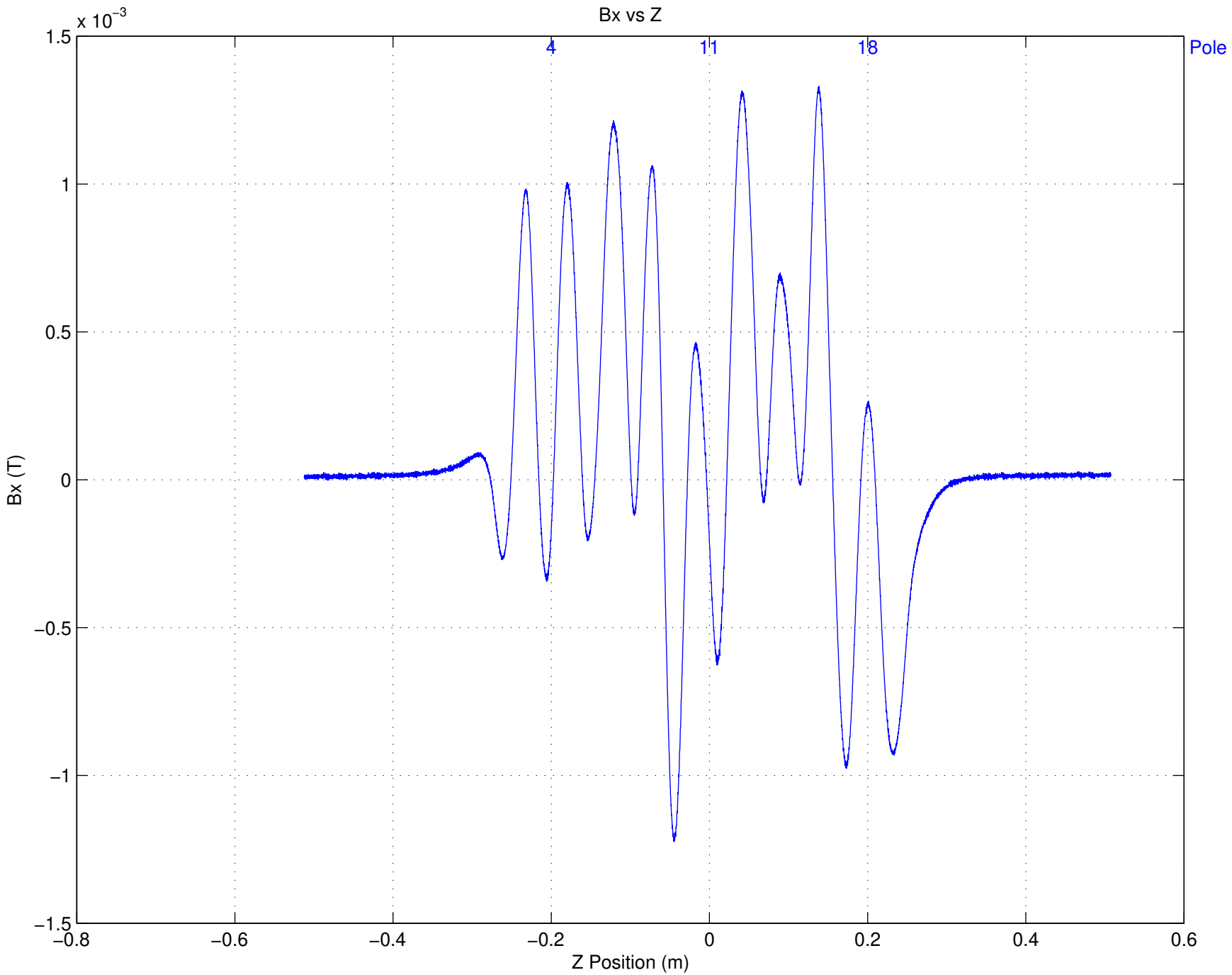
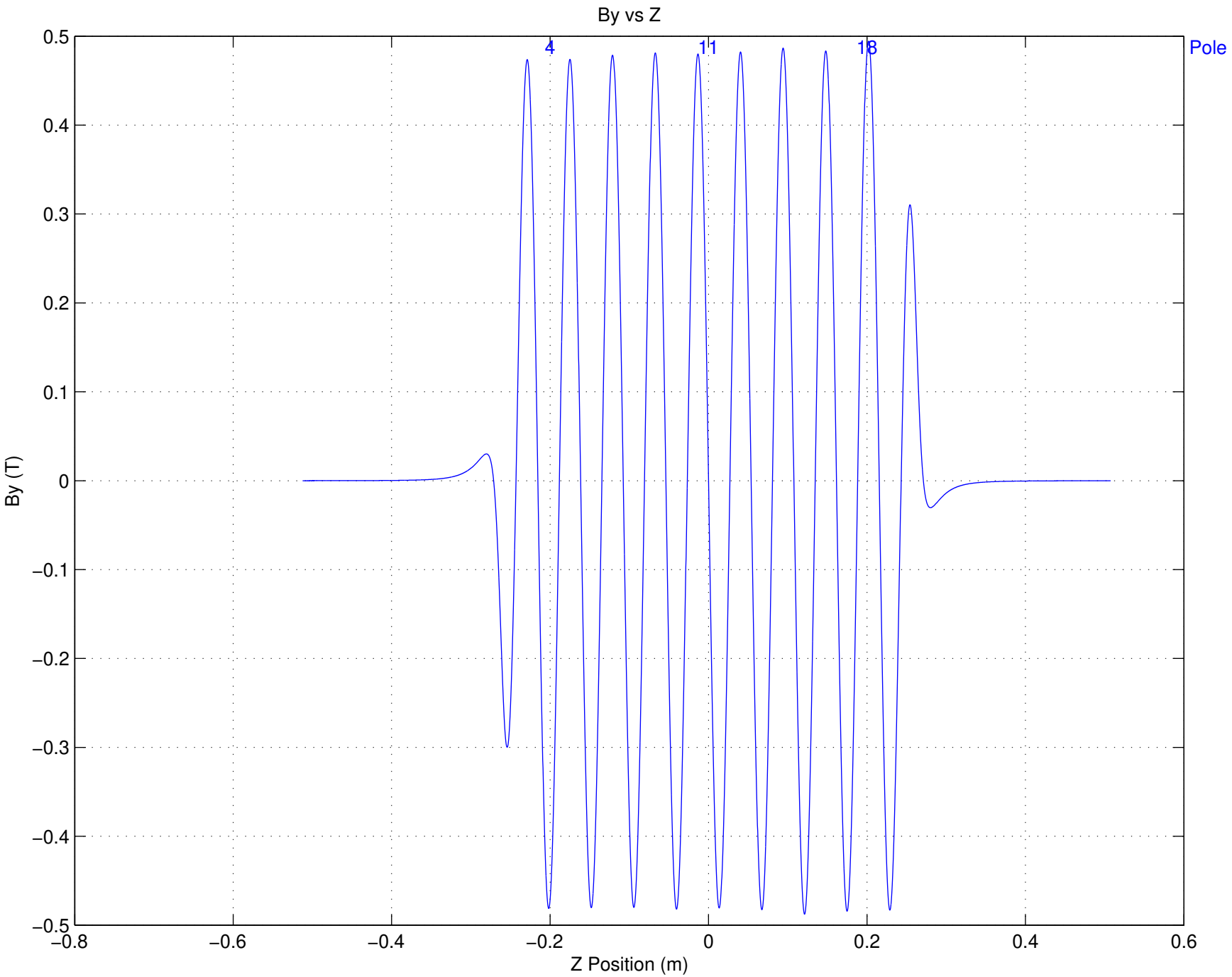
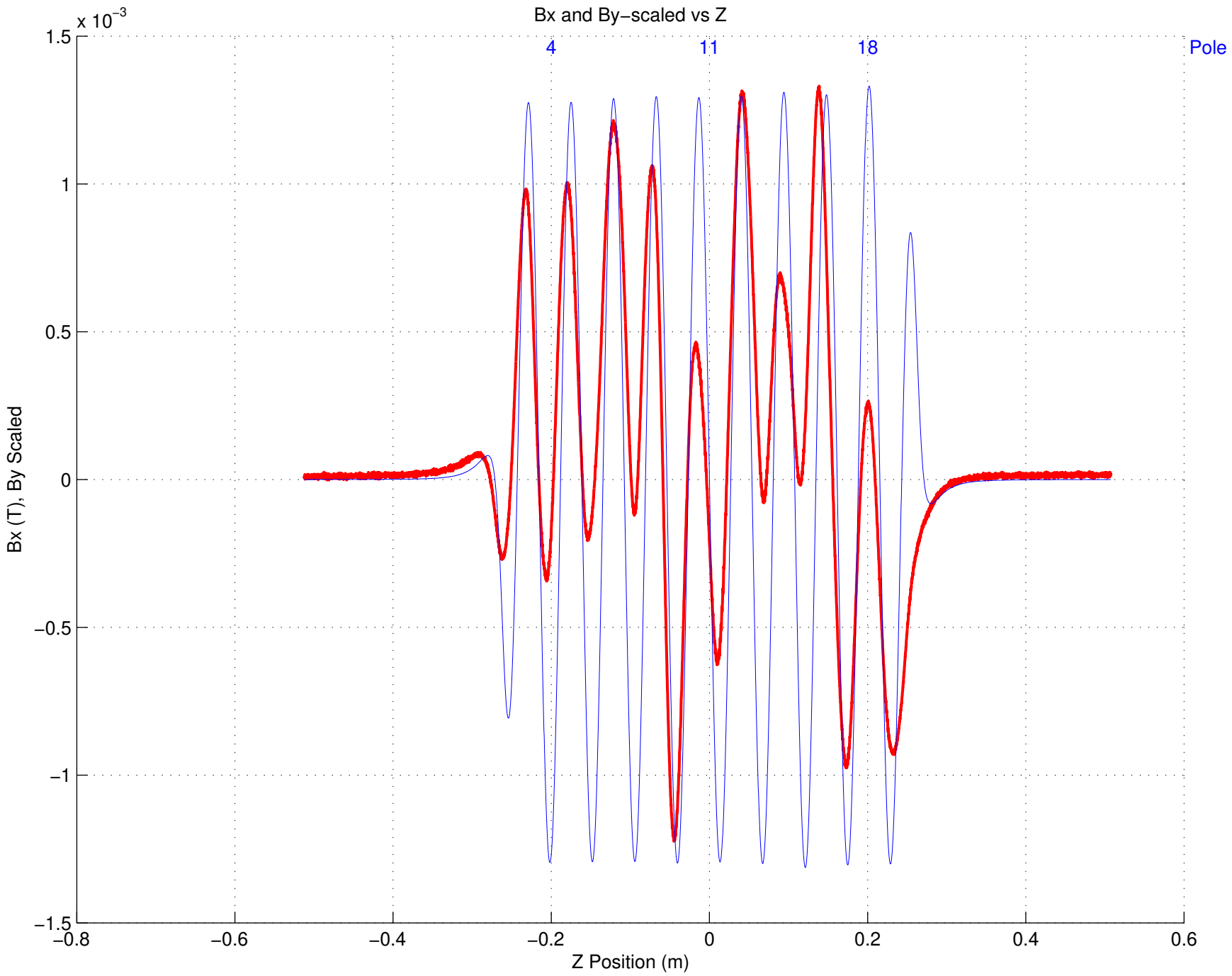
SLAC Magnetic Measurements

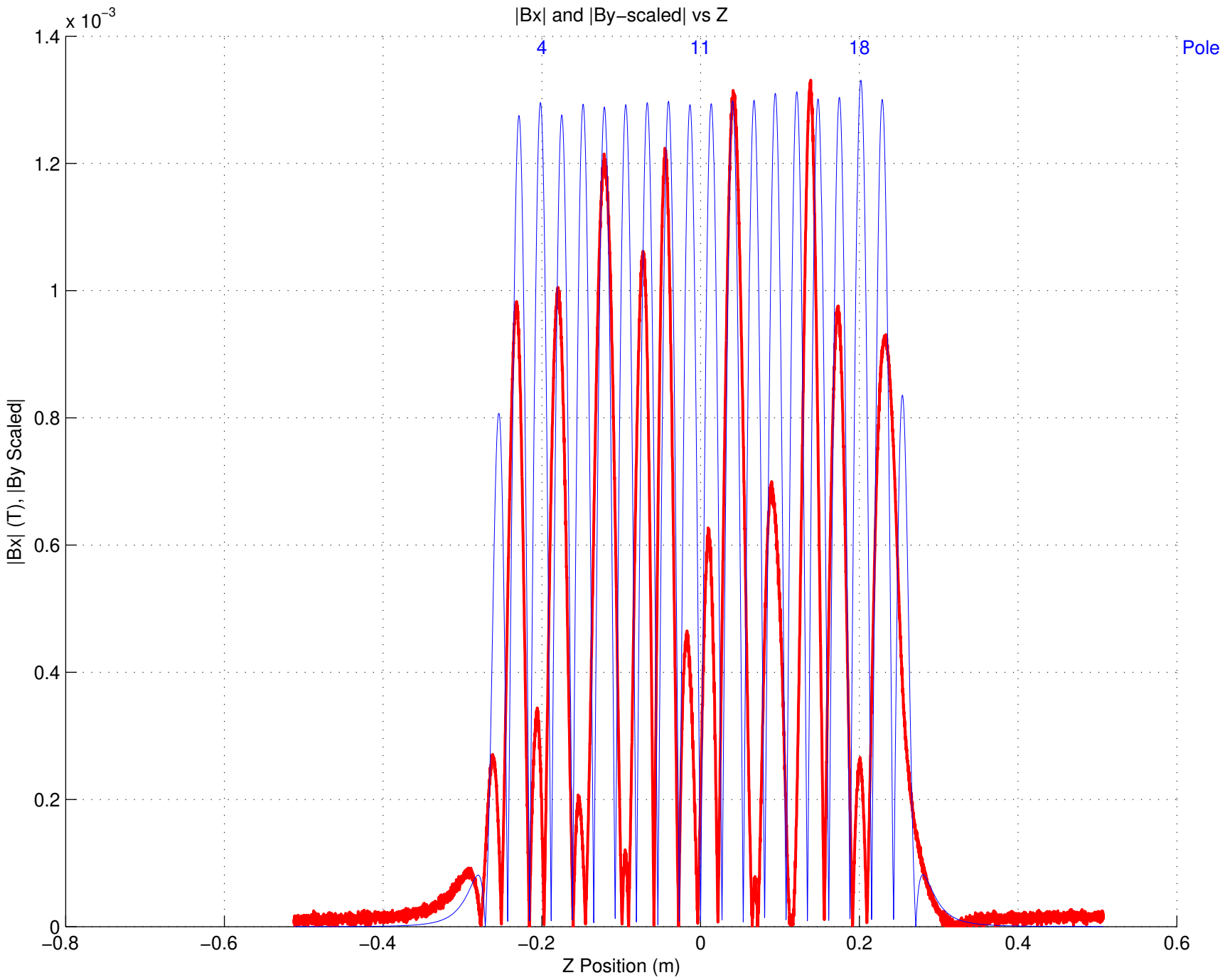
Planar Insertion Device Analysis

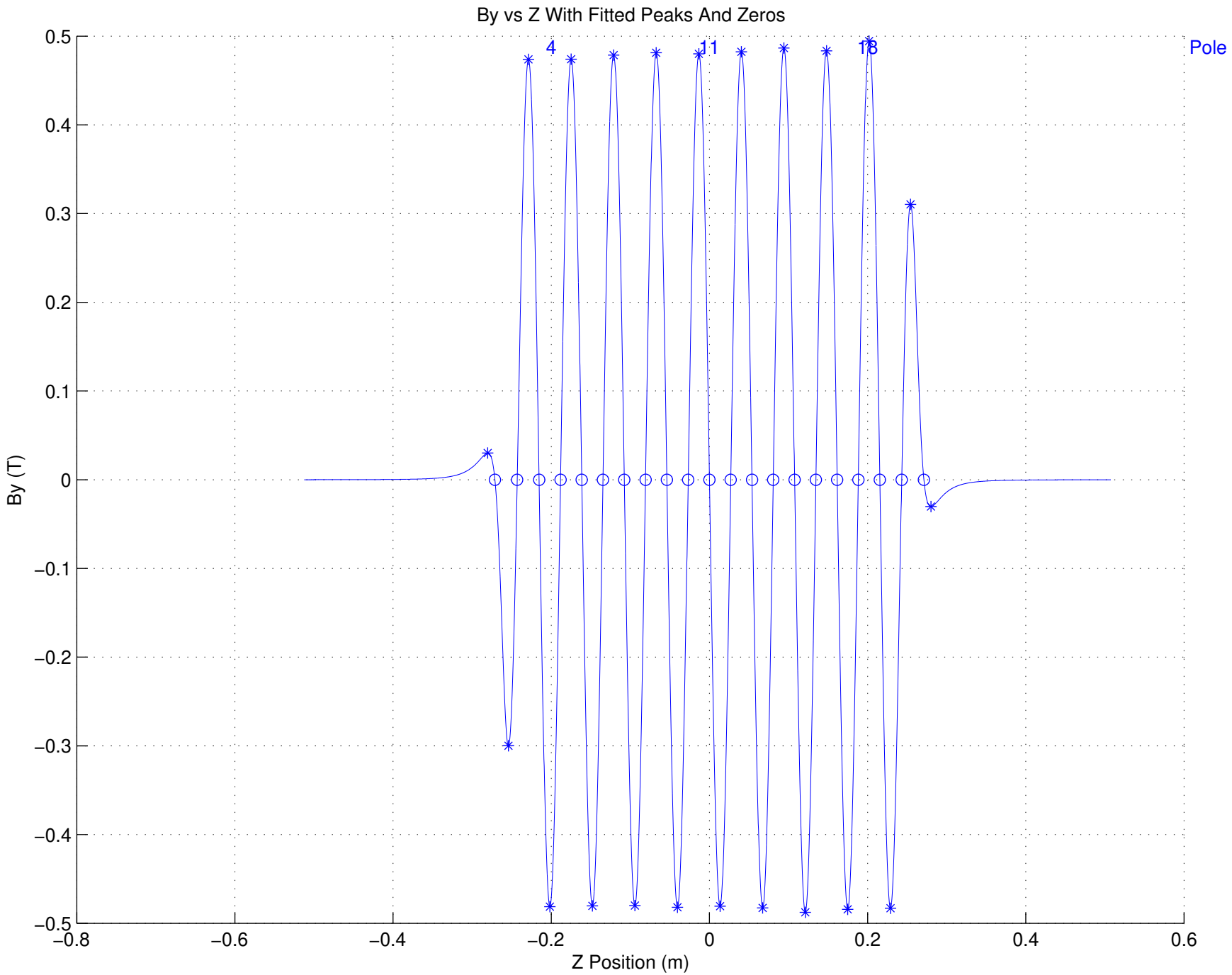
Parameters:
INPUT−FILE−DIR =s:\MagData\LCLS\Undulator\LHU−0002\DATASET0001\Rough Tuning\Z Scans\Run 003\
INPUT−FILE−NAME =x+00000−y+000−bscanz.dat
INPUT−FILE−TYPE =ZVXYBXYH
CORR−REQUIRED =0
GAMMA =264.1884
NOM−LAMBDA−U =0.054
NOM−K−VALUE =2.55
NOM−LAMBDA−R =1.6446e−006
NUM−POLES =22
NUM−END−POLES =3
CELL−LENGTH =0.594

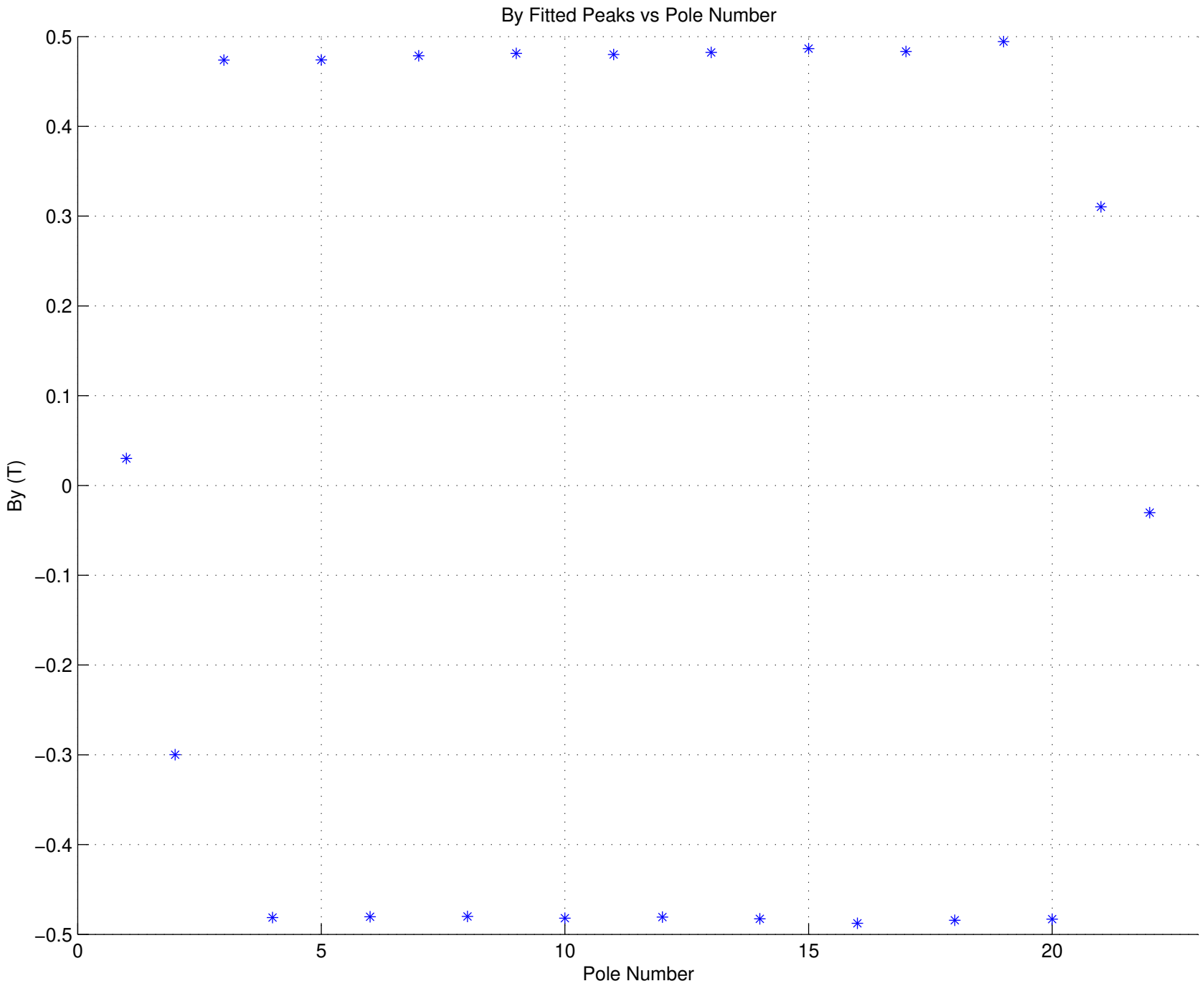

Bx vs Z
x 10^-3
1.5
1
0.5
0
−0.5
−1
−1.5
Bx (T)
4
11
18
Pole
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
Z Position (m)

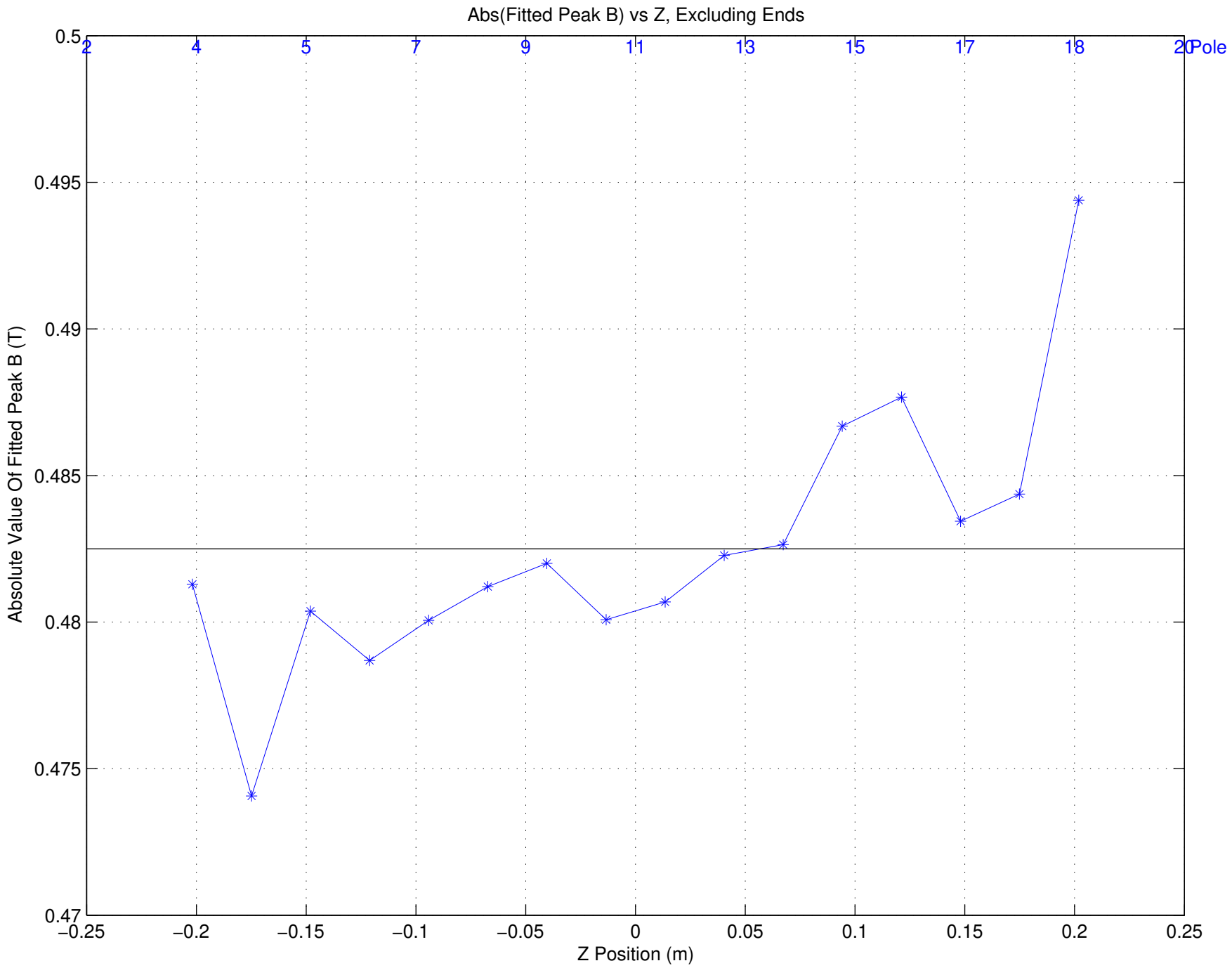

By vs Z
Pole
4
11
18
By (T)
Z Position (m)
0.5
0.4
0.3
0.2
0.1
0
−0.1
−0.2
−0.3
−0.4
−0.5
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6


Bx and By−scaled vs Z
x 10^−3
1.5
1
0.5
0
−0.5
−1
−1.5
4
11
18
Pole
Bx (T), By Scaled
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
Z Position (m)

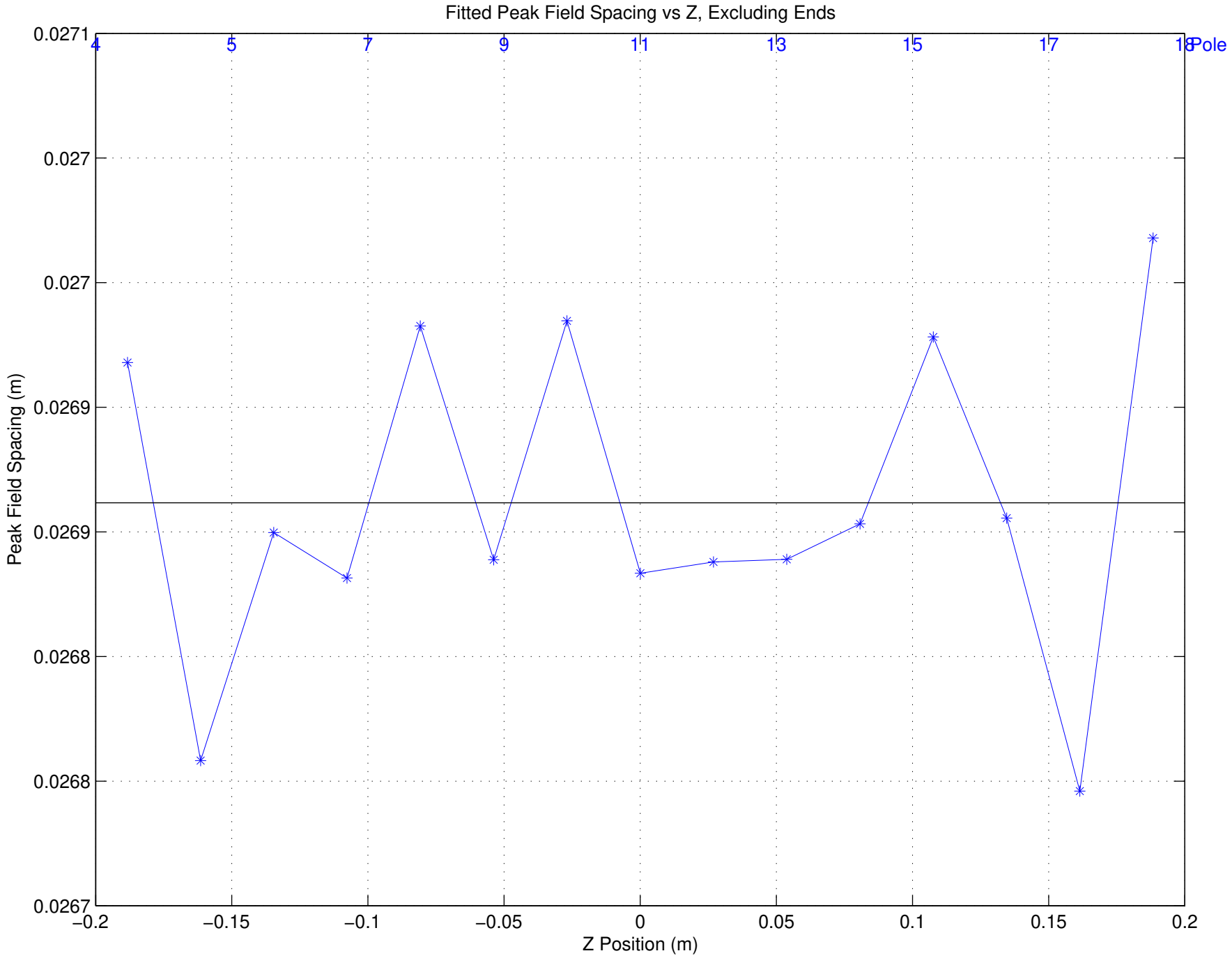

|Bx| and |By−scaled| vs Z
x 10^−3
1.4
1.2
1
0.8
0.6
0.4
0.2
0
4
11
18
Pole
|Bx| (T), |By Scaled|
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
Z Position (m)


By vs Z With Fitted Peaks And Zeros
4
11
18
Pole
0.5
0.4
0.3
0.2
0.1
0
−0.1
−0.2
−0.3
−0.4
−0.5
By (T)
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
Z Position (m)

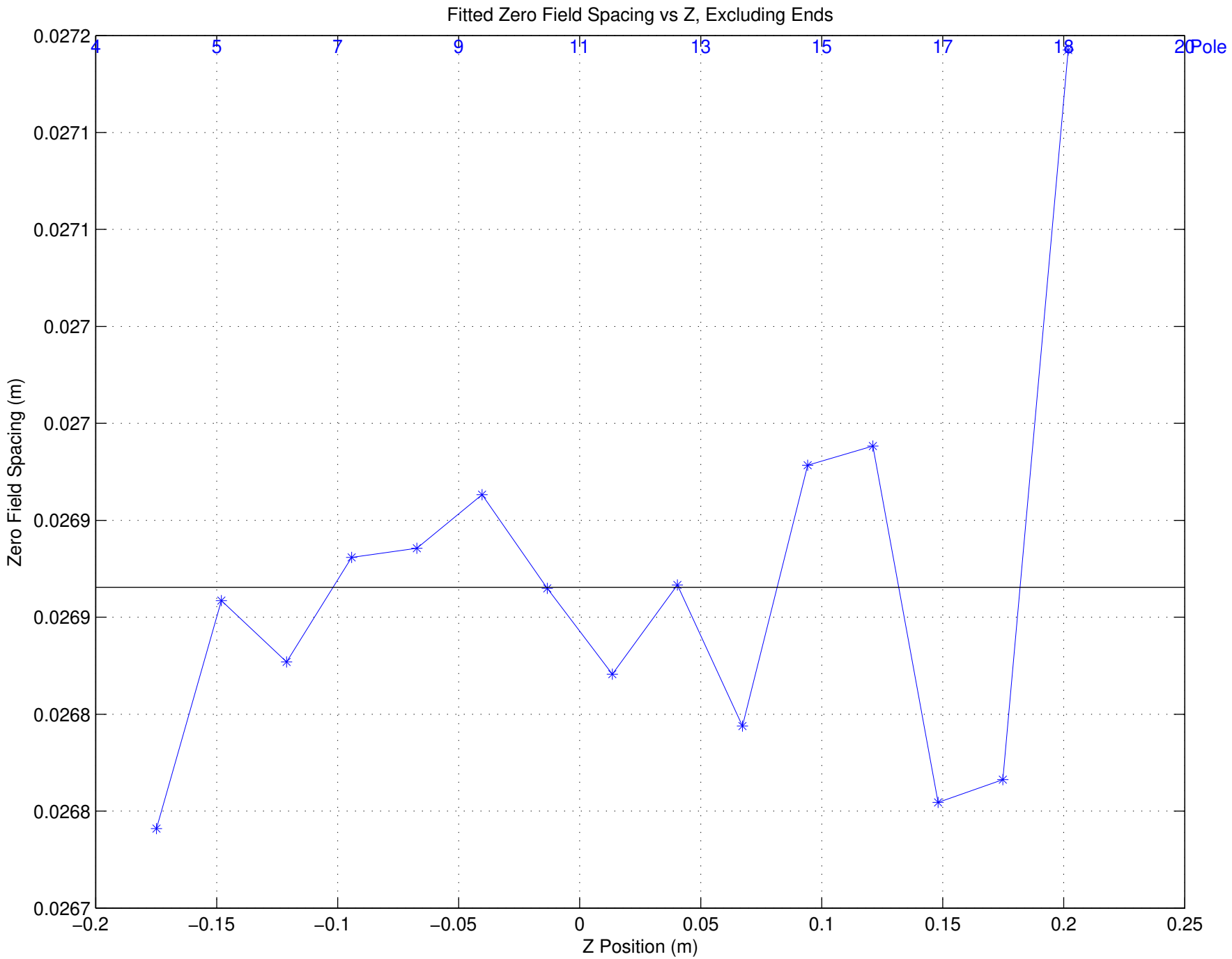

By Fitted Peaks vs Pole Number
By (T)
Pole Number
0.5
0.4
0.3
0.2
0.1
0
−0.1
−0.2
−0.3
−0.4
−0.5
0
5
10
15
20



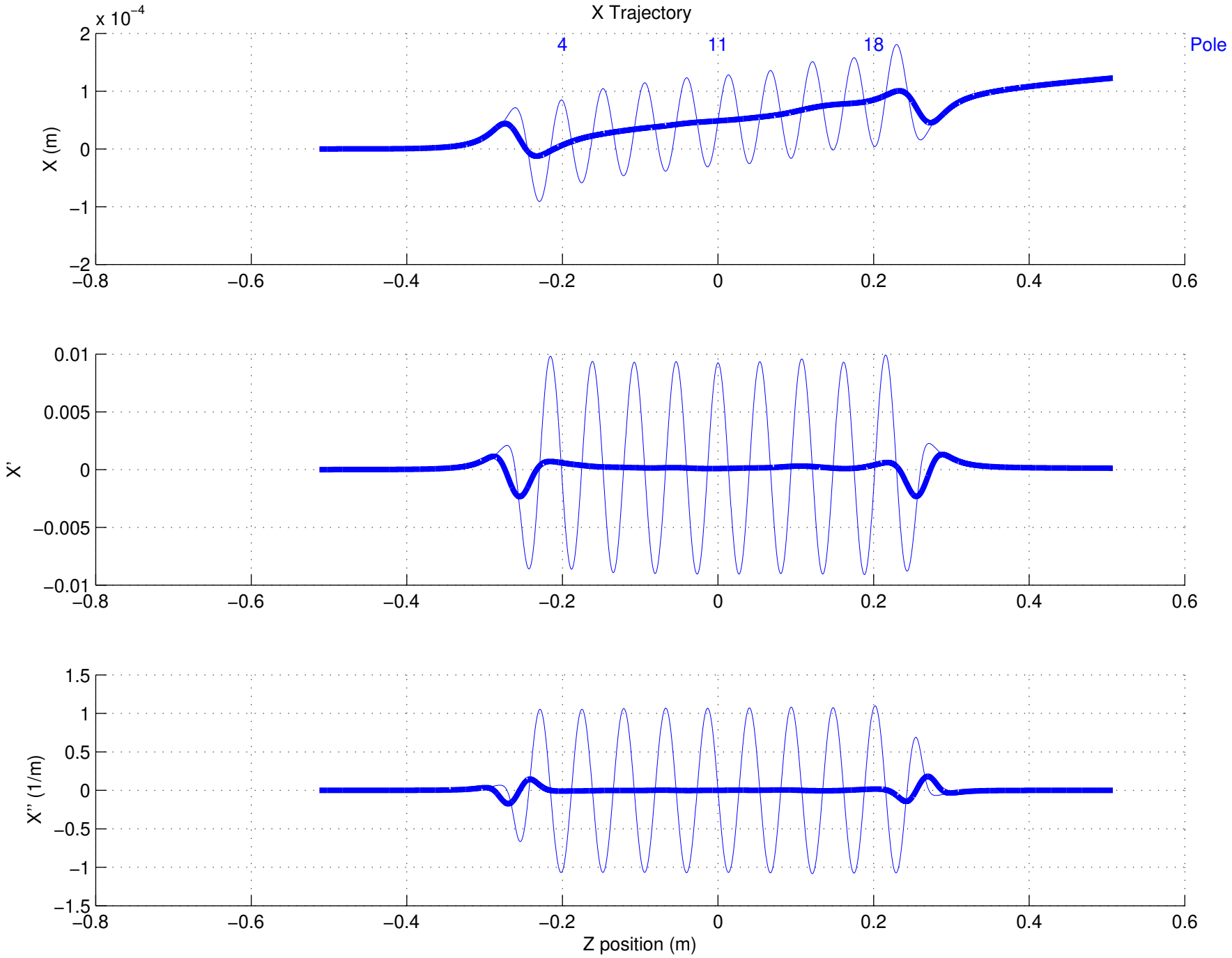
Peak Fields: Ave = 0.482498 T, RMS = 0.004462 T

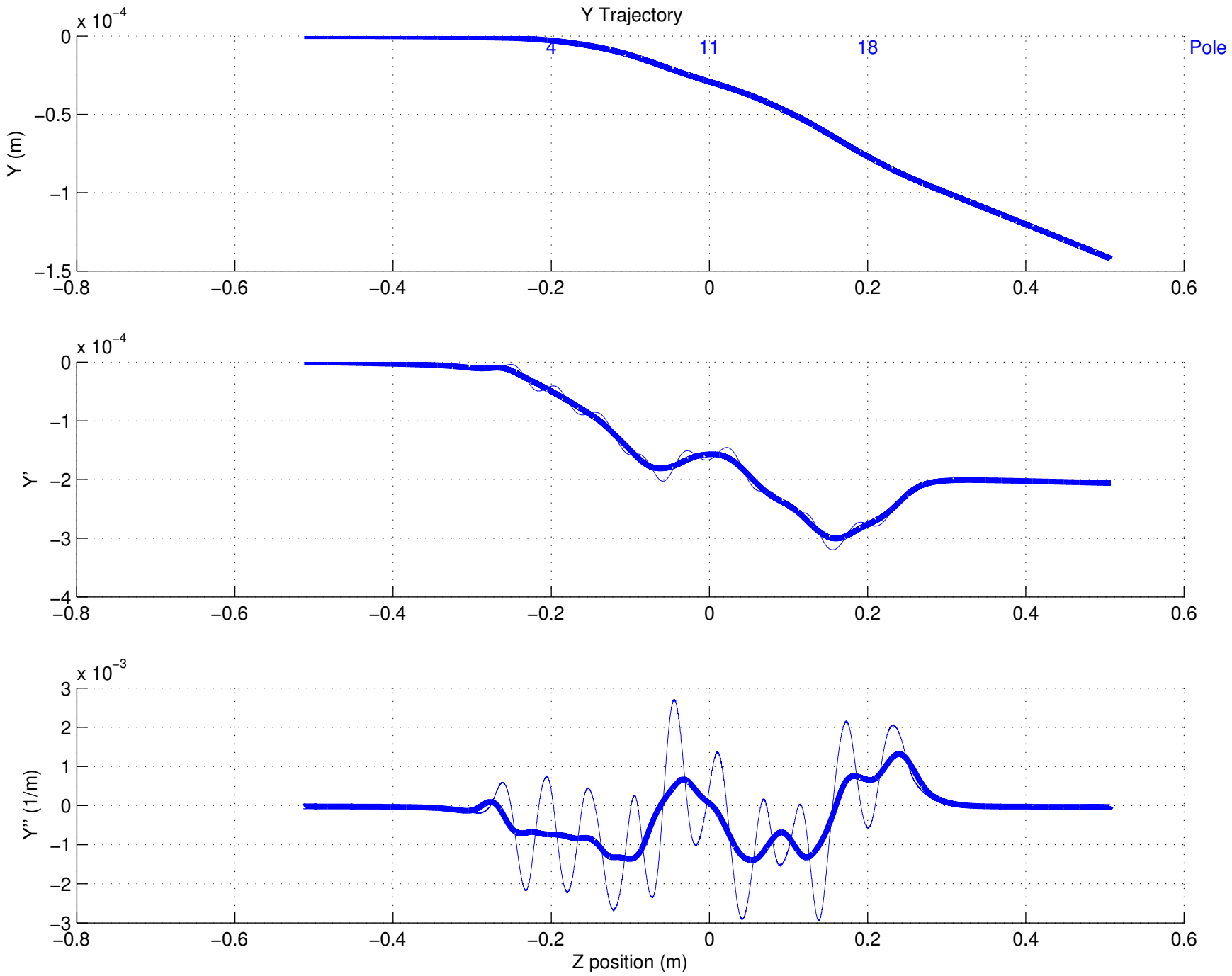


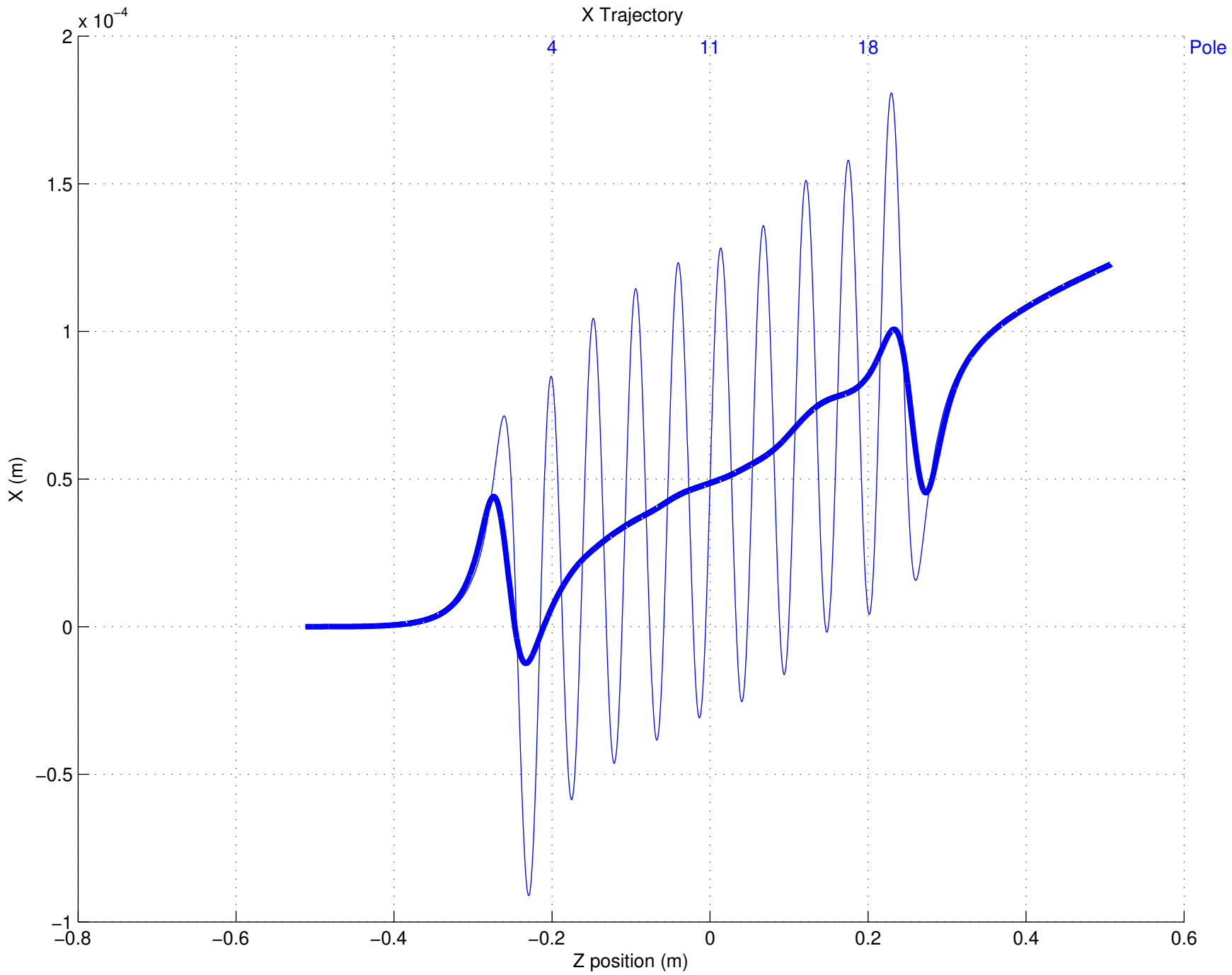
Peak Field Spacing: Ave = 0.026912 m, RMS = 0.000064 m

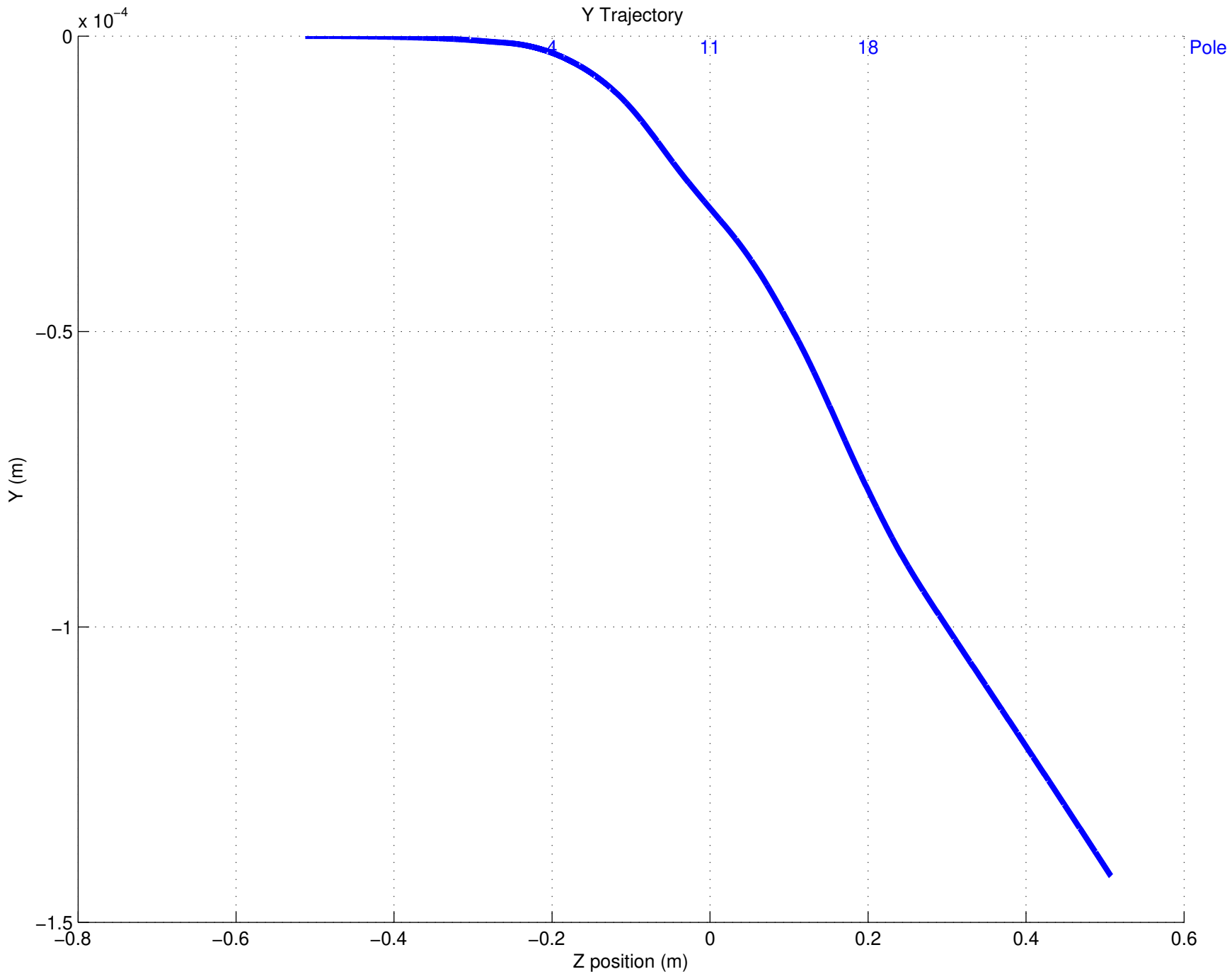


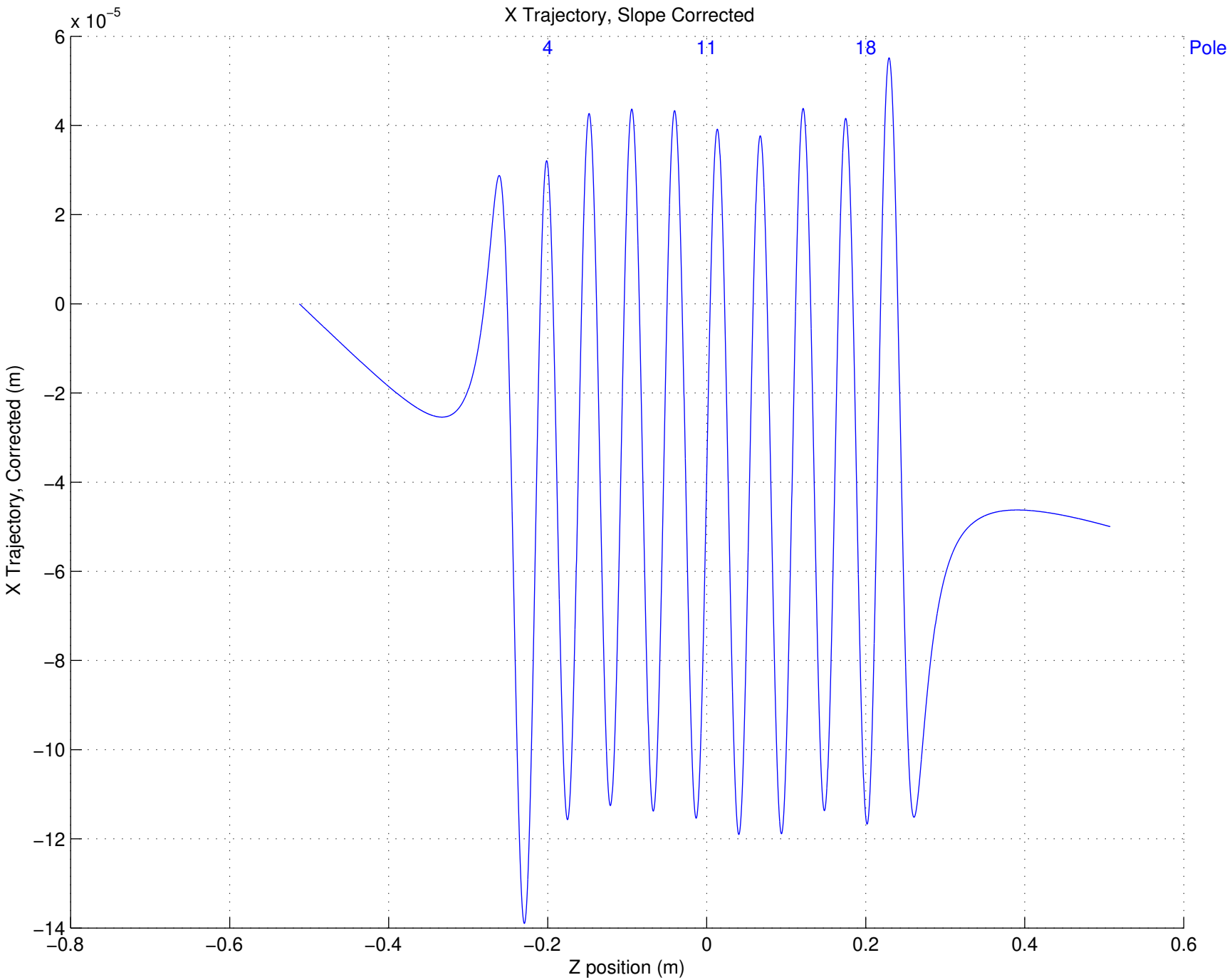
Zero Field Spacing: Ave = 0.026915 m, RMS = 0.000098 m

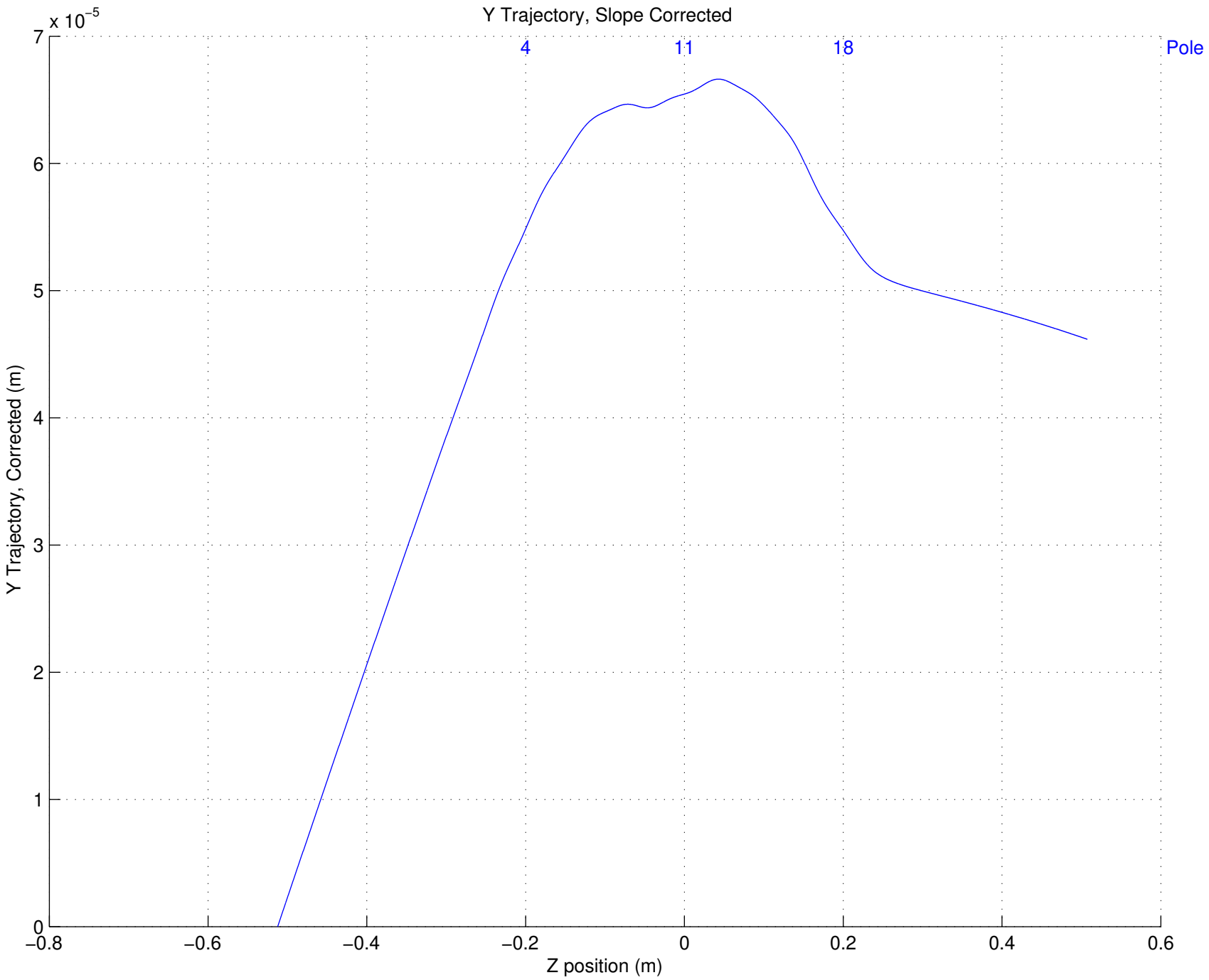

X Trajectory
x 10^-4
X (m)
4
11
18
Pole
X'
X'' (1/m)
Z position (m)

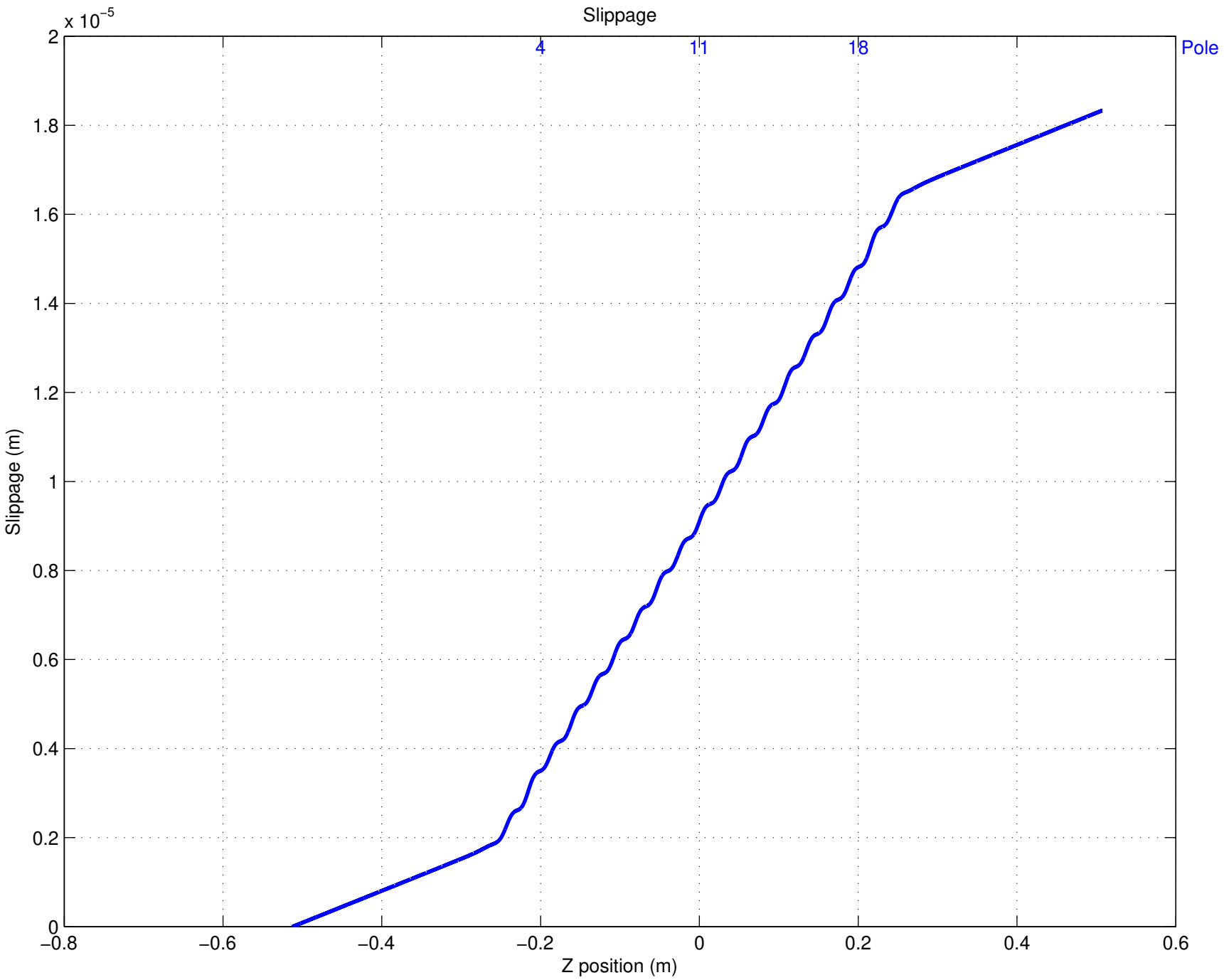

Y Trajectory
x 10^-4
Y (m)
4
11
18
Pole
x 10^-4
Y'
x 10^-3
Y'' (1/m)
Z position (m)

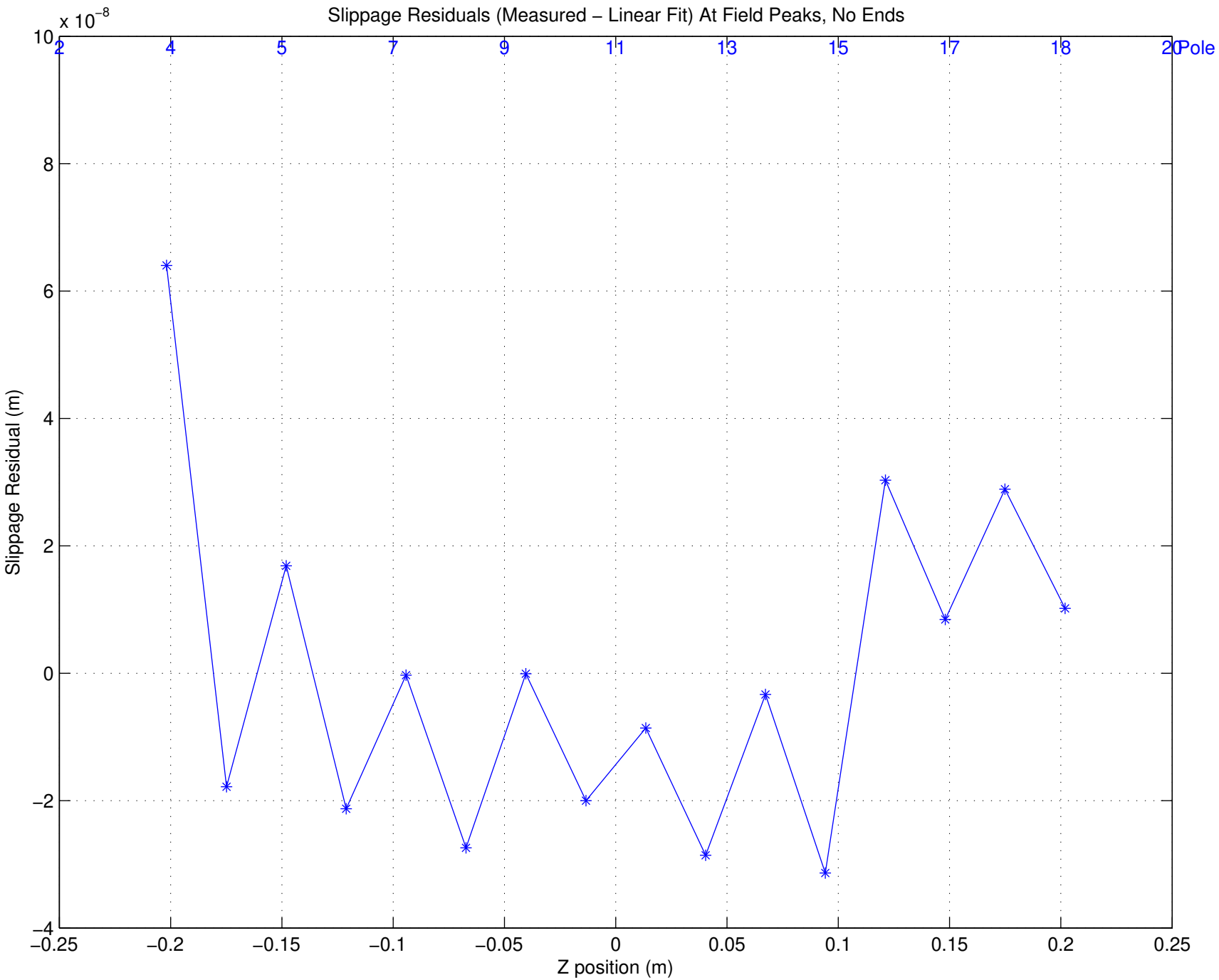

X Trajectory
x 10^-4
2
1.5
1
0.5
0
−0.5
−1
X (m)
4
11
18
Pole
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
Z position (m)

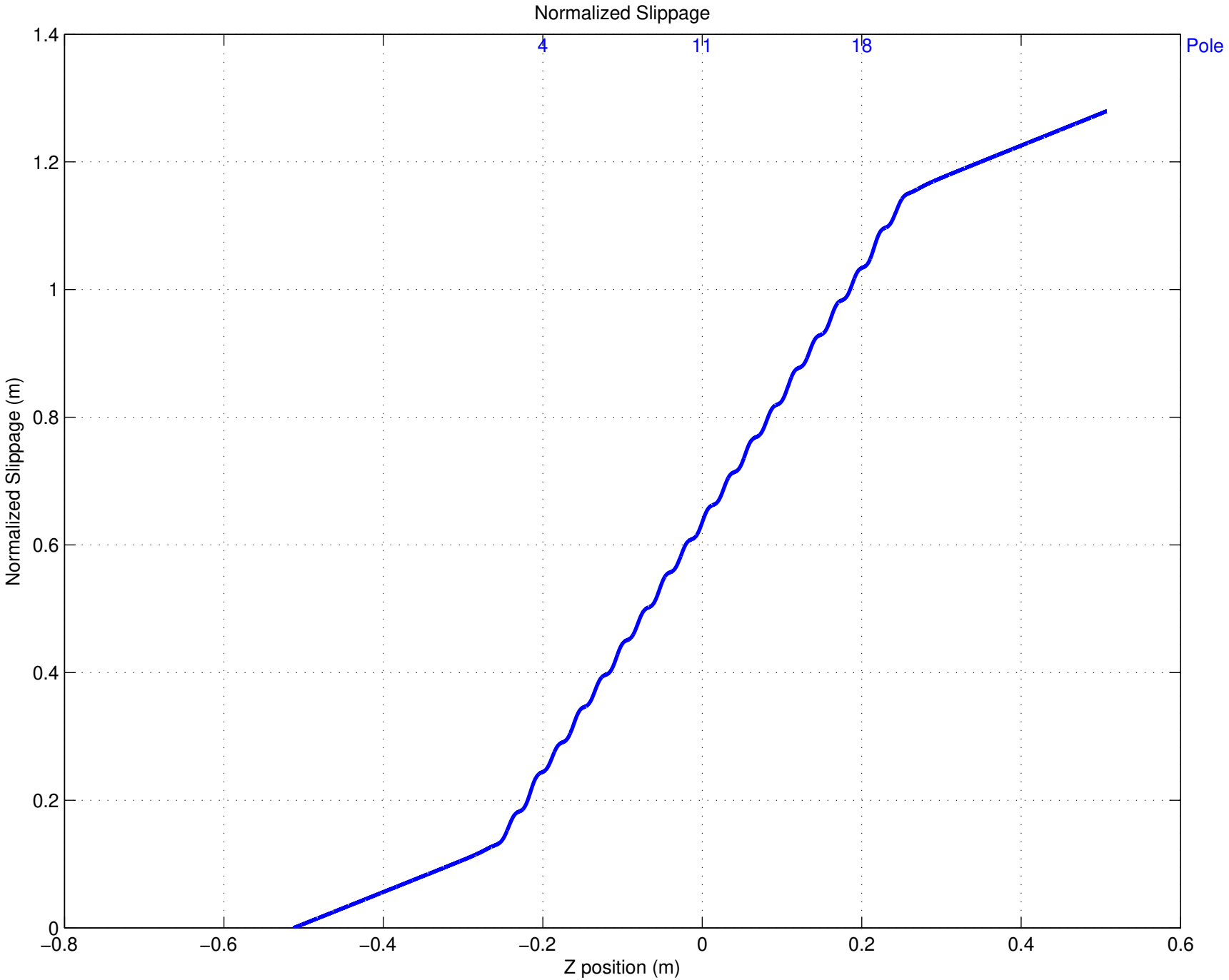

Y Trajectory
x 10^-4
0
−0.5
−1
−1.5
Y (m)
4
11
18
Pole
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
Z position (m)

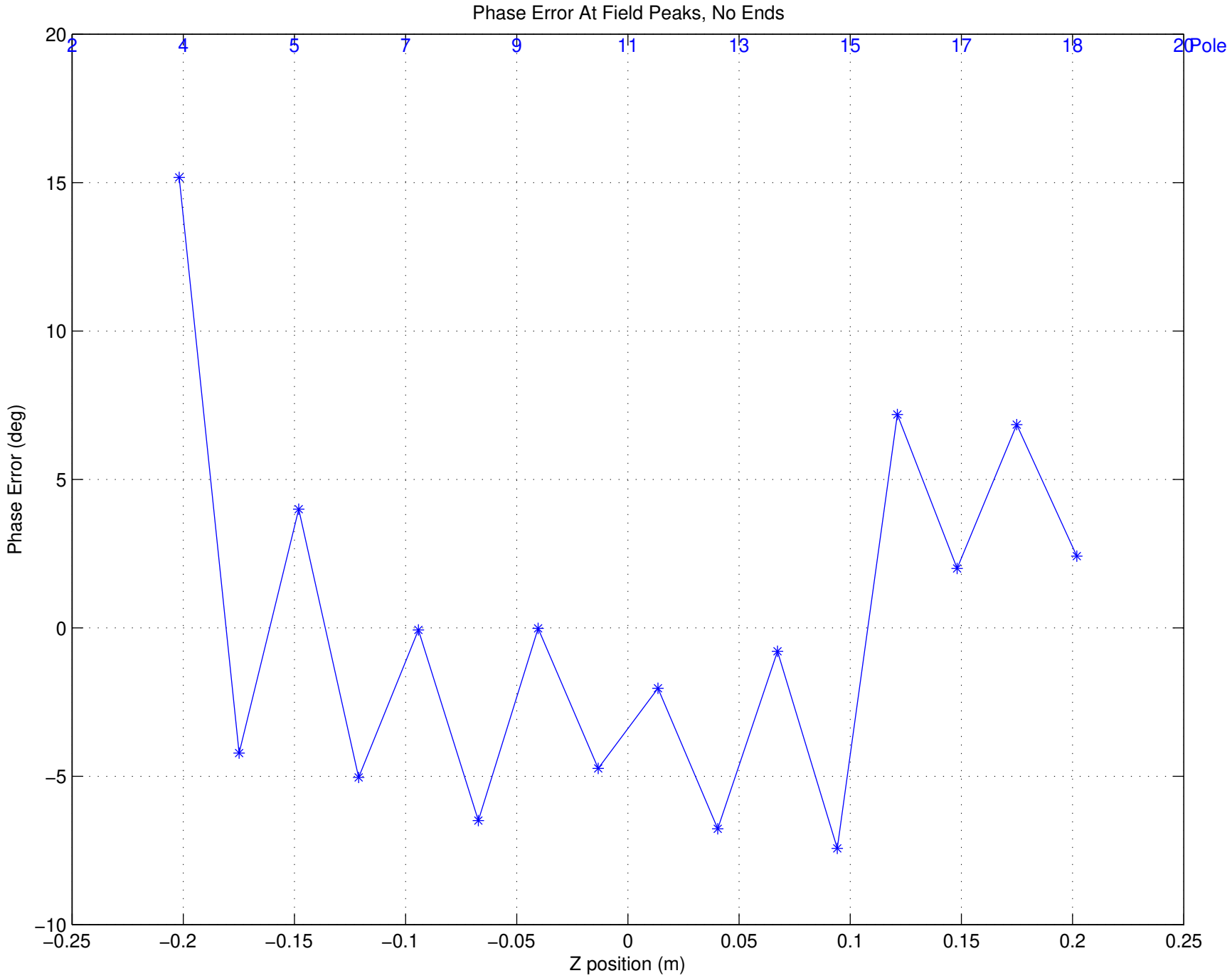

X Trajectory, Slope Corrected
x 10^-5
6
4
2
0
−2
−4
−6
−8
−10
−12
−14
4
11
18
Pole
X Trajectory, Corrected (m)
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
Z position (m)


Y Trajectory, Slope Corrected
x 10^-5
7
6
5
4
3
2
1
0
4
11
18
Pole
Y Trajectory, Corrected (m)
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
Z position (m)

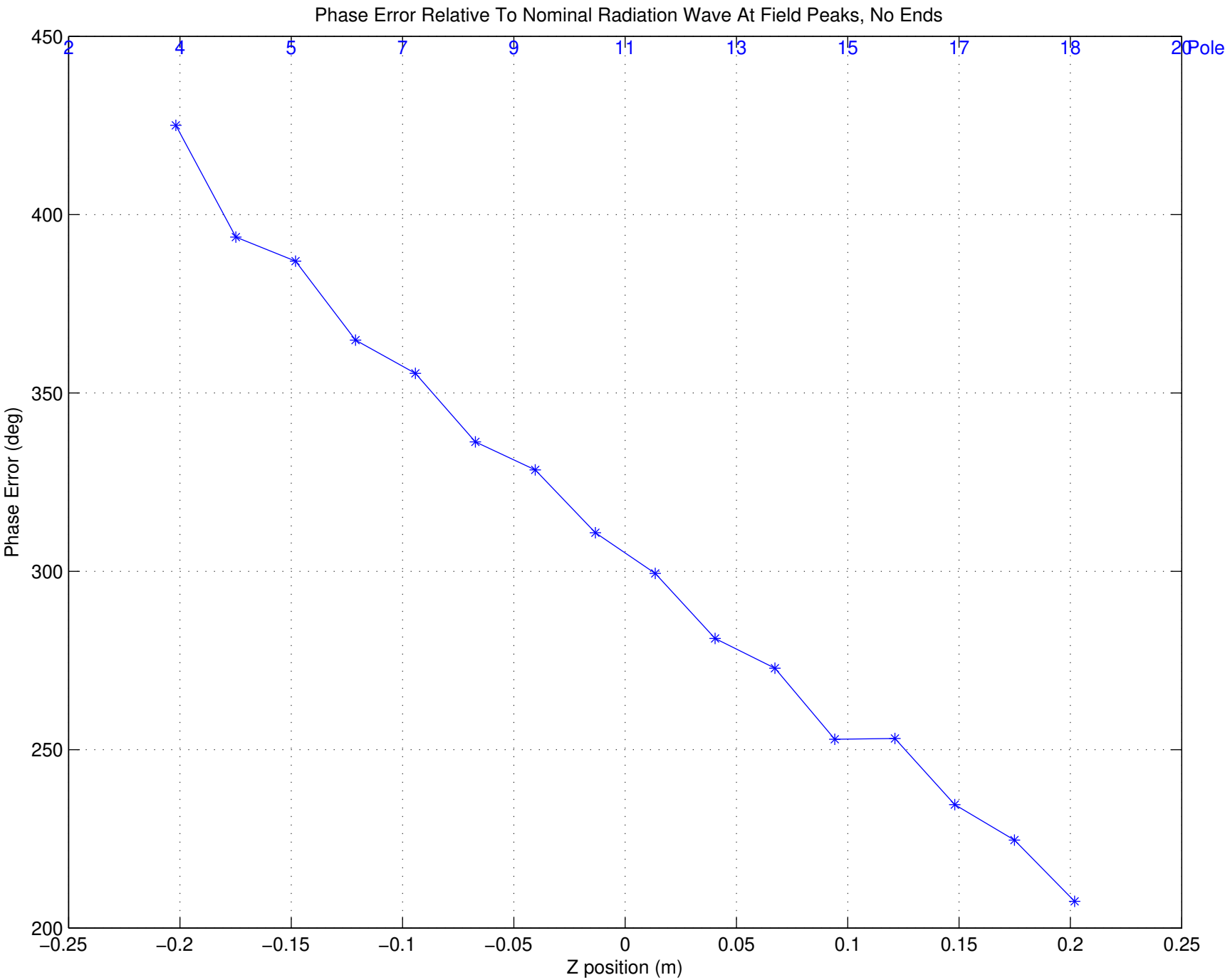

Slippage
x 10^-5
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Slippage (m)
4
11
18
Pole
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
Z position (m)


Slippage Residuals (Measured – Linear Fit) At Field Peaks, No Ends
x 10^-8
10
8
6
4
2
0
−2
−4
2
4
5
7
9
11
13
15
17
18
20
Pole
Slippage Residual (m)
−0.25
−0.2
−0.15
−0.1
−0.05
0
0.05
0.1
0.15
0.2
0.25
Z position (m)


Normalized Slippage
4
11
18
Pole
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Normalized Slippage (m)
−0.8
−0.6
−0.4
−0.2
0
0.2
0.4
0.6
Z position (m)



Phase Error: Ave = 0.000000 deg, RMS = 6.154559 deg


Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
Pole
2
4
5
7
9
11
13
15
17
18
20
450
400
350
300
250
200
Phase Error (deg)
−0.25
−0.2
−0.15
−0.1
−0.05
0
0.05
0.1
0.15
0.2
0.25
Z position (m)