SLAC Traveler for LCLS-II SXPS Measurement Results

This traveler is intended to document checking the final magnetic measurements of Soft X-Ray beamline (SXR) Phase Shifters (SXPS) performed on the Dover bench in the Magnetic Measurement Facility (MMF) at SLAC after the completion of all tuning activities. It contains basic performance indicators compared against tolerances as well as documentary information both in graphical and textual representation.

Serial number from magnet label:	SXPS-16338

Measurement Procedure:

The measurements have been carried out after the undulator segment had been fully tuned according to “LCLS-II Phase Shifter Test Plan” (LCLS-TN-17-2).

Evaluation of Hall Probe Scans: Data Listings A

MATLAB function "EvaluatePhaseShifterField" on	7/24/2018 14:46	
A. SCAN PARAMETERS		
Serial Number	SXPS-16338	
z Scanning Date & Time Range	01/26/2018 20:17 - 01/29/2018 11:01	
Phase Shifter Temperature	20.2544± 0.0421	°C
x axis position	0.0304	m
y axis position	0.000294	m
Scans averaged	3	
Nominal Device Length	0.0825	m
Total Sampling Distance	0.7	m
Integration Cell Length	0.4	m
Earth Field Correction Bx	-0.1	G
Earth Field Correction By	-0.3	G
Nominal Closed Gap Height	10	mm

Evaluation of Hall Probe Scans: Data Listings B

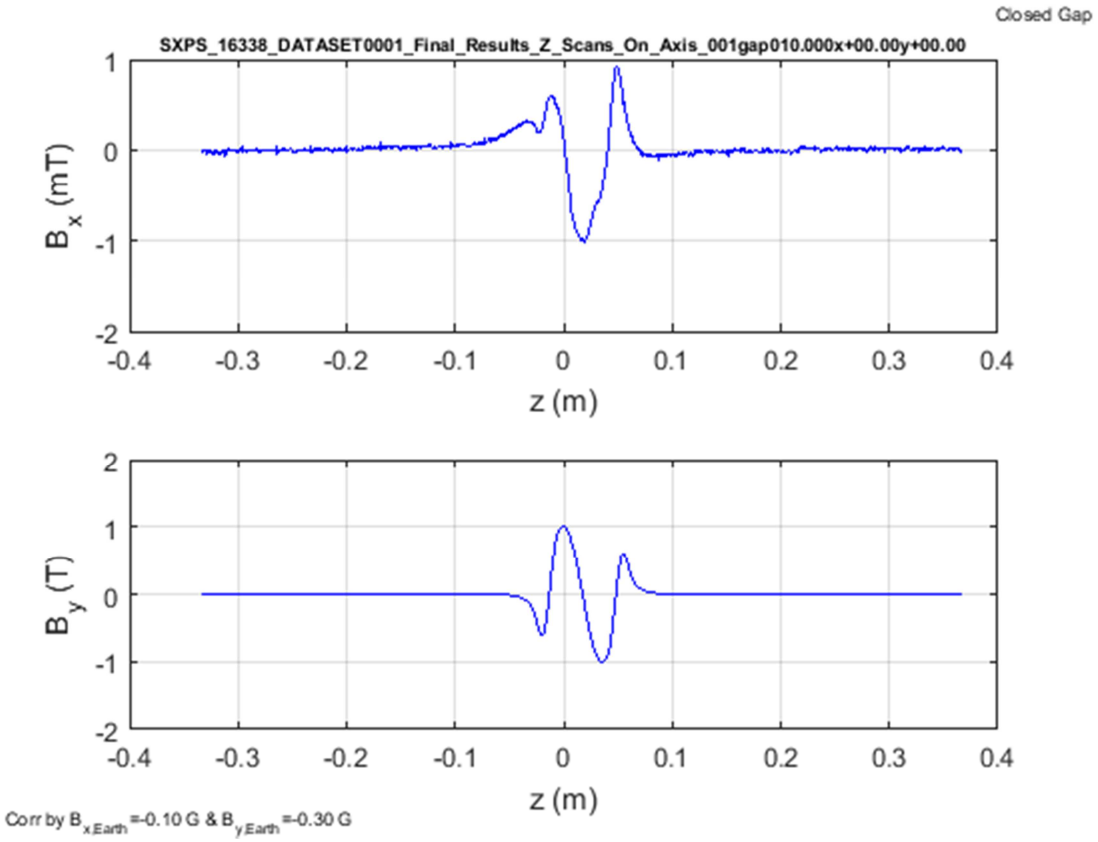
MATLAB function "EvaluatePhaseShifterField" on	7/24/2018 14:46	
B. CORE EVALUATIONS FOR CLOSED GAP		
Closed Gap Scanning Date & Time	1/26/2018 23:13	
Closed Gap Temperature	20.27± 0.17	°C
Encoder Gap	10	mm
Encoder Gap Raw	391,180	
Measured I1X(Cell Range Total)	+2.45 (12 % of Tolerance)	µTm
Measured I2X (Cell Range Total)	+2.05 (4.6 % of Tolerance)	μTm^2
Measured I1Y (Cell Range Total)	-8.98 (45 % of Tolerance)	µTm
Measured I2Y (Cell Range Total)	-8.95 (18 % of Tolerance)	μTm^2
Measured PI (Cell Range Total)	4,518.90	T^2mm^3
Required min PI (Cell Range Total) at Closed Gap	3,814.00	T^2mm^3

MATLAB function "EvaluatePhaseShifterField" on	7/24/2018 14:46	
C. CORE EVALUATIONS FOR OPEN GAP		
Open Gap Scanning Date & Time	1/27/2018 0:51	
Open Gap Temperature	20.29± 0.19	°C
Encoder Gap	100	mm
Encoder Gap Raw	2,191,180	
Measured I1X(Cell Range Total)	-1.73 (8.6 % of Tolerance)	µTm
Measured I2X (Cell Range Total)	-0.19 (0.41 % of Tolerance)	μTm^2
Measured I1Y (Cell Range Total)	-0.82 (4.1 % of Tolerance)	µTm
Measured I2Y (Cell Range Total)	-2.10 (4.2 % of Tolerance)	μTm^2
Measured PI (Cell Range Total)	8.7	T^2mm^3
Allowed max PI (Cell Range Total) at Open Gap	750	T^2mm^3

MATLAB function "EvaluatePhaseShifterField" on	7/24/2018 14:46	
D. ENCODER SETTINGS		
Gap Encoder Offset	9.5590±0.0000	mm

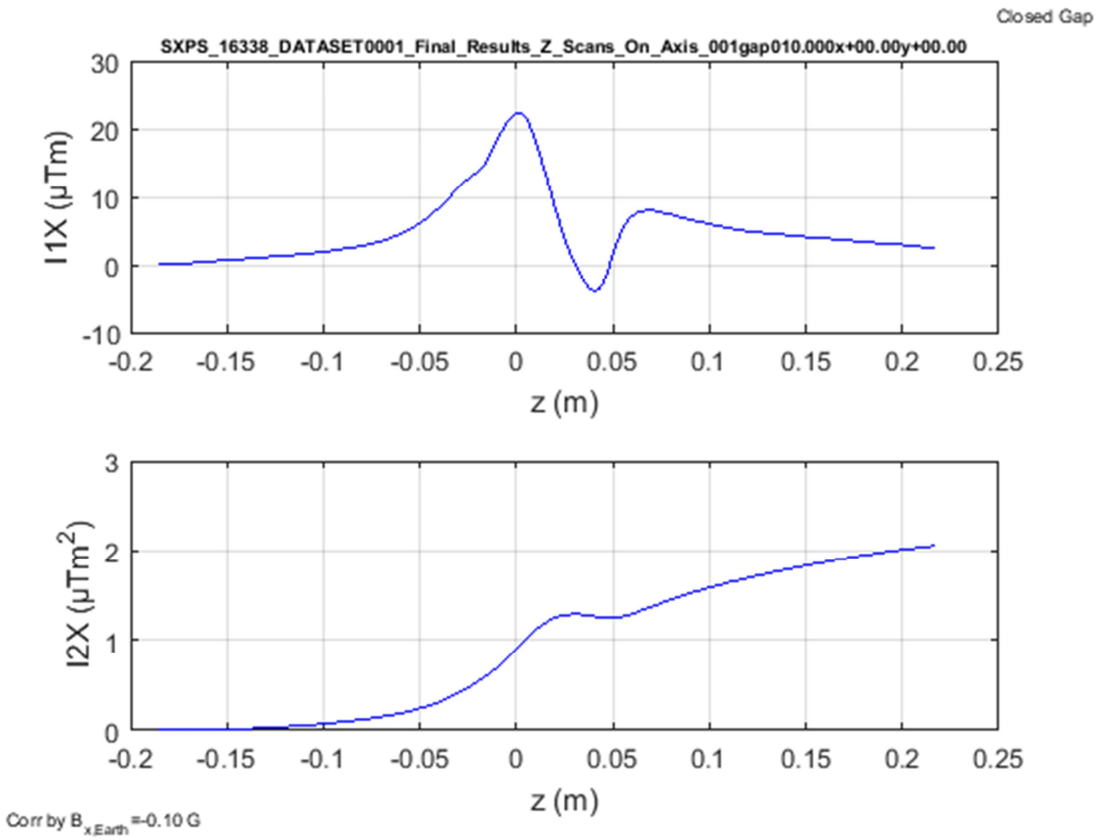
The following figures show result of the field analysis closed gap.

Evaluation of Hall Probe at Closed Gap: Horizontal and Vertical Field



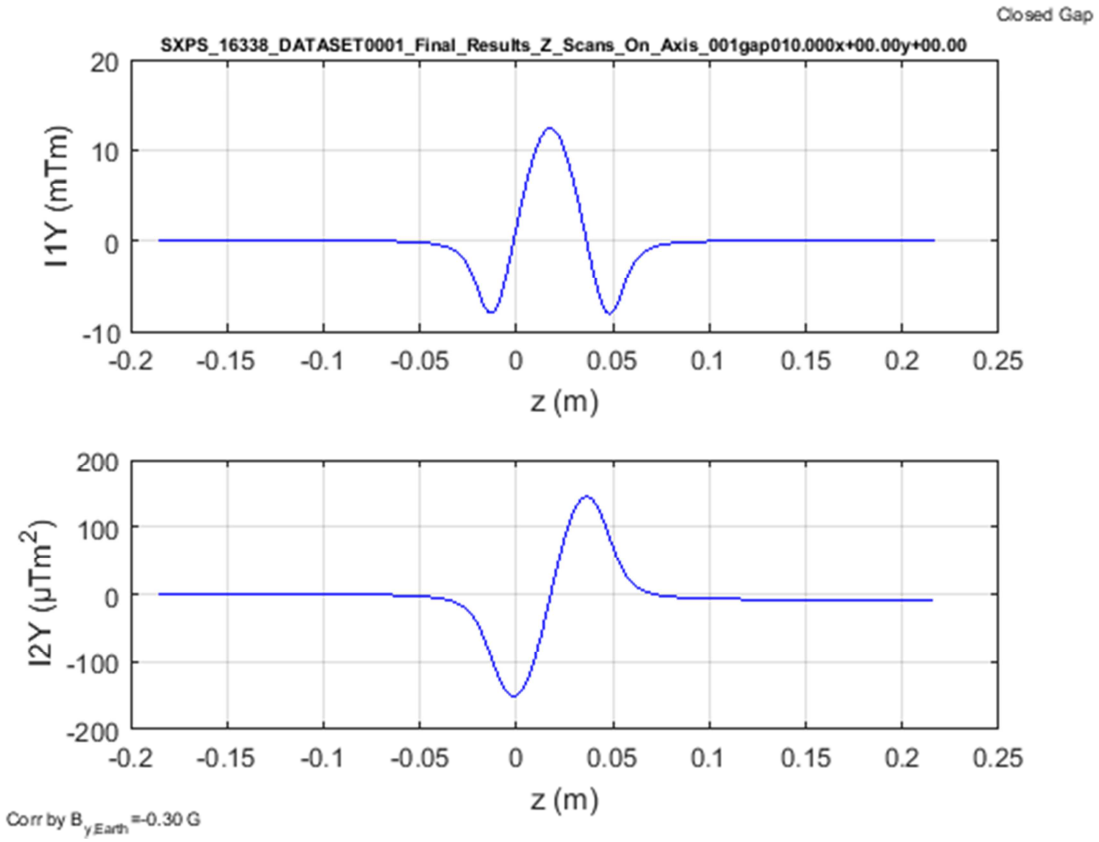
The figures show the x (upper) and y (lower) field components along the phase shifter beam axis for the closed gap. The amount of earth field correction applied is shown in the lower left hand side. [Documentary Information]

Evaluation of Hall Probe at Closed Gap: Horizontal 1st and 2nd Field Integrals



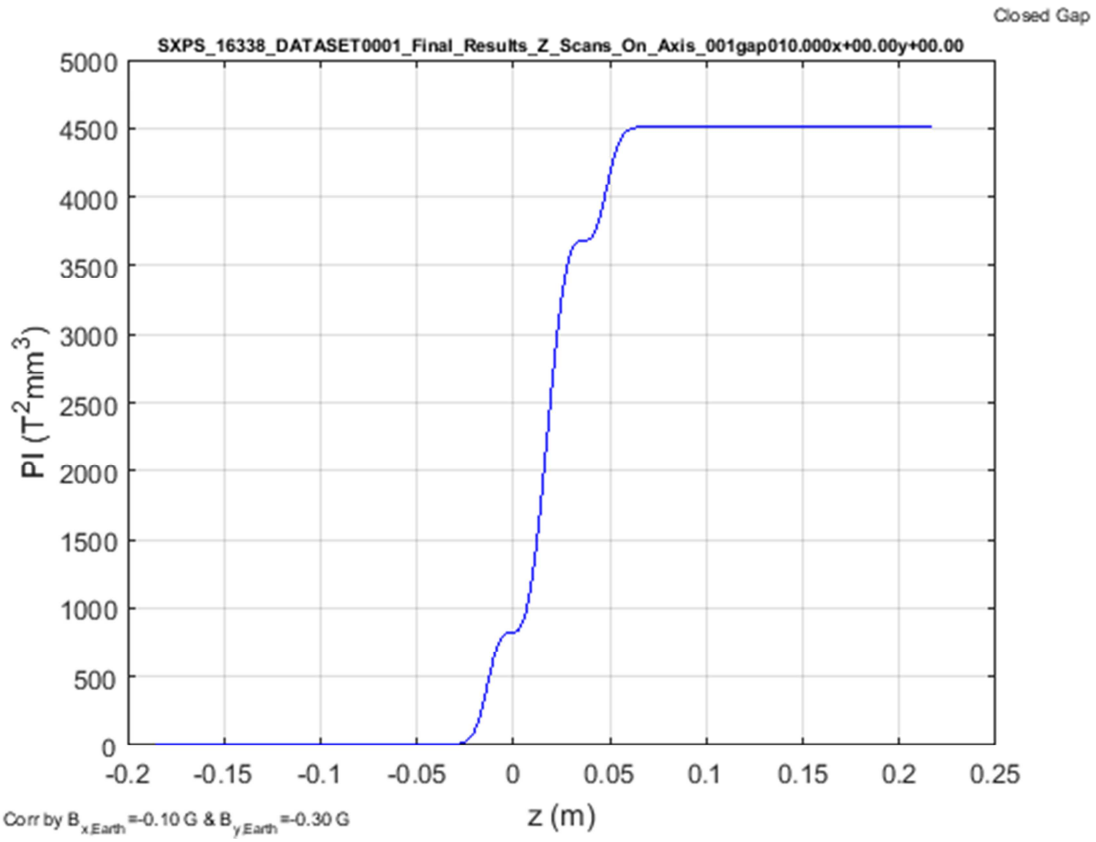
The figures show the horizontal first (I1X, upper) and second (I2X, lower) field integrals along the phase shifter beam axis for the closed gap. The amount of earth field correction applied is shown in the lower left hand side. [Documentary Information]

Evaluation of Hall Probe at Closed Gap: Vertical 1st and 2nd Field Integrals



The figures show the vertical first (I1Y, upper) and second (I2Y, lower) field integrals along the phase shifter beam axis for the closed gap. The amount of earth field correction applied is shown in the lower left hand side. [Documentary Information]

Evaluation of Hall Probe Scans for Closed Gap: Phase Integral Plot



The figure shows the phase integral, PI, of an electron calculated from the measured on-axis magnetic field components for the tuning gap:

$$PI(z) = \int_0^z BL_{x1}^2(\hat{z})\, d\hat{z} + \int_0^z BL_{y1}^2(\hat{z})\, d\hat{z}$$

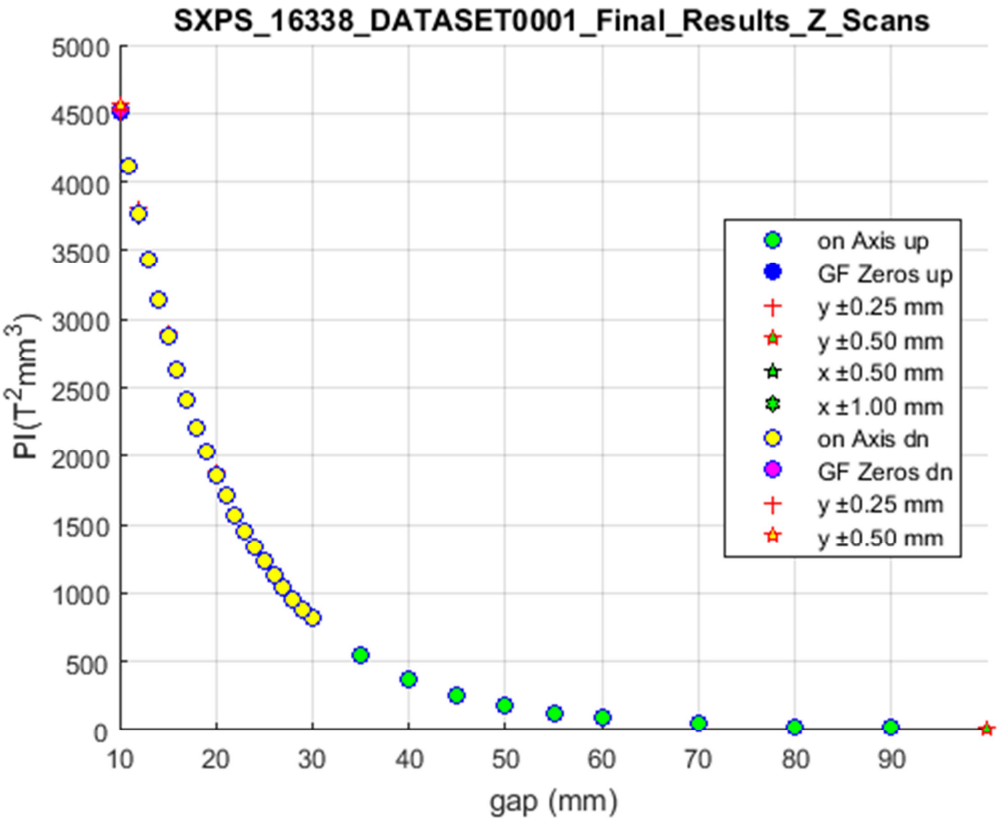
with

$$BL_{x1,y1}(z) = \int_0^z B_{x,y}(\hat{z})\, d\hat{z}$$

The phase integral is proportional to the phase slippage due to the presence of the magnetic field. There is an additional contribution to phase slippage due to the fact that the speed of the electrons is less than the speed of light. This additional contribution is corrected by the undulator segment and does not need to be corrected again for the phase shifters.

The following figures show the results of the gap dependent analysis.

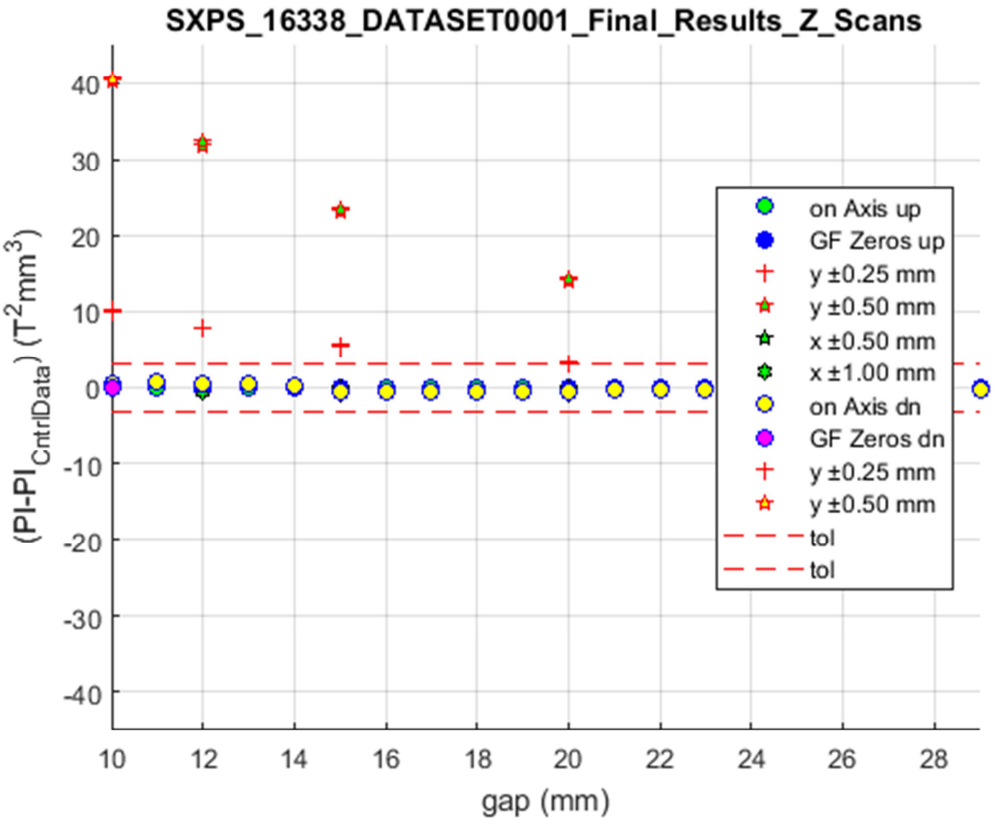
Evaluation of Hall Scans: *PI* vs *gap*



The figure shows phase shifter Phase Integral, *PI*, as a function of gap over the 10 mm – 90 mm gap range. The legend shows a number of different cases that will be explained later in this document because their effect cannot be observed in this full scale plot. Note: The gap values are derived from the readings of the gap encoder installed on the SXPS. In that sense these are nominal gap numbers that will be close but not identical to each of the individual magnet block separations measured across the phase shifter gap.

The continuous conversion between the two axes (i.e. *PI* (*gap*) and *gap* (*PI*) will be done during operations based on the list of reference data points stored in file sxps_16338_pivsgap_spline.dat in the Controls Data folder on the V: drive (see final section of this document for file information). From that *PI* (*gap*) and *gap* (*PI*) can be calculated via cubic spline fits or equivalent. [Documentary Information]

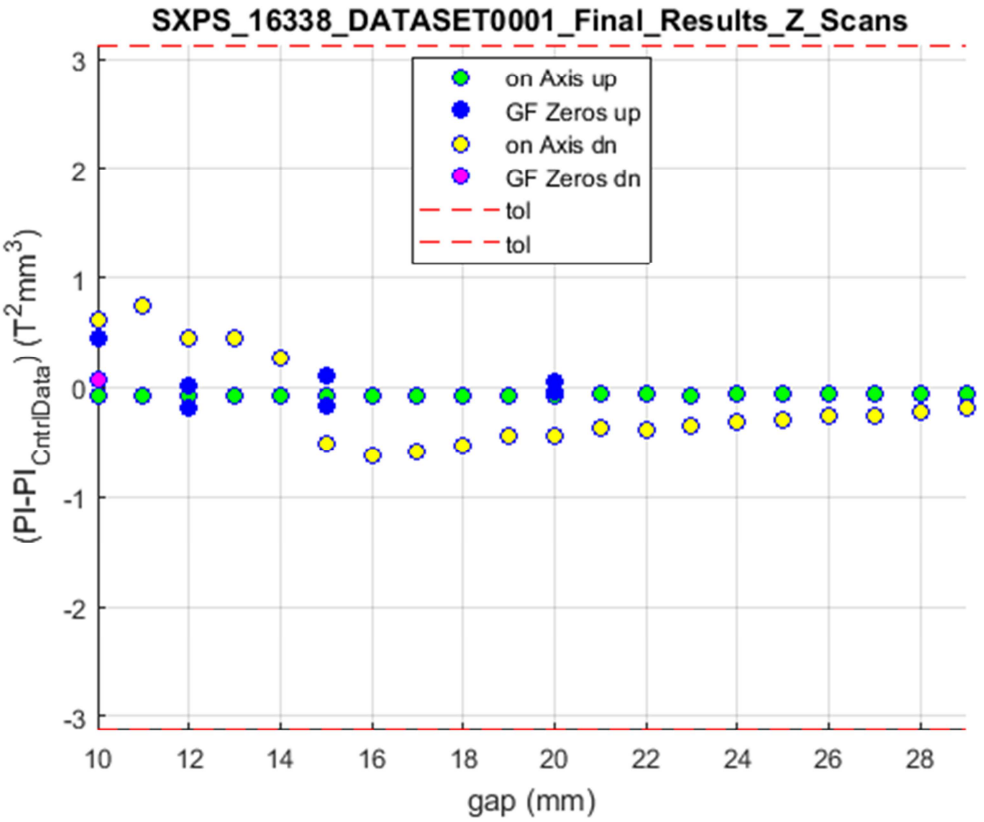
Evaluation of Hall Scans: *PI* -$PI_{control}$ vs *gap*



The figure shows the relative difference between the measured phase shifter Phase Integral, *PI*, and a cubic spline fit to the list of reference data points as a function of gap over the 10 mm – 30 mm operational range. The cubic spline fit data is stored on the V: drive in the Controls Data folder in file sxps_16338_pivsgap_spline.

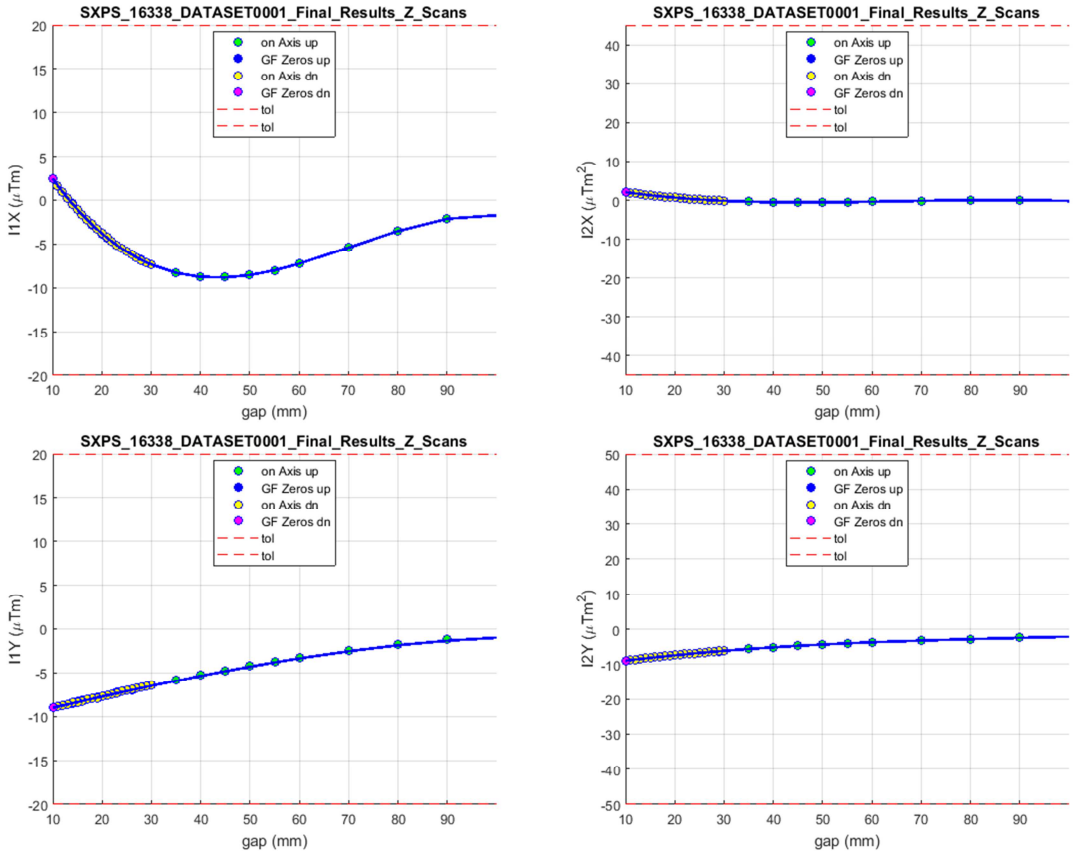
The legend explains the different cases that are shown in the plot: The data show as green filled circles have been acquired on axis as the gap was changed from closed to open. The yellow filled circles show data acquired on axis as the gap was changed from open to closed. The horizontal red dashed lines show the tolerance limits. The other symbols shown indicate off-axis measurements that are added for interest only. The tolerance limits apply for on-axis readings, only.

Evaluation of Hall Scans: ($PI_{eff} - PI_{CntrlData}$) vs *gap*



The figure shows some of the data shown in the previous figure but with a larger vertical scale that just captures the tolerance range. There is a hysteresis effect visible which is small enough to be acceptable. The off-axis measurements are not shown.

Evaluation of Hall Probe: Field Integrals vs. gap

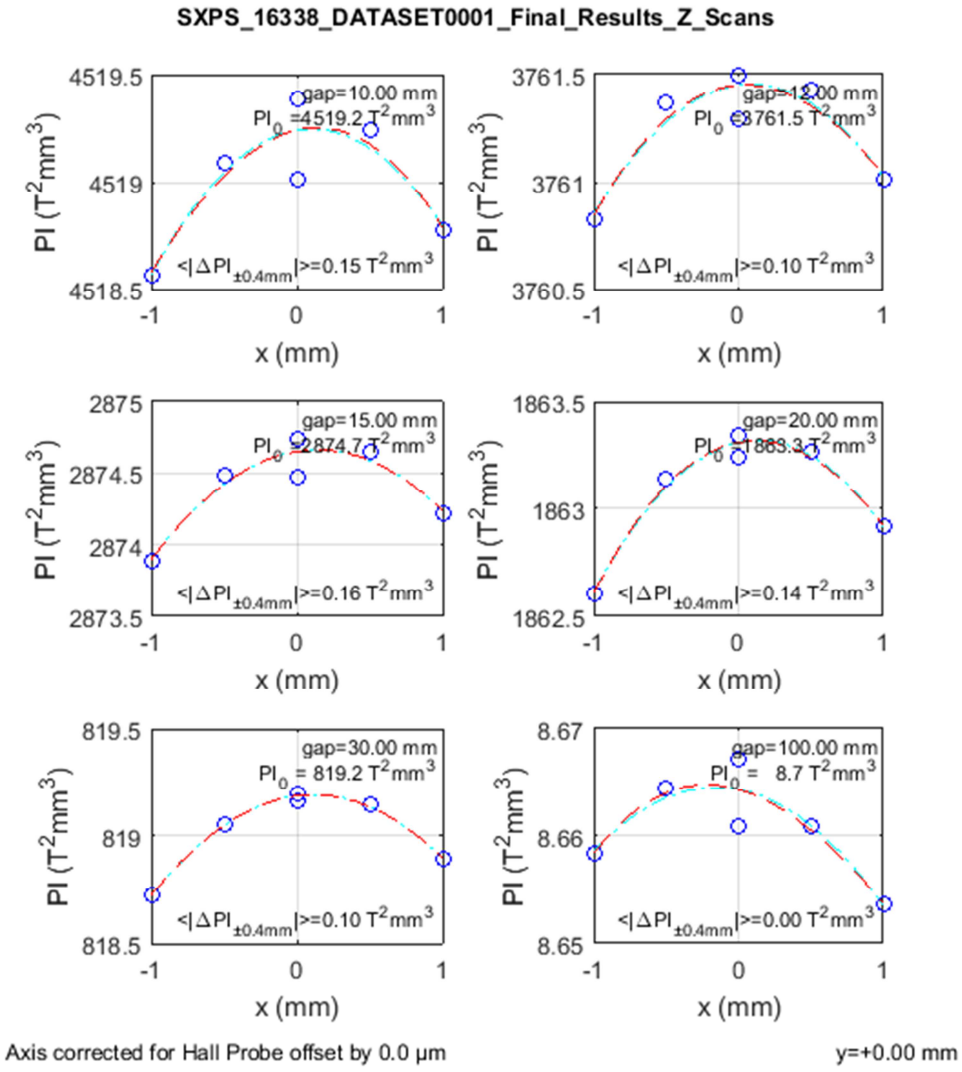


The figures show the field integrals (*I1X*, *I2X*, *I1Y*, *I2Y*) as function of the operational gap. The proximity of the green and yellow circles shows that the field integrals are not sensitive to the hysteresis that can be seen in the phase integral on a previous page. The blue curves are spline fits to the data, they are stored the Controls folder in files

"…i1x_vs_gap_spline.dat",
"…i2x_vs_gap_spline.dat",
"…i1y_vs_gap_spline.dat",
"…i2y_vs_gap_spline.dat",

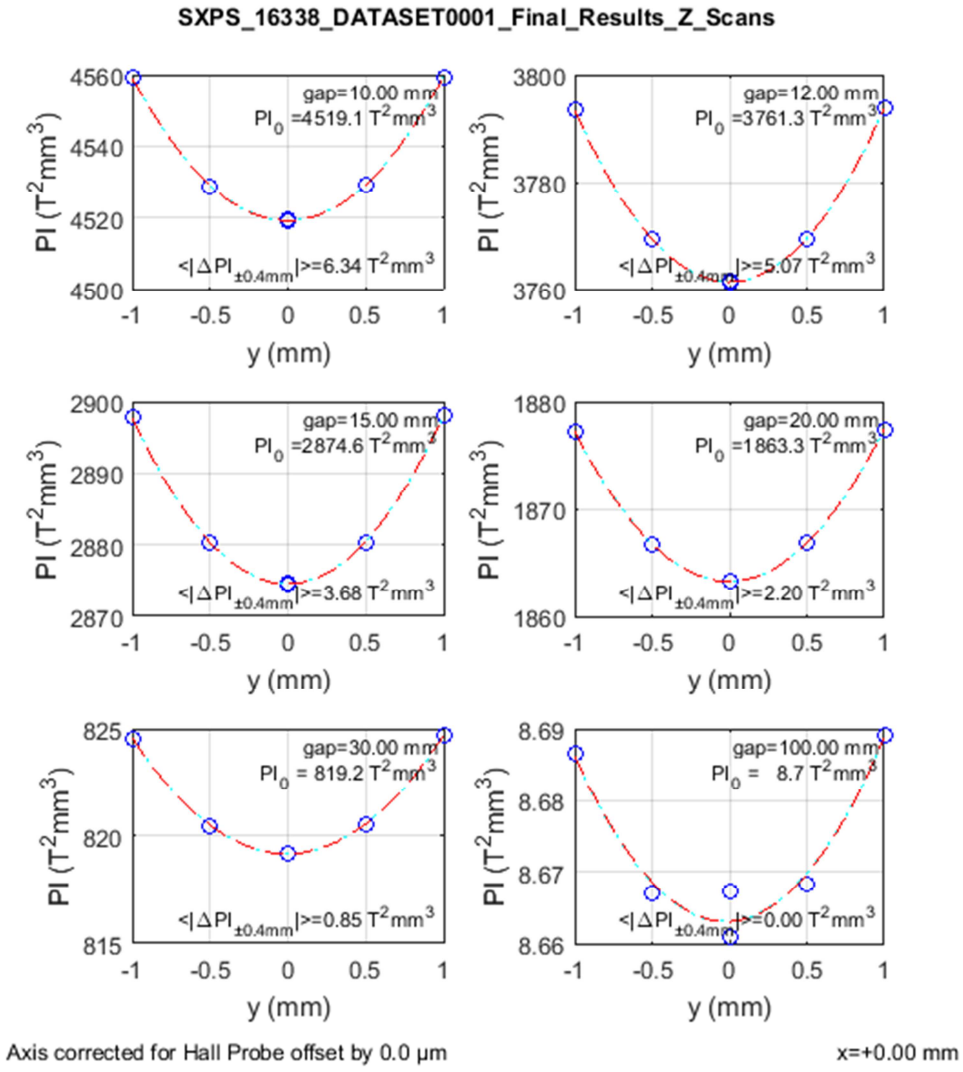
and demonstrate how the controls representations of the field integrals relates to the actual measurements (see final section of this document for file information).

Evaluation of Hall Probe: PI vs. x dependence



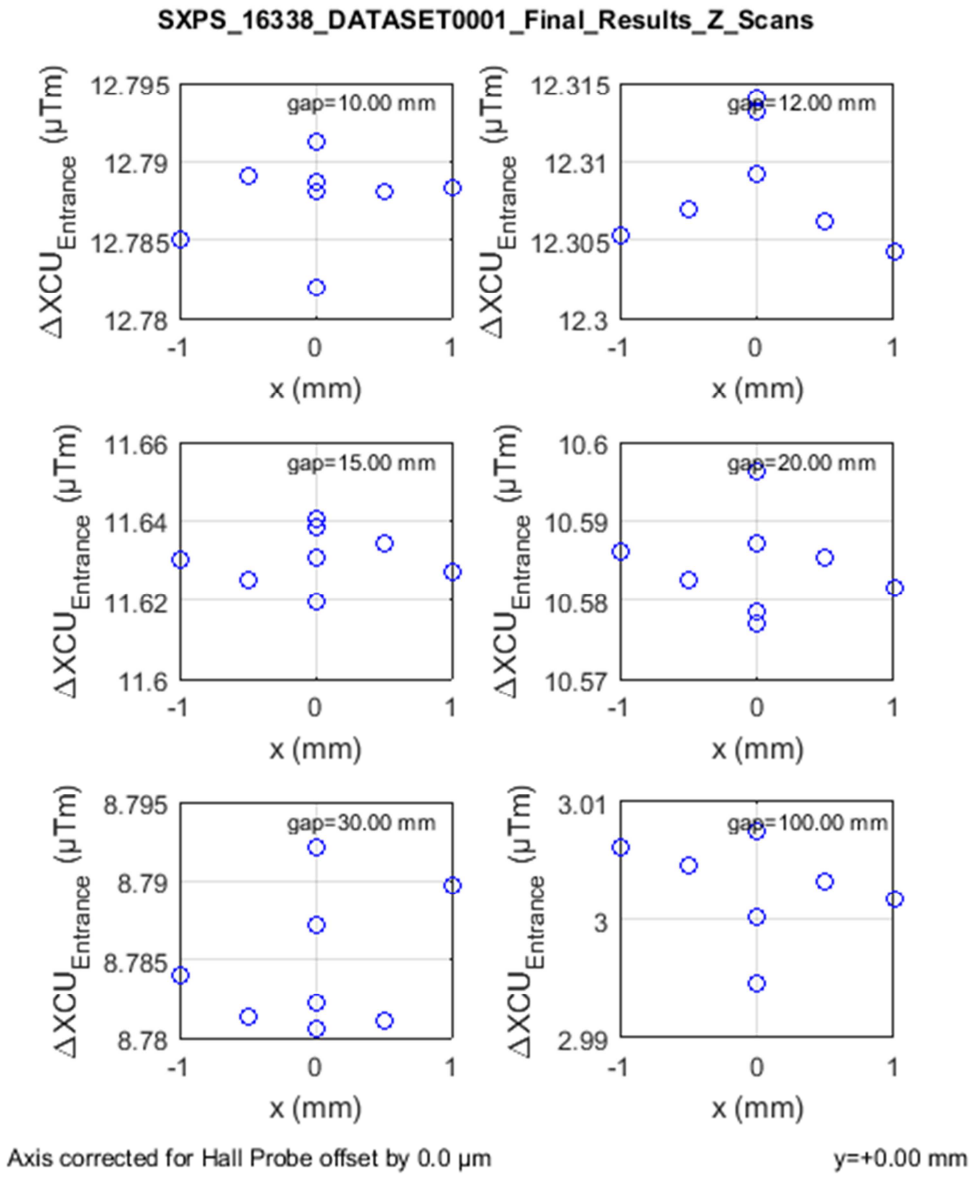
The figure shows the deviation of the phase integral, *PI*, from the on-axis value, PI_0, as function of x at a number of operational gaps. The average deviation at z=±0.4 mm is printed at the lower part of each plot. [Documentary Information]

Evaluation of Hall Probe: K vs. y dependence



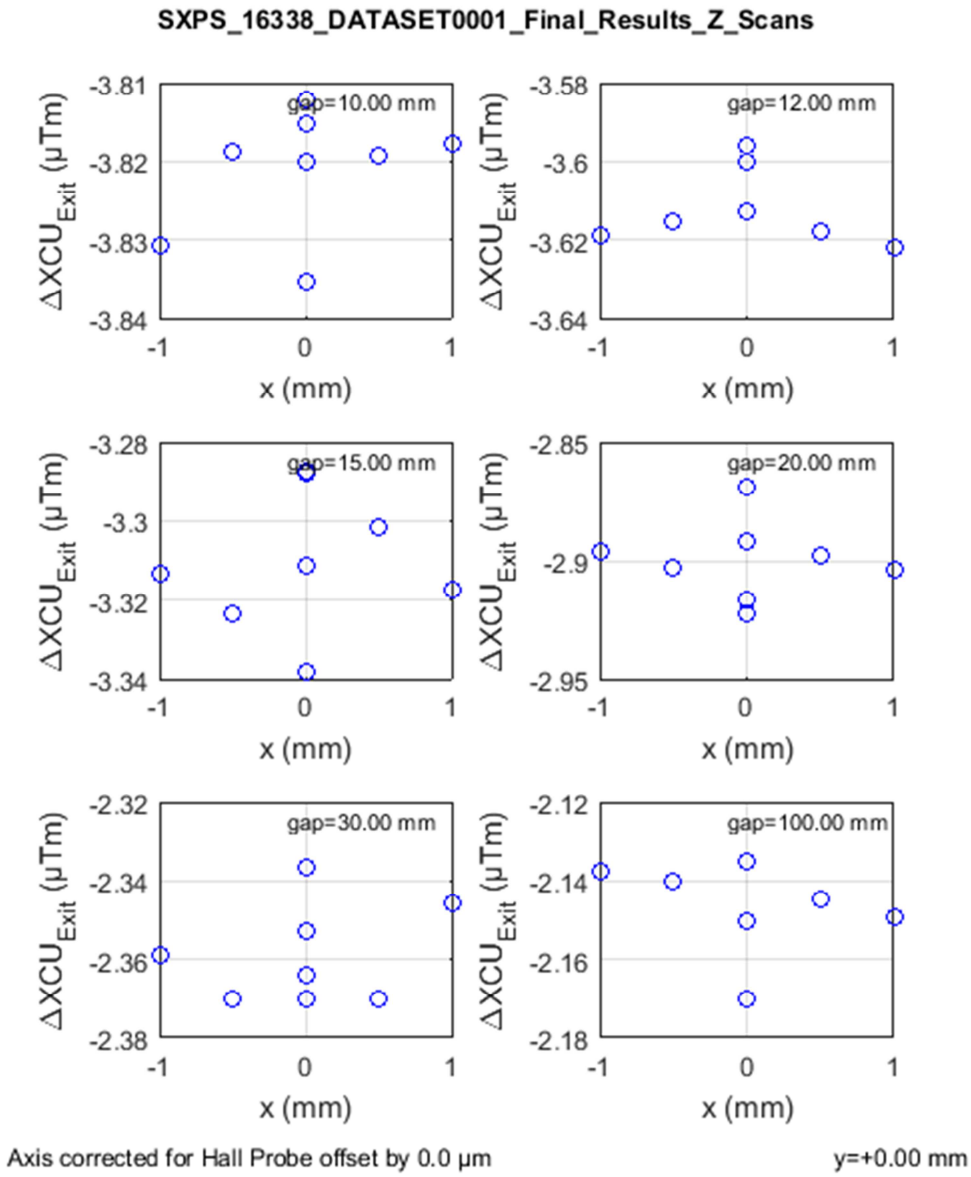
The figure shows the deviation of the phase integral, *PI*, from the on-axis value, PI_0, as function of *y* at a number of gaps. The average deviation at *z*= ±0.4 mm is printed at the lower part of each plot. [Documentary Information]

Estimated Upstream Horizontal Corrector Strength Requirement vs. x



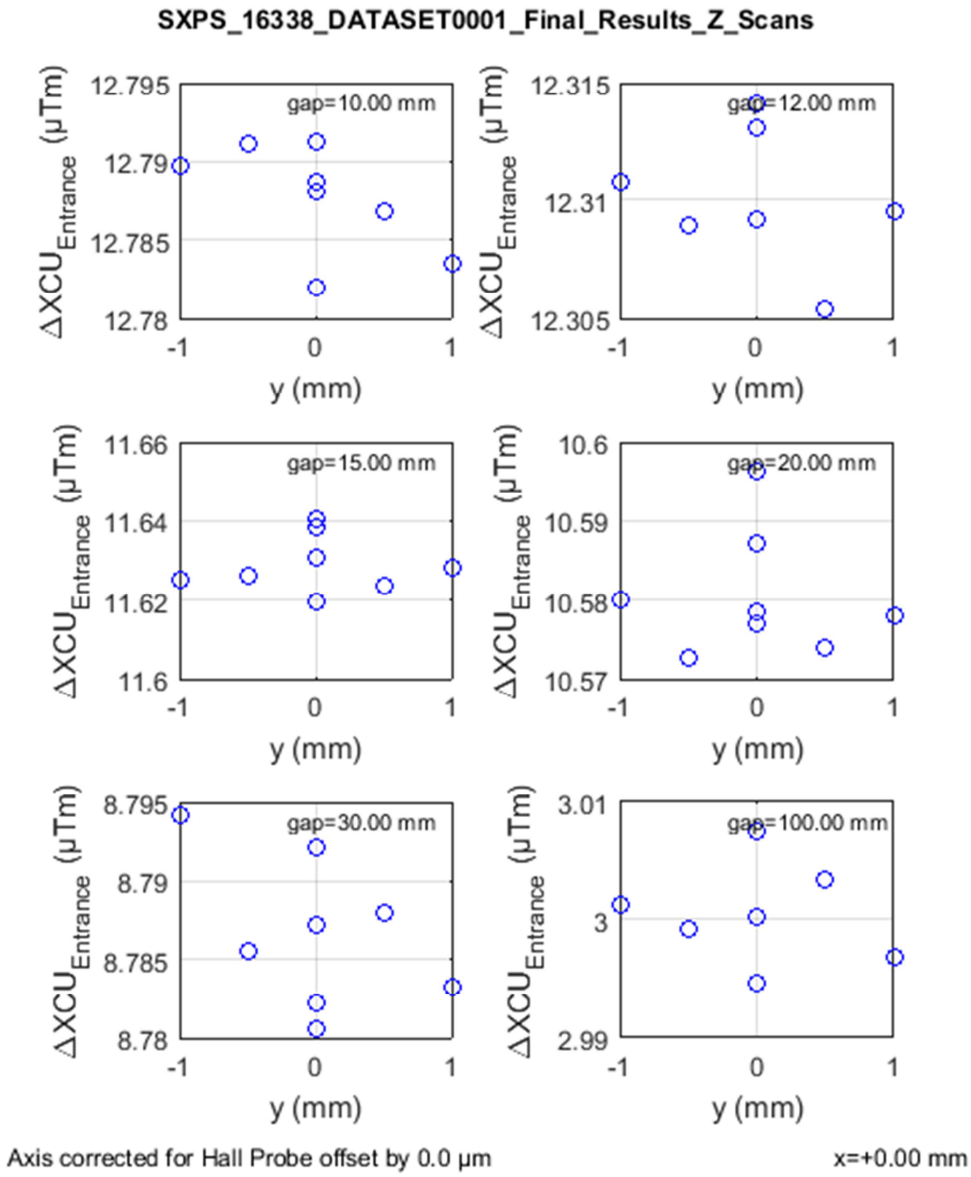
The figure shows the required strength of the upstream horizontal corrector to remove the second vertical phase shifter field integral at the downstream BPM for a number of phase shifter gaps. The analysis was done at a number of off-axis locations in the x-z plane. All values are very small.

Estimated Downstream Horizontal Corrector Strength Requirement vs. x



The figure shows the required strength of the downstream horizontal corrector to remove the first vertical phase shifter field integral and the upstream corrector field integral at the downstream BPM for a number of phase shifter gaps. The analysis was done at a number of off-axis locations in the x-z plane. All values are very small.

Estimated Upstream Horizontal Corrector Strength Requirement vs. y



The figure shows the required strength of the upstream horizontal corrector to remove the second vertical phase shifter field integrals at the downstream BPM for a number of phase shifter gaps. The analysis was done at a number of off-axis locations in the y-z plane. All values are very small

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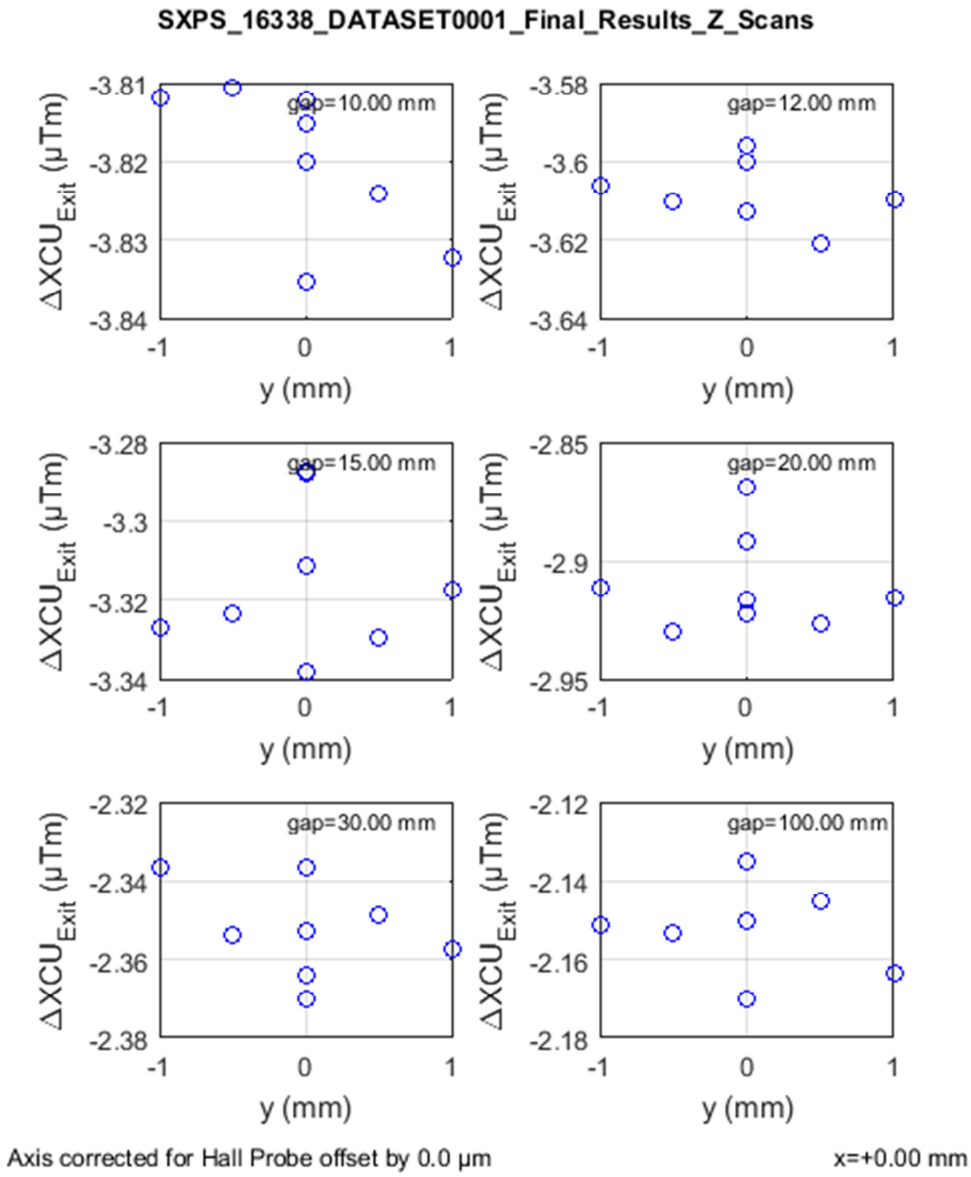
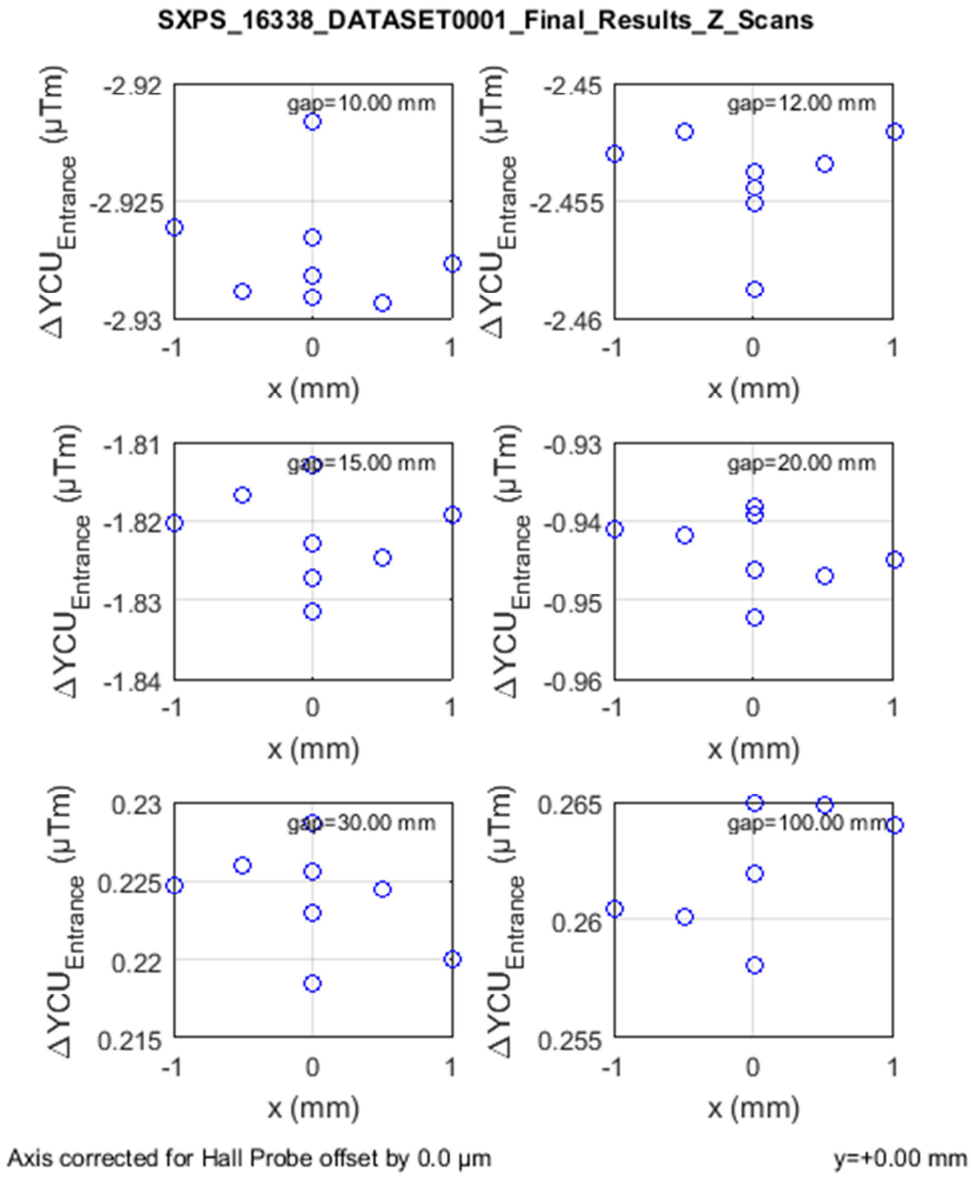
Estimated Downstream Horizontal Corrector Strength Requirement vs. y



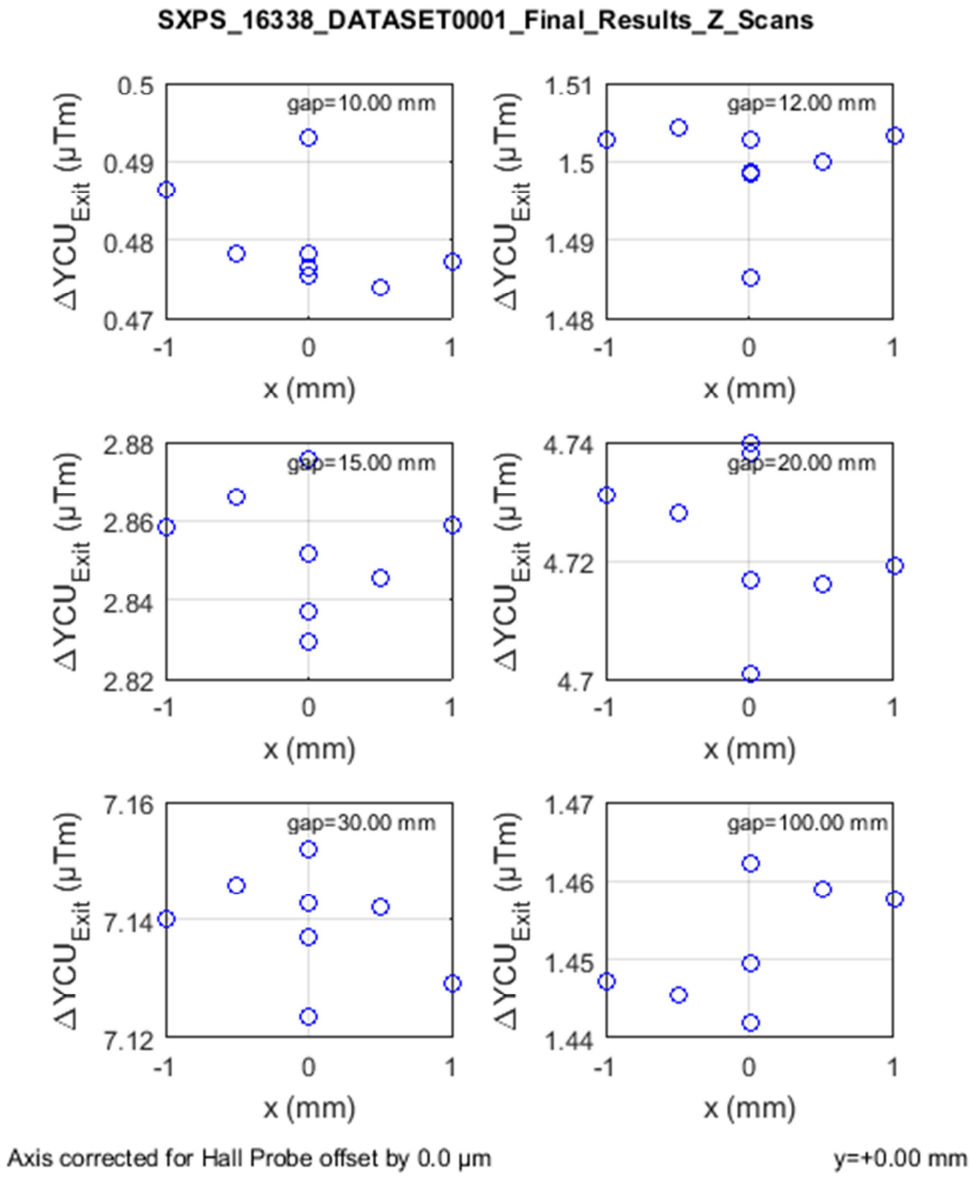
The figure shows the required strength of the upstream horizontal corrector to remove the first vertical phase shifter field integral and the upstream corrector field integral at the downstream BPM for a number of phase shifter gaps. The analysis was done at a number of off-axis locations in the y-z plane. All values are very small.

Estimated Upstream Vertical Corrector Strength Requirement vs. x



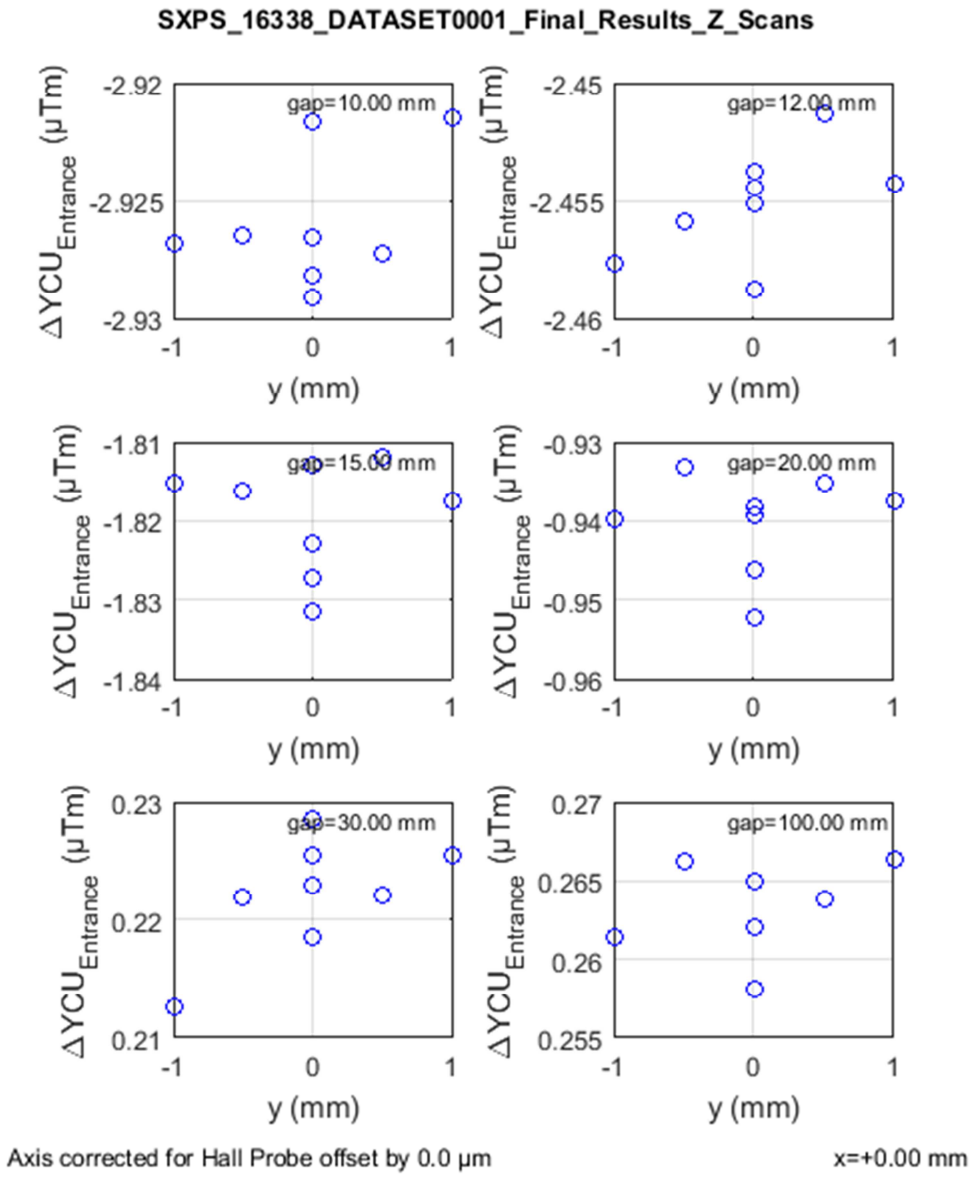
The figure shows the required strength of the upstream horizontal corrector to remove the second horizontal phase shifter field integral at the downstream BPM for a number of phase shifter gaps. The analysis was done at a number of off-axis locations in the x-z plane. All values are very small.

Estimated Downstream Vertical Corrector Strength Requirement vs. x



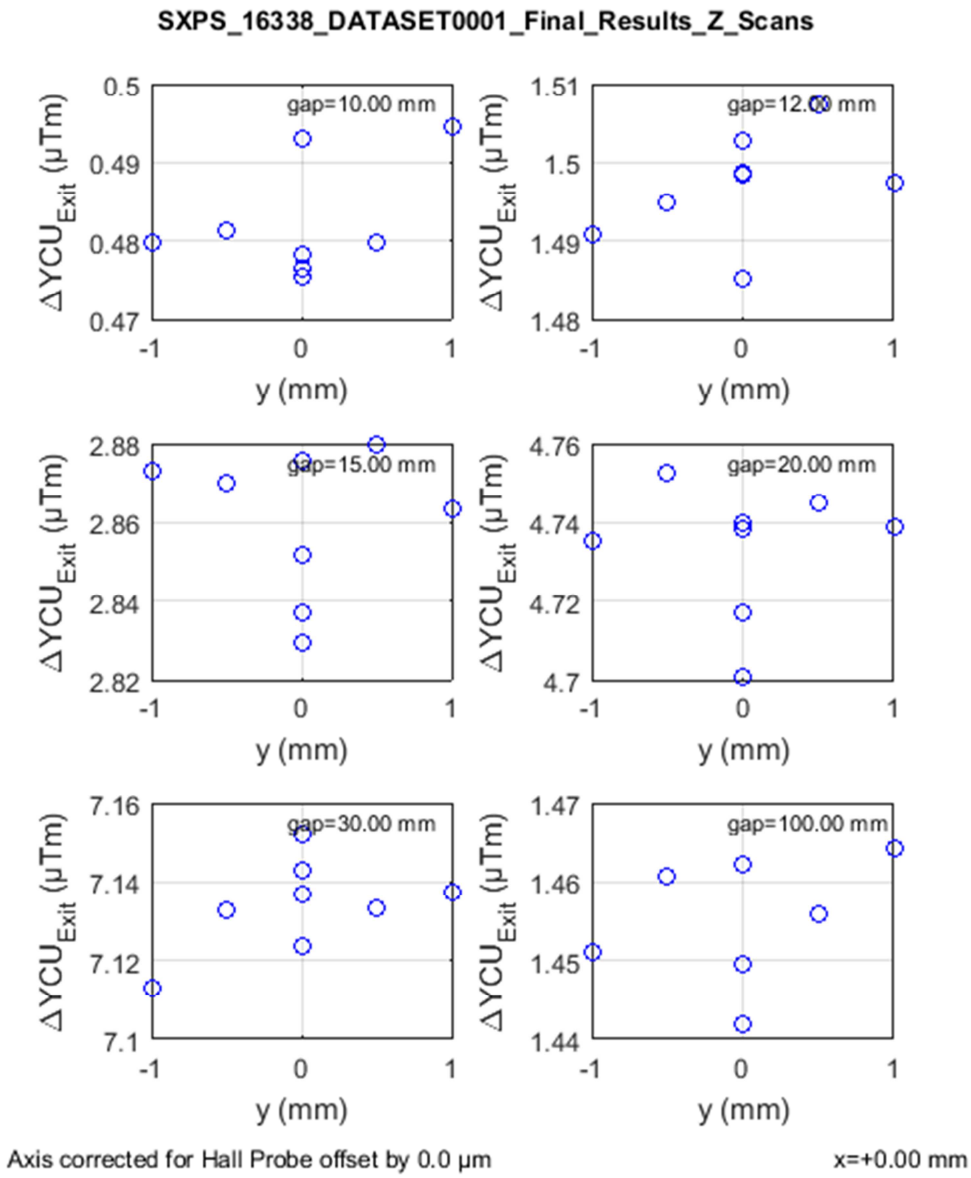
The figure shows the required strength of the downstream vertical corrector to remove the first horizontal phase shifter field integral and upstream corrector field integral at the downstream BPM for a number of phase shifter gaps. The analysis was done at a number of off-axis locations in the x-z plane. All values are very small.

Estimated Upstream Vertical Corrector Strength Requirement vs. y



The figure shows the required strength of the upstream vertical corrector to remove the second horizontal phase shifter field integral at the downstream BPM for a number of phase shifter gaps. The analysis was done at a number of off-axis locations in the y-z plane. All values are very small.

Estimated Downstream Vertical Corrector Strength Requirement vs. y



The figure shows the required strength of the downstream vertical corrector to remove the first horizontal undulator field integral and upstream corrector field integral at the downstream BPM for a number of phase shifter gaps. The analysis was done at a number of off-axis locations in the y-z plane. All values are very small

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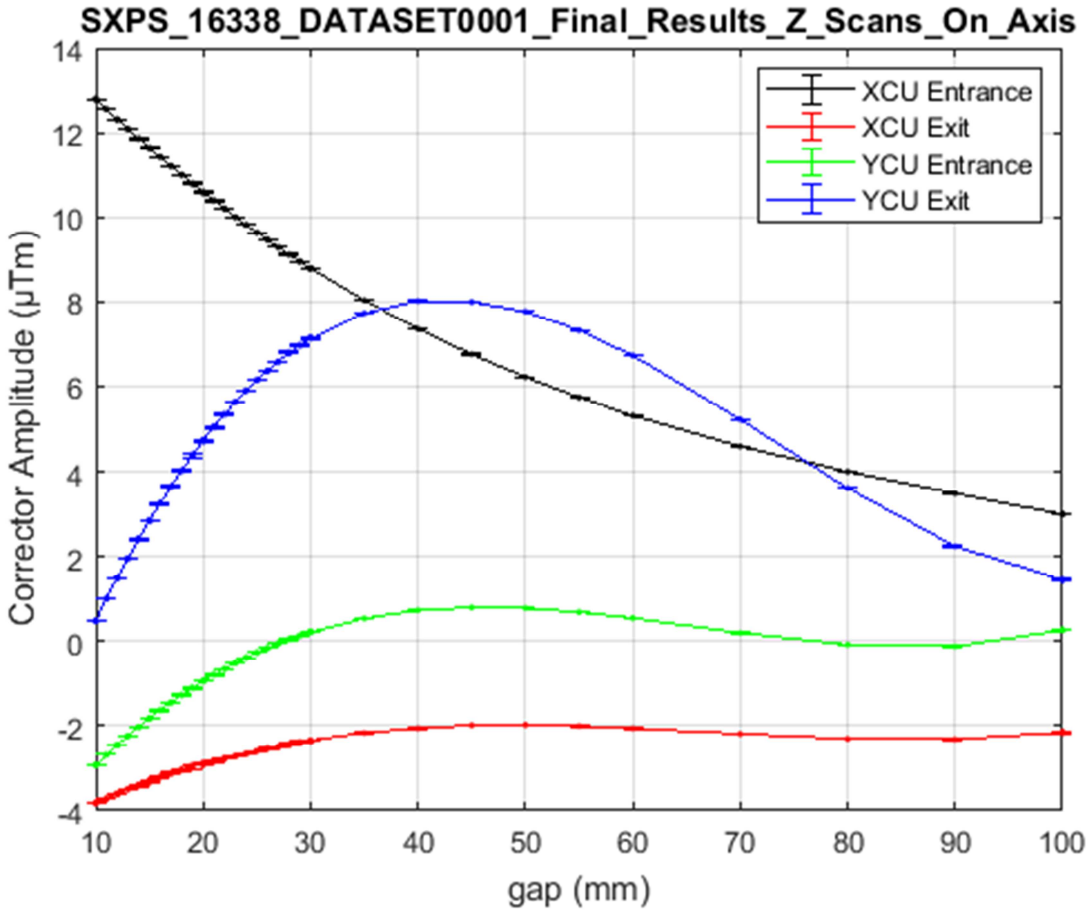
Estimated Corrector Strengths Requirement vs. gap



The figure shows, as function of phase shifter gap, the required strengths of the upstream and downstream horizontal and vertical correctors to remove the effect of phase shifter field integrals at the downstream BPM over the entire available gap range. All values are very small.

Measurement Results are stored:

At V-Drive:

☒ V:\MET\MagServe\MagData\LCLS-II\Phase Shifter\

☐ _____

In Folder:

☒ SXPS_16338\DATASET0001\Final Results\

☐ _____

Confirmation of File Locations:

The following lists all required data files documenting the tuning results. An existence check was done and the result is indicated next to each filename as “exists” or “missing”.

Sub folder: Z Scans\Good Field Region exists

001gap010.000x-01.00y+00.00\zscan.dat	exists
002gap010.000x-00.50y+00.00\zscan.dat	exists
003gap010.000x+00.00y+00.00\zscan.dat	exists
004gap010.000x+00.50y+00.00\zscan.dat	exists
005gap010.000x+01.00y+00.00\zscan.dat	exists
032gap010.000x+00.00y-00.50\zscan.dat	exists
003gap010.000x+00.00y+00.00\zscan.dat	exists
034gap010.000x+00.00y+00.50\zscan.dat	exists
006gap012.000x-01.00y+00.00\zscan.dat	exists
007gap012.000x-00.50y+00.00\zscan.dat	exists
008gap012.000x+00.00y+00.00\zscan.dat	exists
009gap012.000x+00.50y+00.00\zscan.dat	exists
010gap012.000x+01.00y+00.00\zscan.dat	exists
037gap012.000x+00.00y-00.50\zscan.dat	exists
008gap012.000x+00.00y+00.00\zscan.dat	exists
039gap012.000x+00.00y+00.50\zscan.dat	exists
011gap015.000x-01.00y+00.00\zscan.dat	exists
012gap015.000x-00.50y+00.00\zscan.dat	exists
013gap015.000x+00.00y+00.00\zscan.dat	exists
014gap015.000x+00.50y+00.00\zscan.dat	exists
015gap015.000x+01.00y+00.00\zscan.dat	exists

042gap015.000x+00.00y-00.50\zscan.dat	exists
013gap015.000x+00.00y+00.00\zscan.dat	exists
044gap015.000x+00.00y+00.50\zscan.dat	exists
016gap020.000x-01.00y+00.00\zscan.dat	exists
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018gap020.000x+00.00y+00.00\zscan.dat	exists
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020gap020.000x+01.00y+00.00\zscan.dat	exists
047gap020.000x+00.00y-00.50\zscan.dat	exists
018gap020.000x+00.00y+00.00\zscan.dat	exists
049gap020.000x+00.00y+00.50\zscan.dat	exists
021gap030.000x-01.00y+00.00\zscan.dat	exists
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023gap030.000x+00.00y+00.00\zscan.dat	exists
024gap030.000x+00.50y+00.00\zscan.dat	exists
025gap030.000x+01.00y+00.00\zscan.dat	exists
052gap030.000x+00.00y-00.50\zscan.dat	exists
023gap030.000x+00.00y+00.00\zscan.dat	exists
054gap030.000x+00.00y+00.50\zscan.dat	exists
026gap100.000x-01.00y+00.00\zscan.dat	exists
027gap100.000x-00.50y+00.00\zscan.dat	exists
028gap100.000x+00.00y+00.00\zscan.dat	exists
029gap100.000x+00.50y+00.00\zscan.dat	exists
030gap100.000x+01.00y+00.00\zscan.dat	exists
057gap100.000x+00.00y-00.50\zscan.dat	exists
028gap100.000x+00.00y+00.00\zscan.dat	exists
059gap100.000x+00.00y+00.50\zscan.dat	exists

Sub Folder: Z Scans\On Axis exists

001gap010.000x+00.00y+00.00\zscan.dat	exists
002gap011.000x+00.00y+00.00\zscan.dat	exists
003gap012.000x+00.00y+00.00\zscan.dat	exists
004gap013.000x+00.00y+00.00\zscan.dat	exists
005gap014.000x+00.00y+00.00\zscan.dat	exists
006gap015.000x+00.00y+00.00\zscan.dat	exists
007gap016.000x+00.00y+00.00\zscan.dat	exists
008gap017.000x+00.00y+00.00\zscan.dat	exists
009gap018.000x+00.00y+00.00\zscan.dat	exists

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015gap024.000x+00.00y+00.00\zscan.dat	exists
016gap025.000x+00.00y+00.00\zscan.dat	exists
017gap026.000x+00.00y+00.00\zscan.dat	exists
018gap027.000x+00.00y+00.00\zscan.dat	exists
019gap028.000x+00.00y+00.00\zscan.dat	exists
020gap029.000x+00.00y+00.00\zscan.dat	exists
021gap030.000x+00.00y+00.00\zscan.dat	exists
022gap035.000x+00.00y+00.00\zscan.dat	exists
023gap040.000x+00.00y+00.00\zscan.dat	exists
024gap045.000x+00.00y+00.00\zscan.dat	exists
025gap050.000x+00.00y+00.00\zscan.dat	exists
026gap055.000x+00.00y+00.00\zscan.dat	exists
027gap060.000x+00.00y+00.00\zscan.dat	exists
028gap070.000x+00.00y+00.00\zscan.dat	exists
029gap080.000x+00.00y+00.00\zscan.dat	exists
030gap090.000x+00.00y+00.00\zscan.dat	exists
031gap100.000x+00.00y+00.00\zscan.dat	exists

Sub Folder: Z Scans\Stretched Wire\Good Field Region exists

011gap010.000x-02.00y+00.00_i1X_integrals.txt	exists
012gap010.000x-01.00y+00.00_i1X_integrals.txt	exists
013gap010.000x+00.00y+00.00_i1X_integrals.txt	exists
014gap010.000x+01.00y+00.00_i1X_integrals.txt	exists
015gap010.000x+02.00y+00.00_i1X_integrals.txt	exists
031gap010.000x+00.00y-02.00_i1X_integrals.txt	exists
032gap010.000x+00.00y-01.00_i1X_integrals.txt	exists
013gap010.000x+00.00y+00.00_i1X_integrals.txt	exists
034gap010.000x+00.00y+01.00_i1X_integrals.txt	exists
035gap010.000x+00.00y+02.00_i1X_integrals.txt	exists
051gap012.000x-02.00y+00.00_i1X_integrals.txt	exists
052gap012.000x-01.00y+00.00_i1X_integrals.txt	exists
053gap012.000x+00.00y+00.00_i1X_integrals.txt	exists

054gap012.000x+01.00y+00.00_i1X_integrals.txt	exists
055gap012.000x+02.00y+00.00_i1X_integrals.txt	exists
071gap012.000x+00.00y-02.00_i1X_integrals.txt	exists
072gap012.000x+00.00y-01.00_i1X_integrals.txt	exists
053gap012.000x+00.00y+00.00_i1X_integrals.txt	exists
074gap012.000x+00.00y+01.00_i1X_integrals.txt	exists
075gap012.000x+00.00y+02.00_i1X_integrals.txt	exists
091gap015.000x-02.00y+00.00_i1X_integrals.txt	exists
092gap015.000x-01.00y+00.00_i1X_integrals.txt	exists
093gap015.000x+00.00y+00.00_i1X_integrals.txt	exists
094gap015.000x+01.00y+00.00_i1X_integrals.txt	exists
095gap015.000x+02.00y+00.00_i1X_integrals.txt	exists
111gap015.000x+00.00y-02.00_i1X_integrals.txt	exists
112gap015.000x+00.00y-01.00_i1X_integrals.txt	exists
093gap015.000x+00.00y+00.00_i1X_integrals.txt	exists
114gap015.000x+00.00y+01.00_i1X_integrals.txt	exists
115gap015.000x+00.00y+02.00_i1X_integrals.txt	exists
131gap020.000x-02.00y+00.00_i1X_integrals.txt	exists
132gap020.000x-01.00y+00.00_i1X_integrals.txt	exists
133gap020.000x+00.00y+00.00_i1X_integrals.txt	exists
134gap020.000x+01.00y+00.00_i1X_integrals.txt	exists
135gap020.000x+02.00y+00.00_i1X_integrals.txt	exists
151gap020.000x+00.00y-02.00_i1X_integrals.txt	exists
152gap020.000x+00.00y-01.00_i1X_integrals.txt	exists
133gap020.000x+00.00y+00.00_i1X_integrals.txt	exists
154gap020.000x+00.00y+01.00_i1X_integrals.txt	exists
155gap020.000x+00.00y+02.00_i1X_integrals.txt	exists
171gap030.000x-02.00y+00.00_i1X_integrals.txt	exists
172gap030.000x-01.00y+00.00_i1X_integrals.txt	exists
173gap030.000x+00.00y+00.00_i1X_integrals.txt	exists
174gap030.000x+01.00y+00.00_i1X_integrals.txt	exists
175gap030.000x+02.00y+00.00_i1X_integrals.txt	exists
191gap030.000x+00.00y-02.00_i1X_integrals.txt	exists
192gap030.000x+00.00y-01.00_i1X_integrals.txt	exists
173gap030.000x+00.00y+00.00_i1X_integrals.txt	exists
194gap030.000x+00.00y+01.00_i1X_integrals.txt	exists
195gap030.000x+00.00y+02.00_i1X_integrals.txt	exists
211gap100.000x-02.00y+00.00_i1X_integrals.txt	exists

212gap100.000x-01.00y+00.00_i1X_integrals.txt	exists
213gap100.000x+00.00y+00.00_i1X_integrals.txt	exists
214gap100.000x+01.00y+00.00_i1X_integrals.txt	exists
215gap100.000x+02.00y+00.00_i1X_integrals.txt	exists
231gap100.000x+00.00y-02.00_i1X_integrals.txt	exists
232gap100.000x+00.00y-01.00_i1X_integrals.txt	exists
213gap100.000x+00.00y+00.00_i1X_integrals.txt	exists
234gap100.000x+00.00y+01.00_i1X_integrals.txt	exists
235gap100.000x+00.00y+02.00_i1X_integrals.txt	exists
016gap010.000x-02.00y+00.00_i2X_integrals.txt	exists
017gap010.000x-01.00y+00.00_i2X_integrals.txt	exists
018gap010.000x+00.00y+00.00_i2X_integrals.txt	exists
019gap010.000x+01.00y+00.00_i2X_integrals.txt	exists
020gap010.000x+02.00y+00.00_i2X_integrals.txt	exists
036gap010.000x+00.00y-02.00_i2X_integrals.txt	exists
037gap010.000x+00.00y-01.00_i2X_integrals.txt	exists
018gap010.000x+00.00y+00.00_i2X_integrals.txt	exists
039gap010.000x+00.00y+01.00_i2X_integrals.txt	exists
040gap010.000x+00.00y+02.00_i2X_integrals.txt	exists
056gap012.000x-02.00y+00.00_i2X_integrals.txt	exists
057gap012.000x-01.00y+00.00_i2X_integrals.txt	exists
058gap012.000x+00.00y+00.00_i2X_integrals.txt	exists
059gap012.000x+01.00y+00.00_i2X_integrals.txt	exists
060gap012.000x+02.00y+00.00_i2X_integrals.txt	exists
076gap012.000x+00.00y-02.00_i2X_integrals.txt	exists
077gap012.000x+00.00y-01.00_i2X_integrals.txt	exists
058gap012.000x+00.00y+00.00_i2X_integrals.txt	exists
079gap012.000x+00.00y+01.00_i2X_integrals.txt	exists
080gap012.000x+00.00y+02.00_i2X_integrals.txt	exists
096gap015.000x-02.00y+00.00_i2X_integrals.txt	exists
097gap015.000x-01.00y+00.00_i2X_integrals.txt	exists
098gap015.000x+00.00y+00.00_i2X_integrals.txt	exists
099gap015.000x+01.00y+00.00_i2X_integrals.txt	exists
100gap015.000x+02.00y+00.00_i2X_integrals.txt	exists
116gap015.000x+00.00y-02.00_i2X_integrals.txt	exists
117gap015.000x+00.00y-01.00_i2X_integrals.txt	exists
098gap015.000x+00.00y+00.00_i2X_integrals.txt	exists
119gap015.000x+00.00y+01.00_i2X_integrals.txt	exists

120gap015.000x+00.00y+02.00_i2X_integrals.txt	exists
136gap020.000x-02.00y+00.00_i2X_integrals.txt	exists
137gap020.000x-01.00y+00.00_i2X_integrals.txt	exists
138gap020.000x+00.00y+00.00_i2X_integrals.txt	exists
139gap020.000x+01.00y+00.00_i2X_integrals.txt	exists
140gap020.000x+02.00y+00.00_i2X_integrals.txt	exists
156gap020.000x+00.00y-02.00_i2X_integrals.txt	exists
157gap020.000x+00.00y-01.00_i2X_integrals.txt	exists
138gap020.000x+00.00y+00.00_i2X_integrals.txt	exists
159gap020.000x+00.00y+01.00_i2X_integrals.txt	exists
160gap020.000x+00.00y+02.00_i2X_integrals.txt	exists
176gap030.000x-02.00y+00.00_i2X_integrals.txt	exists
177gap030.000x-01.00y+00.00_i2X_integrals.txt	exists
178gap030.000x+00.00y+00.00_i2X_integrals.txt	exists
179gap030.000x+01.00y+00.00_i2X_integrals.txt	exists
180gap030.000x+02.00y+00.00_i2X_integrals.txt	exists
196gap030.000x+00.00y-02.00_i2X_integrals.txt	exists
197gap030.000x+00.00y-01.00_i2X_integrals.txt	exists
178gap030.000x+00.00y+00.00_i2X_integrals.txt	exists
199gap030.000x+00.00y+01.00_i2X_integrals.txt	exists
200gap030.000x+00.00y+02.00_i2X_integrals.txt	exists
216gap100.000x-02.00y+00.00_i2X_integrals.txt	exists
217gap100.000x-01.00y+00.00_i2X_integrals.txt	exists
218gap100.000x+00.00y+00.00_i2X_integrals.txt	exists
219gap100.000x+01.00y+00.00_i2X_integrals.txt	exists
220gap100.000x+02.00y+00.00_i2X_integrals.txt	exists
236gap100.000x+00.00y-02.00_i2X_integrals.txt	exists
237gap100.000x+00.00y-01.00_i2X_integrals.txt	exists
218gap100.000x+00.00y+00.00_i2X_integrals.txt	exists
239gap100.000x+00.00y+01.00_i2X_integrals.txt	exists
240gap100.000x+00.00y+02.00_i2X_integrals.txt	exists
001gap010.000x-02.00y+00.00_i1Y_integrals.txt	exists
002gap010.000x-01.00y+00.00_i1Y_integrals.txt	exists
003gap010.000x+00.00y+00.00_i1Y_integrals.txt	exists
004gap010.000x+01.00y+00.00_i1Y_integrals.txt	exists
005gap010.000x+02.00y+00.00_i1Y_integrals.txt	exists
021gap010.000x+00.00y-02.00_i1Y_integrals.txt	exists
022gap010.000x+00.00y-01.00_i1Y_integrals.txt	exists

003gap010.000x+00.00y+00.00_i1Y_integrals.txt	exists
024gap010.000x+00.00y+01.00_i1Y_integrals.txt	exists
025gap010.000x+00.00y+02.00_i1Y_integrals.txt	exists
041gap012.000x-02.00y+00.00_i1Y_integrals.txt	exists
042gap012.000x-01.00y+00.00_i1Y_integrals.txt	exists
043gap012.000x+00.00y+00.00_i1Y_integrals.txt	exists
044gap012.000x+01.00y+00.00_i1Y_integrals.txt	exists
045gap012.000x+02.00y+00.00_i1Y_integrals.txt	exists
061gap012.000x+00.00y-02.00_i1Y_integrals.txt	exists
062gap012.000x+00.00y-01.00_i1Y_integrals.txt	exists
043gap012.000x+00.00y+00.00_i1Y_integrals.txt	exists
064gap012.000x+00.00y+01.00_i1Y_integrals.txt	exists
065gap012.000x+00.00y+02.00_i1Y_integrals.txt	exists
081gap015.000x-02.00y+00.00_i1Y_integrals.txt	exists
082gap015.000x-01.00y+00.00_i1Y_integrals.txt	exists
083gap015.000x+00.00y+00.00_i1Y_integrals.txt	exists
084gap015.000x+01.00y+00.00_i1Y_integrals.txt	exists
085gap015.000x+02.00y+00.00_i1Y_integrals.txt	exists
101gap015.000x+00.00y-02.00_i1Y_integrals.txt	exists
102gap015.000x+00.00y-01.00_i1Y_integrals.txt	exists
083gap015.000x+00.00y+00.00_i1Y_integrals.txt	exists
104gap015.000x+00.00y+01.00_i1Y_integrals.txt	exists
105gap015.000x+00.00y+02.00_i1Y_integrals.txt	exists
121gap020.000x-02.00y+00.00_i1Y_integrals.txt	exists
122gap020.000x-01.00y+00.00_i1Y_integrals.txt	exists
123gap020.000x+00.00y+00.00_i1Y_integrals.txt	exists
124gap020.000x+01.00y+00.00_i1Y_integrals.txt	exists
125gap020.000x+02.00y+00.00_i1Y_integrals.txt	exists
141gap020.000x+00.00y-02.00_i1Y_integrals.txt	exists
142gap020.000x+00.00y-01.00_i1Y_integrals.txt	exists
123gap020.000x+00.00y+00.00_i1Y_integrals.txt	exists
144gap020.000x+00.00y+01.00_i1Y_integrals.txt	exists
145gap020.000x+00.00y+02.00_i1Y_integrals.txt	exists
161gap030.000x-02.00y+00.00_i1Y_integrals.txt	exists
162gap030.000x-01.00y+00.00_i1Y_integrals.txt	exists
163gap030.000x+00.00y+00.00_i1Y_integrals.txt	exists
164gap030.000x+01.00y+00.00_i1Y_integrals.txt	exists
165gap030.000x+02.00y+00.00_i1Y_integrals.txt	exists

181gap030.000x+00.00y-02.00_i1Y_integrals.txt	exists
182gap030.000x+00.00y-01.00_i1Y_integrals.txt	exists
163gap030.000x+00.00y+00.00_i1Y_integrals.txt	exists
184gap030.000x+00.00y+01.00_i1Y_integrals.txt	exists
185gap030.000x+00.00y+02.00_i1Y_integrals.txt	exists
201gap100.000x-02.00y+00.00_i1Y_integrals.txt	exists
202gap100.000x-01.00y+00.00_i1Y_integrals.txt	exists
203gap100.000x+00.00y+00.00_i1Y_integrals.txt	exists
204gap100.000x+01.00y+00.00_i1Y_integrals.txt	exists
205gap100.000x+02.00y+00.00_i1Y_integrals.txt	exists
221gap100.000x+00.00y-02.00_i1Y_integrals.txt	exists
222gap100.000x+00.00y-01.00_i1Y_integrals.txt	exists
203gap100.000x+00.00y+00.00_i1Y_integrals.txt	exists
224gap100.000x+00.00y+01.00_i1Y_integrals.txt	exists
225gap100.000x+00.00y+02.00_i1Y_integrals.txt	exists
006gap010.000x-02.00y+00.00_i2Y_integrals.txt	exists
007gap010.000x-01.00y+00.00_i2Y_integrals.txt	exists
008gap010.000x+00.00y+00.00_i2Y_integrals.txt	exists
009gap010.000x+01.00y+00.00_i2Y_integrals.txt	exists
010gap010.000x+02.00y+00.00_i2Y_integrals.txt	exists
026gap010.000x+00.00y-02.00_i2Y_integrals.txt	exists
027gap010.000x+00.00y-01.00_i2Y_integrals.txt	exists
008gap010.000x+00.00y+00.00_i2Y_integrals.txt	exists
029gap010.000x+00.00y+01.00_i2Y_integrals.txt	exists
030gap010.000x+00.00y+02.00_i2Y_integrals.txt	exists
046gap012.000x-02.00y+00.00_i2Y_integrals.txt	exists
047gap012.000x-01.00y+00.00_i2Y_integrals.txt	exists
048gap012.000x+00.00y+00.00_i2Y_integrals.txt	exists
049gap012.000x+01.00y+00.00_i2Y_integrals.txt	exists
050gap012.000x+02.00y+00.00_i2Y_integrals.txt	exists
066gap012.000x+00.00y-02.00_i2Y_integrals.txt	exists
067gap012.000x+00.00y-01.00_i2Y_integrals.txt	exists
048gap012.000x+00.00y+00.00_i2Y_integrals.txt	exists
069gap012.000x+00.00y+01.00_i2Y_integrals.txt	exists
070gap012.000x+00.00y+02.00_i2Y_integrals.txt	exists
086gap015.000x-02.00y+00.00_i2Y_integrals.txt	exists
087gap015.000x-01.00y+00.00_i2Y_integrals.txt	exists
088gap015.000x+00.00y+00.00_i2Y_integrals.txt	exists

089gap015.000x+01.00y+00.00_i2Y_integrals.txt	exists
090gap015.000x+02.00y+00.00_i2Y_integrals.txt	exists
106gap015.000x+00.00y-02.00_i2Y_integrals.txt	exists
107gap015.000x+00.00y-01.00_i2Y_integrals.txt	exists
088gap015.000x+00.00y+00.00_i2Y_integrals.txt	exists
109gap015.000x+00.00y+01.00_i2Y_integrals.txt	exists
110gap015.000x+00.00y+02.00_i2Y_integrals.txt	exists
126gap020.000x-02.00y+00.00_i2Y_integrals.txt	exists
127gap020.000x-01.00y+00.00_i2Y_integrals.txt	exists

Sub Folder: Z Scans\Stretched Wire\On Axis exists

003gap010.000x+00.00y+00.00_i1X_integrals.txt	exists
007gap012.000x+00.00y+00.00_i1X_integrals.txt	exists
011gap014.000x+00.00y+00.00_i1X_integrals.txt	exists
015gap016.000x+00.00y+00.00_i1X_integrals.txt	exists
019gap018.000x+00.00y+00.00_i1X_integrals.txt	exists
023gap020.000x+00.00y+00.00_i1X_integrals.txt	exists
027gap022.000x+00.00y+00.00_i1X_integrals.txt	exists
031gap024.000x+00.00y+00.00_i1X_integrals.txt	exists
035gap026.000x+00.00y+00.00_i1X_integrals.txt	exists
039gap028.000x+00.00y+00.00_i1X_integrals.txt	exists
043gap030.000x+00.00y+00.00_i1X_integrals.txt	exists
051gap040.000x+00.00y+00.00_i1X_integrals.txt	exists
055gap050.000x+00.00y+00.00_i1X_integrals.txt	exists
059gap060.000x+00.00y+00.00_i1X_integrals.txt	exists
063gap070.000x+00.00y+00.00_i1X_integrals.txt	exists
067gap080.000x+00.00y+00.00_i1X_integrals.txt	exists
071gap090.000x+00.00y+00.00_i1X_integrals.txt	exists
075gap100.000x+00.00y+00.00_i1X_integrals.txt	exists
004gap010.000x+00.00y+00.00_i2X_integrals.txt	exists
008gap012.000x+00.00y+00.00_i2X_integrals.txt	exists
012gap014.000x+00.00y+00.00_i2X_integrals.txt	exists
016gap016.000x+00.00y+00.00_i2X_integrals.txt	exists
020gap018.000x+00.00y+00.00_i2X_integrals.txt	exists
024gap020.000x+00.00y+00.00_i2X_integrals.txt	exists
028gap022.000x+00.00y+00.00_i2X_integrals.txt	exists
032gap024.000x+00.00y+00.00_i2X_integrals.txt	exists
036gap026.000x+00.00y+00.00_i2X_integrals.txt	exists

040gap028.000x+00.00y+00.00_i2X_integrals.txt	exists
044gap030.000x+00.00y+00.00_i2X_integrals.txt	exists
052gap040.000x+00.00y+00.00_i2X_integrals.txt	exists
056gap050.000x+00.00y+00.00_i2X_integrals.txt	exists
060gap060.000x+00.00y+00.00_i2X_integrals.txt	exists
064gap070.000x+00.00y+00.00_i2X_integrals.txt	exists
068gap080.000x+00.00y+00.00_i2X_integrals.txt	exists
072gap090.000x+00.00y+00.00_i2X_integrals.txt	exists
076gap100.000x+00.00y+00.00_i2X_integrals.txt	exists
001gap010.000x+00.00y+00.00_i1Y_integrals.txt	exists
005gap012.000x+00.00y+00.00_i1Y_integrals.txt	exists
009gap014.000x+00.00y+00.00_i1Y_integrals.txt	exists
013gap016.000x+00.00y+00.00_i1Y_integrals.txt	exists
017gap018.000x+00.00y+00.00_i1Y_integrals.txt	exists
021gap020.000x+00.00y+00.00_i1Y_integrals.txt	exists
025gap022.000x+00.00y+00.00_i1Y_integrals.txt	exists
029gap024.000x+00.00y+00.00_i1Y_integrals.txt	exists
033gap026.000x+00.00y+00.00_i1Y_integrals.txt	exists
037gap028.000x+00.00y+00.00_i1Y_integrals.txt	exists
041gap030.000x+00.00y+00.00_i1Y_integrals.txt	exists
049gap040.000x+00.00y+00.00_i1Y_integrals.txt	exists
053gap050.000x+00.00y+00.00_i1Y_integrals.txt	exists
057gap060.000x+00.00y+00.00_i1Y_integrals.txt	exists
061gap070.000x+00.00y+00.00_i1Y_integrals.txt	exists
065gap080.000x+00.00y+00.00_i1Y_integrals.txt	exists
069gap090.000x+00.00y+00.00_i1Y_integrals.txt	exists
073gap100.000x+00.00y+00.00_i1Y_integrals.txt	exists
002gap010.000x+00.00y+00.00_i2Y_integrals.txt	exists
006gap012.000x+00.00y+00.00_i2Y_integrals.txt	exists
010gap014.000x+00.00y+00.00_i2Y_integrals.txt	exists
014gap016.000x+00.00y+00.00_i2Y_integrals.txt	exists
018gap018.000x+00.00y+00.00_i2Y_integrals.txt	exists
022gap020.000x+00.00y+00.00_i2Y_integrals.txt	exists
026gap022.000x+00.00y+00.00_i2Y_integrals.txt	exists
030gap024.000x+00.00y+00.00_i2Y_integrals.txt	exists
034gap026.000x+00.00y+00.00_i2Y_integrals.txt	exists
038gap028.000x+00.00y+00.00_i2Y_integrals.txt	exists
042gap030.000x+00.00y+00.00_i2Y_integrals.txt	exists

050gap040.000x+00.00y+00.00_i2Y_integrals.txt	exists
054gap050.000x+00.00y+00.00_i2Y_integrals.txt	exists
058gap060.000x+00.00y+00.00_i2Y_integrals.txt	exists
062gap070.000x+00.00y+00.00_i2Y_integrals.txt	exists
066gap080.000x+00.00y+00.00_i2Y_integrals.txt	exists
070gap090.000x+00.00y+00.00_i2Y_integrals.txt	exists
074gap100.000x+00.00y+00.00_i2Y_integrals.txt	exists

Sub Folder: Controls Data exists

sxps_16338_i1x_vs_gap_spline.dat	exists
sxps_16338_i1y_vs_gap_spline.dat	exists
sxps_16338_i2x_vs_gap_spline.dat	exists
sxps_16338_i2y_vs_gap_spline.dat	exists

Summary of findings

Finding	Solution

Approval and Assignment by Heinz-Dieter Nuhn:

Data Storage Checked:	Y	Y/N
Magnet accepted:	Y	Y/N
Assigned Location	SXPS-16338	Phase Shifter Name

Heinz-Dieter Nuhn	Heinz-Dieter Nuhn	7/24/2018
(Signature)	(Name)	(Date)