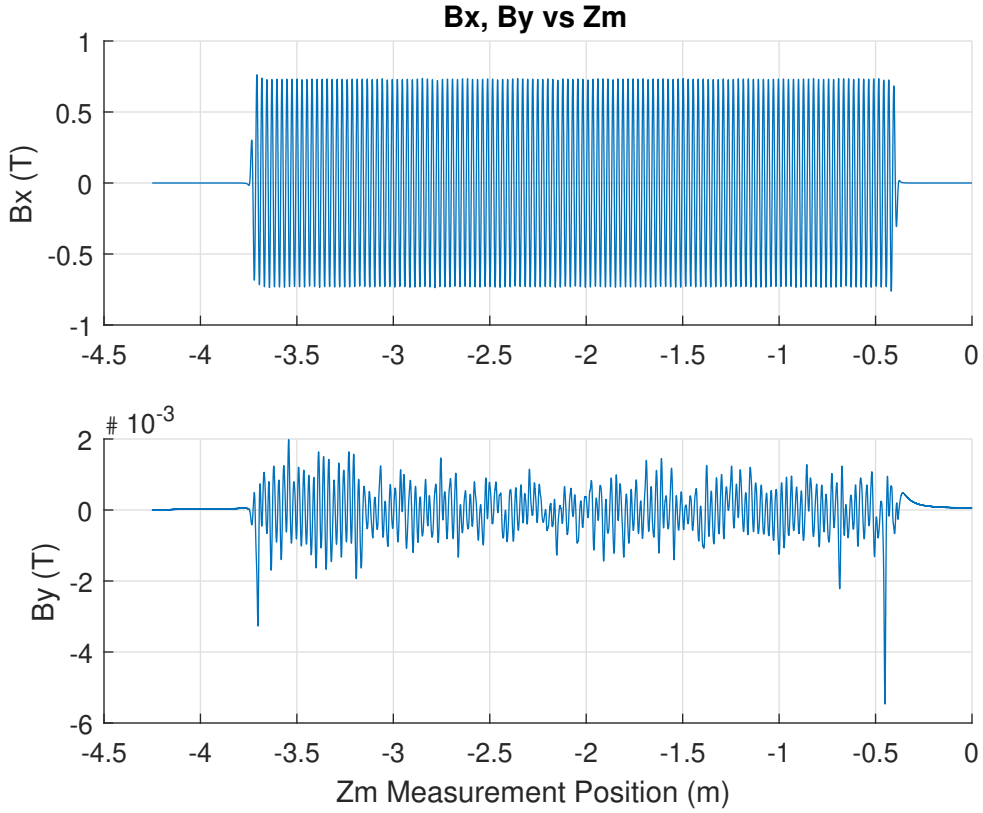
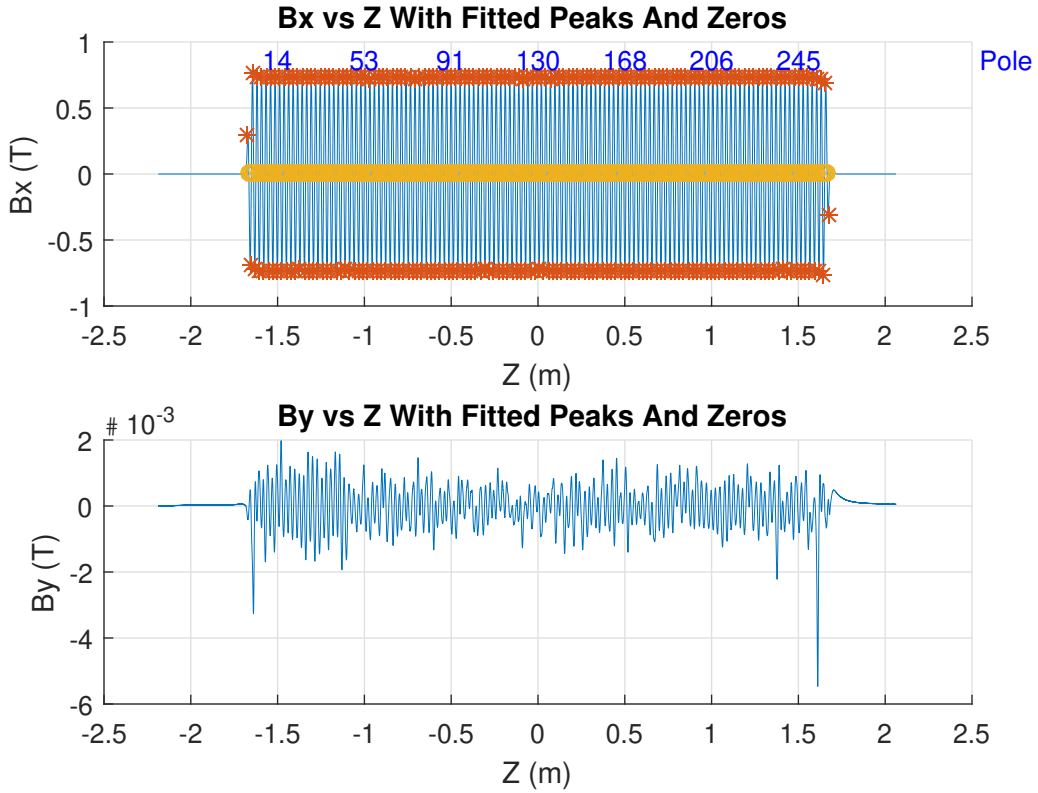
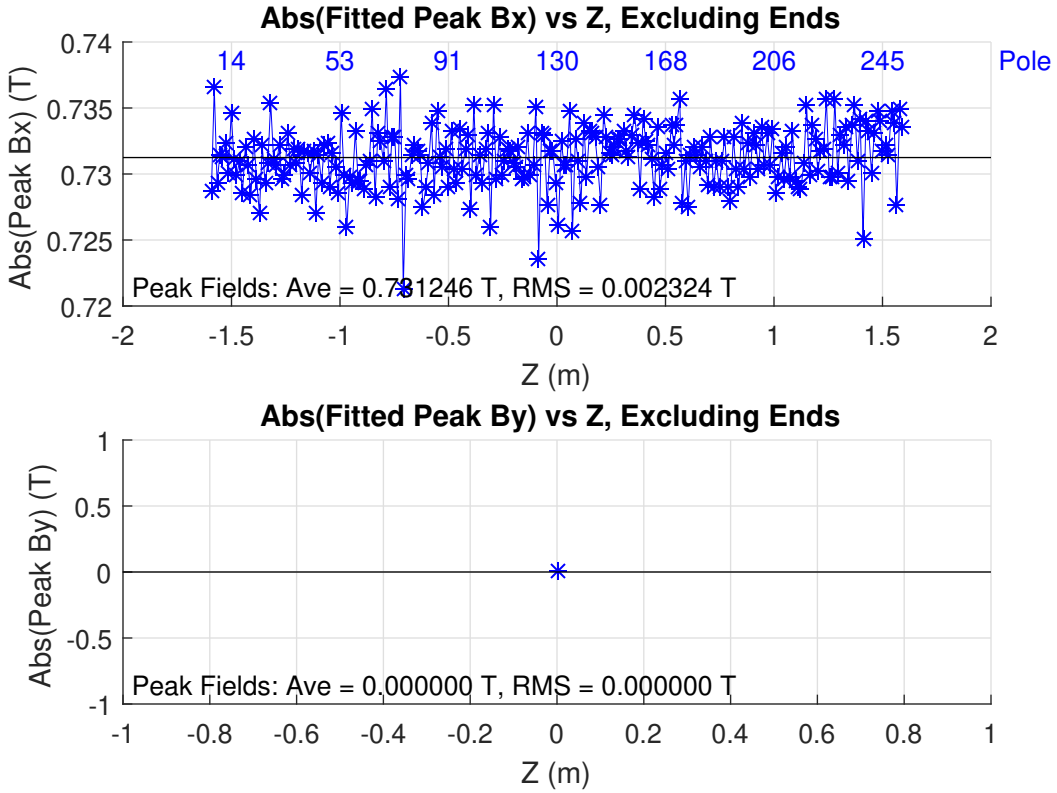
SLAC Magnetic Measurements

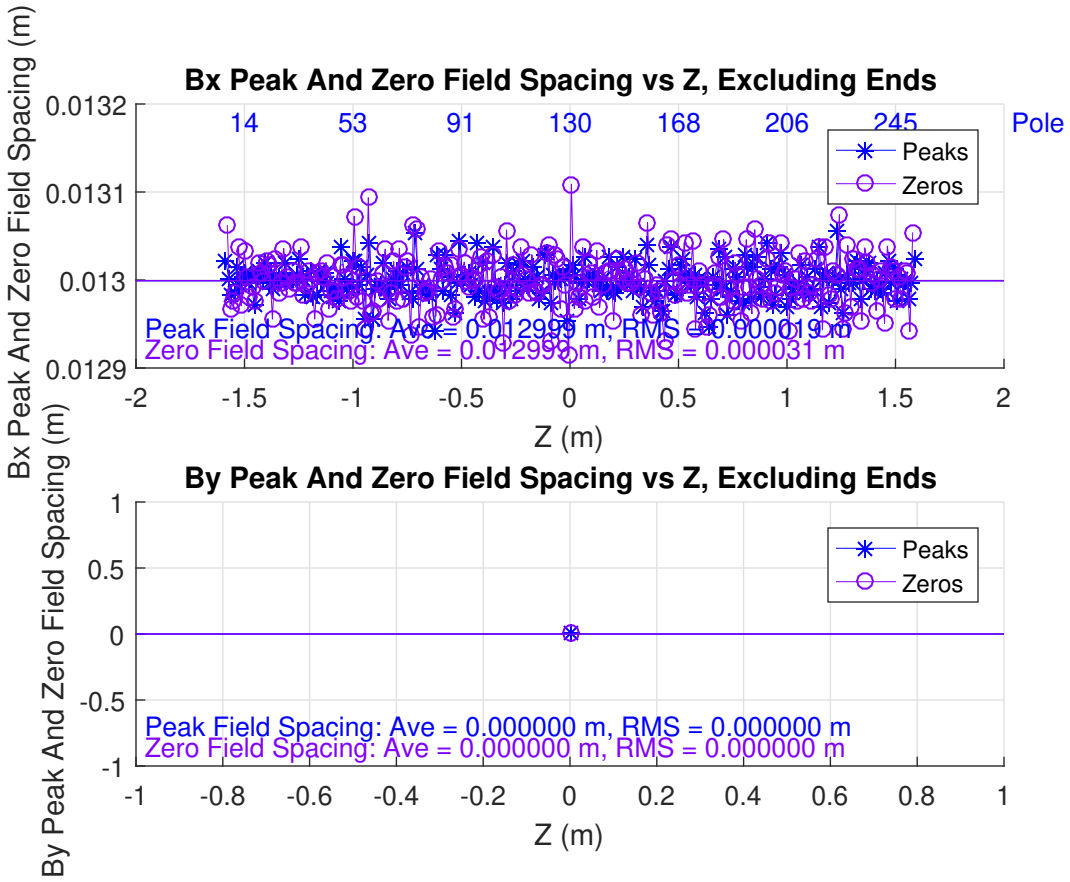
Planar Insertion Device Analysis

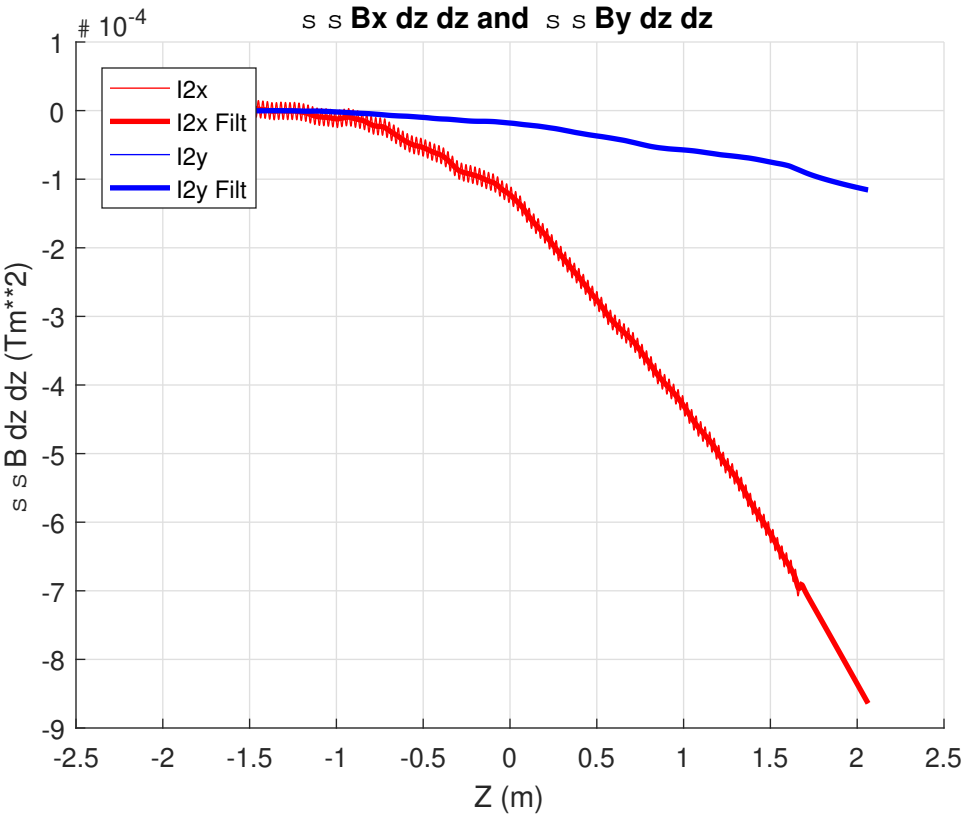
Parameters:
INPUT-FILE-DIR =S:\MagData\LCLS2\Undulator\HGVPU\DATASET0001\Fine Tuning\Z Scans\Run 057\
INPUT-FILE-NAME =x+00000-y+000-bscanz.dat
INPUT-FILE-TYPE =ZVXYBXYH
CORR-REQUIRED =0
GAMMA =26689
NOM-LAMBDA-U =0.026
NOM-K-VALUE =3.5
NOM-LAMBDA-R =1.3004e-10
NUM-POLES =258
NUM-END-POLES =6
CELL-LENGTH =3.656

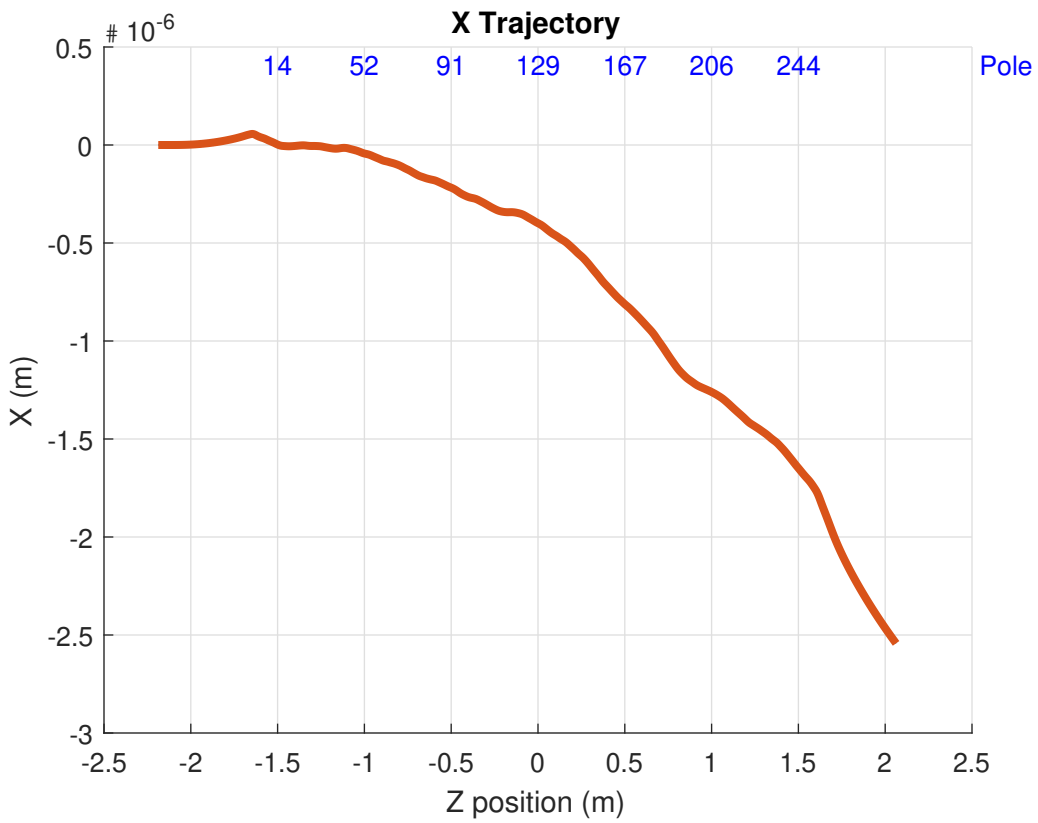

Bx, By vs Zm
Bx (T)
1
0.5
0
-0.5
-1
-4.5
-4
-3.5
-3
-2.5
-2
-1.5
-1
-0.5
0
10^-3
By (T)
2
0
-2
-4
-6
Zm Measurement Position (m)

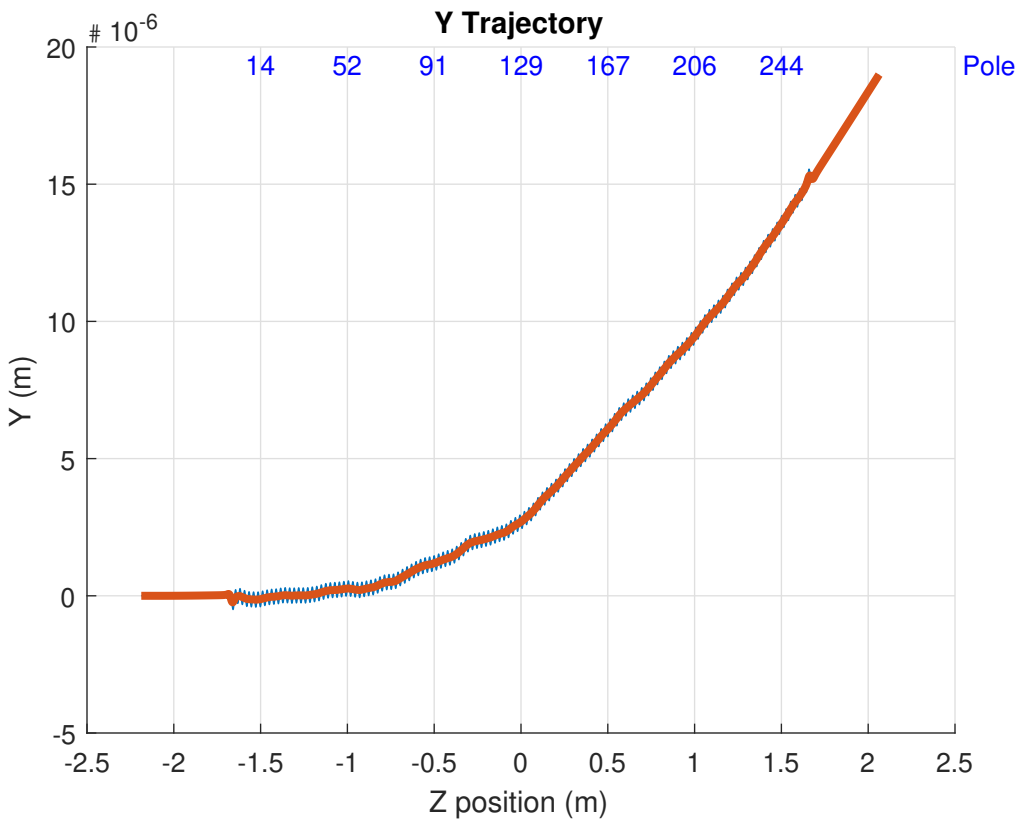

Bx vs Z With Fitted Peaks And Zeros
14
53
91
130
168
206
245
Pole
Bx (T)
Z (m)
10^-3
By vs Z With Fitted Peaks And Zeros
By (T)
Z (m)

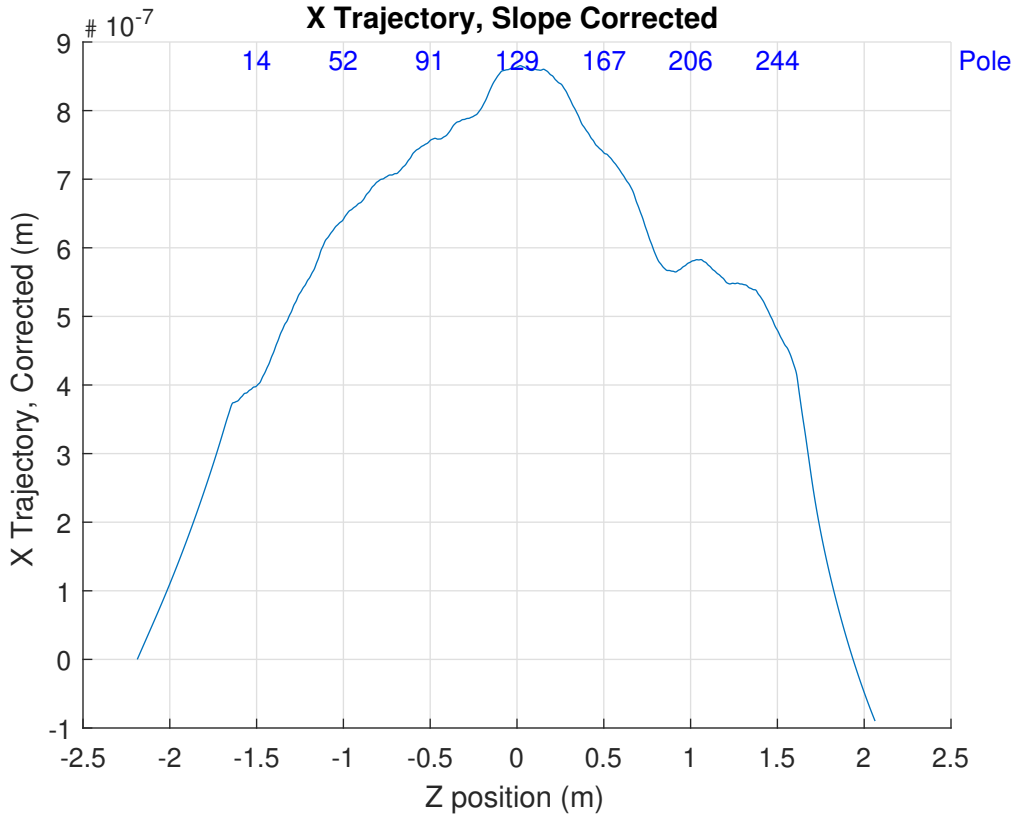

Abs(Fitted Peak Bx) vs Z, Excluding Ends
14
53
91
130
168
206
245
Pole
Abs(Peak Bx) (T)
0.74
0.735
0.73
0.725
0.72
Peak Fields: Ave = 0.731246 T, RMS = 0.002324 T
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
Abs(Fitted Peak By) vs Z, Excluding Ends
Abs(Peak By) (T)
1
0.5
0
-0.5
-1
Peak Fields: Ave = 0.000000 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)

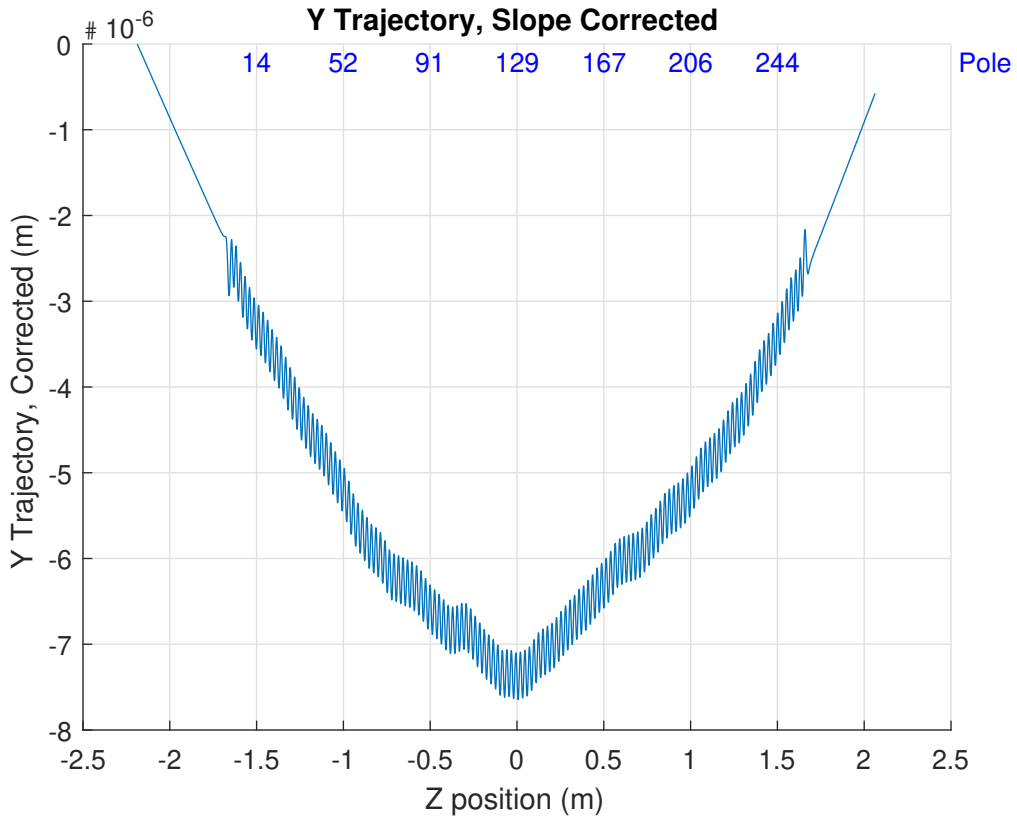

Bx Peak And Zero Field Spacing vs Z, Excluding Ends
Bx Peak And Zero Field Spacing (m)
0.0132
0.0131
0.013
0.0129
14
53
91
130
168
206
245
Pole
Peaks
Zeros
Peak Field Spacing: Ave = 0.012995 m, RMS = 0.000019 m
Zero Field Spacing: Ave = 0.012995 m, RMS = 0.000031 m
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z (m)
By Peak And Zero Field Spacing vs Z, Excluding Ends
By Peak And Zero Field Spacing (m)
1
0.5
0
-0.5
-1
Peaks
Zeros
Peak Field Spacing: Ave = 0.000000 m, RMS = 0.000000 m
Zero Field Spacing: Ave = 0.000000 m, RMS = 0.000000 m
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
Z (m)

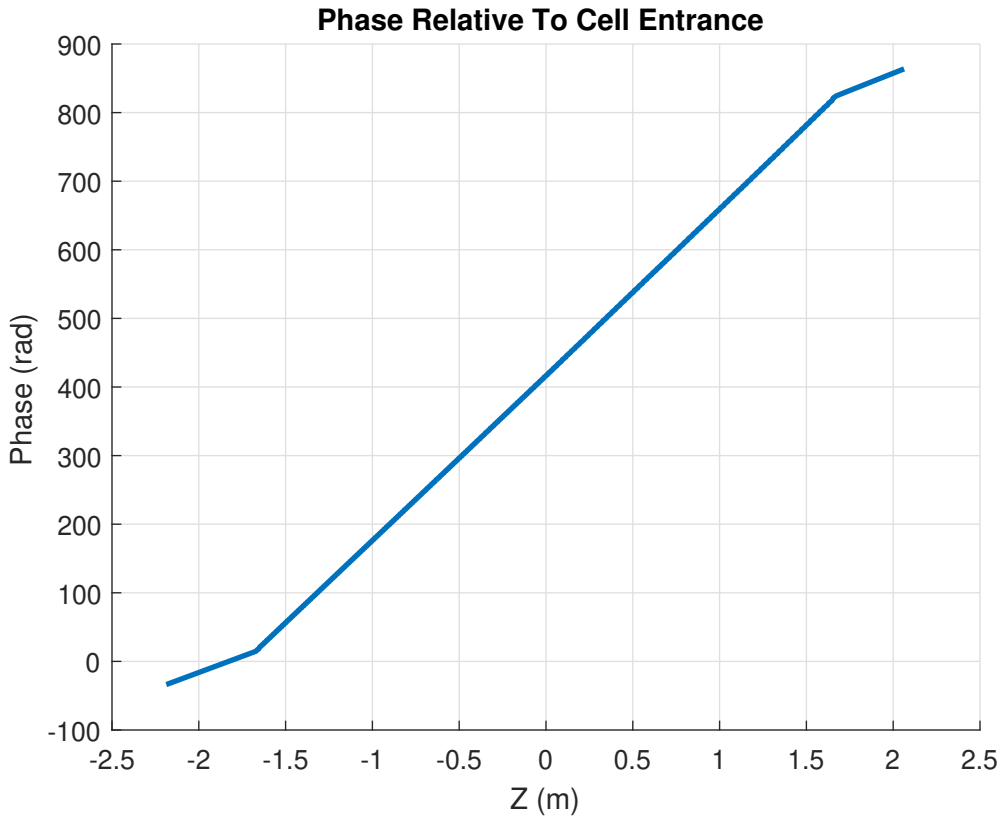

∫∫ Bx dz dz and ∫∫ By dz dz
10^-4
I2x
I2x Filt
I2y
I2y Filt
∫∫B dz dz (Tm**2)
Z (m)
1
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5

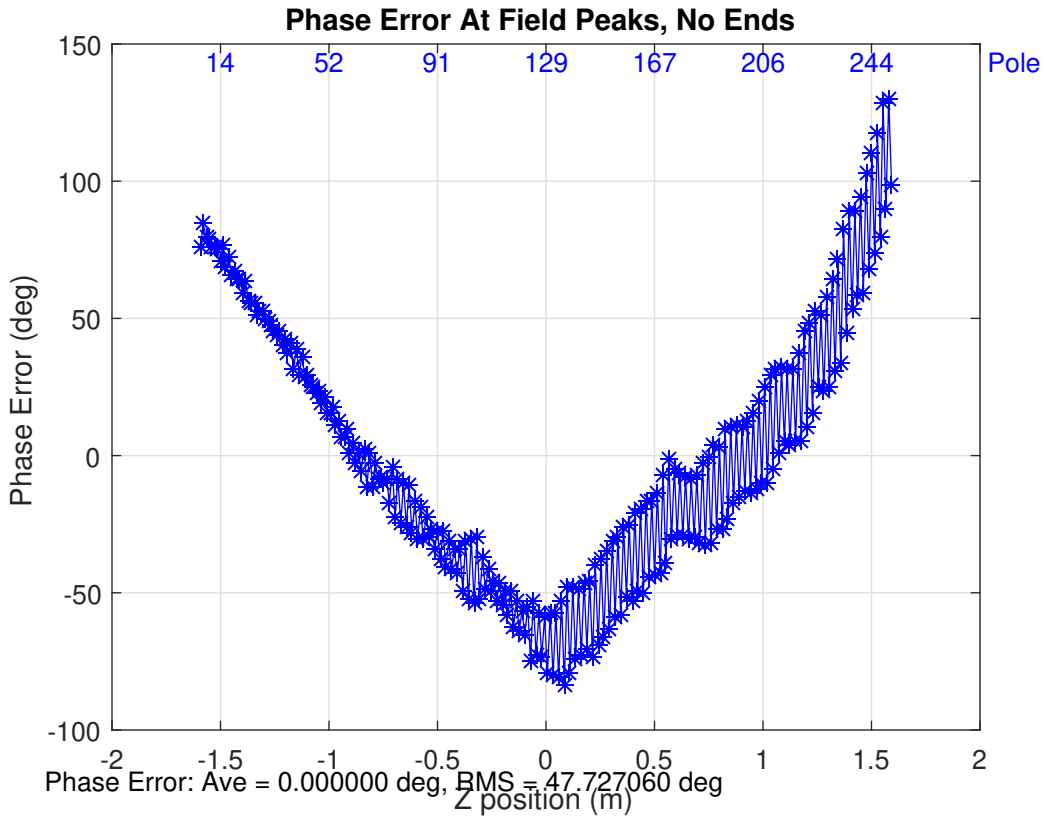

X Trajectory
10^-6
14
52
91
129
167
206
244
Pole
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
X (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)

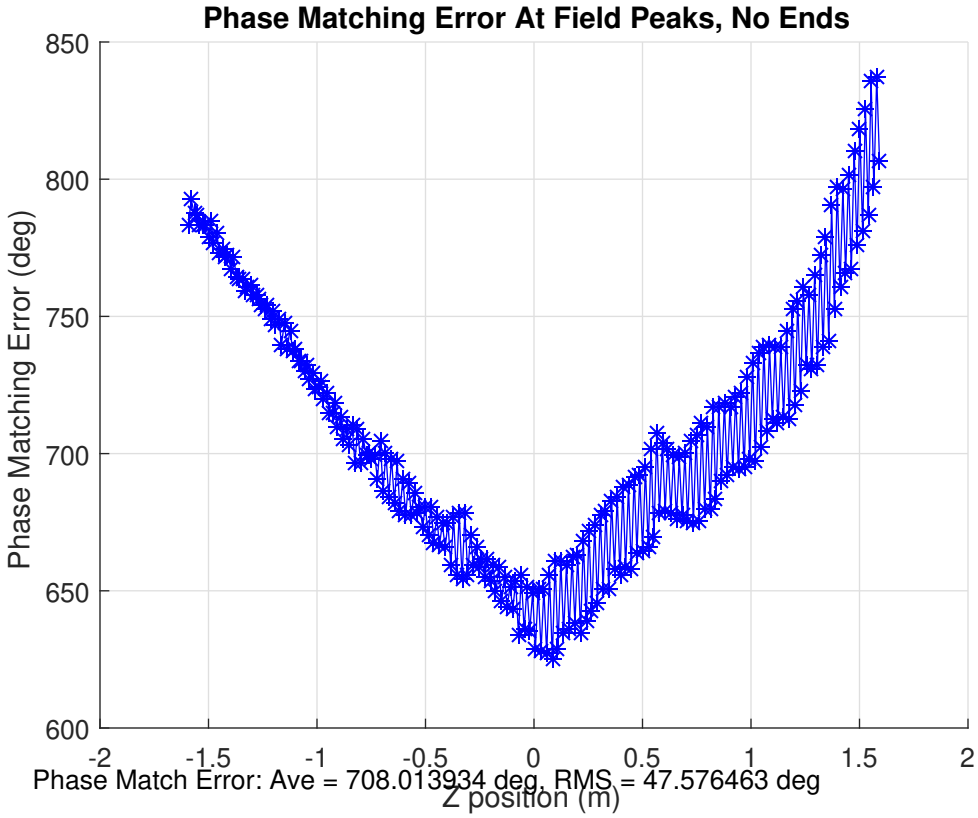

Y Trajectory
10^-6
14
52
91
129
167
206
244
Pole
20
15
10
5
0
-5
Y (m)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Z position (m)

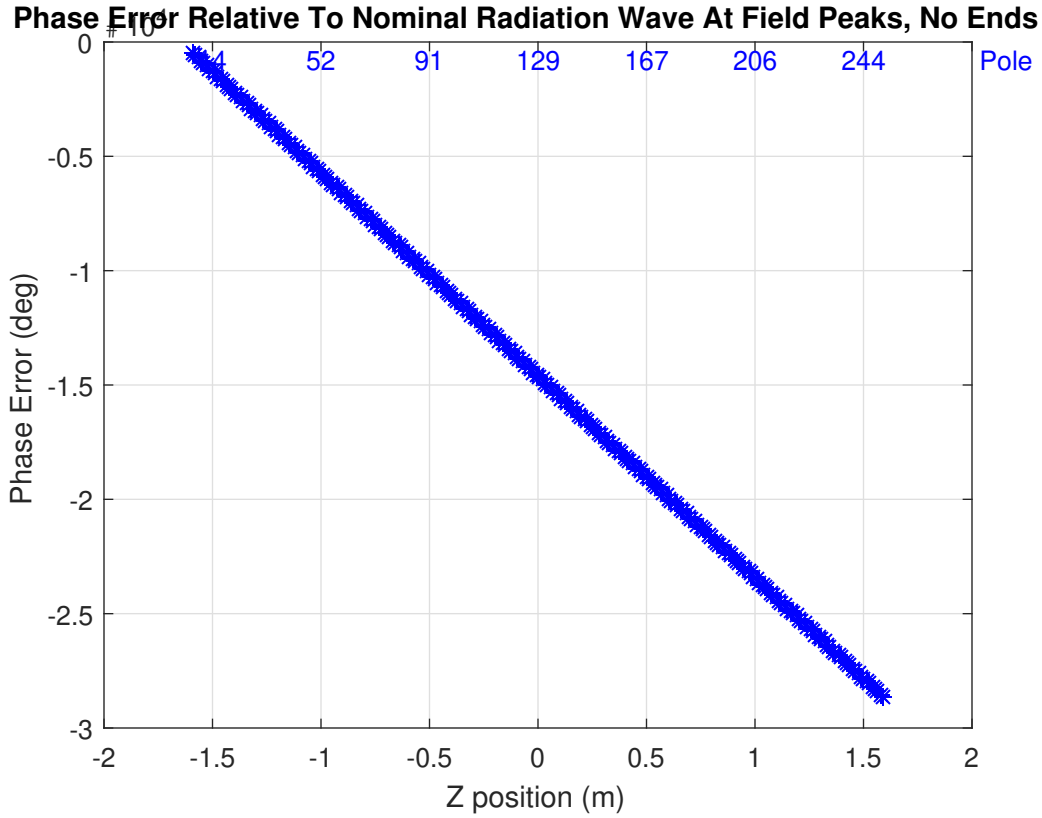

X Trajectory, Slope Corrected
10^-7
14
52
91
129
167
206
244
Pole
X Trajectory, Corrected (m)
Z position (m)
9
8
7
6
5
4
3
2
1
0
-1
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5


Y Trajectory, Slope Corrected
10^-6
14
52
91
129
167
206
244
Pole
0
-1
-2
-3
-4
-5
-6
-7
-8
Y Trajectory, Corrected (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
900
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 At Field Peaks, No Ends
14
52
91
129
167
206
244
Pole
150
100
50
0
-50
-100
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Phase Error (deg)
Phase Error: Ave = 0.000000 deg, RMS = 47.727060 deg
Z position (m)


Phase Matching Error At Field Peaks, No Ends
Phase Matching Error (deg)
850
800
750
700
650
600
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Phase Match Error: Ave = 708.013934 deg, RMS = 47.576463 deg
Z position (m)


Phase Error Relative To Nominal Radiation Wave At Field Peaks, No Ends
#10
0
-0.5
-1
-1.5
-2
-2.5
-3
Phase Error (deg)
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
Z position (m)
52
91
129
167
206
244
Pole