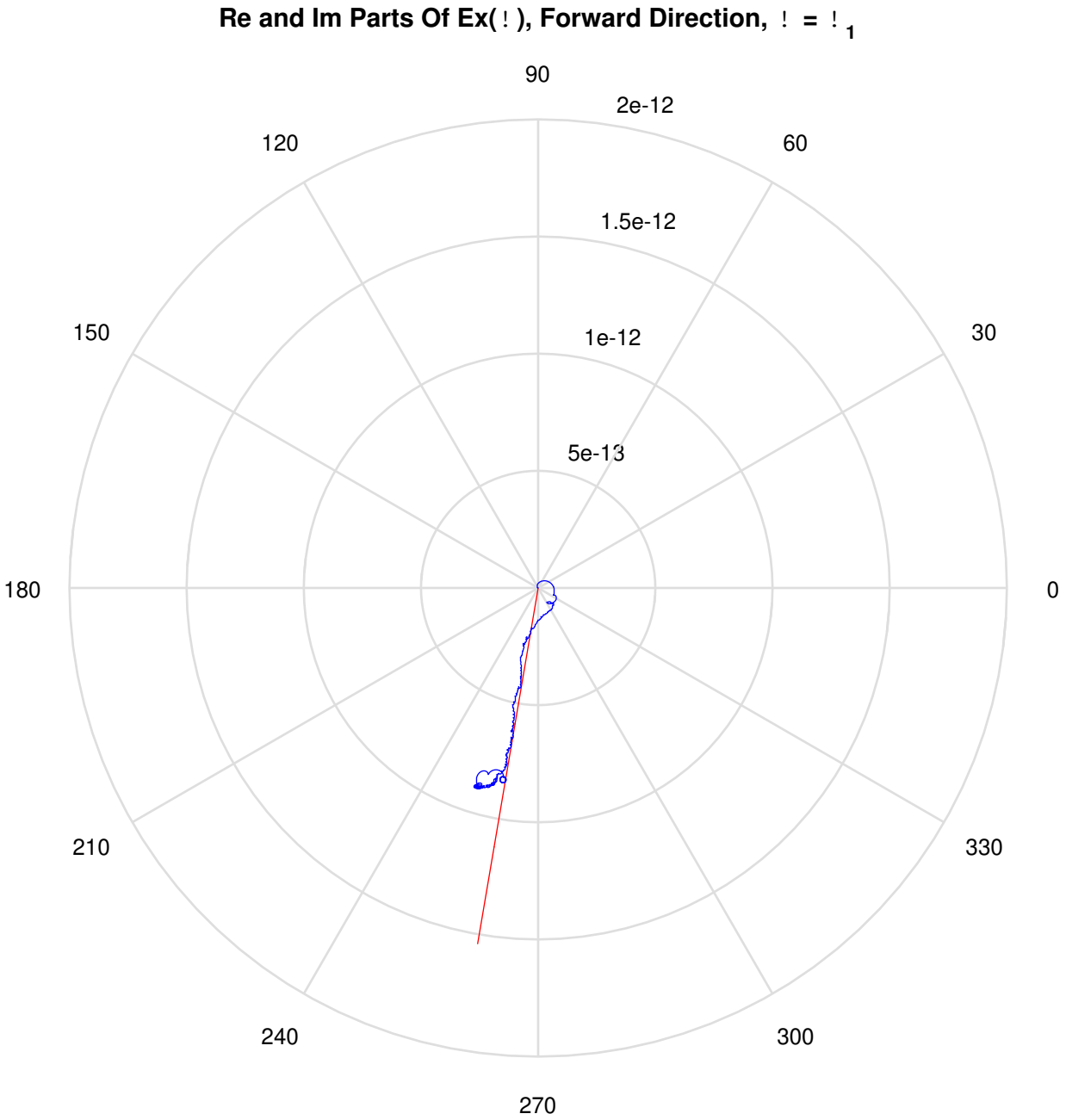

Phase Relative To Cell Entrance
700
600
500
400
300
200
100
0
Phase (rad)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

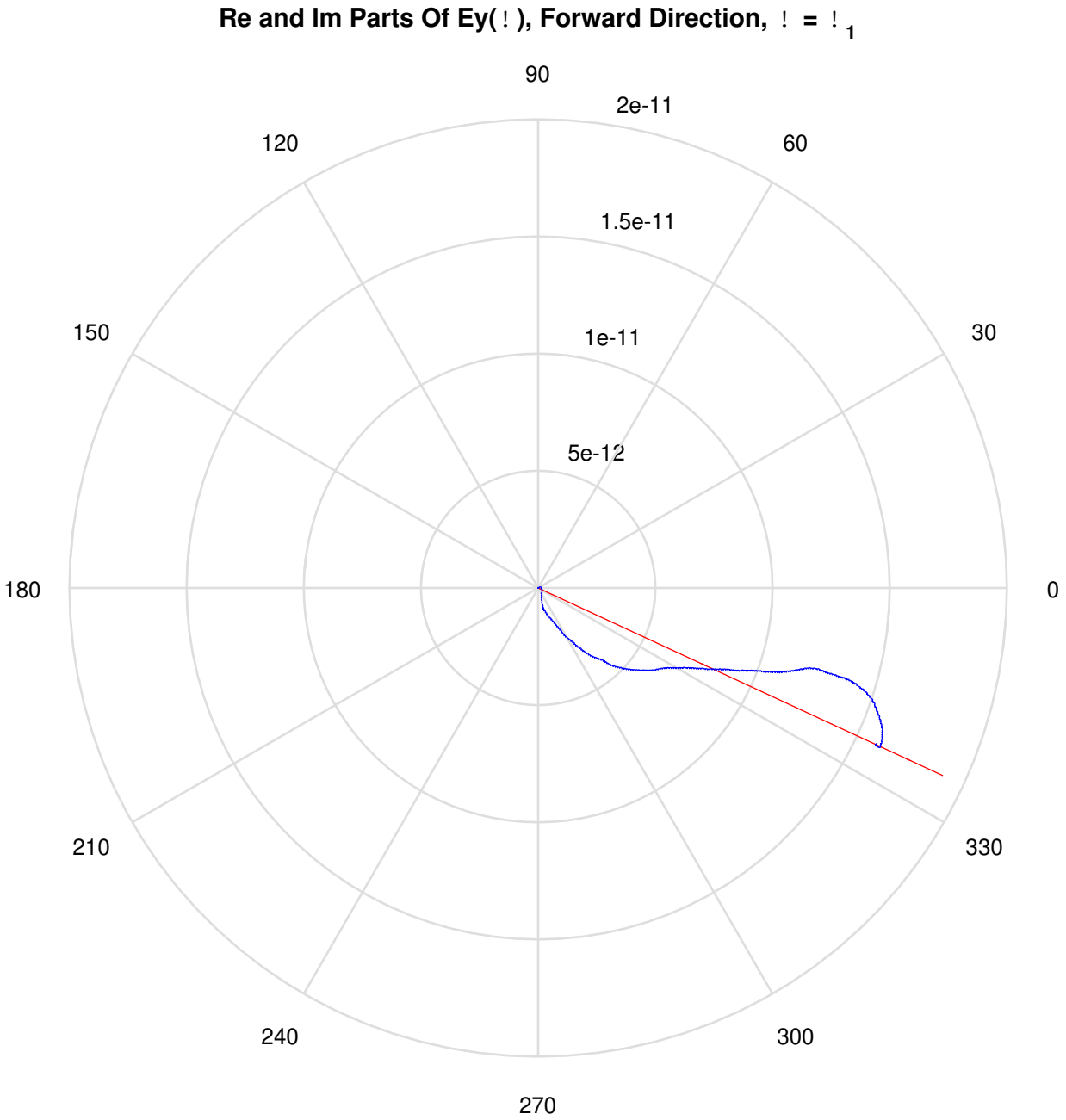

Phase Error At Field Peaks, No Ends
100
50
0
-50
5
37
68
99
130
162
193
Pole
Phase Error (deg)
Phase Error: Ave = 0.000000 deg, RMS = 29.981894 deg
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

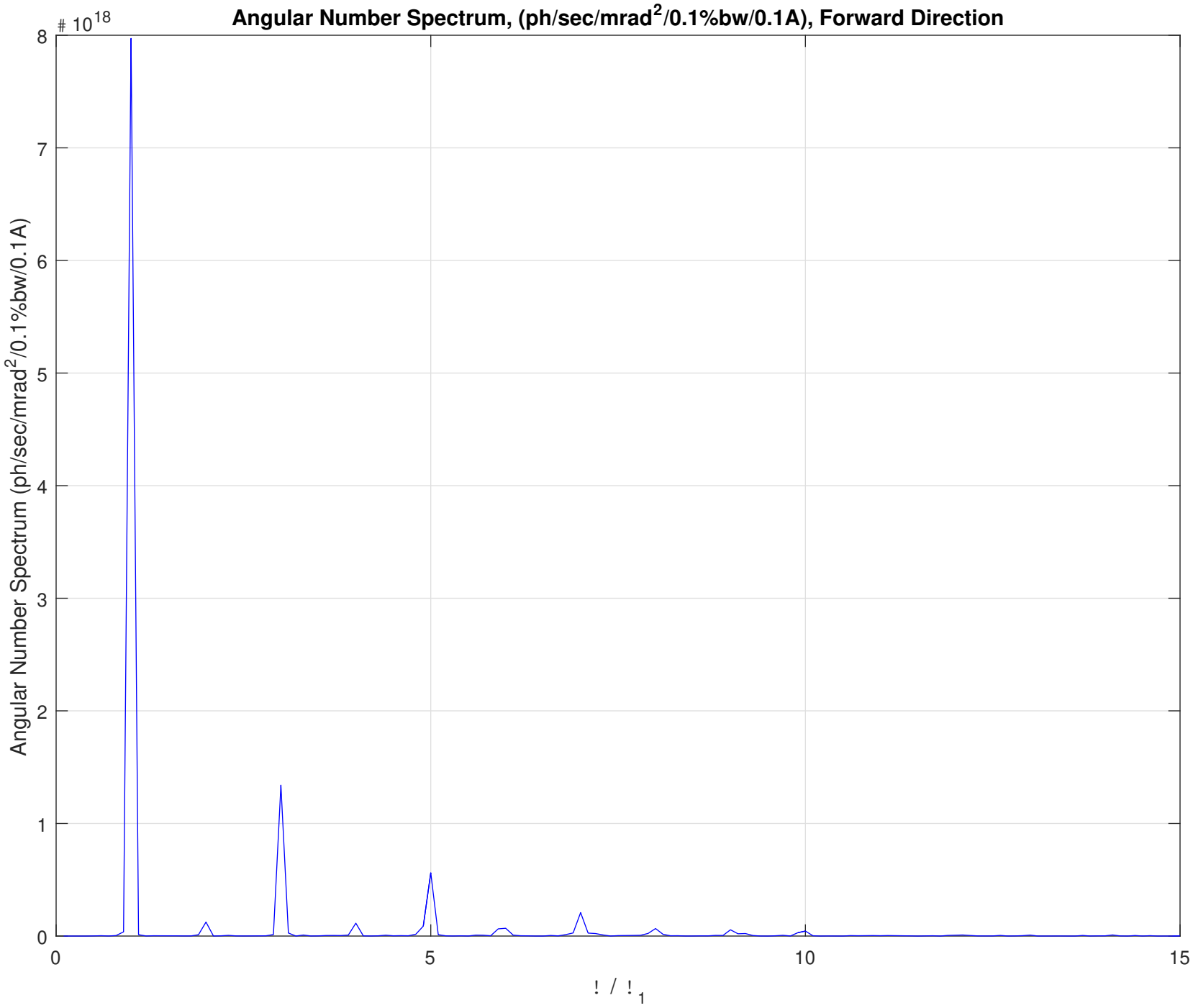

Phase Error At Field Peaks, No Ends, Trajectory Slope Corrected
5
37
68
99
130
162
193
Pole
60
50
40
30
20
10
0
-10
-20
-30
-40
Phase Error (deg)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
Phase Error: Ave = 0.000000 deg, RMS = 17.219503 deg

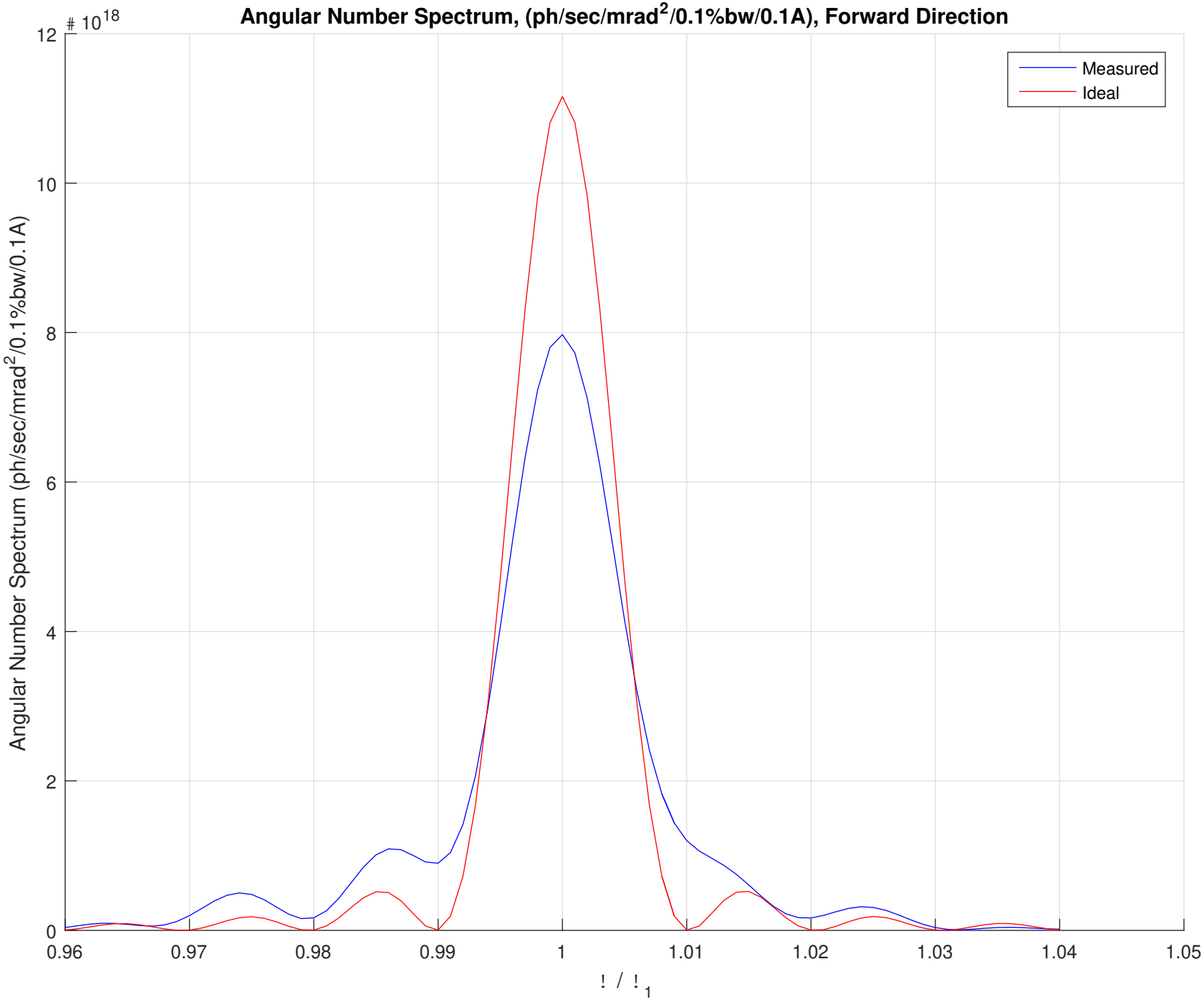

Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
5
37
68
99
130
162
193
Pole
-1320
-1340
-1360
-1380
-1400
-1420
-1440
-1460
-1480
Phase Error (deg)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

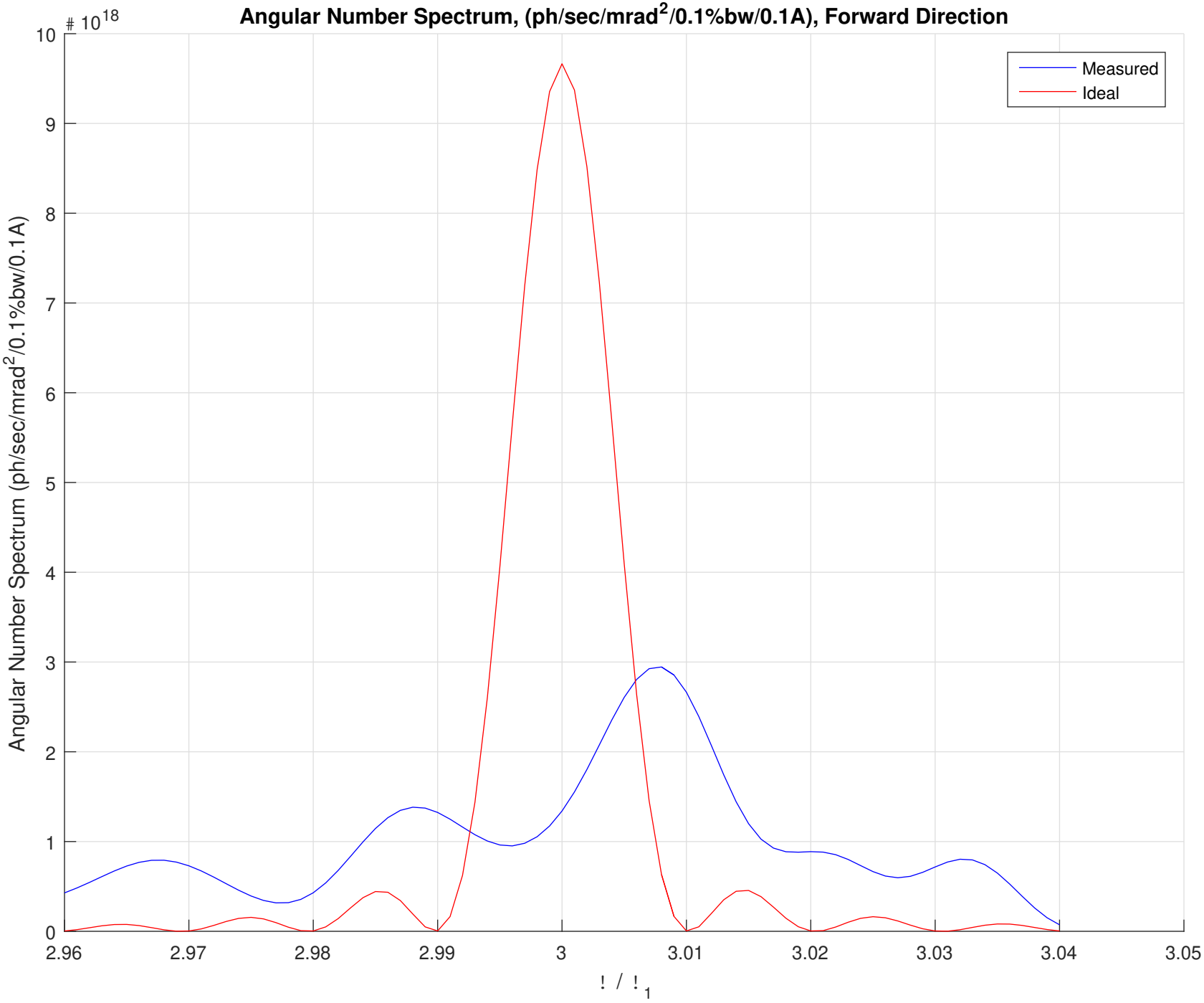

Phase Integral And Effective Length
10^-6
PI
Fit
Effective Length = 3.105599 m
Phase Integral (T^2m^3)
Z (m)
10
8
6
4
2
0
-2
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2

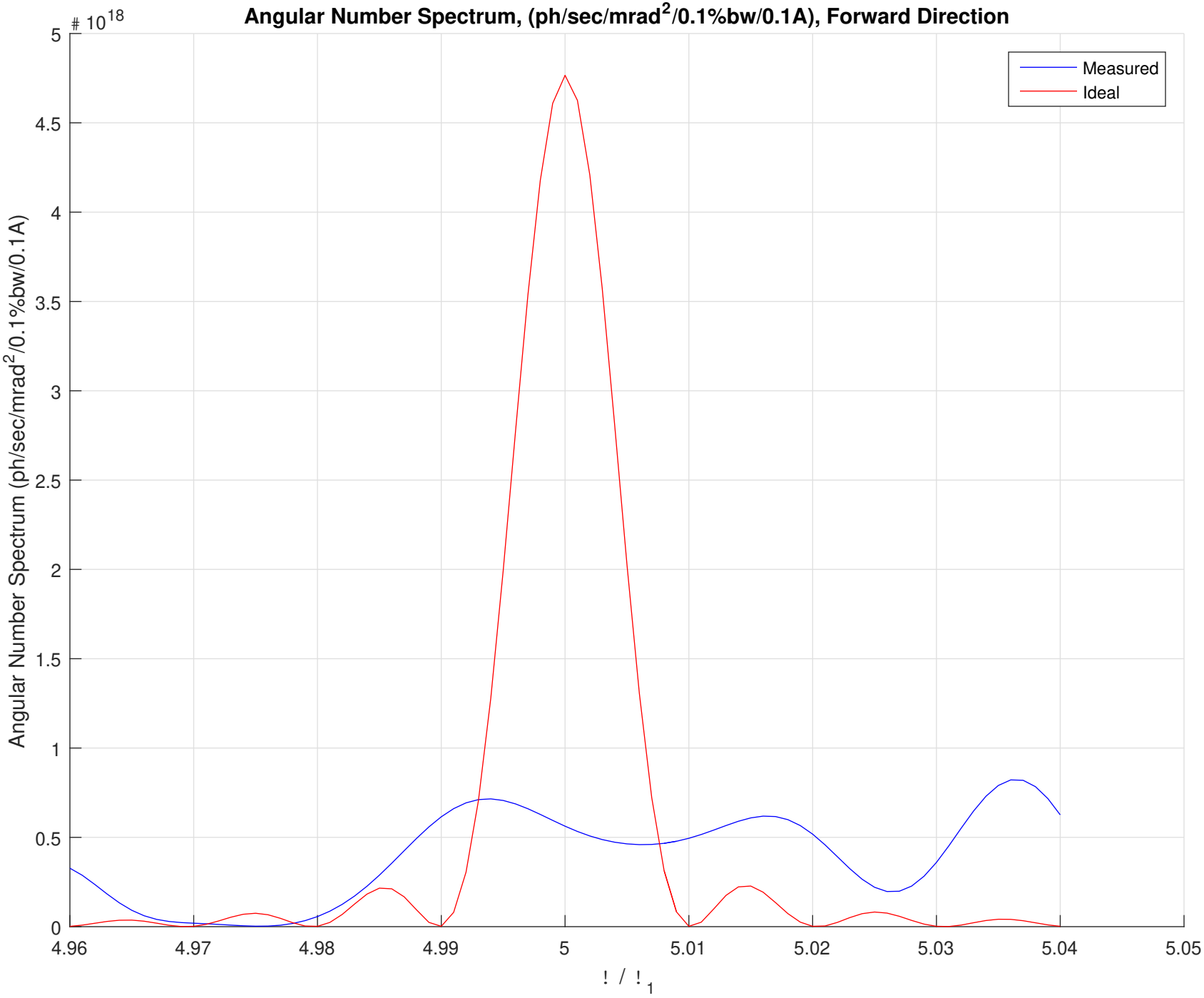

Re and Im Parts Of Ex(!), Forward Direction, ! = !1
90
2e-12
120
60
1.5e-12
150
1e-12
30
5e-13
180
0
210
330
240
300
270


Re and Im Parts Of Ey(!), Forward Direction, ! = !1
90
2e-11
120
60
1.5e-11
150
30
1e-11
5e-12
180
0
210
330
240
300
270


Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{18}
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
8
7
6
5
4
3
2
1
0
0
5
10
15
! / !$_1$


Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{18}
Measured
Ideal
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
12
10
8
6
4
2
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^{18}
Measured
Ideal
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
10
9
8
7
6
5
4
3
2
1
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^{18}
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
4.96
4.97
4.98
4.99
5
5.01
5.02
5.03
5.04
5.05
! / !$_1$