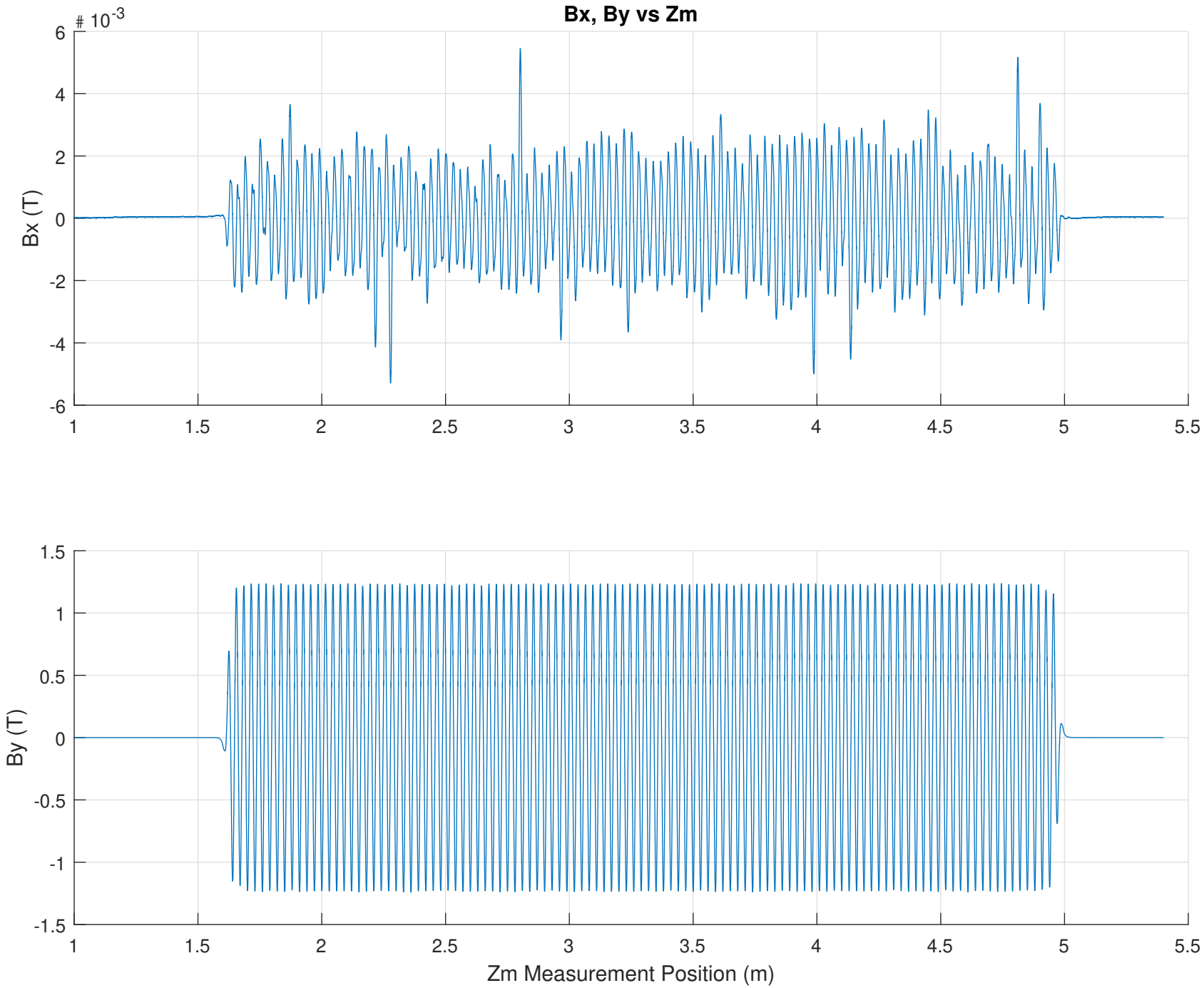
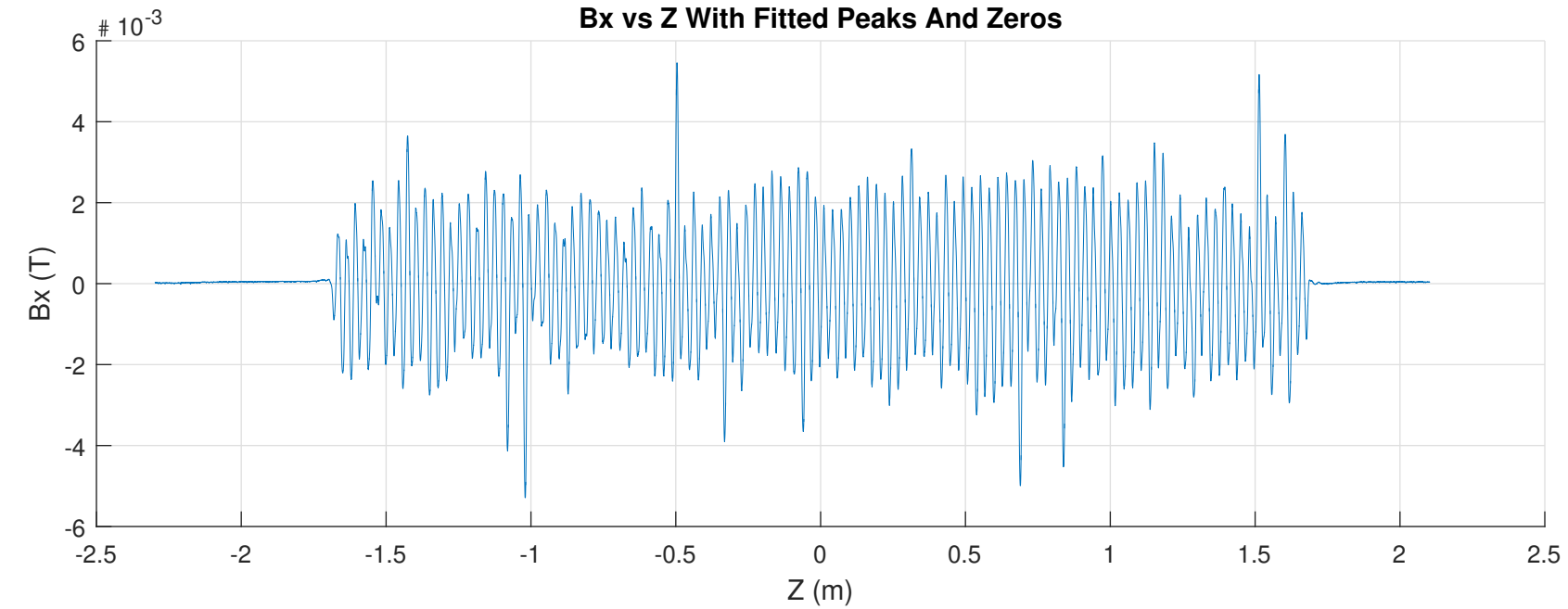
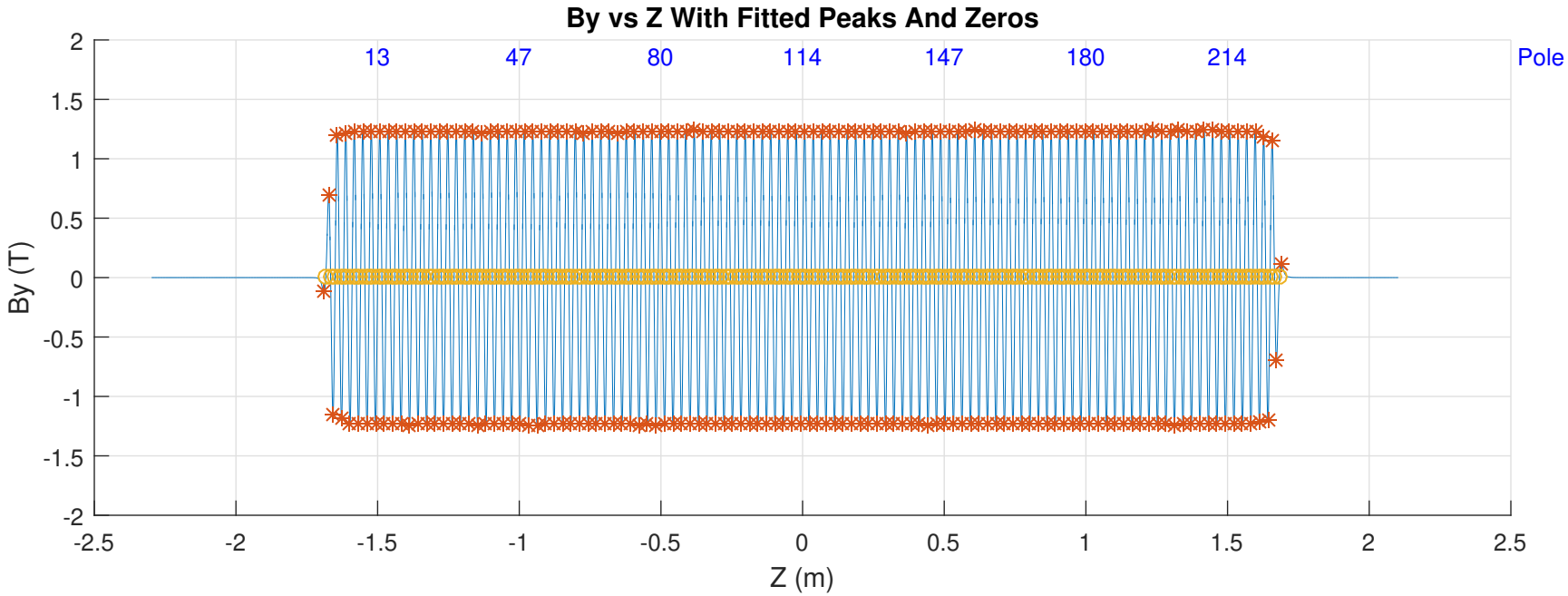
SLAC Magnetic Measurements

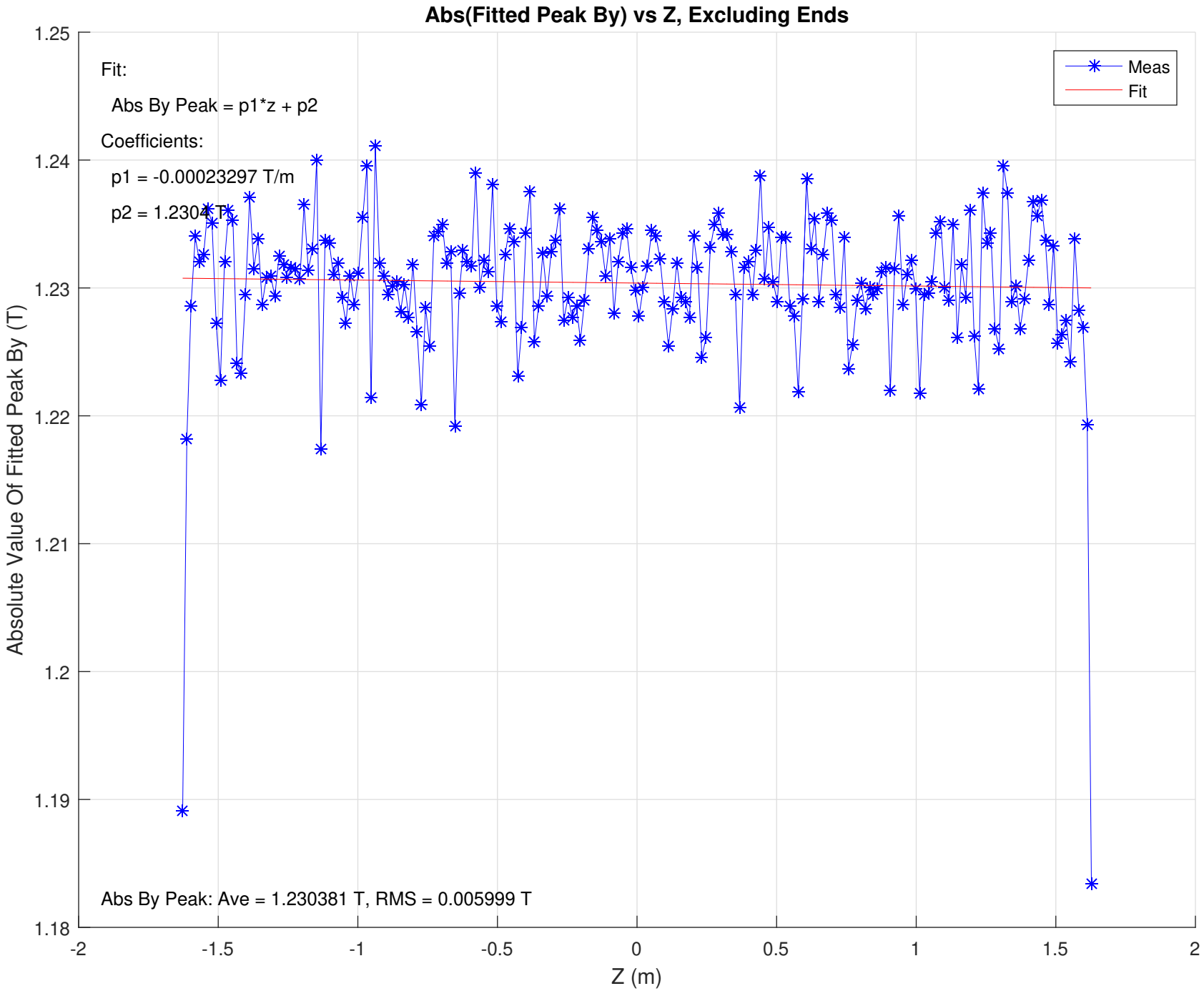
Planar Insertion Device Analysis

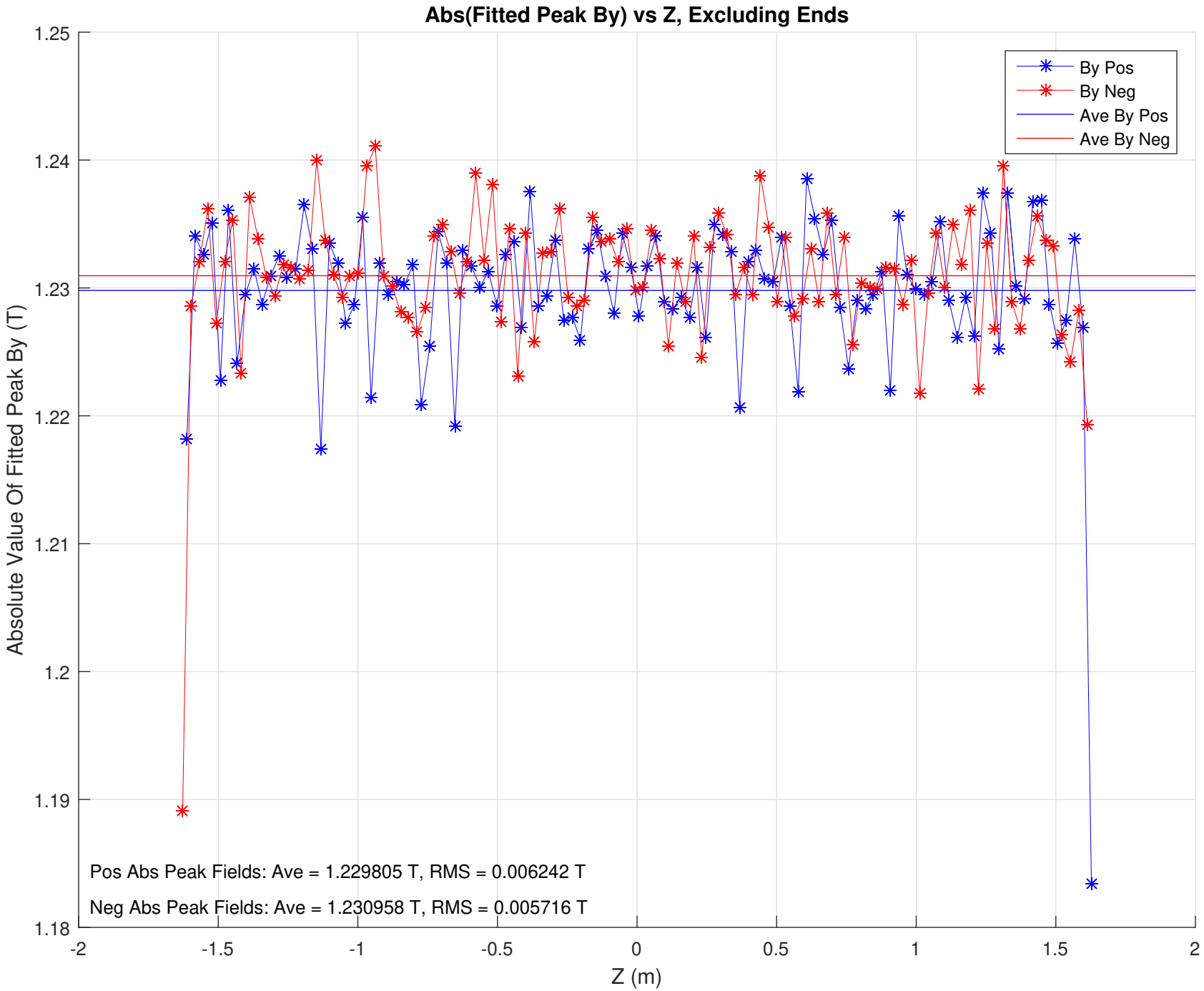
Parameters:
INPUT-FILE-DIR =s:\magdata\LCLS-II\Undulator\SXR-REFERENCE\DATASET0001\Tuning\Z Scans\Run 002\
INPUT-FILE-NAME =\x+00100-y+000-bscanz.dat
INPUT-FILE-TYPE =ZVXYBXYH
CORR-REQUIRED =0
GAMMA =26689
NOM-LAMBDA-U =0.026
NOM-K-VALUE =3.5
NOM-LAMBDA-R =1.3004e-10
NUM-POLES =226
NUM-END-POLES =4
CELL-LENGTH =4.4

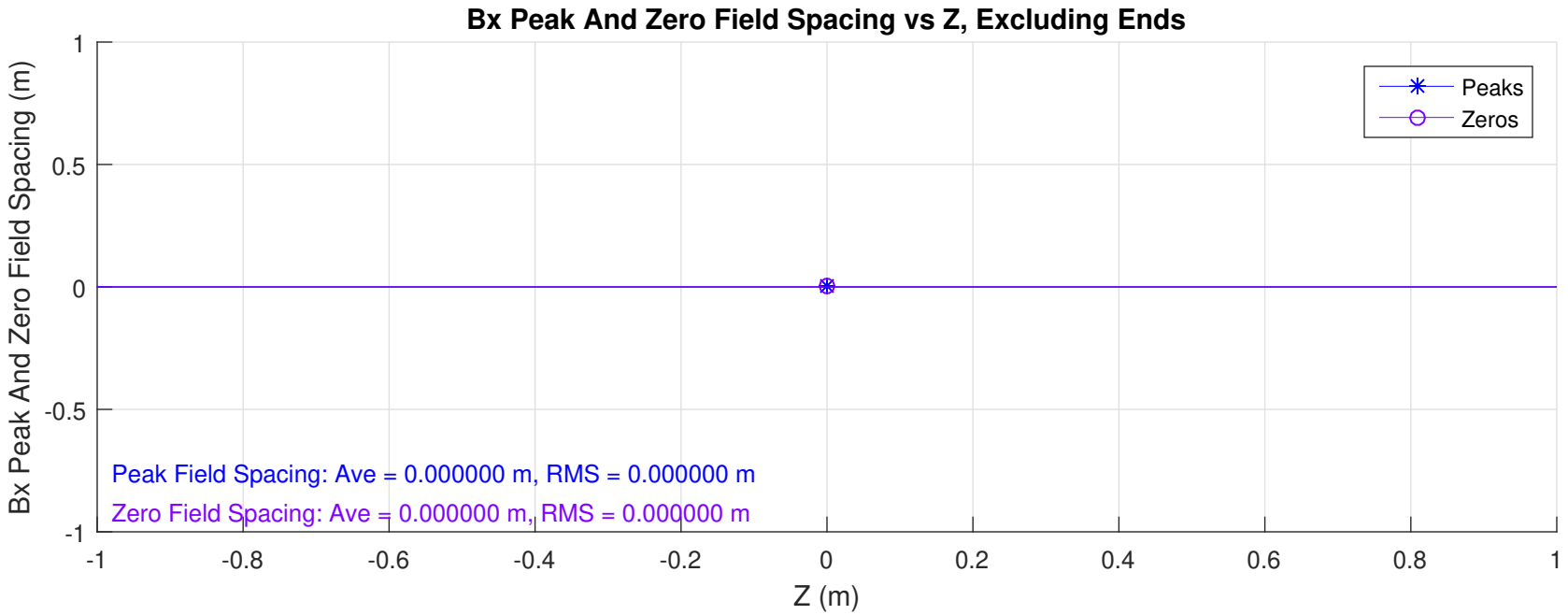

Bx, By vs Zm
10^-3
Bx (T)
By (T)
Zm Measurement Position (m)

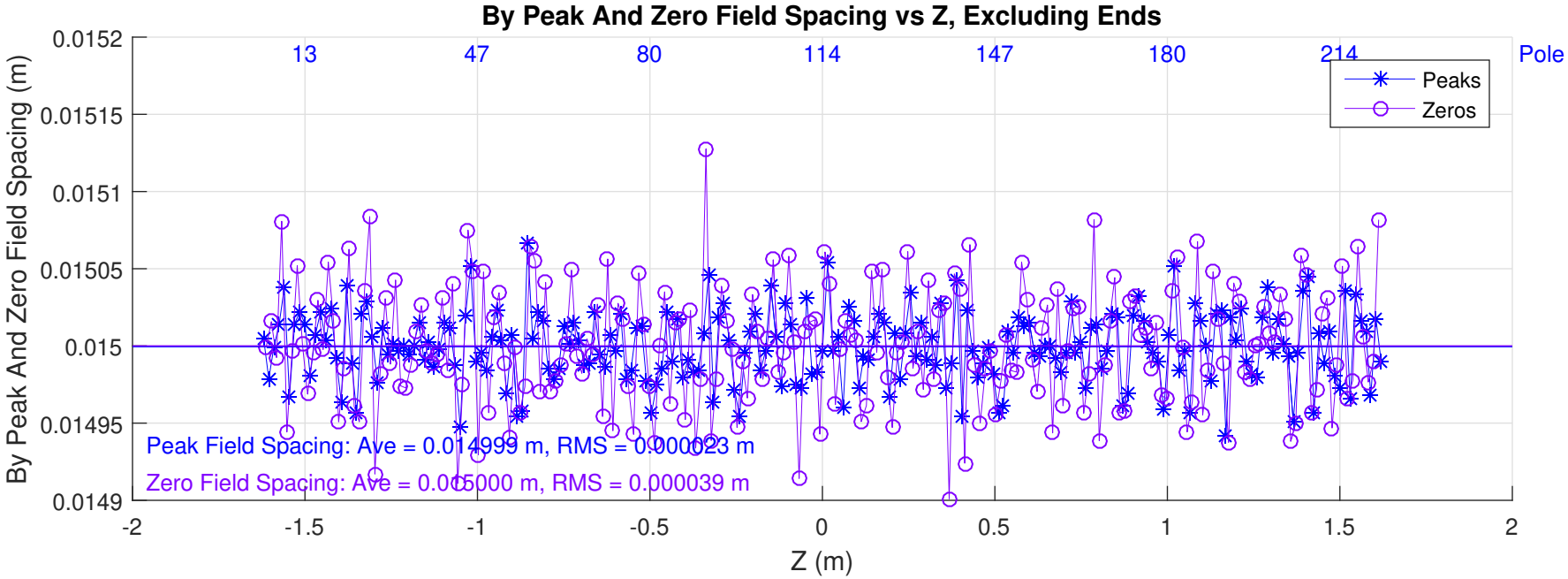

Bx vs Z With Fitted Peaks And Zeros
10^-3
Bx (T)
Z (m)

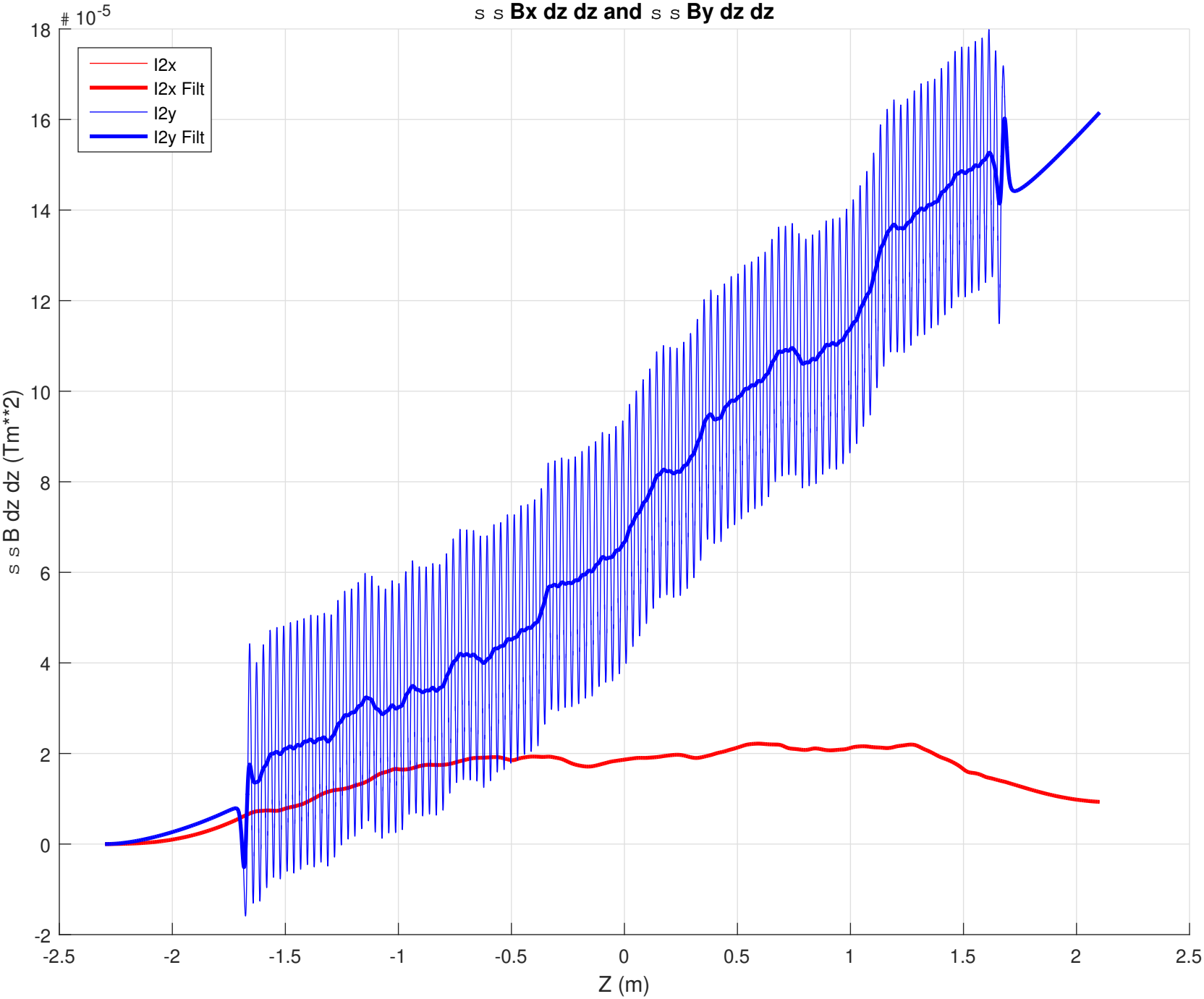

By vs Z With Fitted Peaks And Zeros
13
47
80
114
147
180
214
Pole
By (T)
Z (m)

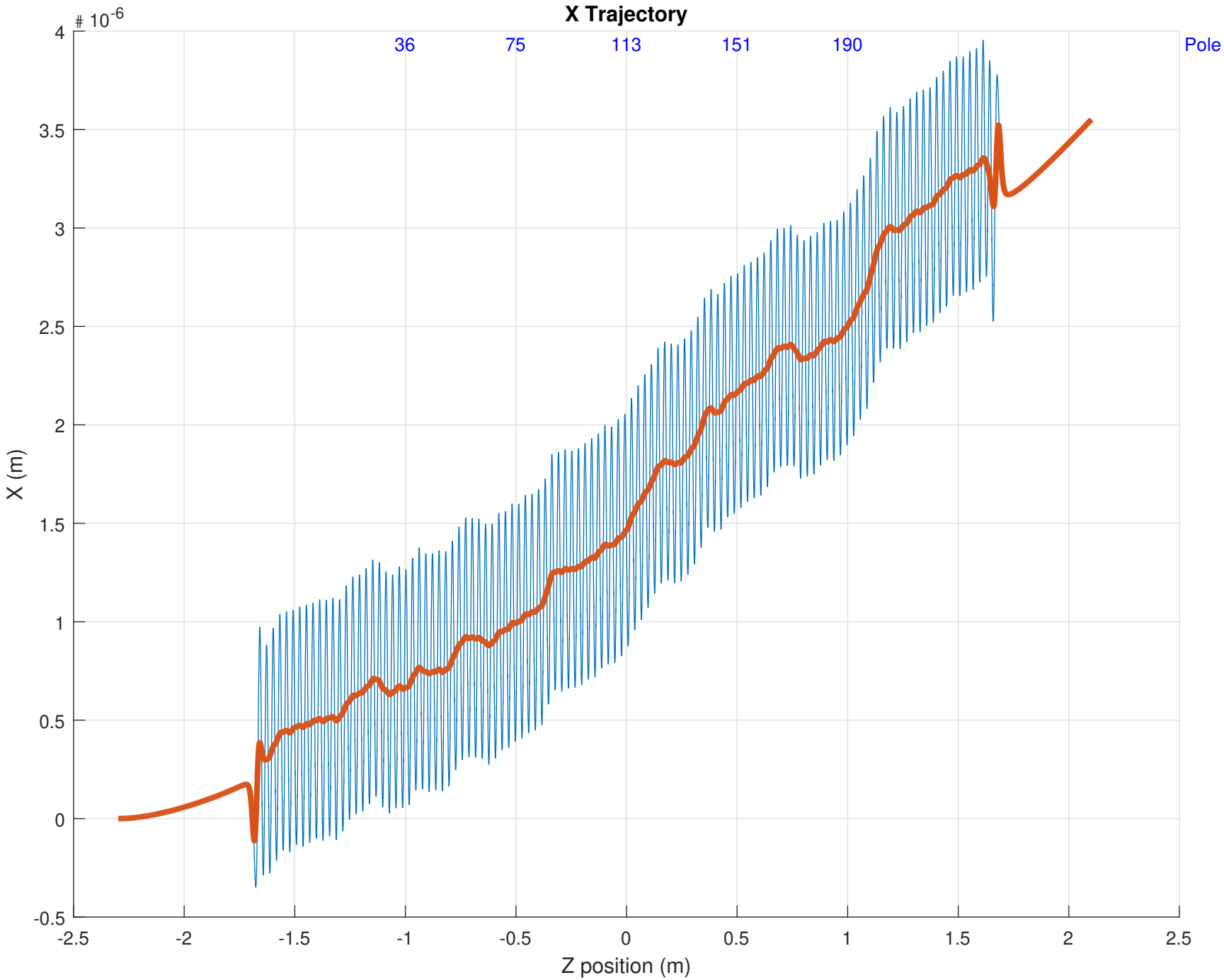

Abs(Fitted Peak By) vs Z, Excluding Ends
Fit:
Abs By Peak = p1*z + p2
Coefficients:
p1 = -0.00023297 T/m
p2 = 1.2304 T
Meas
Fit
Abs By Peak: Ave = 1.230381 T, RMS = 0.005999 T
Absolute Value Of Fitted Peak By (T)
Z (m)
1.25
1.24
1.23
1.22
1.21
1.2
1.19
1.18
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2

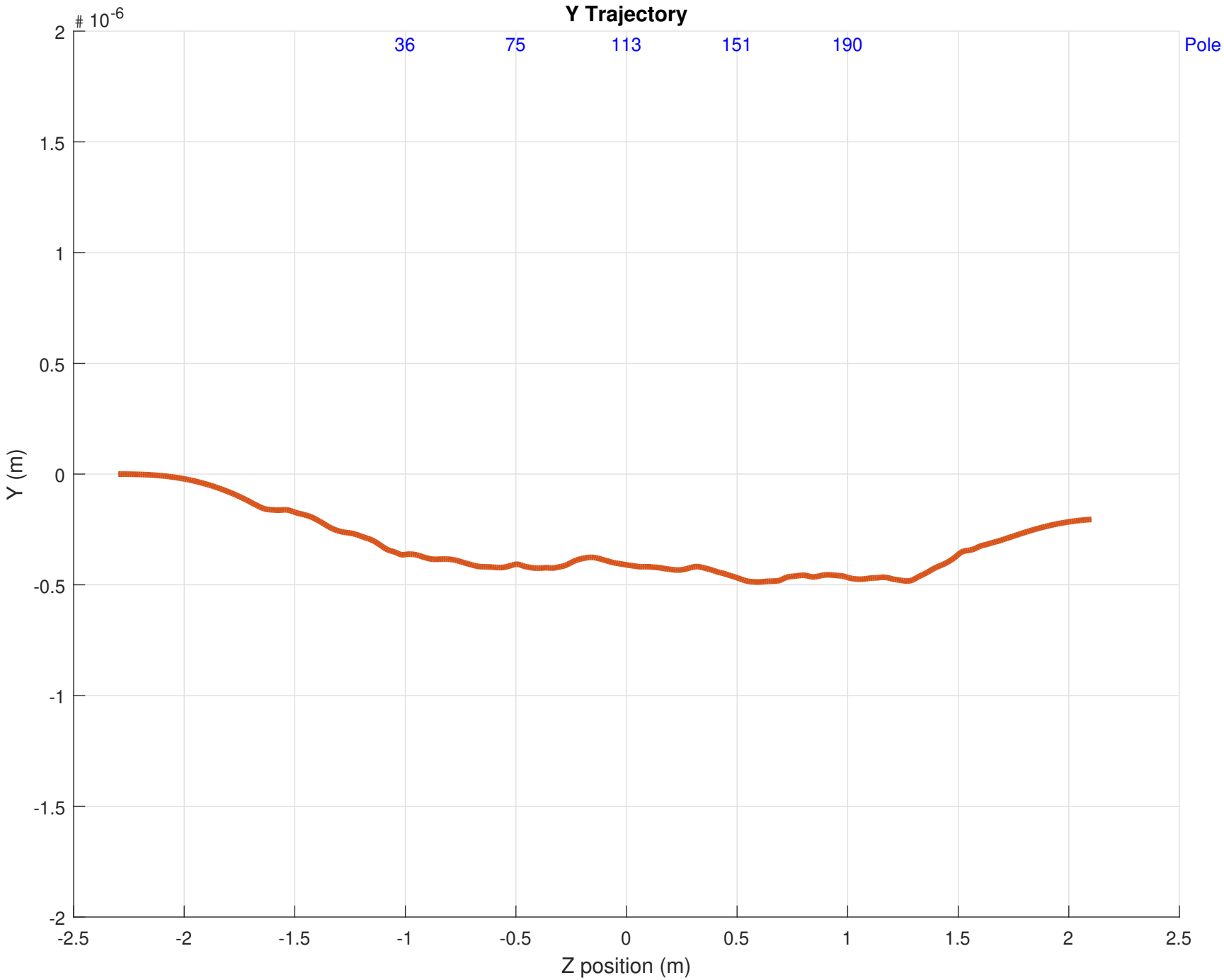

Abs(Fitted Peak By) vs Z, Excluding Ends
By Pos
By Neg
Ave By Pos
Ave By Neg
Absolute Value Of Fitted Peak By (T)
Z (m)
1.25
1.24
1.23
1.22
1.21
1.2
1.19
1.18
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Pos Abs Peak Fields: Ave = 1.229805 T, RMS = 0.006242 T
Neg Abs Peak Fields: Ave = 1.230958 T, RMS = 0.005716 T

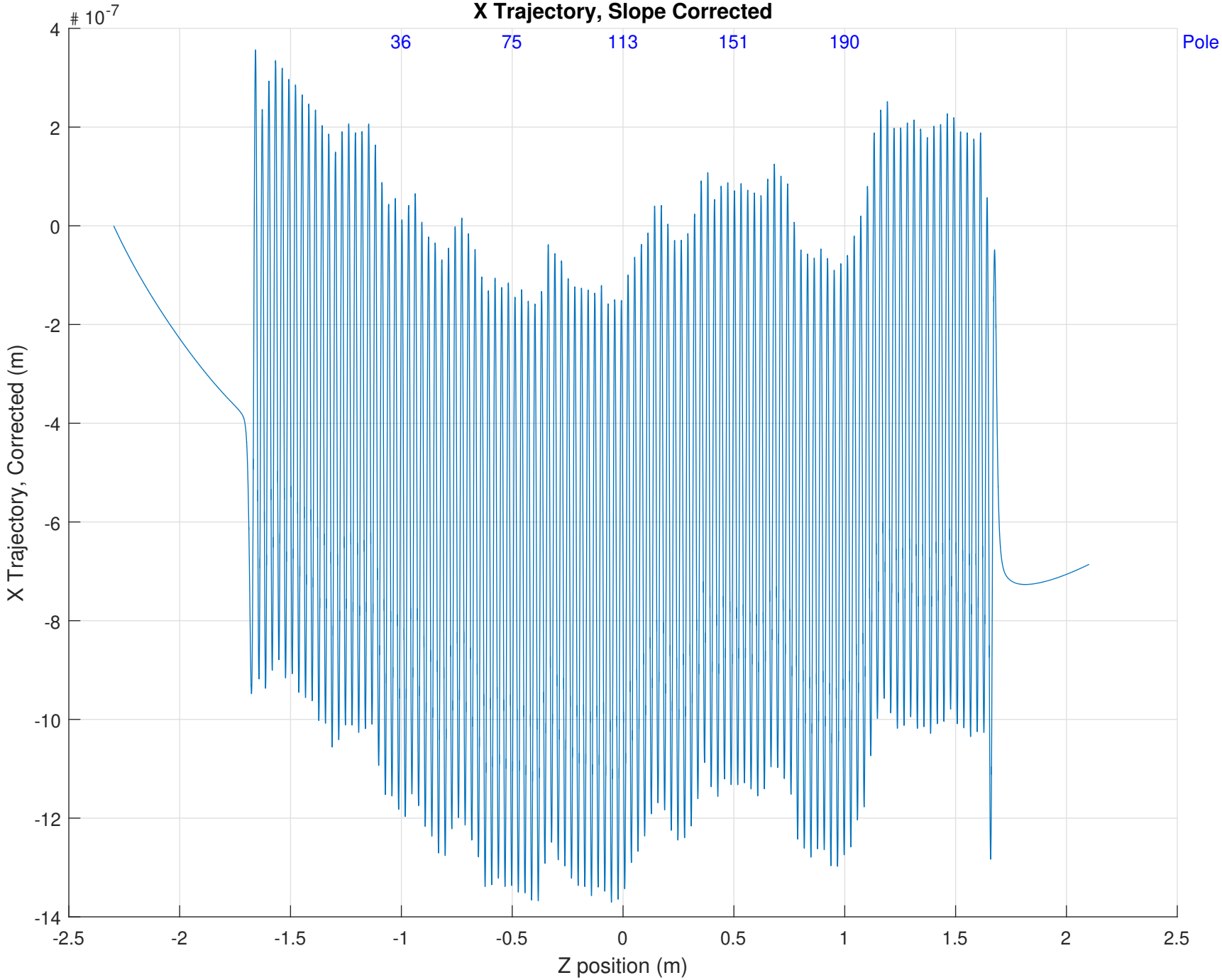

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
Z (m)
Peaks
Zeros
Peak Field Spacing: Ave = 0.000000 m, RMS = 0.000000 m
Zero Field Spacing: Ave = 0.000000 m, RMS = 0.000000 m

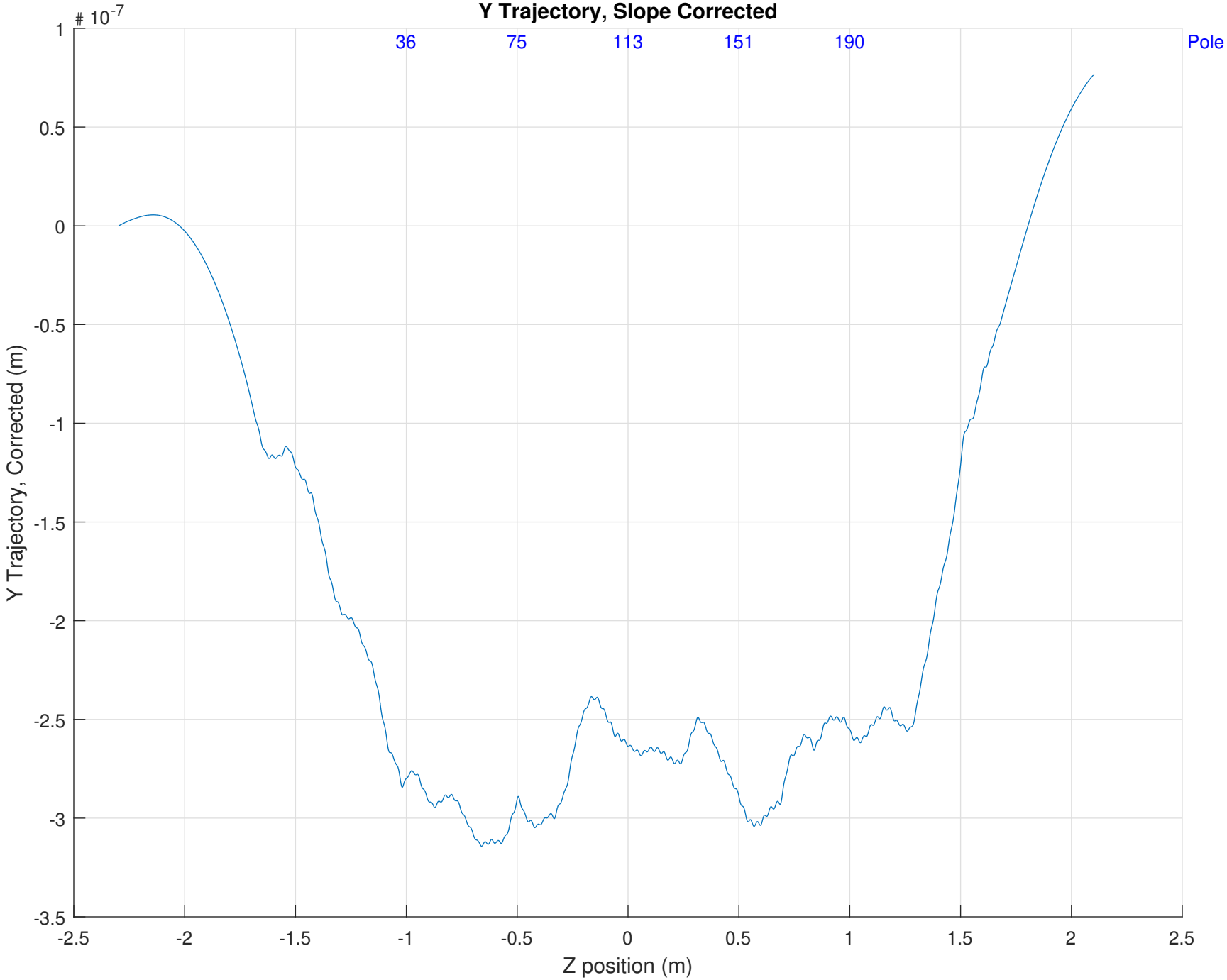

By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
Z (m)
13
47
80
114
147
180
214
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.014999 m, RMS = 0.000023 m
Zero Field Spacing: Ave = 0.015000 m, RMS = 0.000039 m

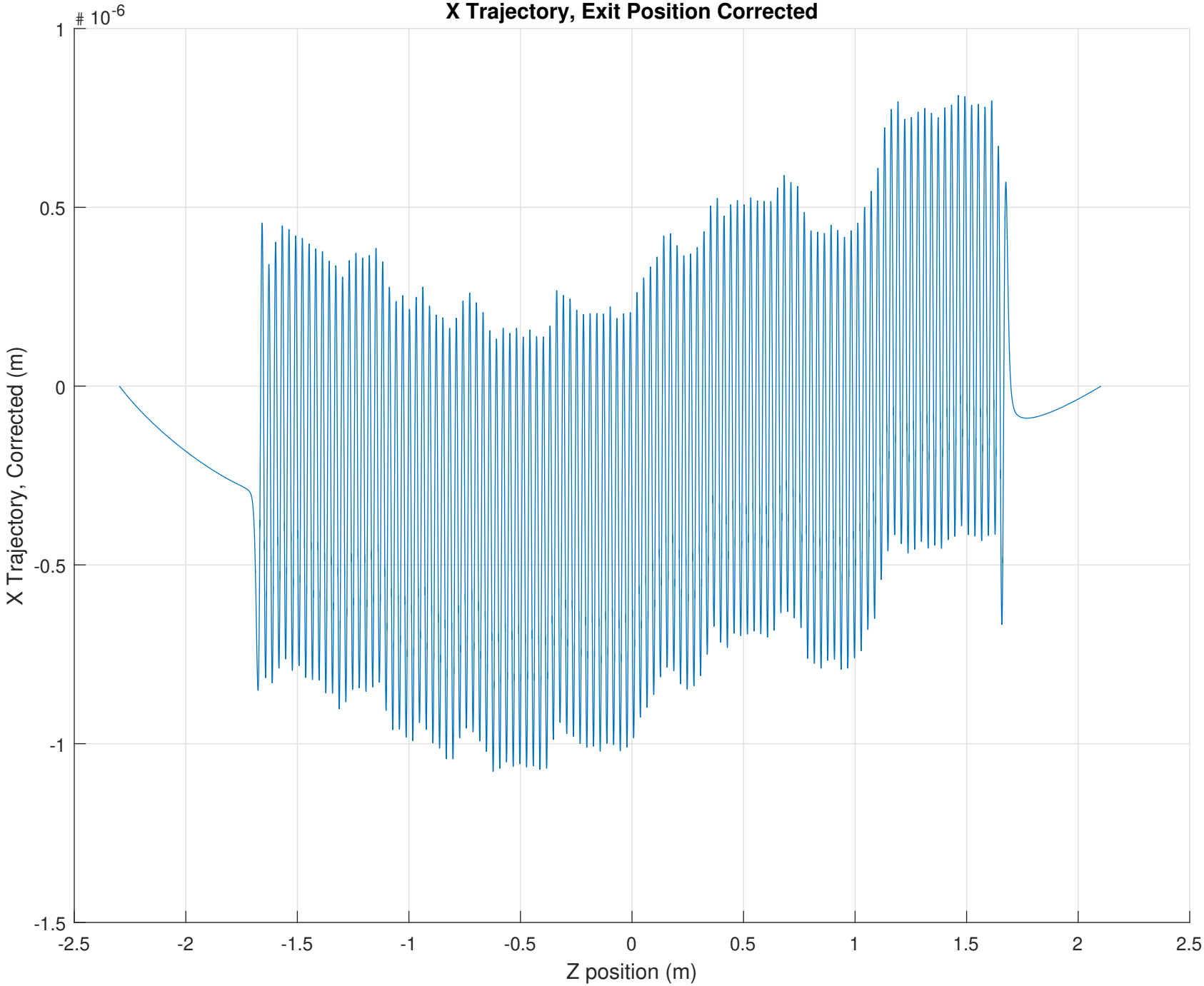

s s Bx dz dz and s s By dz dz
10^-5
I2x
I2x Filt
I2y
I2y Filt
s s B dz dz (Tm**2)
Z (m)
18
16
14
12
10
8
6
4
2
0
-2
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5

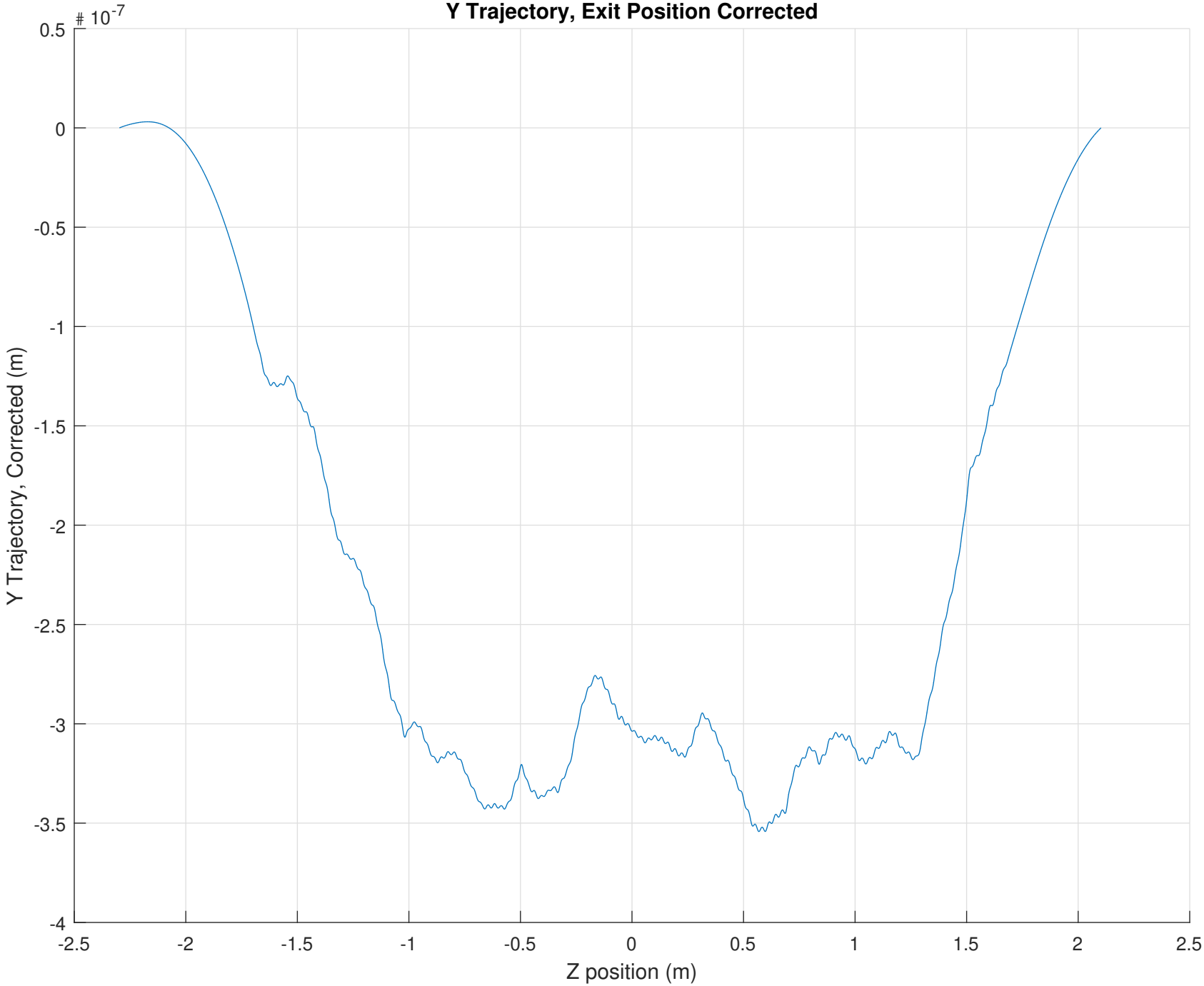

X Trajectory
10^-6
36
75
113
151
190
Pole
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
X (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)

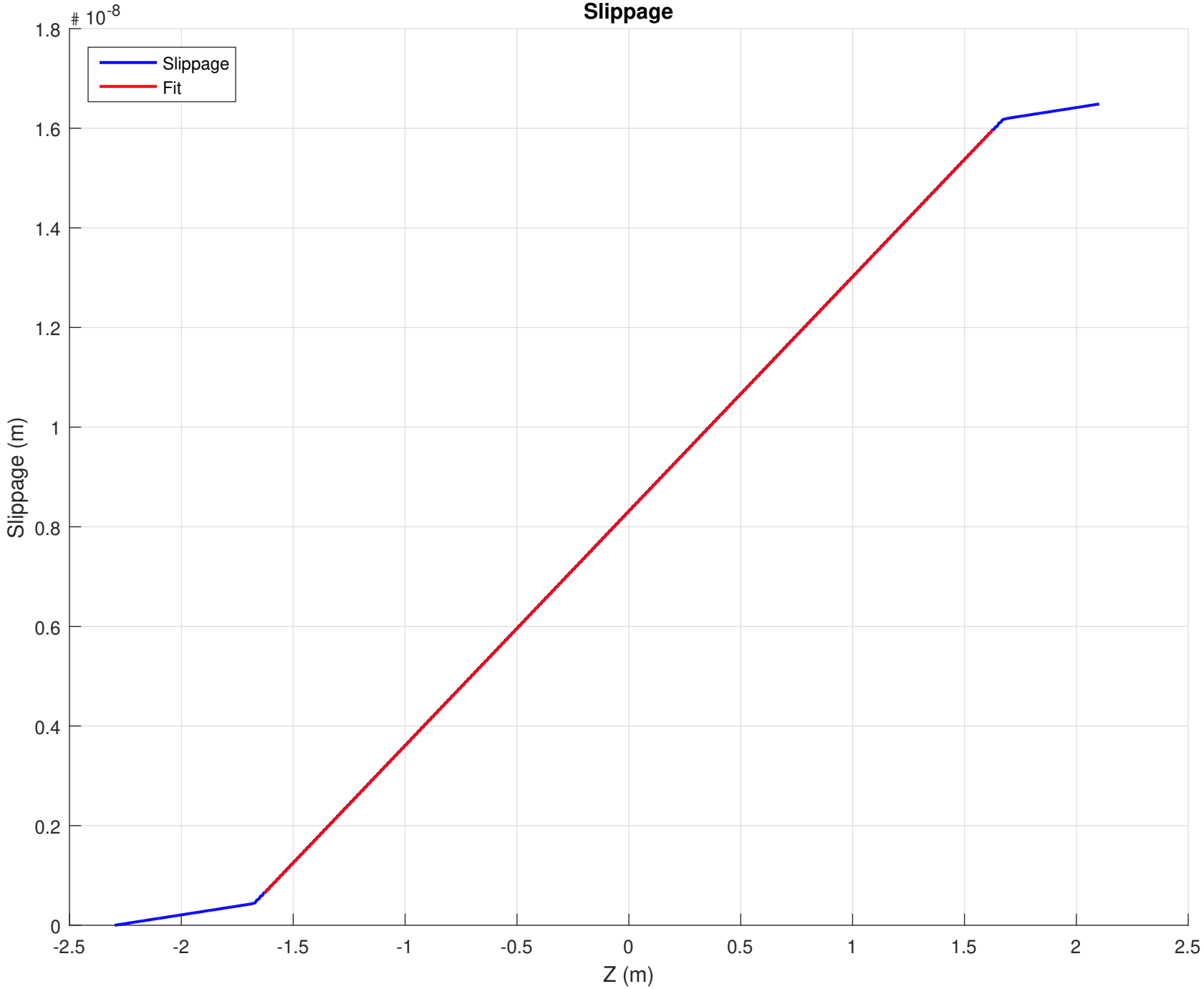

Y Trajectory
10^-6
36
75
113
151
190
Pole
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
Y (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)

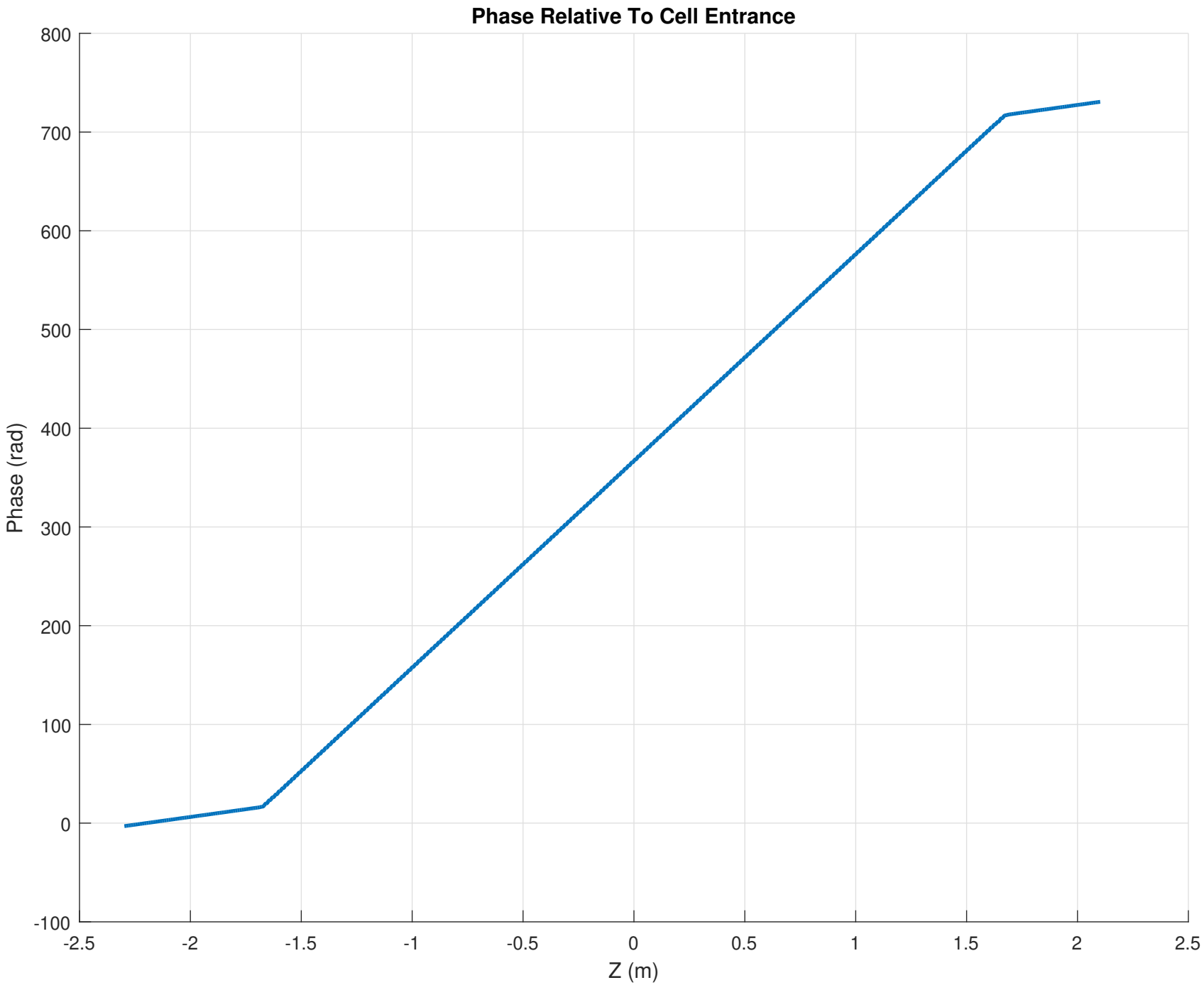

X Trajectory, Slope Corrected
10^-7
36
75
113
151
190
Pole
X Trajectory, Corrected (m)
Z position (m)
4
2
0
-2
-4
-6
-8
-10
-12
-14
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5

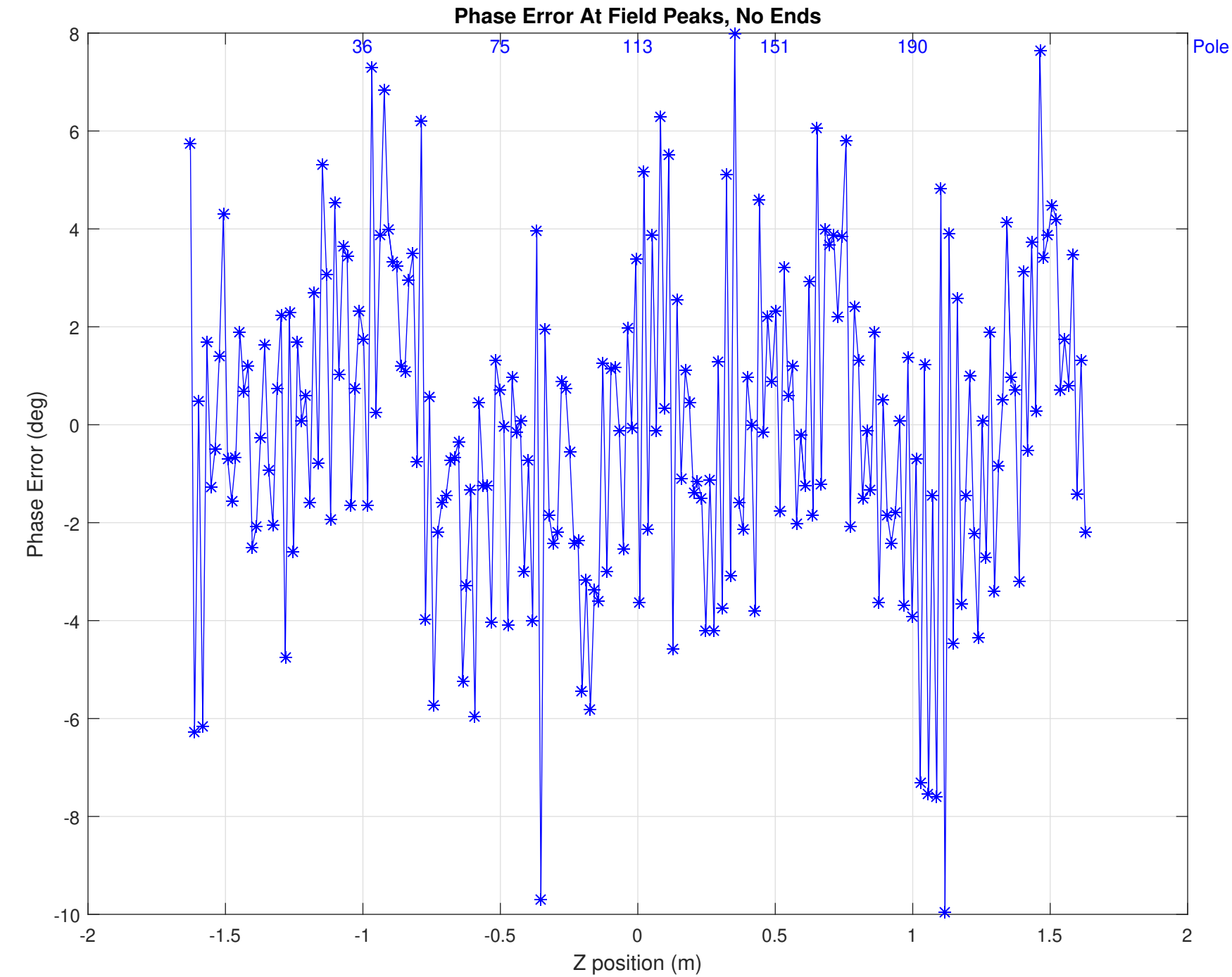

Y Trajectory, Slope Corrected
10^-7
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
-3.5
36
75
113
151
190
Pole
Y Trajectory, Corrected (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)


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

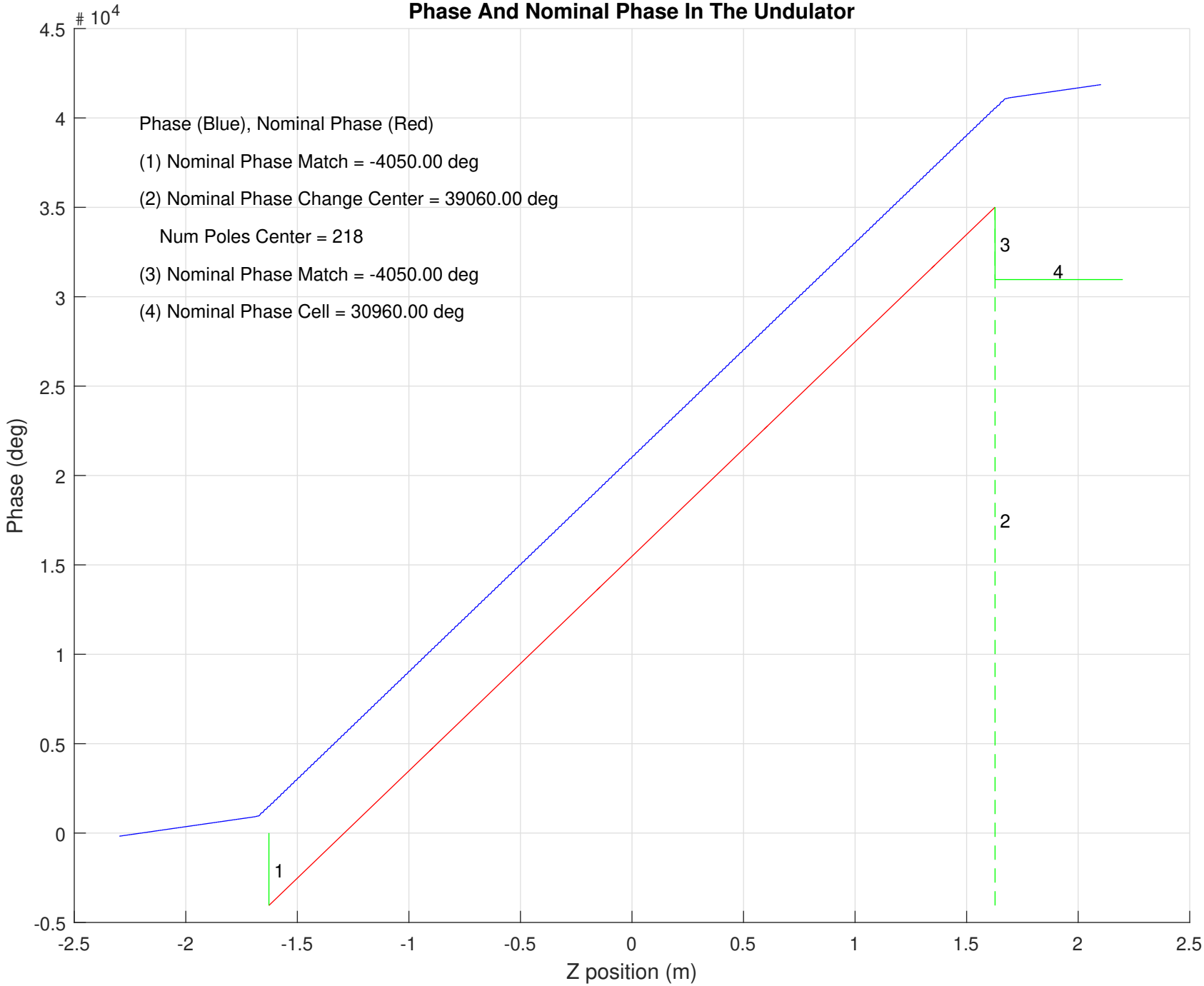

Y Trajectory, Exit Position Corrected
10^-7
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
-3.5
-4
Y Trajectory, Corrected (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)

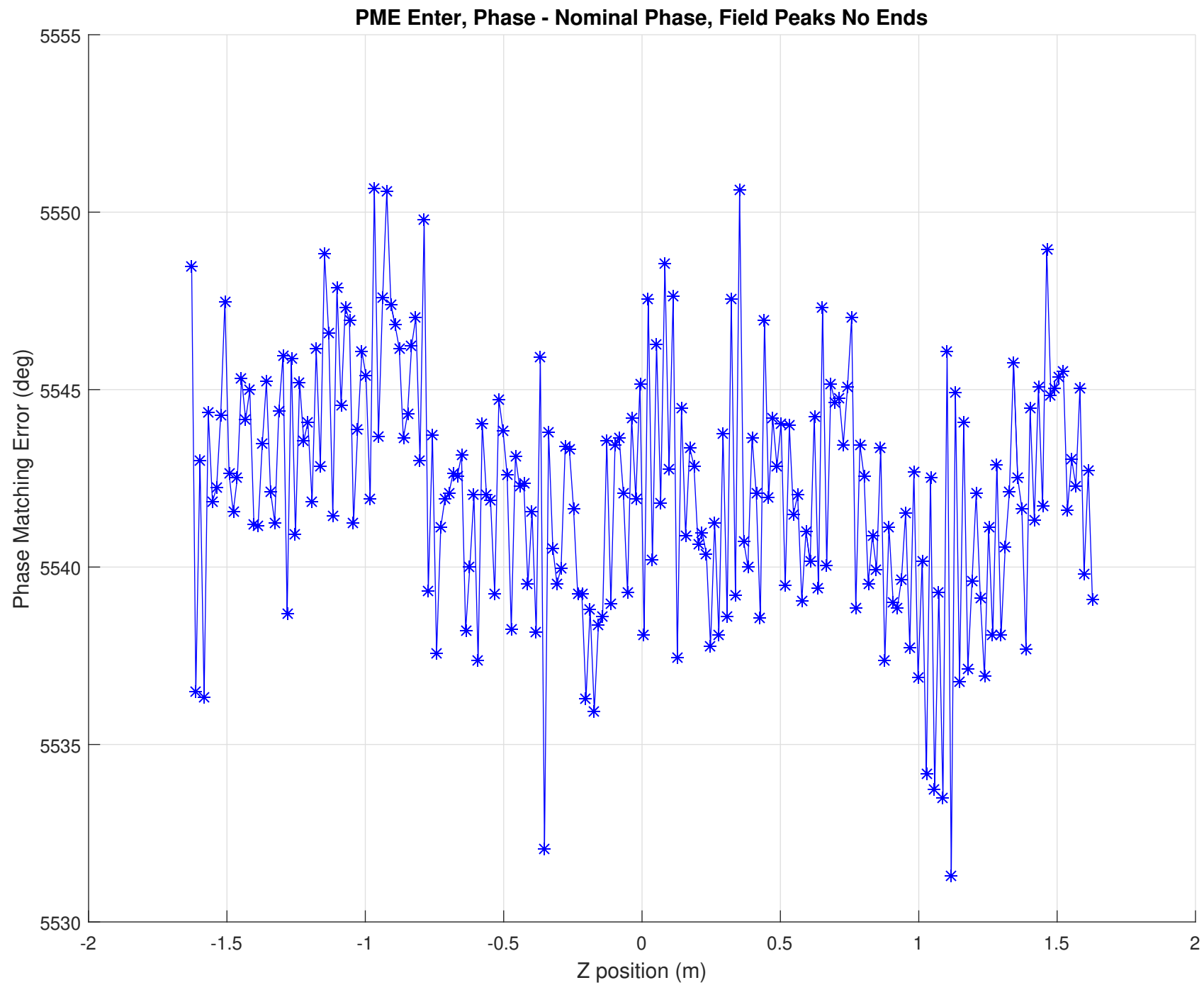

Slippage
10^-8
Slippage
Fit
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Slippage (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z (m)


Phase Relative To Cell Entrance
800
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)

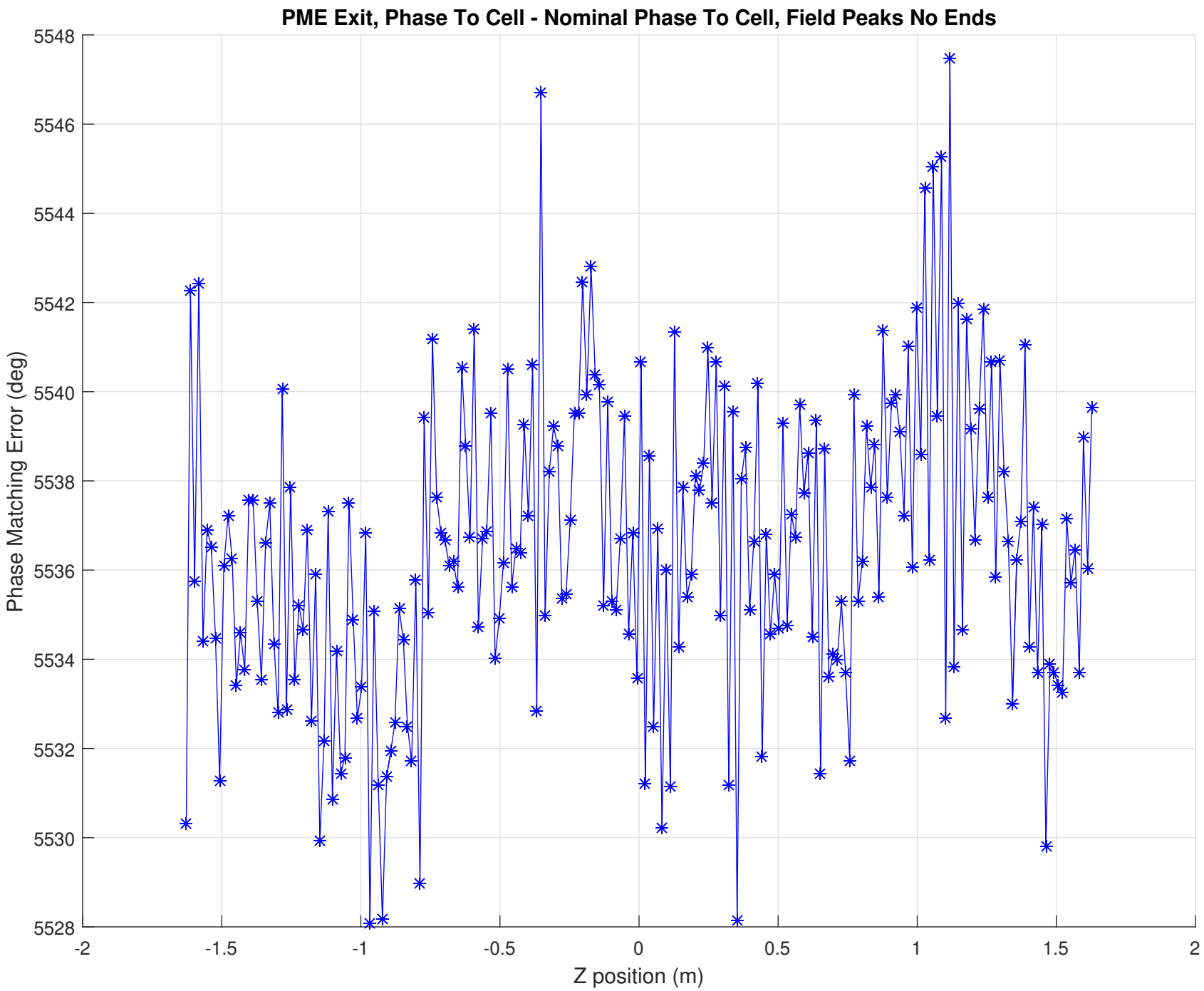


Phase Error: Ave = -0.000000 deg, RMS = 3.202721 deg


Phase And Nominal Phase In The Undulator
10^4
Phase (Blue), Nominal Phase (Red)
(1) Nominal Phase Match = -4050.00 deg
(2) Nominal Phase Change Center = 39060.00 deg
Num Poles Center = 218
(3) Nominal Phase Match = -4050.00 deg
(4) Nominal Phase Cell = 30960.00 deg
1
2
3
4
Phase (deg)
Z position (m)
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5



Phase Match Error: Ave = 5542.237907 deg, RMS = 3.412265 deg



Phase Match Error: Ave = 5536.517191 deg, RMS = 3.412265 deg