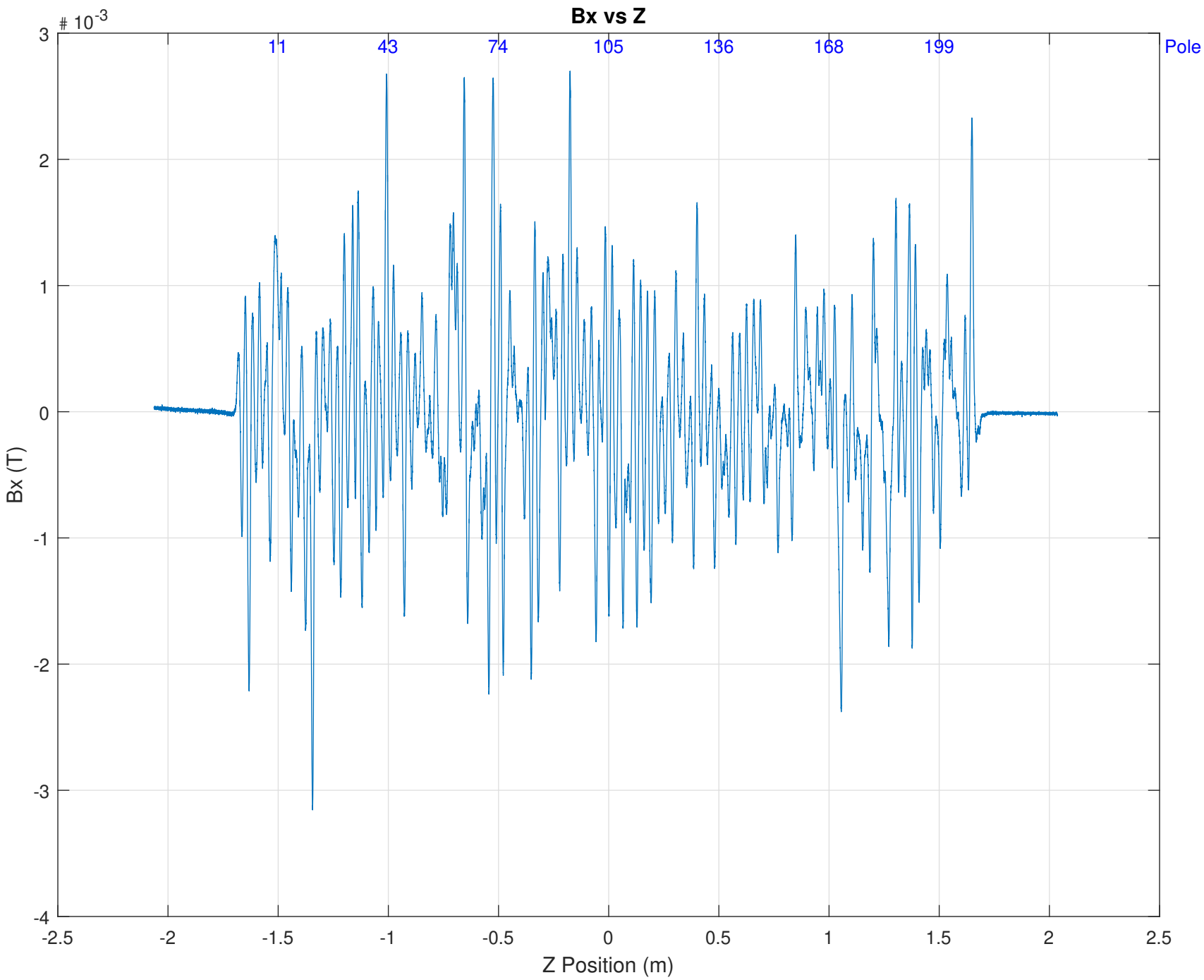
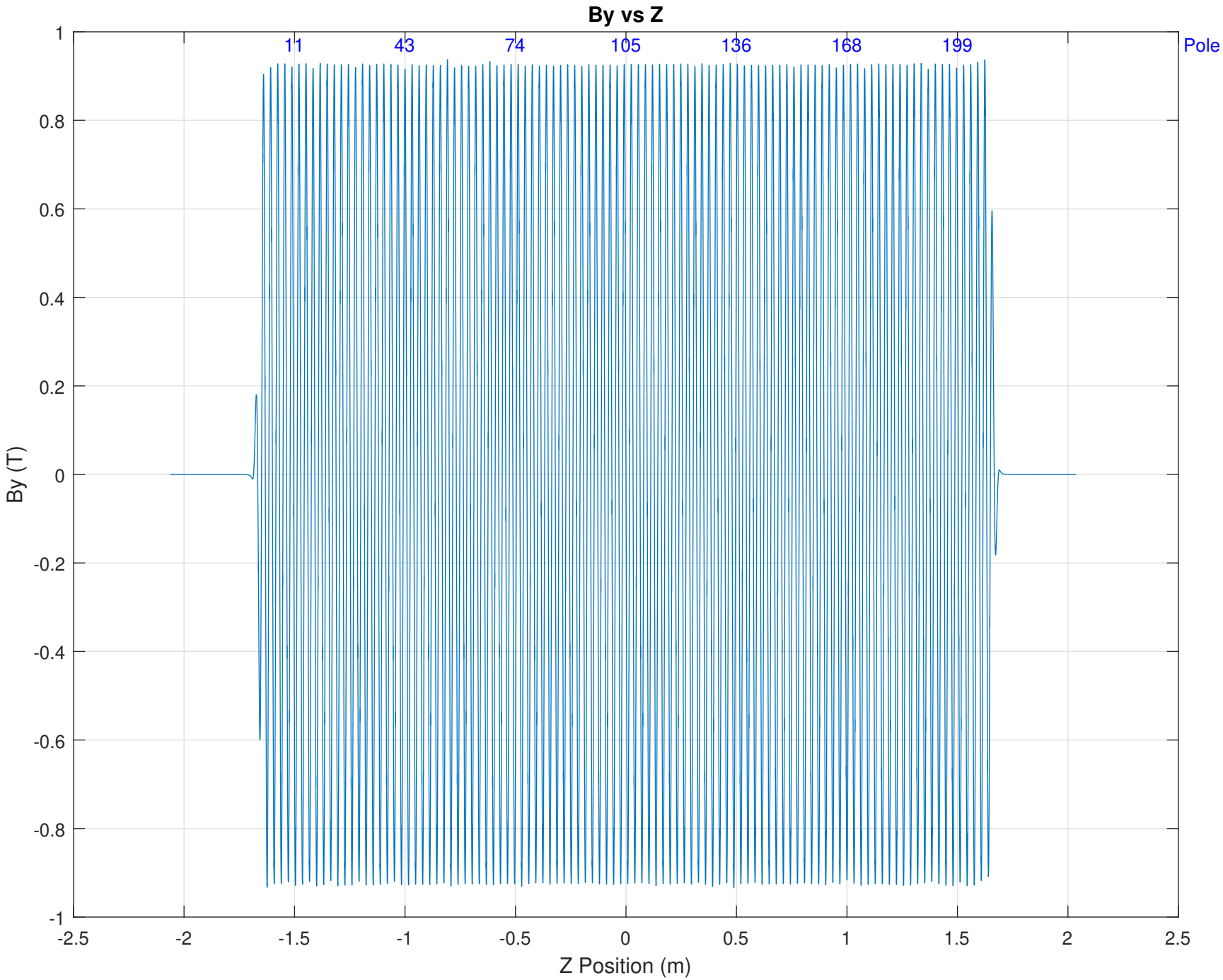
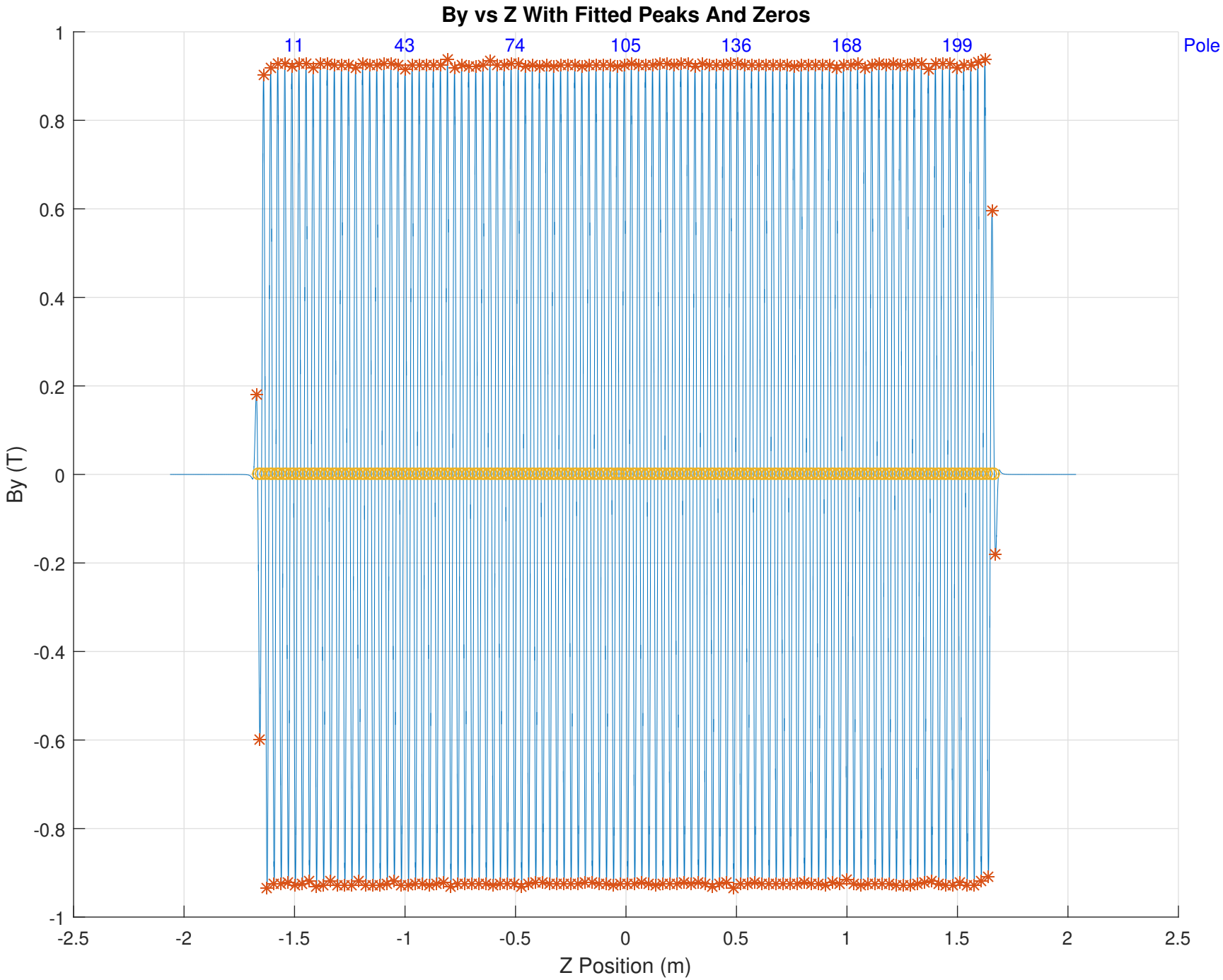
SLAC Magnetic Measurements

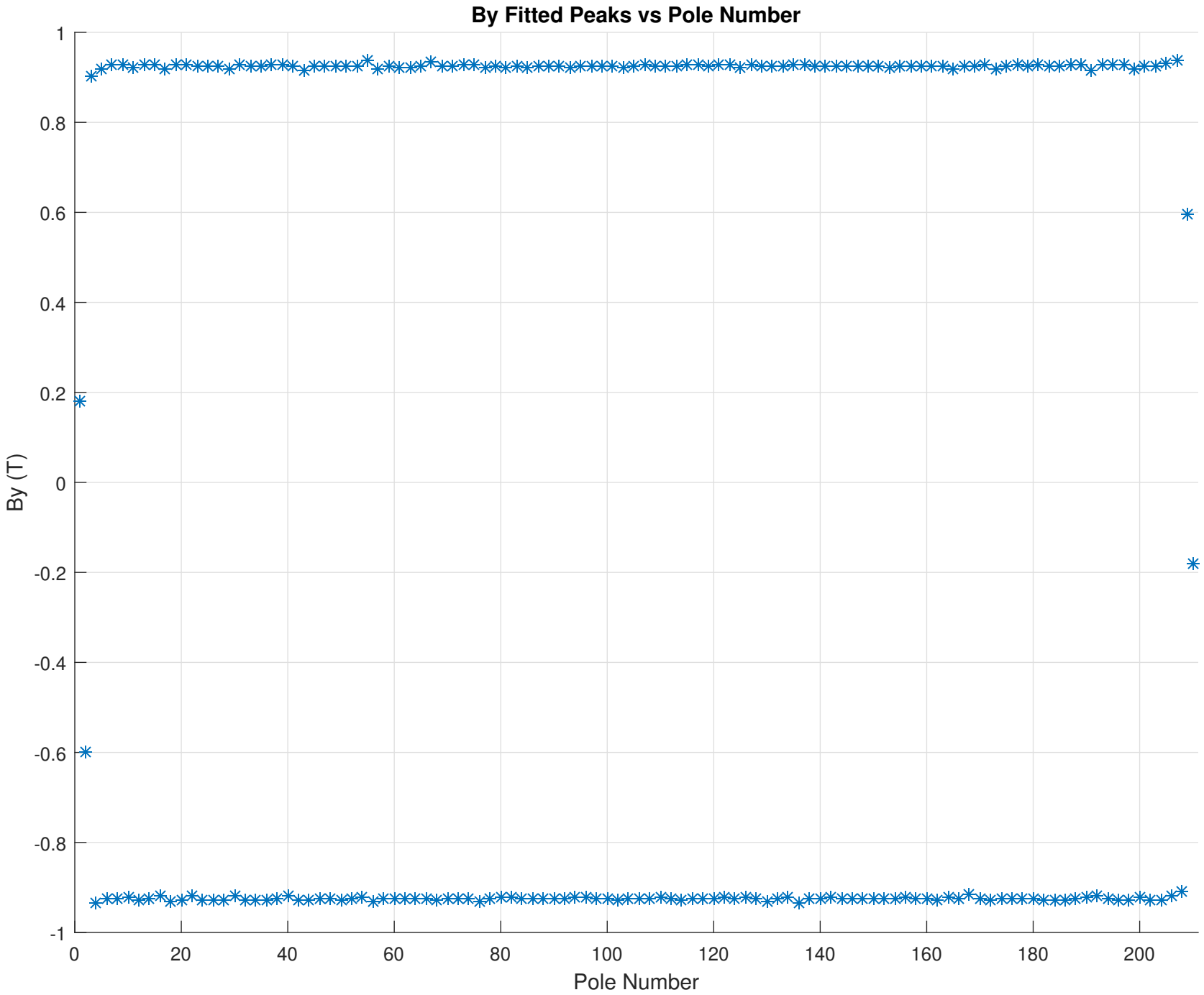
Planar Insertion Device Analysis

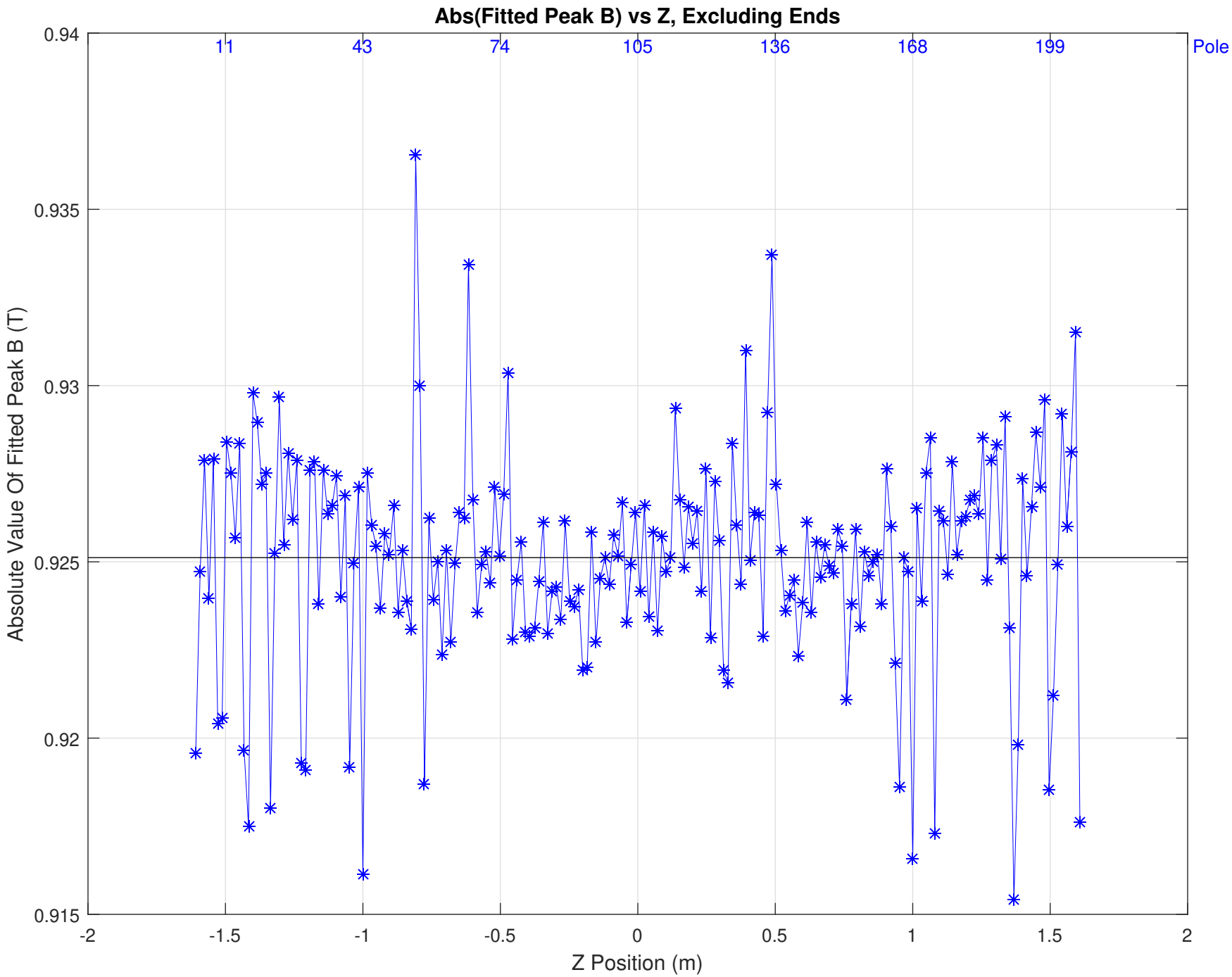
Parameters:
INPUT-FILE-DIR =S:\MagData\LCLS\Undulator\HXU-32\DATASET0001\Fine Tuning\Z Scans\Run 020\
INPUT-FILE-NAME =x+00000-y+000-bscanz.dat
INPUT-FILE-TYPE =ZVXYBXYH
CORR-REQUIRED =0
GAMMA =7827.79
NOM-LAMBDA-U =0.032
NOM-K-VALUE =2.6963
NOM-LAMBDA-R =1.2103e-09
NUM-POLES =210
NUM-END-POLES =4
CELL-LENGTH =3.656


Bx vs Z
10^-3
3
2
1
0
-1
-2
-3
-4
11
43
74
105
136
168
199
Pole
Bx (T)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z Position (m)

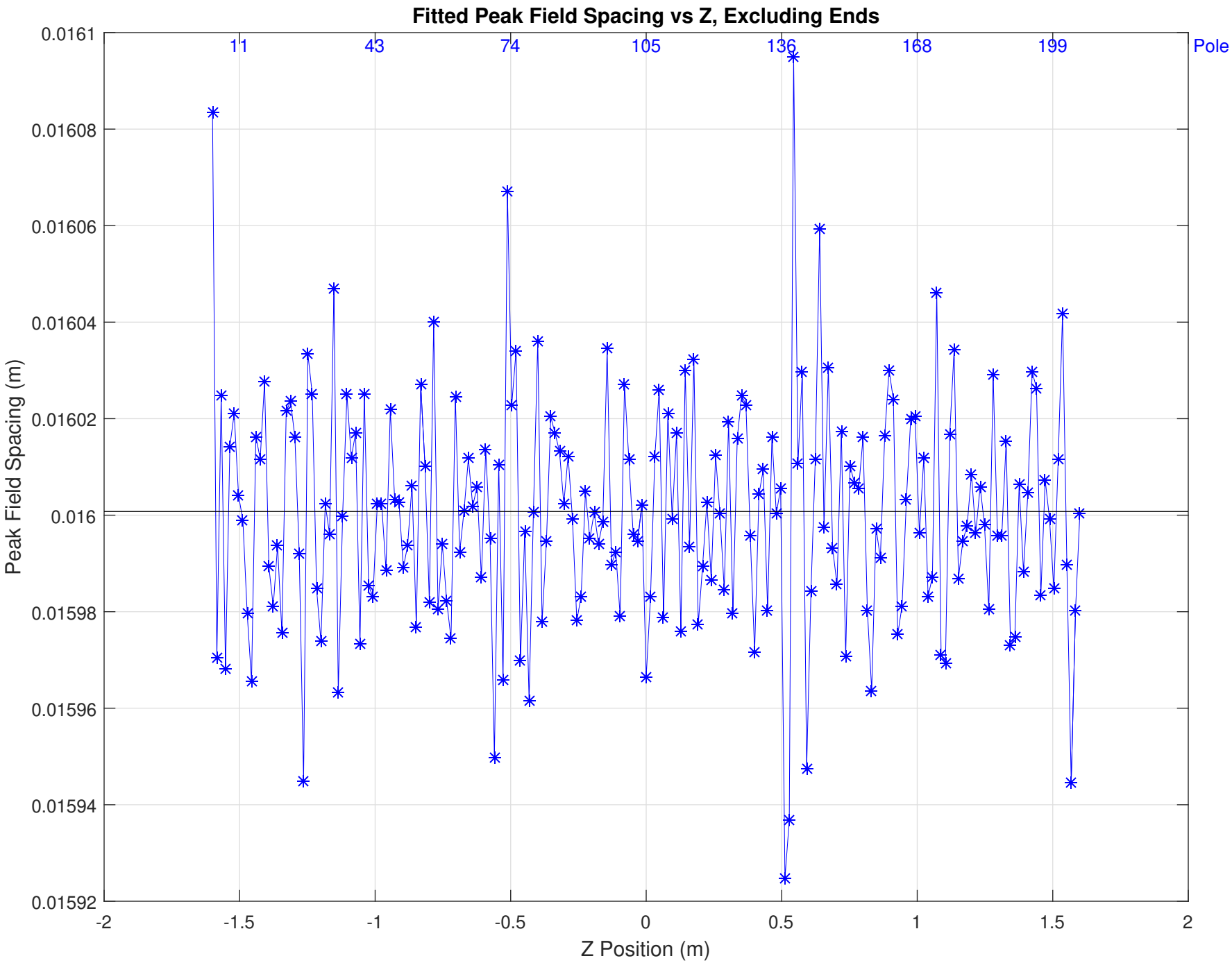

By vs Z
11
43
74
105
136
168
199
Pole
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
By (T)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z Position (m)


By vs Z With Fitted Peaks And Zeros
11
43
74
105
136
168
199
Pole
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
By (T)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z Position (m)

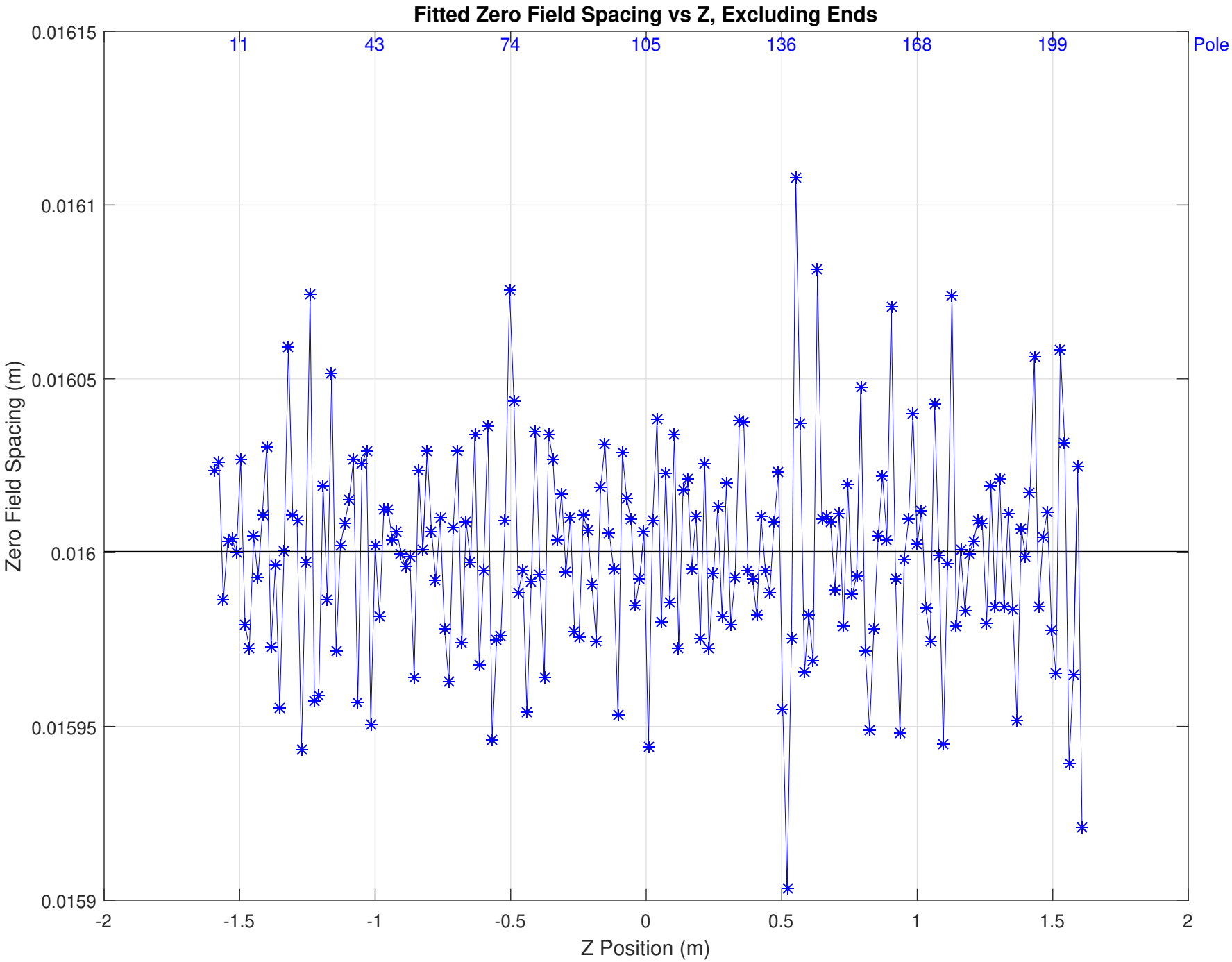

By Fitted Peaks vs Pole Number
By (T)
Pole Number
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
0
20
40
60
80
100
120
140
160
180
200



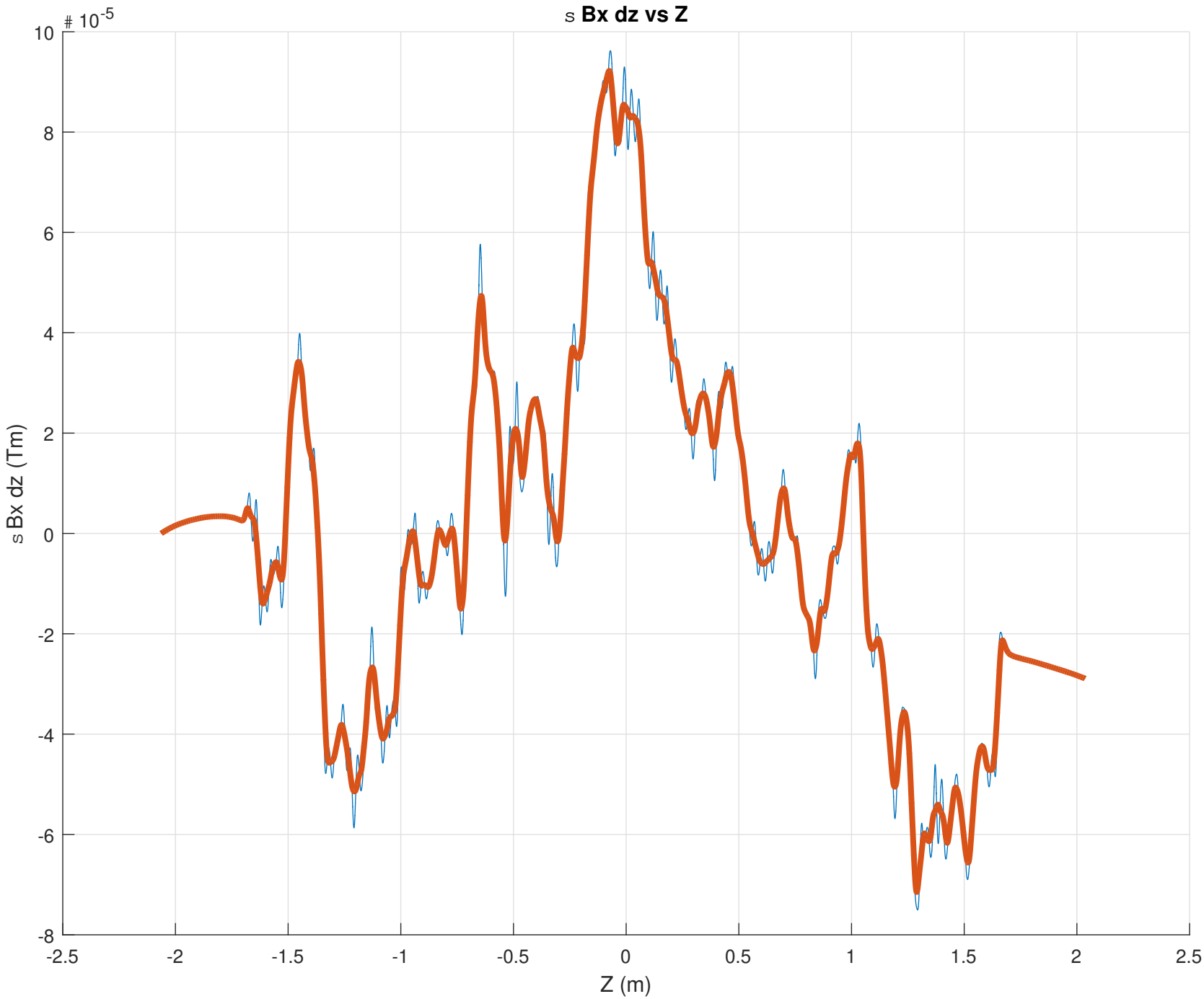
Peak Fields: Ave = 0.925119 T, RMS = 0.003059 T

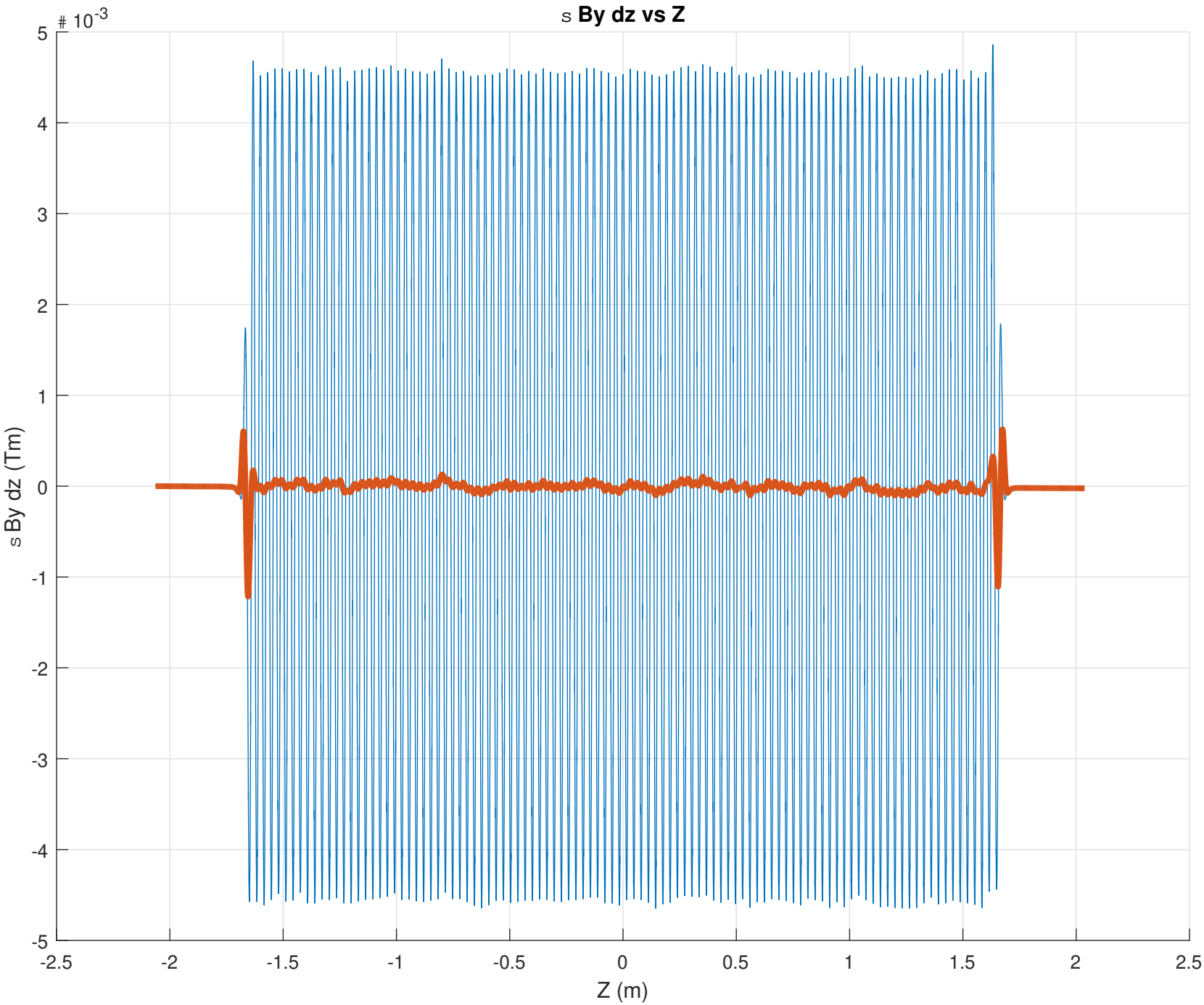


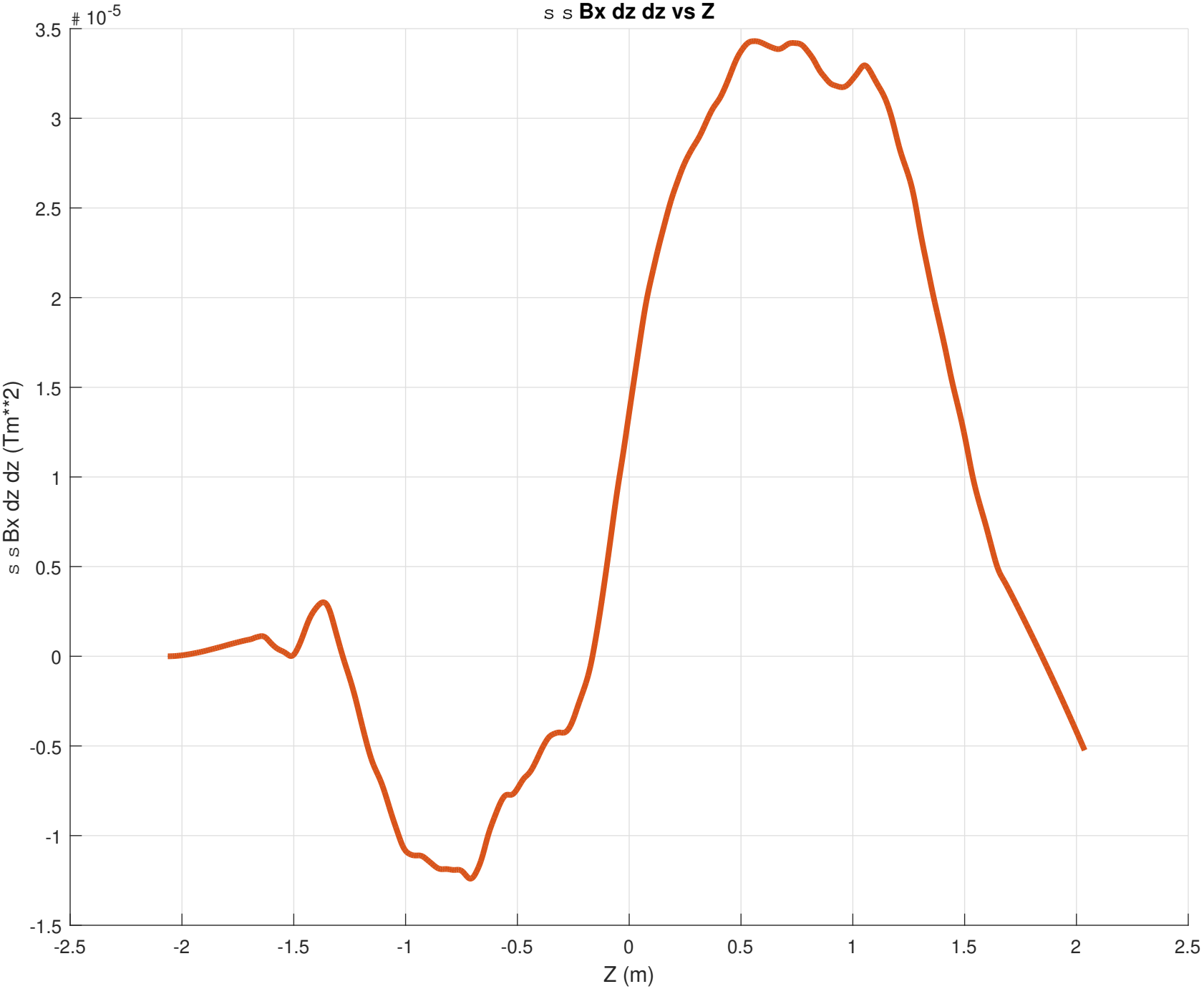
Peak Field Spacing: Ave = 0.016001 m, RMS = 0.000024 m

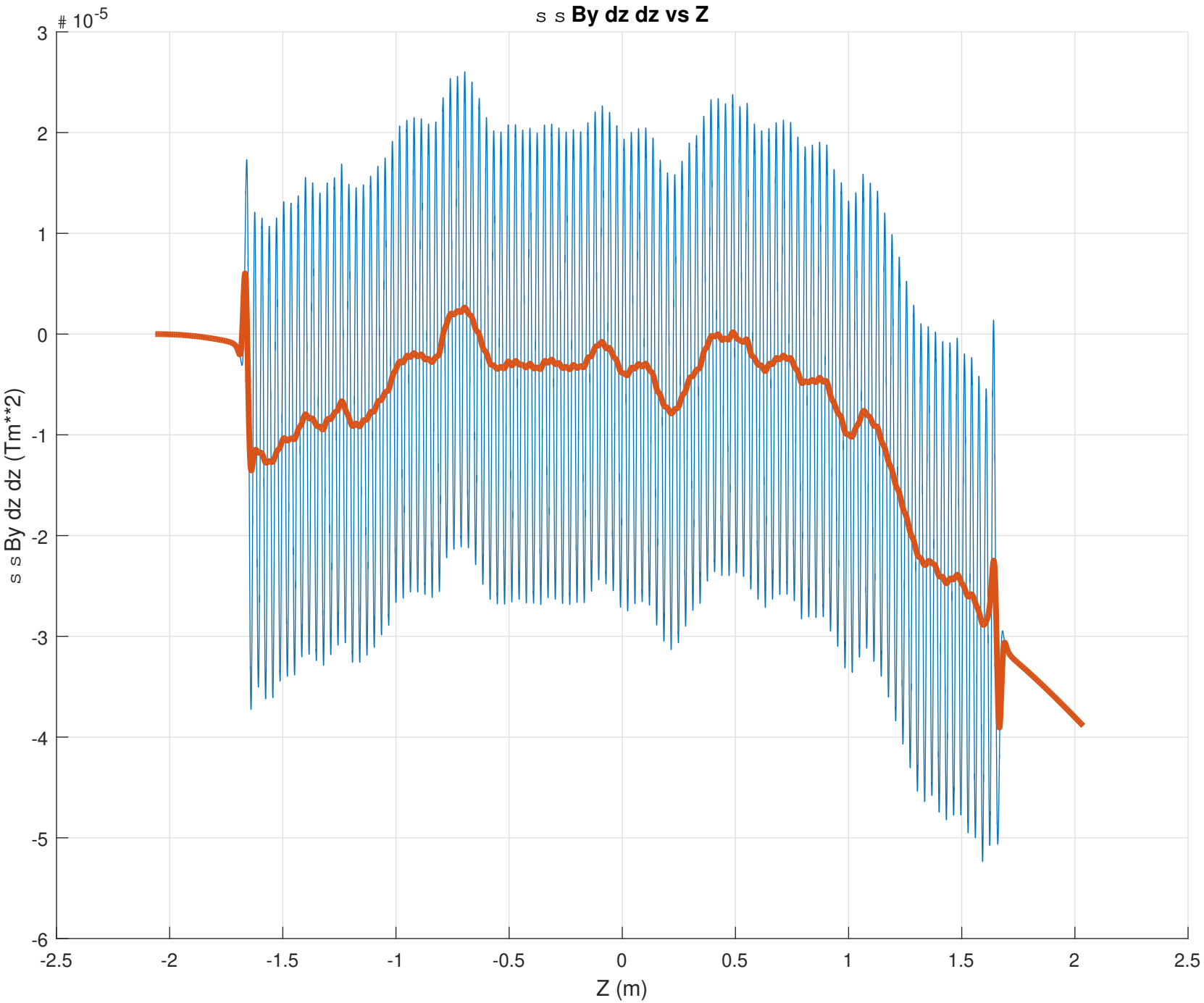


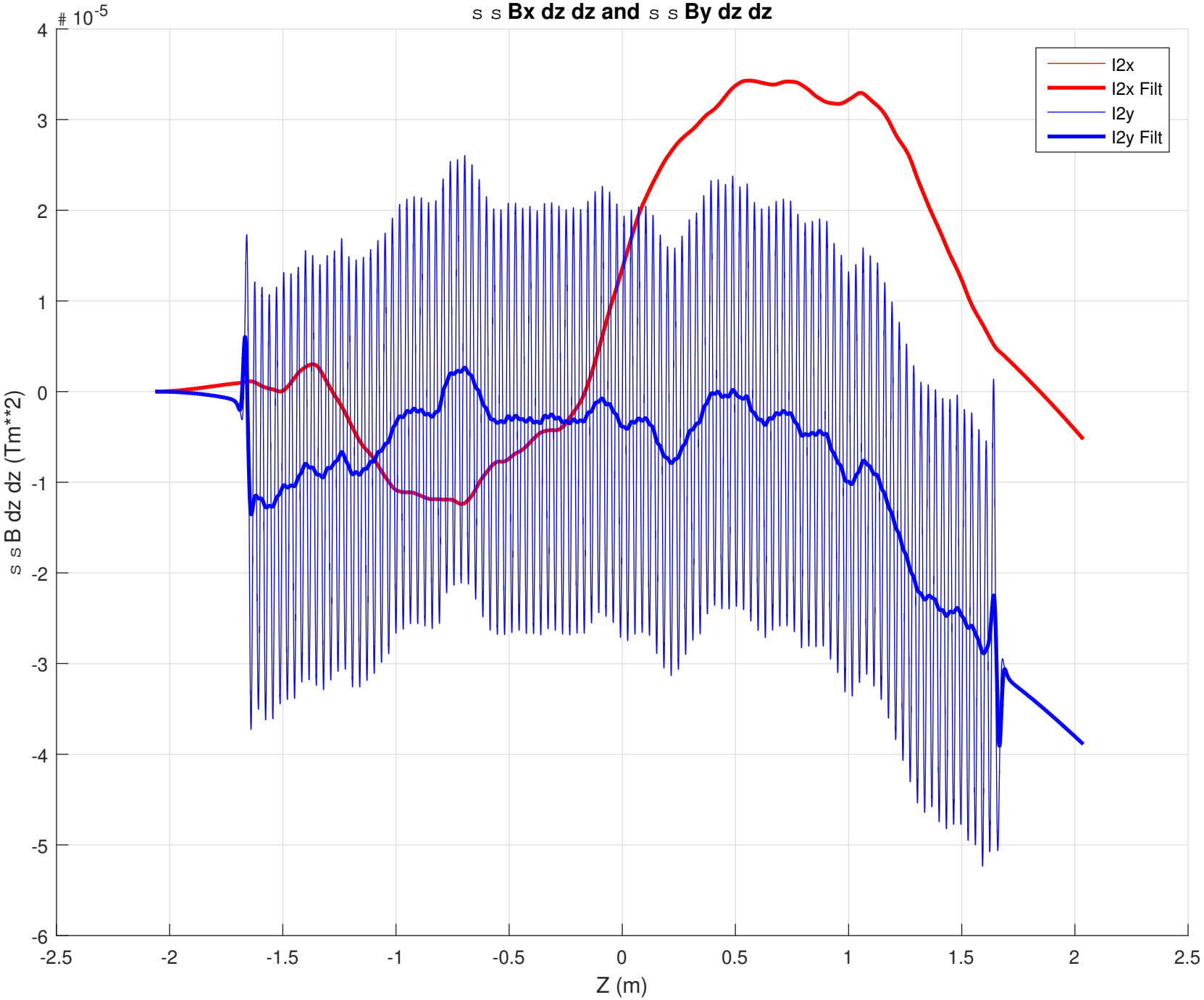
Zero Field Spacing: Ave = 0.016000 m, RMS = 0.000030 m

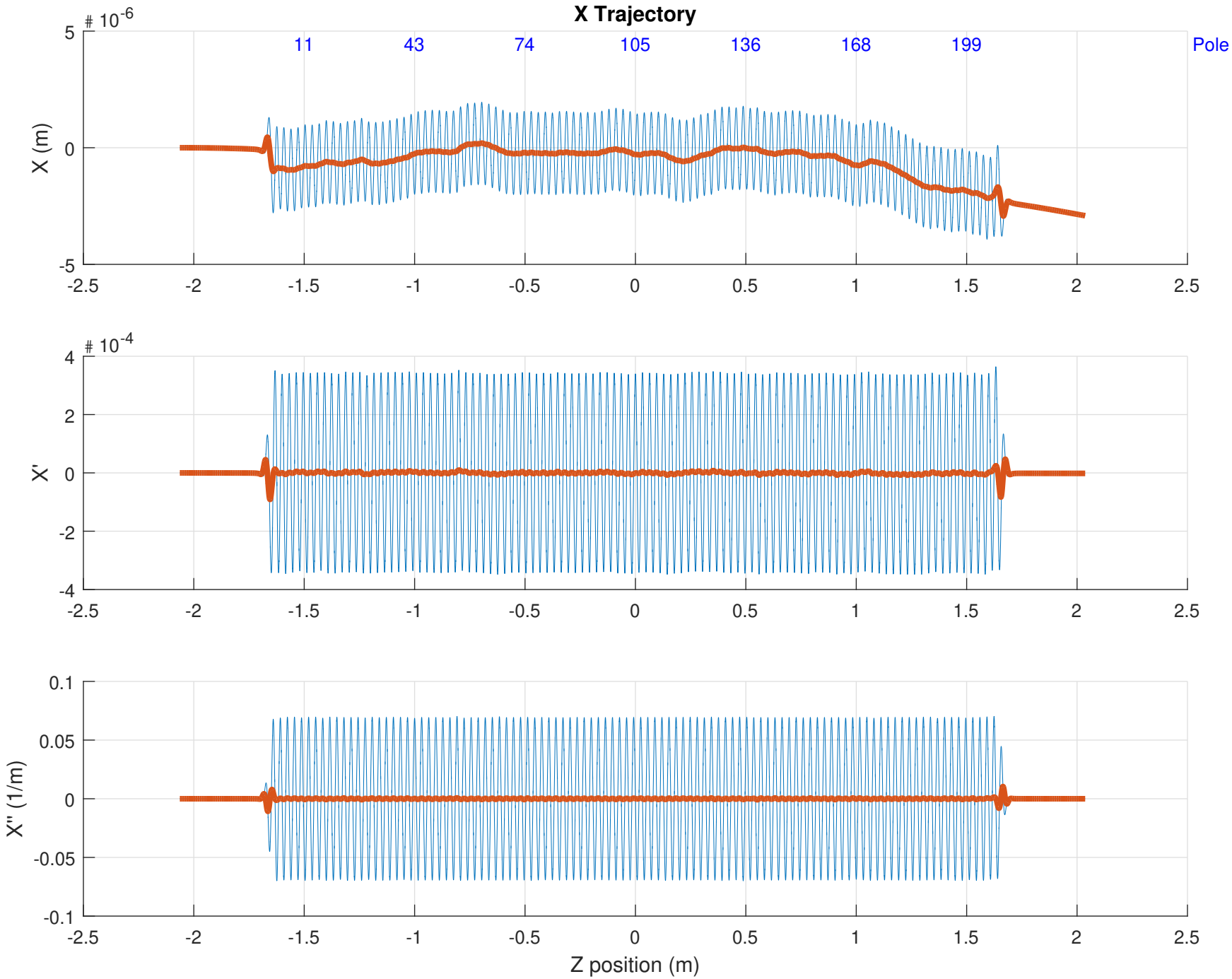

s Bx dz vs Z
10-5
10
8
6
4
2
0
-2
-4
-6
-8
s Bx dz (Tm)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z (m)

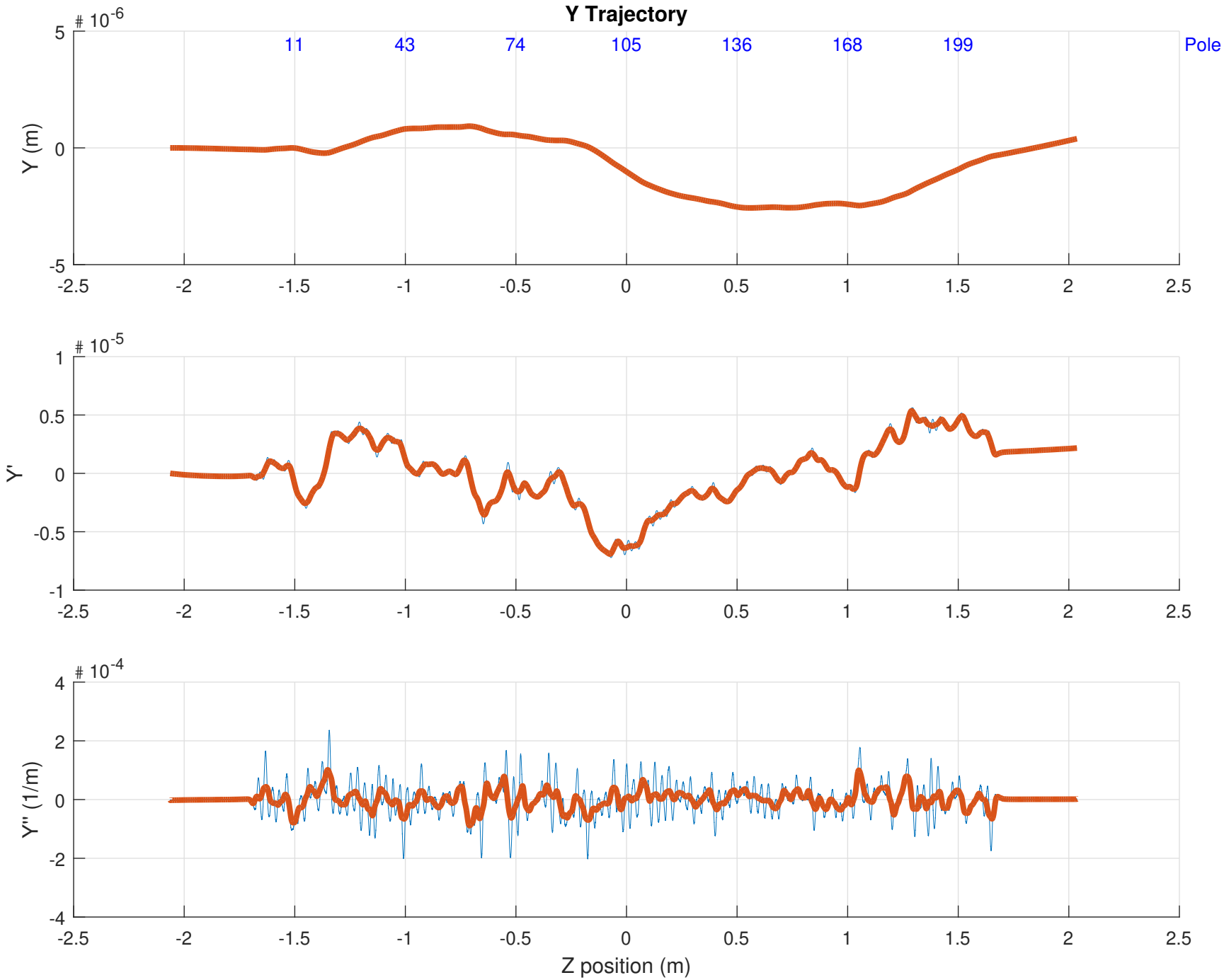

s By dz vs Z
10^-3
5
4
3
2
1
0
-1
-2
-3
-4
-5
s By dz (Tm)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z (m)

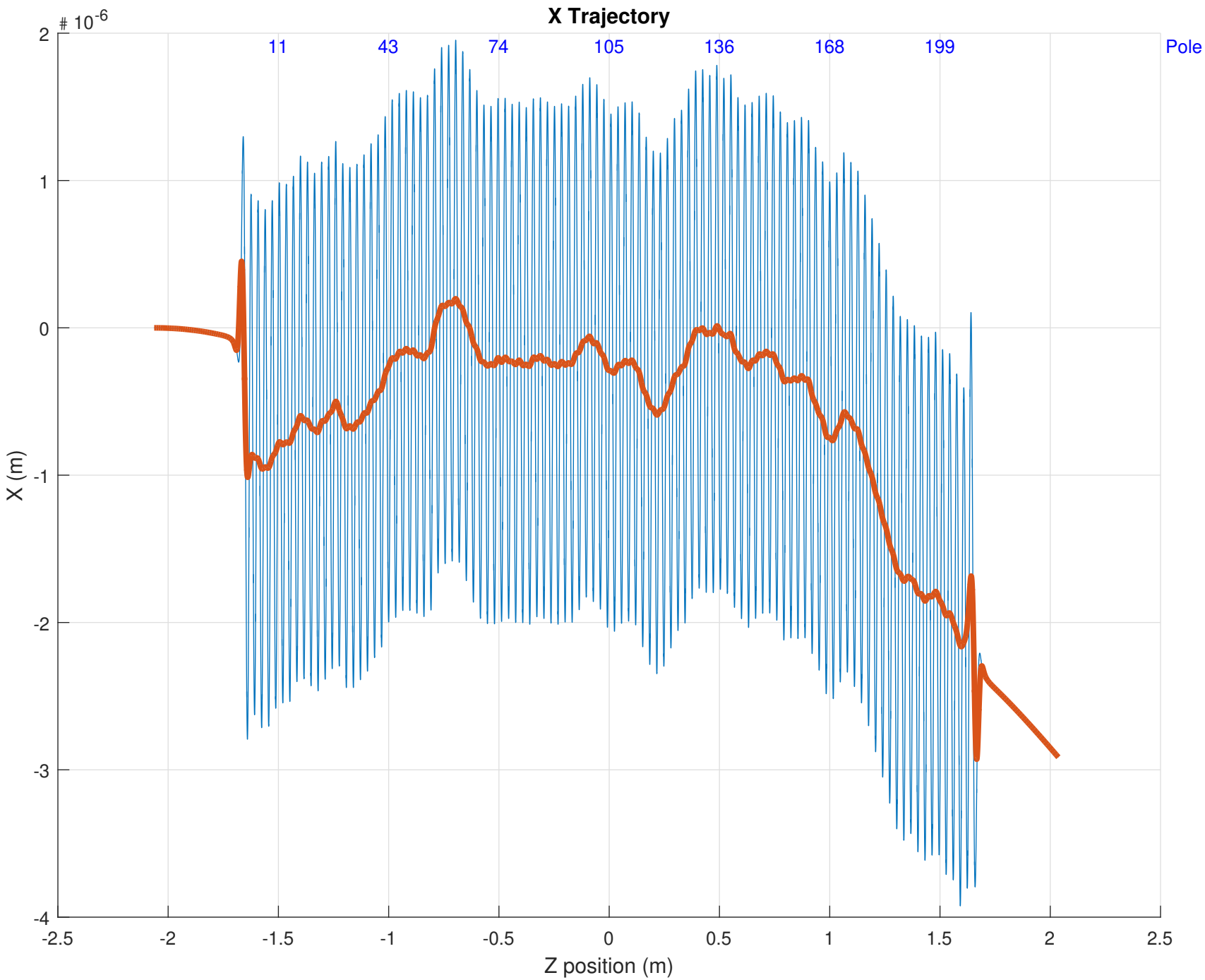

s s Bx dz dz vs Z
10^-5
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
s s Bx dz dz (Tm**2)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z (m)

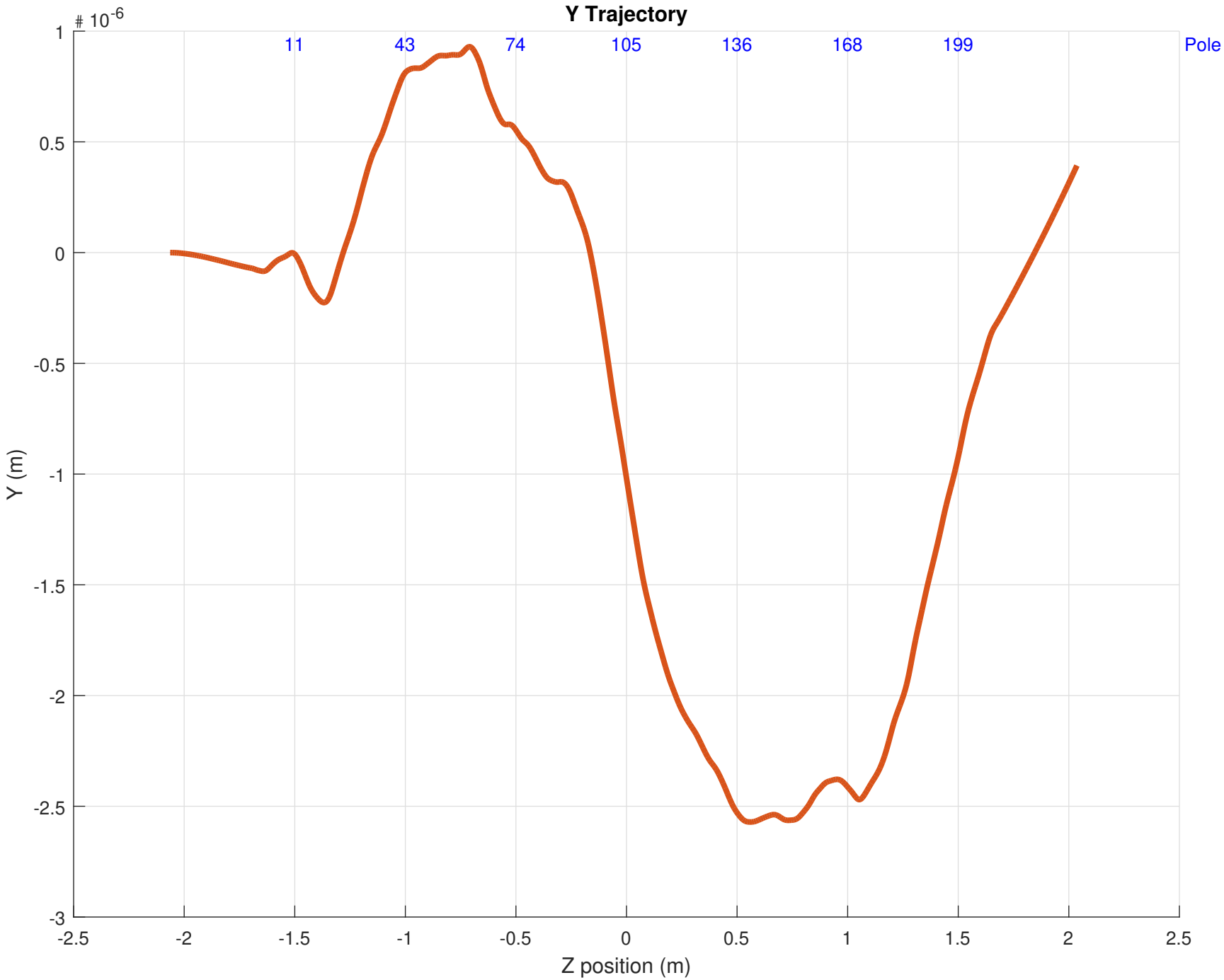

s s By dz dz vs Z
10^-5
3
2
1
0
-1
-2
-3
-4
-5
-6
s s By dz dz (Tm**2)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z (m)

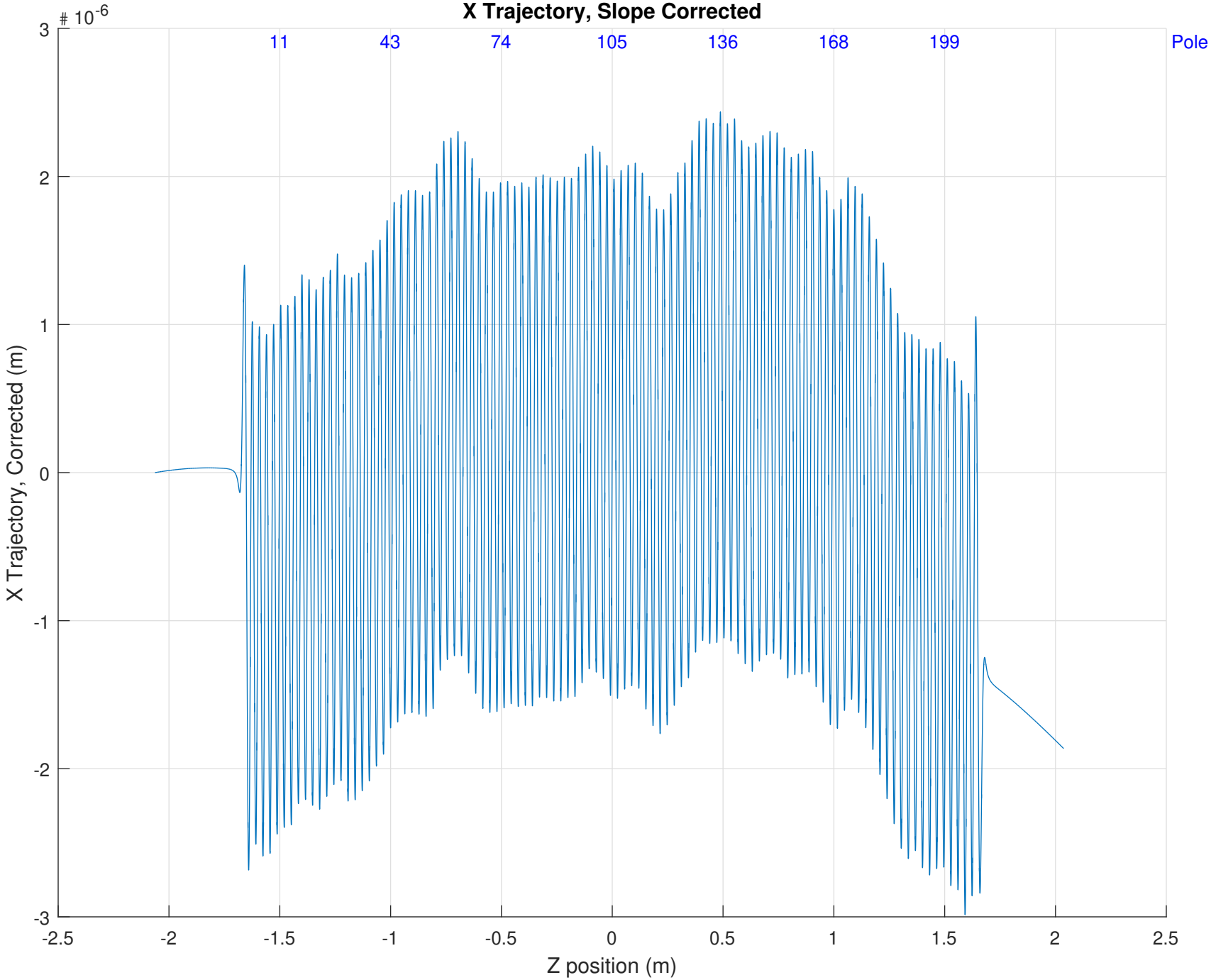

s s Bx dz dz and s s By dz dz
10^-5
s s B dz dz (Tm**2)
Z (m)
I2x
I2x Filt
I2y
I2y Filt
4
3
2
1
0
-1
-2
-3
-4
-5
-6
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5

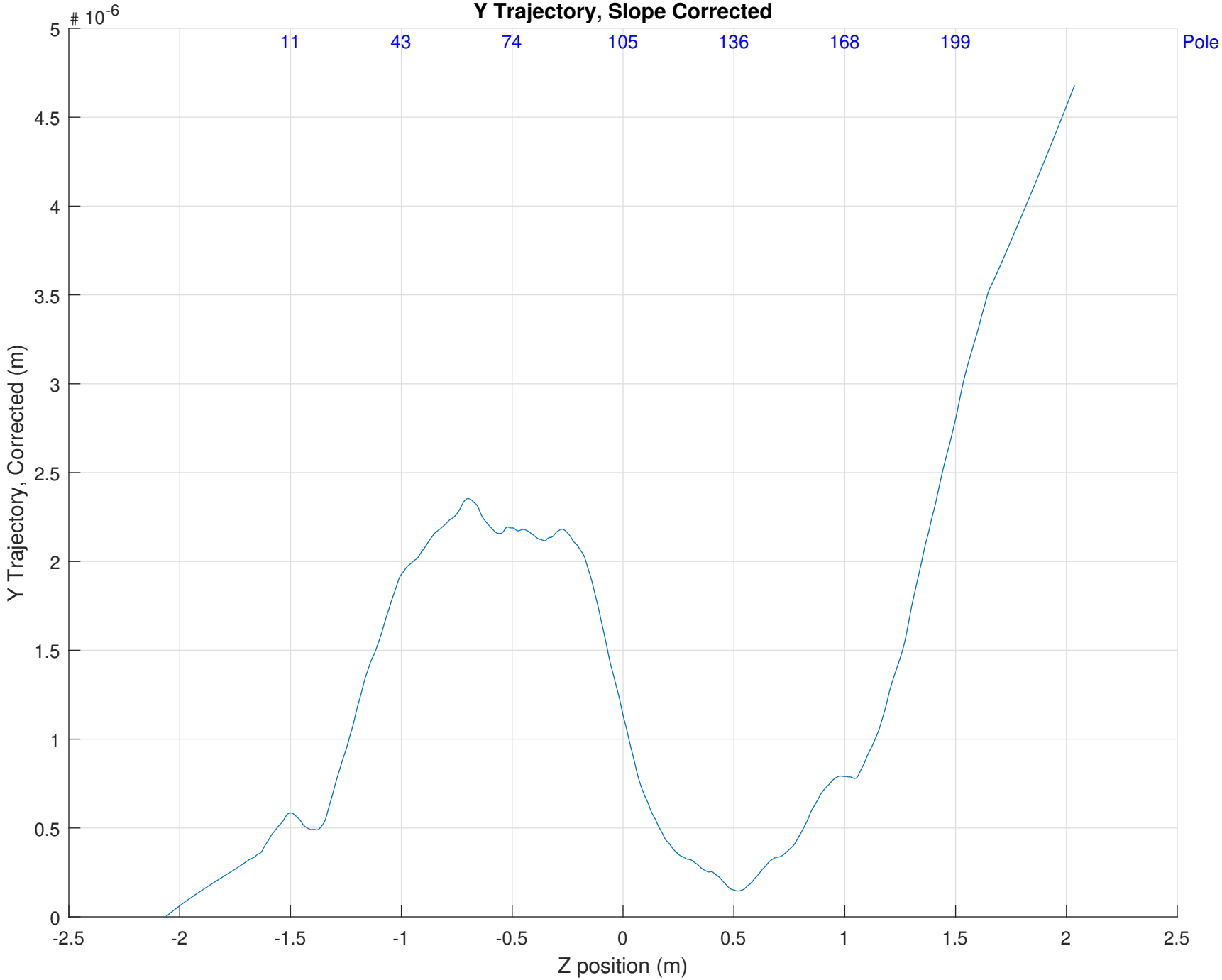

X Trajectory
10^-6
11
43
74
105
136
168
199
Pole
X (m)
10^-4
X'
X'' (1/m)
Z position (m)

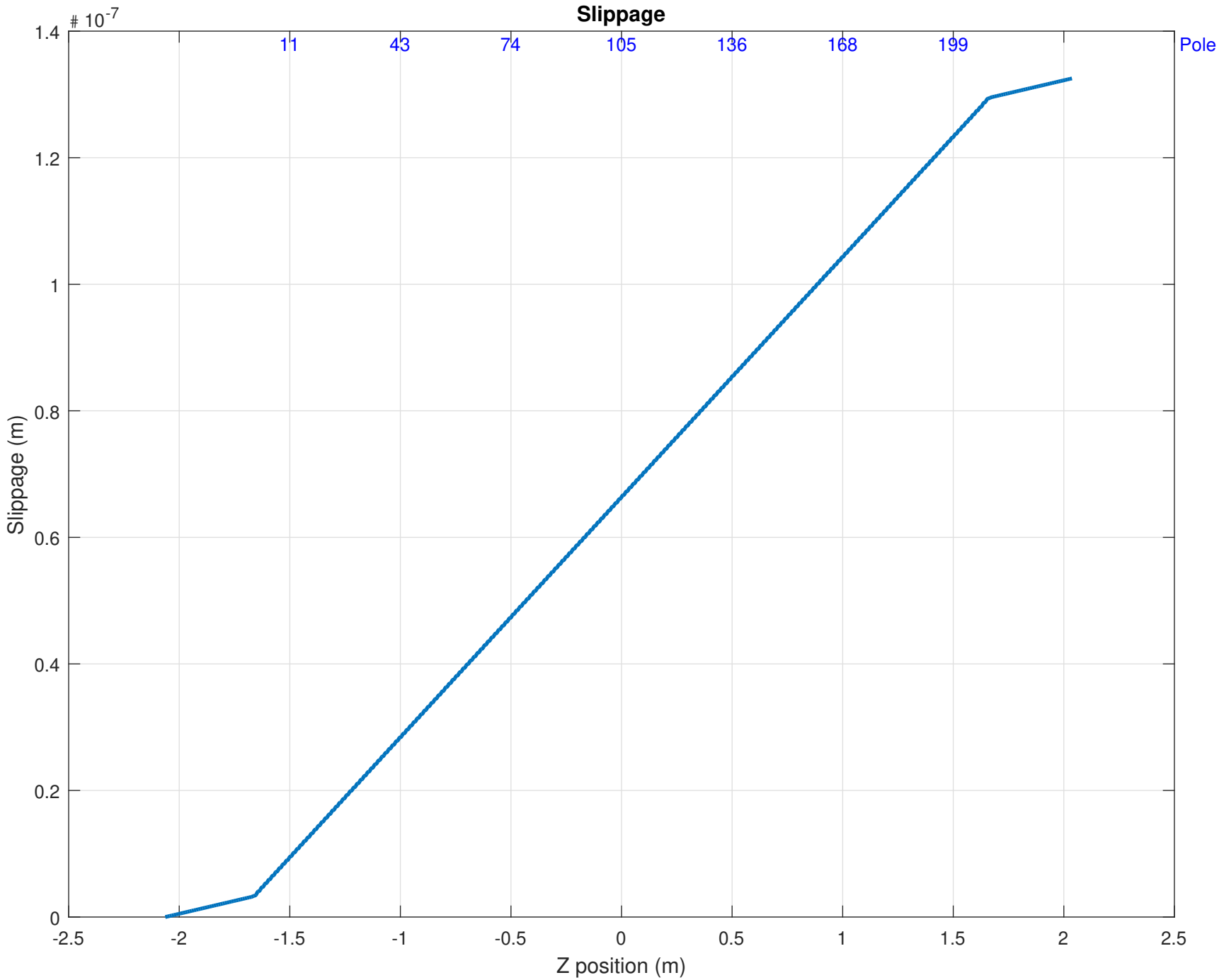

Y Trajectory
10^-6
11
43
74
105
136
168
199
Pole
Y (m)
10^-5
Y'
10^-4
Y'' (1/m)
Z position (m)

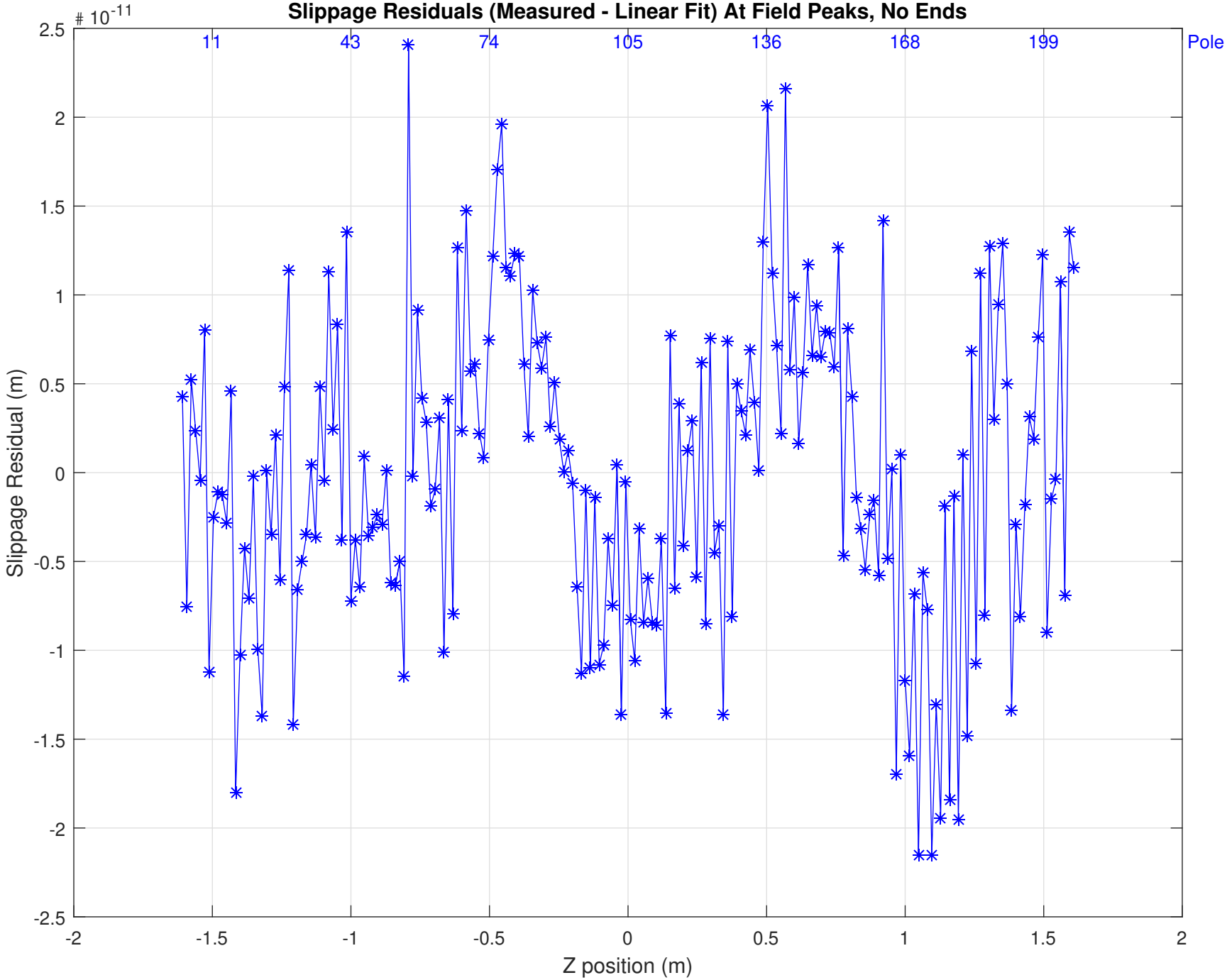

X Trajectory
10^-6
11
43
74
105
136
168
199
Pole
2
1
0
-1
-2
-3
-4
X (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)

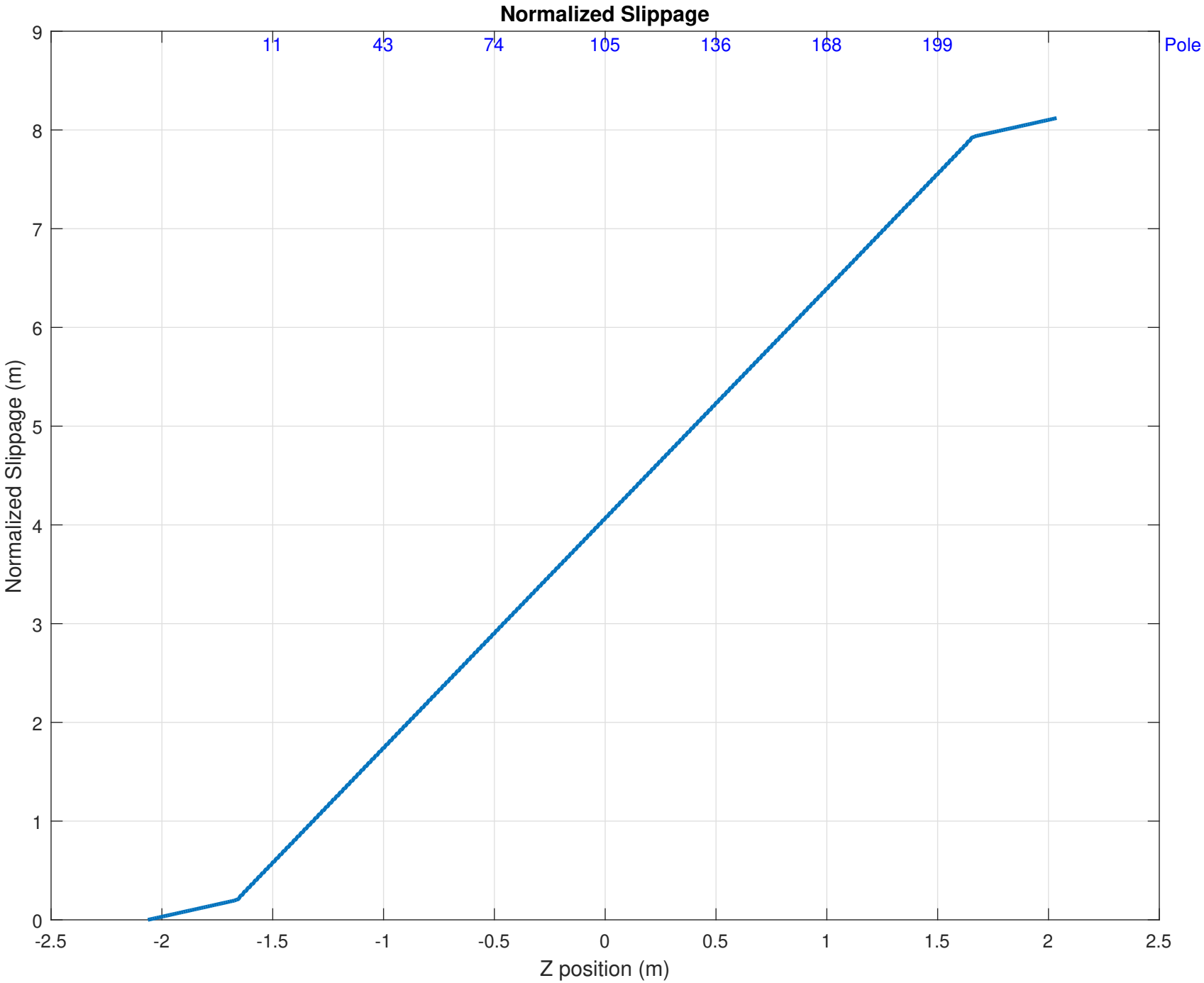

Y Trajectory
10^-6
11
43
74
105
136
168
199
Pole
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
Y (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)

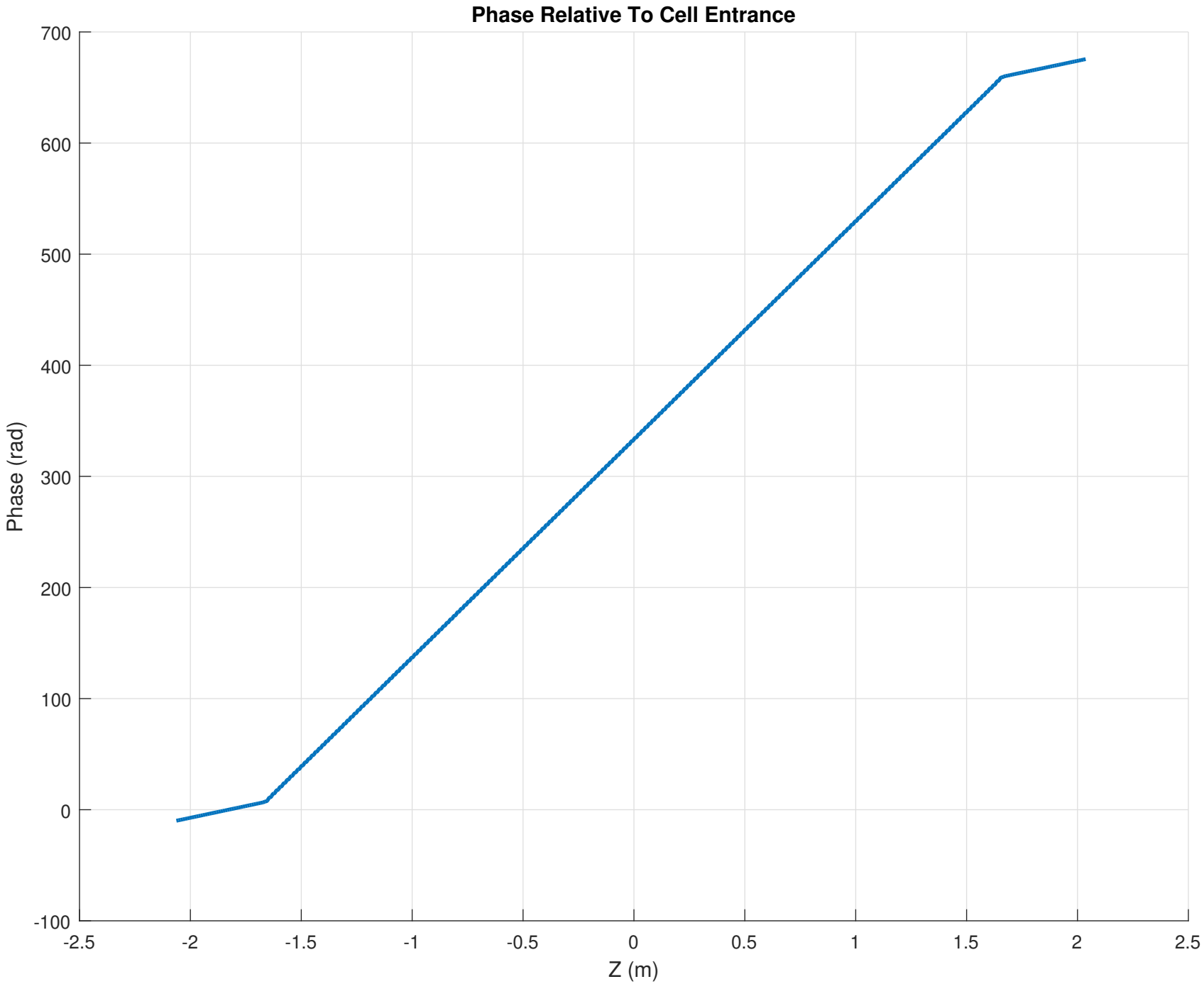

X Trajectory, Slope Corrected
10-6
11
43
74
105
136
168
199
Pole
3
2
1
0
-1
-2
-3
X Trajectory, Corrected (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)

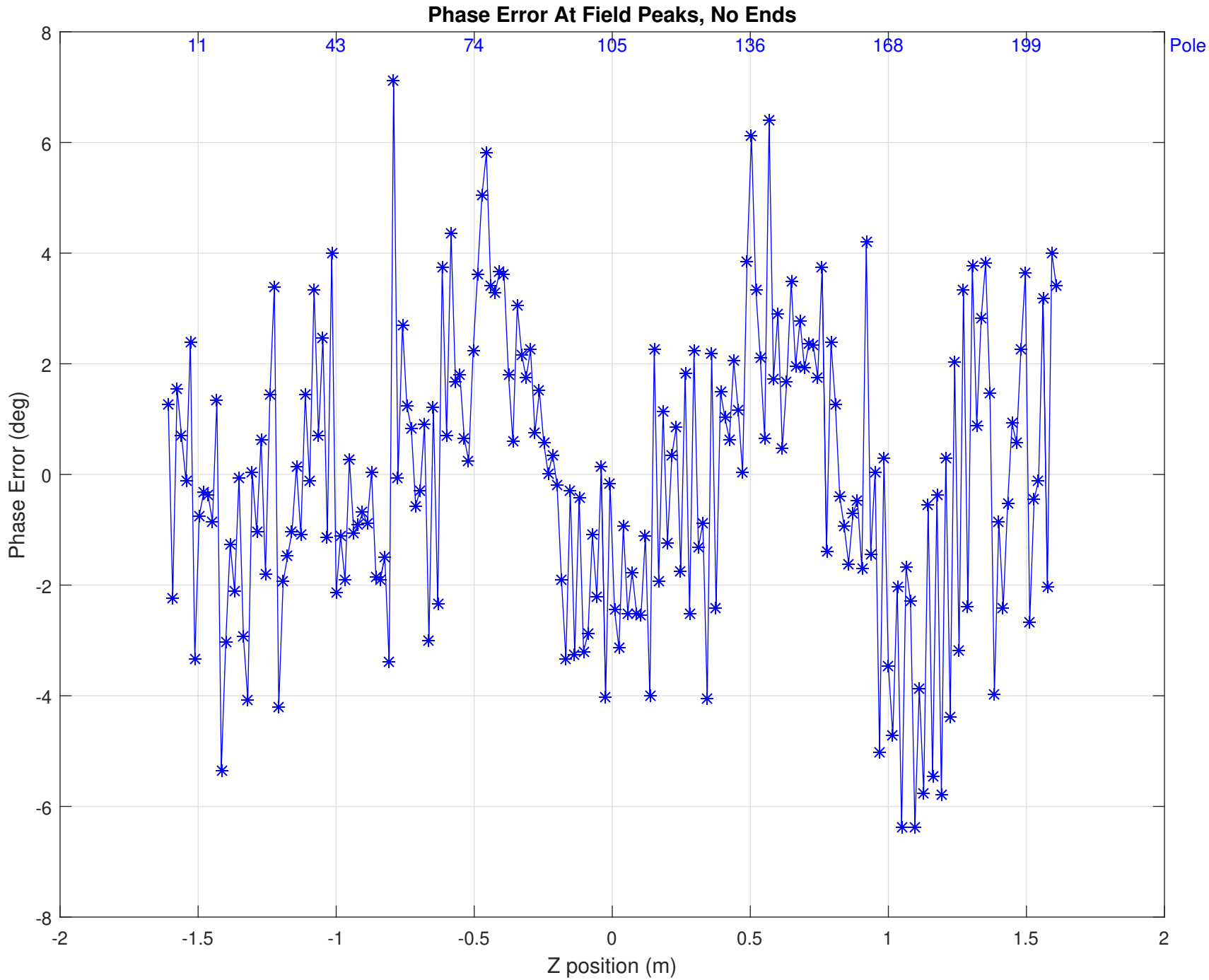

Y Trajectory, Slope Corrected
10^-6
11
43
74
105
136
168
199
Pole
Y Trajectory, Corrected (m)
Z position (m)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5


Slippage
10^-7
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Slippage (m)
11
43
74
105
136
168
199
Pole
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)

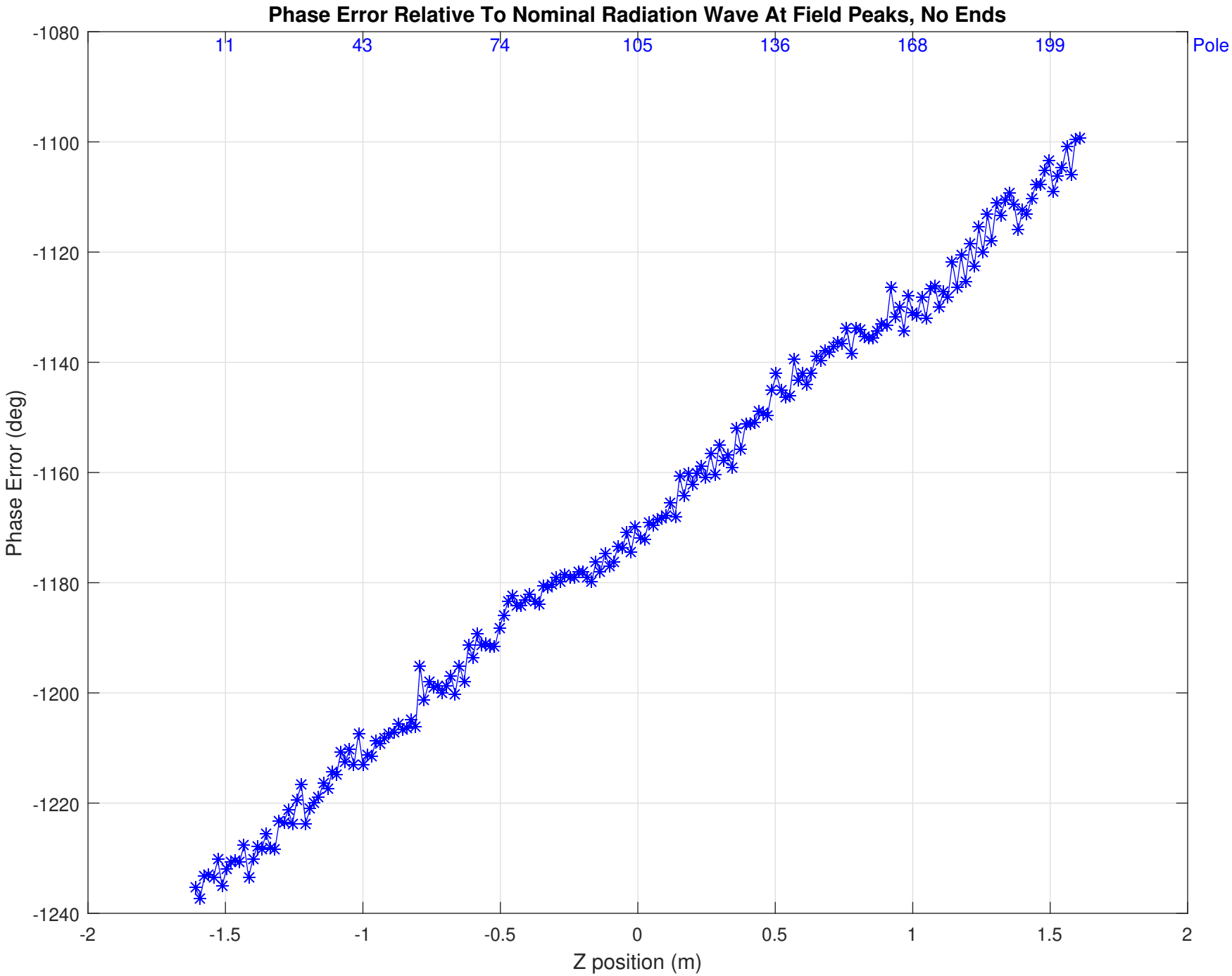

Slippage Residuals (Measured - Linear Fit) At Field Peaks, No Ends
10^-11
11
43
74
105
136
168
199
Pole
2.5
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
Slippage Residual (m)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z position (m)


Normalized Slippage
11
43
74
105
136
168
199
Pole
9
8
7
6
5
4
3
2
1
0
Normalized Slippage (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)


Phase Relative To Cell Entrance
700
600
500
400
300
200
100
0
-100
Phase (rad)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z (m)



Phase Error: Ave = 0.000000 deg, RMS = 2.581587 deg


Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
11
43
74
105
136
168
199
Pole
-1080
-1100
-1120
-1140
-1160
-1180
-1200
-1220
-1240
Phase Error (deg)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z position (m)