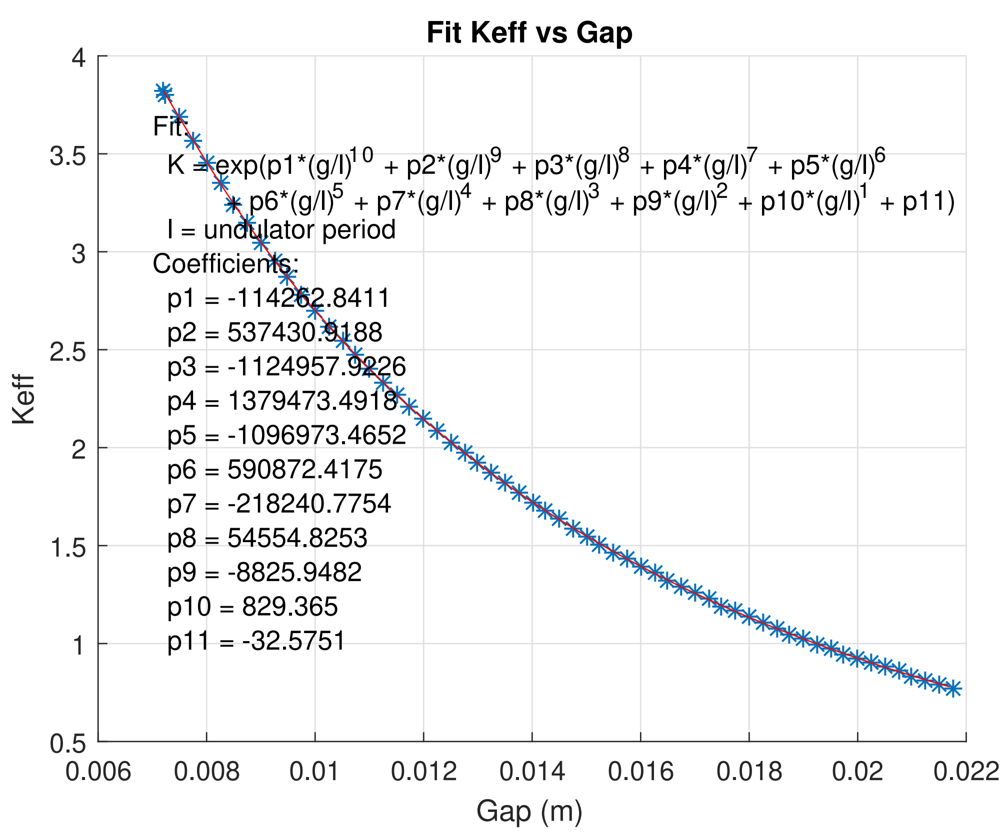
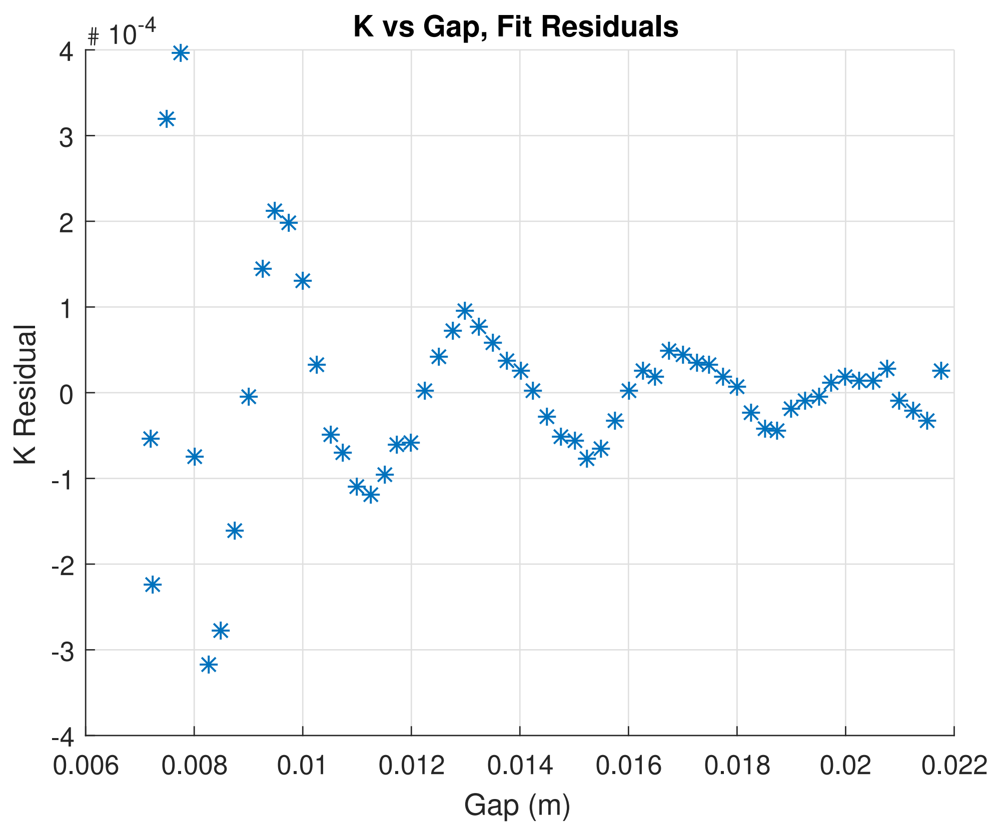
SLAC Magnetic Measurements
Undulator Analysis Comparison

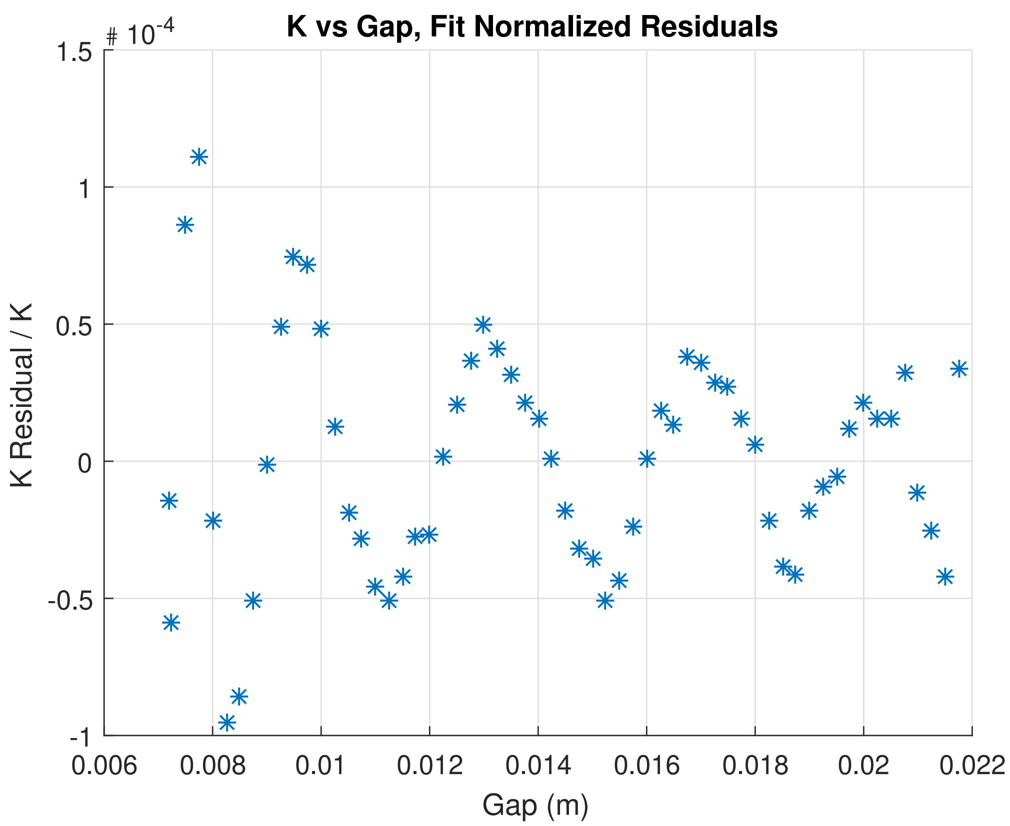
Title:
Fit K Study

Input Files:
1) S:\MagData\DUMMY\Undulator\HXU-32\DATASET0001\Tuning\Z Scans\Run 018\Gap100p000x+0p00y+0p00\pid_anal.mat
2) S:\MagData\DUMMY\Undulator\HXU-32\DATASET0001\Tuning\Z Scans\Run 018\Gap10p000x+0p00y+0p00\pid_anal.mat
3) S:\MagData\DUMMY\Undulator\HXU-32\DATASET0001\Tuning\Z Scans\Run 018\Gap10p250x+0p00y+0p00\pid_anal.mat
4) S:\MagData\DUMMY\Undulator\HXU-32\DATASET0001\Tuning\Z Scans\Run 018\Gap10p500x+0p00y+0p00\pid_anal.mat
5) S:\MagData\DUMMY\Undulator\HXU-32\DATASET0001\Tuning\Z Scans\Run 018\Gap10p750x+0p00y+0p00\pid_anal.mat
6) S:\MagData\DUMMY\Undulator\HXU-32\DATASET0001\Tuning\Z Scans\Run 018\Gap11p000x+0p00y+0p00\pid_anal.mat
7) S:\MagData\DUMMY\Undulator\HXU-32\DATASET0001\Tuning\Z Scans\Run 018\Gap11p250x+0p00y+0p00\pid_anal.mat
8) S:\MagData\DUMMY\Undulator\HXU-32\DATASET0001\Tuning\Z Scans\Run 018\Gap11p500x+0p00y+0p00\pid_anal.mat
9) S:\MagData\DUMMY\Undulator\HXU-32\DATASET0001\Tuning\Z Scans\Run 018\Gap11p750x+0p00y+0p00\pid_anal.mat
10) S:\MagData\DUMMY\Undulator\HXU-32\DATASET0001\Tuning\Z Scans\Run 018\Gap12p000x+0p00y+0p00\pid_anal.mat
11) S:\MagData\DUMMY\Undulator\HXU-32\DATASET0001\Tuning\Z Scans\Run 018\Gap12p250x+0p00y+0p00\pid_anal.mat
12) S:\MagData\DUMMY\Undulator\HXU-32\DATASET0001\Tuning\Z Scans\Run 018\Gap12p500x+0p00y+0p00\pid_anal.mat
13) S:\MagData\DUMMY\Undulator\HXU-32\DATASET0001\Tuning\Z Scans\Run 018\Gap12p750x+0p00y+0p00\pid_anal.mat
14) S:\MagData\DUMMY\Undulator\HXU-32\DATASET0001\Tuning\Z Scans\Run 018\Gap13p000x+0p00y+0p00\pid_anal.mat
15) S:\MagData\DUMMY\Undulator\HXU-32\DATASET0001\Tuning\Z Scans\Run 018\Gap13p250x+0p00y+0p00\pid_anal.mat
16) S:\MagData\DUMMY\Undulator\HXU-32\DATASET0001\Tuning\Z Scans\Run 018\Gap13p500x+0p00y+0p00\pid_anal.mat
17) S:\MagData\DUMMY\Undulator\HXU-32\DATASET0001\Tuning\Z Scans\Run 018\Gap13p750x+0p00y+0p00\pid_anal.mat
18) S:\MagData\DUMMY\Undulator\HXU-32\DATASET0001\Tuning\Z Scans\Run 018\Gap14p000x+0p00y+0p00\pid_anal.mat
19) S:\MagData\DUMMY\Undulator\HXU-32\DATASET0001\Tuning\Z Scans\Run 018\Gap14p250x+0p00y+0p00\pid_anal.mat
20) S:\MagData\DUMMY\Undulator\HXU-32\DATASET0001\Tuning\Z Scans\Run 018\Gap14p500x+0p00y+0p00\pid_anal.mat
21) S:\MagData\DUMMY\Undulator\HXU-32\DATASET0001\Tuning\Z Scans\Run 018\Gap14p750x+0p00y+0p00\pid_anal.mat
22) S:\MagData\DUMMY\Undulator\HXU-32\DATASET0001\Tuning\Z Scans\Run 018\Gap15p000x+0p00y+0p00\pid_anal.mat
23) S:\MagData\DUMMY\Undulator\HXU-32\DATASET0001\Tuning\Z Scans\Run 018\Gap15p250x+0p00y+0p00\pid_anal.mat


Fit Keff vs Gap
Fit:
K = exp(p1*(g/l)^10 + p2*(g/l)^9 + p3*(g/l)^8 + p4*(g/l)^7 + p5*(g/l)^6
+ p6*(g/l)^5 + p7*(g/l)^4 + p8*(g/l)^3 + p9*(g/l)^2 + p10*(g/l)^1 + p11)
l = undulator period
Coefficients:
p1 = -114262.8411
p2 = 537430.9188
p3 = -1124957.9226
p4 = 1379473.4918
p5 = -1096973.4652
p6 = 590872.4175
p7 = -218240.7754
p8 = 54554.8253
p9 = -8825.9482
p10 = 829.365
p11 = -32.5751
Keff
Gap (m)
4
3.5
3
2.5
2
1.5
1
0.5
0.006
0.008
0.01
0.012
0.014
0.016
0.018
0.02
0.022



K vs Gap, Fit Residuals
10-4
4
3
2
1
0
-1
-2
-3
-4
K Residual
0.006
0.008
0.01
0.012
0.014
0.016
0.018
0.02
0.022
Gap (m)


K vs Gap, Fit Normalized Residuals
10^-4
1.5
1
0.5
0
-0.5
-1
K Residual / K
0.006
0.008
0.01
0.012
0.014
0.016
0.018
0.02
0.022
Gap (m)