Very sensitive Elemental and Structural Probe Employing Radiation from a Synchrotron (VESPERS)

Revised: April 29th, 2019

This is a document to explain the formats of the data file collected on VESPERS beamline. Please be noted that different technique may have its own data file associated. Data file formats will vary depending on the which X-ray fluorescence detector is used. At VESPERS, there are three X-ray fluorescence detectors: single element Vortex detector, 4-element Vortex detector, and 13-element germanium detector.

Table of Contents:

1. Files for Different X-ray Fluorescence Detectors

1.1. Files for Single Element Vortex Detector

In general, there are always three files saved when using the single element Vortex detector and they end with:

- Filename.dat
- filename_SingleElementXMapVortex.dat
- filename_SingleElementXMapVortexRaw.dat

The _SingleElementXMapVortex.dat file contains the deadtime-corrected spectrum output from either the single-element Vortex detector for each point. The spectra have 2048 channels and therefore each row in the _SingleElementXMapVortex.dat.dat file is a complete spectrum. The _SingleElementXMapVortexRaw.dat file contains the raw (i.e. not deadtime corrected) spectrum output from either the single-element Vortex detector for each point. Note that there is an option to export the spectra in columns instead of rows when setting up a scan.

1.2. Files for 4-Element Vortex Detector

In general, there are always six files saved when using the 4-element Vortex detector and they end with:

- Filename.dat
- filename_FourElementXMapVortex.dat
- filename_FourElementXMapVortexSpectrum1.dat
- filename_FourElementXMapVortexSpectrum2.dat
- filename_FourElementXMapVortexSpectrum3.dat
- filename_FourElementXMapVortexSpectrum4.dat

The _FourElementXMapVortex.dat file contains the summed deadtime-corrected spectrum output from the 4-element Vortex detector for each data point. The spectra have 2048 channels and therefore each row in the _FourElementXMapVortex.dat.dat file is a complete spectrum. Note that there is an option to export the spectra in columns instead of rows when setting up a scan. The spectra in the _FourElementXMapVortex.dat file are the deadtime-corrected sum of a four channels of the 4-element Vortex detector. Raw spectrum for each data point of each channel can be found in the _FourElementXMapVortexSpectrum.dat files. There are four _FourElementXMapVortexSpectrum.dat files (labelled 1-4) for each element of the four-element Vortex detector.

1.3. Files for 13-Element Germanium Detector

In general, there are always 14 files saved when using the 13-element Germanium detector and they end with:

- Filename.dat
- filename_13GeEl.dat
- filename_13GeElementRawSpectrum1.dat
- filename_13GeElementRawSpectrum2.dat
- filename_13GeElementRawSpectrum3.dat
- filename_13GeElementRawSpectrum4.dat
- filename_13GeElementRawSpectrum5.dat
- filename_13GeElementRawSpectrum6.dat
- filename_13GeElementRawSpectrum7.dat
- filename_13GeElementRawSpectrum8.dat
- filename_13GeElementRawSpectrum9.dat
- filename_13GeElementRawSpectrum10.dat
- filename_13GeElementRawSpectrum11.dat
- filename_13GeElementRawSpectrum12.dat

The _13GeEl.dat file contains the summed deadtime-corrected spectrum output from the 13-element germanium detector for each data point. The spectra have 2048 channels and therefore each row in the _13GeEl.dat file is a complete spectrum. Note that there is an option to export the spectra in columns instead of rows when setting up a scan. Raw spectrum (i.e. not deadtime-corrected) for each data point of each channel can be found in the _F13GeElementRawSpectrum.dat files. There are 12 _FourElementXMapVortexSpectrum.dat files for each active element of the 13-element germanium detector (13th element is not currently active).

1.4. Files for the Single and 4-Element Vortex Detectors

In general, there are always six files saved when using the 1- and4-element Vortex detectors at the same time and they end with:

- Filename.dat
- filename_SingleElementXMapVortex.dat
- filename_SingleElementXMapVortexRaw.dat

- filename_FourElementXMapVortex.dat
- filename_FourElementXMapVortexSpectrum1.dat
- filename_FourElementXMapVortexSpectrum2.dat
- filename_FourElementXMapVortexSpectrum3.dat
- filename_FourElementXMapVortexSpectrum4.dat

The _SingleElementXMapVortex.dat and _FourElementXMapVortex.dat files contains the summed deadtime-corrected spectrum output from the 1- and4-element Vortex detector for each data point, respective. The spectra have 2048 channels and therefore each row in the _SingleElementXMapVortex.dat and _FourElementXMapVortex.dat files are a complete spectrum. Note that there is an option to export the spectra in columns instead of rows when setting up a scan. Raw spectrum for each data point of each element can be found in the filename_SingleElementXMapVortexRaw.dat and _FourElementXMapVortexSpectrum.dat files. There are four _FourElementXMapVortexSpectrum.dat files for each element of the 4-element Vortex detector.

2. Data files

The next section will be a breakdown of each .dat type for each type of scan available at VESPERS. Important note: In all the data files there will be columns that are denoted set points and others which are denoted feedback. When doing data analysis, use the feedback points whenever possible. These will reflect experimental condition more accurately. Also, the number lines in the header and columns in the data file will vary depending on the number of Regions of Interest and if users are collecting XRD patterns with their scans.

2.1. 2D Mapping

2.1.1. 2D Mapping Data File Header

Sections	Description
1	Scan name and the iteration number.
2	Data in the format YYYY:MM:DD HH:MM:SS.
3	Facility: VESPERS Beamline.
4	Fluorescence Detector: Either Single-element XMAP Vortex, 4-element XMAP Vortex, or 13-element germanium.
5	Will show which Ion chamber was selected for the I0 signal (Isplit, IpreKB, Imini, or Ipost) and a short description on the location of the ion chamber.

6	Will show information on the selected region of interests. The number of lines in this section will vary depending on the number of selected regions of interest. Includes information on the element of interest, X-ray fluorescence line, and the captured energy range (eV) used to create the XRF maps.
7	Will show which motors were used in the experiment (i.e. H and V or X and Z).
8	Map Dimensions: Will show the start and end positions for each Axis as well as the motor step size.
9	Will show the coordinates for the focus position (i.e. the Y or N motor).
10	Detector to sample distance in millimeters.
11	Type of beam used. Either Pink, Si, 1.6% Bandpass, or 10% bandpass.
12	Aluminum filter thickness. Will vary between 0-800 µm.
13	Horizontal and vertical slit size. Size will generally depend on the type of beam used for the experiment.
14	Gas in in ion chambers. Generally will be N_2.
15	Ion chamber gain settings.

2.1.2. 2D Mapping Scan File Columns (Single Element Vortex Detector)

Column	Name	Description
1	H or X	Set point of sample coordinate in horizontal direction.
2	V or Z	Set point of sample coordinate in vertical direction.
3	SampleH(X)Feedback	Feedback of sample coordinate in horizontal direction.
4	SampleV(Z)Feedback	Feedback of sample coordinate in vertical direction.
5	SplitIonChamber	Split ion chamber output.
6	PreKBIonChamber	Pre-KB mirror ion chamber output.
7	MiniIonChamber	Mini ion chamber output.
8	PostIonChamber	Post sample ion chamber output.
9	MasterDwellTime	Dwell time for each data point.
10	RingCurrent	Electron current in the storage ring when data was taken.
11	SingleElementXMapVortexDeadTime	Dead-time of Vortex detector expressed in percentage.
12	SingleElementXMapVortexRealTime	Real time. The amount of time the detector was active.
13	SingleElementXMapVortexLiveTime	Live time. The amount of time the detector was able to process signal. Live time = Real time – dead time.
14	SingleElementXMapVortexFastPeaks	Input count rate to the detector.
15	SingleElementXMapVortexSlowPeaks	Output count rate of the detector.
16	PilatusFileNumber	Name associated with the Pilatus diffraction image for each data point. Note that Pilatus diffraction image files are saved as a separate file. This column appears only if diffraction was enabled.

17	ROI	Deadtime-corrected counts for the selected region of interested.
18	normROI	ROI counts normalized to the I0 signal.
* Additional columns will consist of the deadtime-corrected ROI counts (ROI) and normalized ROI counts (normROI) for additional regions of interest. The number of additional columns will depend on the number of selected regions of interest		

2.1.3. 2D Mapping Scan File Columns (4-Element Vortex Detector)

Column	Name	Description
1	H or X	Set point of sample coordinate in horizontal direction.
2	V or Z	Set point of sample coordinate in vertical direction.
3	SampleH(X)Feedback	Feedback of sample coordinate in horizontal direction.
4	SampleV(Z)Feedback	Feedback of sample coordinate in vertical direction.
5	SplitIonChamber	Split ion chamber output.
6	PreKBIonChamber	Pre-KB mirror ion chamber output.
7	MiniIonChamber	Mini ion chamber output.
8	PostIonChamber	Post sample ion chamber output.
9	MasterDwellTime	Dwell time for each data point.
10	RingCurrent	Electron current in the storage ring when data was taken.
11	FourElementXMapVortexDeadTime1	Dead-time of element 1 of the 4-element Vortex detector expressed in percentage.
12	FourElementXMapVortexRealTime1	Real time. The amount of time the 1st element of the 4-element Vortex Detector was active.
13	FourElementXMapVortexLiveTime1	Live time. The amount of time the 1st element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
14	FourElementXMapVortexFastPeaks1	Input count rate to the 1st element of the 4-element Vortex Detector.
15	FourElementXMapVortexSlowPeaks1	Output count rate of the 1st element of the 4-element Vortex Detector.
16	FourElementXMapVortexDeadTime2	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.
17	FourElementXMapVortexRealTime2	Real time. The amount of time the 2nd element of the 4-element Vortex Detector was active.
18	FourElementXMapVortexLiveTime2	Live time. The amount of time the 2nd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.

19	FourElementXMapVortexFastPeaks2	Input count rate to the 2nd element of the 4-element Vortex Detector.
20	FourElementXMapVortexSlowPeaks2	Output count rate of the 2nd element of the 4-element Vortex Detector.
21	FourElementXMapVortexDeadTime3	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.
22	FourElementXMapVortexRealTime3	Real time. The amount of time the 3rd element of the 4-element Vortex Detector was active.
23	FourElementXMapVortexLiveTime3	Live time. The amount of time the 3rd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
24	FourElementXMapVortexFastPeaks3	Input count rate to the 3rd element of the 4-element Vortex Detector.
25	FourElementXMapVortexSlowPeaks3	Output count rate of the 3rd element of the 4-element Vortex Detector.
26	FourElementXMapVortexDeadTime4	Dead-time of the 4th element of the 4-element Vortex detector expressed in percentage.
27	FourElementXMapVortexRealTime4	Real time. The amount of time the 4th element of the 4-element Vortex Detector was active.
28	FourElementXMapVortexLiveTime4	Live time. The amount of time the 4th element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
29	FourElementXMapVortexFastPeaks4	Input count rate to the 4th element of the 4-element Vortex Detector.
30	FourElementXMapVortexSlowPeaks4	Output count rate of the 4th element of the 4-element Vortex Detector.
31	PilatusFileNumber	Name associated with the Pilatus diffraction image for each data point. Note that Pilatus diffraction image files are saved as a separate file. This column appears only if diffraction was enabled.
32	ROI	Deadtime-corrected counts for the selected region of interested.
33	normROI	ROI counts normalized to the I0 signal.
* Additional columns will consist of the deadtime-corrected ROI counts (ROI) and normalized ROI counts (normROI) for additional regions of interest. The number of additional columns will depend on the number of selected regions of interest		

2.1.4. 2D Mapping Scan File Columns (13-Element Germanium Detector)

Column	Name	Description
1	X	Set point of sample coordinate in X direction.
2	Z	Set point of sample coordinate in Z direction.
3	BigBeamXFeedback	Feedback of sample coordinate in X direction.
4	BigBeamZFeedback	Feedback of sample coordinate in Z direction.
5	SplitIonChamber	Split ion chamber output.
6	PreKBIonChamber	Pre-KB mirror ion chamber output.
7	MiniIonChamber	Mini ion chamber output.
8	PostIonChamber	Post sample ion chamber output.
9	MasterDwellTime	Dwell time for each data point.
10	RingCurrent	Electron current in the storage ring when data was taken.
11	ROI	Deadtime-corrected counts for the selected region of interested.
12	normROI	ROI counts normalized to the I0 signal.
* Additional columns will consist of the deadtime-corrected ROI counts (ROI) and normalized ROI counts (normROI) for additional regions of interest. The number of additional columns will depend on the number of selected regions of interest		

2.1.5. 2D Mapping Scan File Columns (Single and 4-Element Vortex Detectors)

Column	Name	Description
1	H or X	Set point of sample coordinate in horizontal direction.
2	V or Z	Set point of sample coordinate in vertical direction.
3	SampleH(X)Feedback	Feedback of sample coordinate in horizontal direction.
4	SampleV(Z)Feedback	Feedback of sample coordinate in vertical direction.
5	SplitIonChamber	Split ion chamber output.
6	PreKBIonChamber	Pre-KB mirror ion chamber output.
7	MiniIonChamber	Mini ion chamber output.
8	PostIonChamber	Post sample ion chamber output.
9	MasterDwellTime	Dwell time for each data point.
10	RingCurrent	Electron current in the storage ring when data was taken.
11	SingleElementXMapVortexDeadTime	Dead-time of Vortex detector expressed in percentage.
12	SingleElementXMapVortexRealTime	Real time. The amount of time the detector was active.
13	SingleElementXMapVortexLiveTime	Live time. The amount of time the detector was able to process signal. Live time = Real time – dead time.
14	SingleElementXMapVortexFastPeaks	Input count rate to the detector.

15	SingleElementXMapVortexSlowPeaks	Output count rate of the detector.
16	FourElementXMapVortexRealTime1	Real time. The amount of time the 1st element of the 4-element Vortex Detector was active.
17	FourElementXMapVortexLiveTime1	Live time. The amount of time the 1st element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
18	FourElementXMapVortexFastPeaks1	Input count rate to the 1st element of the 4-element Vortex Detector.
19	FourElementXMapVortexSlowPeaks1	Output count rate of the 1st element of the 4-element Vortex Detector.
20	FourElementXMapVortexDeadTime2	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.
21	FourElementXMapVortexRealTime2	Real time. The amount of time the 2nd element of the 4-element Vortex Detector was active.
22	FourElementXMapVortexLiveTime2	Live time. The amount of time the 2nd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
23	FourElementXMapVortexFastPeaks2	Input count rate to the 2nd element of the 4-element Vortex Detector.
24	FourElementXMapVortexSlowPeaks2	Output count rate of the 2nd element of the 4-element Vortex Detector.
25	FourElementXMapVortexDeadTime3	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.
26	FourElementXMapVortexRealTime3	Real time. The amount of time the 3rd element of the 4-element Vortex Detector was active.
27	FourElementXMapVortexLiveTime3	Live time. The amount of time the 3rd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
28	FourElementXMapVortexFastPeaks3	Input count rate to the 3rd element of the 4-element Vortex Detector.
29	FourElementXMapVortexSlowPeaks3	Output count rate of the 3rd element of the 4-element Vortex Detector.
30	FourElementXMapVortexDeadTime4	Dead-time of the 4th element of the 4-element Vortex detector expressed in percentage.
31	FourElementXMapVortexRealTime4	Real time. The amount of time the 4th element of the 4-element Vortex Detector was active.
32	FourElementXMapVortexLiveTime4	Live time. The amount of time the 4th element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.

33	FourElementXMapVortexFastPeaks4	Input count rate to the 4th element of the 4-element Vortex Detector.
34	FourElementXMapVortexSlowPeaks4	Output count rate of the 4th element of the 4-element Vortex Detector.
35	PilatusFileNumber	Name associated with the Pilatus diffraction image for each data point. Note that Pilatus diffraction image files are saved as a separate file. This column appears only if diffraction was enabled.
36	ROI	Deadtime-corrected counts for the selected region of interested.
37	normROI	ROI counts normalized to the I0 signal.
* Additional columns will consist of the deadtime-corrected ROI counts (ROI) and normalized ROI counts (normROI) for additional regions of interest. The number of additional columns will depend on the number of selected regions of interest		

2.2. Line Scans

2.2.1. Line Scan Data File Header

Sections	Description
1	Scan name and the iteration number.
2	Data in the format YYYY:MM:DD HH:MM:SS.
3	Facility: VESPERS Beamline.
4	Fluorescence Detector: Either Single-element XMAP Vortex, 4-element XMAP Vortex, or 13-element germanium.
5	Will show which Ion chamber was selected for the I0 signal (Isplit, IpreKB, Imini, or Ipost) and a short description on the location of the ion chamber
6	Will show information on the selected region of interests. The number of lines in this section will vary depending on the number of selected regions of interest. Includes information on the element of interest, X-ray fluorescence line, and the captured energy range (eV) used to create the XRF maps.
7	Will show which motor direction is scanned.
8	Line Dimensions: Will show the start position, step size, end positions, and dwell time for each region of scan. Note that line scans can have multiple regions.
9	Will show the coordinates for the focus position (i.e. the Y or N motor).
10	Will show the coordinates for the motor in the fixed position.
11	Detector to sample distance in millimeters.
12	Type of beam used. Either Pink, Si, 1.6% Bandpass, or 10% bandpass.

13	Aluminum filter thickness. Will vary between 0-800 µm.
14	Horizontal and vertical slit size. Size will generally depend on the type of beam used for the experiment.
15	Gas in in ion chambers. Generally will be N_2.
16	Ion chamber gain settings.

2.2.2. Line Scan Data File Column (Single Element Vortex Detector)

Column	Name	Description
1	H(X) or V(Z)	Set point of sample coordinate in horizontal or vertical directions.
2	SampleH(X)Feedback or SampleV(Z)Feedback	Feedback of sample coordinate in horizontal or vertical directions.
3	SplitIonChamber	Split ion chamber output.
4	PreKBIonChamber	Pre-KB mirror ion chamber output.
5	MiniIonChamber	Mini ion chamber output.
6	PostIonChamber	Post sample ion chamber output.
7	MasterDwellTime	Dwell time for each data point.
8	RingCurrent	Electron current in the storage ring when data was taken.
9	SingleElementXMapVortexDeadTime	Dead-time of Vortex detector expressed in percentage.
10	SingleElementXMapVortexRealTime	Real time. The amount of time the detector was active.
11	SingleElementXMapVortexLiveTime	Live time. The amount of time the detector was able to process signal. Live time = Real time – dead time.
12	SingleElementXMapVortexFastPeaks	Input count rate to the detector.
15	SingleElementXMapVortexSlowPeaks	Output count rate of the detector.
16	PilatusFileNumber	Name associated with the Pilatus diffraction image for each data point. Note that Pilatus diffraction image files are saved as a separate file. This column appears only if diffraction was enabled.
17	ROI	Deadtime-corrected counts for the selected region of interested.
18	normROI	ROI counts normalized to the I0 signal.
* Additional columns will consist of the deadtime-corrected ROI counts (ROI) and normalized ROI counts (normROI) for additional regions of interest. The number of additional columns will depend on the number of selected regions of interest		

2.2.3. Line Scan Data File Column (4-Element Vortex Detector)

Column	Name	Description
1	H(X) or V(Z)	Set point of sample coordinate in horizontal or vertical directions.
2	SampleH(X)Feedback or SampleV(Z)Feedback	Feedback of sample coordinate in horizontal or vertical directions.
3	SplitIonChamber	Split ion chamber output.
4	PreKBIonChamber	Pre-KB mirror ion chamber output.
5	MiniIonChamber	Mini ion chamber output.
6	PostIonChamber	Post sample ion chamber output.
7	MasterDwellTime	Dwell time for each data point.
8	RingCurrent	Electron current in the storage ring when data was taken.
9	FourElementXMapVortexDeadTime1	Dead-time of element 1 of the 4-element Vortex detector expressed in percentage.
10	FourElementXMapVortexRealTime1	Real time. The amount of time the 1st element of the 4-element Vortex Detector was active.
11	FourElementXMapVortexLiveTime1	Live time. The amount of time the 1st element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
12	FourElementXMapVortexFastPeaks1	Input count rate to the 1st element of the 4-element Vortex Detector.
13	FourElementXMapVortexSlowPeaks1	Output count rate of the 1st element of the 4-element Vortex Detector.
14	FourElementXMapVortexDeadTime2	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.
15	FourElementXMapVortexRealTime2	Real time. The amount of time the 2nd element of the 4-element Vortex Detector was active.
16	FourElementXMapVortexLiveTime2	Live time. The amount of time the 2nd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
17	FourElementXMapVortexFastPeaks2	Input count rate to the 2nd element of the 4-element Vortex Detector.
18	FourElementXMapVortexSlowPeaks2	Output count rate of the 2nd element of the 4-element Vortex Detector.
19	FourElementXMapVortexDeadTime3	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.
20	FourElementXMapVortexRealTime3	Real time. The amount of time the 3rd element of the 4-element Vortex Detector was active.

21	FourElementXMapVortexLiveTime3	Live time. The amount of time the 3rd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
22	FourElementXMapVortexFastPeaks3	Input count rate to the 3rd element of the 4-element Vortex Detector.
23	FourElementXMapVortexSlowPeaks3	Output count rate of the 3rd element of the 4-element Vortex Detector.
24	FourElementXMapVortexDeadTime4	Dead-time of the 4th element of the 4-element Vortex detector expressed in percentage.
25	FourElementXMapVortexRealTime4	Real time. The amount of time the 4th element of the 4-element Vortex Detector was active.
26	FourElementXMapVortexLiveTime4	Live time. The amount of time the 4th element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
27	FourElementXMapVortexFastPeaks4	Input count rate to the 4th element of the 4-element Vortex Detector.
28	FourElementXMapVortexSlowPeaks4	Output count rate of the 4th element of the 4-element Vortex Detector.
29	PilatusFileNumber	Name associated with the Pilatus diffraction image for each data point. Note that Pilatus diffraction image files are saved as a separate file. This column appears only if diffraction was enabled.
30	ROI	Deadtime-corrected counts for the selected region of interested.
31	normROI	ROI counts normalized to the I0 signal.
* Additional columns will consist of the deadtime-corrected ROI counts (ROI) and normalized ROI counts (normROI) for additional regions of interest. The number of additional columns will depend on the number of selected regions of interest		

2.2.4. Line Scan Data File Column (13-Element Germanium Detector)

Column	Name	Description
1	X or Z	Set point of sample coordinate in horizontal (X) or vertical (Z) directions.
2	SampleXFeedback or SampleZFeedback	Feedback of sample coordinate in horizontal (X) or vertical (Z) directions.
3	SplitIonChamber	Split ion chamber output.
4	PreKBIonChamber	Pre-KB mirror ion chamber output.

5	MiniIonChamber	Mini ion chamber output.
6	PostIonChamber	Post sample ion chamber output.
7	MasterDwellTime	Dwell time for each data point.
8	RingCurrent	Electron current in the storage ring when data was taken.
9	ROI	Deadtime-corrected counts for the selected region of interested.
10	normROI	ROI counts normalized to the I0 signal.
* Additional columns will consist of the deadtime-corrected ROI counts (ROI) and normalized ROI counts (normROI) for additional regions of interest. The number of additional columns will depend on the number of selected regions of interest		

2.2.5. Line Scan Data File Column (Single and 4-Element Vortex Detectors)

Column	Name	Description
1	H(X) or V(Z)	Set point of sample coordinate in horizontal or vertical directions.
2	SampleH(X)Feedback or SampleV(Z)Feedback	Feedback of sample coordinate in horizontal or vertical directions.
3	SplitIonChamber	Split ion chamber output.
4	PreKBIonChamber	Pre-KB mirror ion chamber output.
5	MiniIonChamber	Mini ion chamber output.
6	PostIonChamber	Post sample ion chamber output.
7	MasterDwellTime	Dwell time for each data point.
8	RingCurrent	Electron current in the storage ring when data was taken.
9	SingleElementXMapVortexDeadTime	Dead-time of Vortex detector expressed in percentage.
10	SingleElementXMapVortexRealTime	Real time. The amount of time the detector was active.
11	SingleElementXMapVortexLiveTime	Live time. The amount of time the detector was able to process signal. Live time = Real time – dead time.
12	SingleElementXMapVortexFastPeaks	Input count rate to the detector.
13	SingleElementXMapVortexSlowPeaks	Output count rate of the detector.
14	FourElementXMapVortexRealTime1	Real time. The amount of time the 1st element of the 4-element Vortex Detector was active.
15	FourElementXMapVortexLiveTime1	Live time. The amount of time the 1st element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
16	FourElementXMapVortexFastPeaks1	Input count rate to the 1st element of the 4-element Vortex Detector.
17	FourElementXMapVortexSlowPeaks1	Output count rate of the 1st element of the 4-element Vortex Detector.

18	FourElementXMapVortexDeadTime2	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.
19	FourElementXMapVortexRealTime2	Real time. The amount of time the 2nd element of the 4-element Vortex Detector was active.
20	FourElementXMapVortexLiveTime2	Live time. The amount of time the 2nd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
21	FourElementXMapVortexFastPeaks2	Input count rate to the 2nd element of the 4-element Vortex Detector.
22	FourElementXMapVortexSlowPeaks2	Output count rate of the 2nd element of the 4-element Vortex Detector.
23	FourElementXMapVortexDeadTime3	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.
24	FourElementXMapVortexRealTime3	Real time. The amount of time the 3rd element of the 4-element Vortex Detector was active.
25	FourElementXMapVortexLiveTime3	Live time. The amount of time the 3rd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
26	FourElementXMapVortexFastPeaks3	Input count rate to the 3rd element of the 4-element Vortex Detector.
27	FourElementXMapVortexSlowPeaks3	Output count rate of the 3rd element of the 4-element Vortex Detector.
28	FourElementXMapVortexDeadTime4	Dead-time of the 4th element of the 4-element Vortex detector expressed in percentage.
29	FourElementXMapVortexRealTime4	Real time. The amount of time the 4th element of the 4-element Vortex Detector was active.
30	FourElementXMapVortexLiveTime4	Live time. The amount of time the 4th element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
31	FourElementXMapVortexFastPeaks4	Input count rate to the 4th element of the 4-element Vortex Detector.
32	FourElementXMapVortexSlowPeaks4	Output count rate of the 4th element of the 4-element Vortex Detector.
33	PilatusFileNumber	Name associated with the Pilatus diffraction image for each data point. Note that Pilatus diffraction image files are saved as a separate file. This column appears only if diffraction was enabled.
34	ROI	Deadtime-corrected counts for the selected region of interested.

35	normROI	ROI counts normalized to the I0 signal.
* Additional columns will consist of the deadtime-corrected ROI counts (ROI) and normalized ROI counts (normROI) for additional regions of interest. The number of additional columns will depend on the number of selected regions of interest		

2.3. XAS Scans

2.3.1. XAS Scan Data File Header

Sections	Description
1	Scan name and the iteration number.
2	Data in the format YYYY:MM:DD HH:MM:SS.
3	Facility: CLS VESPERS Beamline.
4	Scanned edge: will show which X-ray absorption edge was scanned in the experiment.
5	Fluorescence Detector: Either Single-element XMAP Vortex, 4-element XMAP Vortex, or 13-element germanium.
6	Will show which Ion chamber was selected for the I0 signal (Isplit, IpreKB, Imini, or Ipost) and a short description on the location of the ion chamber.
7	Will show which Ion chamber was selected for the It signal (Isplit, IpreKB, Imini, or Ipost) and a short description on the location of the ion chamber.
8	When setting up the experiment, there is an option to automatically move to a specific location of a sample. This section will show if a user selected this option.
9	Focus position: will show the coordinates for the focus position in millimeters.
10	Will show information on the selected region of interests. The number of lines in this section will vary depending on the number of selected regions of interest. Includes information on the element of interest, X-ray fluorescence line, and the captured energy range (eV) used to create the XRF maps.
11	Regions scanned. Will show the start and end position of each energy region as well as the energy step size and dwell time for each region. Note that the end position and step size on the last energy region will be shown in k-space if users select the EXAFS scan option.
12	The coordinates for the horizontal and vertical positions.
13	Detector to sample distance in millimeters.
14	Type of beam used. Either Si, 1.6% Bandpass, or 10% bandpass.
15	Aluminum filter thickness. Will vary between 0-800 µm.
16	Horizontal and vertical slit size. Size will generally depend on the type of beam used for the experiment.
17	Gas in in ion chambers. Generally will be N_2.
18	Ion chamber gain settings.

19	A note that the I0.X signal is the energy feedback.

2.3.2. XAS Scan Data File Column (Single Element Vortex Detector)

Column	Name	Description
1	I0.X	Feedback energy from the monochromator.
2	SplitIonChamber	Split ion chamber output.
3	PreKBIonChamber	Pre-KB mirror ion chamber output.
4	MiniIonChamber	Mini ion chamber output.
5	PostIonChamber	Post sample ion chamber output.
6	MasterDwellTime	Dwell time for each data point.
7	RingCurrent	Electron current in the storage ring when data was taken.
8	EnergySetpoint	Set point of Energy for monochromator.
9	EnergyFeedback	Feedback of energy from monochromator.
9	SingleElementXMapVortexDeadTime	Dead-time of Vortex detector expressed in percentage.
10	SingleElementXMapVortexRealTime	Real time. The amount of time the detector was active.
11	SingleElementXMapVortexLiveTime	Live time. The amount of time the detector was able to process signal. Live time = Real time – dead time.
12	SingleElementXMapVortexFastPeaks	Input count rate to the detector.
13	SingleElementXMapVortexSlowPeaks	Output count rate of the detector.
14	k-space	K values for EXAFS measurements.
15	ROI	Deadtime-corrected counts for the selected region of interested.
16	normROI	ROI counts normalized to the I0 signal.
* Additional columns will consist of the deadtime-corrected ROI counts (ROI) and normalized ROI counts (normROI) for additional regions of interest. The number of additional columns will depend on the number of selected regions of interest		
Last Column	Trans	Transmission signal. Calculated as the log(I0/It).

2.3.3. XAS Scan Data File Columns (4-Element Vortex Detector)

Column	Name	Description
1	I0.X	Feedback energy from the monochromator.
2	SplitIonChamber	Split ion chamber output.
3	PreKBIonChamber	Pre-KB mirror ion chamber output.
4	MiniIonChamber	Mini ion chamber output.
5	PostIonChamber	Post sample ion chamber output.

6	MasterDwellTime	Dwell time for each data point
7	RingCurrent	Electron current in the storage ring when data was taken.
8	EnergySetpoint	Set point of Energy for monochromator.
9	EnergyFeedback	Feedback of energy from monochromator.
10	FourElementXMapVortexDeadTime1	Dead-time of element 1 of the 4-element Vortex detector expressed in percentage.
11	FourElementXMapVortexRealTime1	Real time. The amount of time the 1st element of the 4-element Vortex Detector was active.
12	FourElementXMapVortexLiveTime1	Live time. The amount of time the 1st element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
13	FourElementXMapVortexFastPeaks1	Input count rate to the 1st element of the 4-element Vortex Detector.
14	FourElementXMapVortexSlowPeaks1	Output count rate of the 1st element of the 4-element Vortex Detector.
15	FourElementXMapVortexDeadTime2	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.
16	FourElementXMapVortexRealTime2	Real time. The amount of time the 2nd element of the 4-element Vortex Detector was active.
17	FourElementXMapVortexLiveTime2	Live time. The amount of time the 2nd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
18	FourElementXMapVortexFastPeaks2	Input count rate to the 2nd element of the 4-element Vortex Detector.
19	FourElementXMapVortexSlowPeaks2	Output count rate of the 2nd element of the 4-element Vortex Detector.
20	FourElementXMapVortexDeadTime3	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.
21	FourElementXMapVortexRealTime3	Real time. The amount of time the 3rd element of the 4-element Vortex Detector was active.
22	FourElementXMapVortexLiveTime3	Live time. The amount of time the 3rd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
23	FourElementXMapVortexFastPeaks3	Input count rate to the 3rd element of the 4-element Vortex Detector.
24	FourElementXMapVortexSlowPeaks3	Output count rate of the 3rd element of the 4-element Vortex Detector.
25	FourElementXMapVortexDeadTime4	Dead-time of the 4th element of the 4-element Vortex detector expressed in percentage.

26	FourElementXMapVortexRealTime4	Real time. The amount of time the 4th element of the 4-element Vortex Detector was active.
27	FourElementXMapVortexLiveTime4	Live time. The amount of time the 4th element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
28	FourElementXMapVortexFastPeaks4	Input count rate to the 4th element of the 4-element Vortex Detector.
29	FourElementXMapVortexSlowPeaks4	Output count rate of the 4th element of the 4-element Vortex Detector.
30	k-space	K value for EAXFS measurements.
31	ROI	Deadtime-corrected counts for the selected region of interested.
32	normROI	ROI counts normalized to the I0 signal.
* Additional columns will consist of the deadtime-corrected ROI counts (ROI) and normalized ROI counts (normROI) for additional regions of interest. The number of additional columns will depend on the number of selected regions of interest		
Last Column	Trans	Transmission signal. Calculated as the log(I0/It).

2.3.4. XAS Scan Data File Columns (13-Element Germanium Detector)

Column	Name	Description
1	I0.X	Feedback energy from the monochromator
2	SplitIonChamber	Split ion chamber output.
3	PreKBIonChamber	Pre-KB mirror ion chamber output.
4	MiniIonChamber	Mini ion chamber output.
5	PostIonChamber	Post sample ion chamber output.
6	MasterDwellTime	Dwell time for each data point.
7	RingCurrent	Electron current in the storage ring when data was taken.
8	EnergySetpoint	Set point of Energy for monochromator.
9	EnergyFeedback	Feedback of energy from monochromator.
10	k-space	K value for EXAFS measurements.
11	ROI	Deadtime-corrected counts for the selected region of interested.
12	normROI	ROI counts normalized to the I0 signal.
* Additional columns will consist of the deadtime-corrected ROI counts (ROI) and normalized ROI counts (normROI) for additional regions of interest. The number of additional columns will depend on the number of selected regions of interest		

Last Column	Trans	Transmission signal. Calculated as the log(I0/It).

2.3.5. XAS Scan Data File Columns (Single and 4-Element Vortex Detectors)

Column	Name	Description
1	I0.X	Feedback energy from the monochromator.
2	SplitIonChamber	Split ion chamber output.
3	PreKBIonChamber	Pre-KB mirror ion chamber output.
4	MiniIonChamber	Mini ion chamber output.
5	PostIonChamber	Post sample ion chamber output.
6	MasterDwellTime	Dwell time for each data point
7	RingCurrent	Electron current in the storage ring when data was taken.
8	EnergySetpoint	Set point of Energy for monochromator.
9	EnergyFeedback	Feedback of energy from monochromator.
9	SingleElementXMapVortexDeadTime	Dead-time of Vortex detector expressed in percentage.
10	SingleElementXMapVortexRealTime	Real time. The amount of time the detector was active.
11	SingleElementXMapVortexLiveTime	Live time. The amount of time the detector was able to process signal. Live time = Real time – dead time.
12	SingleElementXMapVortexFastPeaks	Input count rate to the detector.
13	SingleElementXMapVortexSlowPeaks	Output count rate of the detector.
14	FourElementXMapVortexRealTime1	Real time. The amount of time the 1st element of the 4-element Vortex Detector was active.
15	FourElementXMapVortexLiveTime1	Live time. The amount of time the 1st element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
16	FourElementXMapVortexFastPeaks1	Input count rate to the 1st element of the 4-element Vortex Detector.
17	FourElementXMapVortexSlowPeaks1	Output count rate of the 1st element of the 4-element Vortex Detector.
18	FourElementXMapVortexDeadTime2	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.
19	FourElementXMapVortexRealTime2	Real time. The amount of time the 2nd element of the 4-element Vortex Detector was active.
20	FourElementXMapVortexLiveTime2	Live time. The amount of time the 2nd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
21	FourElementXMapVortexFastPeaks2	Input count rate to the 2nd element of the 4-element Vortex Detector.

22	FourElementXMapVortexSlowPeaks2	Output count rate of the 2nd element of the 4-element Vortex Detector.
23	FourElementXMapVortexDeadTime3	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.
24	FourElementXMapVortexRealTime3	Real time. The amount of time the 3rd element of the 4-element Vortex Detector was active.
25	FourElementXMapVortexLiveTime3	Live time. The amount of time the 3rd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
26	FourElementXMapVortexFastPeaks3	Input count rate to the 3rd element of the 4-element Vortex Detector.
27	FourElementXMapVortexSlowPeaks3	Output count rate of the 3rd element of the 4-element Vortex Detector.
28	FourElementXMapVortexDeadTime4	Dead-time of the 4th element of the 4-element Vortex detector expressed in percentage.
29	FourElementXMapVortexRealTime4	Real time. The amount of time the 4th element of the 4-element Vortex Detector was active.
30	FourElementXMapVortexLiveTime4	Live time. The amount of time the 4th element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
31	FourElementXMapVortexFastPeaks4	Input count rate to the 4th element of the 4-element Vortex Detector.
32	FourElementXMapVortexSlowPeaks4	Output count rate of the 4th element of the 4-element Vortex Detector.
33	k-space	K value for EXAFS measurements
34	ROI	Deadtime-corrected counts for the selected region of interested.
35	normROI	ROI counts normalized to the I0 signal.
* Additional columns will consist of the deadtime-corrected ROI counts (ROI) and normalized ROI counts (normROI) for additional regions of interest. The number of additional columns will depend on the number of selected regions of interest		
Last Column	Trans	Transmission signal. Calculated as the log(I0/It).

2.4. Timed Scans

2.4.1. Time Scan Data File Header

Sections	Description
1	Scan name and the iteration number.
2	Data in the format YYYY:MM:DD HH:MM:SS.
3	Facility: VESPERS Beamline.
4	Fluorescence Detector: Either Single-element XMAP Vortex, 4-element XMAP Vortex, or 13-element germanium.
5	Will show which Ion chamber was selected for the I0 signal (Isplit, IpreKB, Imini, or Ipost) and a short description on the location of the ion chamber.
6	Will show information on the selected region of interests. The number of lines in this section will vary depending on the number of selected regions of interest. Includes information on the element of interest, X-ray fluorescence line, and the captured energy range (eV) used to create the XRF maps.
7	A note on the acquisition time for each data point and the amount of time per acquisition.
8	Detector to sample distance in millimeters.
9	Type of beam used. Either Pink, Si, 1.6% Bandpass, or 10% bandpass.
10	Aluminum filter thickness. Will vary between 0-800 µm.
11	Horizontal and vertical slit size. Size will generally depend on the type of beam used for the experiment.
12	Gas in in ion chambers. Generally will be N_2.
13	Ion chamber gain settings.

2.4.2. Timed Scan Data File Column (Single Element Vortex Detector)

Column	Name	Description
1	Time	The time for each acquisition.
2	SplitIonChamber	Split ion chamber output.
3	PreKBIonChamber	Pre-KB mirror ion chamber output.
4	MiniIonChamber	Mini ion chamber output.
5	PostIonChamber	Post sample ion chamber output.
6	MasterDwellTime	Dwell time for each data point.
7	RingCurrent	Electron current in the storage ring when data was taken.
8	SingleElementXMapVortexDeadTime	Dead-time of Vortex detector expressed in percentage.
9	SingleElementXMapVortexRealTime	Real time. The amount of time the detector was active.
10	SingleElementXMapVortexLiveTime	Live time. The amount of time the detector was able to process signal. Live time = Real time – dead time.

11	SingleElementXMapVortexFastPeaks	Input count rate to the detector.
12	SingleElementXMapVortexSlowPeaks	Output count rate of the detector.
13	PilatusFileNumber	Name associated with the Pilatus diffraction image for each data point. Note that Pilatus diffraction image files are saved as a separate file. This column appears only if diffraction was enabled.
14	ROI	Deadtime-corrected counts for the selected region of interested.
15	normROI	ROI counts normalized to the I0 signal.
* Additional columns will consist of the deadtime-corrected ROI counts (ROI) and normalized ROI counts (normROI) for additional regions of interest.		

2.4.3. Timed Scan Data File Columns (4-Element Vortex Detector)

Column	Name	Description
1	Time	The time for each acquisition.
2	SplitIonChamber	Split ion chamber output.
3	PreKBIonChamber	Pre-KB mirror ion chamber output.
4	MiniIonChamber	Mini ion chamber output.
5	PostIonChamber	Post sample ion chamber output.
6	MasterDwellTime	Dwell time for each data point.
7	RingCurrent	Electron current in the storage ring when data was taken.
8	FourElementXMapVortexDeadTime1	Dead-time of element 1 of the 4-element Vortex detector expressed in percentage.
9	FourElementXMapVortexRealTime1	Real time. The amount of time the 1st element of the 4-element Vortex Detector was active.
10	FourElementXMapVortexLiveTime1	Live time. The amount of time the 1st element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
11	FourElementXMapVortexFastPeaks1	Input count rate to the 1st element of the 4-element Vortex Detector.
12	FourElementXMapVortexSlowPeaks1	Output count rate of the 1st element of the 4-element Vortex Detector.
13	FourElementXMapVortexDeadTime2	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.
14	FourElementXMapVortexRealTime2	Real time. The amount of time the 2nd element of the 4-element Vortex Detector was active.

15	FourElementXMapVortexLiveTime2	Live time. The amount of time the 2nd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
16	FourElementXMapVortexFastPeaks2	Input count rate to the 2nd element of the 4-element Vortex Detector.
17	FourElementXMapVortexSlowPeaks2	Output count rate of the 2nd element of the 4-element Vortex Detector.
18	FourElementXMapVortexDeadTime3	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.
19	FourElementXMapVortexRealTime3	Real time. The amount of time the 3rd element of the 4-element Vortex Detector was active.
20	FourElementXMapVortexLiveTime3	Live time. The amount of time the 3rd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
21	FourElementXMapVortexFastPeaks3	Input count rate to the 3rd element of the 4-element Vortex Detector.
22	FourElementXMapVortexSlowPeaks3	Output count rate of the 3rd element of the 4-element Vortex Detector.
23	FourElementXMapVortexDeadTime4	Dead-time of the 4th element of the 4-element Vortex detector expressed in percentage.
24	FourElementXMapVortexRealTime4	Real time. The amount of time the 4th element of the 4-element Vortex Detector was active.
25	FourElementXMapVortexLiveTime4	Live time. The amount of time the 4th element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
26	FourElementXMapVortexFastPeaks4	Input count rate to the 4th element of the 4-element Vortex Detector.
27	FourElementXMapVortexSlowPeaks4	Output count rate of the 4th element of the 4-element Vortex Detector.
28	PilatusFileNumber	Name associated with the Pilatus diffraction image for each data point. Note that Pilatus diffraction image files are saved as a separate file. This column appears only if diffraction was enabled.
29	ROI	Deadtime-corrected counts for the selected region of interested.
30	normROI	ROI counts normalized to the I0 signal.
* Additional columns will consist of the deadtime-corrected ROI counts (ROI) and normalized ROI counts (normROI) for additional regions of interest.		

2.4.4. Timed Scan Data File Columns (13-Element Germanium Detector)

Column	Name	Description
1	Time	The time for each acquisition.
2	SplitIonChamber	Split ion chamber output.
3	PreKBIonChamber	Pre-KB mirror ion chamber output.
4	MiniIonChamber	Mini ion chamber output.
5	PostIonChamber	Post sample ion chamber output.
6	MasterDwellTime	Dwell time for each data point.
7	RingCurrent	Electron current in the storage ring when data was taken.
8	ROI	Deadtime-corrected counts for the selected region of interested.
9	normROI	ROI counts normalized to the I0 signal.
* Additional columns will consist of the deadtime-corrected ROI counts (ROI) and normalized ROI counts (normROI) for additional regions of interest. The number of additional columns will depend on the number of selected regions of interest		

2.4.5. Timed Scan Data File Columns (Single and 4-Element Vortex Detectors)

Column	Name	Description
1	Time	The time for each acquisition.
2	SplitIonChamber	Split ion chamber output.
3	PreKBIonChamber	Pre-KB mirror ion chamber output.
4	MiniIonChamber	Mini ion chamber output.
5	PostIonChamber	Post sample ion chamber output.
6	MasterDwellTime	Dwell time for each data point.
7	RingCurrent	Electron current in the storage ring when data was taken.
8	SingleElementXMapVortexDeadTime	Dead-time of Vortex detector expressed in percentage.
9	SingleElementXMapVortexRealTime	Real time. The amount of time the detector was active.
10	SingleElementXMapVortexLiveTime	Live time. The amount of time the detector was able to process signal. Live time = Real time – dead time.
11	SingleElementXMapVortexFastPeaks	Input count rate to the detector.
12	SingleElementXMapVortexSlowPeaks	Output count rate of the detector.
13	FourElementXMapVortexRealTime1	Real time. The amount of time the 1st element of the 4-element Vortex Detector was active.
14	FourElementXMapVortexLiveTime1	Live time. The amount of time the 1st element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.

15	FourElementXMapVortexFastPeaks1	Input count rate to the 1st element of the 4-element Vortex Detector.
16	FourElementXMapVortexSlowPeaks1	Output count rate of the 1st element of the 4-element Vortex Detector.
17	FourElementXMapVortexDeadTime2	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.
18	FourElementXMapVortexRealTime2	Real time. The amount of time the 2nd element of the 4-element Vortex Detector was active.
19	FourElementXMapVortexLiveTime2	Live time. The amount of time the 2nd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
20	FourElementXMapVortexFastPeaks2	Input count rate to the 2nd element of the 4-element Vortex Detector.
21	FourElementXMapVortexSlowPeaks2	Output count rate of the 2nd element of the 4-element Vortex Detector.
22	FourElementXMapVortexDeadTime3	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.
23	FourElementXMapVortexRealTime3	Real time. The amount of time the 3rd element of the 4-element Vortex Detector was active.
24	FourElementXMapVortexLiveTime3	Live time. The amount of time the 3rd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
25	FourElementXMapVortexFastPeaks3	Input count rate to the 3rd element of the 4-element Vortex Detector.
26	FourElementXMapVortexSlowPeaks3	Output count rate of the 3rd element of the 4-element Vortex Detector.
27	FourElementXMapVortexDeadTime4	Dead-time of the 4th element of the 4-element Vortex detector expressed in percentage.
28	FourElementXMapVortexRealTime4	Real time. The amount of time the 4th element of the 4-element Vortex Detector was active.
29	FourElementXMapVortexLiveTime4	Live time. The amount of time the 4th element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
30	FourElementXMapVortexFastPeaks4	Input count rate to the 4th element of the 4-element Vortex Detector.
31	FourElementXMapVortexSlowPeaks4	Output count rate of the 4th element of the 4-element Vortex Detector.
32	PilatusFileNumber	Name associated with the Pilatus diffraction image for each data point. Note that Pilatus diffraction image files

		are saved as a separate file. This column appears only if diffraction was enabled.
33	ROI	Deadtime-corrected counts for the selected region of interested.
34	normROI	ROI counts normalized to the I0 signal.
* Additional columns will consist of the deadtime-corrected ROI counts (ROI) and normalized ROI counts (normROI) for additional regions of interest. The number of additional columns will depend on the number of selected regions of interest		

2.5. Timed Line Scans

2.5.1. Timed Line Scan Data File Header

Sections	Description
1	Scan name and the iteration number.
2	Data in the format YYYY:MM:DD HH:MM:SS.
3	Facility: CLS VESPERS Beamline.
4	Fluorescence Detector: Either Single-element XMAP Vortex, 4-element XMAP Vortex, or 13-element germanium.
5	Will show which Ion chamber was selected for the I0 signal (Isplit, IpreKB, Imini, or Ipost) and a short description on the location of the ion chamber.
6	Will show information on the selected region of interests. The number of lines in this section will vary depending on the number of selected regions of interest. Includes information on the element of interest, X-ray fluorescence line, and the captured energy range (eV) used to create the XRF maps.
7	A note on which motor was scanned.
8	Line Dimensions: Will show the start position, step size, end positions, and dwell time for each region of scan. Note that line scans can have multiple regions.
9	A note on the time per Acquisition and the number of iterations.
10	Will show the coordinates for the focus position (i.e. the Y or N motor).
11	Will show the coordinates for the motor in the fixed position.
12	Detector to sample distance in millimeters.
13	Type of beam used. Either Pink, Si, 1.6% Bandpass, or 10% bandpass.
14	Aluminum filter thickness. Will vary between 0-800 µm.
15	Horizontal and vertical slit size. Size will generally depend on the type of beam used for the experiment.
16	Gas in in ion chambers. Generally will be N_2.
17	Ion chamber gain settings.

2.5.2. Timed Line Scan Data File Columns (Single Element Vortex Detector)

Column	Name	Description
1	H(X) or V(Z)	Set point of sample coordinate in horizontal or vertical directions.
2	Time	The time for each acquisition.
3	SampleHFeedback or SampleVFeedback	Feedback of sample coordinate in horizontal or vertical directions.
4	SplitIonChamber	Split ion chamber output.
5	PreKBIonChamber	Pre-KB mirror ion chamber output.
6	MiniIonChamber	Mini ion chamber output.
7	PostIonChamber	Post sample ion chamber output.
8	MasterDwellTime	Dwell time for each data point.
9	RingCurrent	Electron current in the storage ring when data was taken.
10	SingleElementXMapVortexDeadTime	Dead-time of Vortex detector expressed in percentage.
11	SingleElementXMapVortexRealTime	Real time. The amount of time the detector was active.
12	SingleElementXMapVortexLiveTime	Live time. The amount of time the detector was able to process signal. Live time = Real time – dead time.
13	SingleElementXMapVortexFastPeaks	Input count rate to the detector.
14	SingleElementXMapVortexSlowPeaks	Output count rate of the detector.
15	PilatusFileNumber	Name associated with the Pilatus diffraction image for each data point. Note that Pilatus diffraction image files are saved as a separate file. This column appears only if diffraction was enabled.
16	ROI	Deadtime-corrected counts for the selected region of interested.
17	normROI	ROI counts normalized to the I0 signal.
* Additional columns will consist of the deadtime-corrected ROI counts (ROI) and normalized ROI counts (normROI) for additional regions of interest. The number of additional columns will depend on the number of selected regions of interest		

2.5.3. Timed Line Scan Data File Columns (4-Element Vortex Detector)

Column	Name	Description
1	H(X) or V(Z)	Set point of sample coordinate in horizontal or vertical directions.
2	Time	The time for each acquisition.

3	SampleHFeedback or SampleVFeedback	Feedback of sample coordinate in horizontal or vertical directions.
4	SplitIonChamber	Split ion chamber output.
5	PreKBIonChamber	Pre-KB mirror ion chamber output.
6	MiniIonChamber	Mini ion chamber output.
7	PostIonChamber	Post sample ion chamber output.
8	MasterDwellTime	Dwell time for each data point.
9	RingCurrent	Electron current in the storage ring when data was taken.
10	FourElementXMapVortexDeadTime1	Dead-time of element 1 of the 4-element Vortex detector expressed in percentage.
11	FourElementXMapVortexRealTime1	Real time. The amount of time the 1st element of the 4-element Vortex Detector was active.
12	FourElementXMapVortexLiveTime1	Live time. The amount of time the 1st element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
13	FourElementXMapVortexFastPeaks1	Input count rate to the 1st element of the 4-element Vortex Detector.
14	FourElementXMapVortexSlowPeaks1	Output count rate of the 1st element of the 4-element Vortex Detector.
15	FourElementXMapVortexDeadTime2	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.
16	FourElementXMapVortexRealTime2	Real time. The amount of time the 2nd element of the 4-element Vortex Detector was active.
17	FourElementXMapVortexLiveTime2	Live time. The amount of time the 2nd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
18	FourElementXMapVortexFastPeaks2	Input count rate to the 2nd element of the 4-element Vortex Detector.
19	FourElementXMapVortexSlowPeaks2	Output count rate of the 2nd element of the 4-element Vortex Detector.
20	FourElementXMapVortexDeadTime3	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.
21	FourElementXMapVortexRealTime3	Real time. The amount of time the 3rd element of the 4-element Vortex Detector was active.
22	FourElementXMapVortexLiveTime3	Live time. The amount of time the 3rd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
23	FourElementXMapVortexFastPeaks3	Input count rate to the 3rd element of the 4-element Vortex Detector.

24	FourElementXMapVortexSlowPeaks3	Output count rate of the 3rd element of the 4-element Vortex Detector.
25	FourElementXMapVortexDeadTime4	Dead-time of the 4th element of the 4-element Vortex detector expressed in percentage.
26	FourElementXMapVortexRealTime4	Real time. The amount of time the 4th element of the 4-element Vortex Detector was active.
27	FourElementXMapVortexLiveTime4	Live time. The amount of time the 4th element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
28	FourElementXMapVortexFastPeaks4	Input count rate to the 4th element of the 4-element Vortex Detector.
29	FourElementXMapVortexSlowPeaks4	Output count rate of the 4th element of the 4-element Vortex Detector.
30	PilatusFileNumber	Name associated with the Pilatus diffraction image for each data point. Note that Pilatus diffraction image files are saved as a separate file. This column appears only if diffraction was enabled.
31	ROI	Deadtime-corrected counts for the selected region of interested.
32	normROI	ROI counts normalized to the I0 signal.
* Additional columns will consist of the deadtime-corrected ROI counts (ROI) and normalized ROI counts (normROI) for additional regions of interest. The number of additional columns will depend on the number of selected regions of interest		

2.5.4. Timed Line Scan Data File Column (13-Element Germanium Detector)

Column	Name	Description
1	X or Z	Set point of sample coordinate in horizontal (X) or vertical (Z) directions.
2	Time	The time for each acquisition.
3	SampleXFeedback or SampleZFeedback	Feedback of sample coordinate in horizontal (X) or vertical (Z) directions.
4	SplitIonChamber	Split ion chamber output.
5	PreKBIonChamber	Pre-KB mirror ion chamber output.
6	MiniIonChamber	Mini ion chamber output.
7	PostIonChamber	Post sample ion chamber output.
8	MasterDwellTime	Dwell time for each data point.
9	RingCurrent	Electron current in the storage ring when data was taken.

10	ROI	Deadtime-corrected counts for the selected region of interested.
11	normROI	ROI counts normalized to the I0 signal.
* Additional columns will consist of the deadtime-corrected ROI counts (ROI) and normalized ROI counts (normROI) for additional regions of interest. The number of additional columns will depend on the number of selected regions of interest		

2.5.5. Timed Line Scan Data File Columns (Single and 4-Element Vortex Detectors)

Column	Name	Description
1	H(X) or V(Z)	Set point of sample coordinate in horizontal or vertical directions.
2	Time	The time for each acquisition.
3	SampleHFeedback or SampleVFeedback	Feedback of sample coordinate in horizontal or vertical directions.
4	SplitIonChamber	Split ion chamber output.
5	PreKBIonChamber	Pre-KB mirror ion chamber output.
6	MiniIonChamber	Mini ion chamber output.
7	PostIonChamber	Post sample ion chamber output.
8	MasterDwellTime	Dwell time for each data point.
9	RingCurrent	Electron current in the storage ring when data was taken.
10	SingleElementXMapVortexDeadTime	Dead-time of Vortex detector expressed in percentage.
11	SingleElementXMapVortexRealTime	Real time. The amount of time the detector was active.
12	SingleElementXMapVortexLiveTime	Live time. The amount of time the detector was able to process signal. Live time = Real time – dead time.
13	SingleElementXMapVortexFastPeaks	Input count rate to the detector.
14	SingleElementXMapVortexSlowPeaks	Output count rate of the detector.
15	FourElementXMapVortexRealTime1	Real time. The amount of time the 1st element of the 4-element Vortex Detector was active.
16	FourElementXMapVortexLiveTime1	Live time. The amount of time the 1st element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
17	FourElementXMapVortexFastPeaks1	Input count rate to the 1st element of the 4-element Vortex Detector.
18	FourElementXMapVortexSlowPeaks1	Output count rate of the 1st element of the 4-element Vortex Detector.
19	FourElementXMapVortexDeadTime2	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.

20	FourElementXMapVortexRealTime2	Real time. The amount of time the 2nd element of the 4-element Vortex Detector was active.
21	FourElementXMapVortexLiveTime2	Live time. The amount of time the 2nd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
22	FourElementXMapVortexFastPeaks2	Input count rate to the 2nd element of the 4-element Vortex Detector.
23	FourElementXMapVortexSlowPeaks2	Output count rate of the 2nd element of the 4-element Vortex Detector.
24	FourElementXMapVortexDeadTime3	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.
25	FourElementXMapVortexRealTime3	Real time. The amount of time the 3rd element of the 4-element Vortex Detector was active.
26	FourElementXMapVortexLiveTime3	Live time. The amount of time the 3rd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
27	FourElementXMapVortexFastPeaks3	Input count rate to the 3rd element of the 4-element Vortex Detector.
28	FourElementXMapVortexSlowPeaks3	Output count rate of the 3rd element of the 4-element Vortex Detector.
29	FourElementXMapVortexDeadTime4	Dead-time of the 4th element of the 4-element Vortex detector expressed in percentage.
30	FourElementXMapVortexRealTime4	Real time. The amount of time the 4th element of the 4-element Vortex Detector was active.
31	FourElementXMapVortexLiveTime4	Live time. The amount of time the 4th element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
32	FourElementXMapVortexFastPeaks4	Input count rate to the 4th element of the 4-element Vortex Detector.
33	FourElementXMapVortexSlowPeaks4	Output count rate of the 4th element of the 4-element Vortex Detector.
34	PilatusFileNumber	Name associated with the Pilatus diffraction image for each data point. Note that Pilatus diffraction image files are saved as a separate file. This column appears only if diffraction was enabled.
35	ROI	Deadtime-corrected counts for the selected region of interested.
36	normROI	ROI counts normalized to the I0 signal.

* Additional columns will consist of the deadtime-corrected ROI counts (ROI) and normalized ROI counts (normROI) for additional regions of interest. The number of additional columns will depend on the number of selected regions of interest

2.6. 3D Mapping

2.6.1. 3D Mapping Data File Header

Sections	Description
1	Scan name and the iteration number.
2	Data in the format YYYY:MM:DD HH:MM:SS.
3	Facility: VESPERS Beamline
4	Fluorescence Detector: Either Single-element XMAP Vortex, 4-element XMAP Vortex, or 13-element germanium.
5	Will show which Ion chamber was selected for the I0 signal (Isplit, IpreKB, Imini, or Ipost) and a short description on the location of the ion chamber.
6	Will show information on the selected region of interests. The number of lines in this section will vary depending on the number of selected regions of interest. Includes information on the element of interest, X-ray fluorescence line, and the captured energy range (eV) used to create the XRF maps.
7	Will show which motors were used in the experiment (i.e. H and V or X and Z).
8	Map Dimensions: Will show the start and end positions for each Axis as well as the motor step size.
9	Will show the coordinates for the focus position (i.e. the Y or N motor).
10	Detector to sample distance in millimeters.
11	Type of beam used. Either Pink, Si, 1.6% Bandpass, or 10% bandpass.
12	Aluminum filter thickness. Will vary between 0-800 µm.
13	Horizontal and vertical slit size. Size will generally depend on the type of beam used for the experiment.
14	Gas in in ion chambers. Generally will be N_2.
15	Ion chamber gain settings.

2.6.2. 3D Mapping Scan Data File Columns (Single Element Detector)

Column	Name	Description
1	H	Set point of sample coordinate in horizontal direction.
2	V	Set point of sample coordinate in vertical direction.
3	Wire	Set point of sample coordinate in wire direction

4	SampleHFeedback	Feedback of sample coordinate in horizontal direction.
5	SampleVFeedback	Feedback of sample coordinate in vertical direction.
6	WireVFeedback	Feedback of sample coordinate in wire direction.
7	SplitIonChamber	Split ion chamber output.
8	PreKBIonChamber	Pre-KB mirror ion chamber output.
9	MiniIonChamber	Mini ion chamber output.
10	PostIonChamber	Post sample ion chamber output.
11	MasterDwellTime	Dwell time for each data point.
12	RingCurrent	Electron current in the storage ring when data was taken.
13	SingleElementXMapVortexDeadTime	Dead-time of Vortex detector expressed in percentage.
14	SingleElementXMapVortexRealTime	Real time. The amount of time the detector was active.
15	SingleElementXMapVortexLiveTime	Live time. The amount of time the detector was able to process signal. Live time = Real time – dead time.
16	SingleElementXMapVortexFastPeaks	Input count rate to the detector.
17	SingleElementXMapVortexSlowPeaks	Output count rate of the detector.
18	PilatusFileNumber	Name associated with the Pilatus diffraction image for each data point. Note that Pilatus diffraction image files are saved as a separate file. This column appears only if diffraction was enabled.
19	ROI	Deadtime-corrected counts for the selected region of interested.
20	normROI	ROI counts normalized to the I0 signal.
* Additional columns will consist of the deadtime-corrected ROI counts (ROI) and normalized ROI counts (normROI) for additional regions of interest. The number of additional columns will depend on the number of selected regions of interest		

2.6.3. 3D Mapping Scan Data File Columns (4-Element Vortex Detector)

Column	Name	Description
1	H	Set point of sample coordinate in horizontal direction.
2	V	Set point of sample coordinate in vertical direction.
3	Wire	Set point of sample coordinate in wire direction.
4	SampleH(X)Feedback	Feedback of sample coordinate in horizontal direction.
5	SampleV(Z)Feedback	Feedback of sample coordinate in vertical direction.
6	WireVFeedback	Feedback of sample coordinate in vertical direction.
7	SplitIonChamber	Split ion chamber output.
8	PreKBIonChamber	Pre-KB mirror ion chamber output.
9	MiniIonChamber	Mini ion chamber output.

10	PostIonChamber	Post sample ion chamber output.
11	MasterDwellTime	Dwell time for each data point.
12	RingCurrent	Electron current in the storage ring when data was taken.
13	FourElementXMapVortexDeadTime1	Dead-time of element 1 of the 4-element Vortex detector expressed in percentage.
14	FourElementXMapVortexRealTime1	Real time. The amount of time the 1st element of the 4-element Vortex Detector was active.
15	FourElementXMapVortexLiveTime1	Live time. The amount of time the 1st element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
16	FourElementXMapVortexFastPeaks1	Input count rate to the 1st element of the 4-element Vortex Detector.
17	FourElementXMapVortexSlowPeaks1	Output count rate of the 1st element of the 4-element Vortex Detector.
18	FourElementXMapVortexDeadTime2	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.
19	FourElementXMapVortexRealTime2	Real time. The amount of time the 2nd element of the 4-element Vortex Detector was active.
20	FourElementXMapVortexLiveTime2	Live time. The amount of time the 2nd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
21	FourElementXMapVortexFastPeaks2	Input count rate to the 2nd element of the 4-element Vortex Detector.
22	FourElementXMapVortexSlowPeaks2	Output count rate of the 2nd element of the 4-element Vortex Detector.
23	FourElementXMapVortexDeadTime3	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.
24	FourElementXMapVortexRealTime3	Real time. The amount of time the 3rd element of the 4-element Vortex Detector was active.
25	FourElementXMapVortexLiveTime3	Live time. The amount of time the 3rd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
26	FourElementXMapVortexFastPeaks3	Input count rate to the 3rd element of the 4-element Vortex Detector.
27	FourElementXMapVortexSlowPeaks3	Output count rate of the 3rd element of the 4-element Vortex Detector.
28	FourElementXMapVortexDeadTime4	Dead-time of the 4th element of the 4-element Vortex detector expressed in percentage.

29	FourElementXMapVortexRealTime4	Real time. The amount of time the 4th element of the 4-element Vortex Detector was active.
30	FourElementXMapVortexLiveTime4	Live time. The amount of time the 4th element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
31	FourElementXMapVortexFastPeaks4	Input count rate to the 4th element of the 4-element Vortex Detector.
32	FourElementXMapVortexSlowPeaks4	Output count rate of the 4th element of the 4-element Vortex Detector.
33	PilatusFileNumber	Name associated with the Pilatus diffraction image for each data point. Note that Pilatus diffraction image files are saved as a separate file. This column appears only if diffraction was enabled.
34	ROI	Deadtime-corrected counts for the selected region of interested.
35	normROI	ROI counts normalized to the I0 signal.
* Additional columns will consist of the deadtime-corrected ROI counts (ROI) and normalized ROI counts (normROI) for additional regions of interest. The number of additional columns will depend on the number of selected regions of interest		

2.6.4. 3D Mapping Scan Data File Columns (Single and 4-Element Vortex Detectors)

Column	Name	Description
1	H	Set point of sample coordinate in horizontal direction.
2	V	Set point of sample coordinate in vertical direction.
3	Wire	Set point of sample coordinate in wire direction.
4	SampleHFeedback	Feedback of sample coordinate in horizontal direction.
5	SampleVFeedback	Feedback of sample coordinate in vertical direction.
6	WireVFeedback	Feedback of sample coordinate in vertical direction.
5	SplitIonChamber	Split ion chamber output.
6	PreKBIonChamber	Pre-KB mirror ion chamber output.
7	MiniIonChamber	Mini ion chamber output.
8	PostIonChamber	Post sample ion chamber output.
9	MasterDwellTime	Dwell time for each data point.
10	RingCurrent	Electron current in the storage ring when data was taken.
11	SingleElementXMapVortexDeadTime	Dead-time of Vortex detector expressed in percentage.
12	SingleElementXMapVortexRealTime	Real time. The amount of time the detector was active.

13	SingleElementXMapVortexLiveTime	Live time. The amount of time the detector was able to process signal. Live time = Real time – dead time.
14	SingleElementXMapVortexFastPeaks	Input count rate to the detector.
15	SingleElementXMapVortexSlowPeaks	Output count rate of the detector.
16	FourElementXMapVortexRealTime1	Real time. The amount of time the 1st element of the 4-element Vortex Detector was active.
17	FourElementXMapVortexLiveTime1	Live time. The amount of time the 1st element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
18	FourElementXMapVortexFastPeaks1	Input count rate to the 1st element of the 4-element Vortex Detector.
19	FourElementXMapVortexSlowPeaks1	Output count rate of the 1st element of the 4-element Vortex Detector.
20	FourElementXMapVortexDeadTime2	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.
21	FourElementXMapVortexRealTime2	Real time. The amount of time the 2nd element of the 4-element Vortex Detector was active.
22	FourElementXMapVortexLiveTime2	Live time. The amount of time the 2nd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
23	FourElementXMapVortexFastPeaks2	Input count rate to the 2nd element of the 4-element Vortex Detector.
24	FourElementXMapVortexSlowPeaks2	Output count rate of the 2nd element of the 4-element Vortex Detector.
25	FourElementXMapVortexDeadTime3	Dead-time of the 2nd element of the 4-element Vortex detector expressed in percentage.
26	FourElementXMapVortexRealTime3	Real time. The amount of time the 3rd element of the 4-element Vortex Detector was active.
27	FourElementXMapVortexLiveTime3	Live time. The amount of time the 3rd element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
28	FourElementXMapVortexFastPeaks3	Input count rate to the 3rd element of the 4-element Vortex Detector.
29	FourElementXMapVortexSlowPeaks3	Output count rate of the 3rd element of the 4-element Vortex Detector.
30	FourElementXMapVortexDeadTime4	Dead-time of the 4th element of the 4-element Vortex detector expressed in percentage.
31	FourElementXMapVortexRealTime4	Real time. The amount of time the 4th element of the 4-element Vortex Detector was active.

32	FourElementXMapVortexLiveTime4	Live time. The amount of time the 4th element of the 4-element Vortex Detector was able to process signal. Live time = Real time – dead time.
33	FourElementXMapVortexFastPeaks4	Input count rate to the 4th element of the 4-element Vortex Detector.
34	FourElementXMapVortexSlowPeaks4	Output count rate of the 4th element of the 4-element Vortex Detector.
35	PilatusFileNumber	Name associated with the Pilatus diffraction image for each data point. Note that Pilatus diffraction image files are saved as a separate file. This column appears only if diffraction was enabled.
36	ROI	Deadtime-corrected counts for the selected region of interested.
37	normROI	ROI counts normalized to the I0 signal.
* Additional columns will consist of the deadtime-corrected ROI counts (ROI) and normalized ROI counts (normROI) for additional regions of interest. The number of additional columns will depend on the number of selected regions of interest		

2.7. Energy Scans

Important Note: Energy Scans is an XRD only scan.

2.7.1. Energy Scan Data File Header

Sections	Description
1	Scan name and the iteration number.
2	Data in the format YYYY:MM:DD HH:MM:SS.
3	Facility: CLS VESPERS Beamline.
5	Area Detector: Default area detector is the Pilatus
6	File Name for XRD images. Note that the XRD image files will be saved in a separate file
6	When setting up the experiment, there is an option to automatically move to a specific location of a sample. This section will show if a user selected this option.
7	Focus position: will show the coordinates for the focus position in millimeters.
11	Regions scanned. Will show the start and end position of each energy region as well as the energy step size and dwell time for each region. Note that the end position and step size on the last energy region will be shown in k-space if users select the EXAFS scan option.
12	The coordinates for the horizontal and vertical positions.
14	Type of beam used. Either Si, 1.6% Bandpass, or 10% bandpass.

15	Aluminum filter thickness. Will vary between 0-800 μm.
16	Horizontal and vertical slit size. Size will generally depend on the type of beam used for the experiment.
17	Gas in in ion chambers. Generally will be N_2.
18	Ion chamber gain settings.

2.7.2. Energy Scan Data File Columns

Column	Name	Description
1	eV	Feedback energy from the monochromator.
2	SplitIonChamber	Split ion chamber output.
3	PreKBIonChamber	Pre-KB mirror ion chamber output.
4	MiniIonChamber	Mini ion chamber output.
5	PostIonChamber	Post sample ion chamber output.
6	EnergySetpoint	Set point of Energy for monochromator.
7	MasterDwellTime	Dwell time for each data point.
8	RingCurrent	Electron current in the storage ring when data was taken.
9	PilatusFileNumber	Name associated with the Pilatus diffraction image for each data point. Note that Pilatus diffraction image files are saved as a separate file.