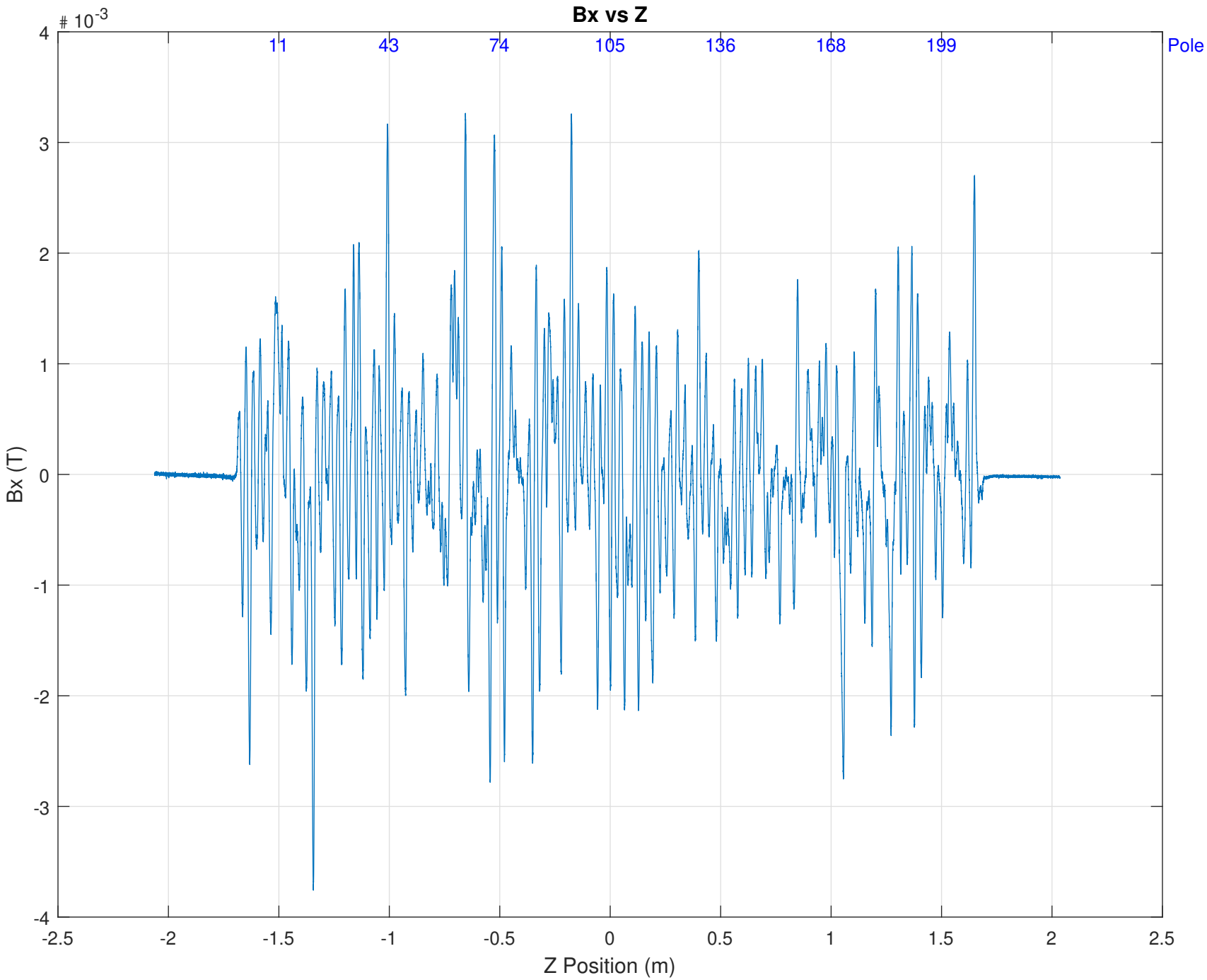
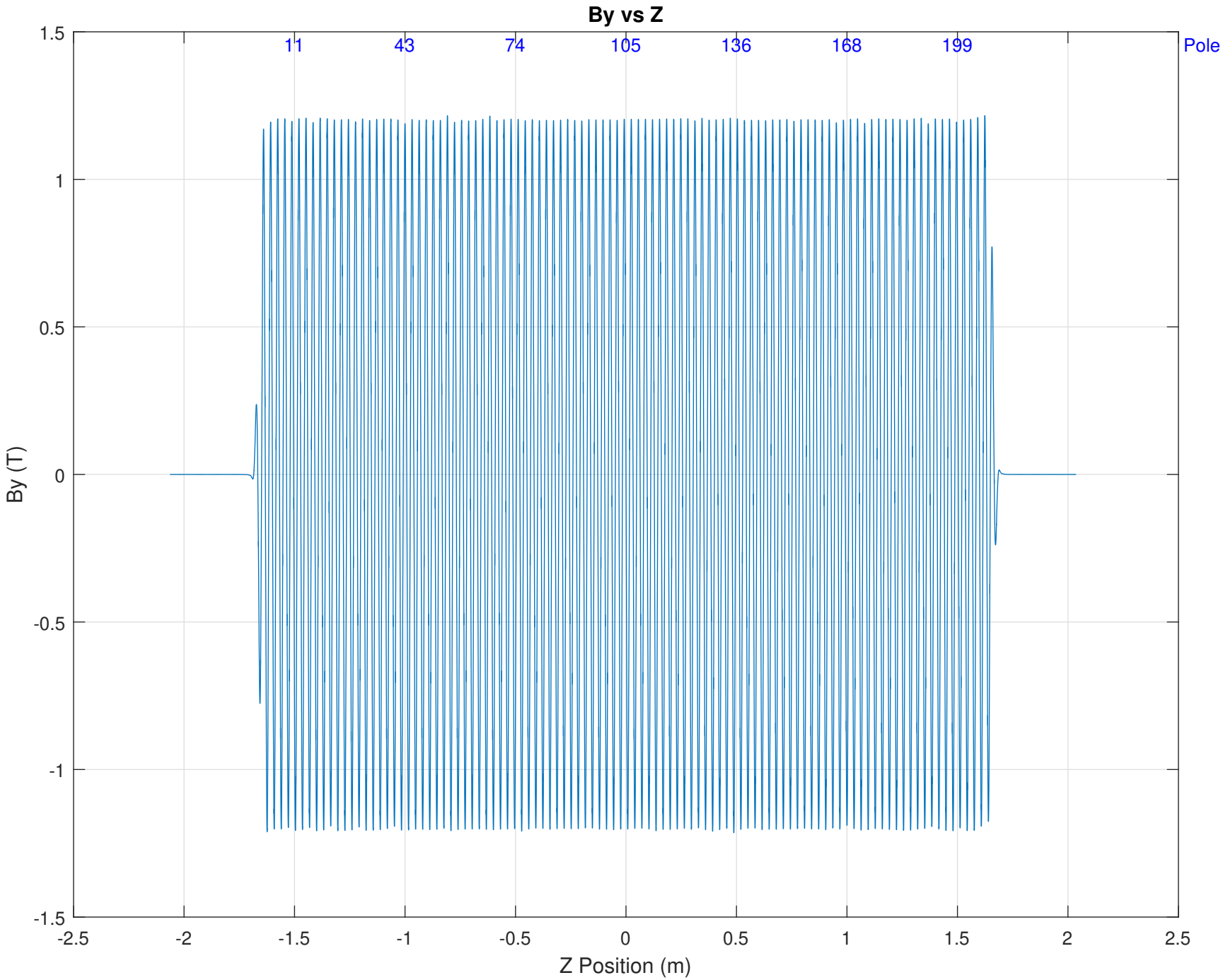
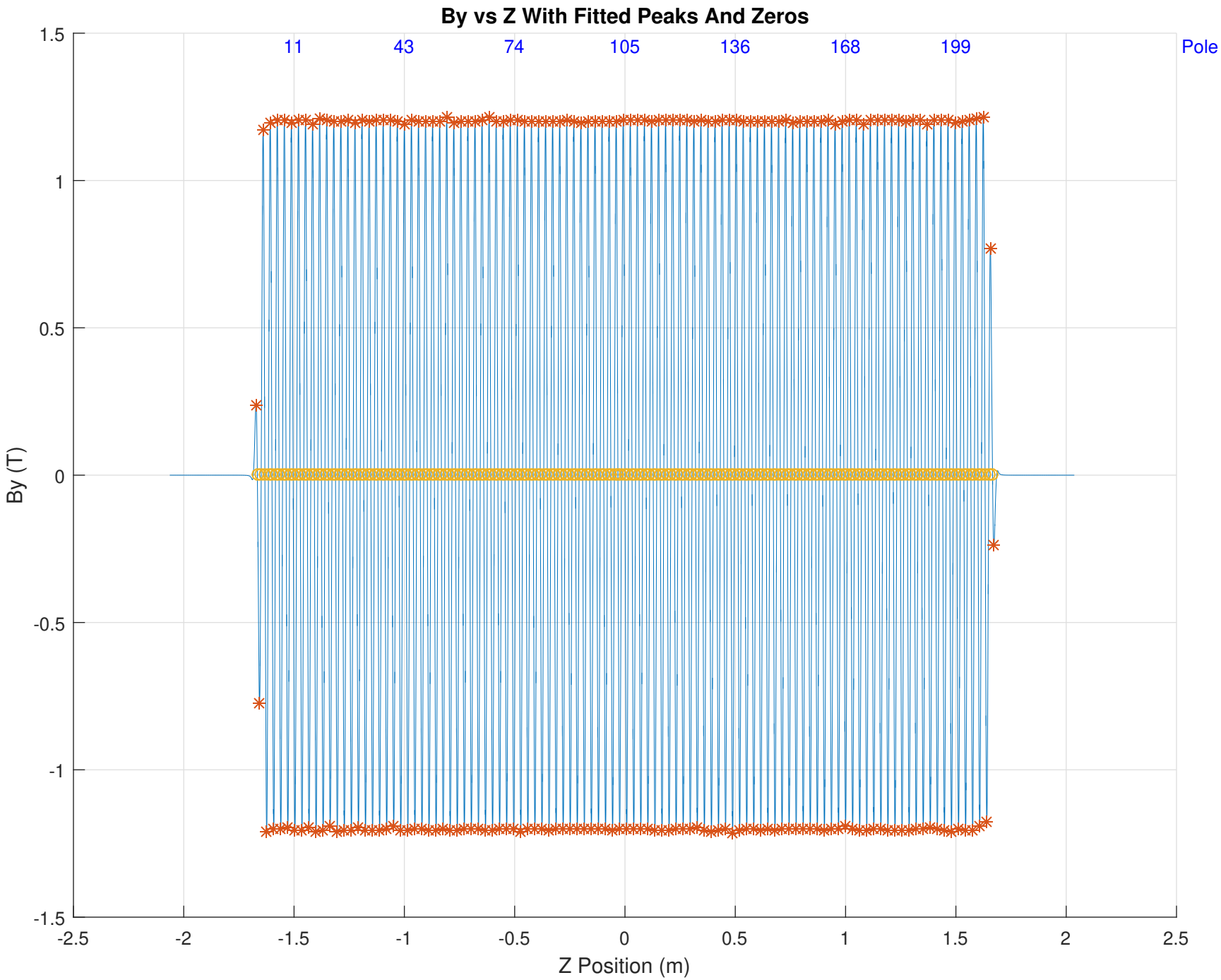
SLAC Magnetic Measurements

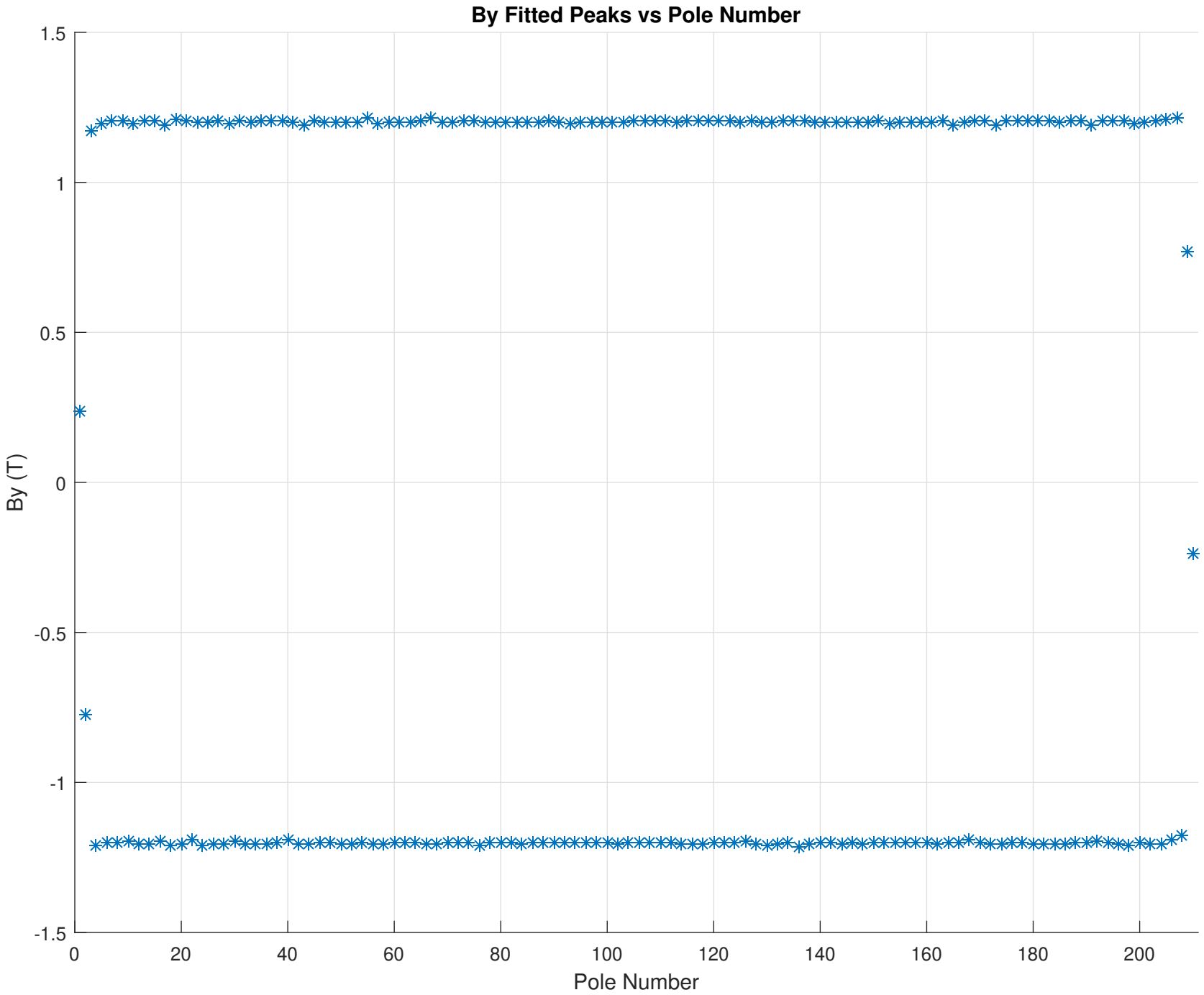
Planar Insertion Device Analysis

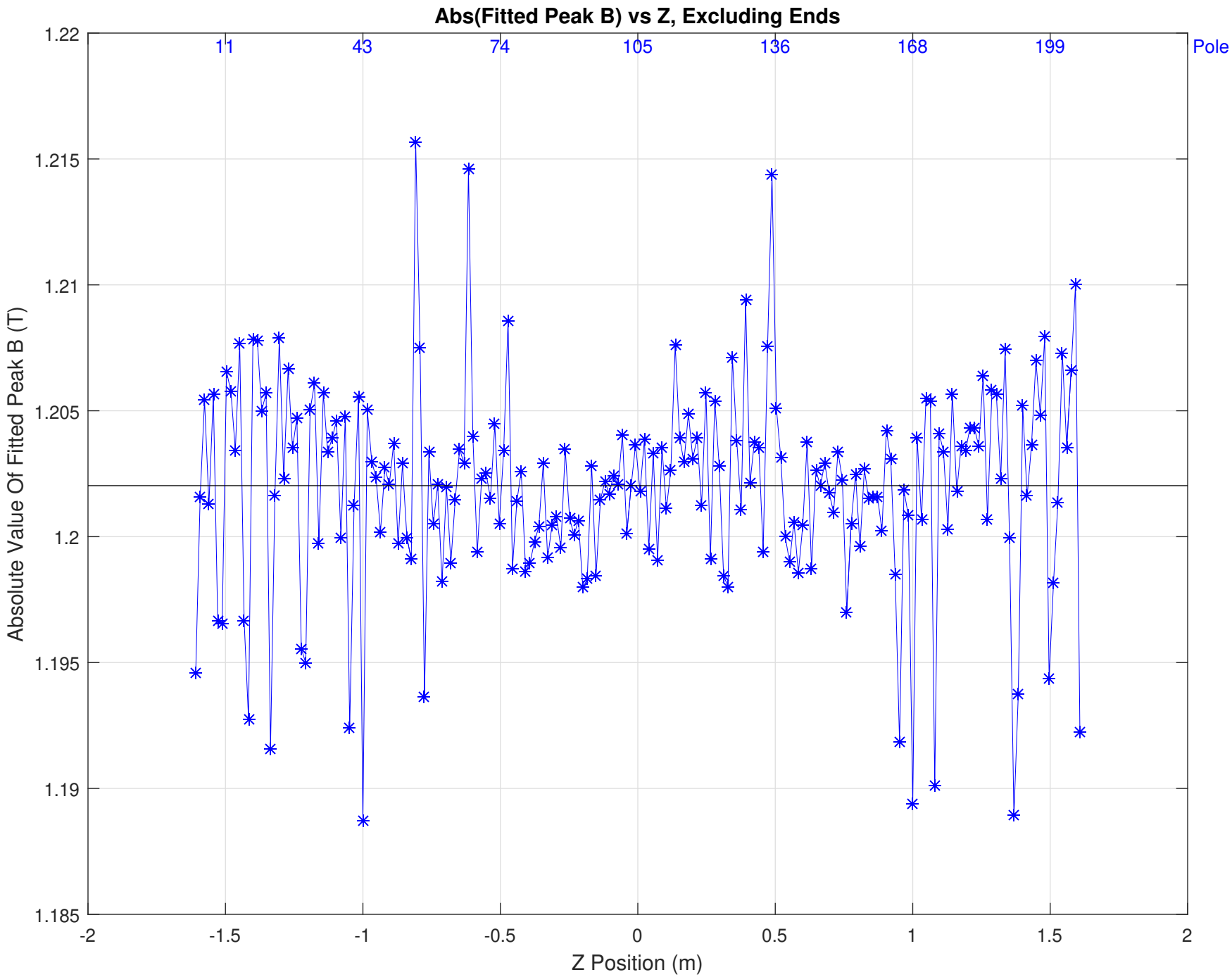
Parameters:
INPUT-FILE-DIR =S:\MagData\LCLS\Undulator\HXU-32\DATASET0001\Fine Tuning\Z Scans\Run 060\
INPUT-FILE-NAME =x+00000-y+000-bscanz.dat
INPUT-FILE-TYPE =ZVXYBXYH
CORR-REQUIRED =0
GAMMA =7827.79
NOM-LAMBDA-U =0.032
NOM-K-VALUE =2.6963
NOM-LAMBDA-R =1.2103e-09
NUM-POLES =210
NUM-END-POLES =4
CELL-LENGTH =3.656


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

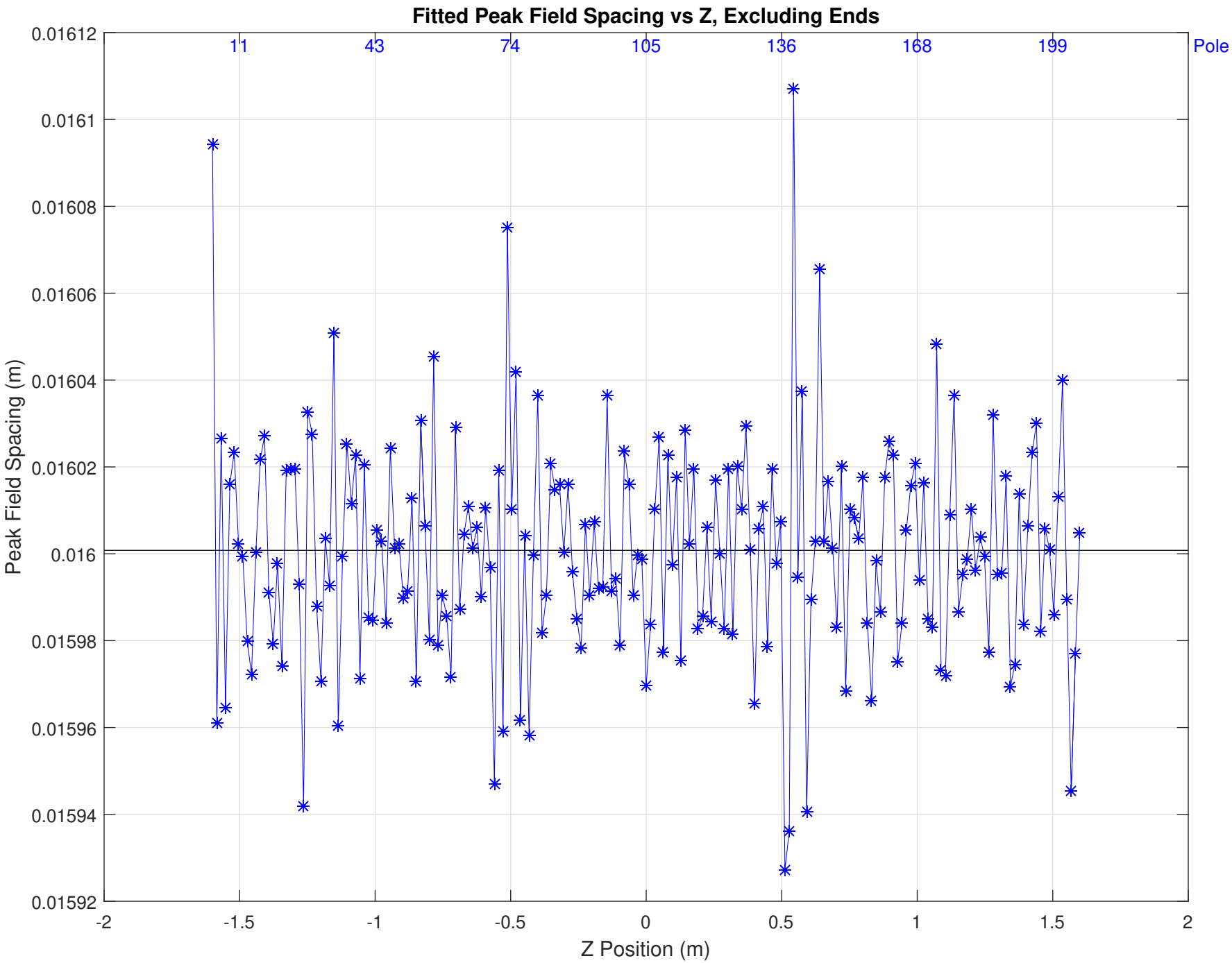

By vs Z
11
43
74
105
136
168
199
Pole
1.5
1
0.5
0
-0.5
-1
-1.5
By (T)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z Position (m)


By vs Z With Fitted Peaks And Zeros
11
43
74
105
136
168
199
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
2.5
Z Position (m)

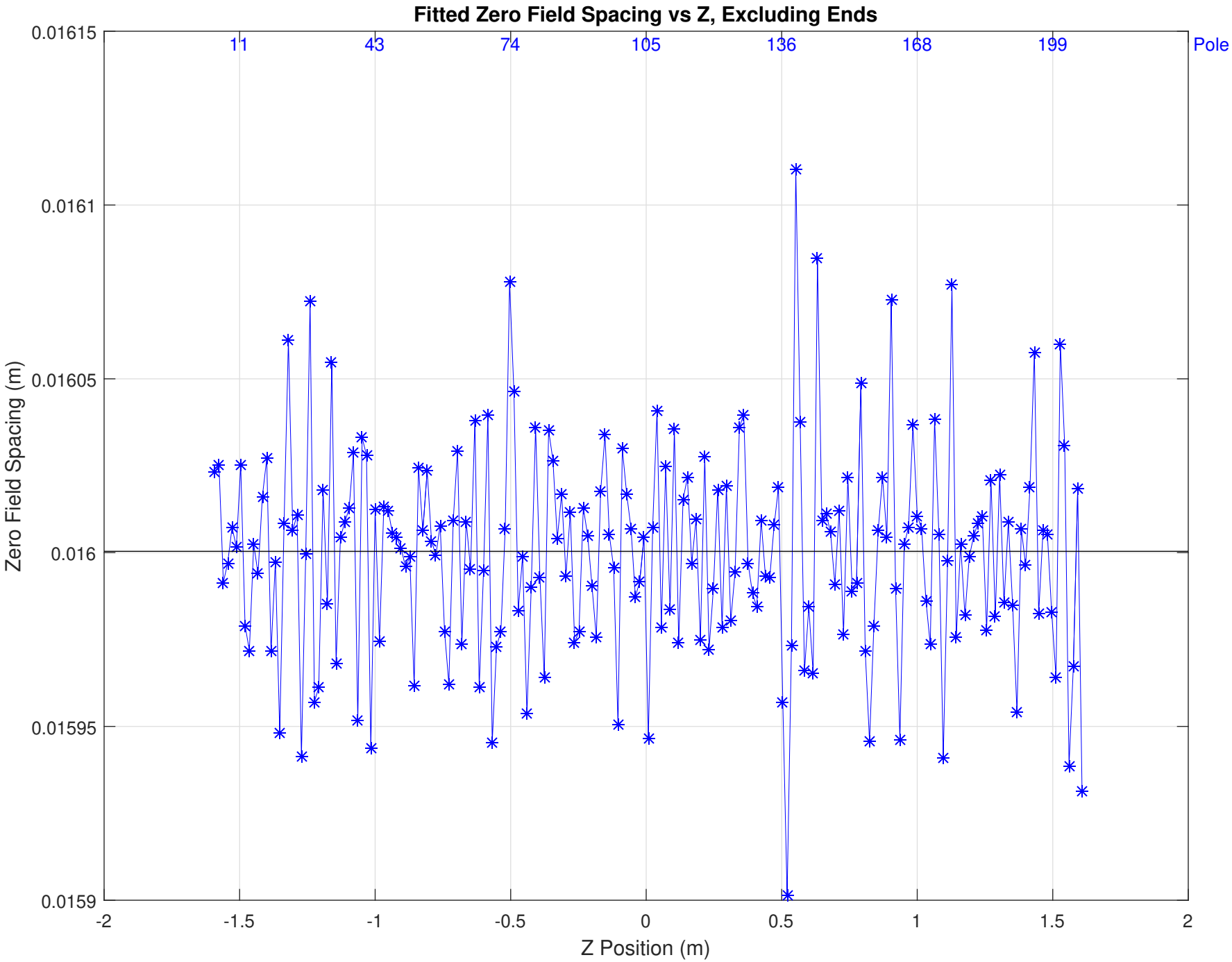

By Fitted Peaks vs Pole Number
By (T)
Pole Number
1.5
1
0.5
0
-0.5
-1
-1.5
0
20
40
60
80
100
120
140
160
180
200



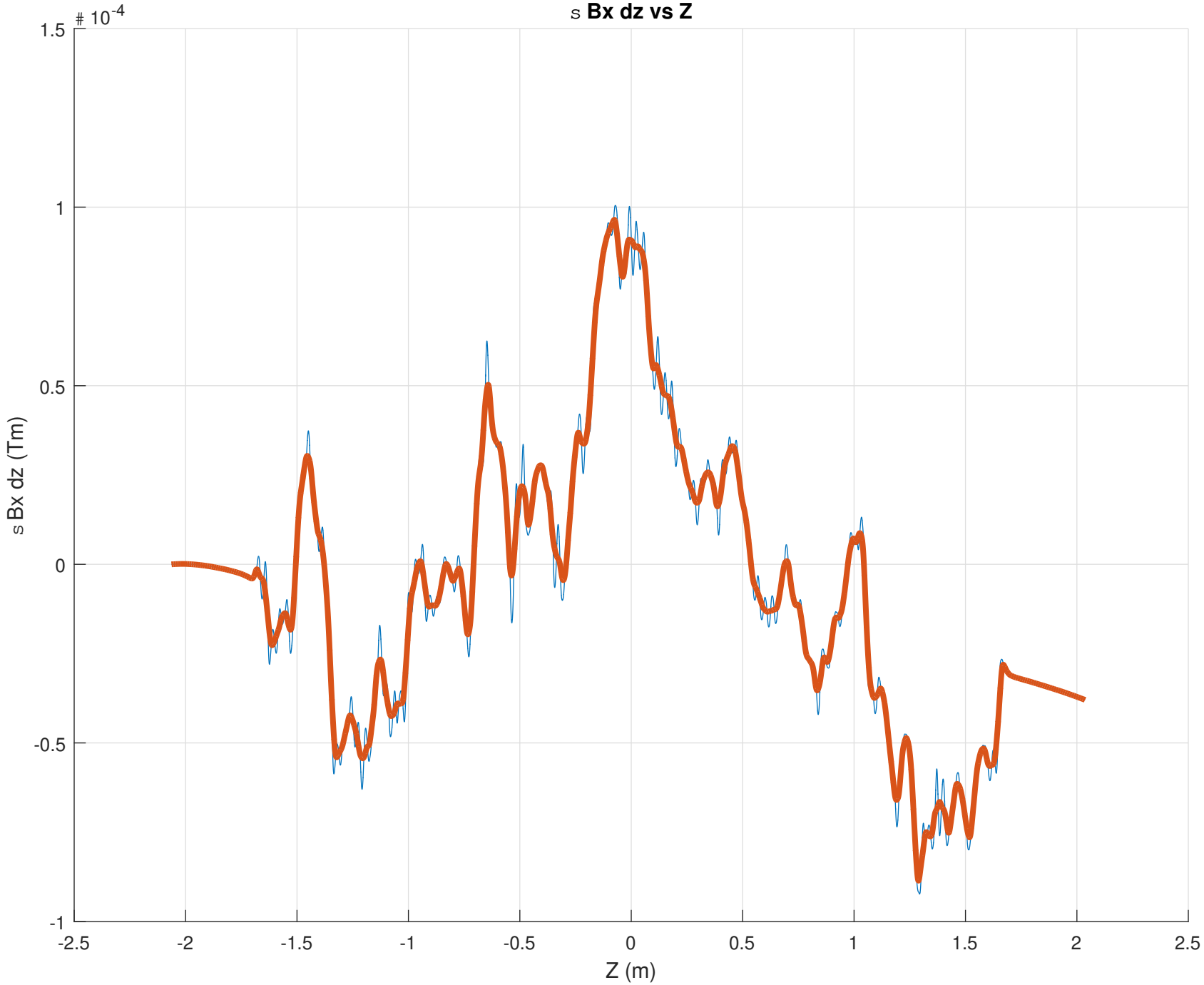
Peak Fields: Ave = 1.202026 T, RMS = 0.004126 T

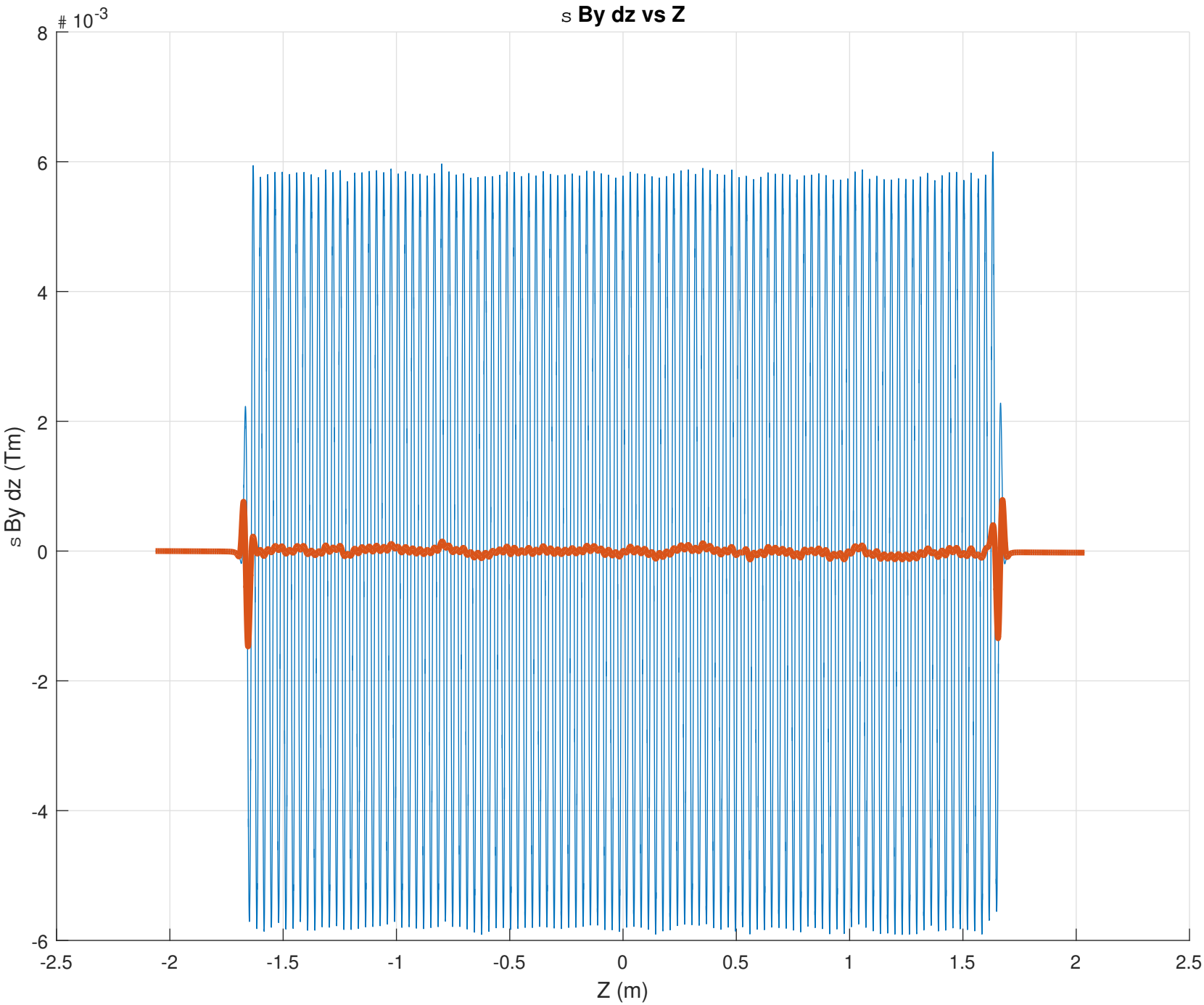


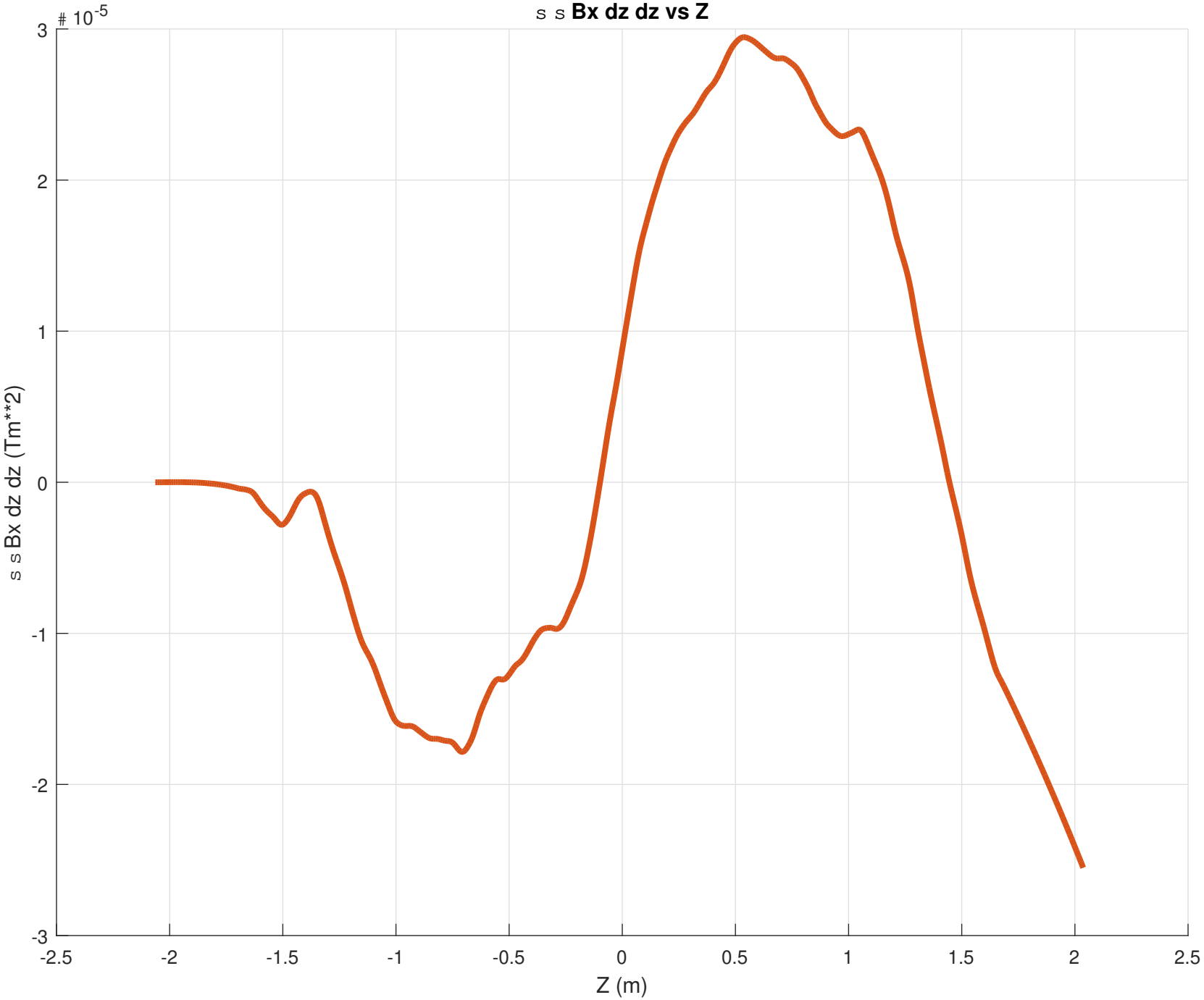
Peak Field Spacing: Ave = 0.016001 m, RMS = 0.000025 m

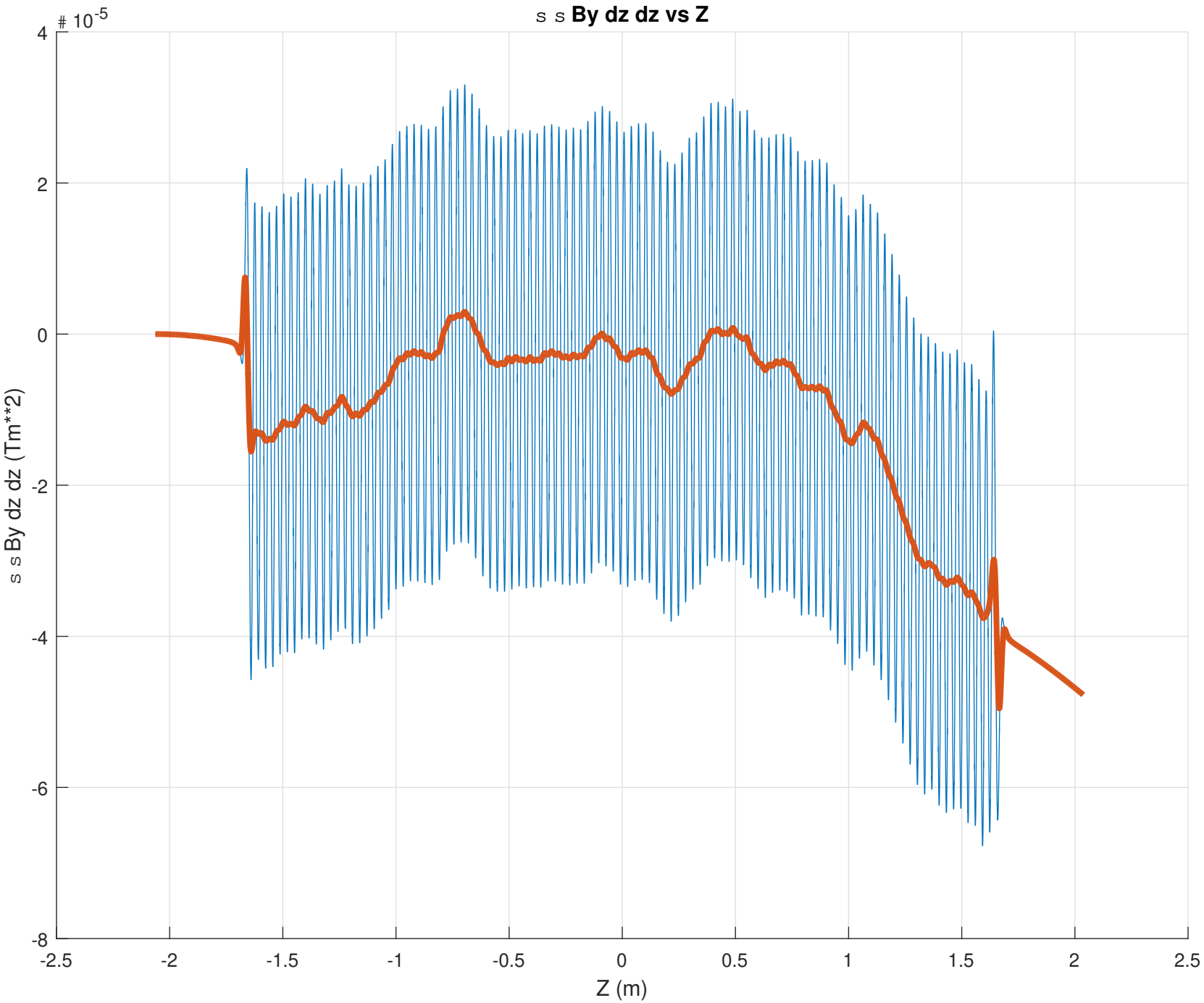


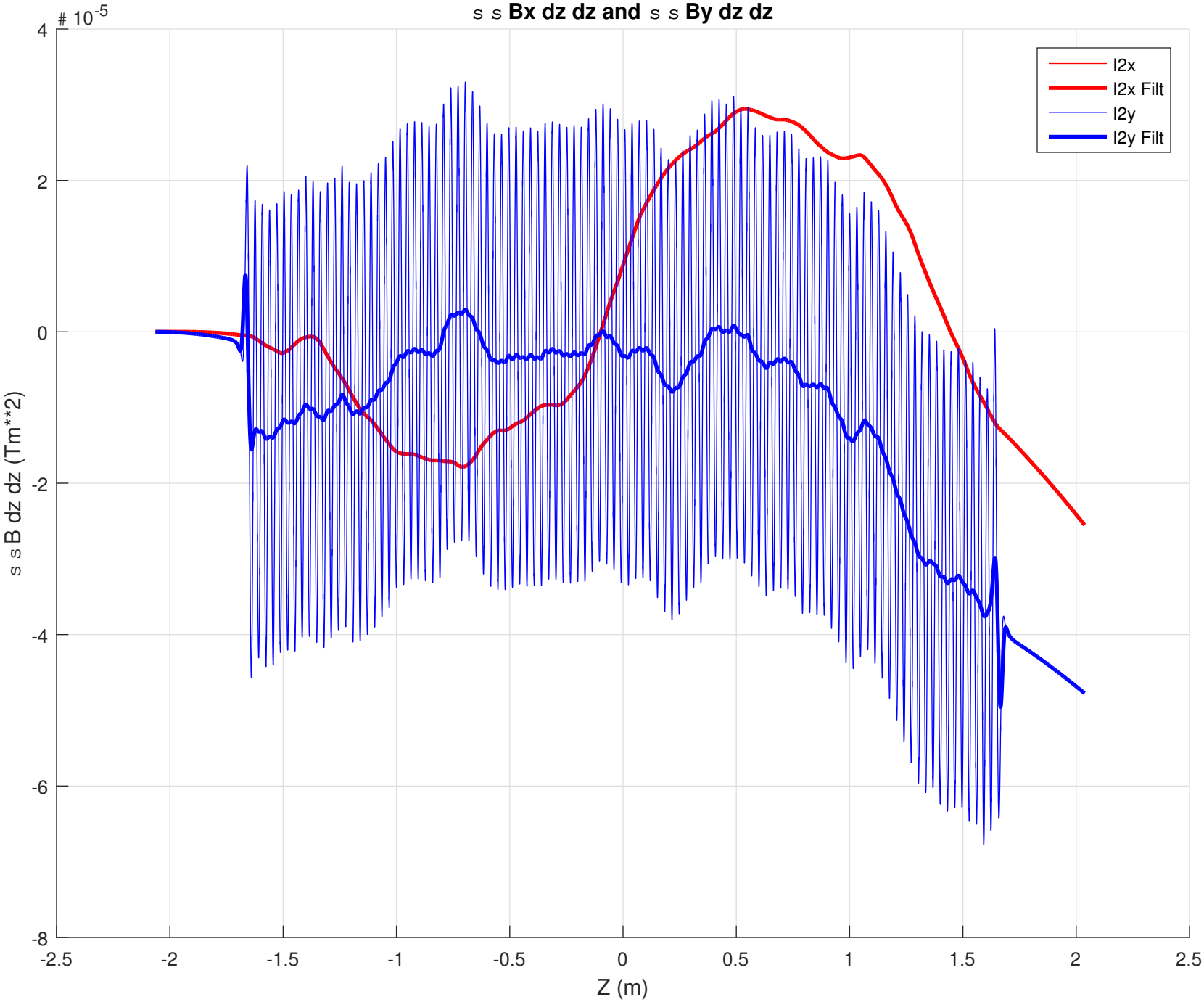
Zero Field Spacing: Ave = 0.016000 m, RMS = 0.000030 m

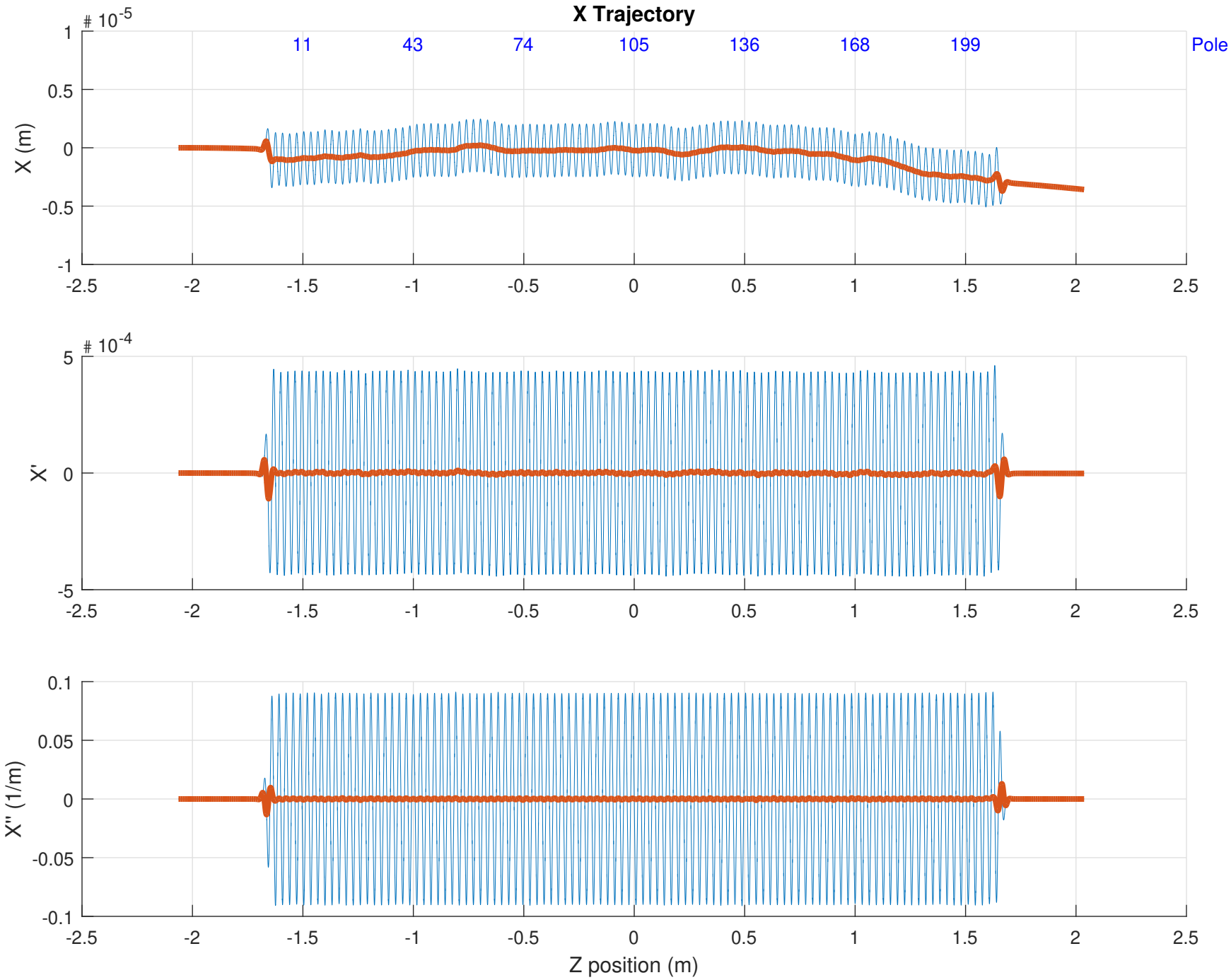

s Bx dz vs Z
10-4
1.5
1
0.5
0
-0.5
-1
s Bx dz (Tm)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z (m)

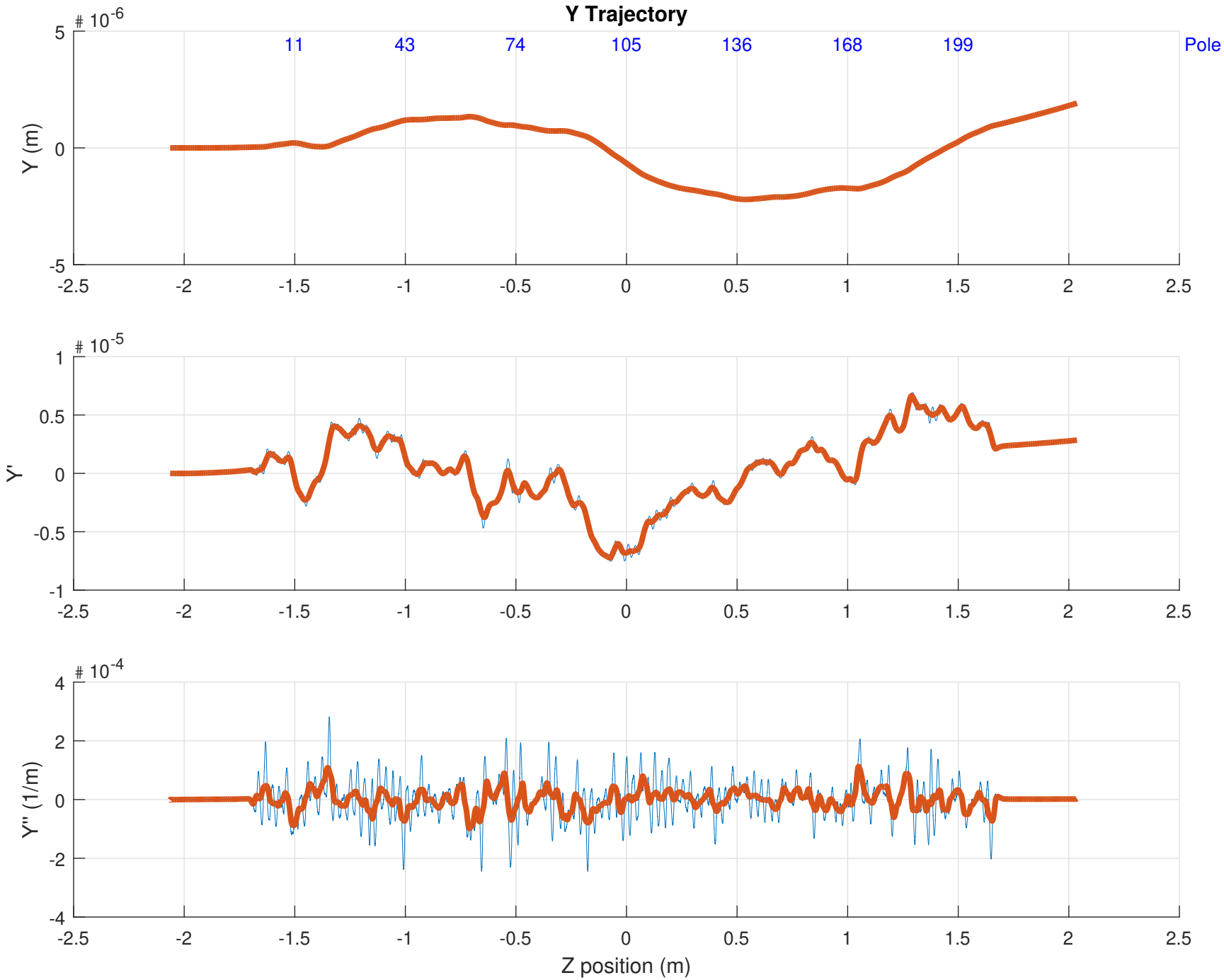

s By dz vs Z
10-3
8
6
4
2
0
-2
-4
-6
s By dz (Tm)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z (m)

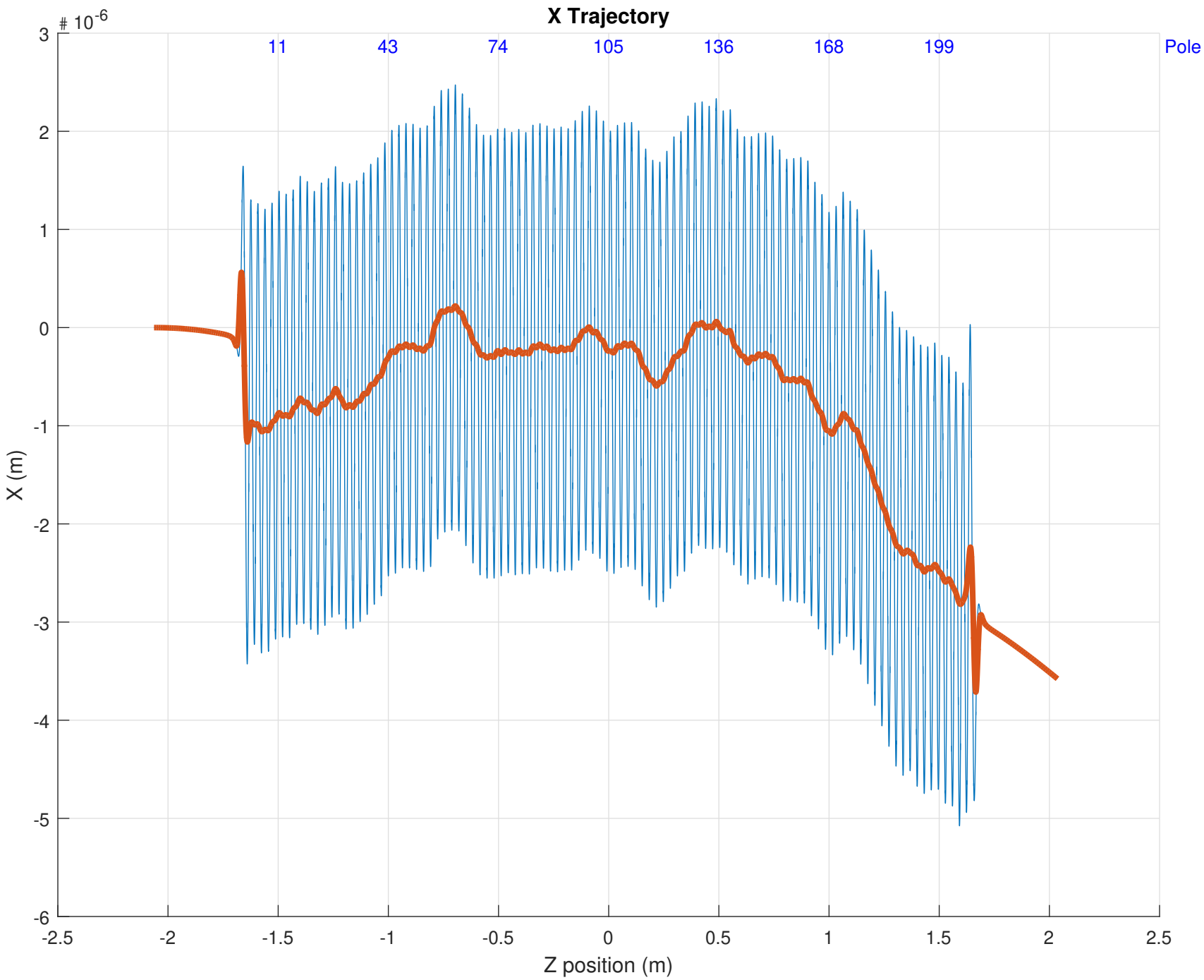

s s Bx dz dz vs Z
10^-5
3
2
1
0
-1
-2
-3
s s Bx dz dz (Tm**2)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z (m)

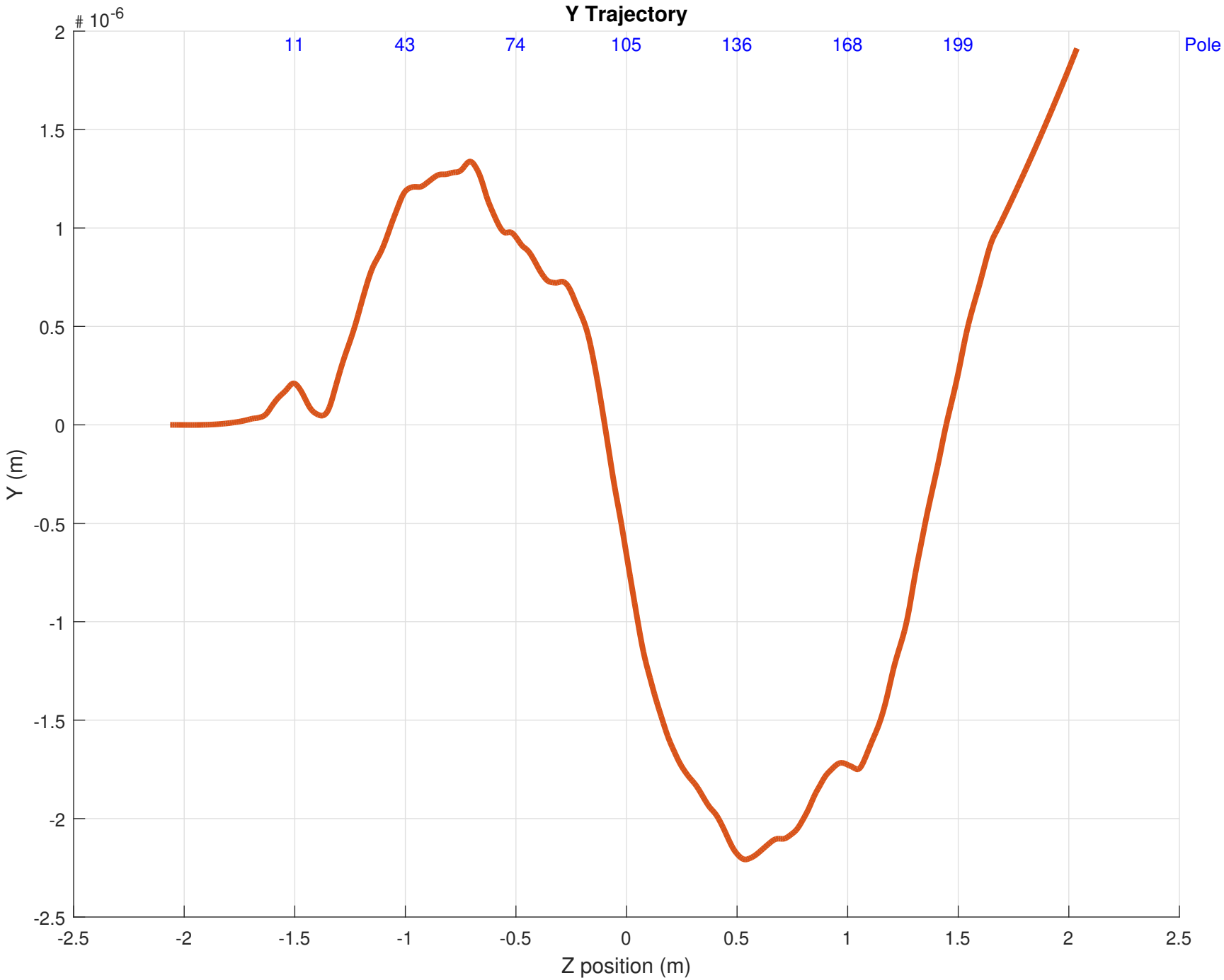

s s By dz dz vs Z
10^-5
4
2
0
-2
-4
-6
-8
s s By dz dz (Tm**2)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z (m)

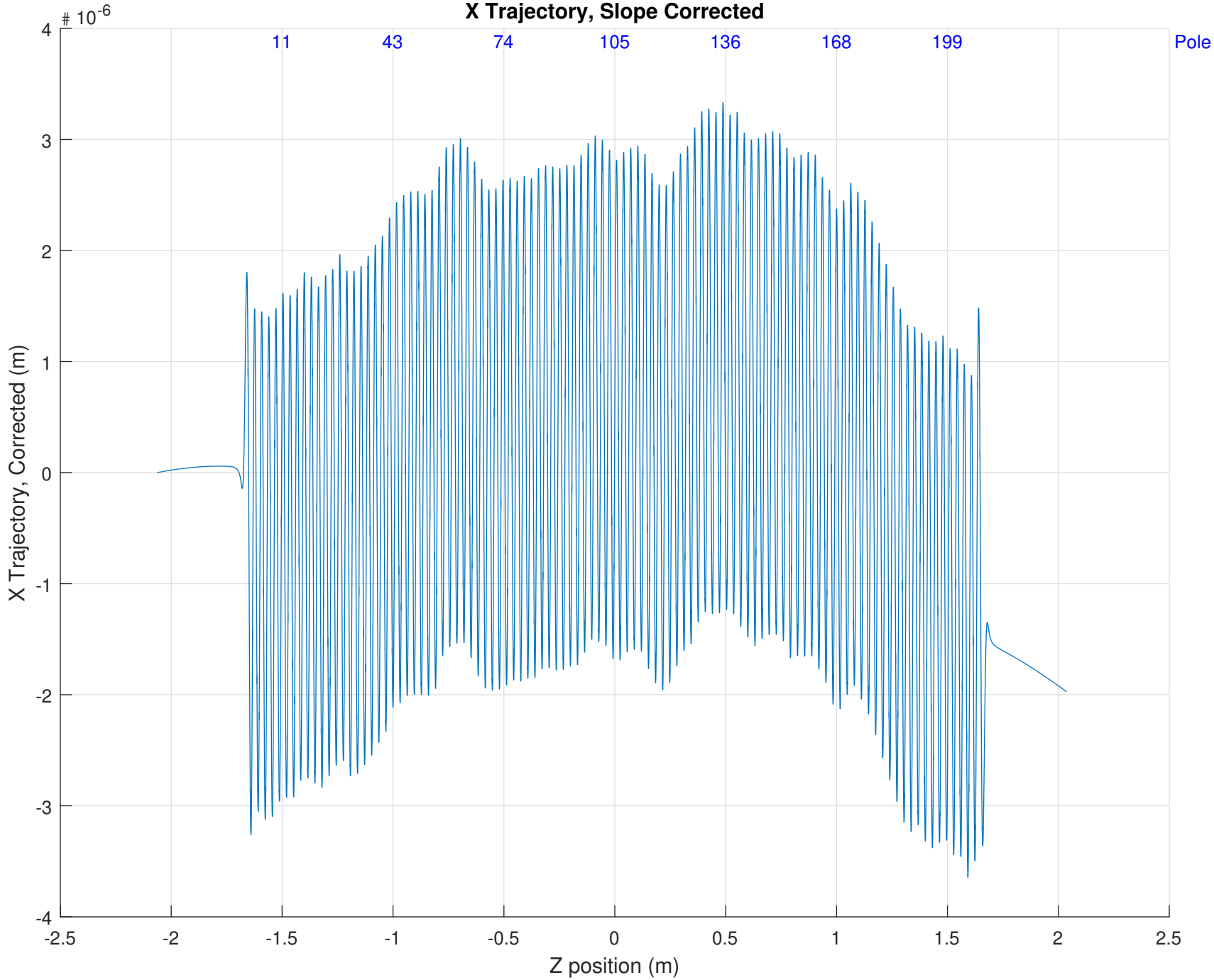

s s Bx dz dz and s s By dz dz
10^-5
s s B dz dz (Tm**2)
Z (m)
I2x
I2x Filt
I2y
I2y Filt
4
2
0
-2
-4
-6
-8
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5

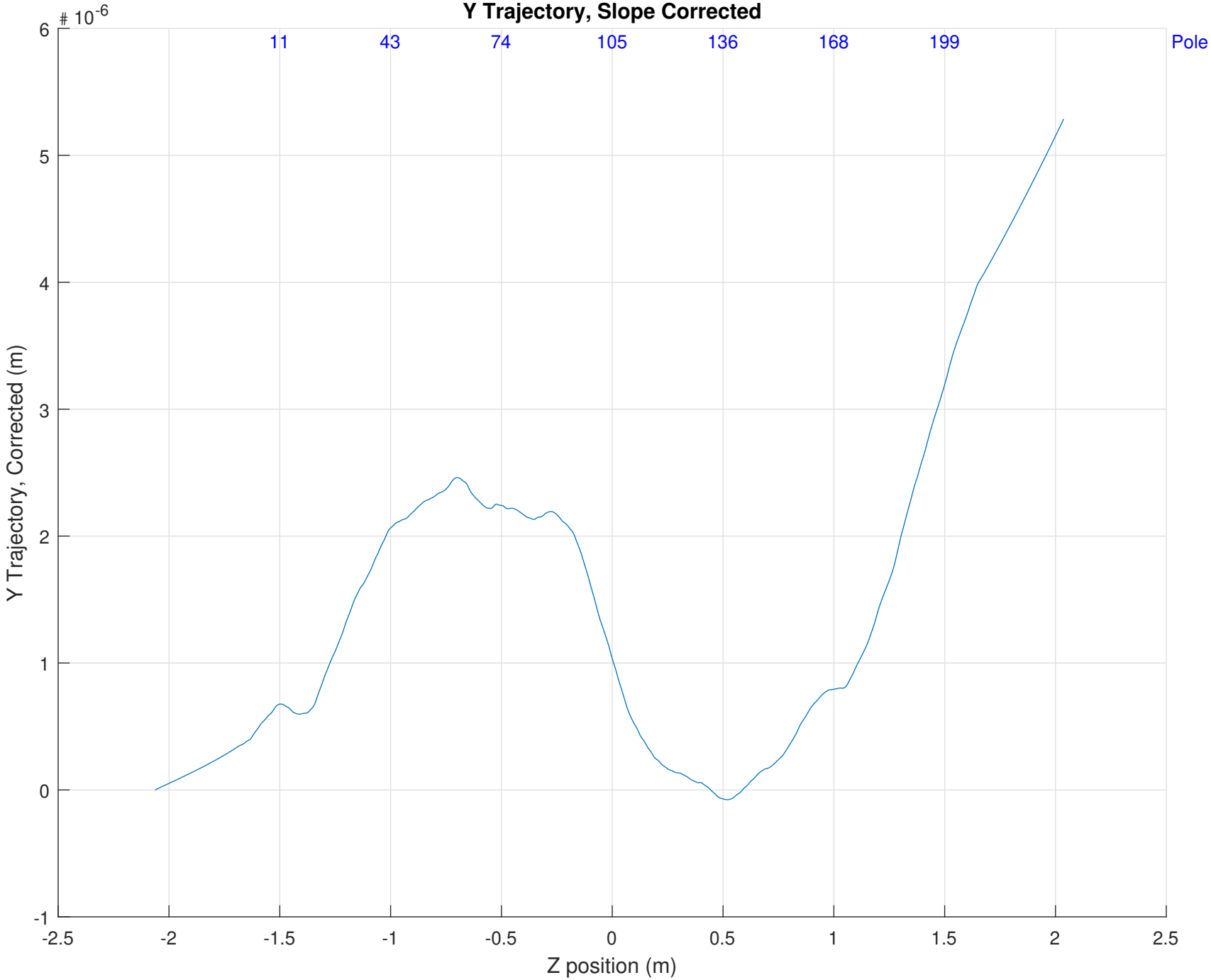

X Trajectory
10^-5
11
43
74
105
136
168
199
Pole
X (m)
10^-4
X'
X'' (1/m)
Z position (m)

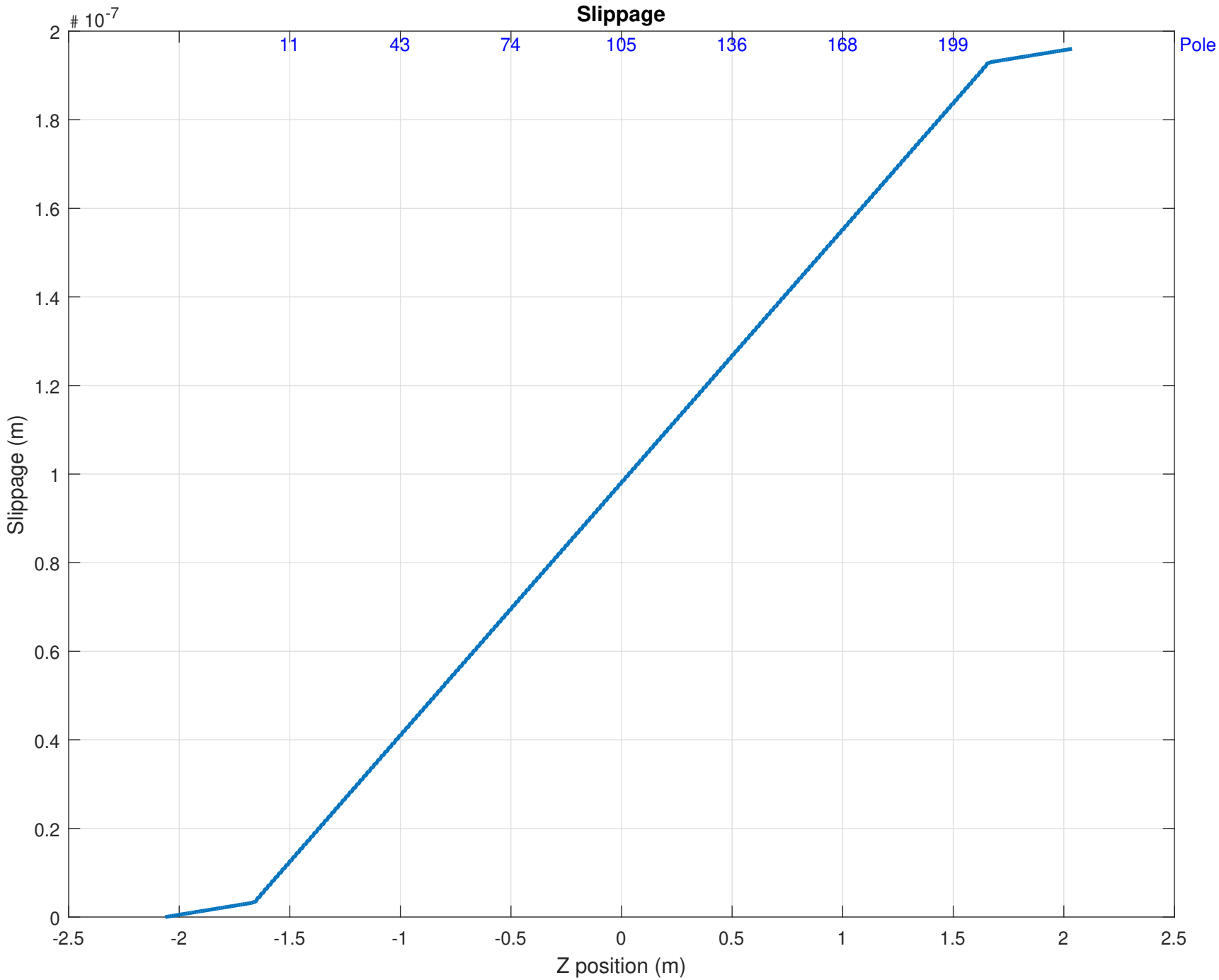

Y Trajectory
10^-6
5
0
-5
Y (m)
11
43
74
105
136
168
199
Pole
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
10^-5
1
0.5
0
-0.5
-1
Y'
10^-4
4
2
0
-2
-4
Y'' (1/m)
Z position (m)

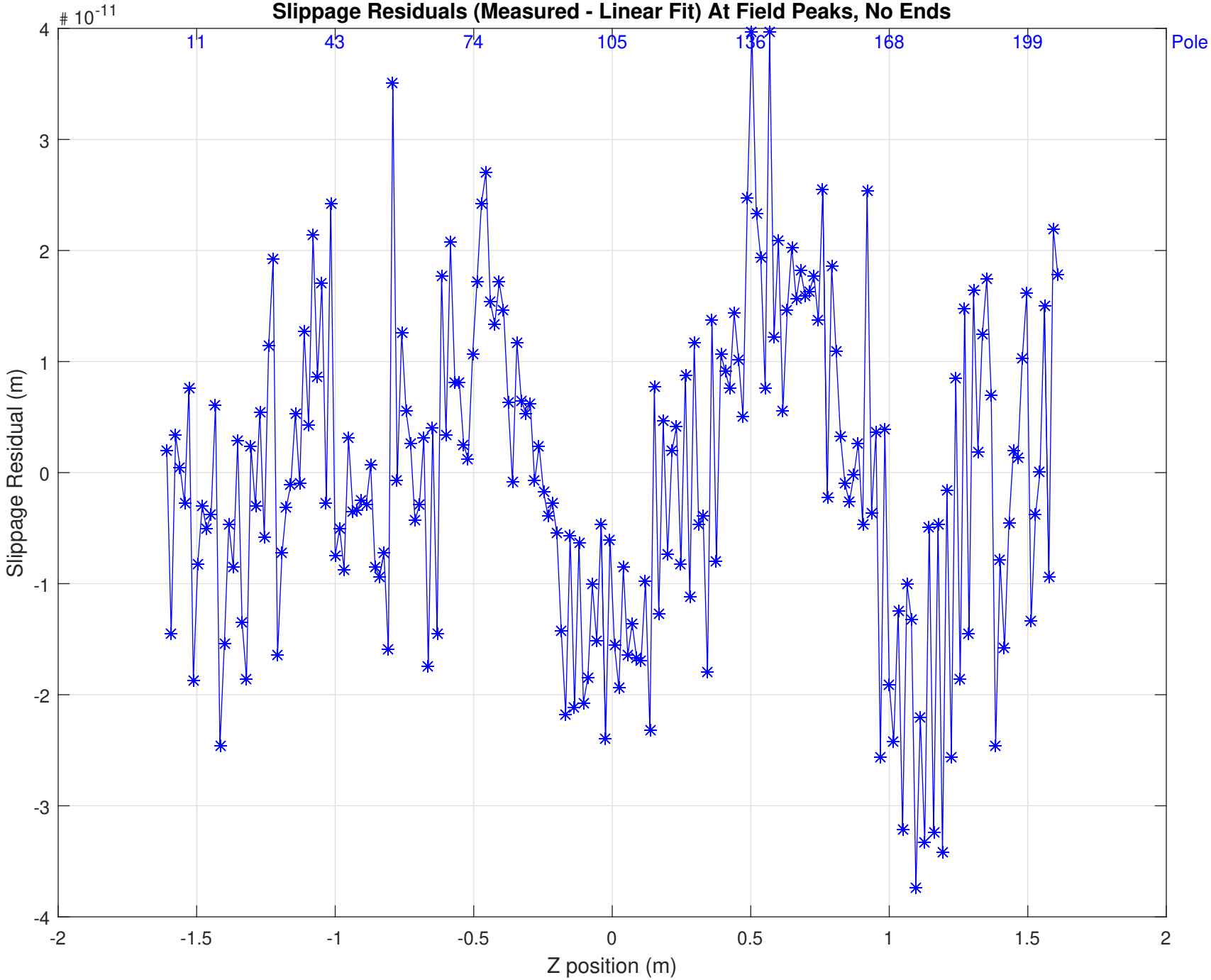

X Trajectory
10^-6
11
43
74
105
136
168
199
Pole
3
2
1
0
-1
-2
-3
-4
-5
-6
X (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)

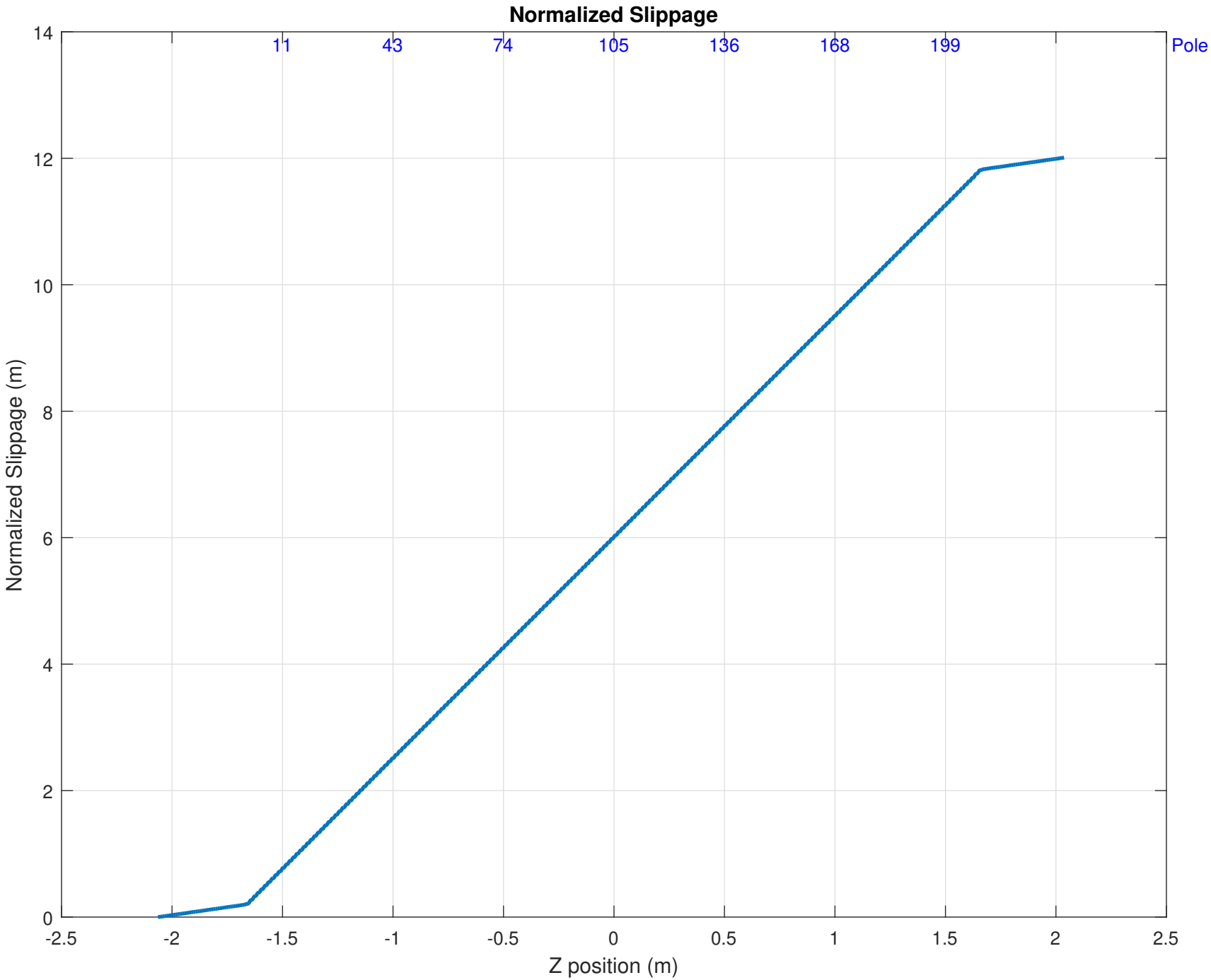

Y Trajectory
10-6
11
43
74
105
136
168
199
Pole
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
Y (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)

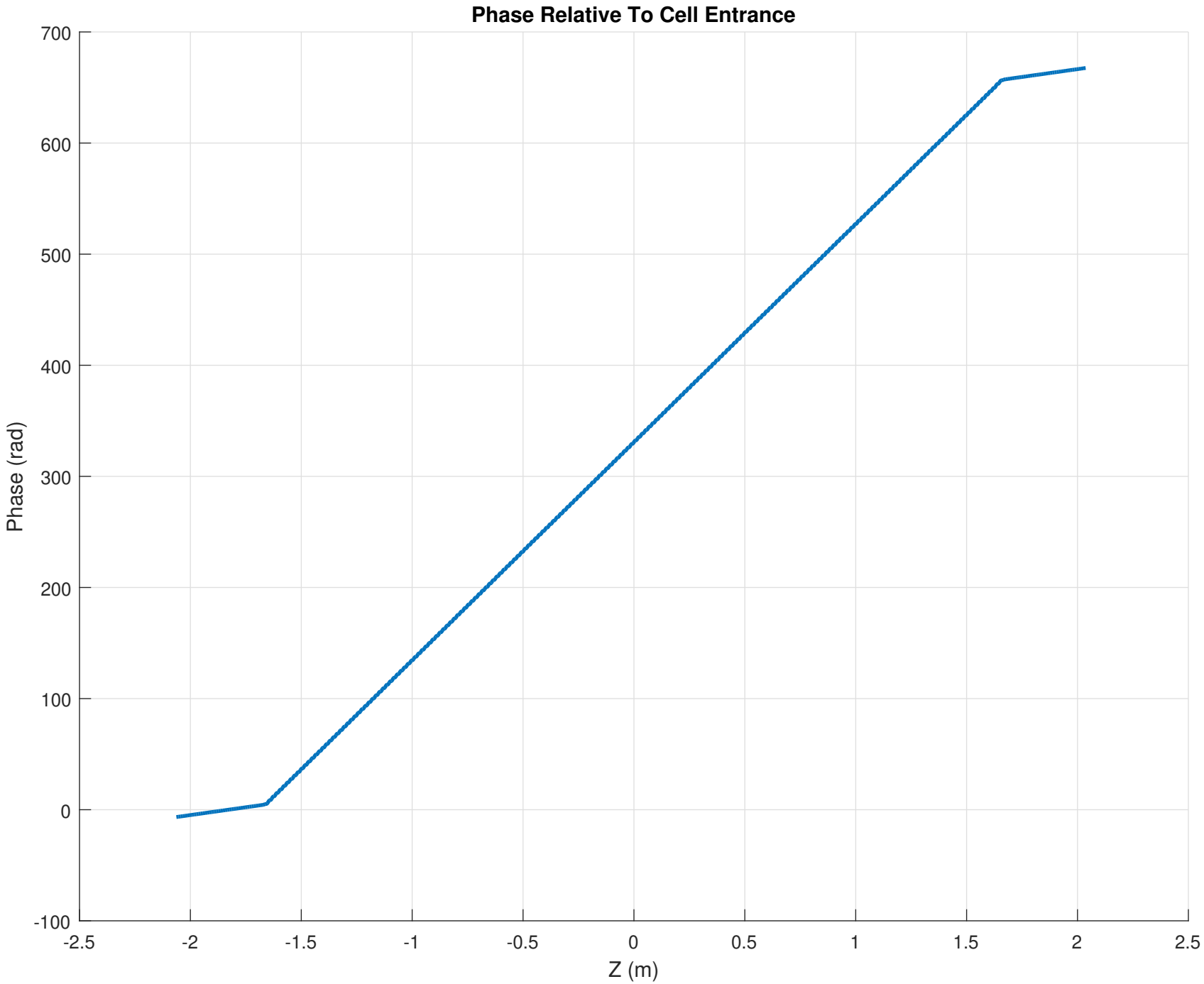

X Trajectory, Slope Corrected
10-6
11
43
74
105
136
168
199
Pole
X Trajectory, Corrected (m)
Z position (m)
4
3
2
1
0
-1
-2
-3
-4
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5

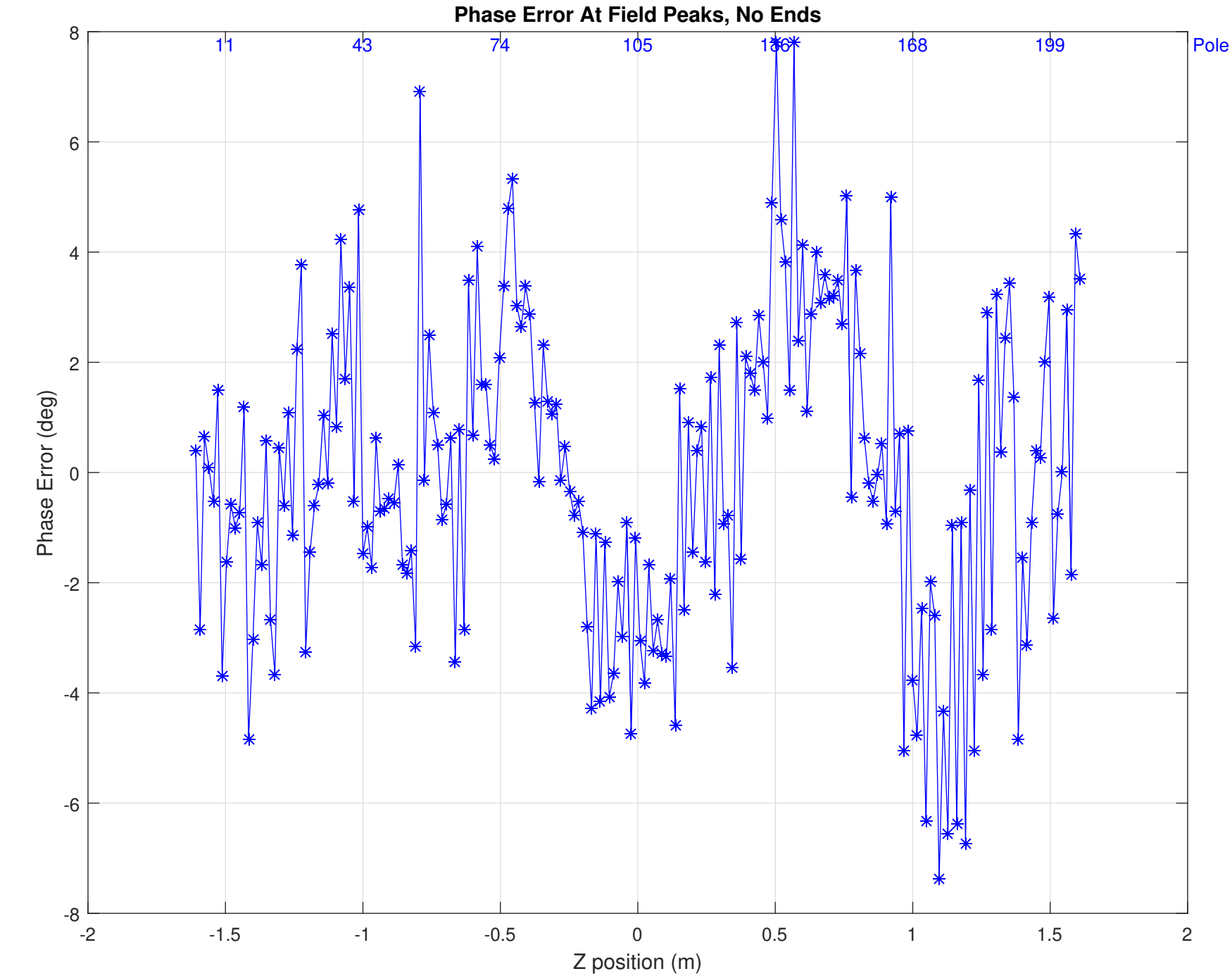

Y Trajectory, Slope Corrected
10^-6
6
5
4
3
2
1
0
-1
11
43
74
105
136
168
199
Pole
Y Trajectory, Corrected (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)


Slippage
10^-7
2
1.8
1.6
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)

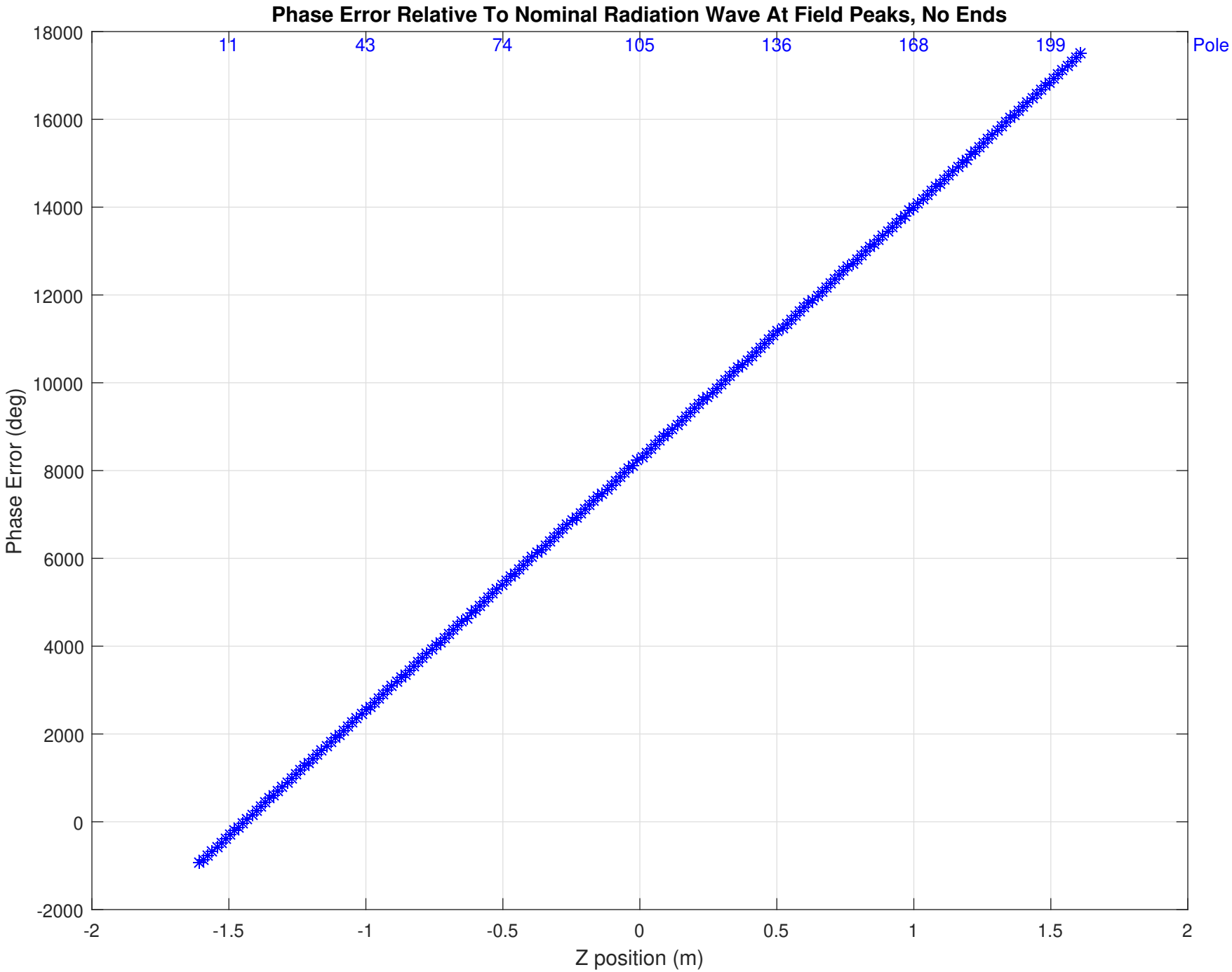

Slippage Residuals (Measured - Linear Fit) At Field Peaks, No Ends
10^-11
11
43
74
105
136
168
199
Pole
Slippage Residual (m)
Z position (m)
4
3
2
1
0
-1
-2
-3
-4
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2


Normalized Slippage
11
43
74
105
136
168
199
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
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 = 2.822967 deg


Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
11
43
74
105
136
168
199
Pole
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
-2000
Phase Error (deg)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z position (m)