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SLAC Magnetic Measurements

EPU Analysis
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INPUT-FILE-TYPE =ZBXYZH
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NOM-K-VALUE =0
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NUM-POLES =196
NUM-END-POLES =4
CELL-LENGTH =3.656
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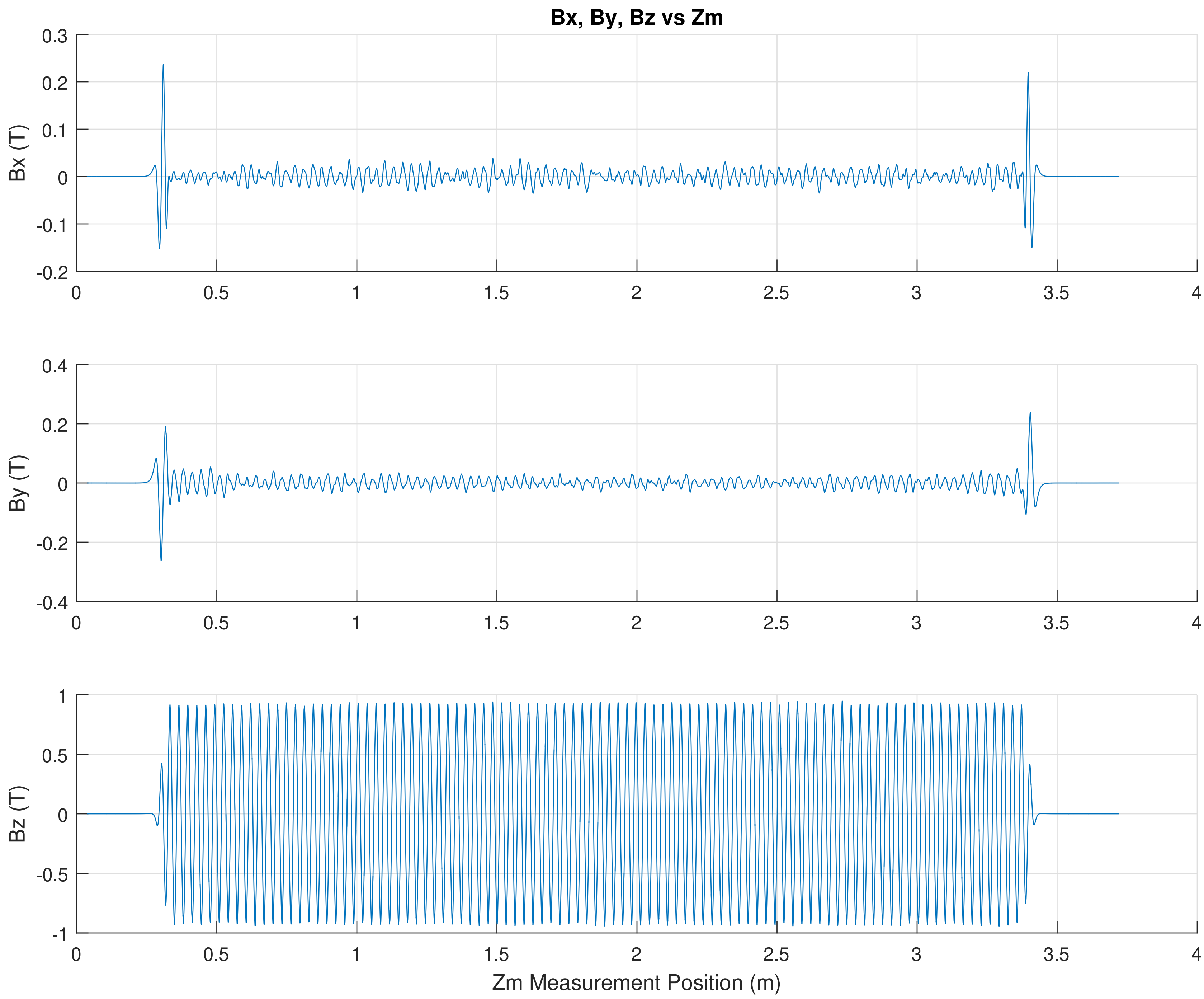
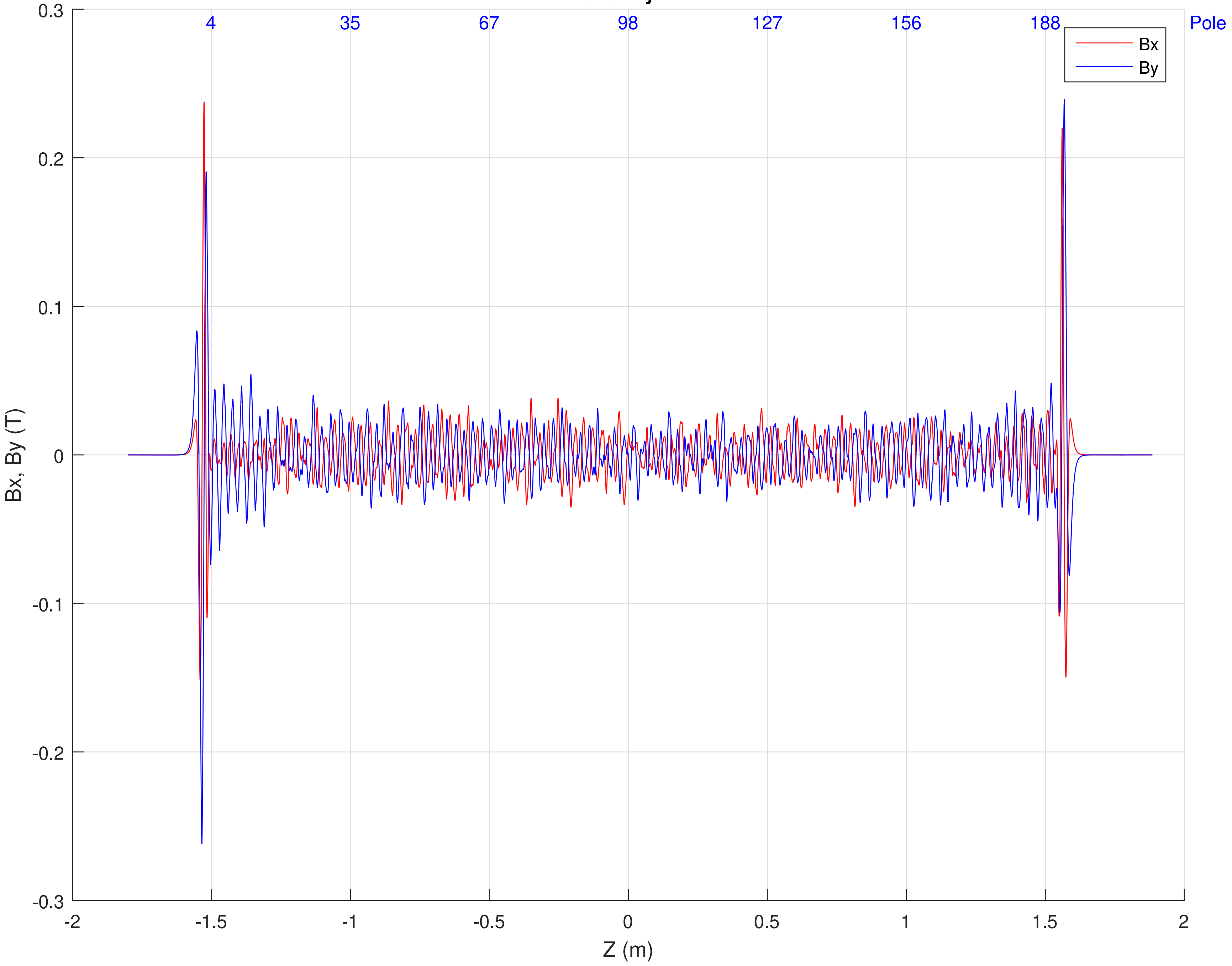
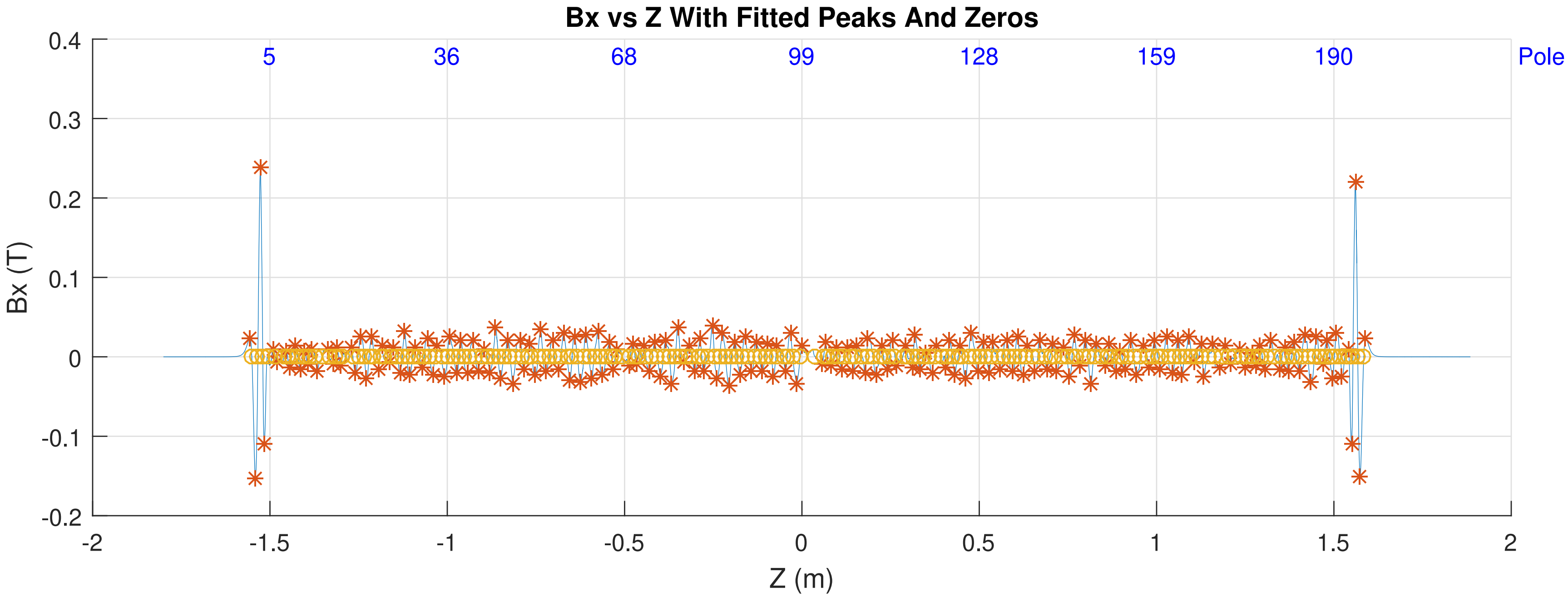
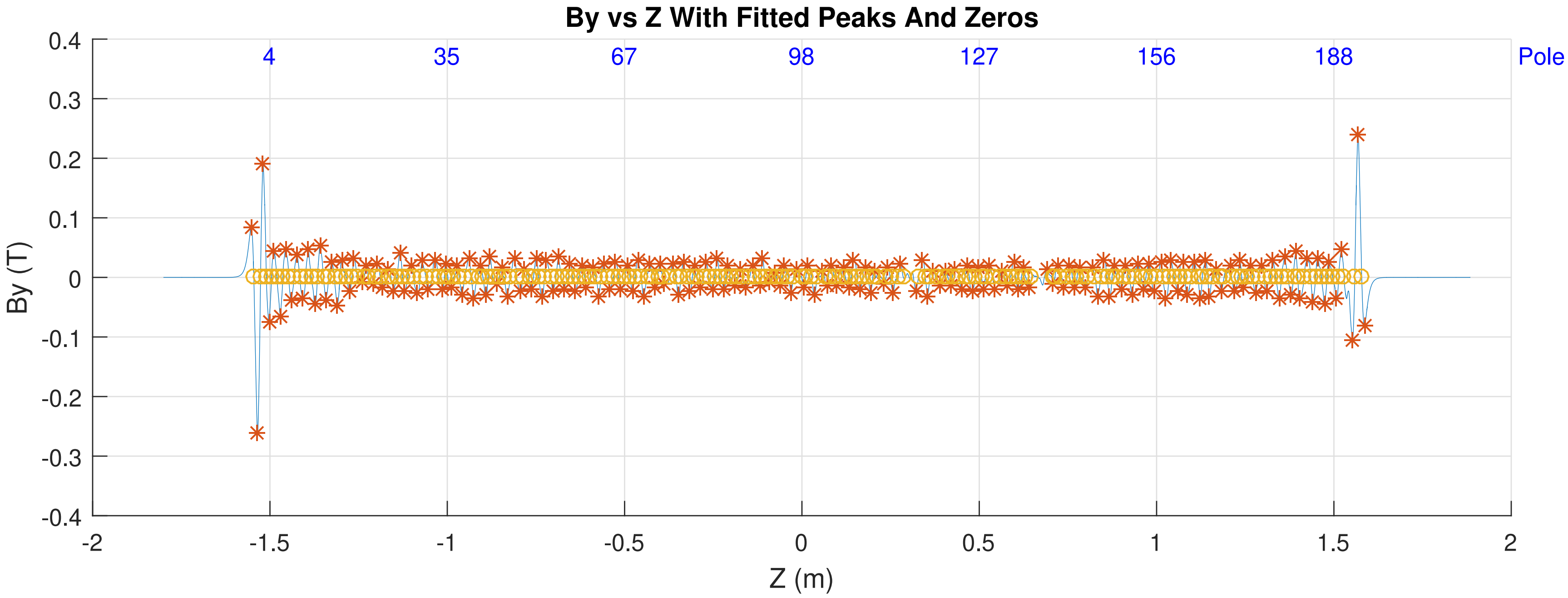
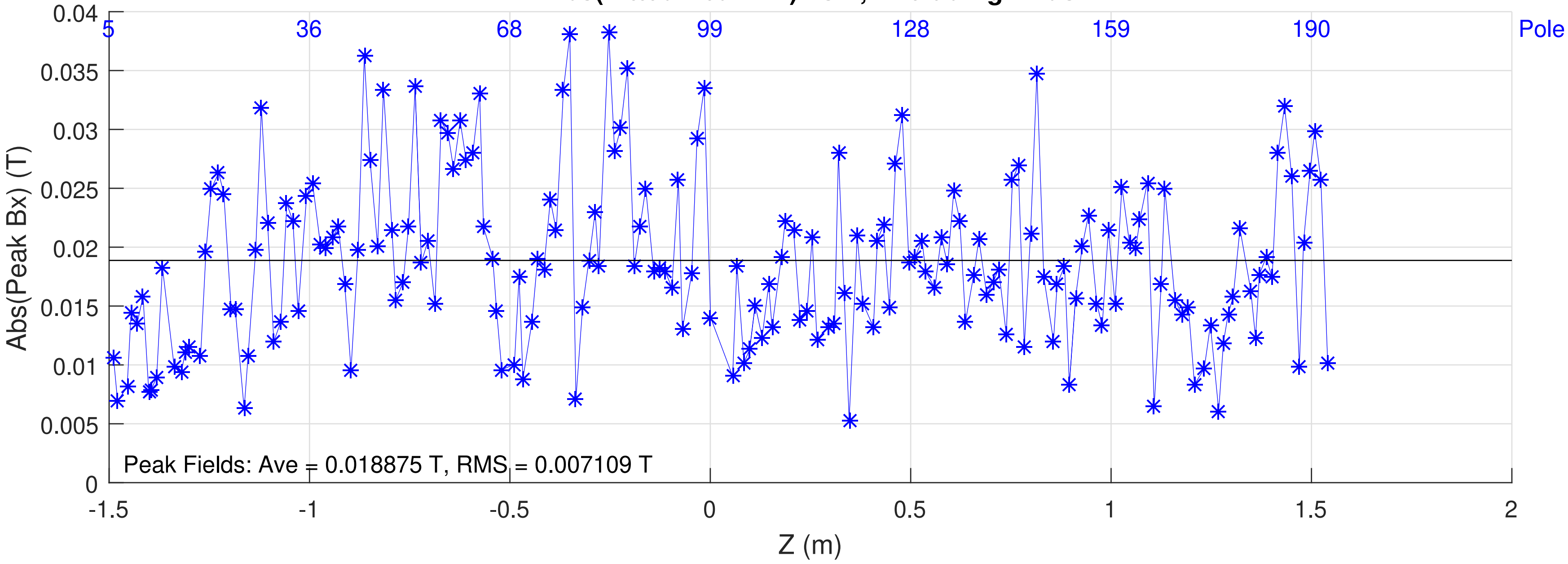

Bx, By, Bz vs Zm
Bx (T)
0.3
0.2
0.1
0
-0.1
-0.2
By (T)
0.4
0.2
0
-0.2
-0.4
Bz (T)
1
0.5
0
-0.5
-1
0
0.5
1
1.5
2
2.5
3
3.5
4
Zm Measurement Position (m)

Bx and By vs Z

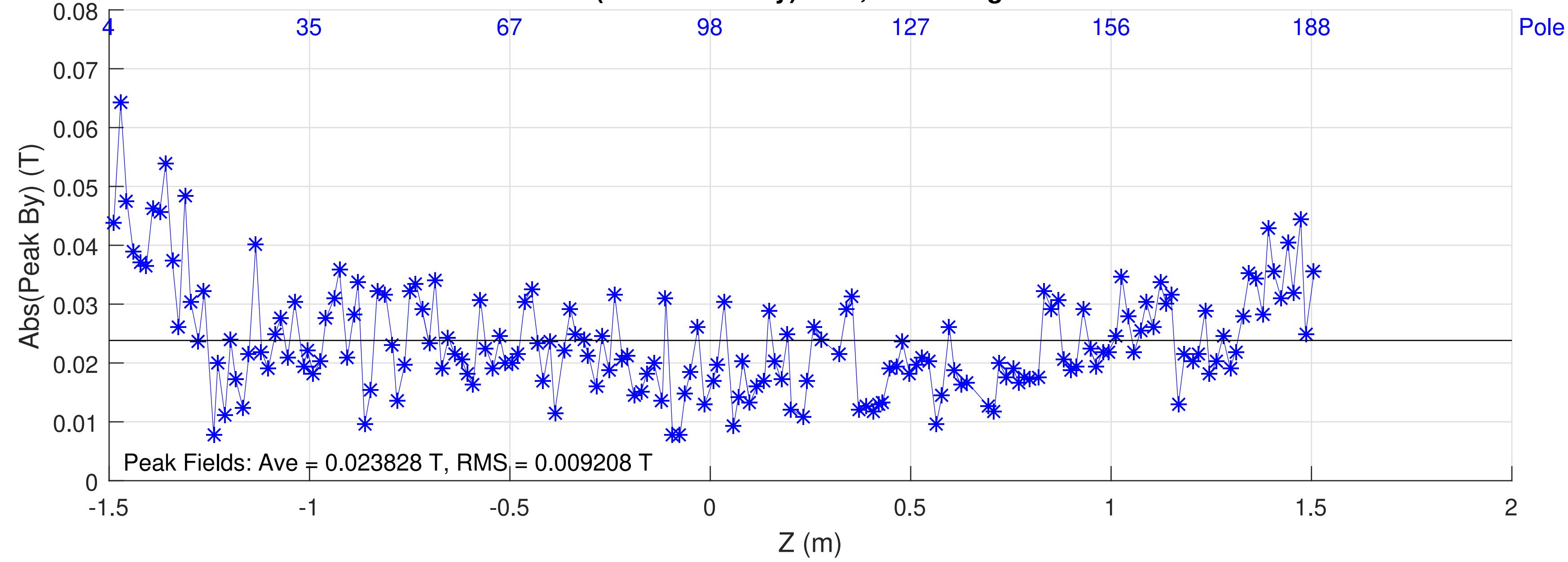

4
35
67
98
127
156
188
Pole
Bx
By
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
Bx, By (T)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)


Bx vs Z With Fitted Peaks And Zeros
5
36
68
99
128
159
190
Pole
Bx (T)
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

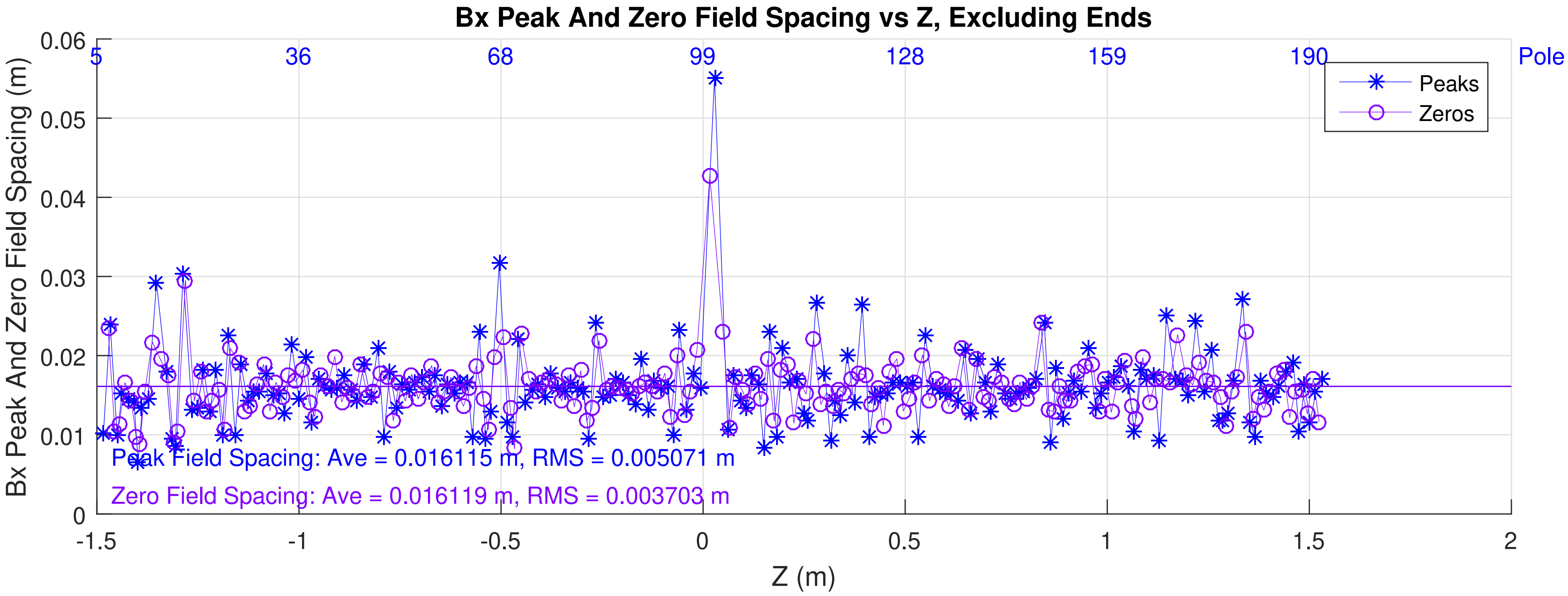

By vs Z With Fitted Peaks And Zeros
4
35
67
98
127
156
188
Pole
By (T)
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

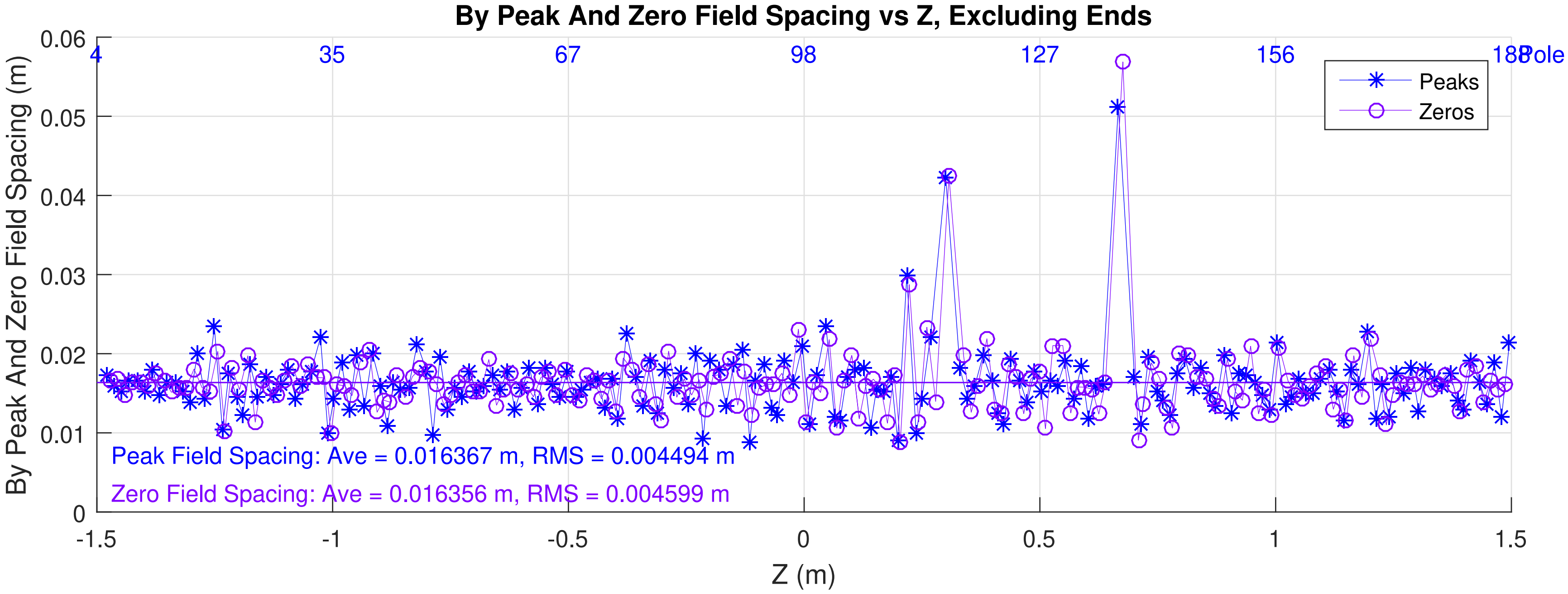


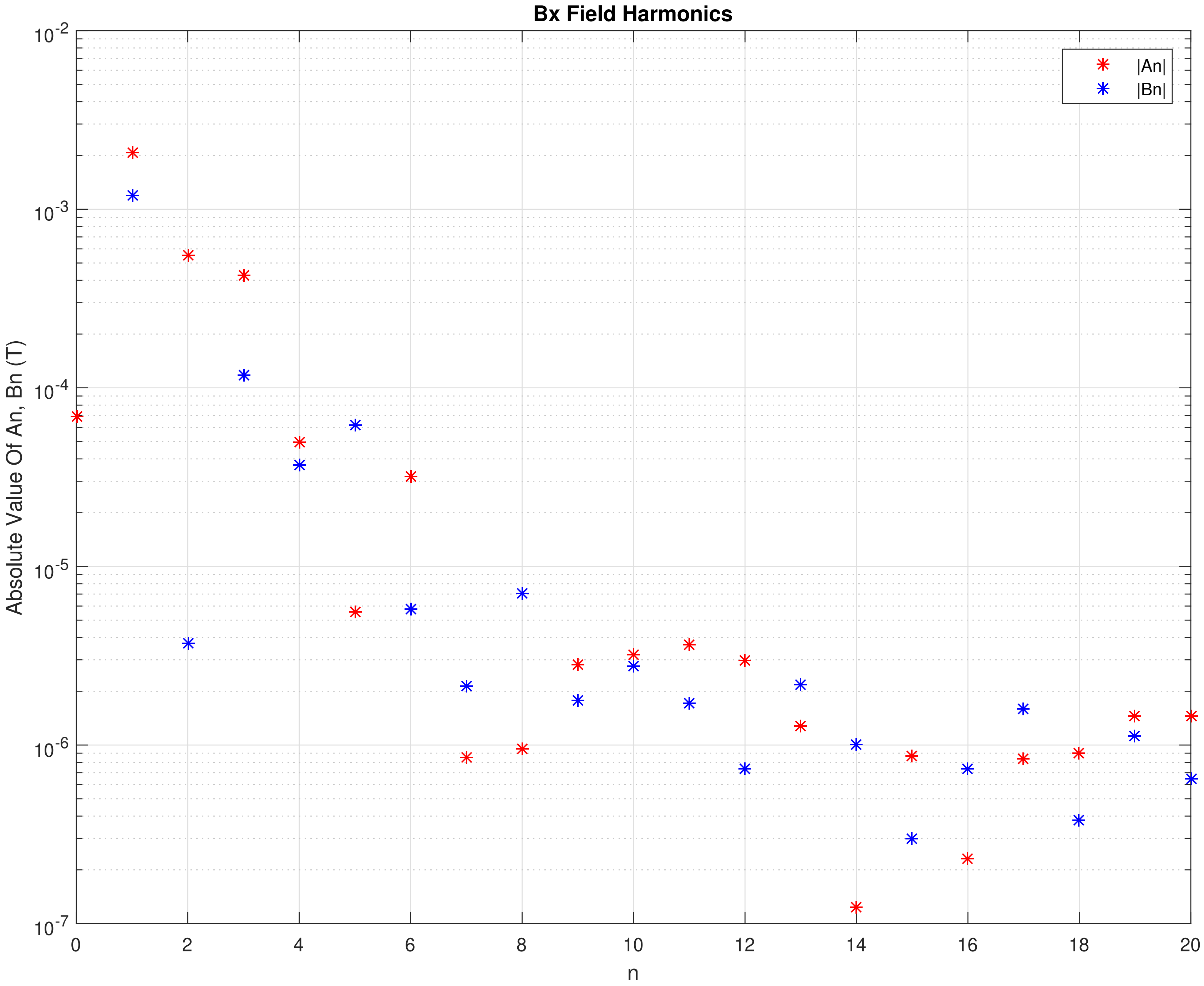
Abs(Fitted Peak Bx) vs Z, Excluding Ends

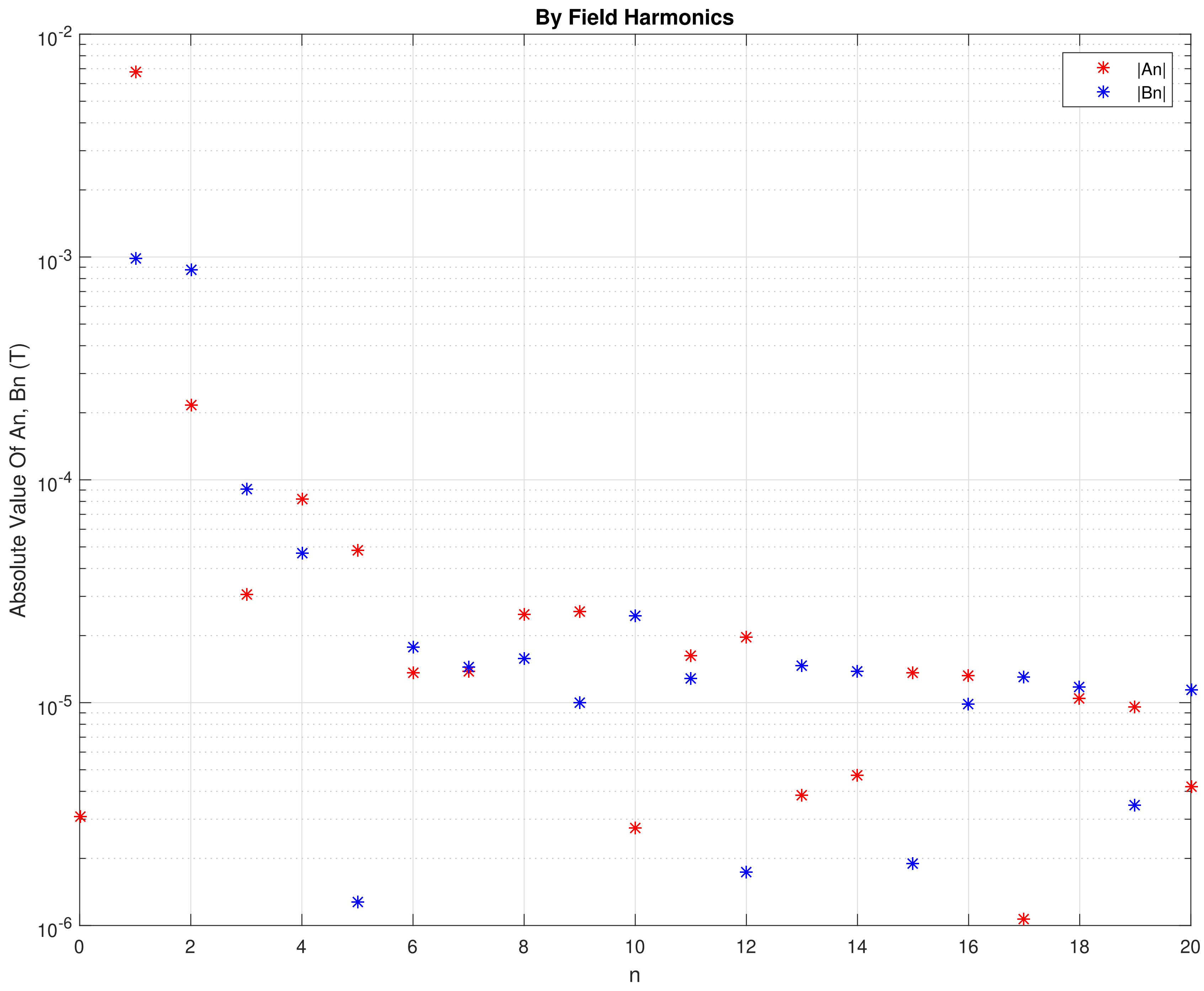


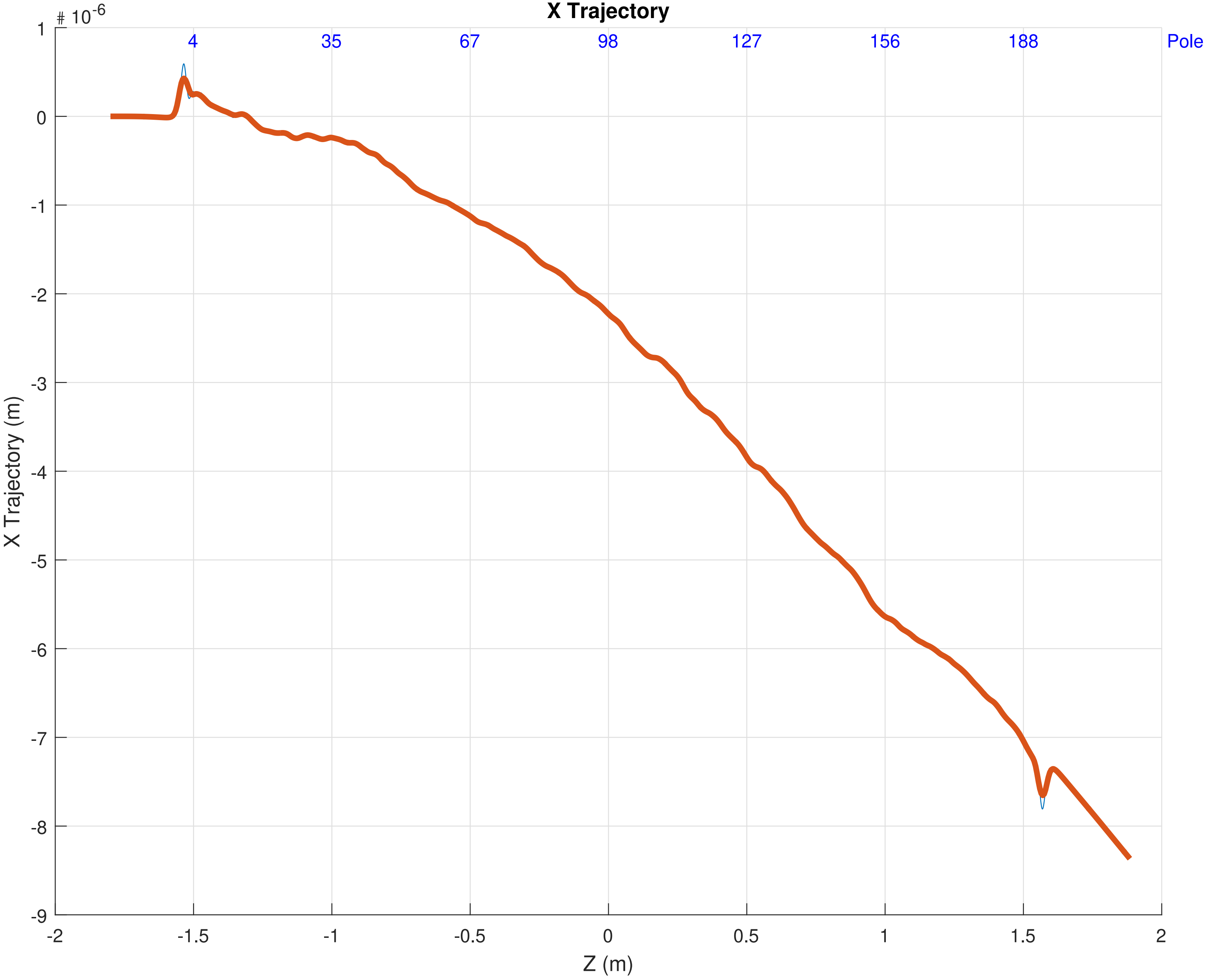
Abs(Fitted Peak By) vs Z, Excluding Ends


Bx Peak And Zero Field Spacing vs Z, Excluding Ends

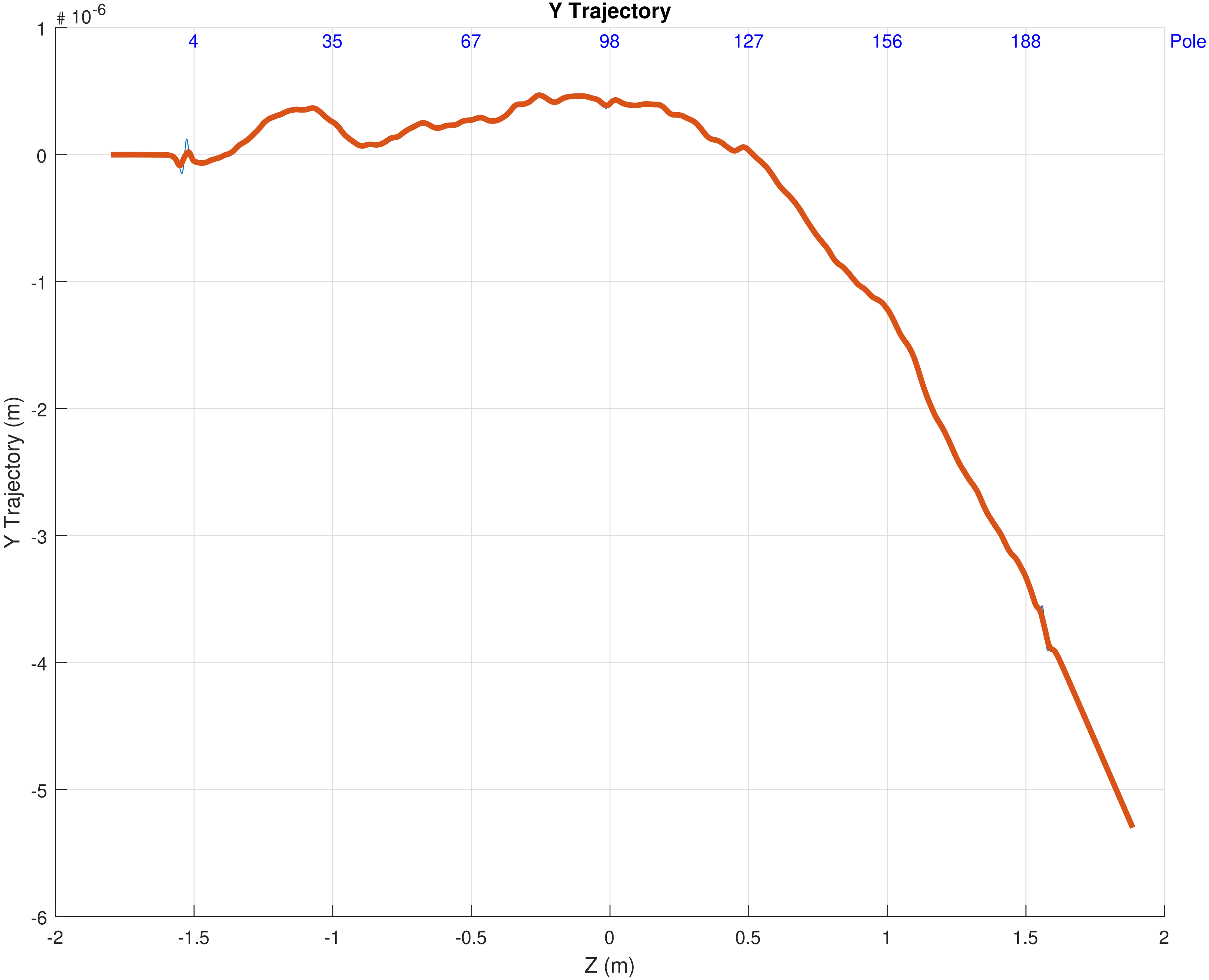

By Peak And Zero Field Spacing vs Z, Excluding Ends

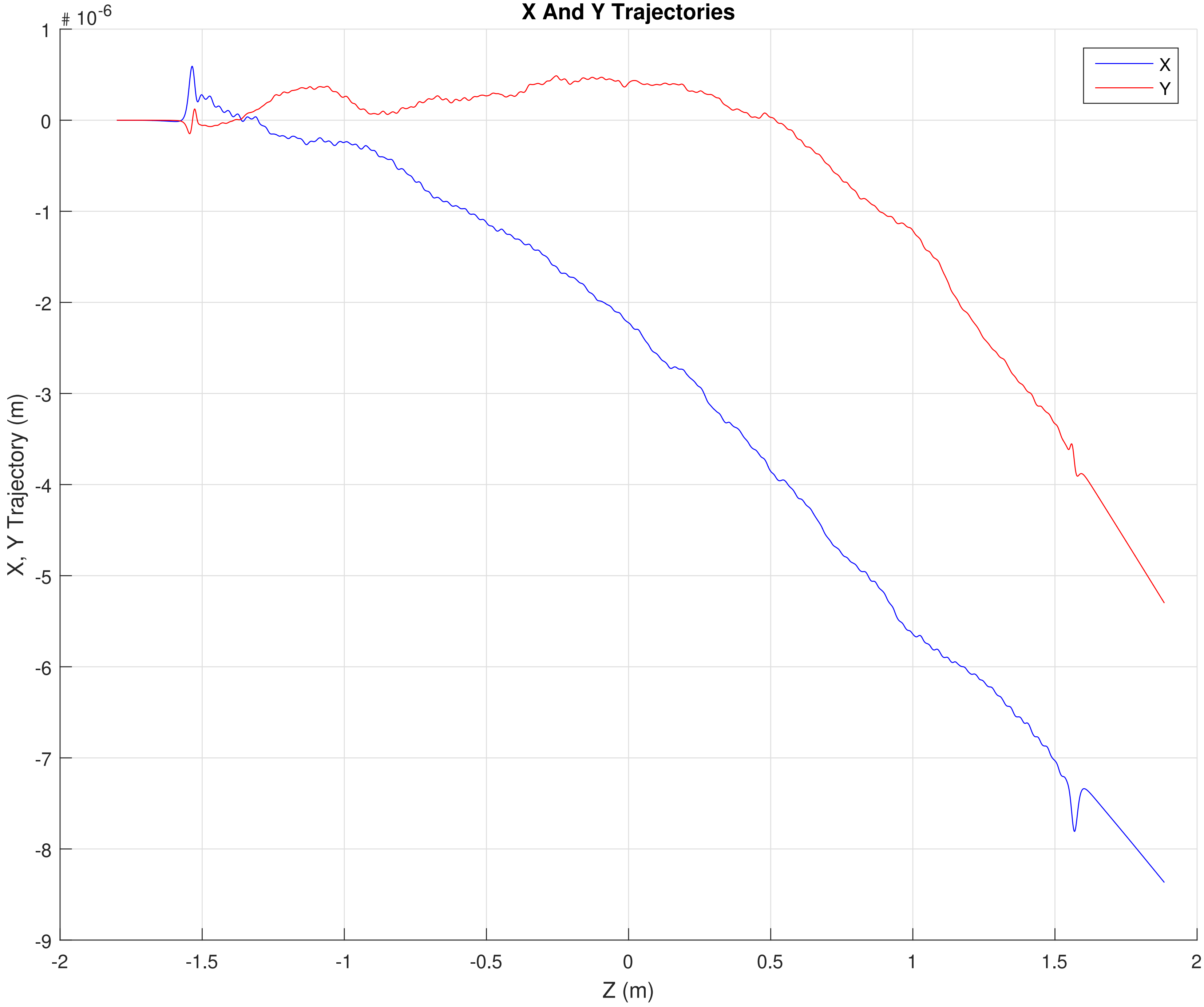

Bx Field Harmonics
Absolute Value Of An, Bn (T)
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
0
2
4
6
8
10
12
14
16
18
20
n
|An|
|Bn|

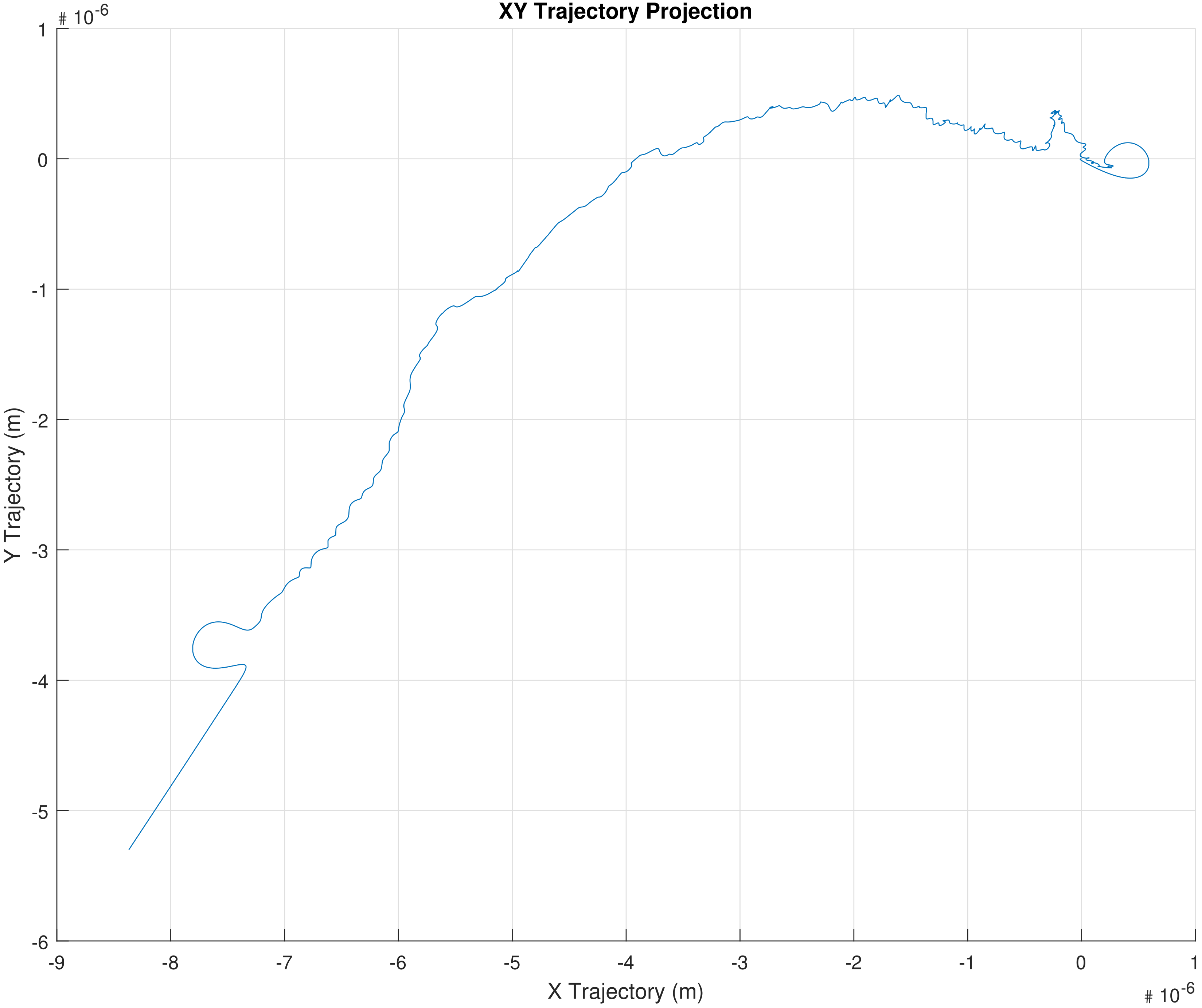

By Field Harmonics
Absolute Value Of An, Bn (T)
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
0
2
4
6
8
10
12
14
16
18
20
n
|An|
|Bn|

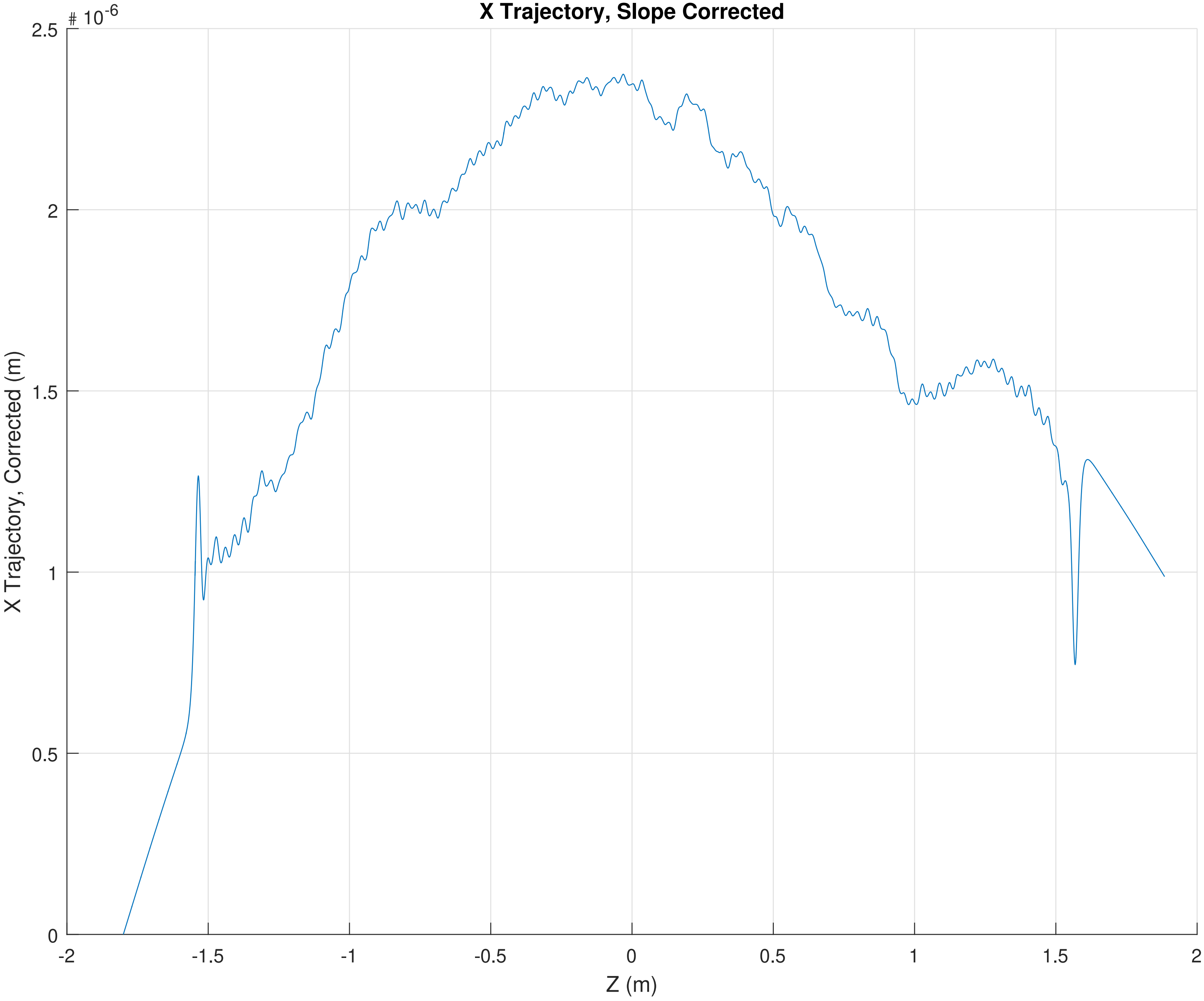


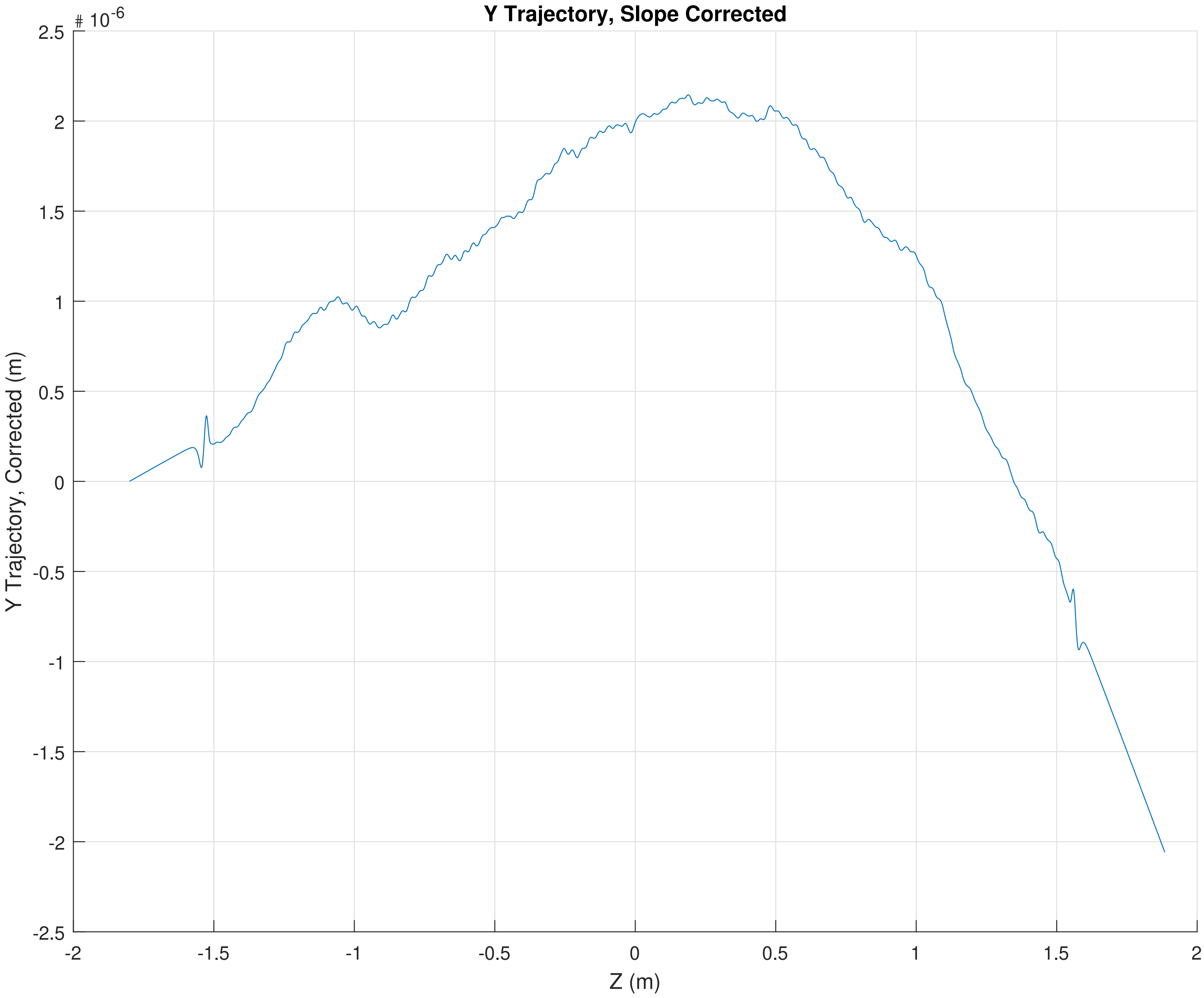
X Trajectory
10^-6
1
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
X Trajectory (m)
4
35
67
98
127
156
188
Pole
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

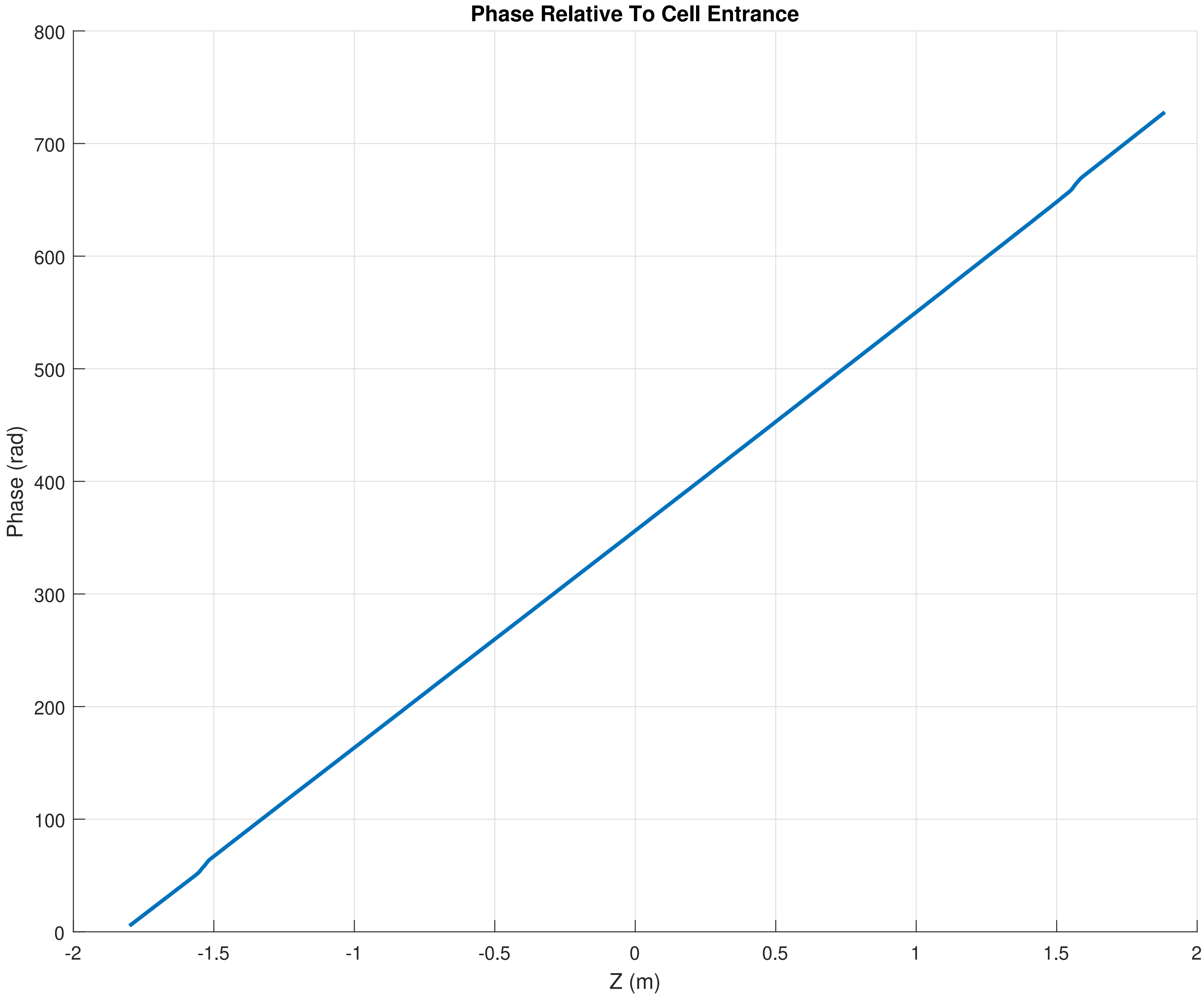

Y Trajectory
10^-6
1
0
-1
-2
-3
-4
-5
-6
Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
4
35
67
98
127
156
188
Pole

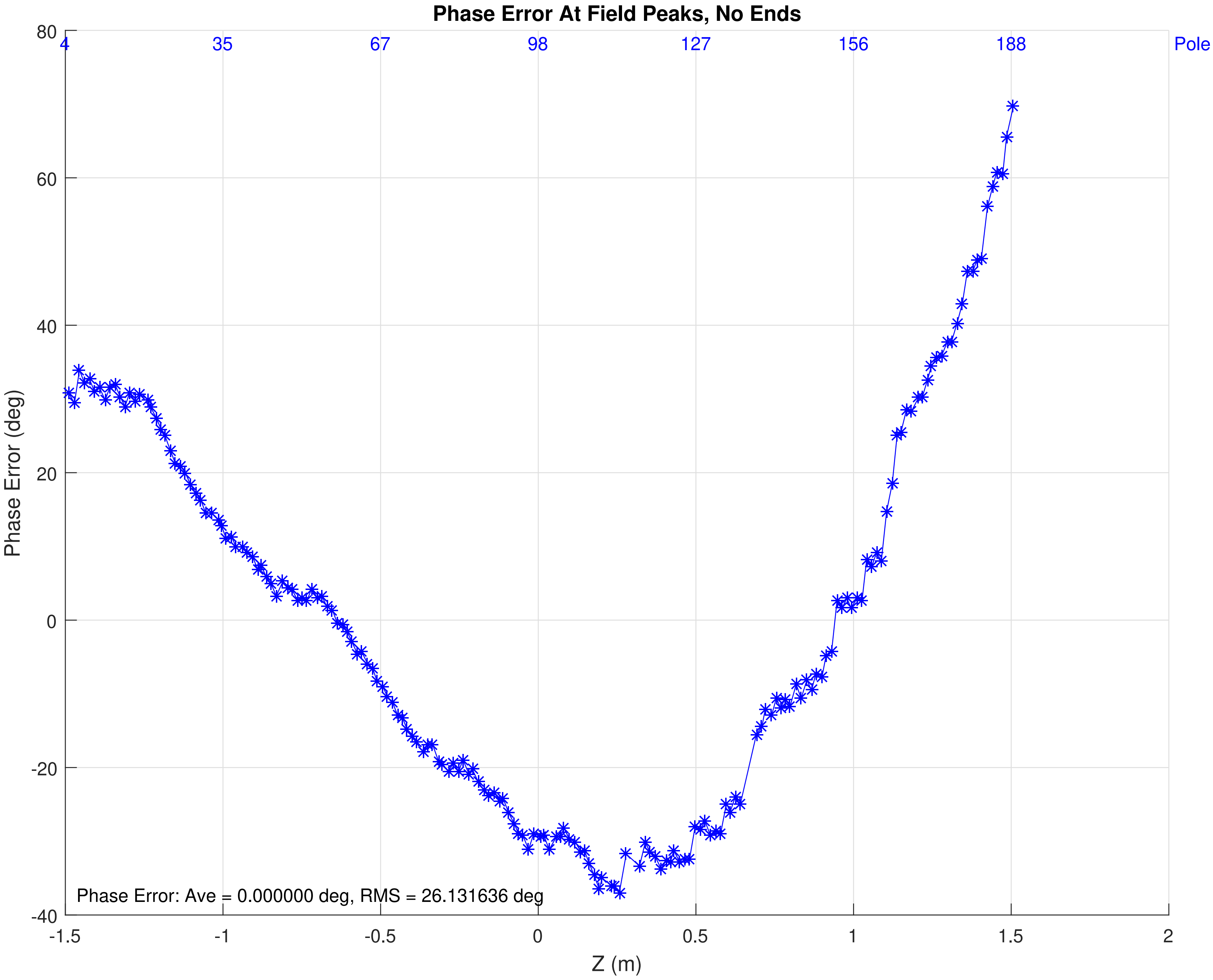

X And Y Trajectories
10^-6
1
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
X, Y Trajectory (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
X
Y

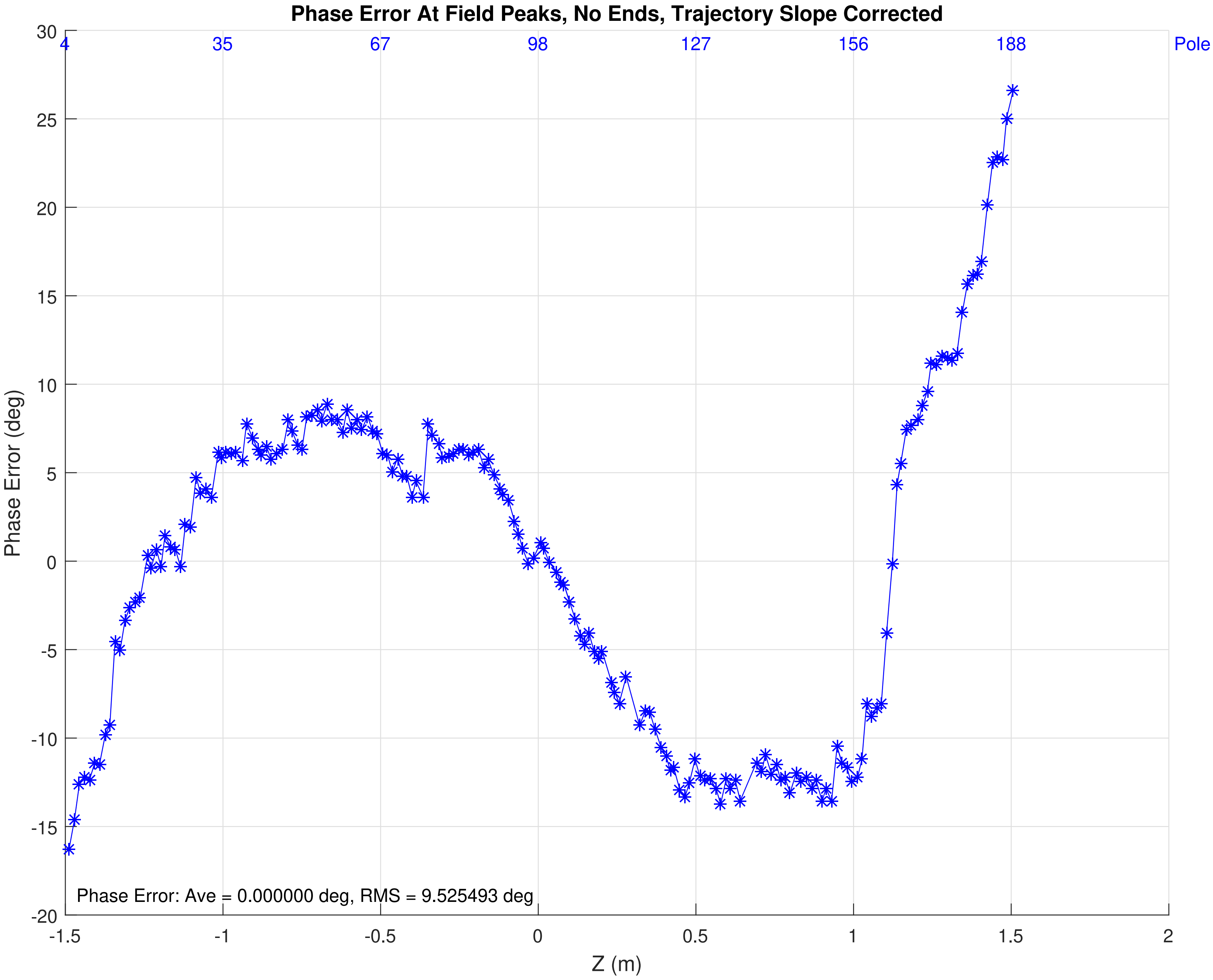

XY Trajectory Projection
10-6
1
0
-1
-2
-3
-4
-5
-6
Y Trajectory (m)
-9
-8
-7
-6
-5
-4
-3
-2
-1
0
1
X Trajectory (m)
10-6


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

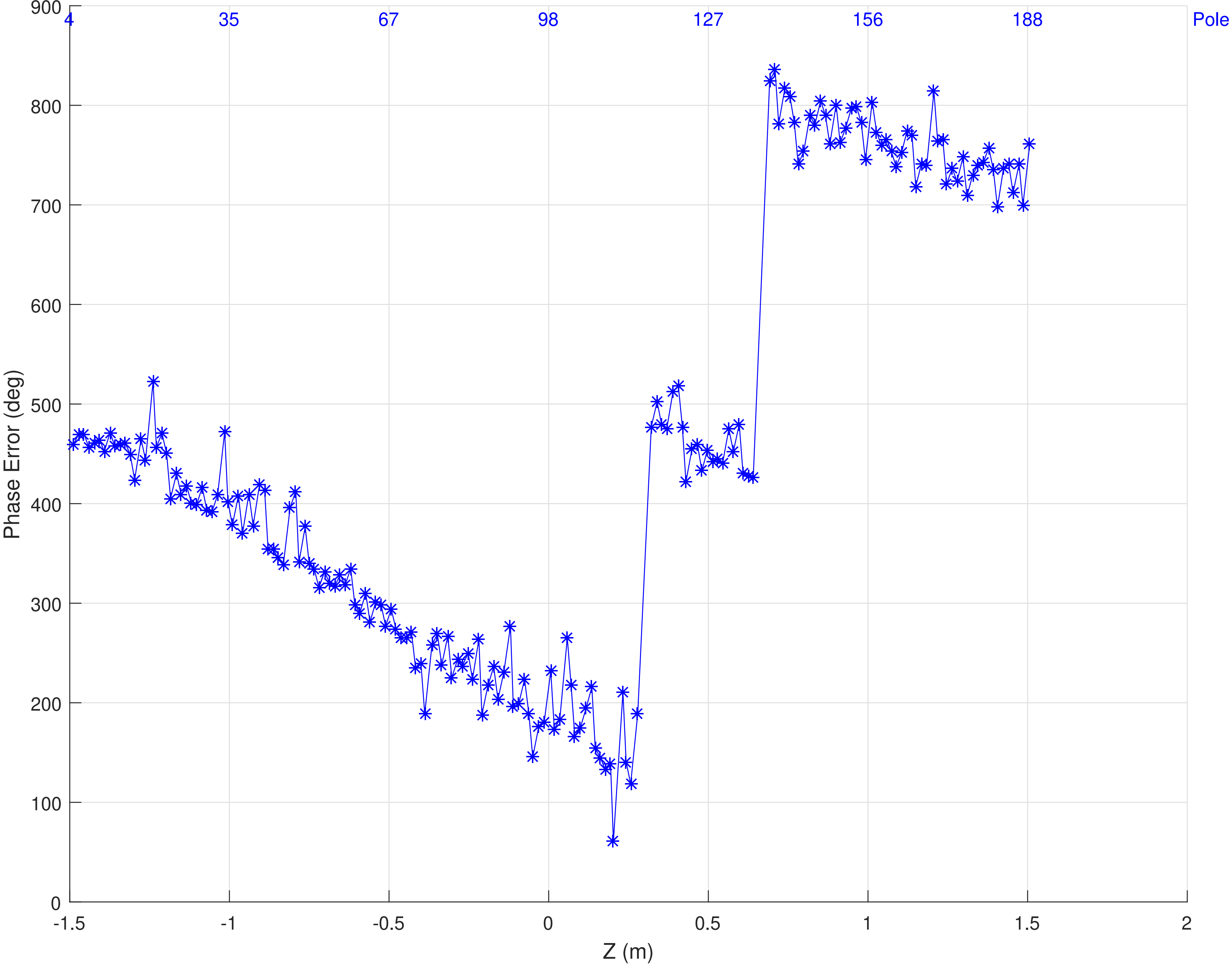

Y Trajectory, Slope Corrected
10-6
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
Y Trajectory, Corrected (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

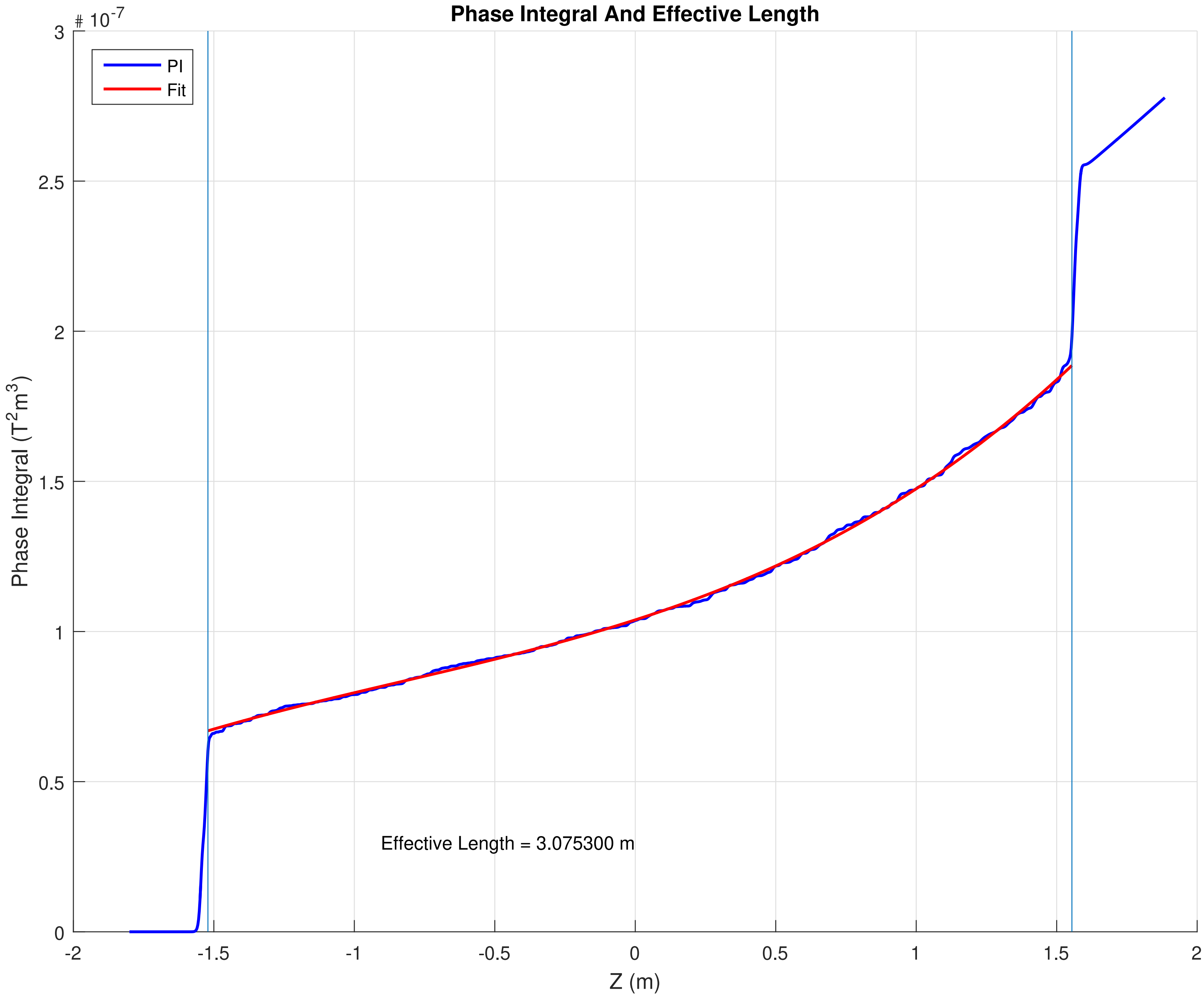

Phase Relative To Cell Entrance
Phase (rad)
800
700
600
500
400
300
200
100
0
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

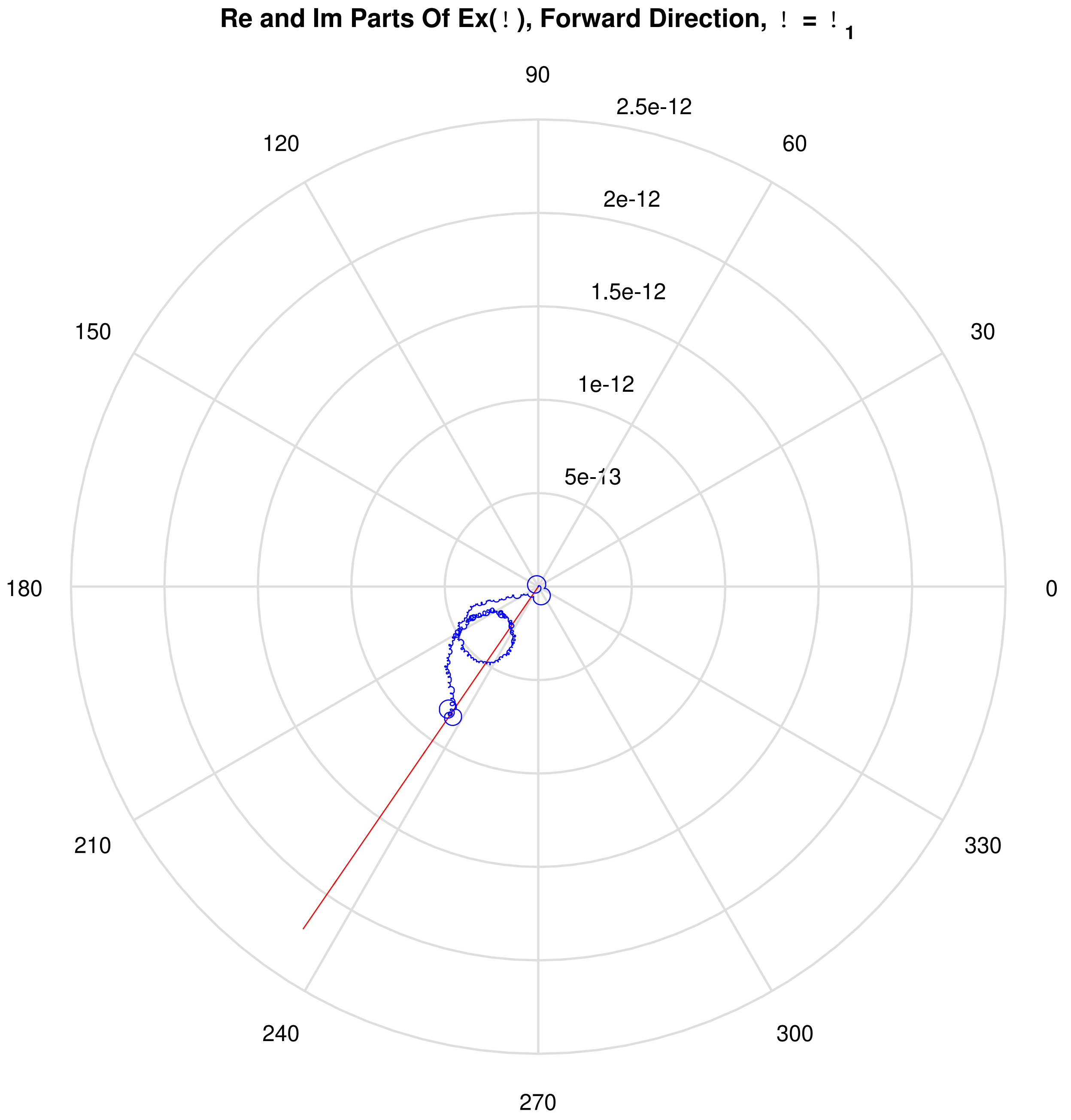

Phase Error At Field Peaks, No Ends
Phase Error (deg)
Z (m)
Pole
4
35
67
98
127
156
188
80
60
40
20
0
-20
-40
-1.5
-1
-0.5
0
0.5
1
1.5
2
Phase Error: Ave = 0.000000 deg, RMS = 26.131636 deg


Phase Error At Field Peaks, No Ends, Trajectory Slope Corrected
4
35
67
98
127
156
188
Pole
30
25
20
15
10
5
0
-5
-10
-15
-20
Phase Error (deg)
Phase Error: Ave = 0.000000 deg, RMS = 9.525493 deg
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

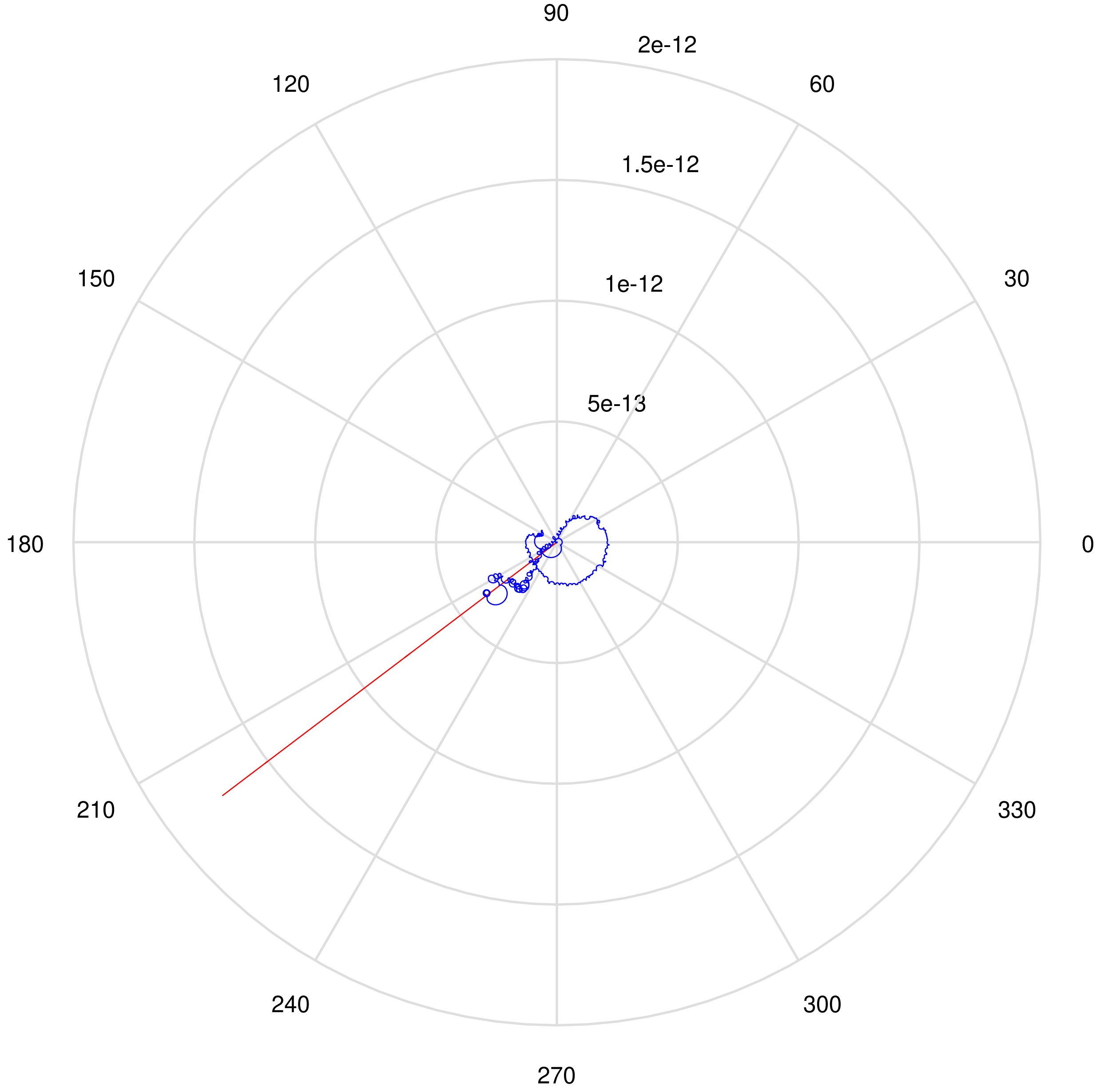
Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends

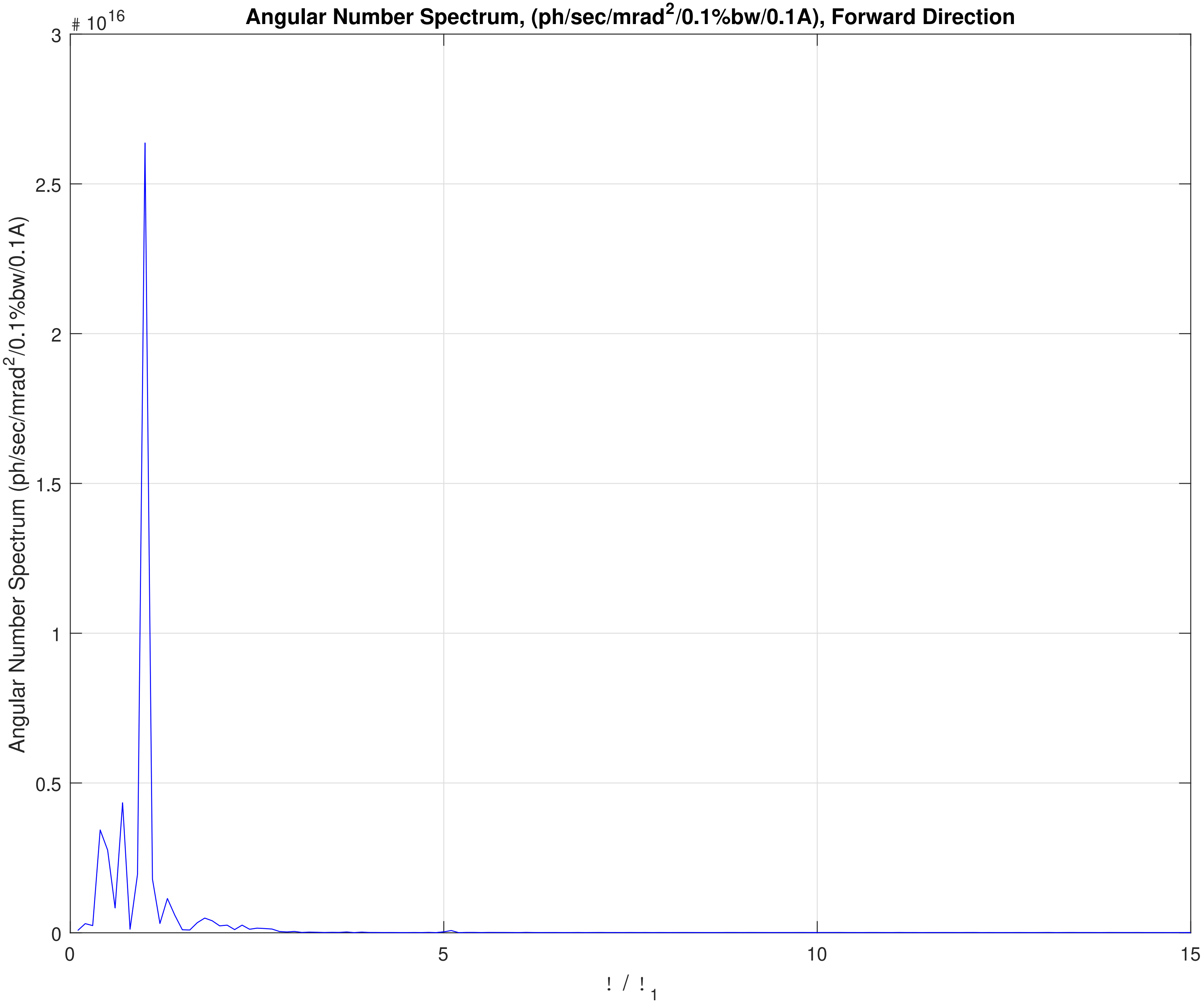



Phase Integral And Effective Length
10^-7
3
2.5
2
1.5
1
0.5
0
PI
Fit
Phase Integral (T^2 m^3)
Effective Length = 3.075300 m
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

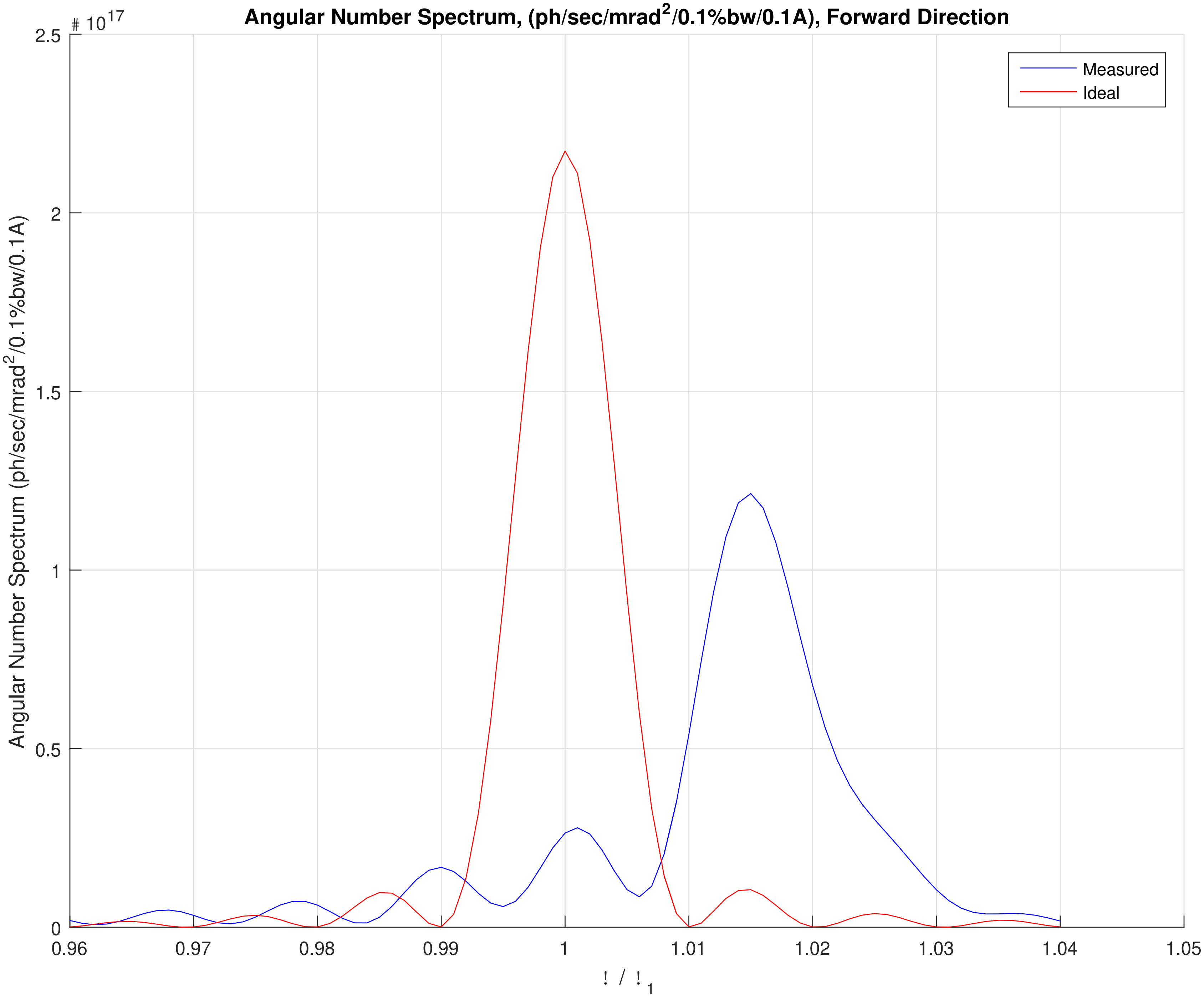

Re and Im Parts Of Ex(!), Forward Direction, ! = !$_1$
90
2.5e-12
60
120
2e-12
1.5e-12
150
30
1e-12
5e-13
180
0
210
330
240
300
270

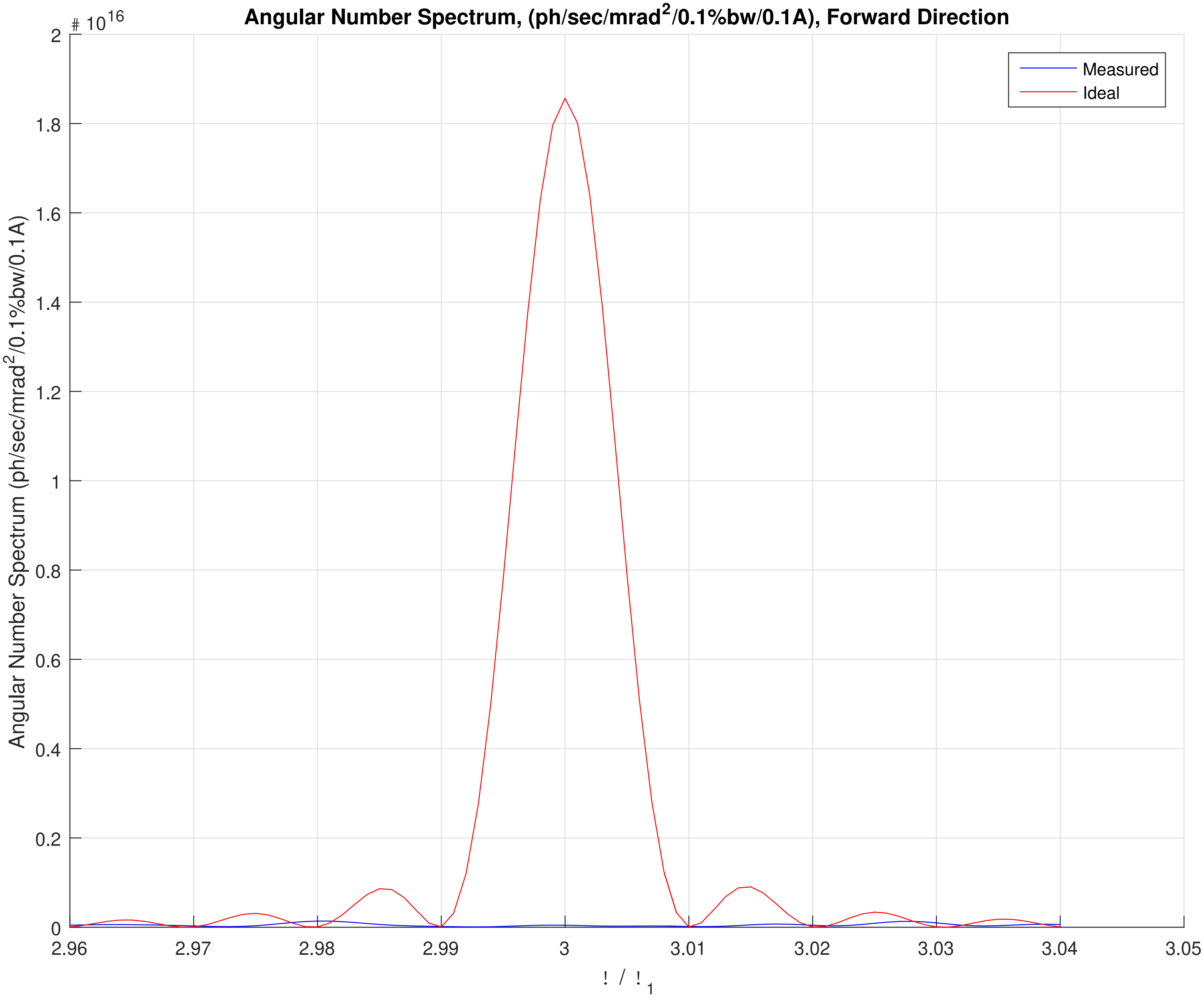
Re and Im Parts Of Ey(ω), Forward Direction, $\omega = \omega_1$



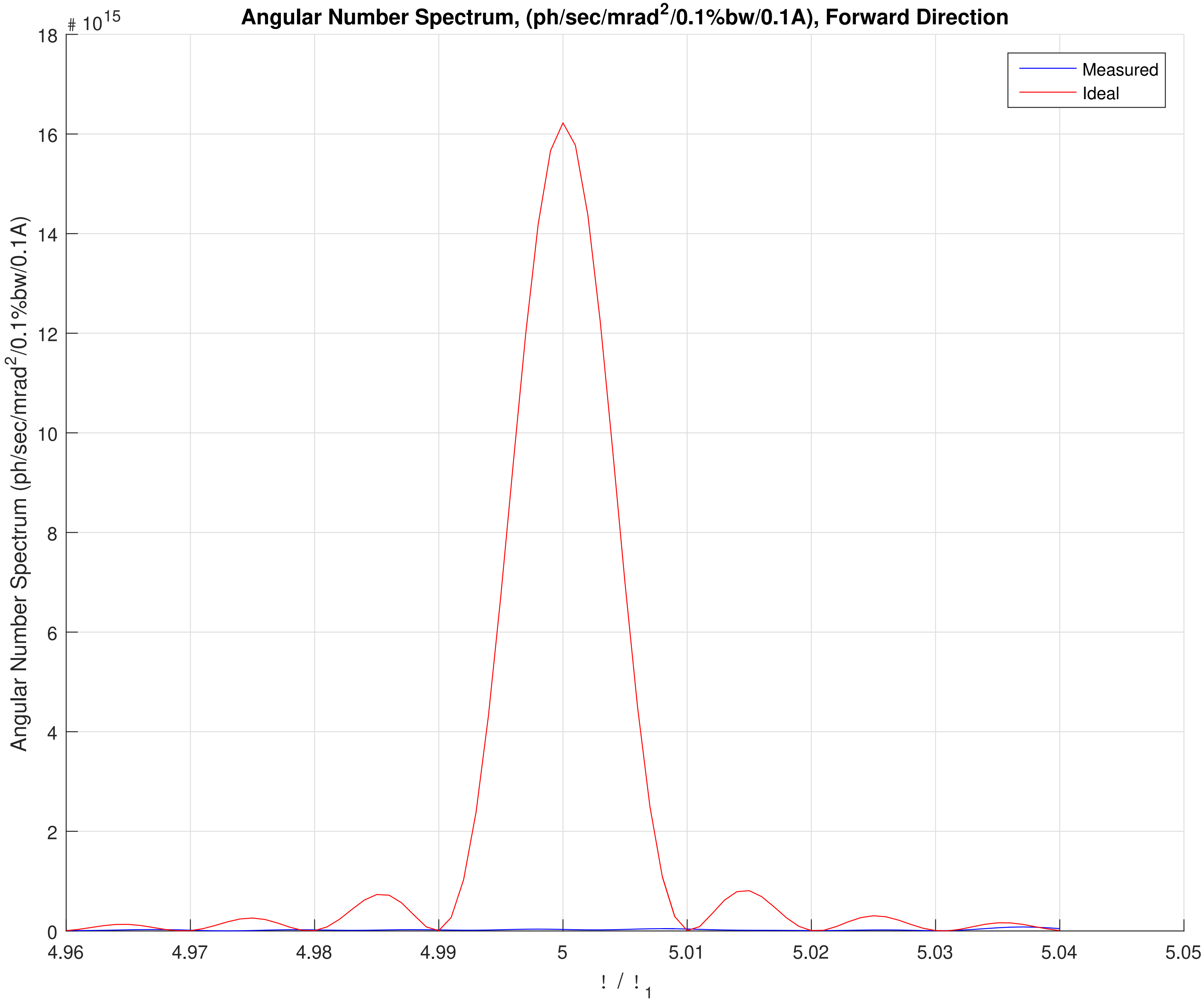


Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{16}
3
2.5
2
1.5
1
0.5
0
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
0
5
10
15
! / !$_1$


Angular Number Spectrum, (ph/sec/mrad^2/0.1%bw/0.1A), Forward Direction
10^{17}
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}
Angular Number Spectrum (ph/sec/mrad^2/0.1%bw/0.1A)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
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^{15}
18
16
14
12
10
8
6
4
2
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