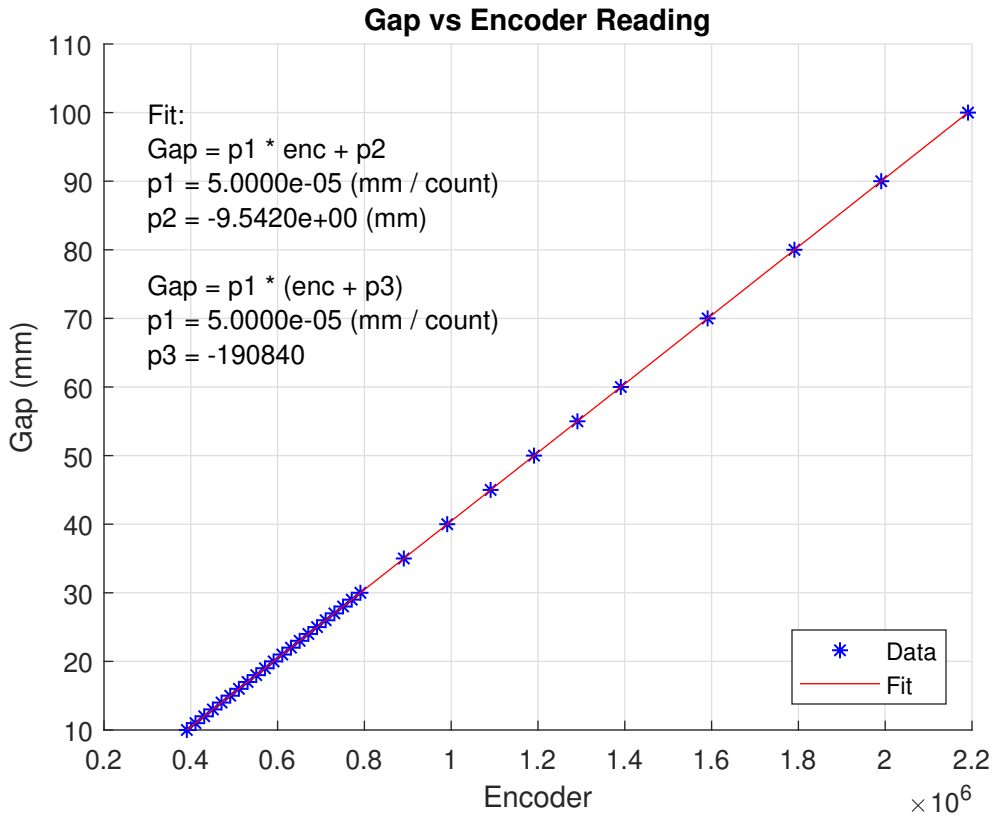
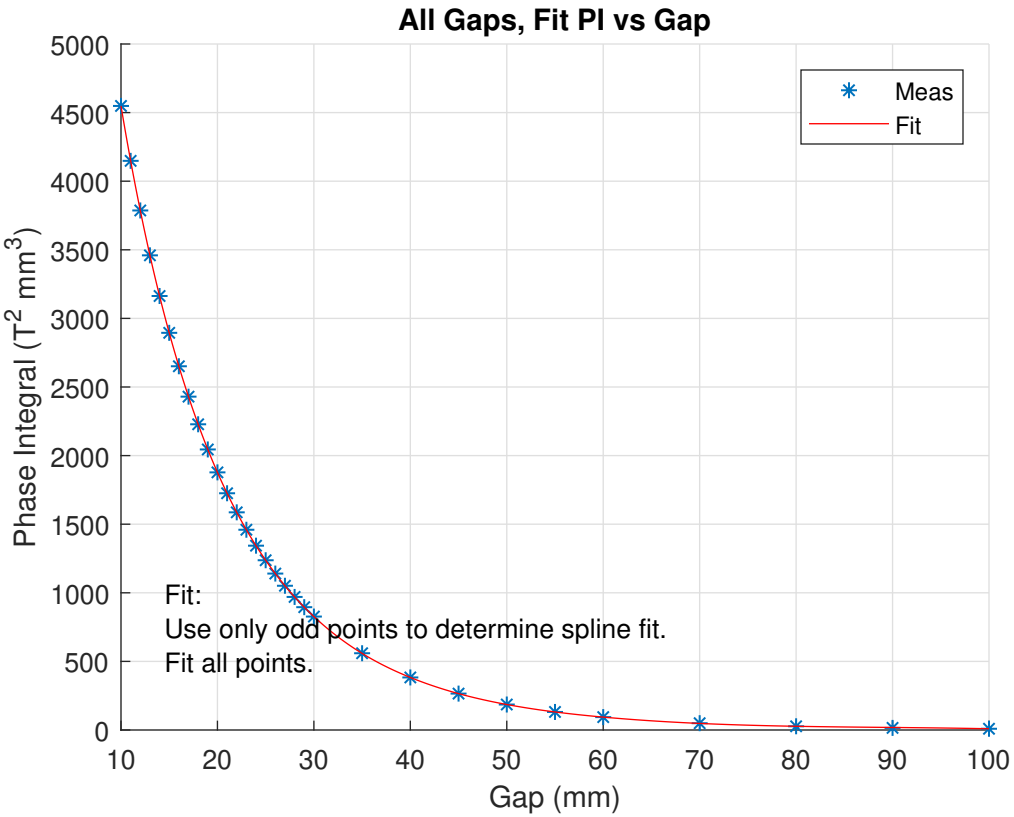
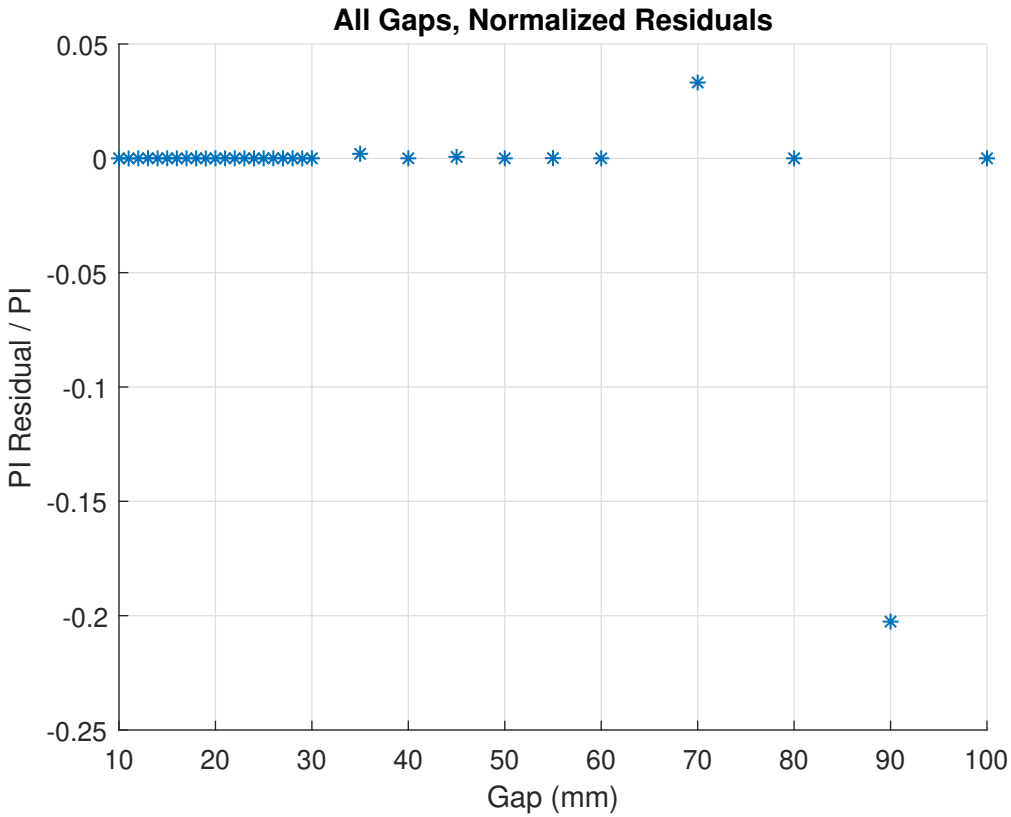
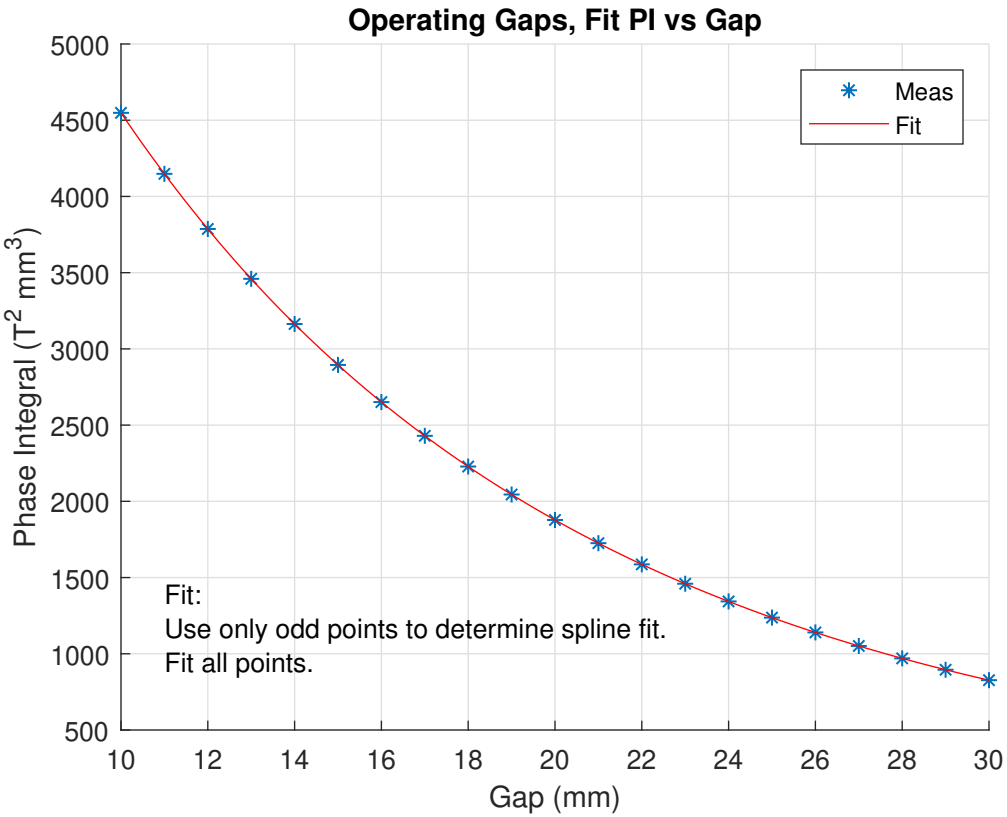
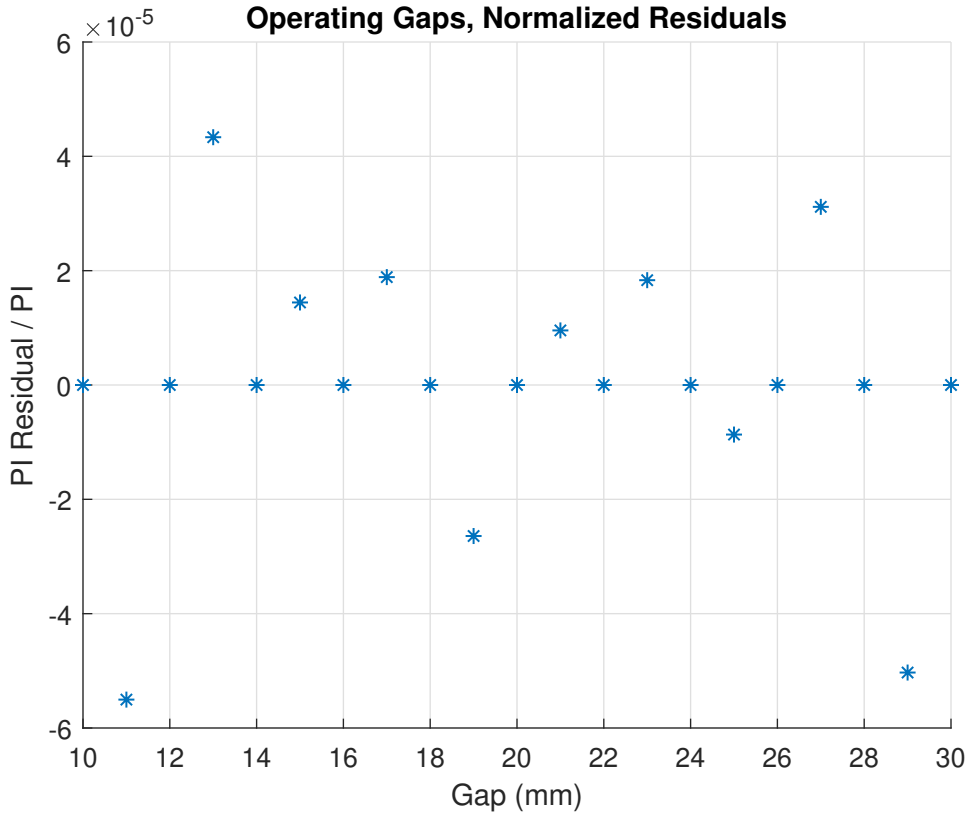
SLAC Magnetic Measurements#
Date: 11-14-2017#
Time: 14:08:48#

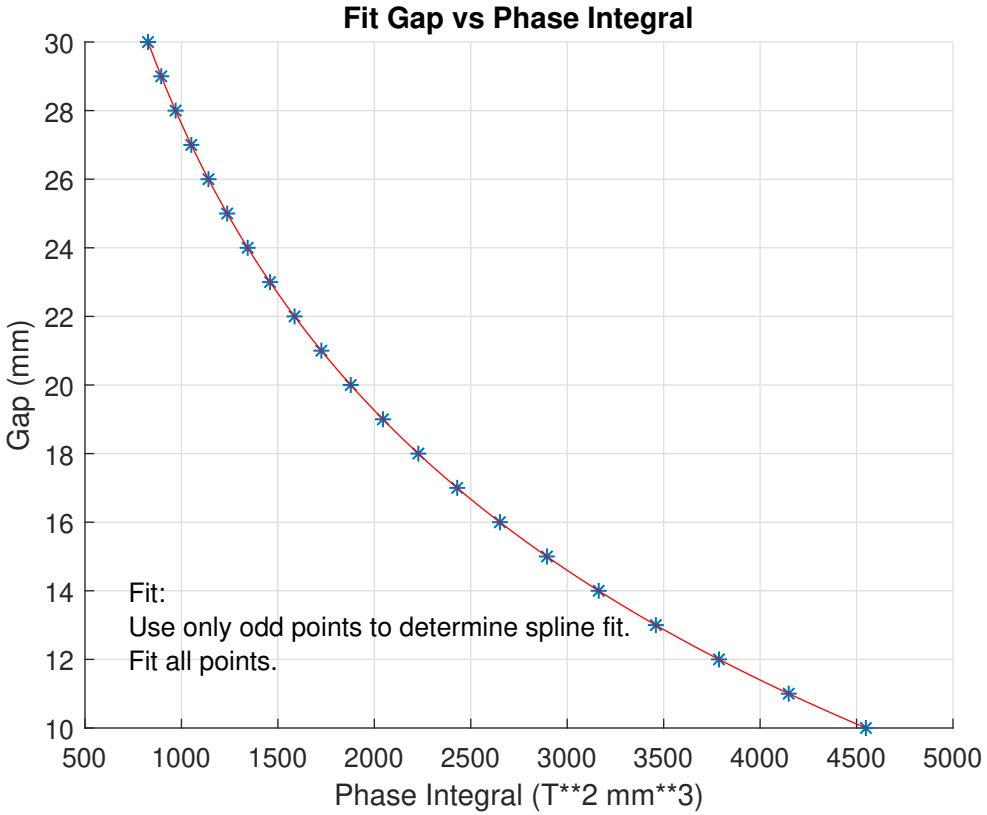

Gap vs Encoder Reading
Fit:
Gap = p1 * enc + p2
p1 = 5.0000e-05 (mm / count)
p2 = -9.5420e+00 (mm)
Gap = p1 * (enc + p3)
p1 = 5.0000e-05 (mm / count)
p3 = -190840
Data
Fit
Gap (mm)
Encoder
×10^6
110
100
90
80
70
60
50
40
30
20
10
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2

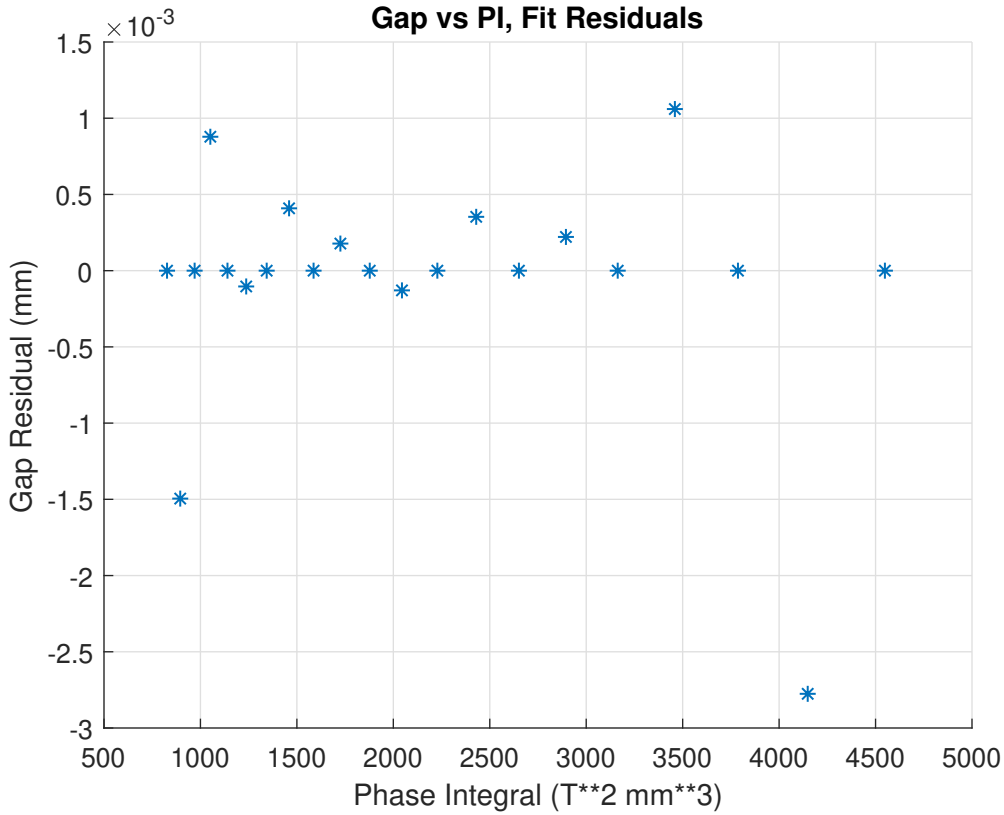

All Gaps, Fit PI vs Gap
Meas
Fit
Phase Integral (T^2 mm^3)
Gap (mm)
Fit:
Use only odd points to determine spline fit.
Fit all points.
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
10
20
30
40
50
60
70
80
90
100

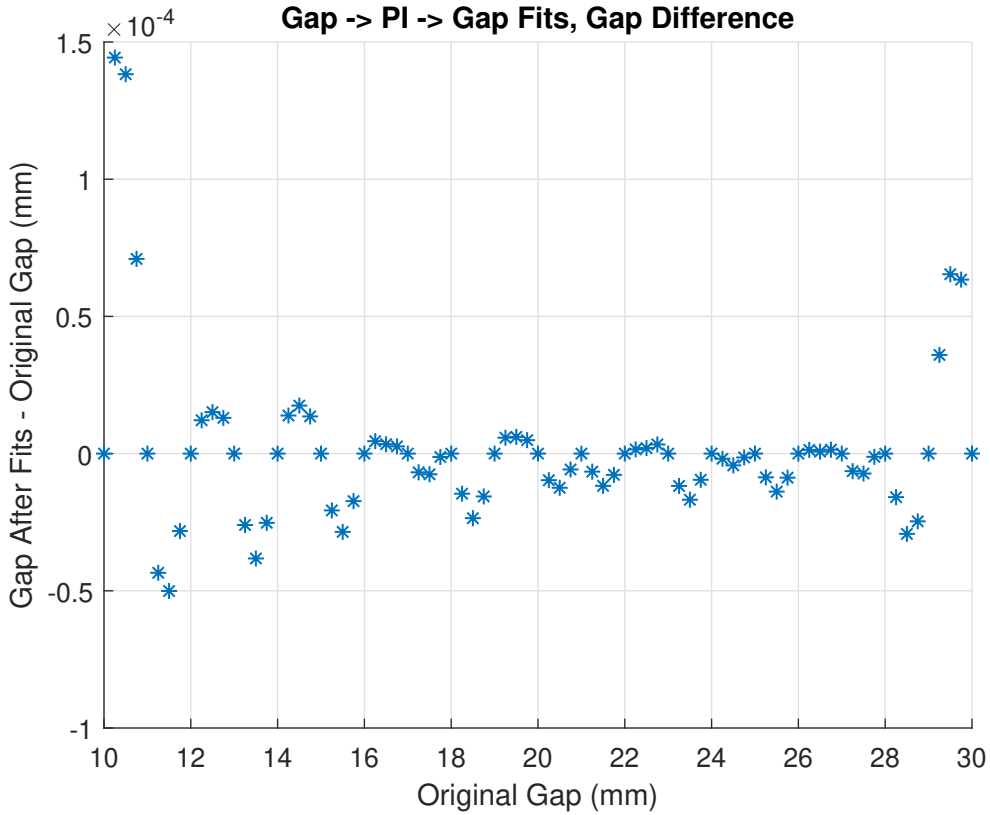

All Gaps, Normalized Residuals
PI Residual / PI
Gap (mm)
0.05
0
-0.05
-0.1
-0.15
-0.2
-0.25
10
20
30
40
50
60
70
80
90
100

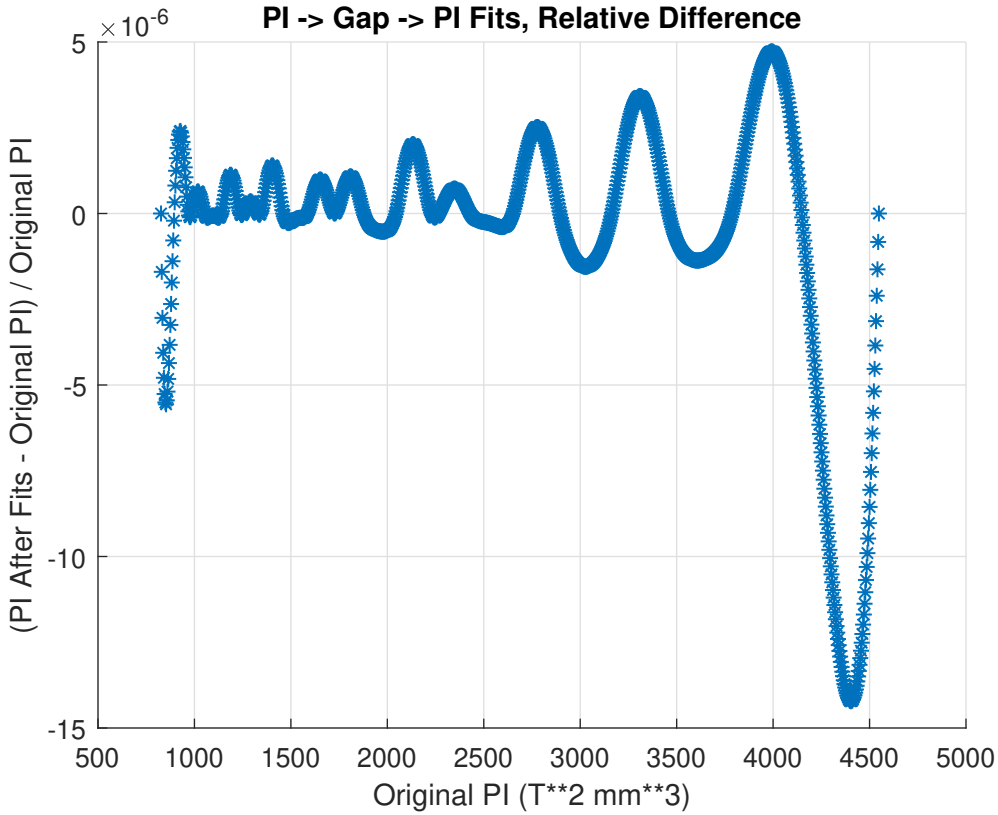

Operating Gaps, Fit PI vs Gap
Meas
Fit
Phase Integral (T^2 mm^3)
Gap (mm)
Fit:
Use only odd points to determine spline fit.
Fit all points.
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
10
12
14
16
18
20
22
24
26
28
30

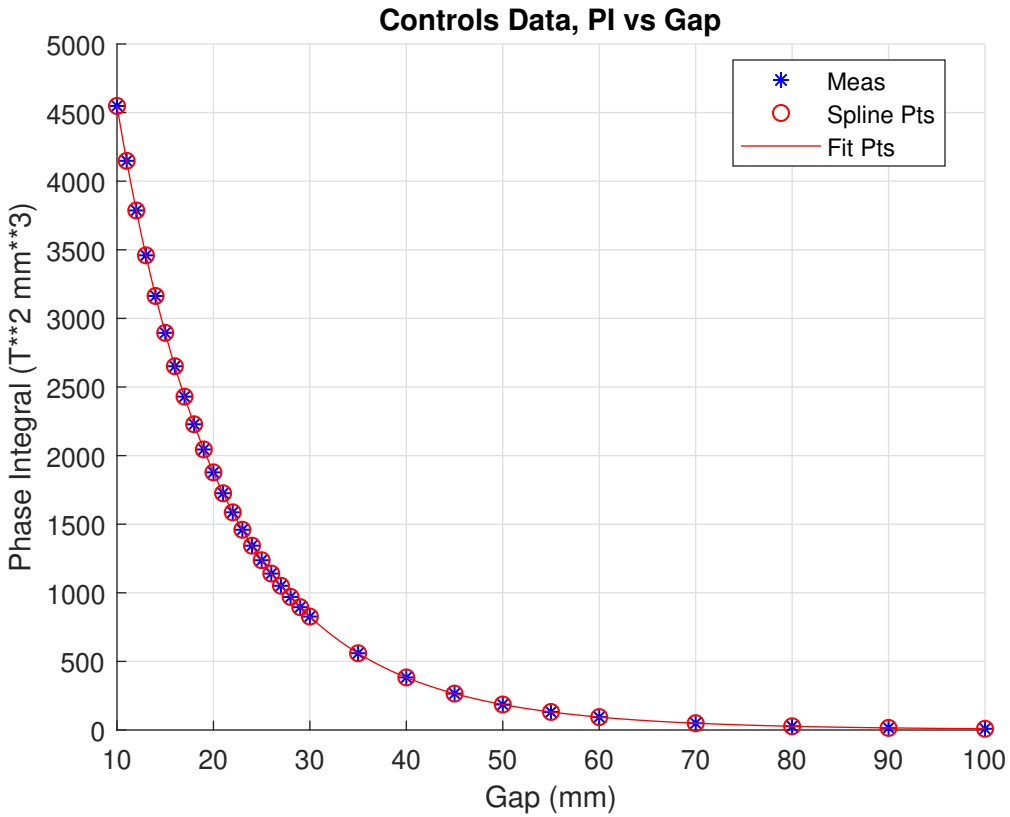

Operating Gaps, Normalized Residuals
×10-5
6
4
2
0
-2
-4
-6
PI Residual / PI
10
12
14
16
18
20
22
24
26
28
30
Gap (mm)

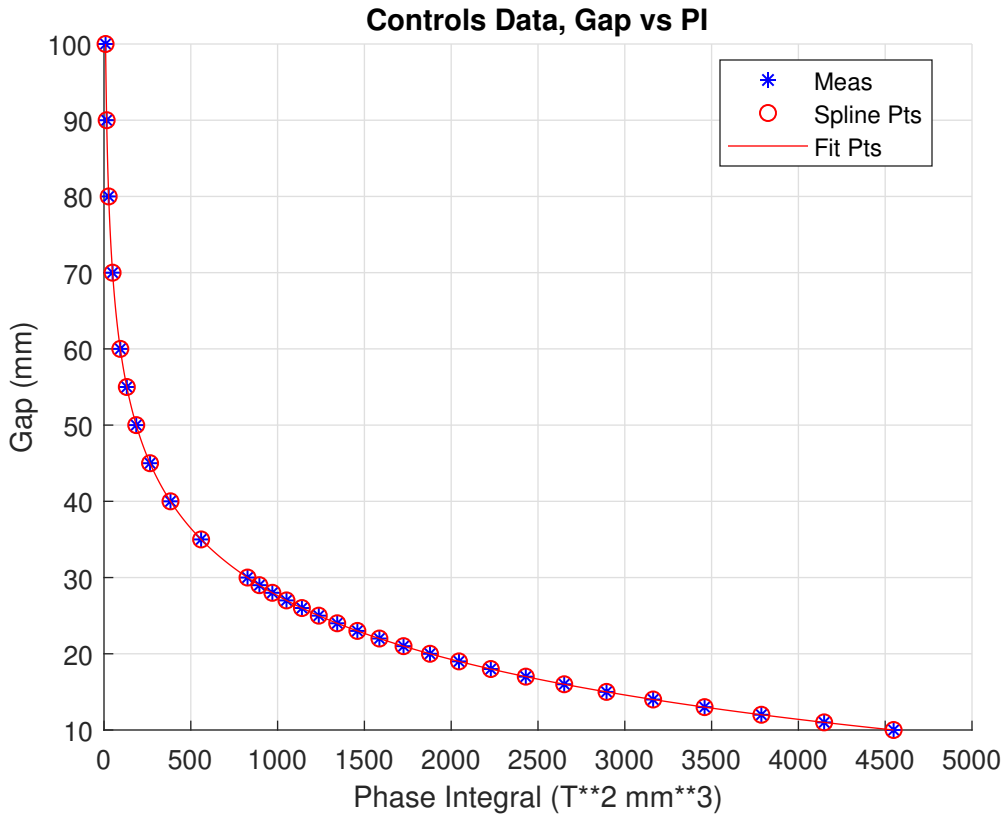

Fit Gap vs Phase Integral
Gap (mm)
Phase Integral (T**2 mm**3)
30
28
26
24
22
20
18
16
14
12
10
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Fit:
Use only odd points to determine spline fit.
Fit all points.


Gap vs PI, Fit Residuals
×10-3
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-2.5
-3
Gap Residual (mm)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Phase Integral (T**2 mm**3)


Gap -> PI -> Gap Fits, Gap Difference
×10^-4
1.5
1
0.5
0
-0.5
-1
Gap After Fits - Original Gap (mm)
10
12
14
16
18
20
22
24
26
28
30
Original Gap (mm)


PI -> Gap -> PI Fits, Relative Difference
×10-6
5
0
-5
-10
-15
(PI After Fits - Original PI) / Original PI
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Original PI (T**2 mm**3)


Controls Data, PI vs Gap
Meas
Spline Pts
Fit Pts
Phase Integral (T**2 mm**3)
Gap (mm)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
10
20
30
40
50
60
70
80
90
100


Controls Data, Gap vs PI
Meas
Spline Pts
Fit Pts
Gap (mm)
Phase Integral (T**2 mm**3)
100
90
80
70
60
50
40
30
20
10
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000