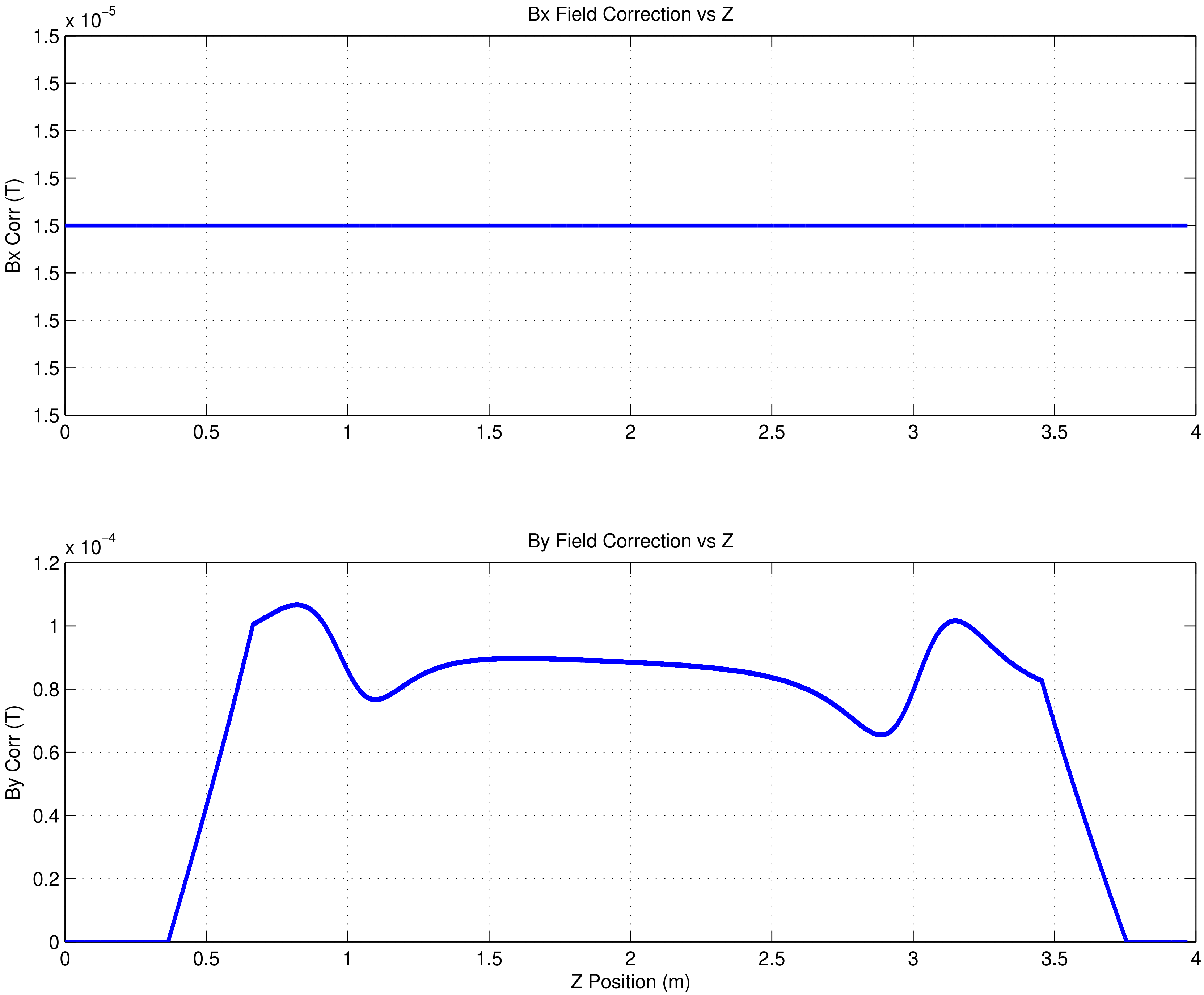
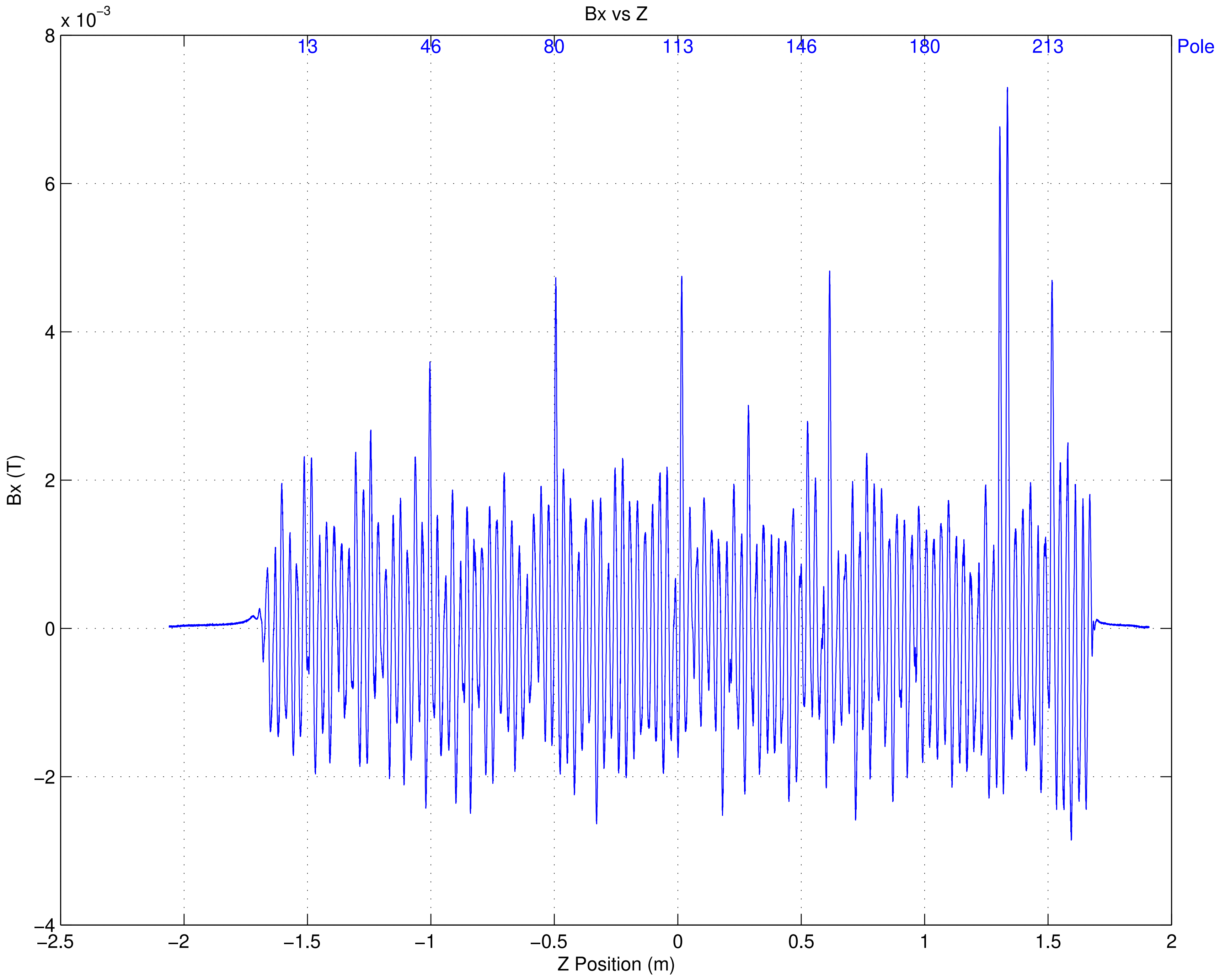
SLAC Magnetic Measurements

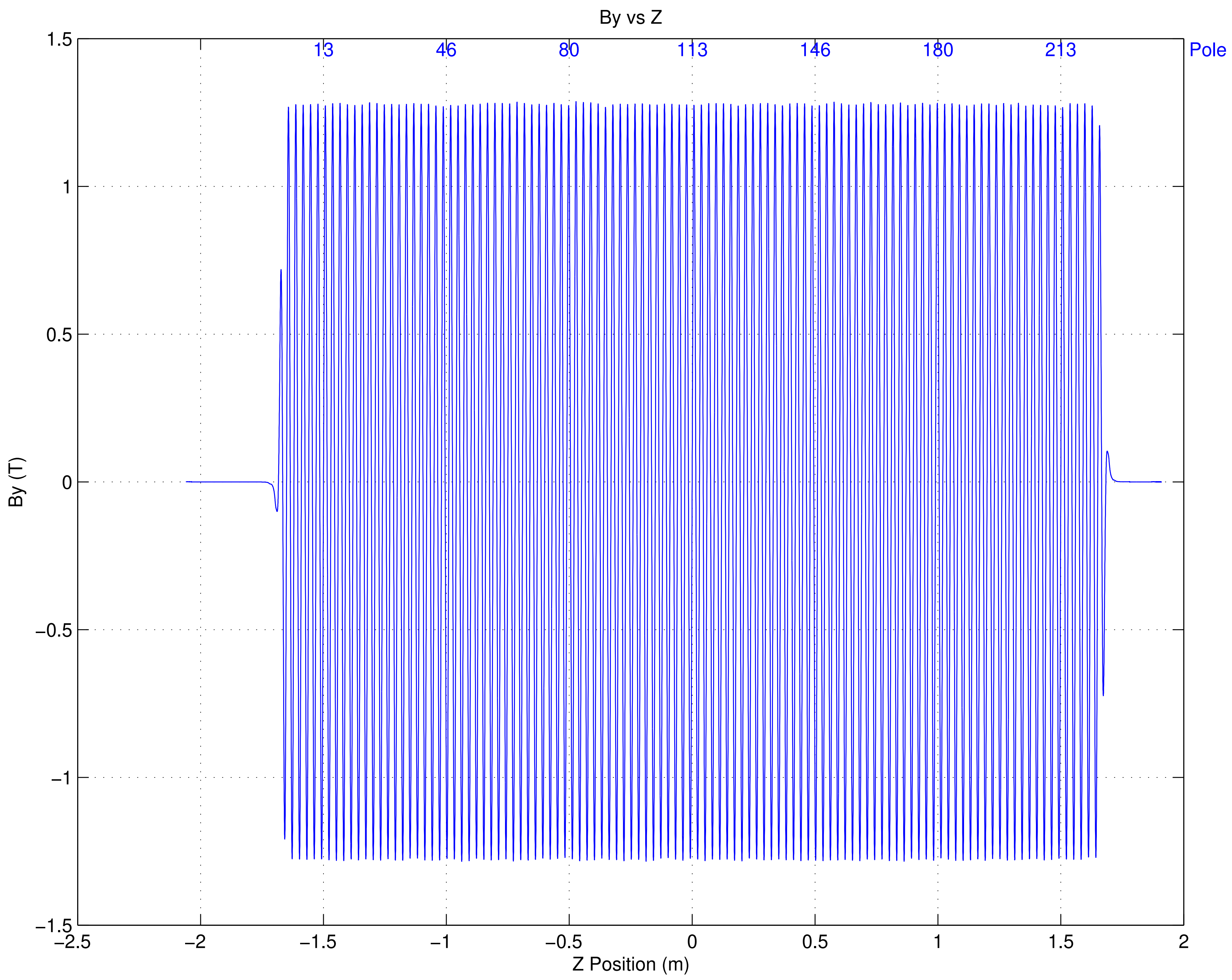
Planar Insertion Device Analysis

Parameters:
INPUT−FILE−DIR =S:\MagData\LCLS\Undulator\L143−112000−09\DATASET0001\Rough Tuning\Z Scans\Run 031\
INPUT−FILE−NAME =x+00000−y+000−bscanz.dat
INPUT−FILE−TYPE =ZVXYBXYH
CORR−REQUIRED =1
GAMMA =26682.25
NOM−LAMBDA−U =0.03
NOM−K−VALUE =3.4977
NOM−LAMBDA−R =1.4995e−010
NUM−POLES =226
NUM−END−POLES =4
CELL−LENGTH =3.656

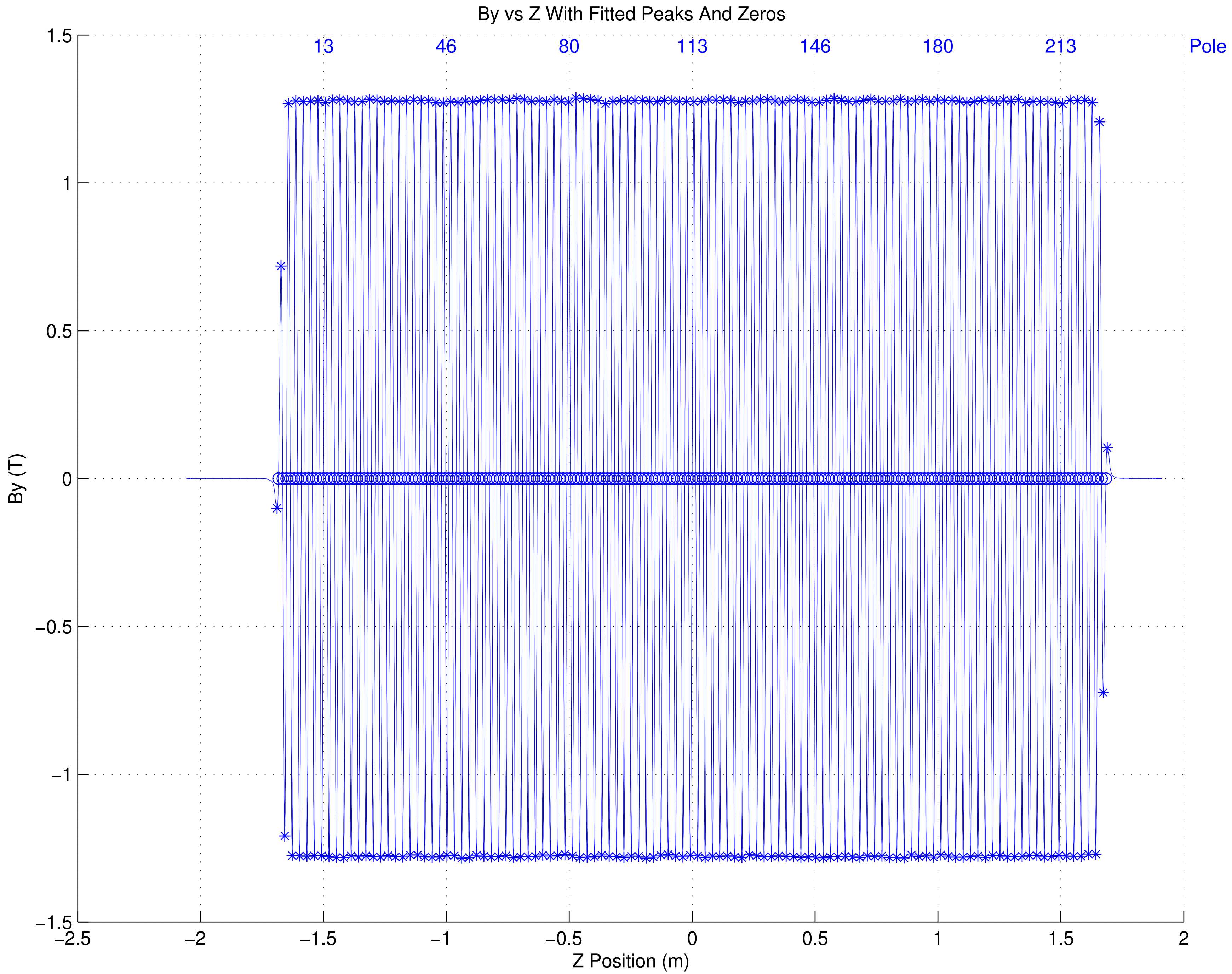

Bx Field Correction vs Z
x 10^-5
1.5
1.5
1.5
1.5
1.5
1.5
1.5
1.5
1.5
Bx Corr (T)
0
0.5
1
1.5
2
2.5
3
3.5
4
By Field Correction vs Z
x 10^-4
1.2
1
0.8
0.6
0.4
0.2
0
By Corr (T)
0
0.5
1
1.5
2
2.5
3
3.5
4
Z Position (m)

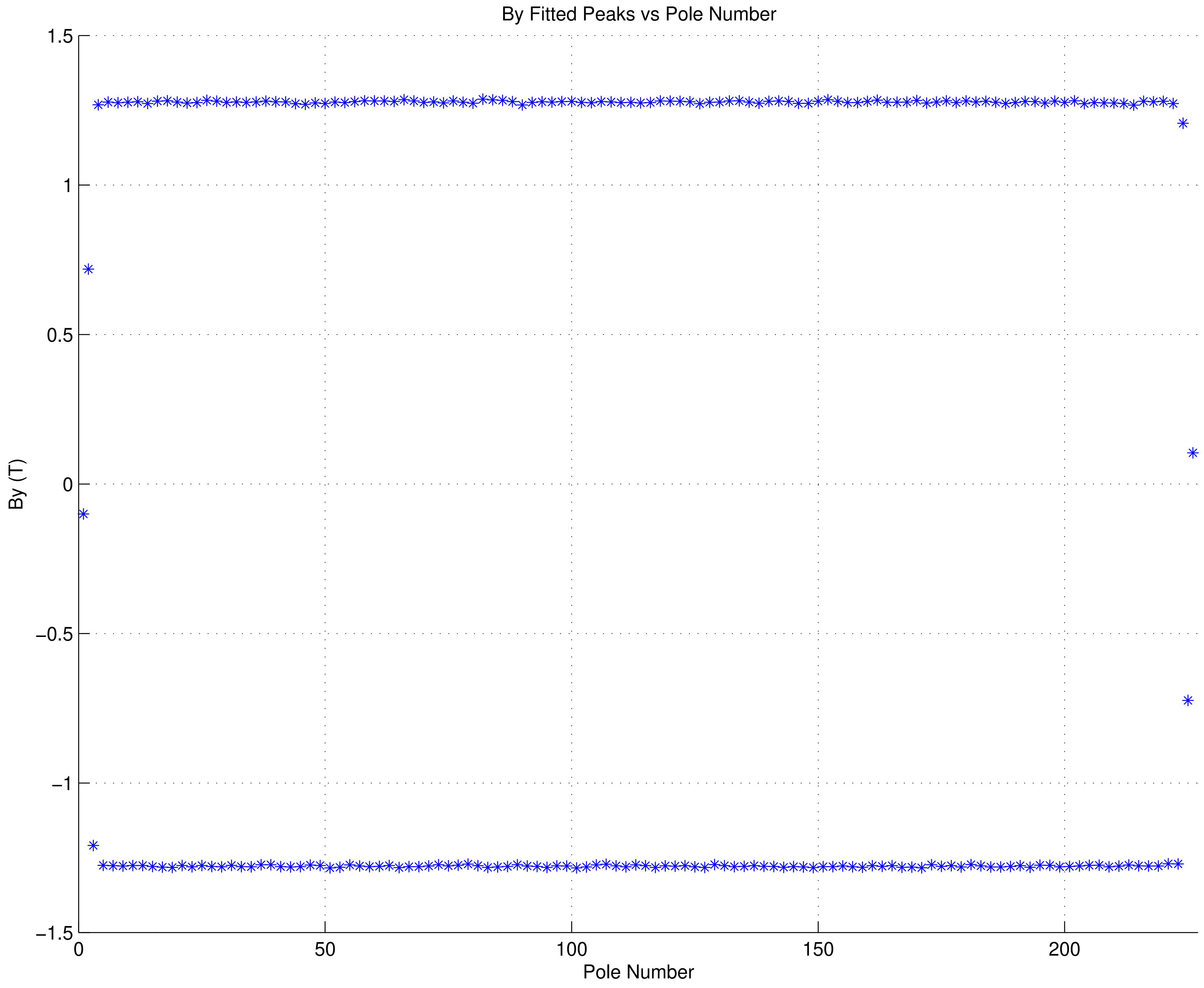


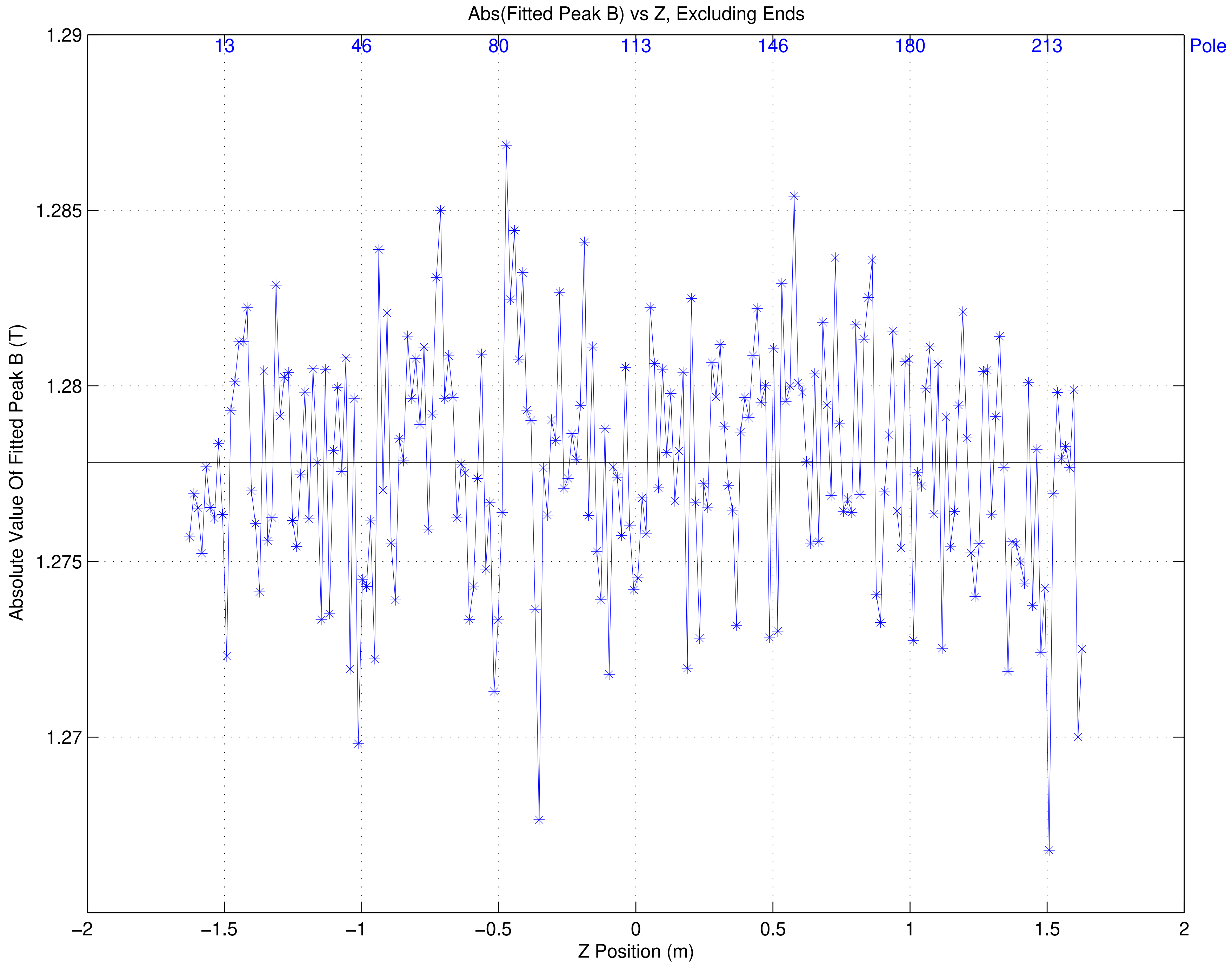
Bx vs Z
x 10^-3
Bx (T)
Z Position (m)
13
46
80
113
146
180
213
Pole
8
6
4
2
0
−2
−4
−2.5
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2



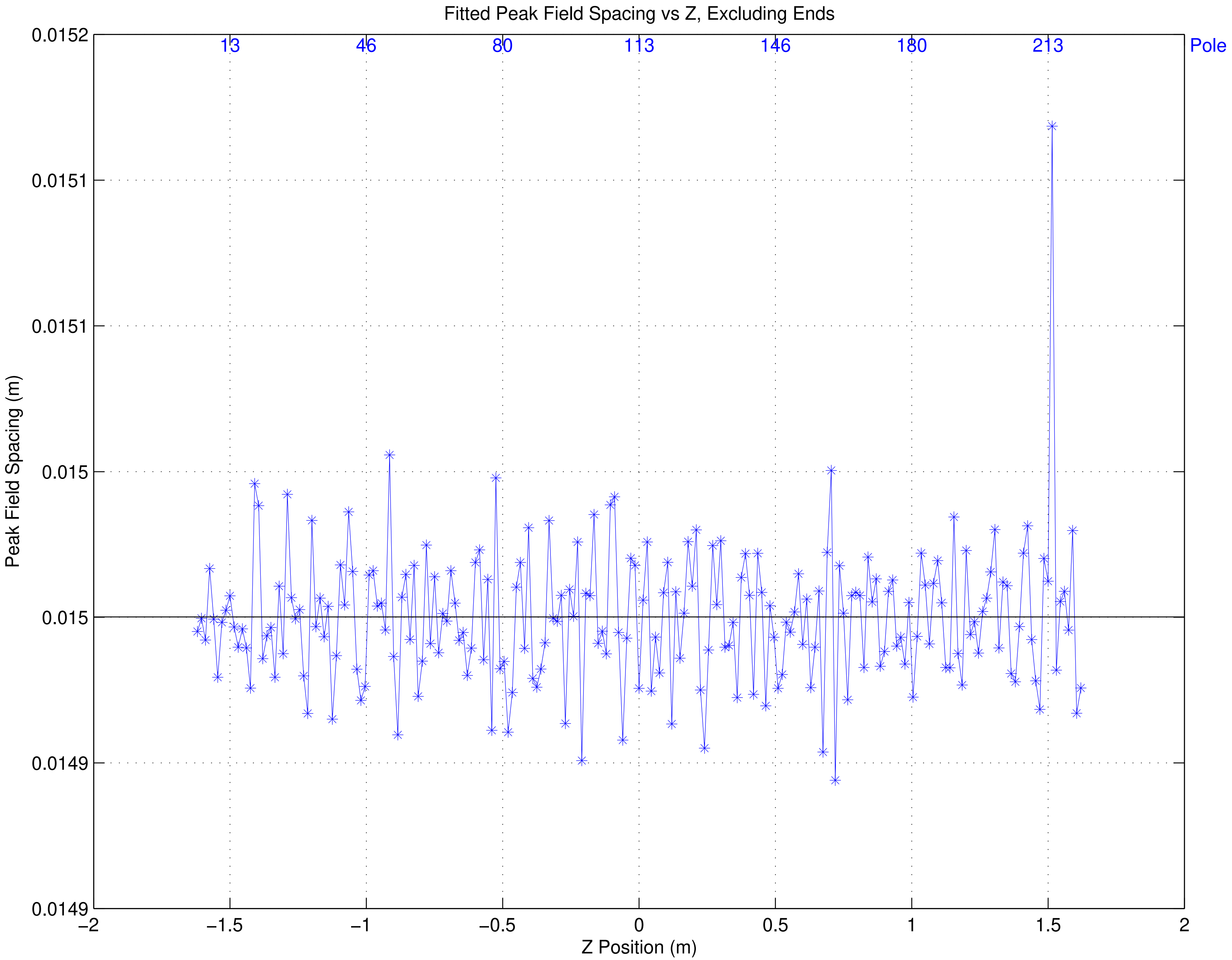
By vs Z
13
46
80
113
146
180
213
Pole
1.5
1
0.5
0
−0.5
−1
−1.5
By (T)
−2.5
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z Position (m)


By vs Z With Fitted Peaks And Zeros
13
46
80
113
146
180
213
Pole
1.5
1
0.5
0
−0.5
−1
−1.5
By (T)
−2.5
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z Position (m)

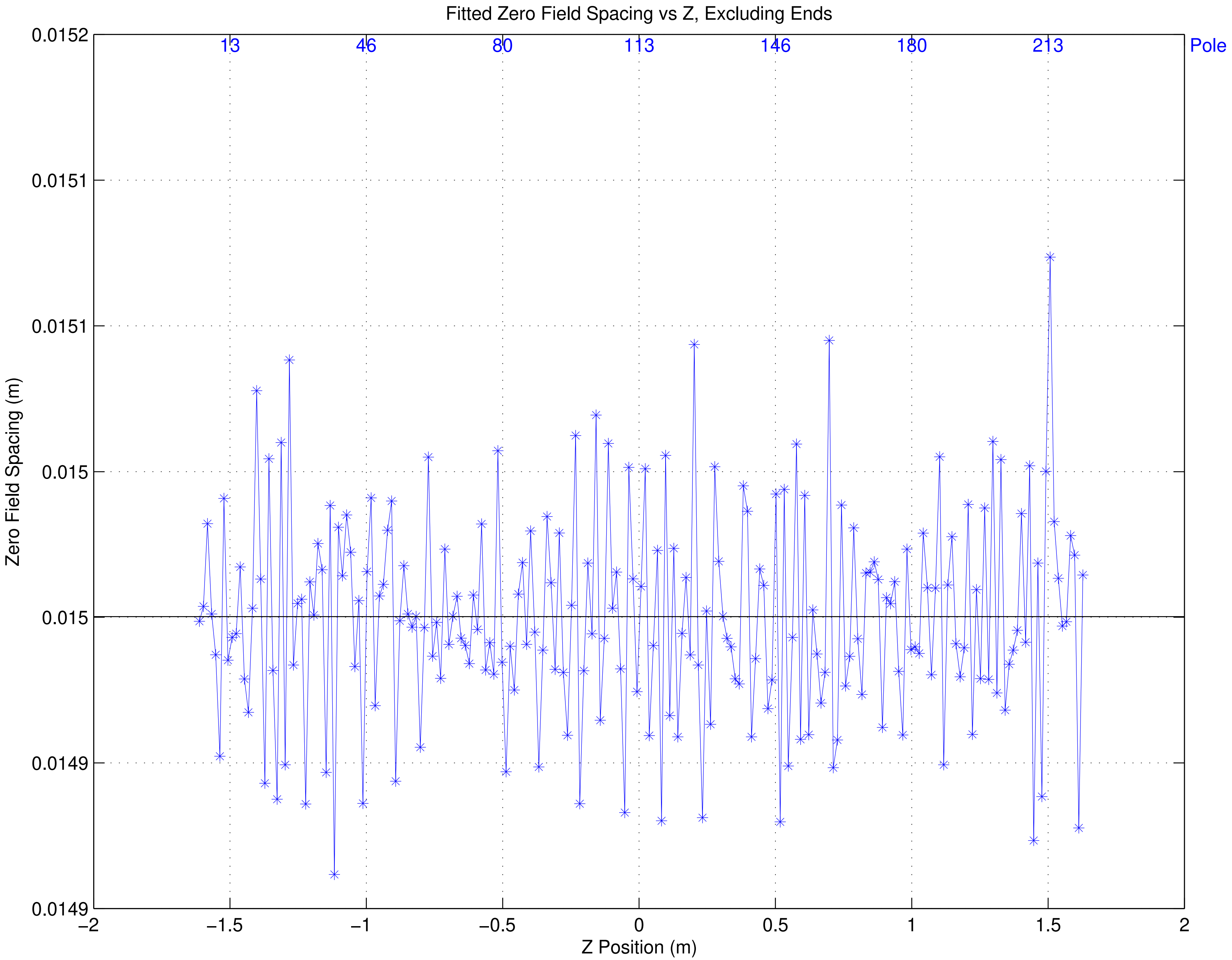

By Fitted Peaks vs Pole Number
By (T)
Pole Number
1.5
1
0.5
0
−0.5
−1
−1.5
0
50
100
150
200



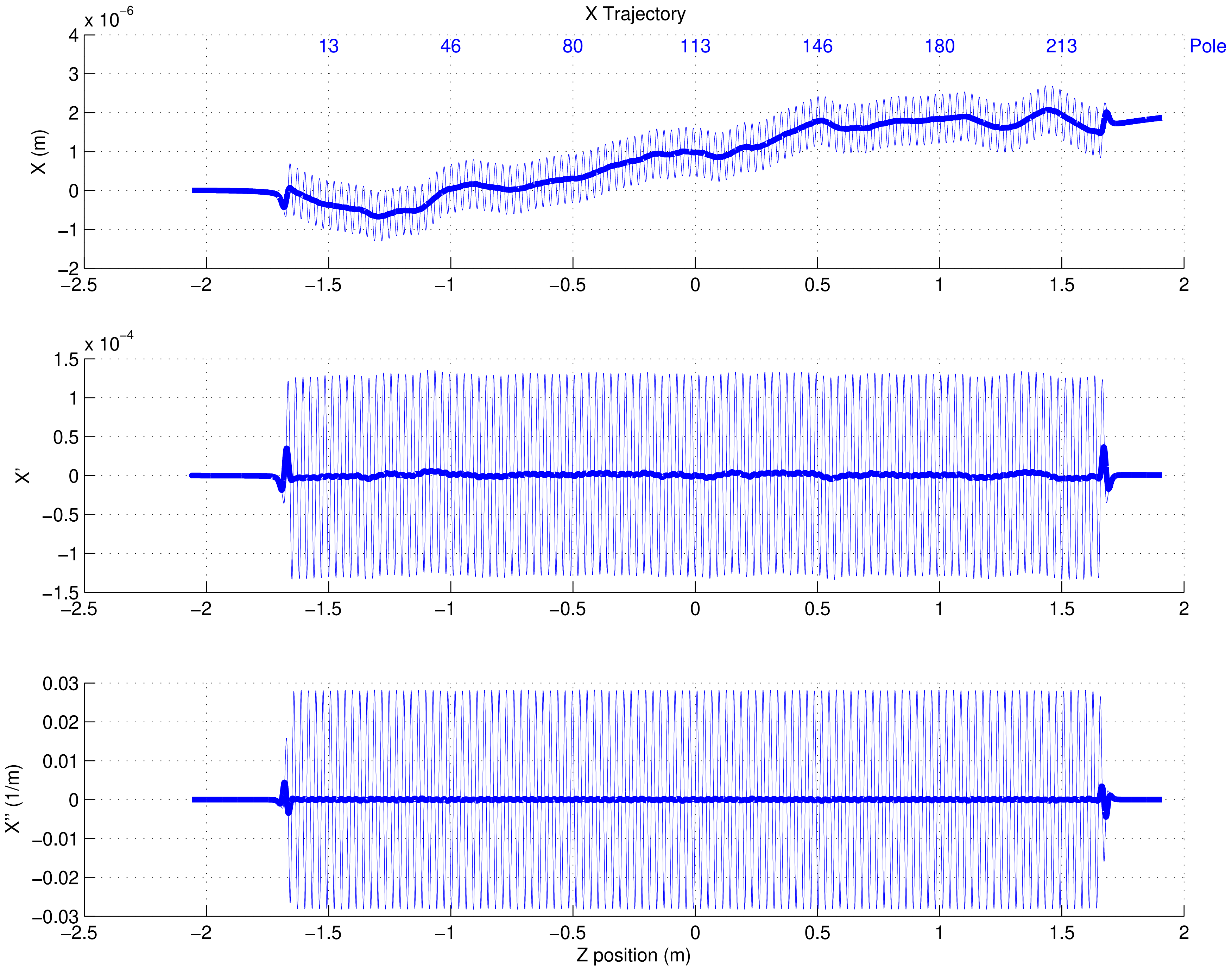
Peak Fields: Ave = 1.277827 T, RMS = 0.003309 T



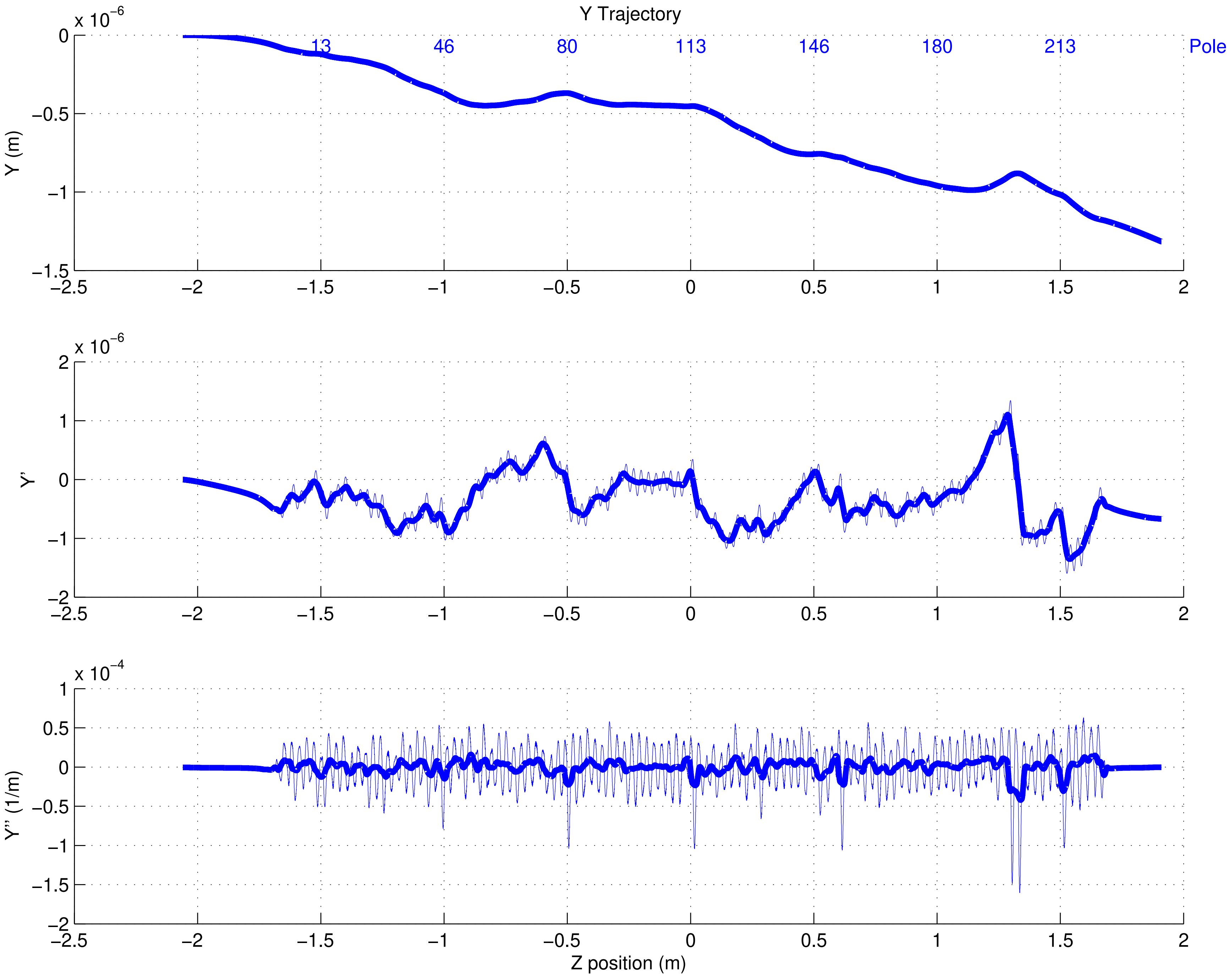
Peak Field Spacing: Ave = 0.015000 m, RMS = 0.000023 m

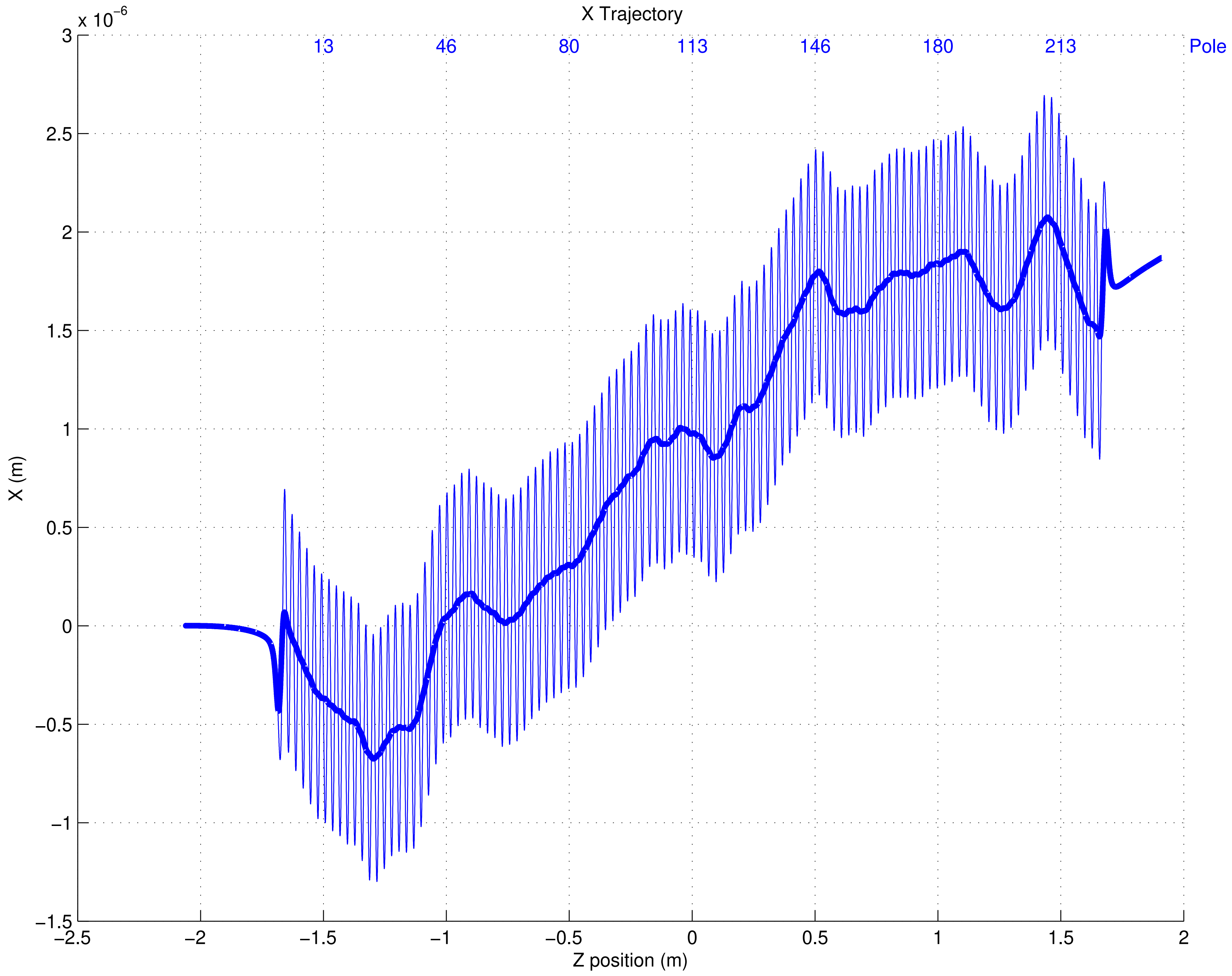


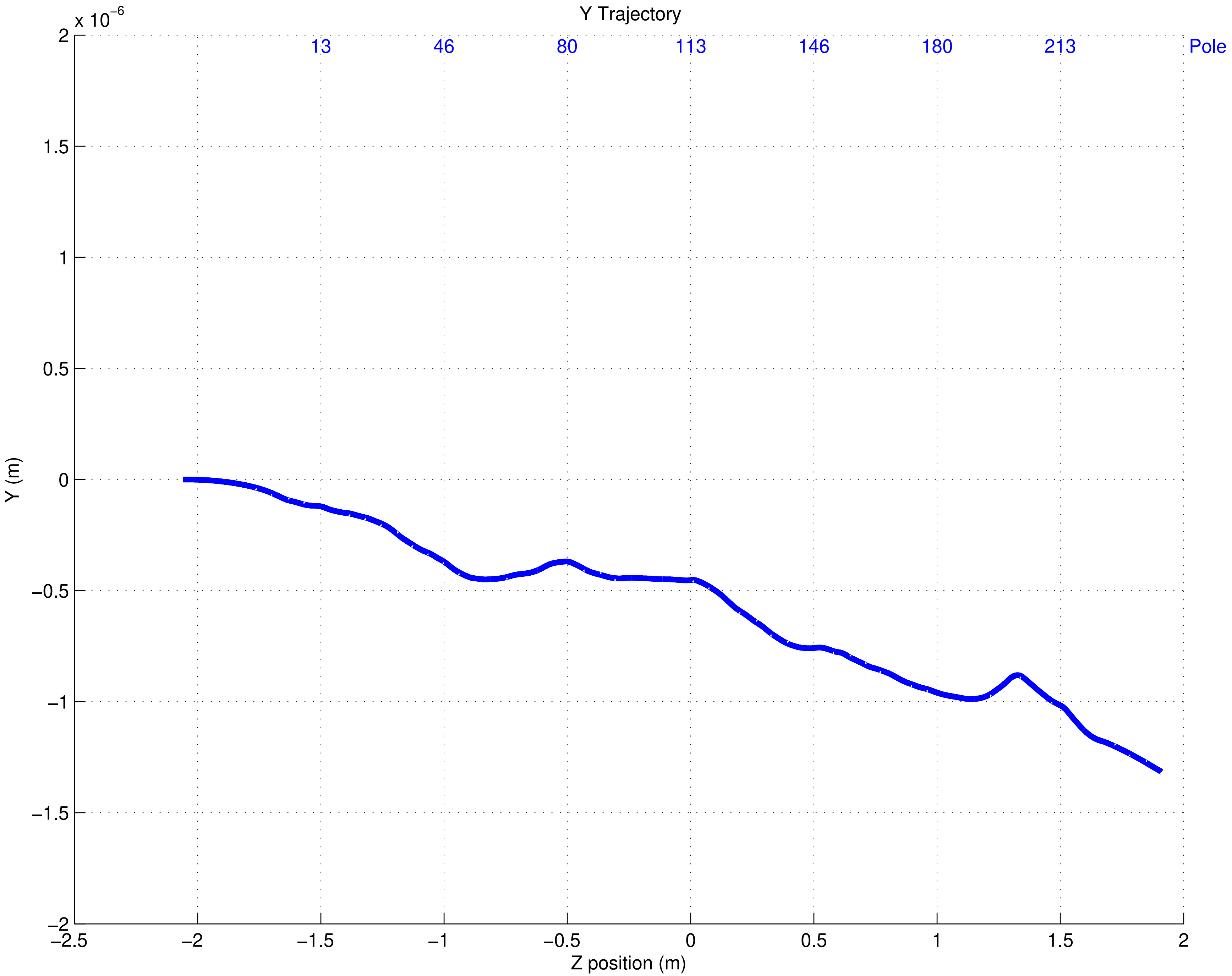
Zero Field Spacing: Ave = 0.015000 m, RMS = 0.000036 m



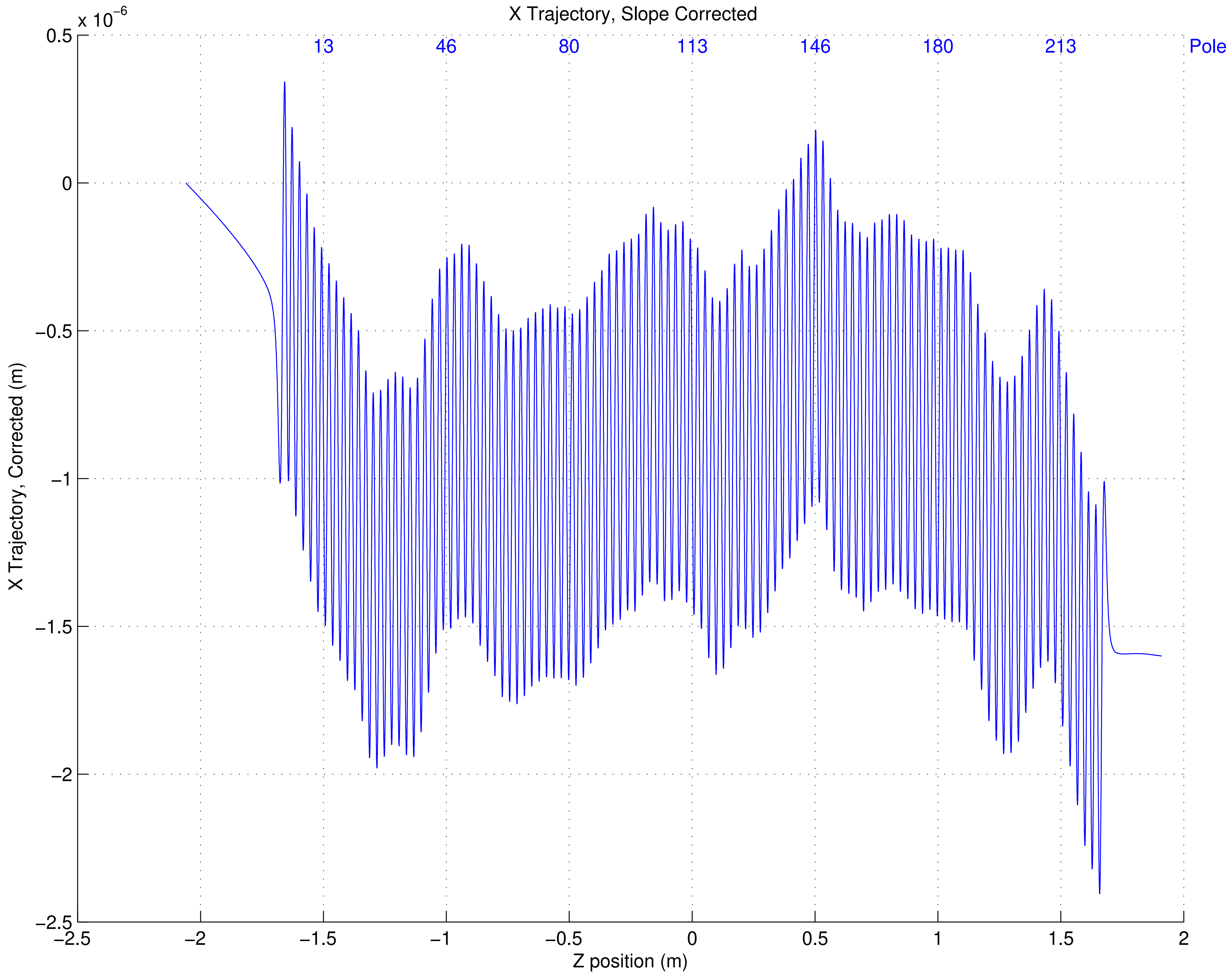
X Trajectory
x 10^−6
X (m)
13
46
80
113
146
180
213
Pole
x 10^−4
X'
X'' (1/m)
Z position (m)


Y Trajectory
x 10^-6
Y (m)
13
46
80
113
146
180
213
Pole
x 10^-6
Y'
x 10^-4
Y'' (1/m)
Z position (m)

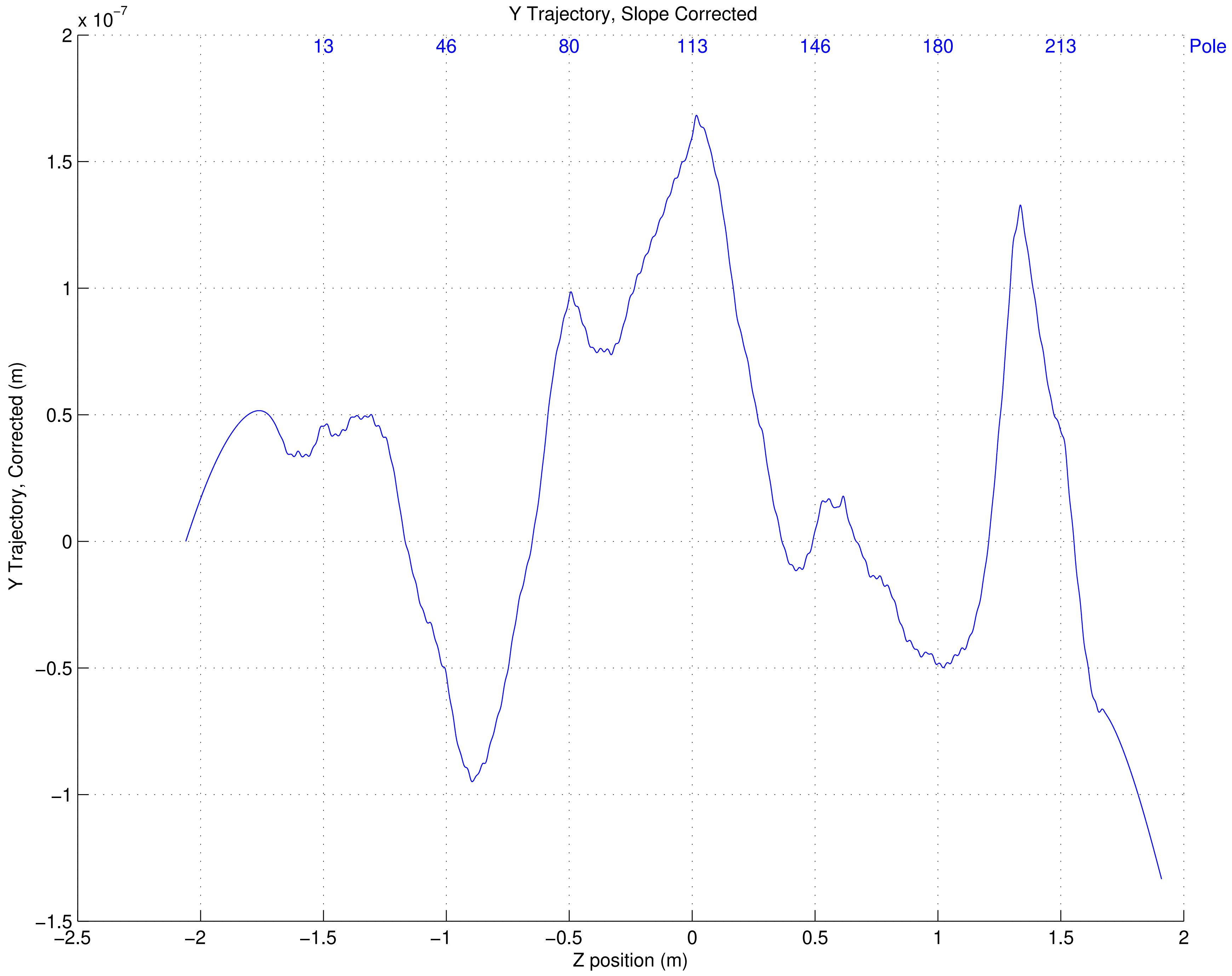

X Trajectory
x 10^-6
3
2.5
2
1.5
1
0.5
0
−0.5
−1
−1.5
X (m)
13
46
80
113
146
180
213
Pole
−2.5
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z position (m)



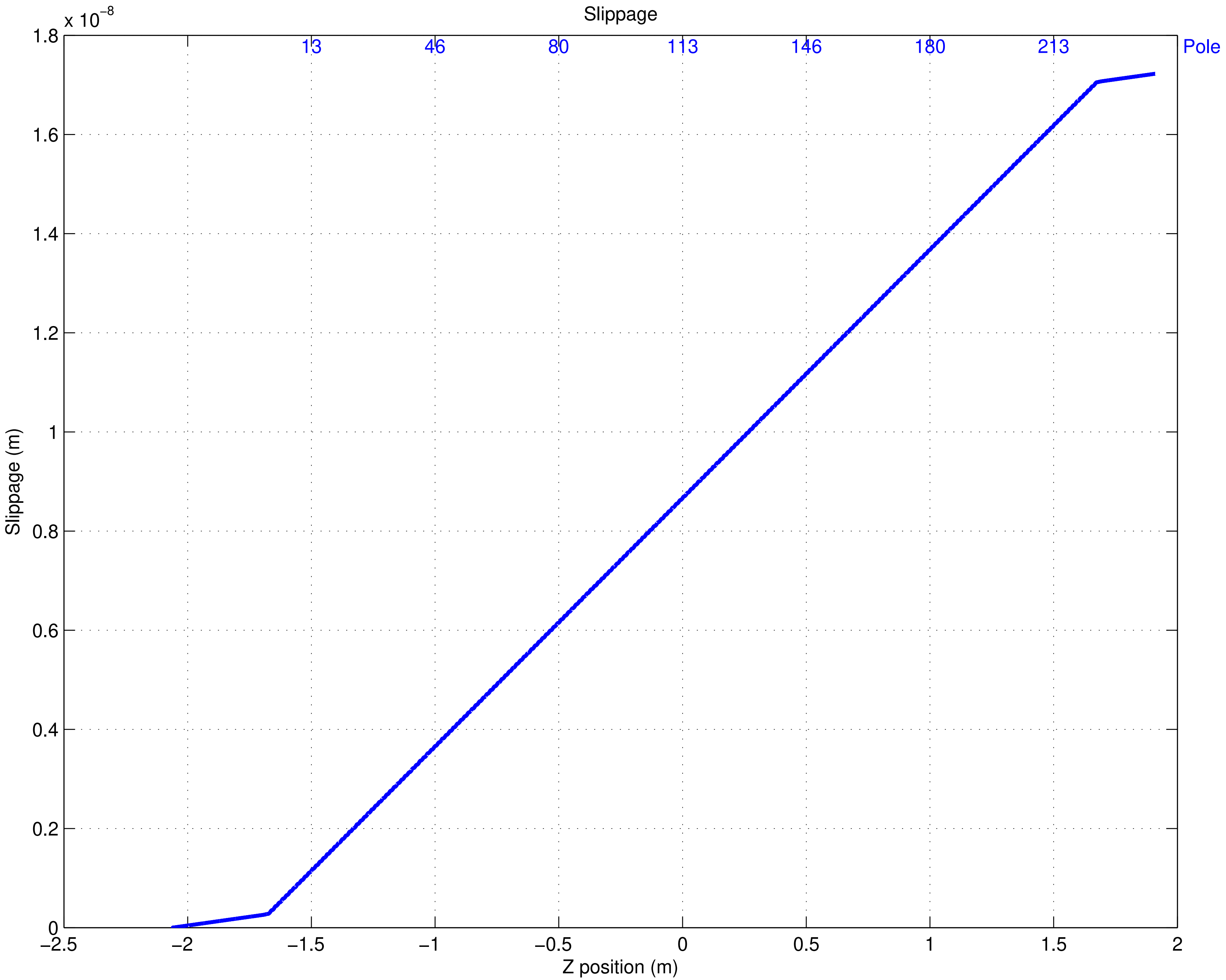
Y Trajectory
x 10^{-6}
13
46
80
113
146
180
213
Pole
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2
Y (m)
−2.5
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z position (m)

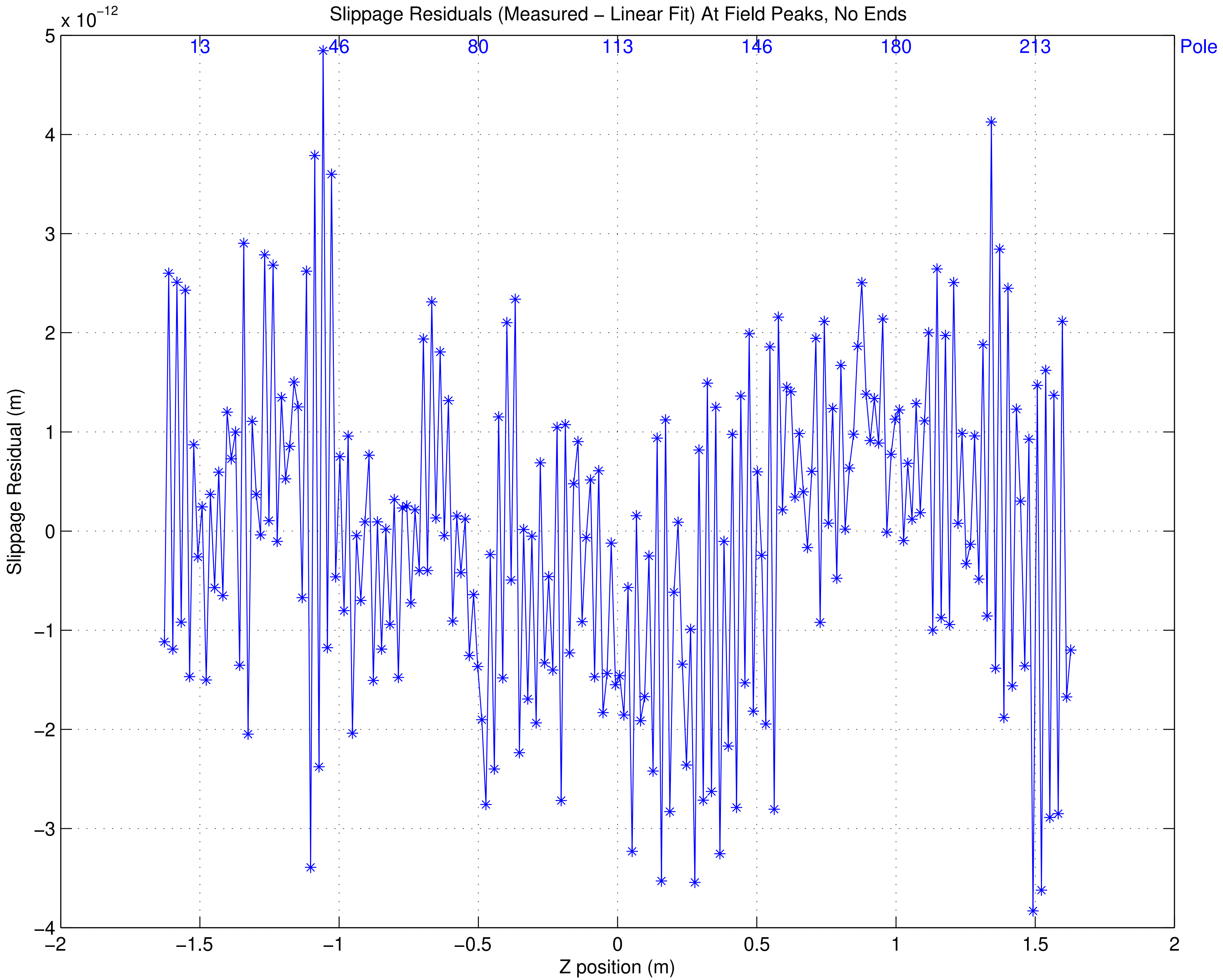


X Trajectory, Slope Corrected
x 10^-6
0.5
0
−0.5
−1
−1.5
−2
−2.5
13
46
80
113
146
180
213
Pole
X Trajectory, Corrected (m)
−2.5
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z position (m)

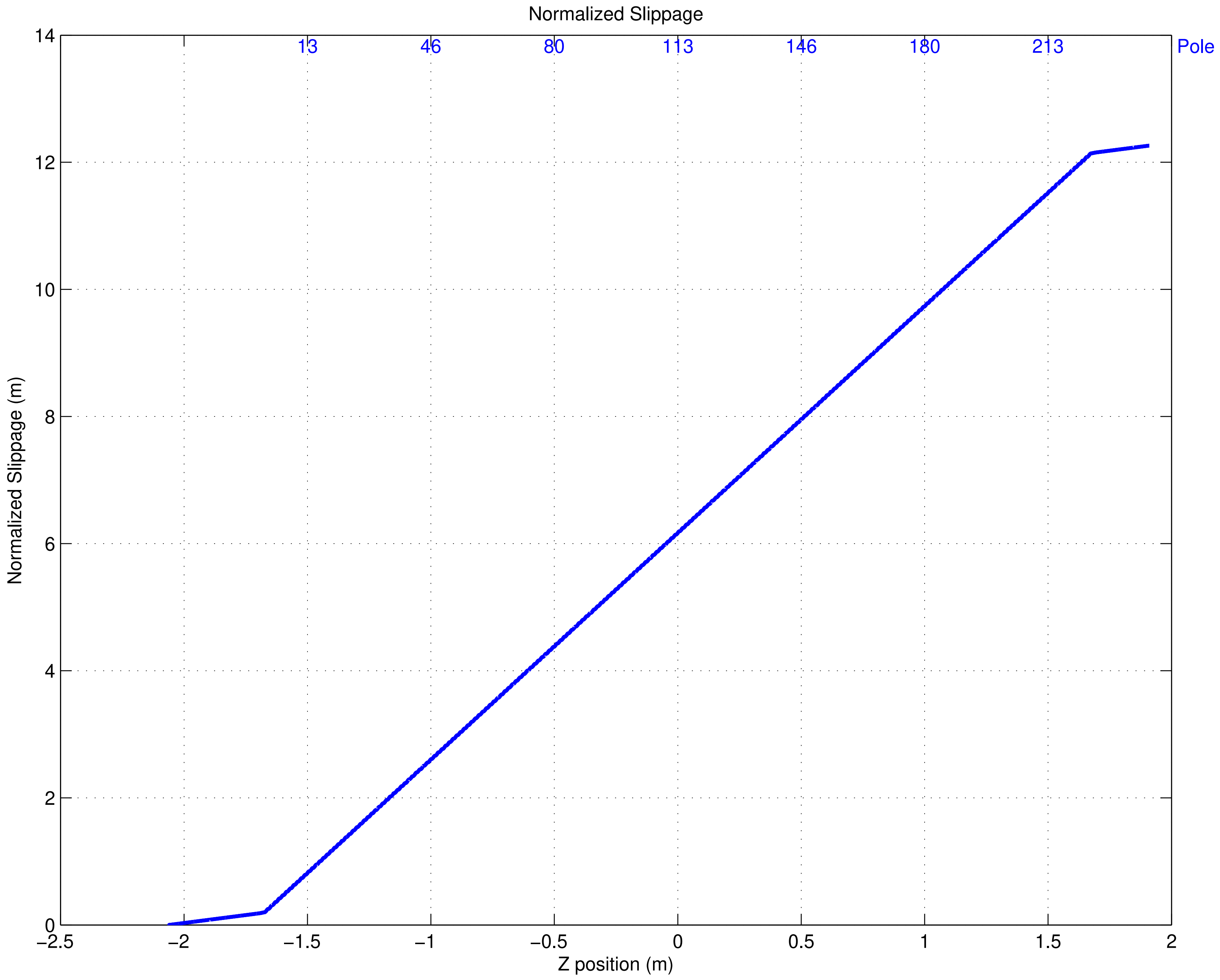


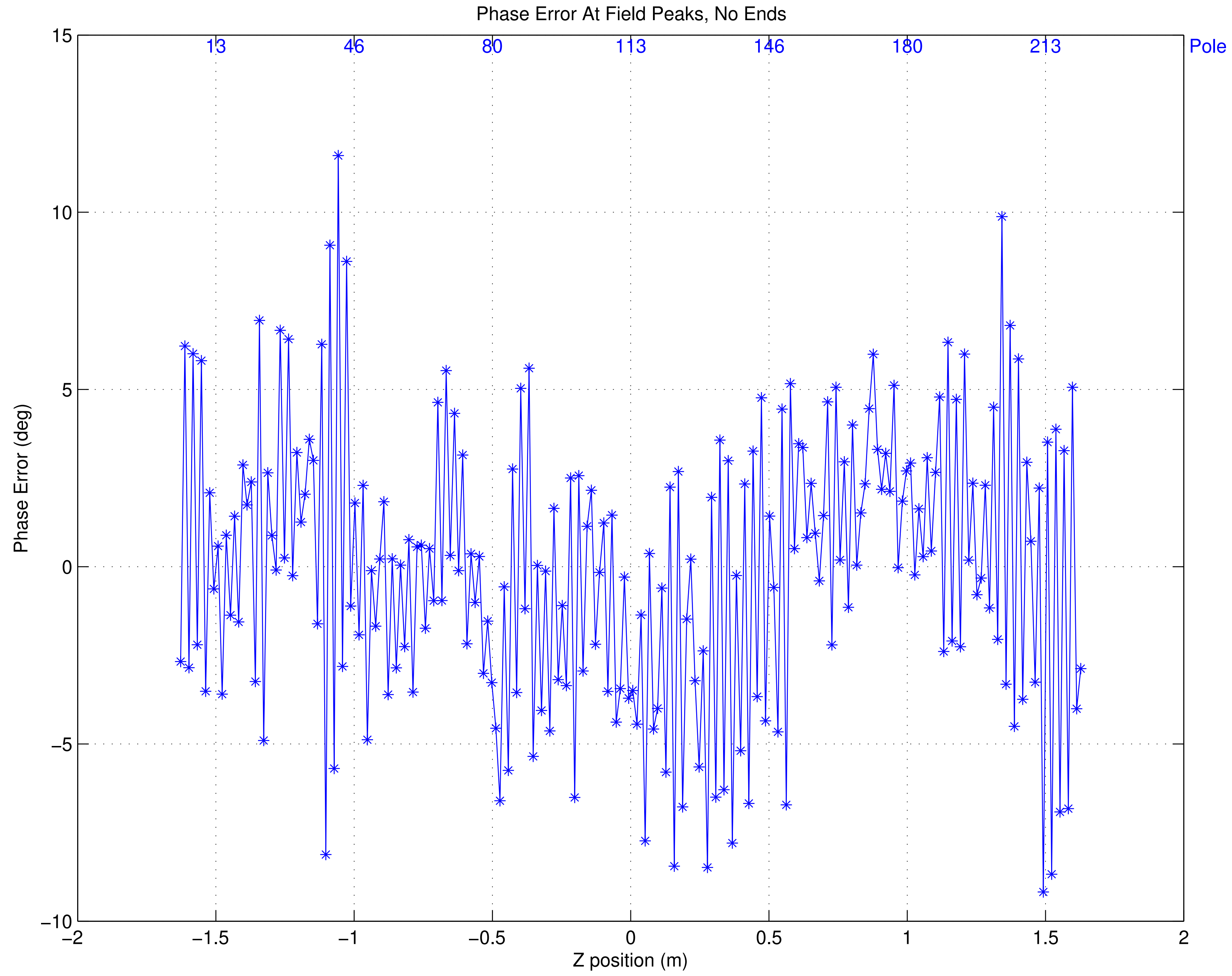
Y Trajectory, Slope Corrected
x 10^-7
13
46
80
113
146
180
213
Pole
Y Trajectory, Corrected (m)
Z position (m)
2
1.5
1
0.5
0
−0.5
−1
−1.5
−2.5
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2


Slippage
x 10^-8
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Slippage (m)
13
46
80
113
146
180
213
Pole
−2.5
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z position (m)

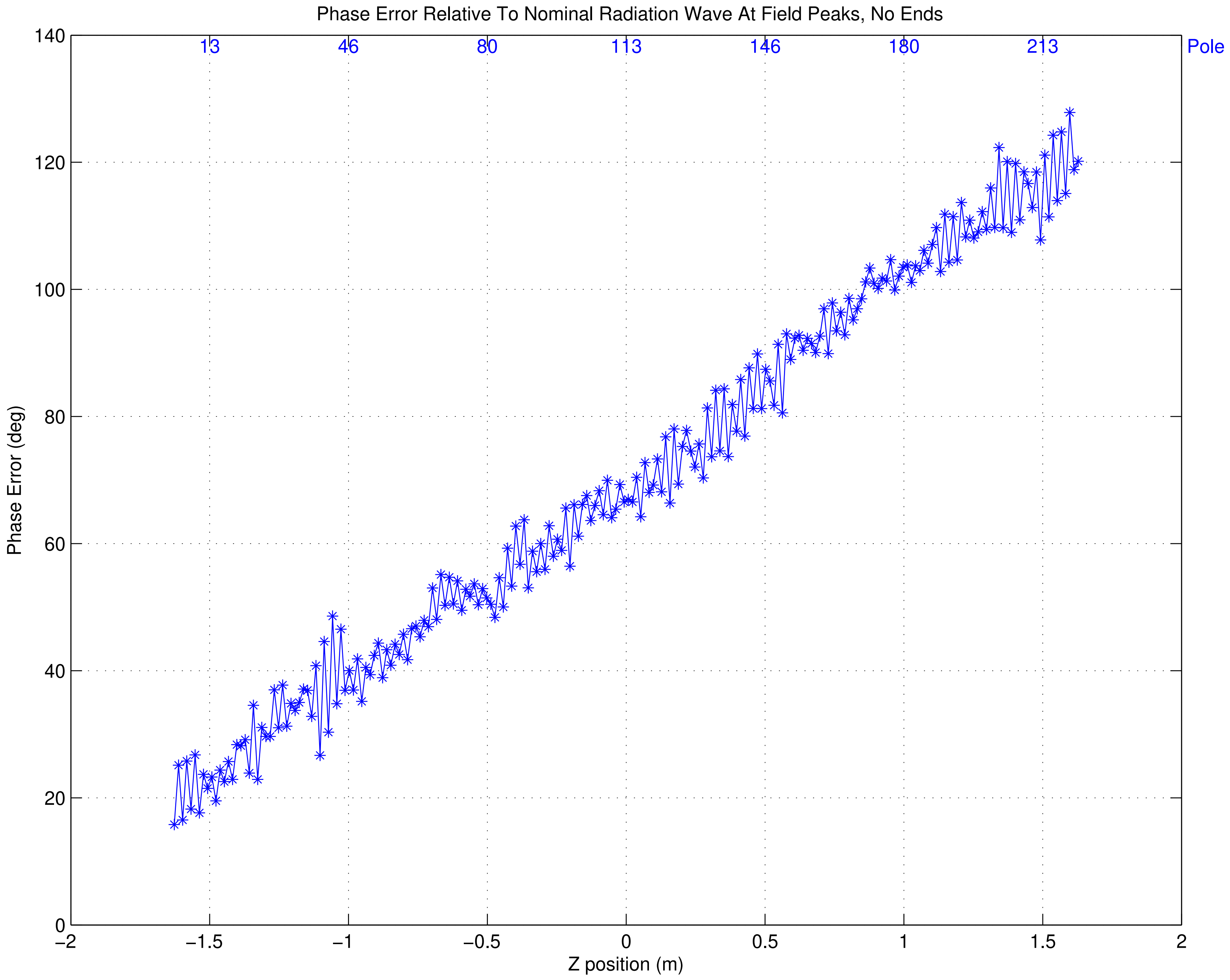


Slippage Residuals (Measured – Linear Fit) At Field Peaks, No Ends
x 10^−12
Slippage Residual (m)
Z position (m)
13
46
80
113
146
180
213
Pole
5
4
3
2
1
0
−1
−2
−3
−4
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2


Normalized Slippage
13
46
80
113
146
180
213
Pole
14
12
10
8
6
4
2
0
Normalized Slippage (m)
−2.5
−2
−1.5
−1
−0.5
0
0.5
1
1.5
2
Z position (m)



Phase Error: Ave = 0.000000 deg, RMS = 3.908749 deg



Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
13
46
80
113
146
180
213
Pole
Phase Error (deg)
0
20
40
60
80
100
120
140
–2
–1.5
–1
–0.5
0
0.5
1
1.5
2
Z position (m)