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SLAC Magnetic Measurements

EPU Analysis
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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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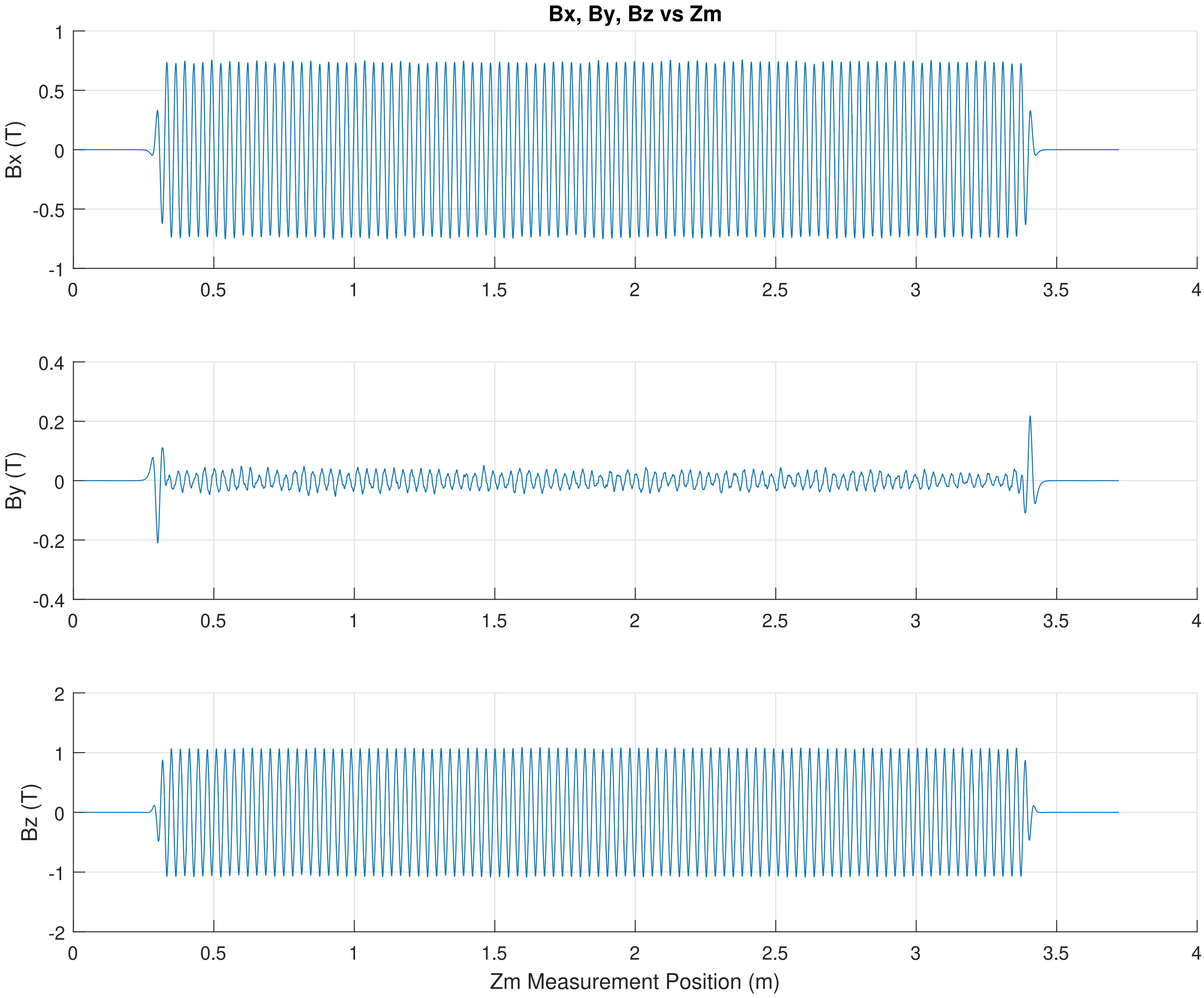
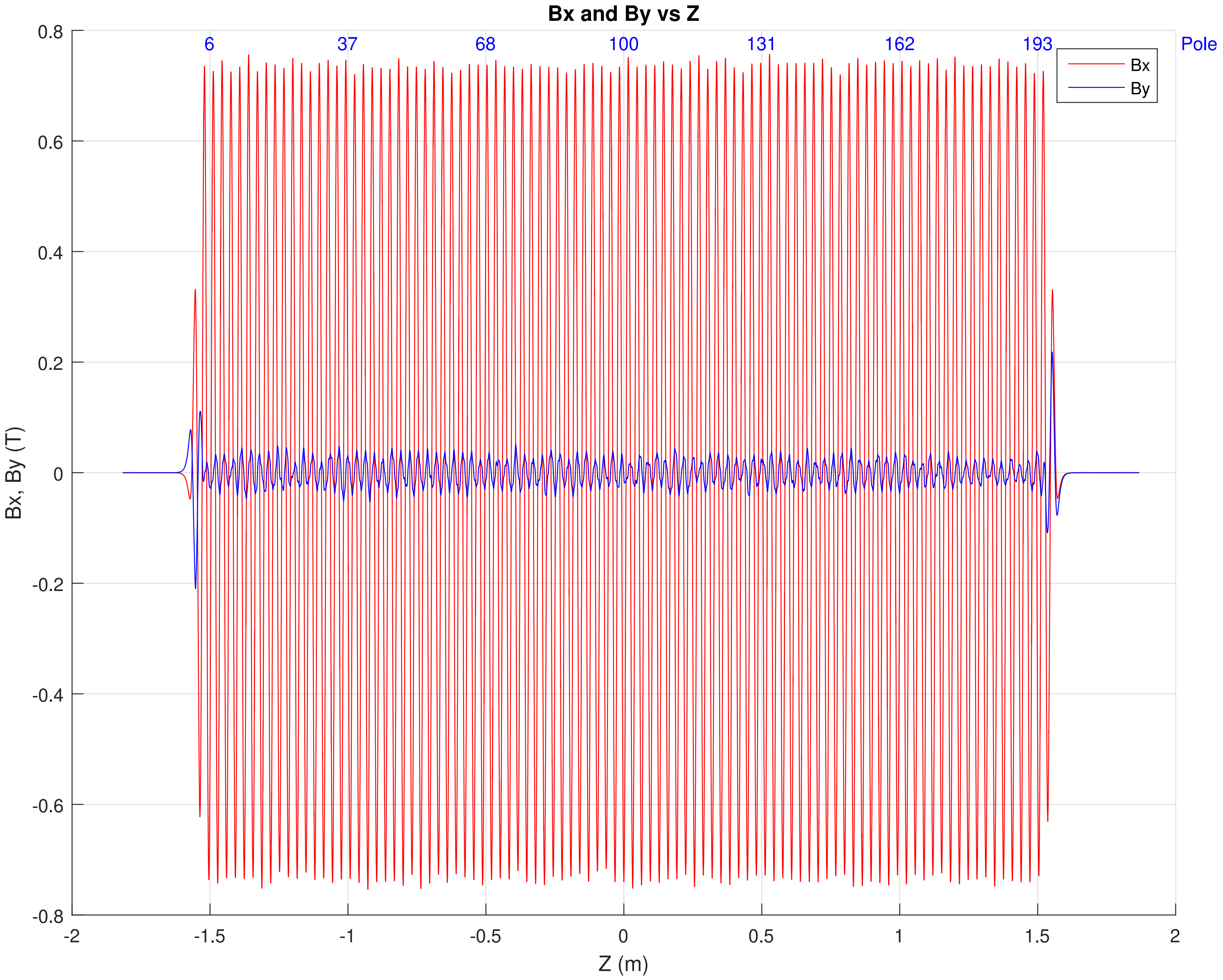
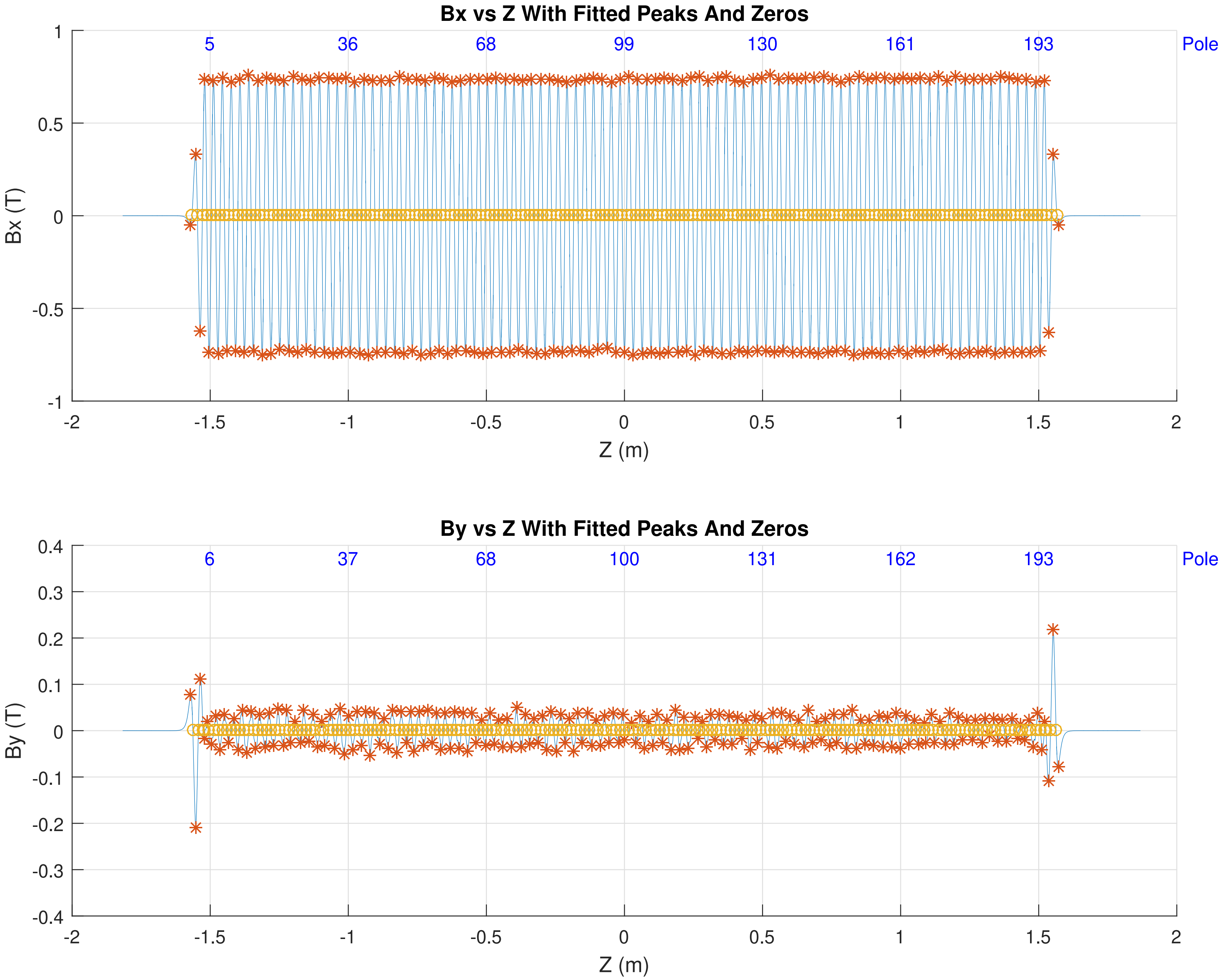
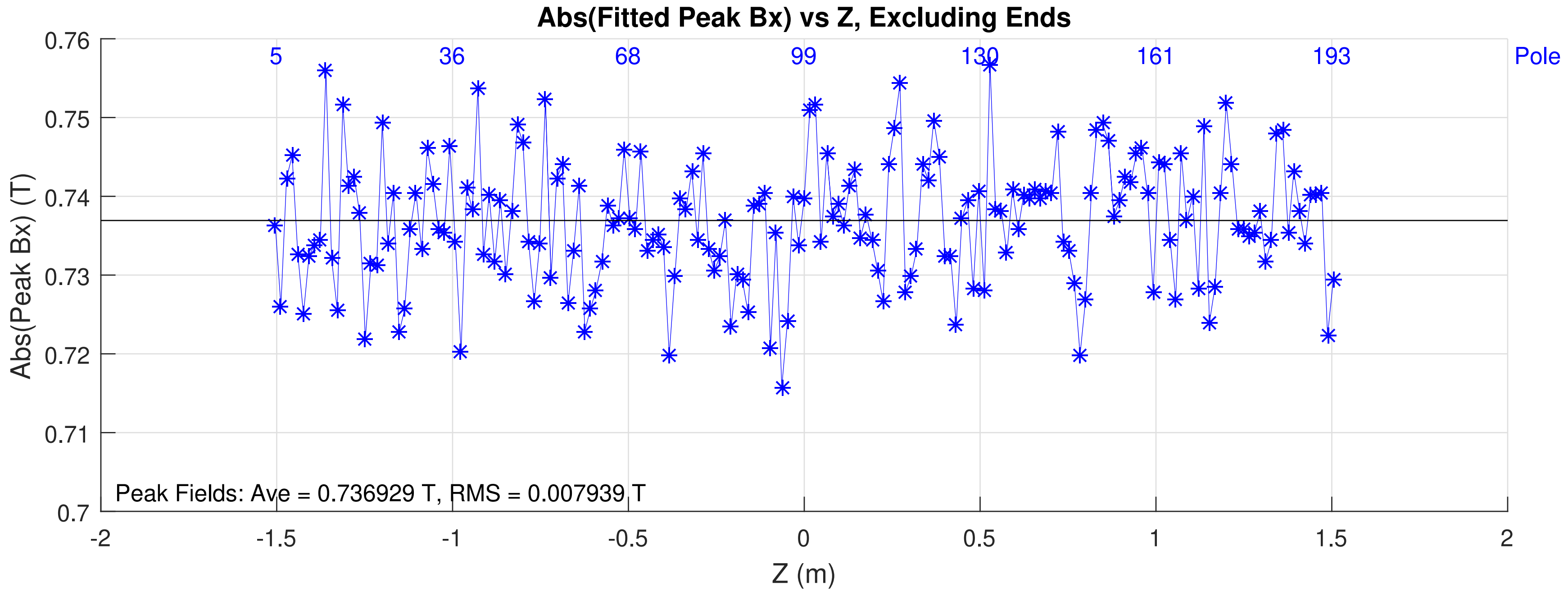

Bx, By, Bz vs Zm
Bx (T)
1
0.5
0
-0.5
-1
0
0.5
1
1.5
2
2.5
3
3.5
4
By (T)
0.4
0.2
0
-0.2
-0.4
0
0.5
1
1.5
2
2.5
3
3.5
4
Bz (T)
2
1
0
-1
-2
0
0.5
1
1.5
2
2.5
3
3.5
4
Zm Measurement Position (m)

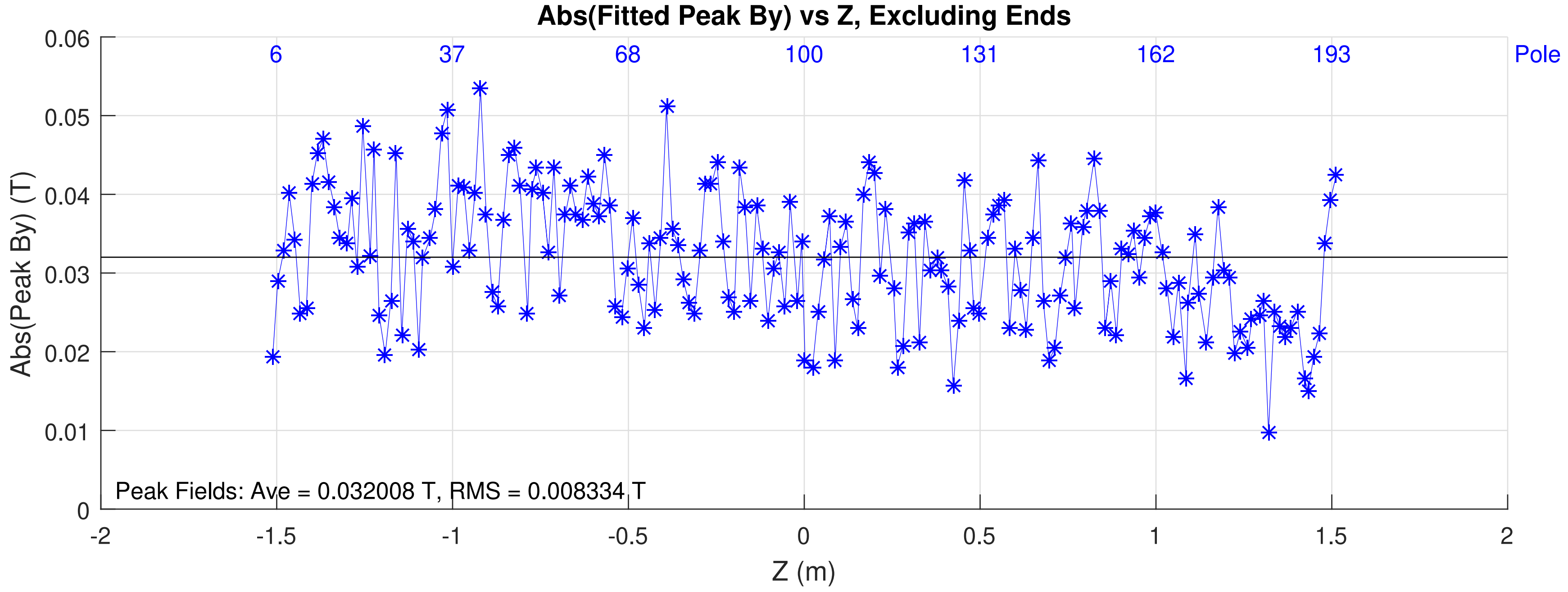

Bx and By vs Z
6
37
68
100
131
162
193
Pole
Bx
By
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
Bx, By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

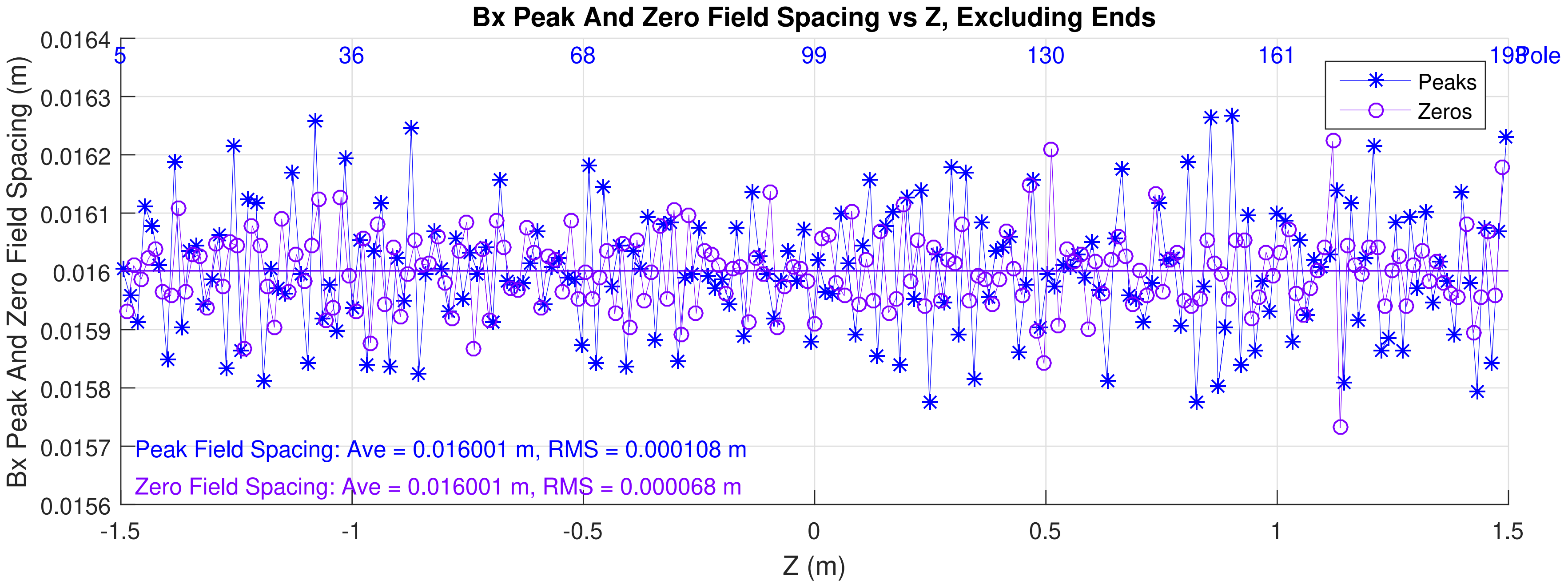


Bx vs Z With Fitted Peaks And Zeros

By vs Z With Fitted Peaks And Zeros

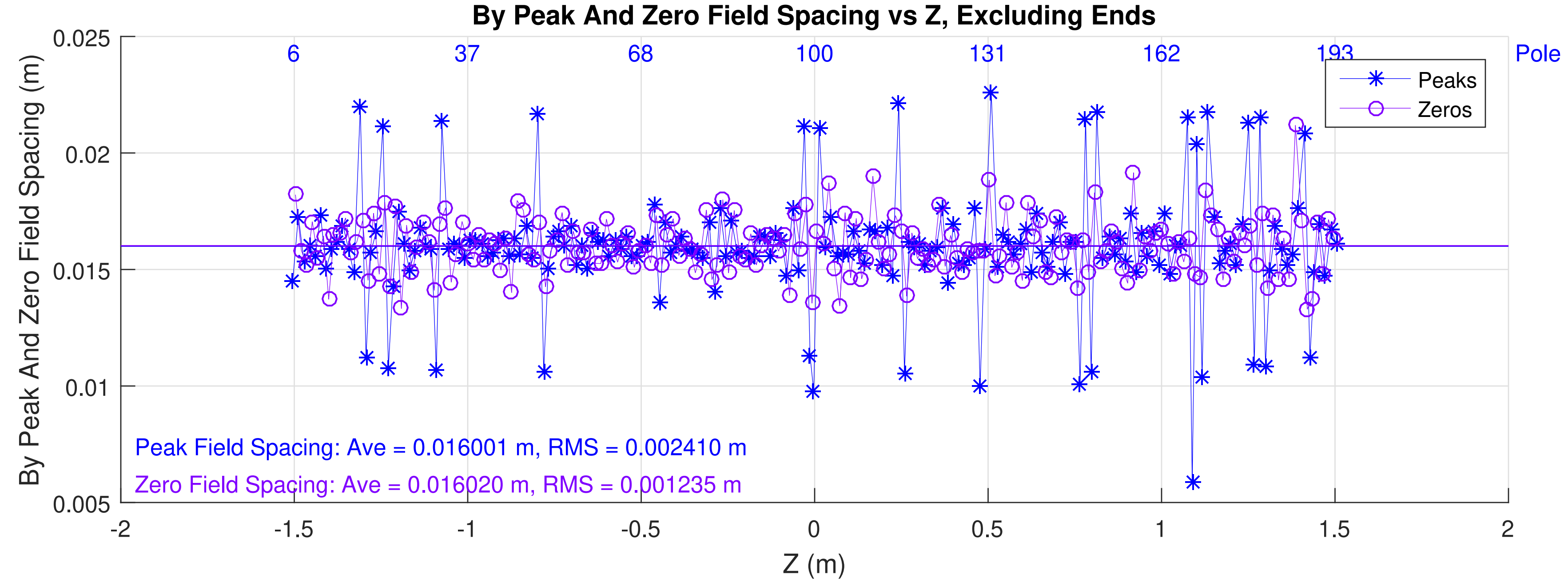

Abs(Fitted Peak Bx) vs Z, Excluding Ends
Abs(Peak Bx) (T)
0.76
0.75
0.74
0.73
0.72
0.71
0.7
5
36
68
99
130
161
193
Pole
Peak Fields: Ave = 0.736929 T, RMS = 0.007939 T
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)


Abs(Fitted Peak By) vs Z, Excluding Ends
Abs(Peak By) (T)
0.06
0.05
0.04
0.03
0.02
0.01
0
6
37
68
100
131
162
193
Pole
Peak Fields: Ave = 0.032008 T, RMS = 0.008334 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

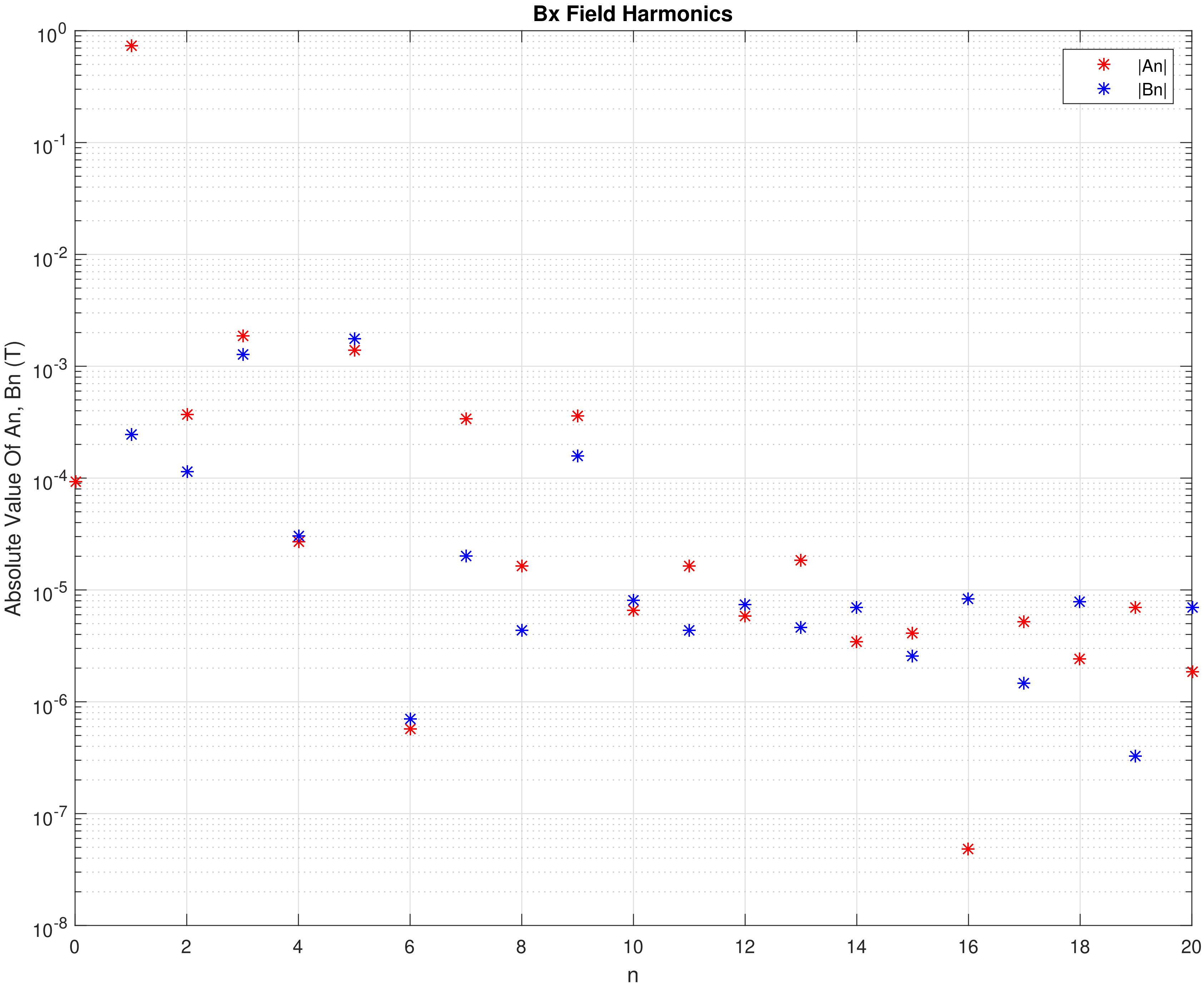
Peak Field Spacing: Ave = 0.016001 m, RMS = 0.000108 m

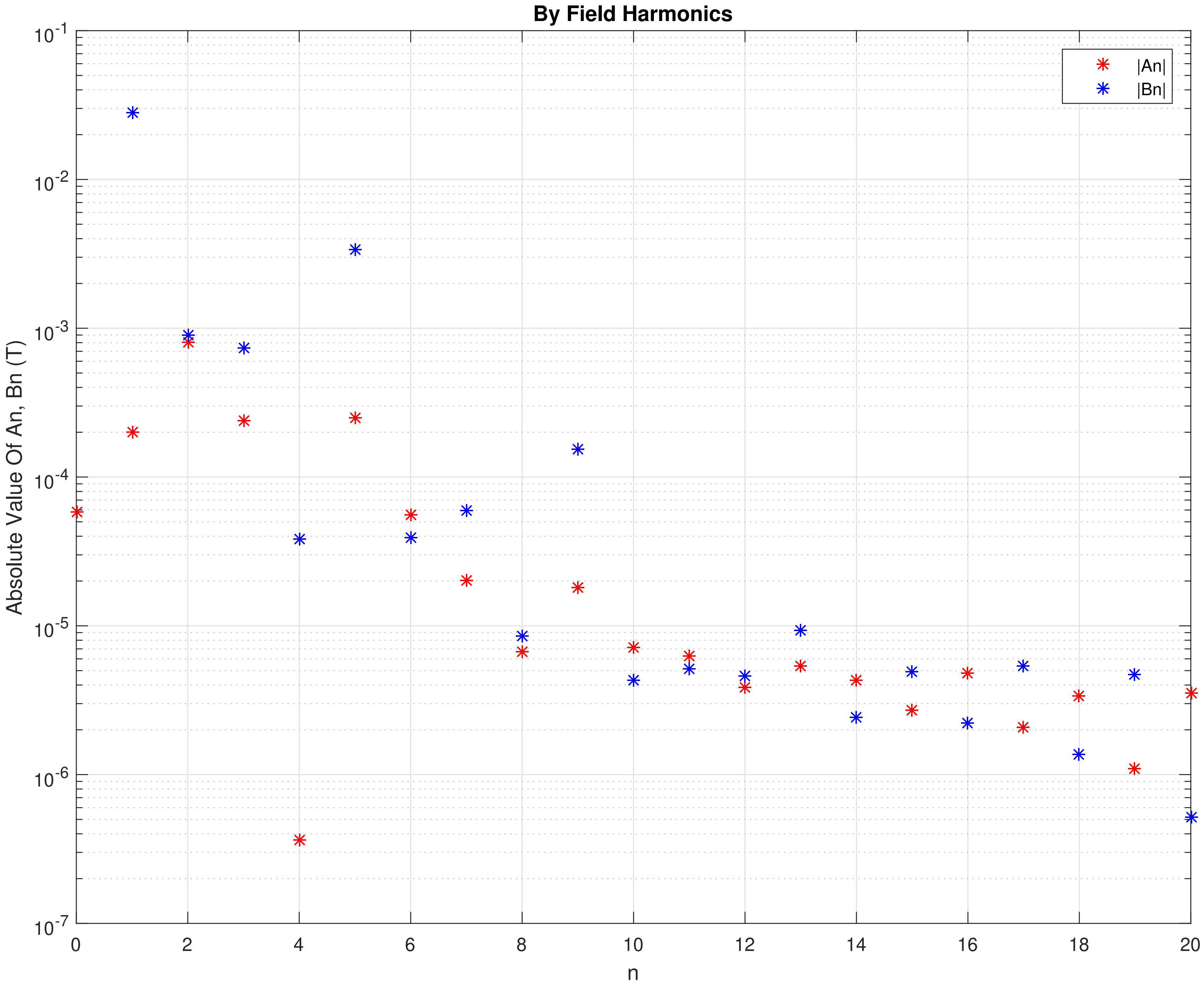
Zero Field Spacing: Ave = 0.016001 m, RMS = 0.000068 m

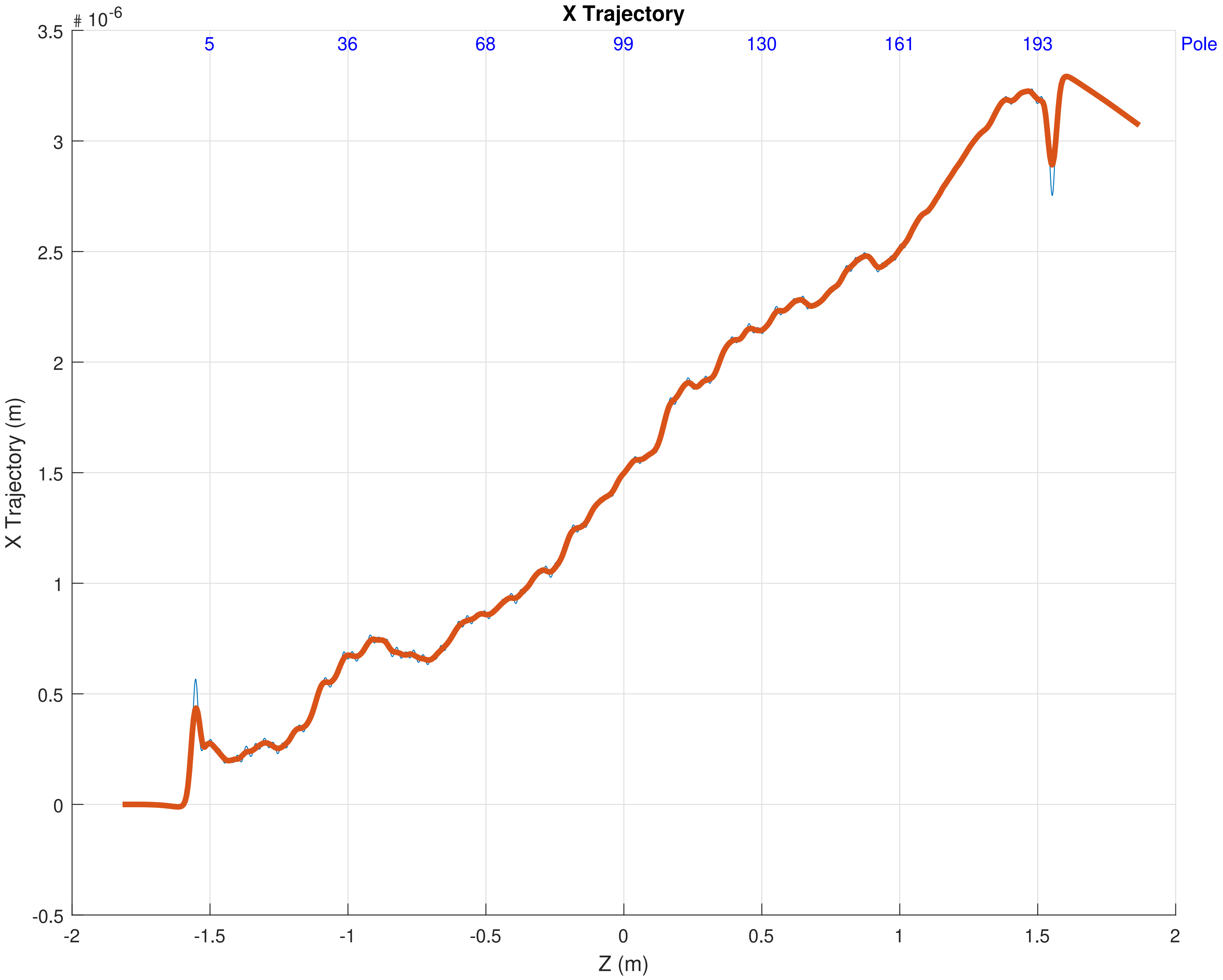

By Peak And Zero Field Spacing vs Z, Excluding Ends

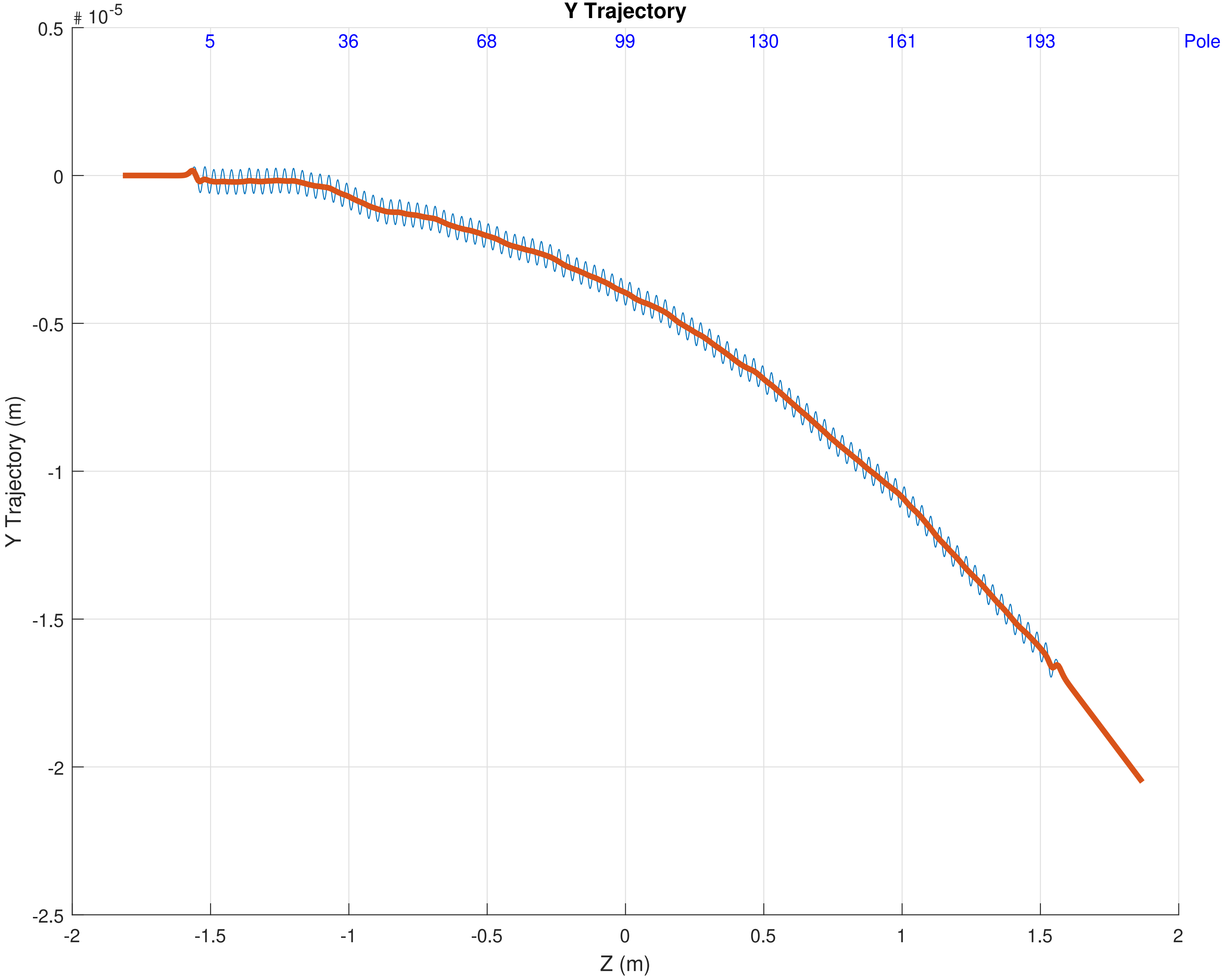
Peak Field Spacing: Ave = 0.016001 m, RMS = 0.002410 m

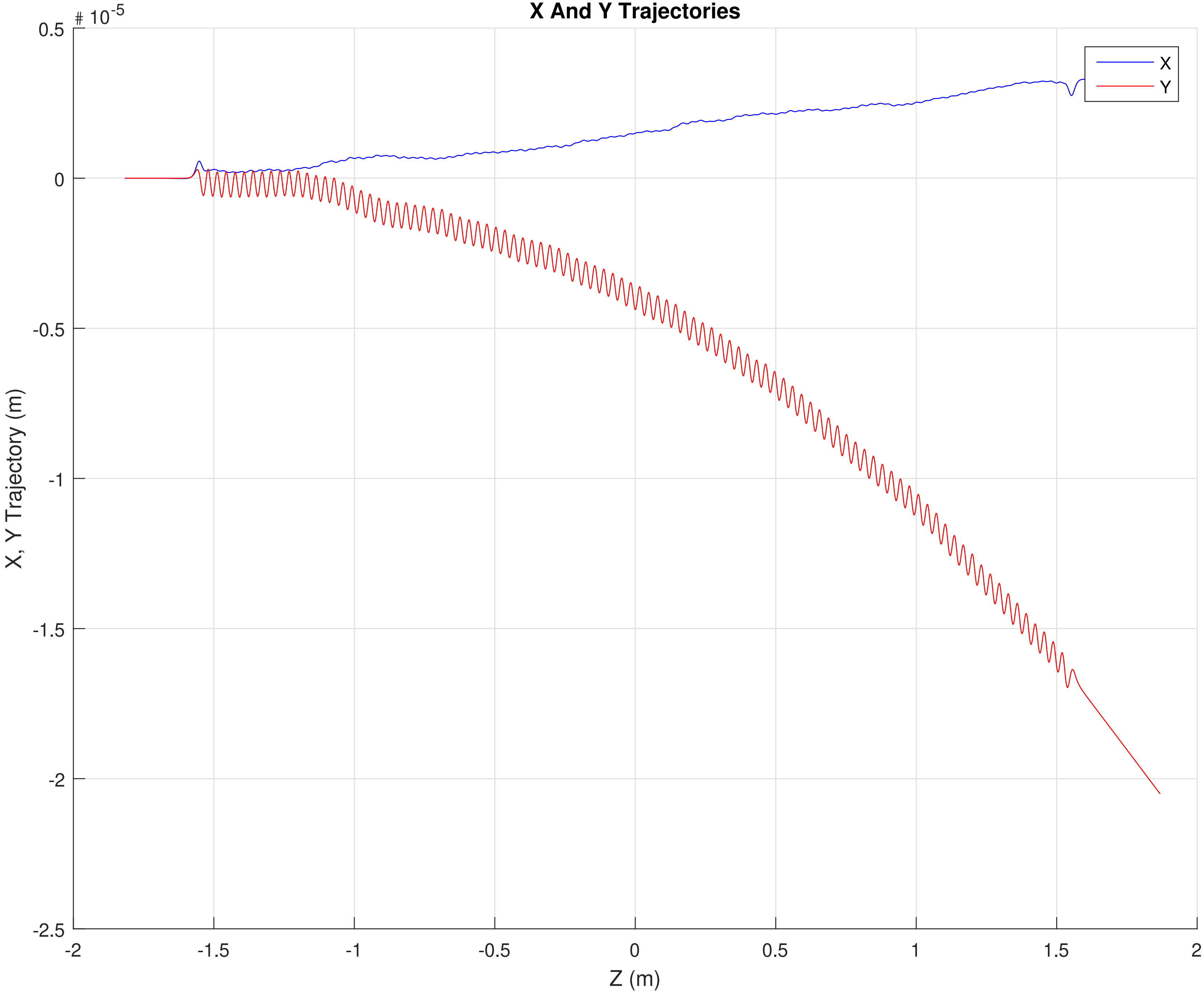
Zero Field Spacing: Ave = 0.016020 m, RMS = 0.001235 m

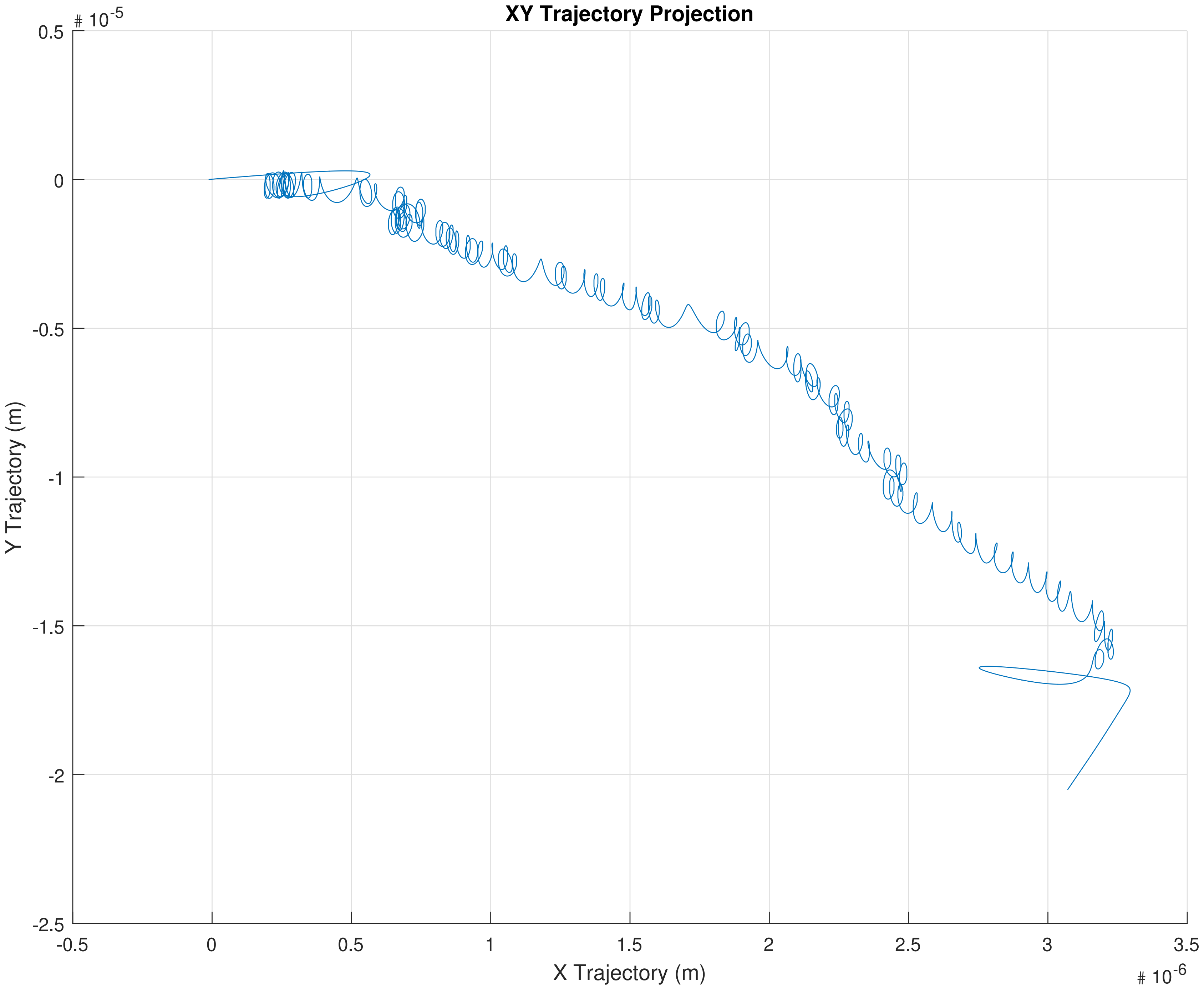

Bx Field Harmonics
Absolute Value Of An, Bn (T)
n
10^0
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
10^{-8}
0
2
4
6
8
10
12
14
16
18
20
|An|
|Bn|

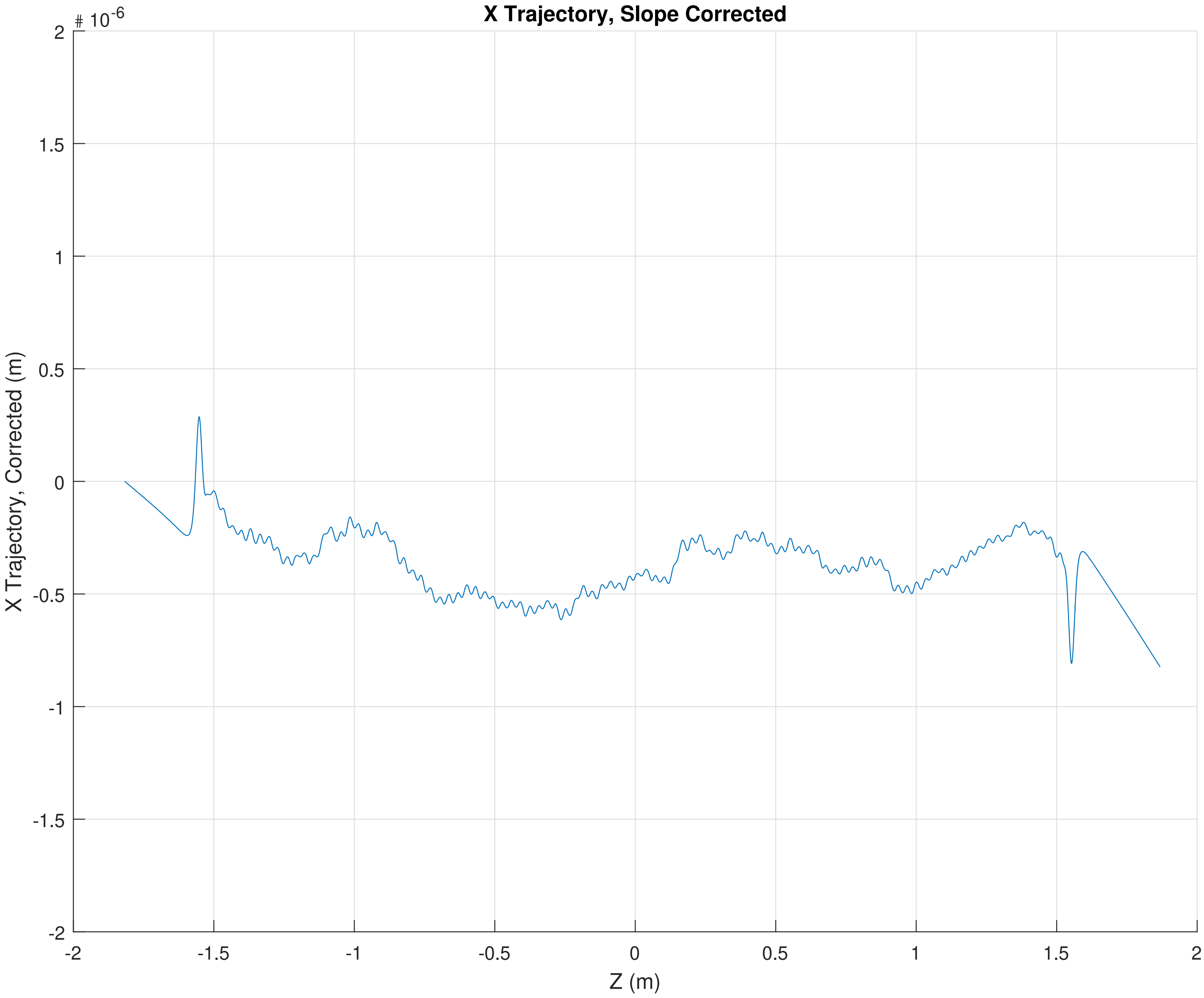

By Field Harmonics
Absolute Value Of An, Bn (T)
n
|An|
|Bn|
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
10^-7
0
2
4
6
8
10
12
14
16
18
20

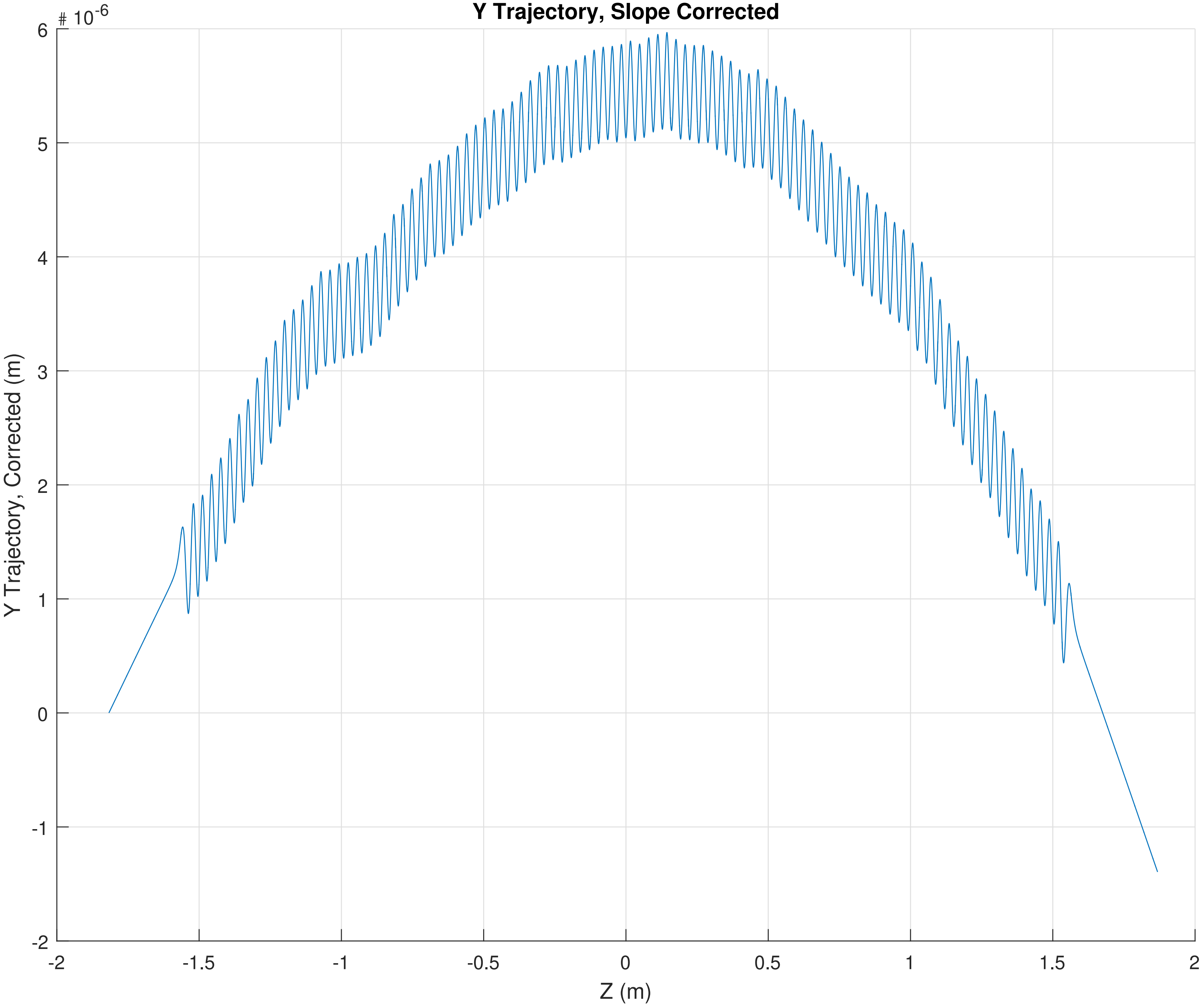

X Trajectory
10-6
5
36
68
99
130
161
193
Pole
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
X Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

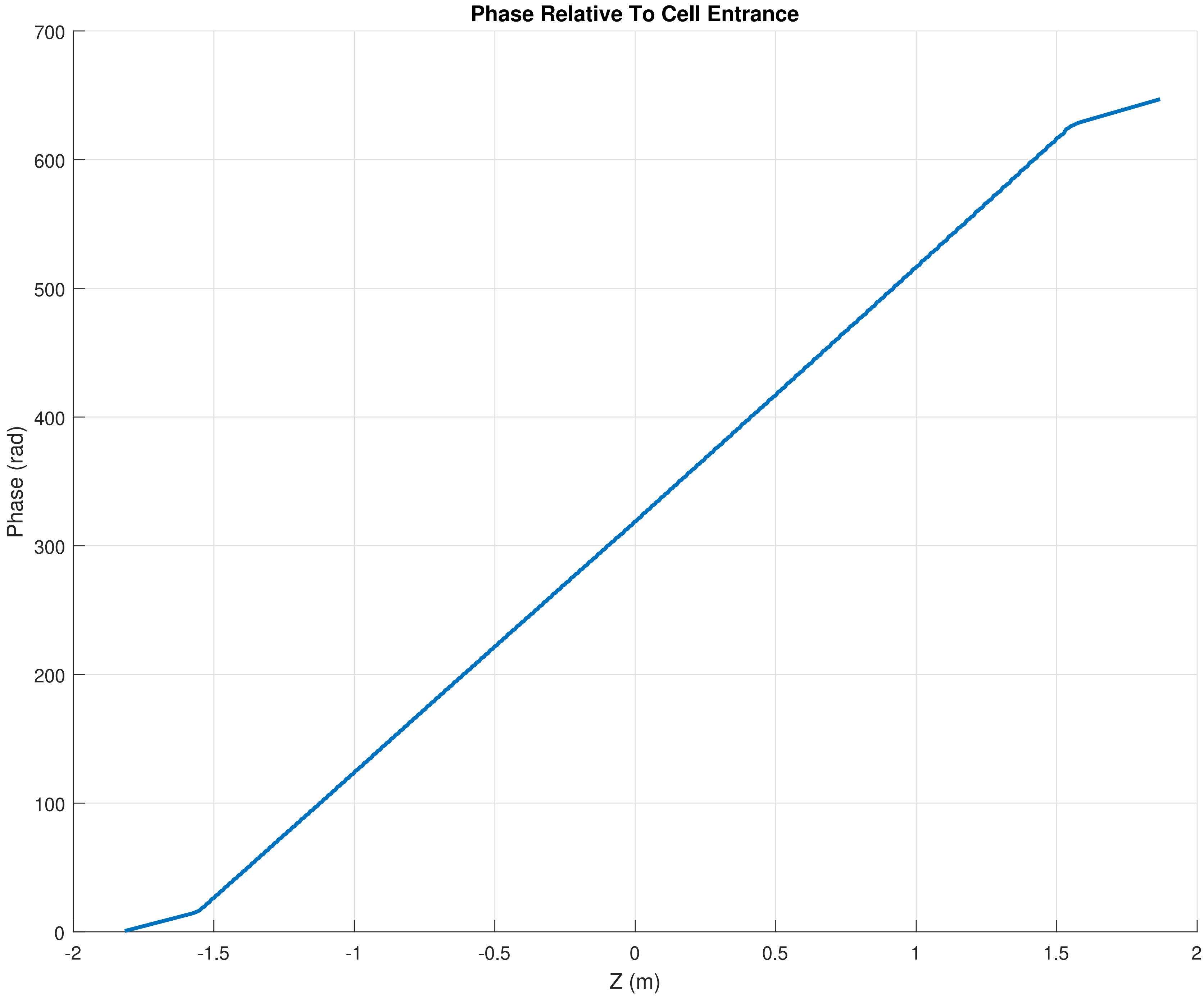

Y Trajectory
10^-5
0.5
0
-0.5
-1
-1.5
-2
-2.5
Y Trajectory (m)
5
36
68
99
130
161
193
Pole
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

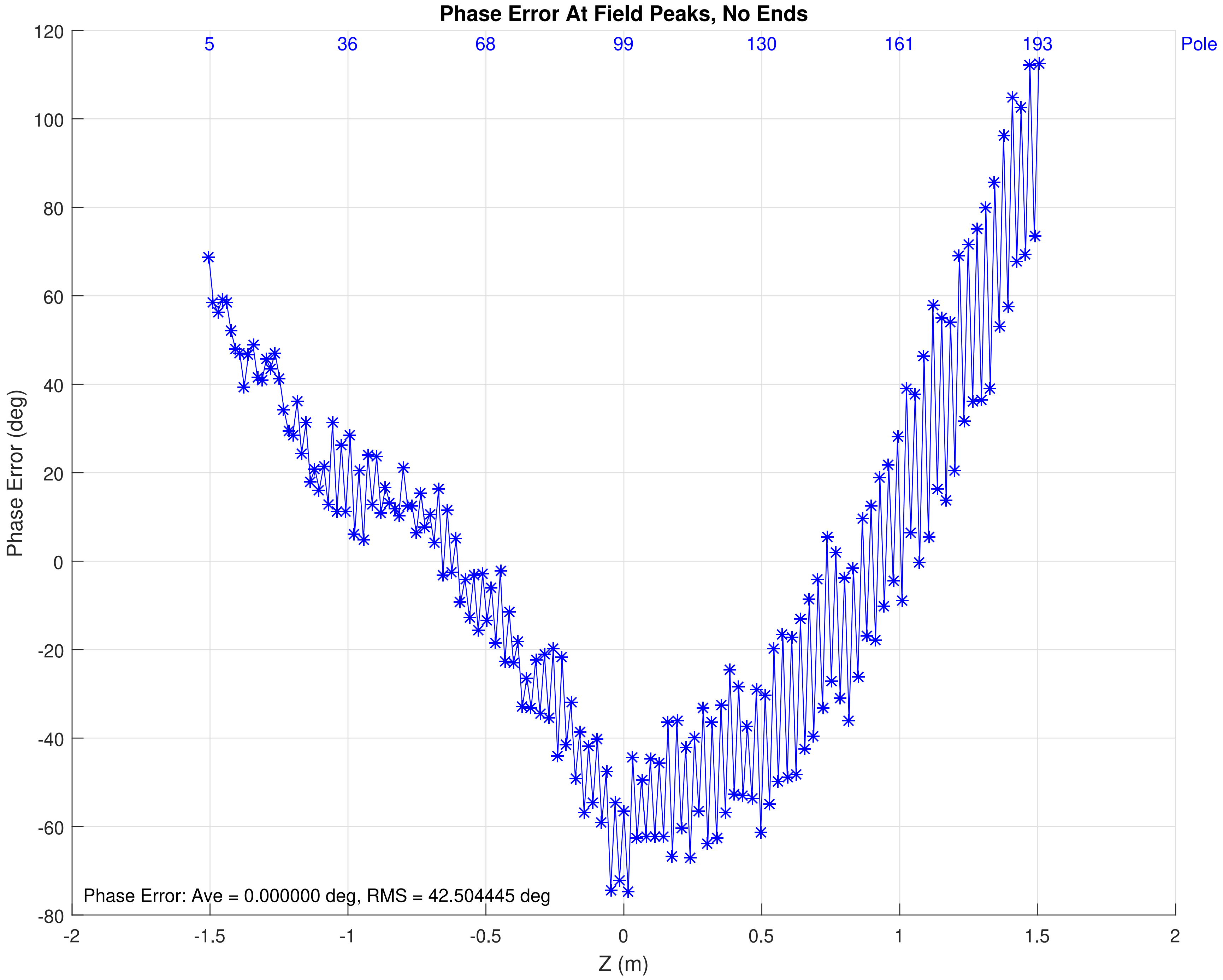

X And Y Trajectories
10^-5
0.5
0
-0.5
-1
-1.5
-2
-2.5
X, Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
X
Y

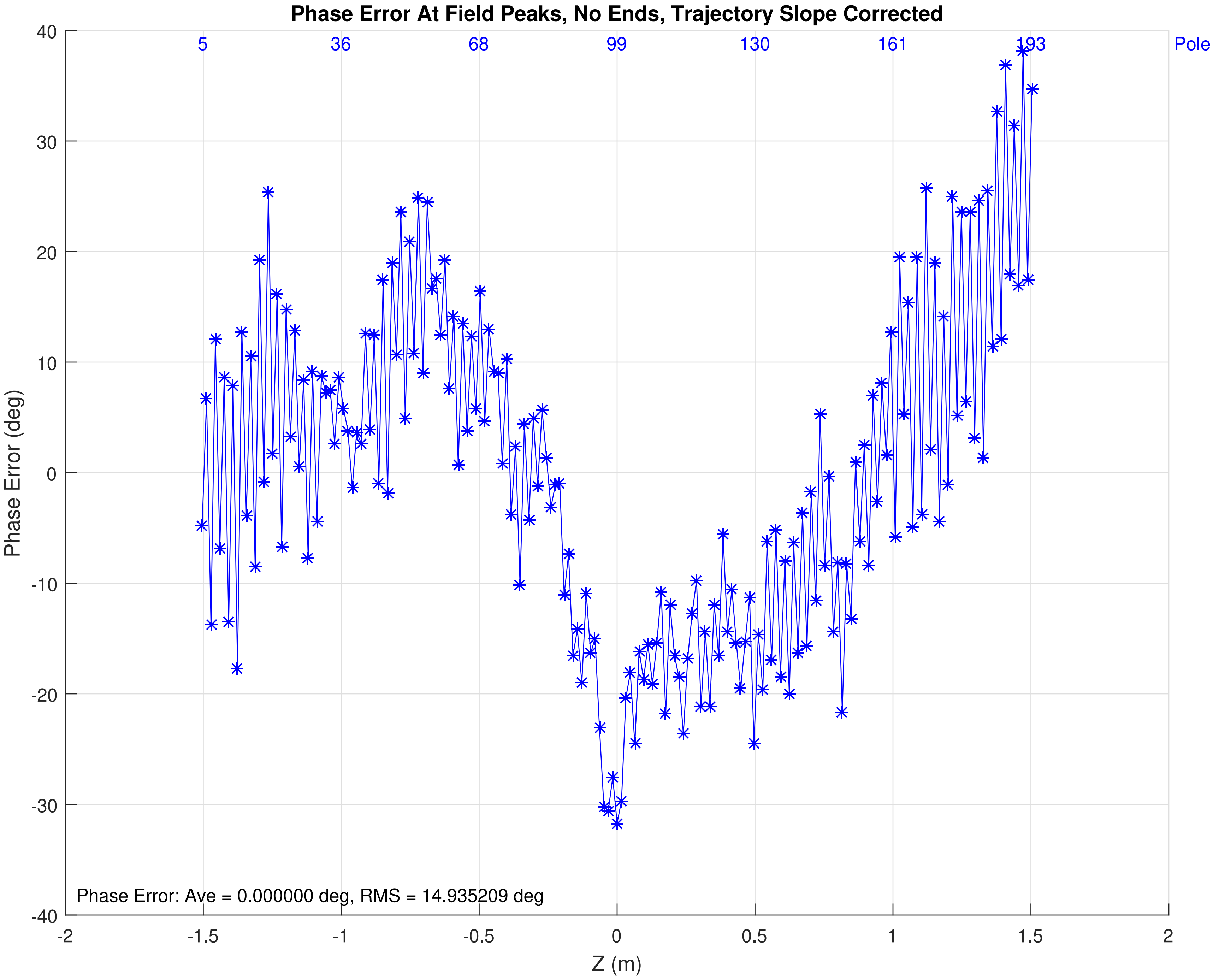

XY Trajectory Projection
10-5
0.5
0
-0.5
-1
-1.5
-2
-2.5
Y Trajectory (m)
-0.5
0
0.5
1
1.5
2
2.5
3
3.5
X Trajectory (m)
10-6

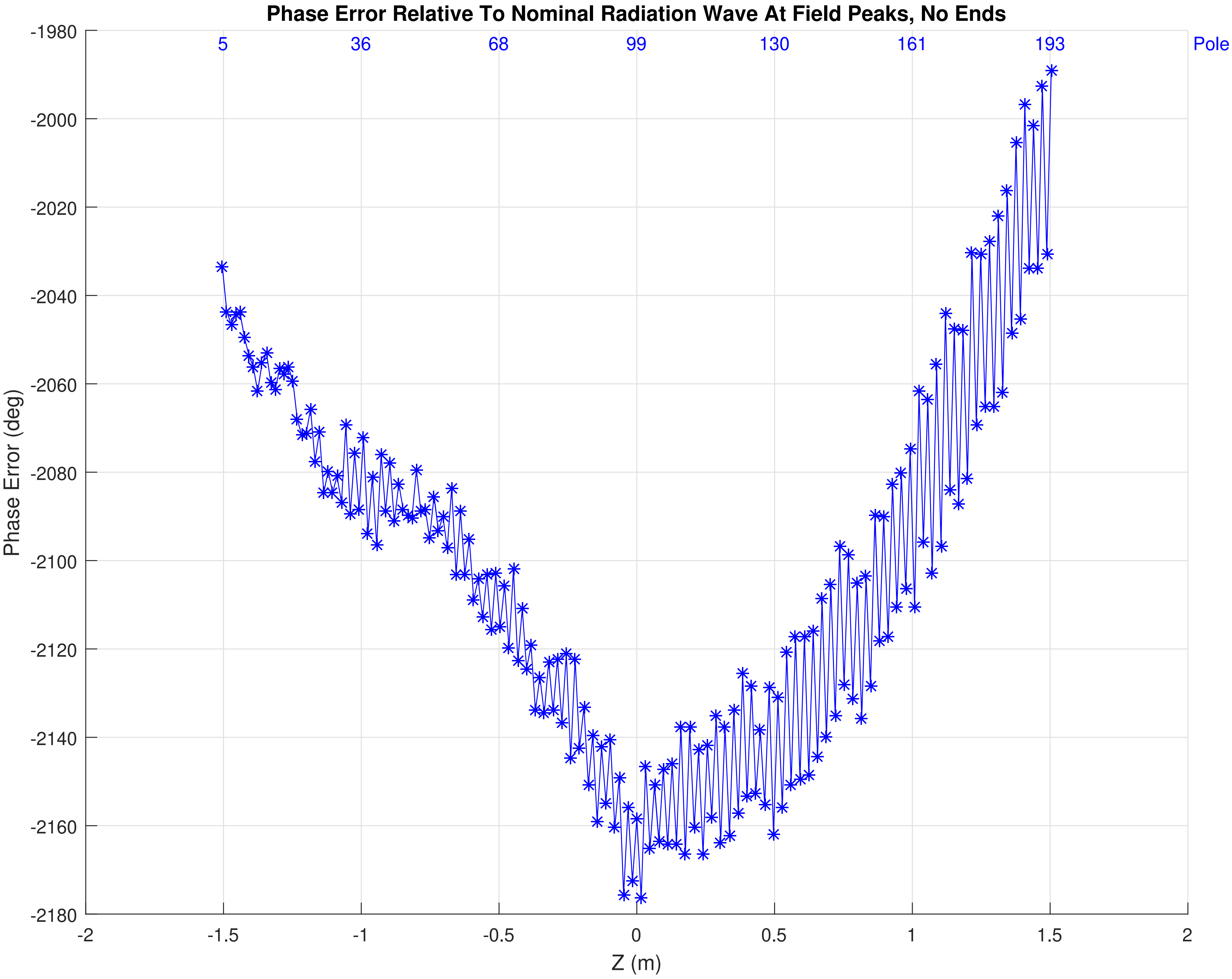

X Trajectory, Slope Corrected
10^-6
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
X Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)


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)

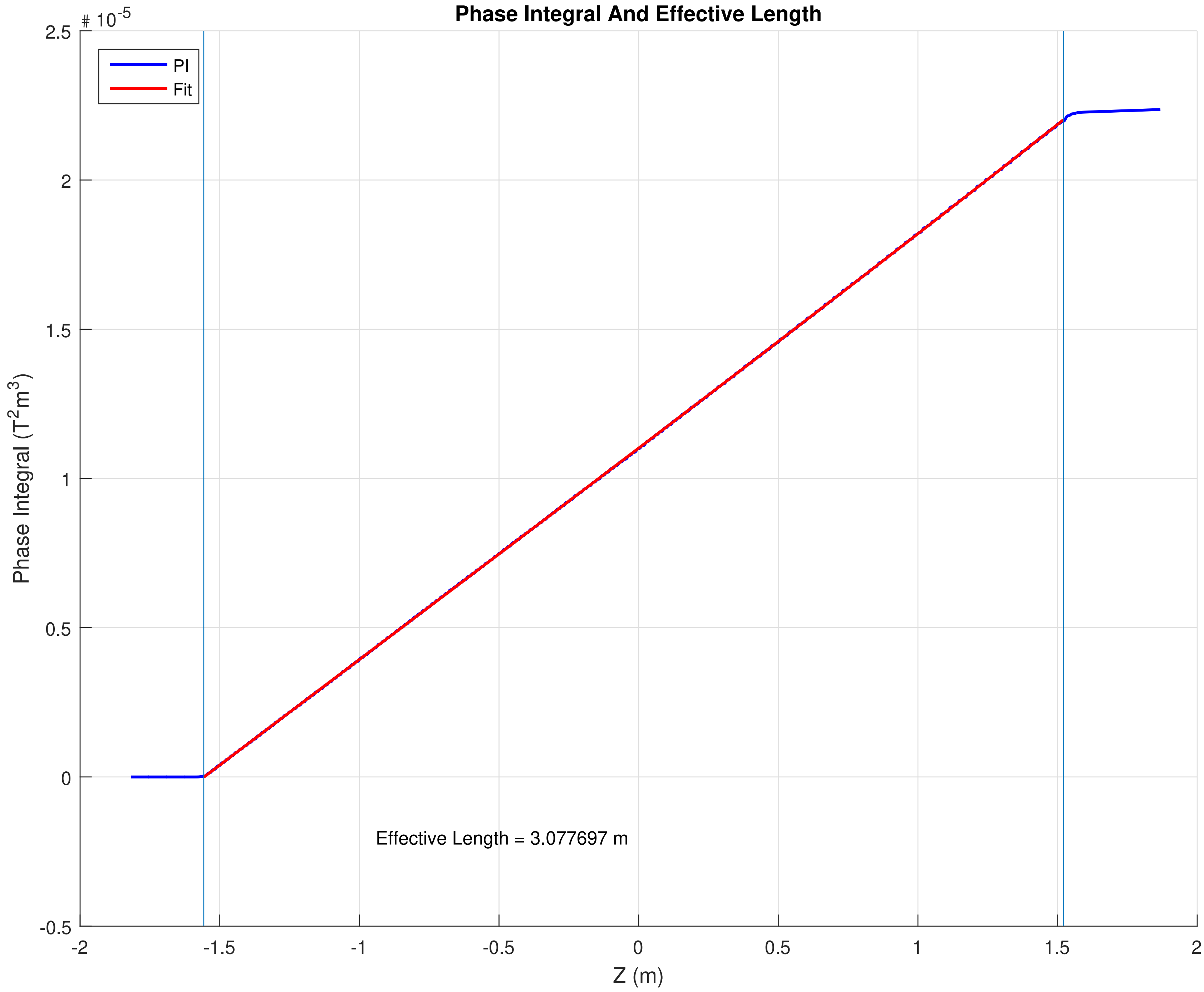

Phase Relative To Cell Entrance
Phase (rad)
0
100
200
300
400
500
600
700
Z (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2


Phase Error At Field Peaks, No Ends
5
36
68
99
130
161
193
Pole
120
100
80
60
40
20
0
-20
-40
-60
-80
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 = 42.504445 deg

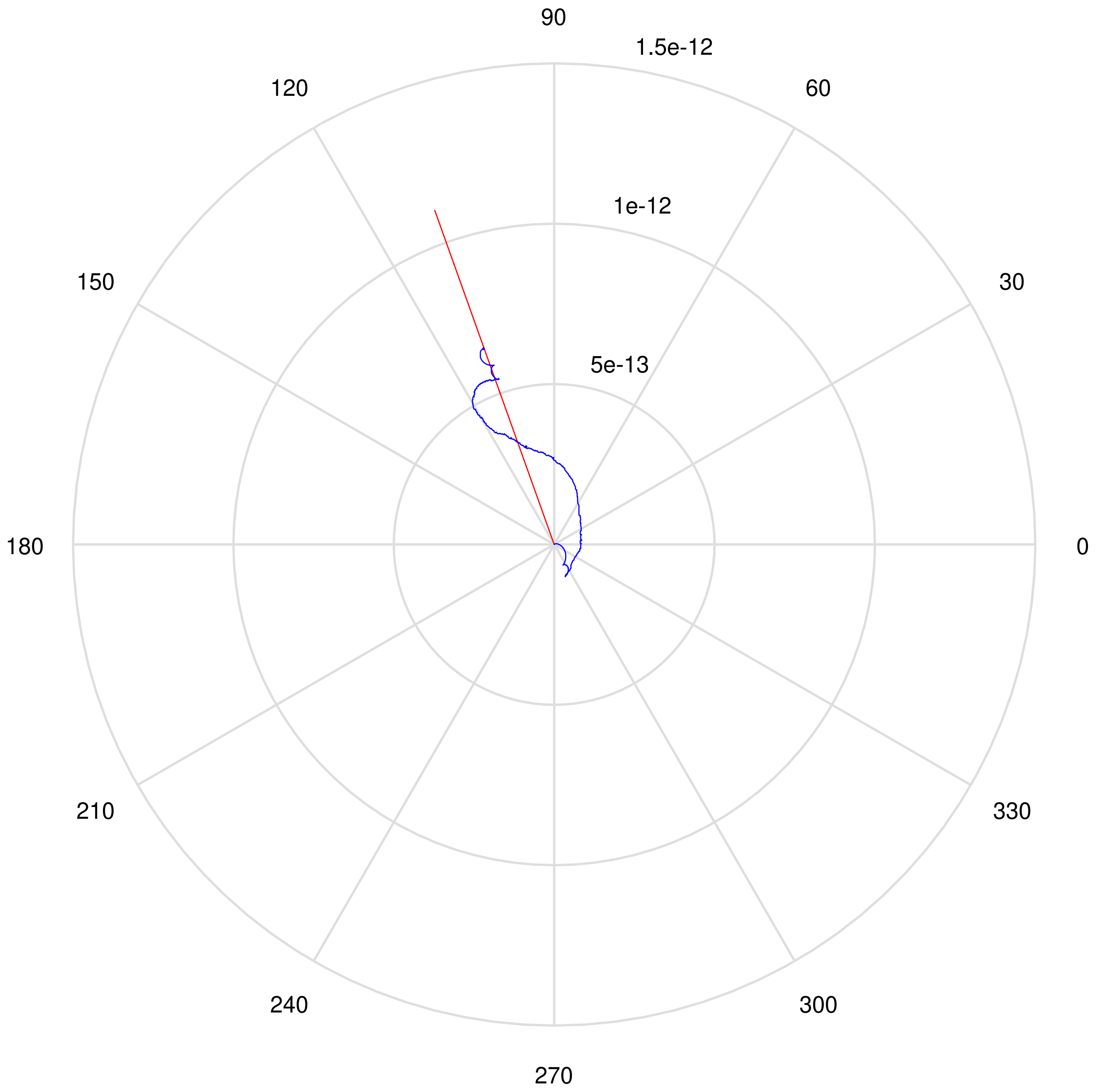

Phase Error At Field Peaks, No Ends, Trajectory Slope Corrected
Phase Error (deg)
Z (m)
40
30
20
10
0
-10
-20
-30
-40
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
5
36
68
99
130
161
193
Pole
Phase Error: Ave = 0.000000 deg, RMS = 14.935209 deg

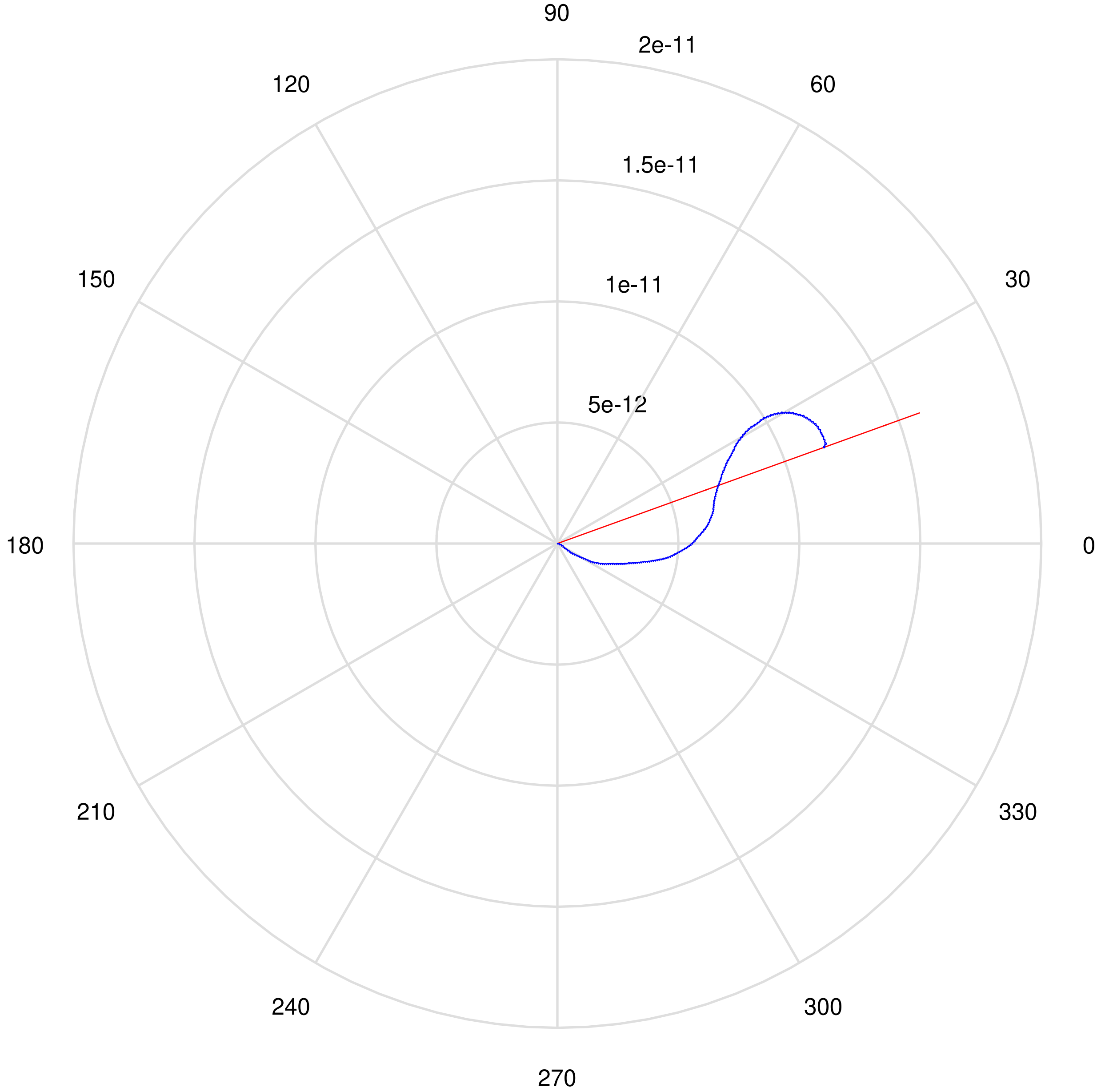


Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends

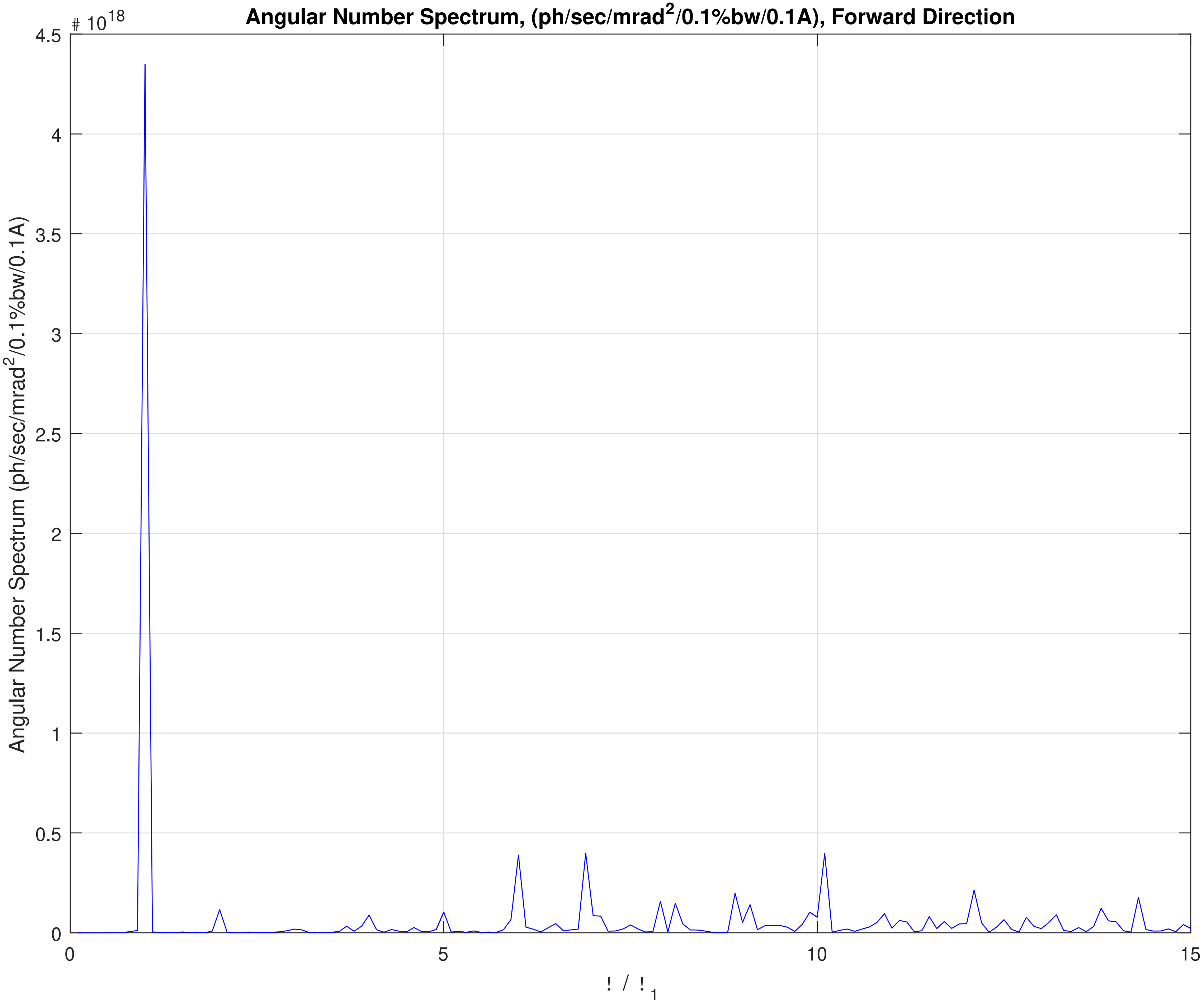

Phase Integral And Effective Length
10^-5
2.5
2
1.5
1
0.5
0
-0.5
Phase Integral (T^2m^3)
PI
Fit
Effective Length = 3.077697 m
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

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

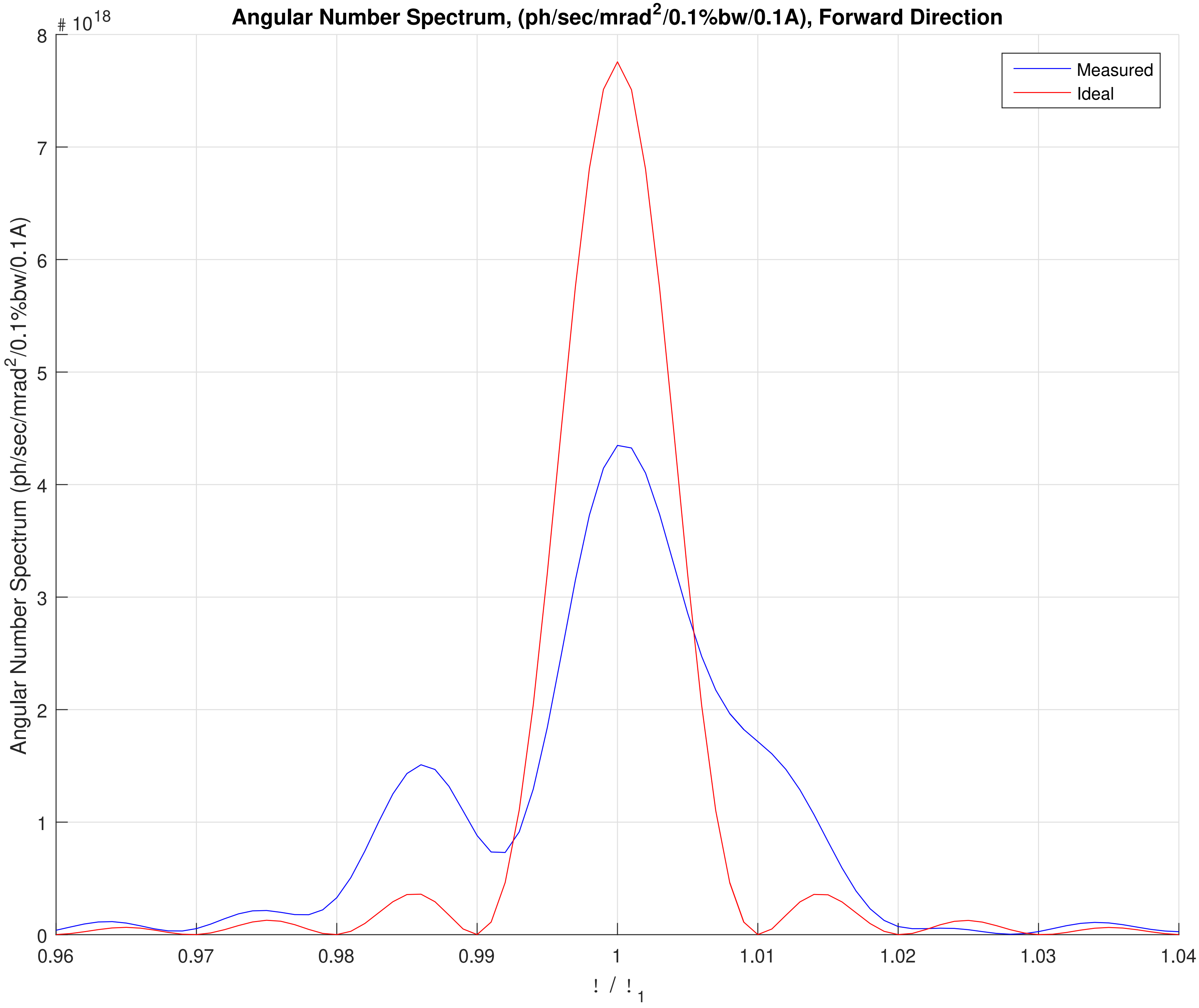


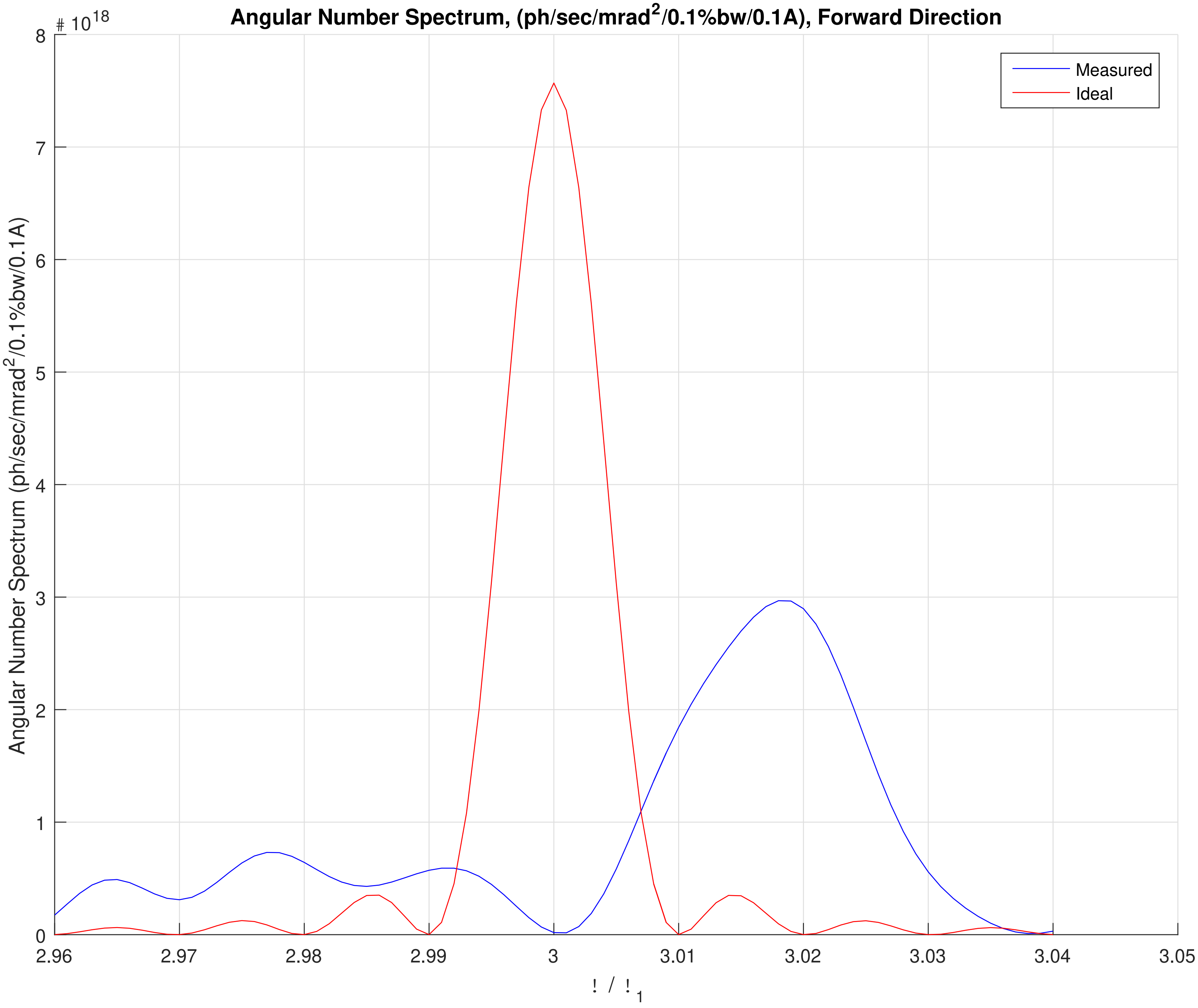


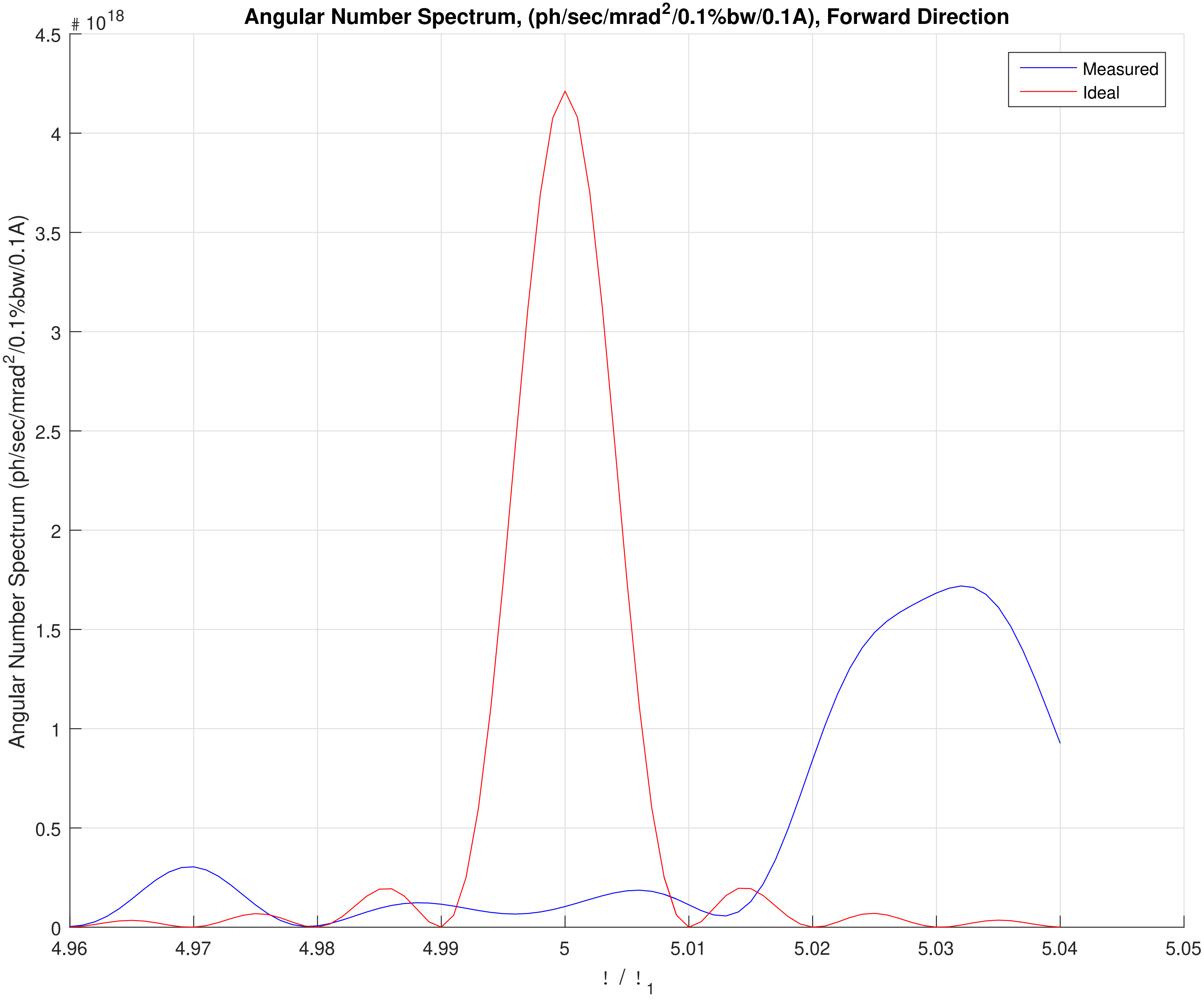
Re and Im Parts Of Ey(!), Forward Direction, ! = !$_1$



Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction


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)
0
1
2
3
4
5
6
7
8
0.96
0.97
0.98
0.99
1
1.01
1.02
1.03
1.04
! / !$_1$
Measured
Ideal


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


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