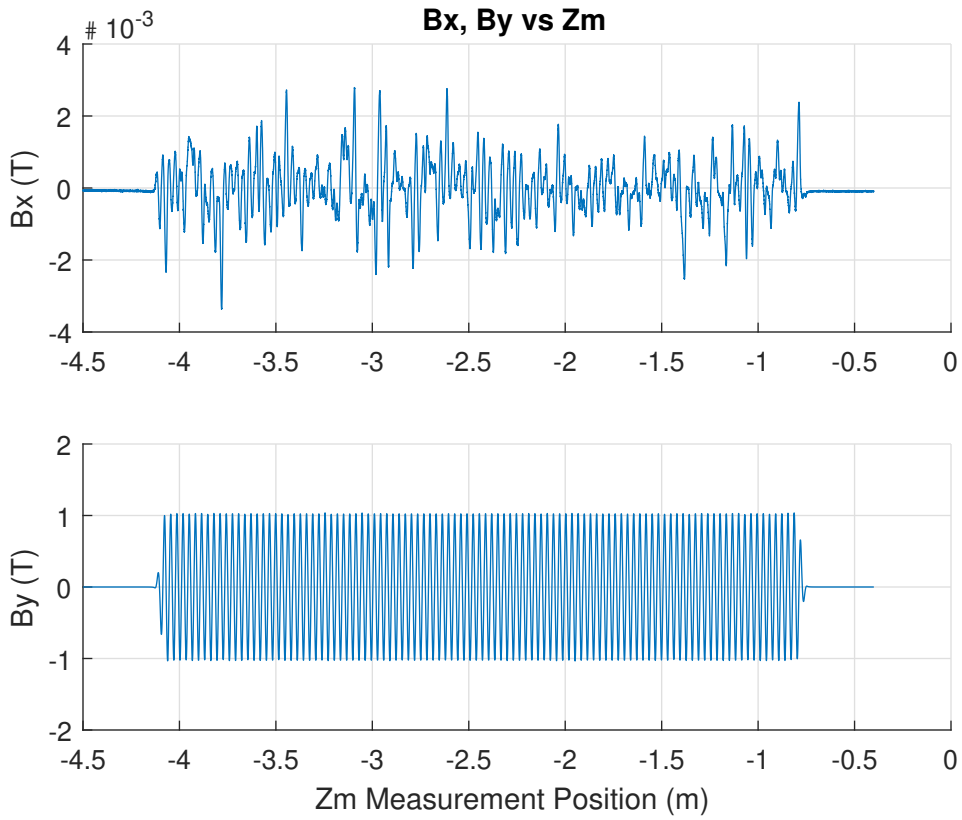
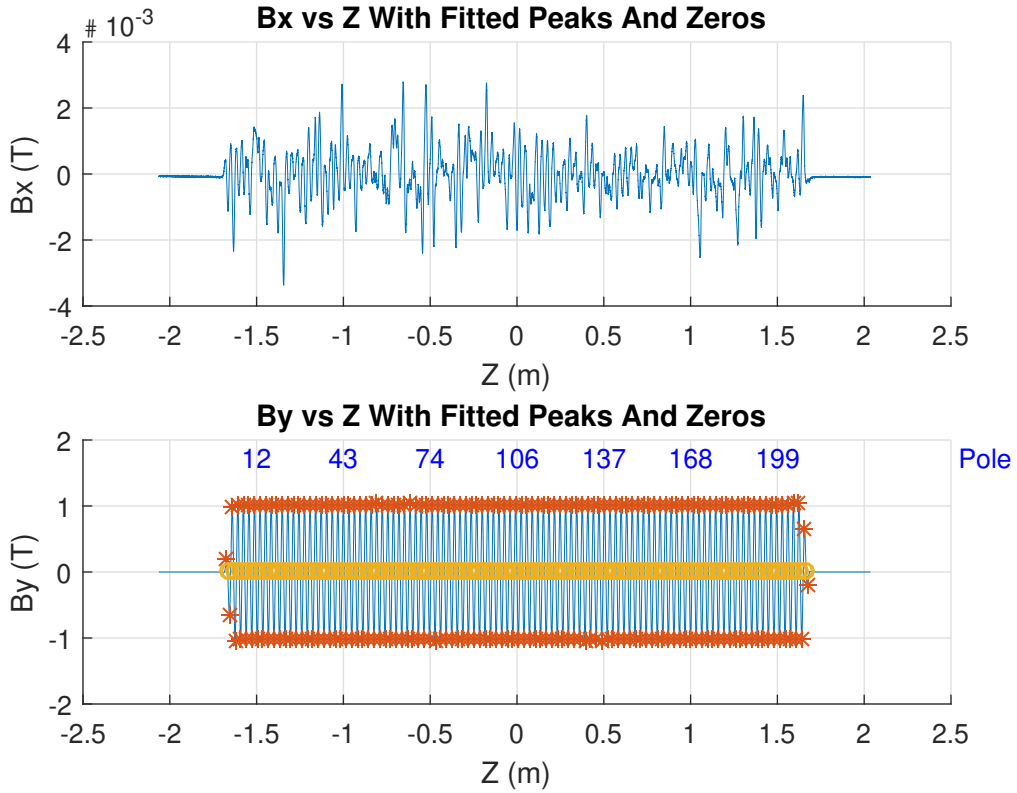
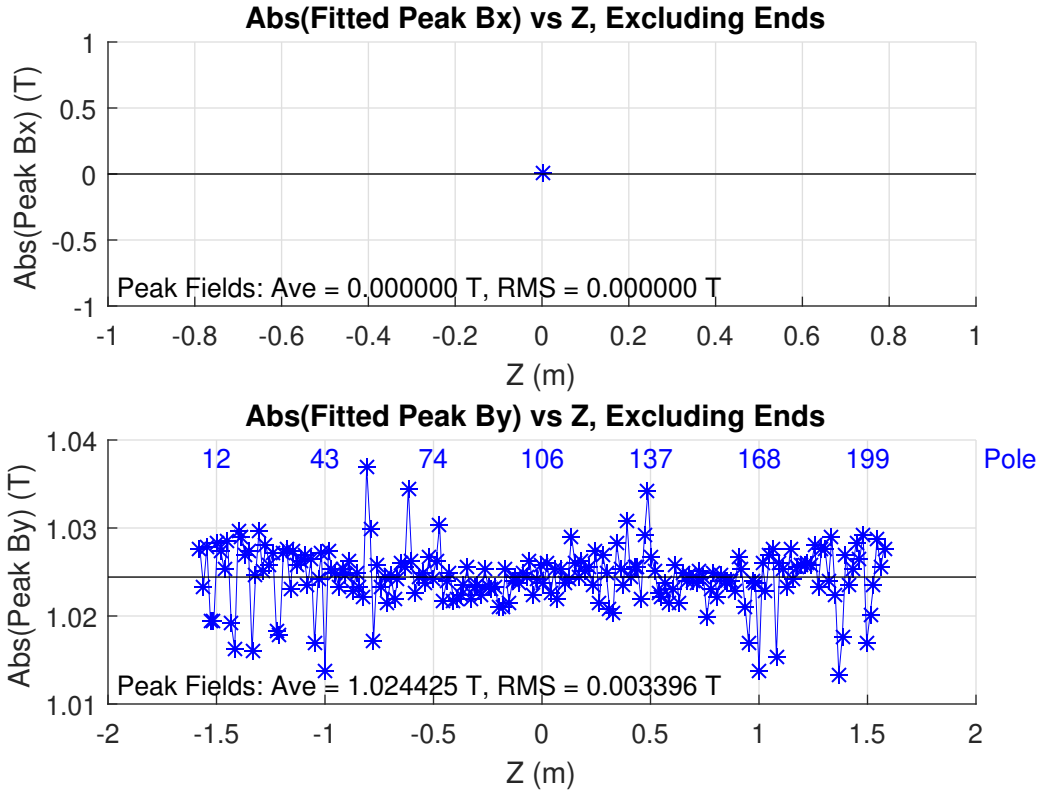
SLAC Magnetic Measurements

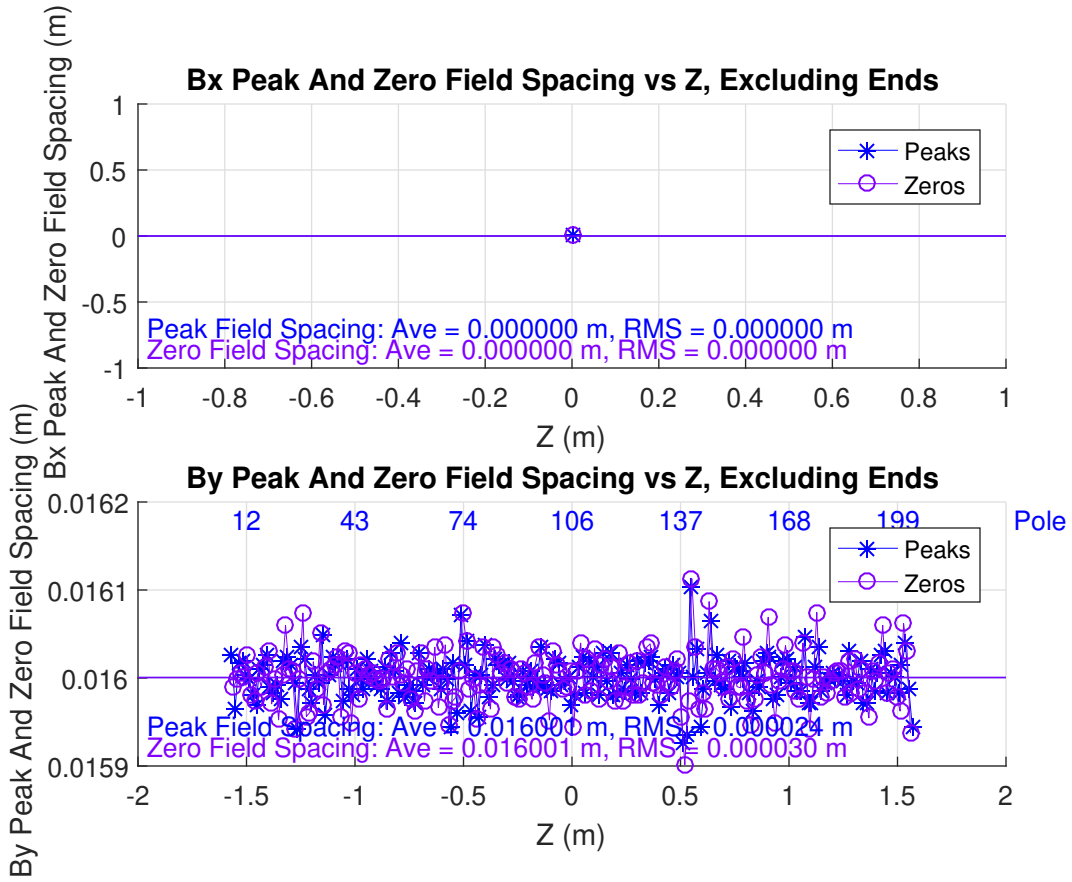
Planar Insertion Device Analysis

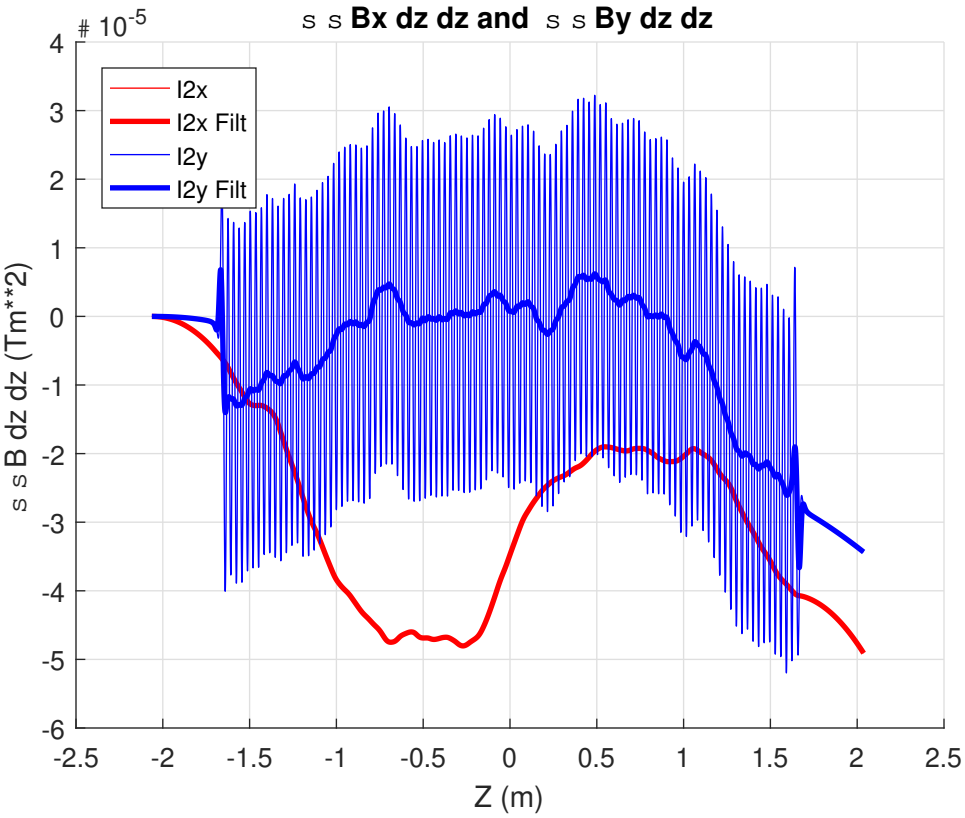
Parameters:
INPUT-FILE-DIR =S:\MagData\LCLS2\Undulator\HXU-32\DATASET0001\Fine Tuning\Z Scans\Run 069\
INPUT-FILE-NAME =x+00000-y+000-bscanz.dat
INPUT-FILE-TYPE =ZVXYBXYH
CORR-REQUIRED =0
GAMMA =7827.79
NOM-LAMBDA-U =0.032
NOM-K-VALUE =3.0531
NOM-LAMBDA-R =1.4781e-09
NUM-POLES =210
NUM-END-POLES =6
CELL-LENGTH =4.4

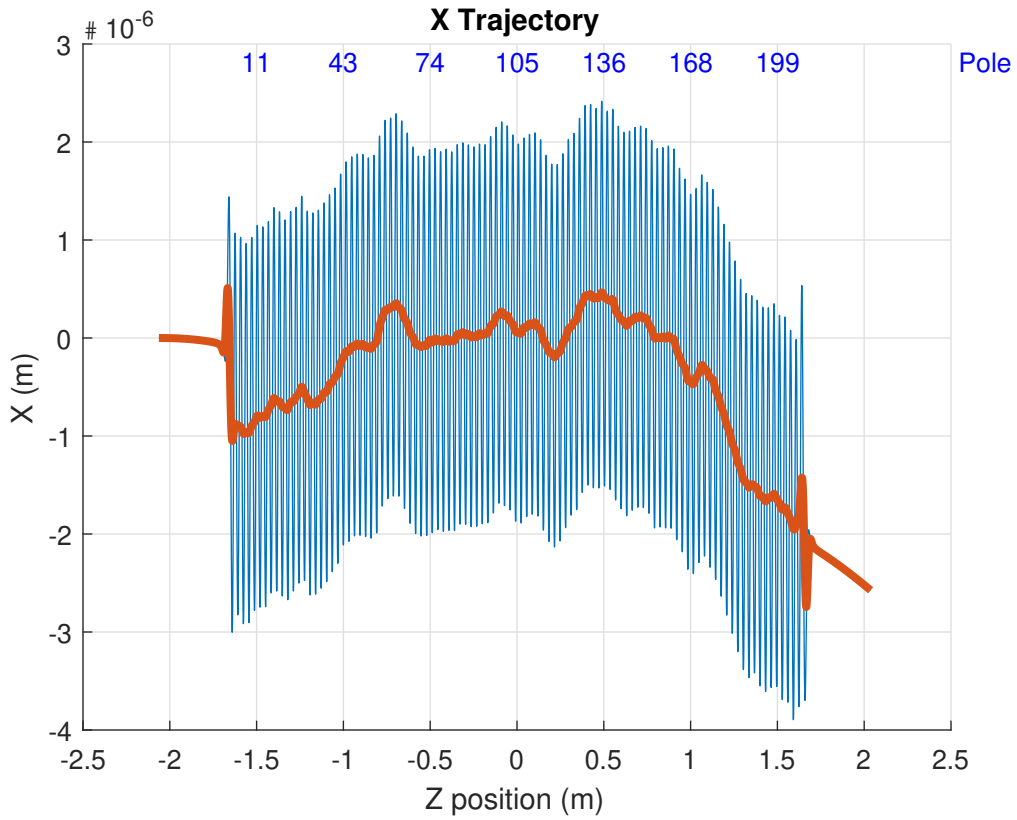

Bx, By vs Zm
10^-3
Bx (T)
By (T)
Zm Measurement Position (m)
4
2
0
-2
-4
1
-1
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0

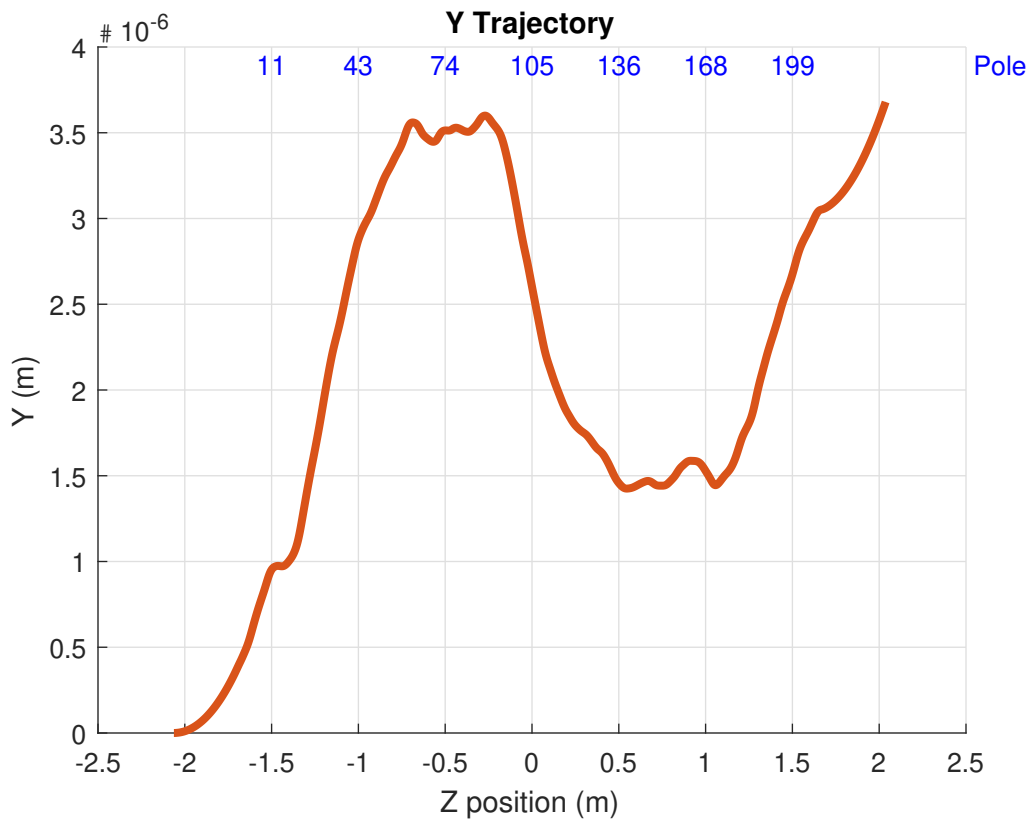

Bx vs Z With Fitted Peaks And Zeros
10^-3
Bx (T)
Z (m)
By vs Z With Fitted Peaks And Zeros
12
43
74
106
137
168
199
Pole
By (T)
Z (m)

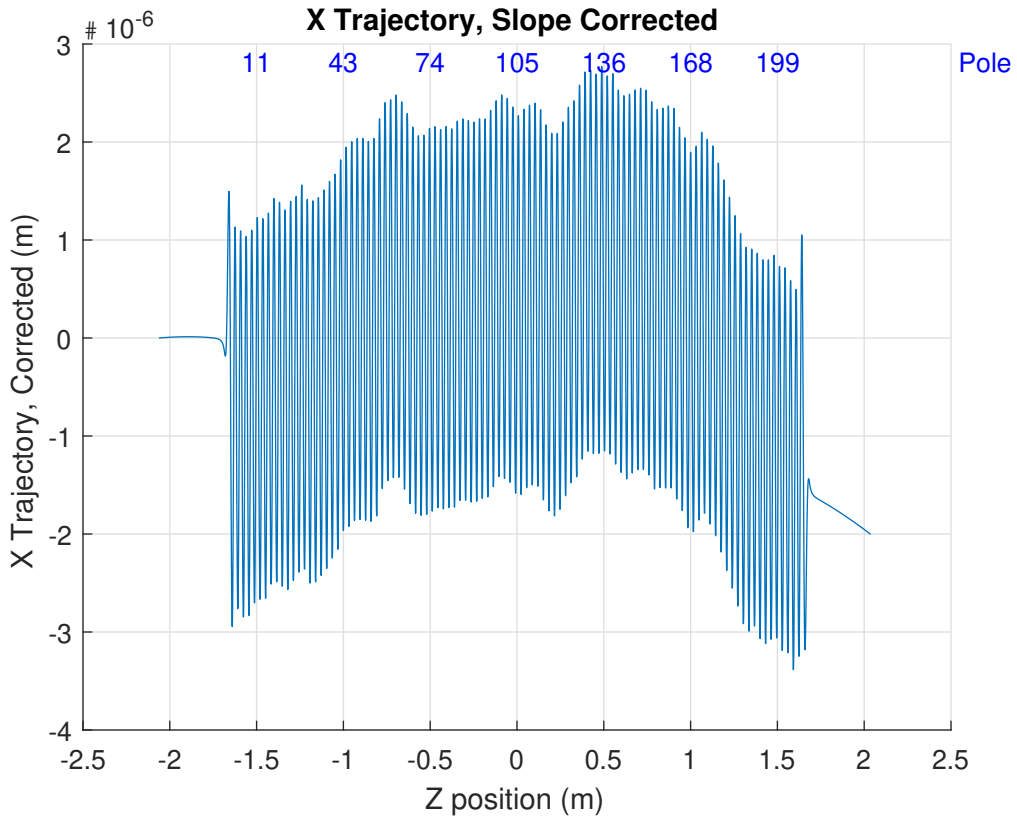

Abs(Fitted Peak Bx) vs Z, Excluding Ends
Abs(Peak Bx) (T)
1
0.5
0
-0.5
-1
Peak Fields: Ave = 0.000000 T, RMS = 0.000000 T
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
Z (m)
Abs(Fitted Peak By) vs Z, Excluding Ends
Abs(Peak By) (T)
1.04
1.03
1.02
1.01
12
43
74
106
137
168
199
Pole
Peak Fields: Ave = 1.024425 T, RMS = 0.003396 T
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)

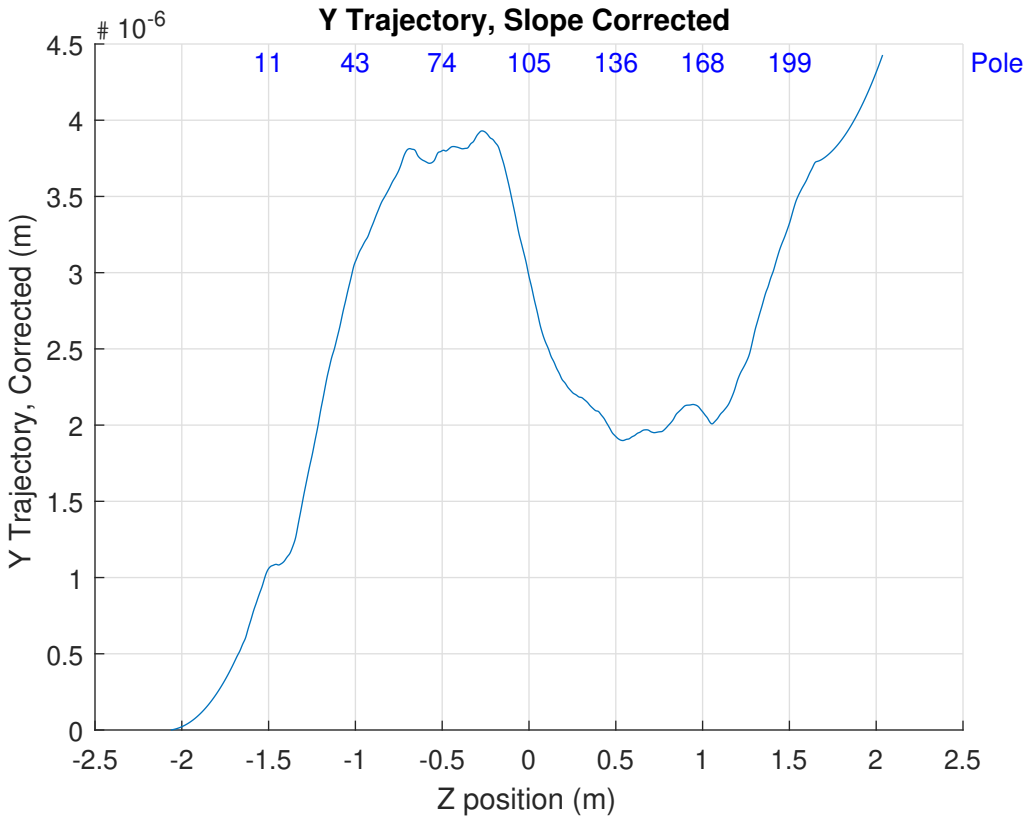

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
Peaks
Zeros
Peak Field Spacing: Ave = 0.000000 m, RMS = 0.000000 m
Zero Field Spacing: Ave = 0.000000 m, RMS = 0.000000 m
Z (m)
By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
12
43
74
106
137
168
199
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.016000 m, RMS = 0.000024 m
Zero Field Spacing: Ave = 0.016001 m, RMS = 0.000030 m
Z (m)

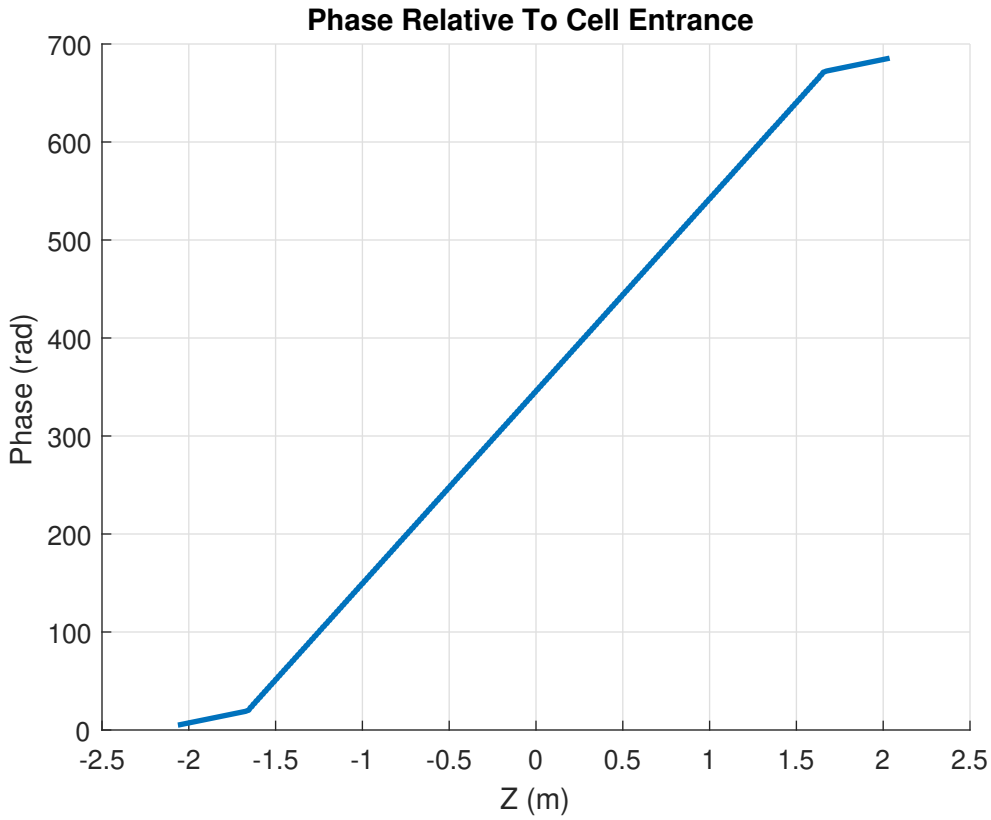

∫∫ Bx dz dz and ∫∫ By dz dz
10^-5
I2x
I2x Filt
I2y
I2y Filt
∫∫ B dz dz (Tm**2)
Z (m)
4
3
2
1
0
-1
-2
-3
-4
-5
-6
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5

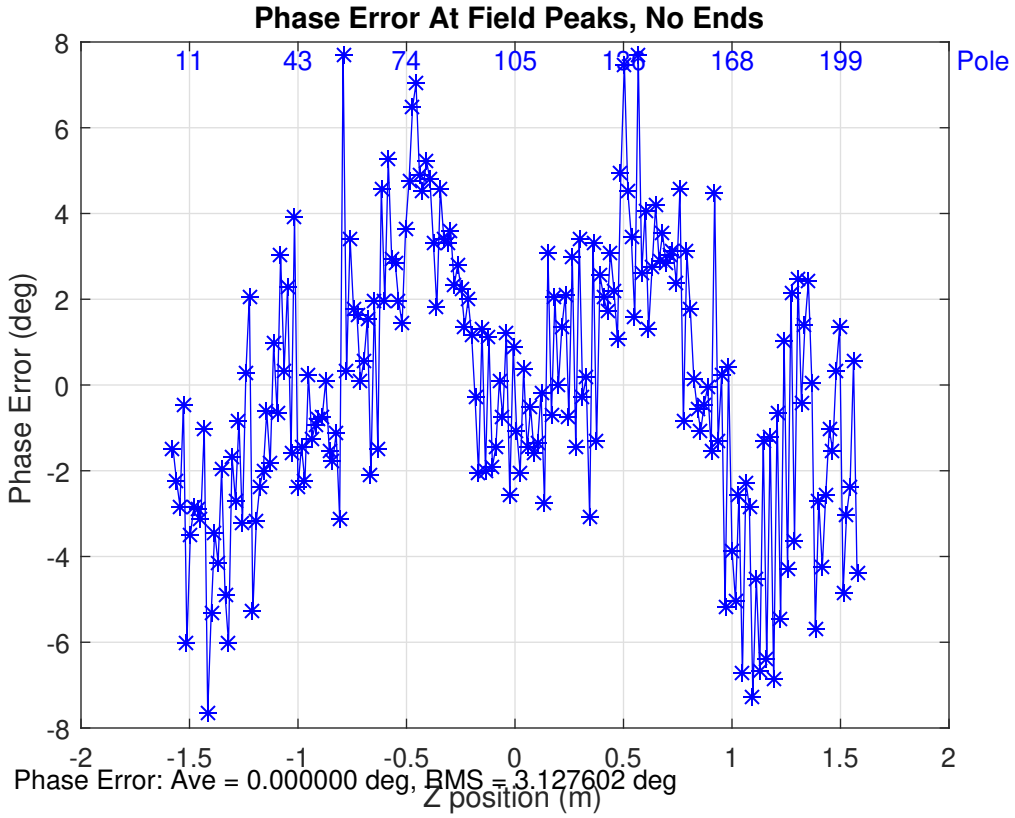

X Trajectory
10^-6
11
43
74
105
136
168
199
Pole
3
2
1
0
-1
-2
-3
-4
X (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)

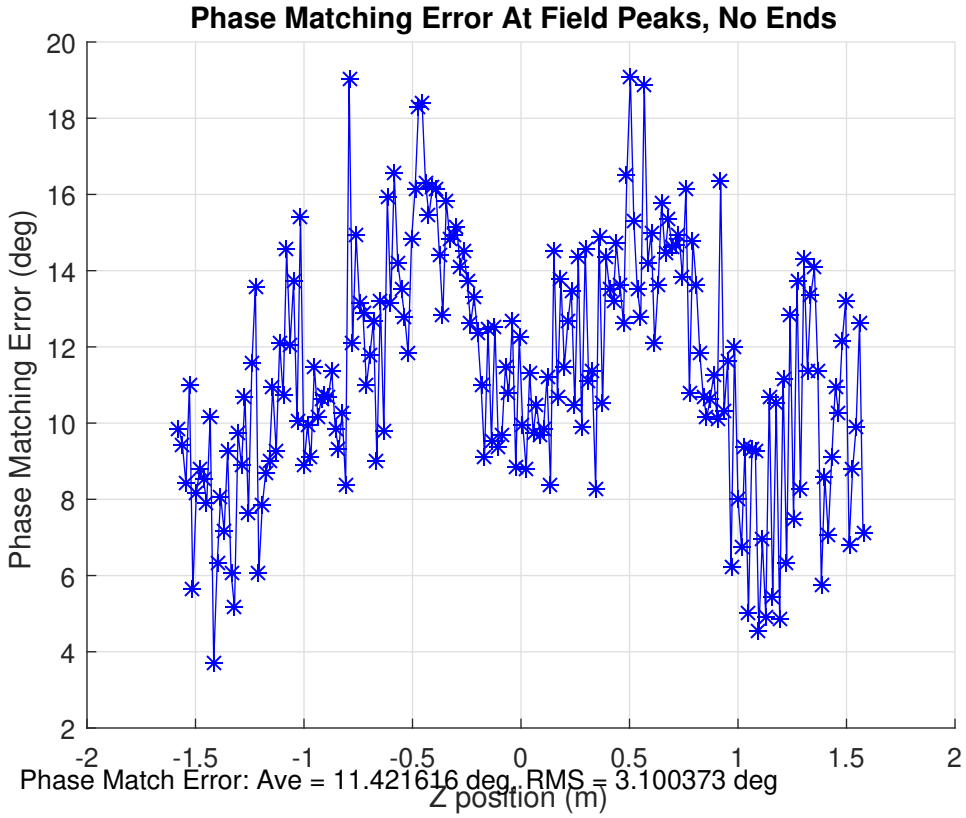

Y Trajectory
10^-6
11
43
74
105
136
168
199
Pole
4
3.5
3
2.5
2
1.5
1
0.5
0
Y (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)


X Trajectory, Slope Corrected
10^-6
11
43
74
105
136
168
199
Pole
X Trajectory, Corrected (m)
Z position (m)
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
11
43
74
105
136
168
199
Pole
Y Trajectory, Corrected (m)
Z position (m)
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


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


Phase Error At Field Peaks, No Ends
11
43
74
105
136
168
199
Pole
8
6
4
2
0
-2
-4
-6
-8
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Phase Error (deg)
Phase Error: Ave = 0.000000 deg, RMS = 3.127602 deg
Z position (m)


Phase Matching Error At Field Peaks, No Ends
Phase Matching Error (deg)
20
18
16
14
12
10
8
6
4
2
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Phase Match Error: Ave = 11.421616 deg, RMS = 3.100373 deg
Z position (m)