



DAWN: RIXS image processing software, I21

DAWN is an open source software ([licence](#)) for the visualisation and processing of scientific data. Although specifically developed for data from synchrotron based techniques, many of the features of DAWN are useful in other fields. DAWN loads data from many common formats (text files, tiffs, hdf5...), as well as those specific to x-ray techniques (NeXus, EDF, MAR...).

Accessing DAWN from your own machine:

Visit the website <https://dawnsci.org/>, download and install the software matching your operating system. Installation instructions are provided on the website.

Accessing DAWN from a linux machine at Diamond:

Open a terminal >> Type 'module load dawn/nightly' ↵ >> 'dawn' ↵

Data location: All of your data in will be stored in a location `'dls/i21/data/Year/Proposal_ID/'`

Processing a RIXS file:

Prerequisites:

Ask your local contact to provide:

1. Energy dispersion value (eV/pixel): For converting the CCD pixels to energy units in eV.
2. Slope correction value: For correcting the tilt of the image on the CCD detector.
3. Dark image file number: For subtracting the background signal that appears on the detector. The dark image file **must** have the same acquisition time as the RIXS image file.
4. RIXS image file number and an elastic spectrum collected immediately after it.

Tutorial Dataset

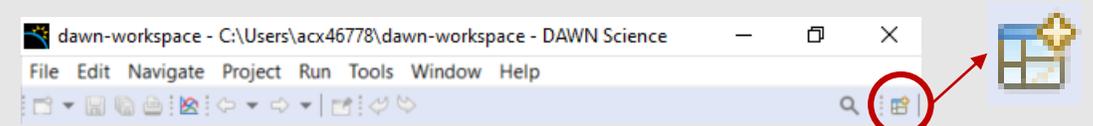
File number	File content	Usage	Acquisition time
i21-157111.nxs	Dark Image	To subtract the Non-RIXS signals from the RIXS images	180 secs
i21-157116.nxs	RIXS Image	To process and get the RIXS spectrum	180 secs
i21-157117.nxs	Elastic Image	To find the zero energy reference for the RIXS spectrum above	30 secs
i21-157118.nxs	RIXS Image	To process and get the RIXS spectrum	180 secs
i21-157119.nxs	Elastic Image	To find the zero energy reference for the RIXS spectrum above	30 secs

Tutorial Dataset parameters

Energy dispersion value (eV/pixel)	Slope correction value
0.01	-0.065

DAWN perspectives: DAWN is designed for different applications and has different perspectives for different purposes.

A perspective can be opened by clicking on the [Open Perspective](#) button in the toolbar.



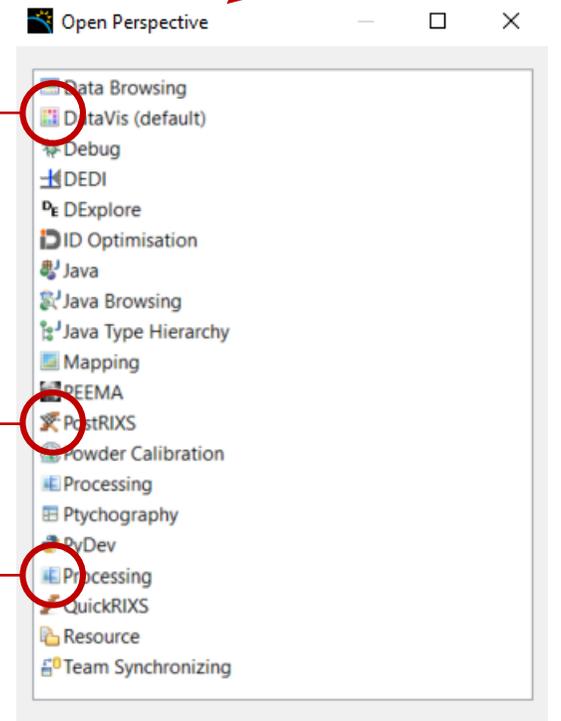
For visualising the data or exporting the data we will be using the [DataVis](#) perspective



For visualising the data or exporting the data we can also use the [PostRIXS](#) perspective



For RIXS processing we will be using the [Processing](#) perspective



RIXS processing perspective:

The screenshot shows the RIXS processing software interface with several panels and annotations:

- Project Explorer:** Located on the left, it shows a tree view with a folder named "data".

*Project Explorer:
This is where you will see the scanned file numbers.*
- Data Slice View:** A large central panel with a grid.

*Data Slice View:
This is where you will drag the files you want to process from the Project Explorer.*
- Processing:** A panel with a table for selecting operations.

*Processing:
This is where you will choose the kind of operations you want to do on the files in the Data Slice View.*
- Model:** A panel with a table for setting parameters.

*Model:
This is where you will put the parameters related to the operations you chose in the Processing panel.*
- Input:** A panel at the bottom left containing a plot with a Y-axis from 0 to 100 and an X-axis from 0 to 100.

*Input:
When you click on a file in the panel above, you will see here the image it contains.*
- Output:** A panel at the bottom right containing a plot with a Y-axis from 0 to 100 and an X-axis from 0 to 100.

*Output:
When you click on a process in the Processing panel, you will see here the results of the processing done on the file selected in Data Slice View Panel.*

0 items selected

Loading your files for processing:

1. Right click on **data** and select **import**

2. Expand **General** and select **Data Folder Link** and click **Next**

3. **Browse** to and select your folder that contains the data files in the field **External folder** and press **finish**.

4. Expanding **data** will now show your **data folder**, which when expanded will show the data files.

Data location: All of your data in will be stored in a location **'dls/i21/data/Year/Proposal_ID/'**

For the tutorial dataset you can save the tutorial data folder in your local drives and load it.

Processing a RIXS file:

The screenshot displays the DAWN Science software interface with several panels:

- Project Explorer:** Shows a file tree with folders like 'examples', 'Proposal_ID', 'processing', 'spool', 'temp', 'xml', and 'src'. Under 'Proposal_ID', there are several RIXS files with '.nxs' extensions and xcam files with '.hdf' extensions.
- Data Slice View:** Shows a list of selected files: 'i21-157116.nxs', 'i21-157117.nxs', and 'i21-157118.nxs'. Red arrows point from the Project Explorer to these files.
- Processing Panel:** A table with columns 'Name' and 'Value' containing parameters for the model.
- Model 'Combined RIXS image reduction':** A table with parameters and their values.
- Input and Output Graphs:** Two empty coordinate systems with 'X-Axis' labels and y-axes ranging from 0 to 100.

Drag the RIXS image file/files that you want to process from the Project explorer panel to the Data slice view panel. Use only the files with extension '.nxs' and not the ones with '.hdf'. Do not drag the elastic image files.

Name	Value
Elastic line scan	NEXT_SCAN
Energy calibration file	
Energy dispersion at...	NaN
Slope override	
Width of strip	1

Name	Value
Elastic line scan	NEXT_SCAN
Energy calibration file	
Energy dispersion at...	NaN
Slope override	
Width of strip	1

Processing a RIXS file:

dawn-workspace - C:\Users\acx46778\dawn-workspace - DAWN Science

File Tools Window Help

Project Explorer File Viewer Data Slice View Processing Model 'Combined RIXS image reduction'

data

- examples
- Proposal_ID
 - processing
 - spool
 - temp
 - xml
 - i21-157111.nxs 271.5 KB 12/01/21 04:33
 - i21-157116.nxs 143.5 KB 12/01/21 04:49
 - i21-157117.nxs 271.5 KB 12/01/21 04:49
 - i21-157118.nxs 143.5 KB 12/01/21 04:56
 - i21-157119.nxs 271.5 KB 12/01/21 04:57
 - xcam-157111.hdf 10.2 MB 12/01/21 04:...
 - xcam-157116.hdf 20.3 MB 12/01/21 04:...
 - xcam-157117.hdf 10.2 MB 12/01/21 04:...
 - xcam-157118.hdf 20.3 MB 12/01/21 04:...
 - xcam-157119.hdf 10.2 MB 12/01/21 04:...
- src

Current slice of data: [- - - -]

Input

100
90
80
70
60
50
40
30
20
10
0

0 10 20 30 40 50 60 70 80 90 100

X-Axis

2 items selected

Processing

Name

Name	Value
Elastic line scan	NEXT_SCAN
Energy calibration file	
Energy dispersion at...	NaN
Slope override	
Width of strip	1

Model 'Combined RIXS image reduction'

Set up data for processing

Select dataset: /entry1/xcam/data [2, 1610, 3304]

Line [1D] Image [2D]

Dimens...	Display	Start:Stop:...	Axes
0 [2]		:	/entry1/xcam/checktopup_time...
1 [1610]	Y	:	indices
2 [3304]	X	:	indices

data[0,:,:]

Click finish

Finish Cancel

Processing a RIXS file:

dawn-workspace - C:\Users\acx46778\dawn-workspace - DAWN Science

File Tools Window Help

Project Explorer File Viewer Data Slice View Processing Model 'Combined RIXS image reduction'

data

- examples
- Proposal_ID
 - processing
 - spool
 - temp
 - xml
 - i21-157111.nxs 271.5 KB 12/01/21 04:33
 - i21-157116.nxs 143.5 KB 12/01/21 04:49
 - i21-157117.nxs 271.5 KB 12/01/21 04:49
 - i21-157118.nxs 143.5 KB 12/01/21 04:56
 - i21-157119.nxs 271.5 KB 12/01/21 04:57
 - xcam-157111.hdf 10.2 MB 12/01/21 04:...
 - xcam-157116.hdf 20.3 MB 12/01/21 04:...
 - xcam-157117.hdf 10.2 MB 12/01/21 04:...
 - xcam-157118.hdf 20.3 MB 12/01/21 04:...
 - xcam-157119.hdf 10.2 MB 12/01/21 04:...
- src

Data Slice View

i21-157116.nxs
i21-157118.nxs

Processing

Name

Name	Value
Elastic line scan	NEXT_SCAN
Energy calibration file	
Energy dispersion at...	NaN
Slope override	
Width of strip	1

Model 'Combined RIXS image reduction'

Name Value

Elastic line scan NEXT_SCAN

Energy calibration file

Energy dispersion at... NaN

Slope override

Width of strip 1

Current slice of data: [0:1610:3304]

Input

data[0,:]

Output

2 items selected

Changing the colormap:

The screenshot displays the DAWN Science software interface. The 'Window' menu is open, and 'Preferences' is highlighted. A callout box points to 'Preferences' with the text: "Click on 'Window' and then select 'Preferences'." The interface includes a file explorer on the left, a 'Data Slice View' window, a 'Processing' window, and a 'Model 'Combined RIXS image reduction'' window. The 'Model' window contains a table with the following data:

Name	Value
Elastic line scan	NEXT_SCAN
Energy calibration file	
Energy dispersion at...	NaN
Slope override	
Width of strip	1

The 'Input' window shows a plot of 'data[0,:]' with a grayscale intensity map. The 'Output' window shows an empty plot with an 'X-Axis' ranging from 0 to 100.

Changing the colormap:

The screenshot shows the DAWN Science software interface. The 'Preferences' dialog box is open, specifically the 'Plot View' section. The 'Default colour mapping' is set to 'Jet (Blue-Cyan-Green-Yellow-Red)'. A red arrow points from the 'Plot View' option in the 'Visualization Preferences' list to the 'Default colour mapping' dropdown. Another red arrow points from the 'Default colour mapping' dropdown to a text box at the bottom right.

Click on 'Plot View' under 'Visualization Preferences' and select colormap of your choice

Name	Value
Elastic line scan	NEXT_SCAN
Energy calibration file	
Energy dispersion at...	NaN
Slope override	
Width of strip	1

Processing a RIXS file: (Continued)

dawn-workspace - C:\Users\acx46778\dawn-workspace - DAWN Science

File Tools Window Help

Project Explorer

- data
 - examples
 - Proposal_ID
 - spool
 - temp
 - xml
 - i21-157111.nxs 271.5 KB 12/01/21 04:33
 - i21-157116.nxs 143.5 KB 12/01/21 04:49
 - i21-157117.nxs 271.5 KB 12/01/21 04:49
 - i21-157118.nxs 143.5 KB 12/01/21 04:56
 - i21-157119.nxs 271.5 KB 12/01/21 04:57
 - xcam-157111.hdf 10.2 MB 12/01/21 04:...
 - xcam-157116.hdf 20.3 MB 12/01/21 04:...
 - xcam-157117.hdf 10.2 MB 12/01/21 04:...
 - xcam-157118.hdf 20.3 MB 12/01/21 04:...
 - xcam-157119.hdf 10.2 MB 12/01/21 04:...
 - src

Data Slice View

i21-157116.nxs
i21-157118.nxs

Perform background subtraction by fitting a PDF to the population of pixel values. The count at which the given signal to background ratio occurs is subtracted

Processing

Name	Value
Image background subtraction - Fitted to a PDF [Background Subtraction]	
Polynomial Background Subtraction 1D Approximation [Background Subtraction 2D]	
Blob Extraction [Binary Image]	
Image Stitching [External Data]	
Pseudo-Flat Field Filter [Image Filter]	
Image Threshold [Image Filter]	
X Region Profile Normalize [Image Filter]	
Downsample Image [Image Filter]	
Mean Filter [Image Filter]	
Median Filter [Image Filter]	

Model 'Combined RIXS image reduction'

Current slice of data: [0:1610:3304]

Input

data[0,:,:]

Output

Type in 'Image...' and select by double left clicking 'Image background subtraction-Fitted to a PDF [Background subtraction]' process in the Processing panel.

Processing a RIXS file: (Continued)

dawn-workspace - C:\Users\acx46778\dawn-workspace - DAWN Science

File Tools Window Help

Project Explorer File Viewer Data Slice View Processing Model 'Image background subtraction - Fitted to a PDF' QuickRIXS

data

- examples
- Proposal_ID
 - processing
 - spool
 - temp
 - xml
 - i21-157111.nxs 271.5 KB 12/01/21 04:33
 - i21-157116.nxs 143.5 KB 12/01/21 04:49
 - i21-157117.nxs 271.5 KB 12/01/21 04:49
 - i21-157118.nxs 143.5 KB 12/01/21 04:56
 - i21-157119.nxs 271.5 KB 12/01/21 04:57
 - xcam-157111.hdf 10.2 MB 12/01/21 04:...
 - xcam-157116.hdf 20.3 MB 12/01/21 04:...
 - xcam-157117.hdf 10.2 MB 12/01/21 04:...
 - xcam-157118.hdf 20.3 MB 12/01/21 04:...
 - xcam-157119.hdf 10.2 MB 12/01/21 04:...
- src

Data Slice View

i21-157116.nxs
i21-157118.nxs

Processing

Name	Value
Image background subtraction - Fitted to a PDF [Background Subtraction]	
Dark image file	

Model 'Image background subtraction - Fitted to a PDF'

Name	Value
Dark image file	

Click in the slot of 'Dark Image file' and browse using the folder icon to select the Dark image file. Here, i21-157111.nxs.

Current slice of data: [0:1610:3304]

Input

data[0,::]

Output

g10 of Histogram counts, Log10 of Background fit against Intens

Fitted PDF in 330:1355: residual = 1.63169e+08
'Gaussian' has 3 parameters:
0) posn = 330.500 in range [330.500, 333.000]
1) fwhm = 140.079 in range [1.00000, 263.255]
2) area = 4.91160e+06 in range [33497.0, 8.81827e+06]
Threshold = 508

Processing a RIXS file: (Continued)

dawn-workspace - C:\Users\acx46778\dawn-workspace - DAWN Science

File Tools Window Help

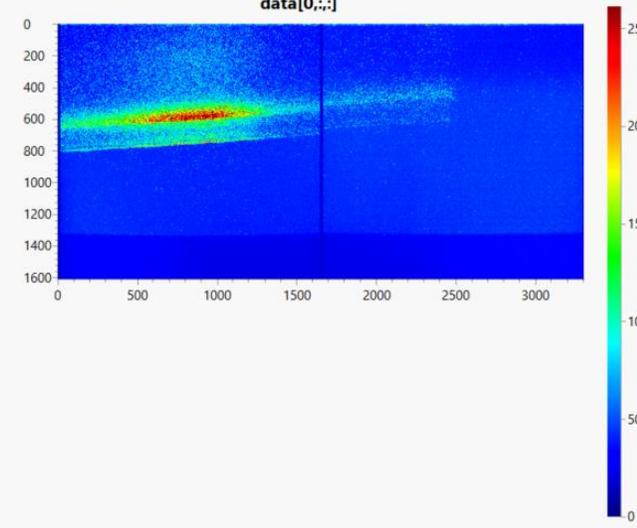
Project Explorer File Viewer Data Slice View Processing Model 'Image background subtraction - Fitted to a PDF'

data

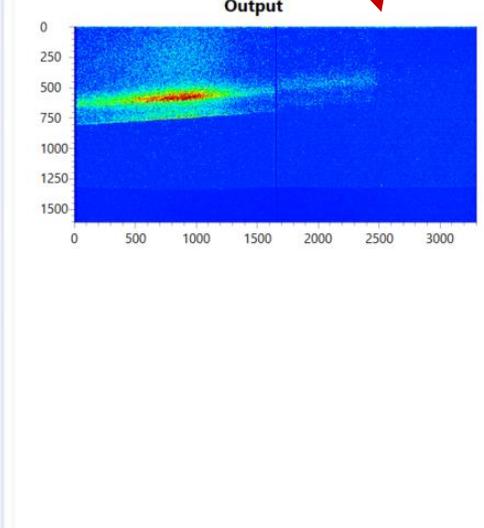
- examples
- Proposal_ID
 - processing
 - spool
 - temp
 - xml
 - i21-157111.nxs 271.5 KB 12/01/21 04:33
 - i21-157116.nxs 143.5 KB 12/01/21 04:49
 - i21-157117.nxs 271.5 KB 12/01/21 04:49
 - i21-157118.nxs 143.5 KB 12/01/21 04:56
 - i21-157119.nxs 271.5 KB 12/01/21 04:57
 - xcam-157111.hdf 10.2 MB 12/01/21 04:57
 - xcam-157116.hdf 20.3 MB 12/01/21 04:57
 - xcam-157117.hdf 10.2 MB 12/01/21 04:57
 - xcam-157118.hdf 20.3 MB 12/01/21 04:57
 - xcam-157119.hdf 10.2 MB 12/01/21 04:57
- src

Current slice of data: [0;1610;3304]

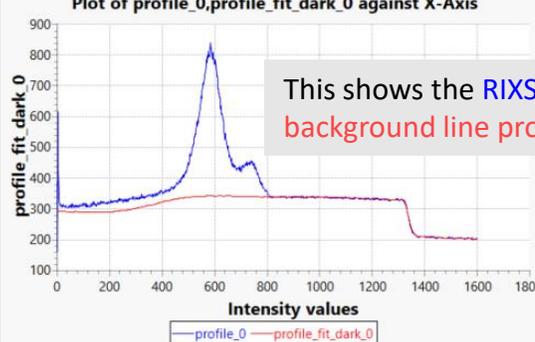
Input data[0,:,:]



Output



Plot of profile_0, profile_fit_dark_0 against X-Axis



profile_fit_dark_0

Intensity values

— profile_0 — profile_fit_dark_0

Blips removed: 41
Fitted function: residual = 1407.38
'Linear' has 2 parameters:
0) m = 1.01250 in range [-1.79769e+308, 1.79769e+308]
1) c = -2.65977 in range [-1.79769e+308, 1.79769e+308]
Peak is -1.63460 cf 335.186
Dark image offset = 0.396244

Click on the process name. You will see that these two panels are updated.

This shows the RIXS line profile and the background line profile.

Processing a RIXS file: (Continued)

dawn-workspace - C:\Users\acx46778\dawn-workspace - DAWN Science

File Tools Window Help

Project Explorer

- data
 - examples
 - Proposal_ID
 - processing
 - spool
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 - xml
 - i21-157111.nxs 271.5 KB 12/01/21 04:33
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 - i21-157117.nxs 271.5 KB 12/01/21 04:49
 - i21-157118.nxs 143.5 KB 12/01/21 04:56
 - i21-157119.nxs 271.5 KB 12/01/21 04:57
 - xcam-157111.hdf 10.2 MB 12/01/21 04:...
 - xcam-157116.hdf 20.3 MB 12/01/21 04:...
 - xcam-157117.hdf 10.2 MB 12/01/21 04:...
 - xcam-157118.hdf 20.3 MB 12/01/21 04:...
 - xcam-157119.hdf 10.2 MB 12/01/21 04:...
 - src

Data Slice View

i21-157116.nxs
i21-157118.nxs

Processing

Image background subtraction - Fitted to a PDF [Background Subtraction]
Com

Combined elastic and RIXS image reduction to spectra

Combined RIXS image reduction [RIXS spectrum processing]

Type in 'Com...' and select by double left clicking 'Combined RIXS image reduction [RIXS spectrum processing]' process in the Processing panel.

Model 'Image background subtraction - Fitted to a PDF'

Name	Value
------	-------

Current slice of data: [0:1610:3304]

Input

data[0,:,:]

Output

Plot of profile_0, profile_fit_dark_0 against X-Axis

Blips removed: 41
Fitted function: residual = 1407.38
'Linear' has 2 parameters:
0) m = 1.01250 in range [-1.79769e+308, 1.79769e+308]
1) c = -2.65977 in range [-1.79769e+308, 1.79769e+308]
Peak is -1.63460 cf 335.186
Dark image offset = 0.396244

Processing a RIXS file: (Continued)

dawn-workspace - C:\Users\acx46778\dawn-workspace - DAWN Science

File Tools Window Help

Project Explorer File Viewer Data Slice View Processing Model 'Combined RIXS image reduction'

data

- examples
- Proposal_ID
 - processing
 - spool
 - temp
 - xml
 - i21-157111.nxs 271.5 KB 12/01/21 04:33
 - i21-157116.nxs 143.5 KB 12/01/21 04:49
 - i21-157117.nxs 271.5 KB 12/01/21 04:49
 - i21-157118.nxs 143.5 KB 12/01/21 04:56
 - i21-157119.nxs 271.5 KB 12/01/21 04:57
 - xcam-157111.hdf 10.2 MB 12/01/21 04:...
 - xcam-157116.hdf 20.3 MB 12/01/21 04:...
 - xcam-157117.hdf 10.2 MB 12/01/21 04:...
 - xcam-157118.hdf 20.3 MB 12/01/21 04:...
 - xcam-157119.hdf 10.2 MB 12/01/21 04:...
- src

Data Slice View

i21-157116.nxs
i21-157118.nxs

Processing

Name

- Image background subtraction - Fitted to a PDF [Background Subtraction]
- Combined RIXS image reduction [RIXS spectrum processing]

Model 'Combined RIXS image reduction'

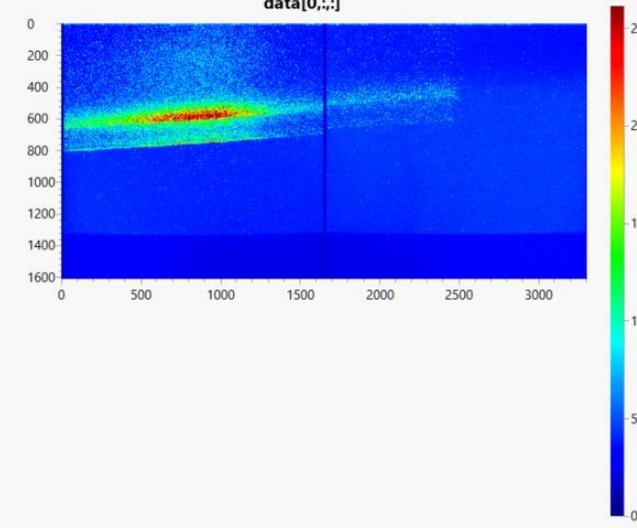
Name	Value
Elastic line scan	NEXT_SCAN
Energy calibration fi...	
Energy dispersion at...	0.01
Slope override	
Width of strip	1

Click and type in the energy dispersion value provided to you in the 'Energy dispersion at' slot. Here, 0.01.

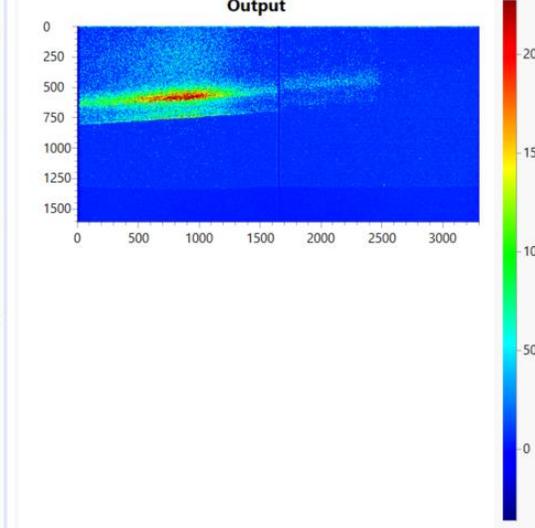
Current slice of data: [0;1610;3304]

Input

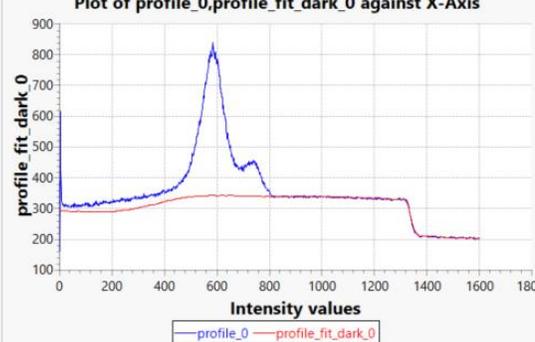
data[0,:;]



Output



Plot of profile_0,profile_fit_dark_0 against X-Axis



Intensity values

profile_0 profile_fit_dark_0

Blips removed: 41
Fitted function: residual = 1407.38
'Linear' has 2 parameters:
0) m = 1.01250 in range [-1.79769e+308, 1.79769e+308]
1) c = -2.65977 in range [-1.79769e+308, 1.79769e+308]

Peak is -1.63460 cf 335.186
Dark image offset = 0.396244

Processing a RIXS file: (Continued)

dawn-workspace - C:\Users\acx46778\dawn-workspace - DAWN Science

File Tools Window Help

Project Explorer File Viewer Data Slice View Processing Model 'Combined RIXS image reduction'

data

- examples
- Proposal_ID
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 - i21-157111.nxs 271.5 KB 12/01/21 04:33
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 - i21-157119.nxs 271.5 KB 12/01/21 04:57
 - xcam-157111.hdf 10.2 MB 12/01/21 04:...
 - xcam-157116.hdf 20.3 MB 12/01/21 04:...
 - xcam-157117.hdf 10.2 MB 12/01/21 04:...
 - xcam-157118.hdf 20.3 MB 12/01/21 04:...
 - xcam-157119.hdf 10.2 MB 12/01/21 04:...
- src

Data Slice View

i21-157116.nxs
i21-157118.nxs

Processing

Name

- Image background subtraction - Fitted to a PDF [Background Subtraction]
- Combined RIXS image reduction [RIXS spectrum processing]

Model 'Combined RIXS image reduction'

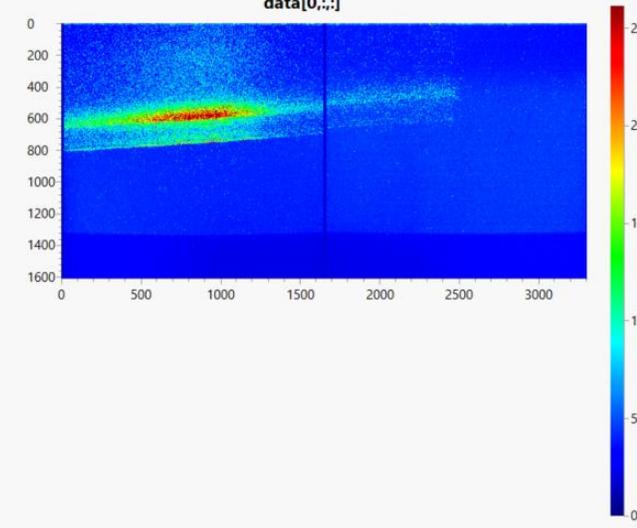
Name	Value
Elastic line scan	NEXT_SCAN
Energy calibration fi...	
Energy dispersion at...	0.01
Slope override	-0.065
Width of strip	1

Click and type in the slope value provided to you in the 'Slope override' slot. Here, -0.065.

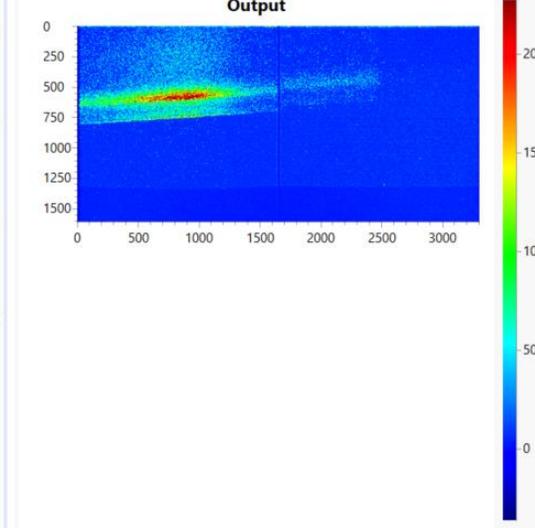
Current slice of data: [0:1610:3304]

Input

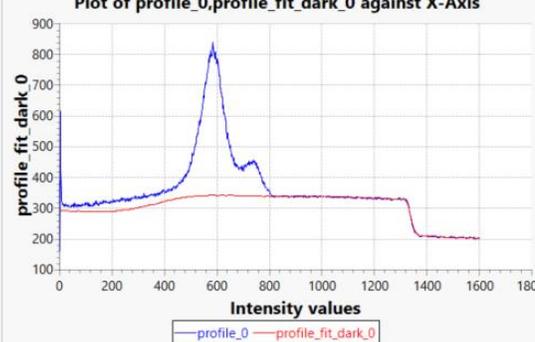
data[0,::]



Output



Plot of profile_0,profile_fit_dark_0 against X-Axis



Intensity values

profile_fit_dark_0

Blips removed: 41
Fitted function: residual = 1407.38
'Linear' has 2 parameters:
0) m = 1.01250 in range [-1.79769e+308, 1.79769e+308]
1) c = -2.65977 in range [-1.79769e+308, 1.79769e+308]

Peak is -1.63460 cf 335.186
Dark image offset = 0.396244

Processing a RIXS file: (Continued)

dawn-workspace - C:\Users\acx46778\dawn-workspace - DAWN Science

File Tools Window Help

Project Explorer

- data
 - examples
 - Proposal_ID
 - processing
 - spool
 - temp
 - xml
 - i21-157111.nxs 271.5 KB 12/01/21 04:33
 - i21-157116.nxs 143.5 KB 12/01/21 04:49
 - i21-157117.nxs 271.5 KB 12/01/21 04:49
 - i21-157118.nxs 143.5 KB 12/01/21 04:56
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 - xcam-157111.hdf 10.2 MB 12/01/21 04:...
 - xcam-157116.hdf 20.3 MB 12/01/21 04:...
 - xcam-157117.hdf 10.2 MB 12/01/21 04:...
 - xcam-157118.hdf 20.3 MB 12/01/21 04:...
 - xcam-157119.hdf 10.2 MB 12/01/21 04:...
 - src

Data Slice View

- i21-157116.nxs
- i21-157118.nxs

Processing

- Image background subtraction - Fitted to a PDF [Background Subtraction]
- Combined RIXS image reduction [RIXS spectrum processing]

Model 'Combined RIXS image reduction'

Name	Value
Elastic line scan	NEXT_SCAN
Energy calibration fi...	
Energy dispersion at...	0.01
Slope override	-0.065
Width of strip	1

Click on the process name. You will see that this panel update.

Input

data[0,:,:]

Output

Plot of profile_0,profile_fit_dark_0 against X-Axis

Blips removed: 41
Fitted function: residual = 1407.38
'Linear' has 2 parameters:
0) m = 1.01250 in range [-1.79769e
1) c = -2.65977 in range [-1.7976e

Peak is -1.63460 cf 335.186
Dark image offset = 0.396244

Wait till this update status disappears

Update...

Processing a RIXS file: (Continued)

dawn-workspace - C:\Users\acx46778\dawn-workspace - DAWN Science

File Tools Window Help

Project Explorer

- data
 - examples
 - Proposal_ID
 - processing
 - spool
 - temp
 - xml
 - i21-157111.nxs 271.5 KB 12/01/21 04:33
 - i21-157116.nxs 143.5 KB 12/01/21 04:49
 - i21-157117.nxs 271.5 KB 12/01/21 04:49
 - i21-157118.nxs 143.5 KB 12/01/21 04:56
 - i21-157119.nxs 271.5 KB 12/01/21 04:57
 - xcam-157111.hdf 10.2 MB 12/01/21 04:...
 - xcam-157116.hdf 20.3 MB 12/01/21 04:...
 - xcam-157117.hdf 10.2 MB 12/01/21 04:...
 - xcam-157118.hdf 20.3 MB 12/01/21 04:...
 - xcam-157119.hdf 10.2 MB 12/01/21 04:...
 - src

Data Slice View

- i21-157116.nxs
- i21-157118.nxs

Processing

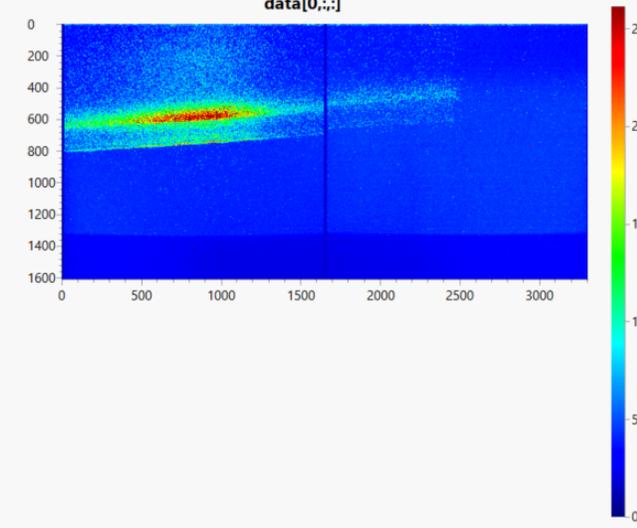
Model 'Combined RIXS image reduction'

Name	Value
Elastic line scan	NEXT_SCAN
Energy calibration fi...	
Energy dispersion at...	0.01
Slope override	-0.065
Width of strip	1

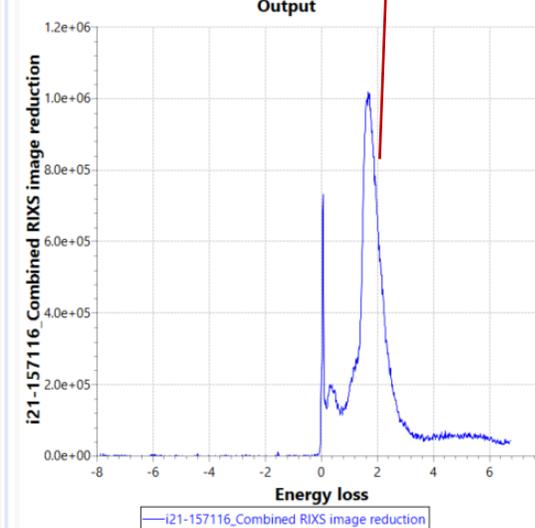
Processing Log:

```
0) c = 392125 in range [-1.79769e+308, 392125]
Fitted spectra of 1 frames
Average FWHM = 4.54557
Slicing image [:2048, 1:1601] from [3304, 1610]
Processing region 0
Clipping original image as it has negative values
Found 57468 photon events, current total = 57468
At frame 0/2
```

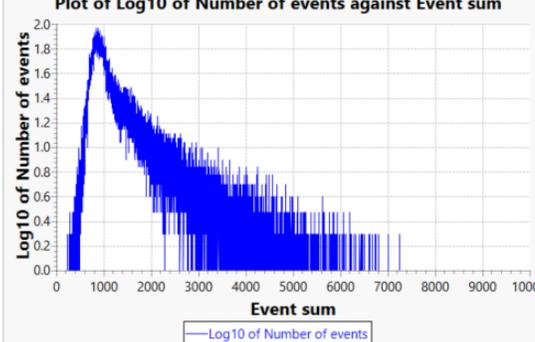
Input: data[0,:]



Output: i21-157116_Combined RIXS image reduction



Plot of Log10 of Number of events against Event sum



Annotations:

- This is how your processed RIXS spectrum looks like.
- You can use this icon to zoom in and see the spectrum.

Processing a RIXS file: (Continued)

dawn-workspace - C:\Users\acx46778\dawn-workspace - DAWN Science

File Tools Window Help

Project Explorer

- data
 - examples
 - Proposal_ID
 - processing
 - spool
 - temp
 - xml
 - i21-157111.nxs 271.5 KB 12/01/21 04:33
 - i21-157116.nxs 143.5 KB 12/01/21 04:49
 - i21-157117.nxs 271.5 KB 12/01/21 04:49
 - i21-157118.nxs 143.5 KB 12/01/21 04:56
 - i21-157119.nxs 271.5 KB 12/01/21 04:57
 - xcam-157111.hdf 10.2 MB 12/01/21 04:...
 - xcam-157116.hdf 20.3 MB 12/01/21 04:...
 - xcam-157117.hdf 10.2 MB 12/01/21 04:...
 - xcam-157118.hdf 20.3 MB 12/01/21 04:...
 - xcam-157119.hdf 10.2 MB 12/01/21 04:...
 - src

Data Slice View

i21-157116.nxs
i21-157118.nxs

Process all files

Processing

Name	Value
Image background subtraction - Fitted to a PDF [Background Subtraction]	
Combined RIXS image reduction [RIXS spectrum processing]	

Model 'Combined RIXS image reduction'

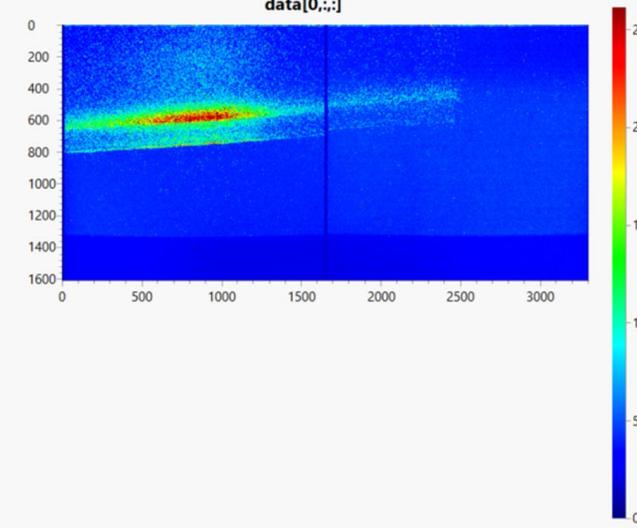
Name	Value
Elastic line scan	NEXT_SCAN
Energy calibration fi...	
Energy dispersion at...	0.01
Slope override	-0.065
Width of strip	1

Click on this play button to process all the RIXS files and save them.

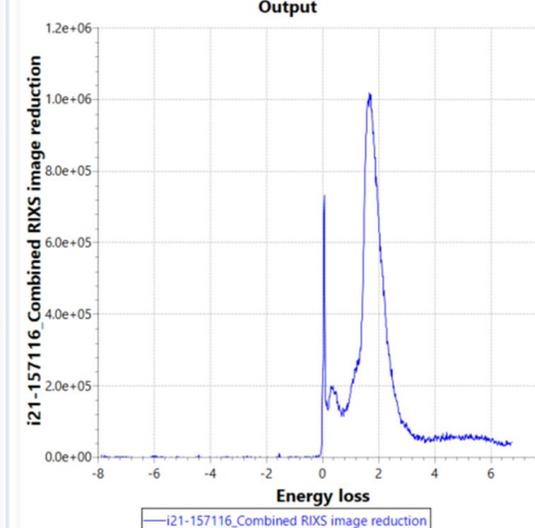
Current slice of data: [0:1610:3304]

Input

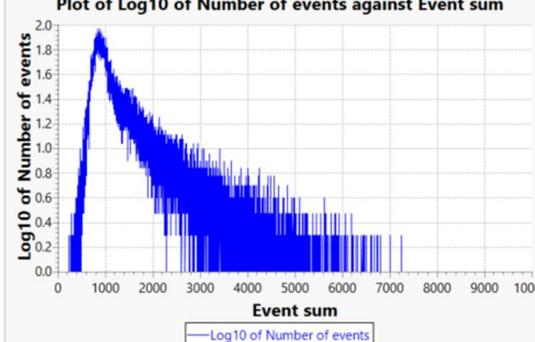
data[0,:]



Output



Plot of Log10 of Number of events against Event sum



0) c = 392125 in range [-1.79769e+308, 392125]
Fitted spectra of 1 frames
Average FWHM = 4.54557
Slicing image [:2048, 1:1601] from [3304, 1610]
Processing region 0
Clipping original image as it has negative values
Found 57468 photon events, current total = 57468
At frame 0/2

Processing a RIXS file: (Continued)

The screenshot displays the DAWN Science software interface. The Project Explorer on the left shows a file tree with folders like 'data', 'examples', 'Proposal_ID', 'processing_ID', 'spool', 'temp', and 'xml'. The Data Slice View shows a list of files including 'i21-157116.nxs' and 'i21-157118.nxs'. The Processing window shows a list of processing steps: 'Image background subtraction - Fitted to a PDF [Background Subtraction]' and 'Combined RIXS image reduction [RIXS spectrum processing]'. The Model window shows parameters for 'Combined RIXS image reduction', including 'Elastic line scan' (NEXT_SCAN), 'Energy calibration fi...', 'Energy dispersion at...' (0.01), 'Slope override' (-0.065), and 'Width of strip' (1).

A dialog box titled 'Please select a directory' is open, showing the folder path 'C:\Users\acx46778\Desktop\Proposal_ID'. The dialog has options for 'Automatically load data to DataVis perspective', 'Processed data only', 'Link original data (no data copied)', and 'Process data into copy of original'. A red arrow points to the 'Link original data (no data copied)' option.

A text box with a grey background contains the following instructions:

Browse to a folder where you want to save the data. Do not use the parent data folder. You can use the 'processing' subfolder to save the data. Click on the 'Link original data (no data copied)' and OK.

The bottom of the interface shows several plots: 'data[0,:]' (a 2D heatmap), 'Output' (a plot of 'i21-157116 Combined RIXS image reduction' vs 'Energy loss'), and 'Plot of Log10 of Number of events against Event sum' (a histogram). A console window at the bottom right shows the following output:

```
0) c = 392125 in range [-1.79769e+308, 392125]
Fitted spectra of 1 frames
Average FWHM = 4.54557
Slicing image [:2048, 1:1601] from [3304, 1610]
Processing region 0
Clipping original image as it has negative values
Found 57468 photon events, current total = 57468
At frame 0/2
```

Processing a RIXS file: Basic button functionalities

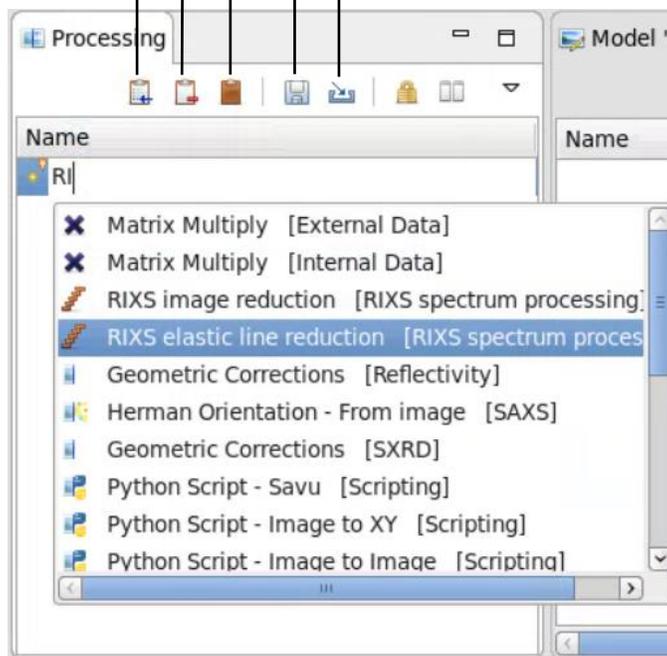
Load a saved list of operations with model parameters

Save the list of operations along with model parameter

Remove all operations

Remove selected operation

Insert operation



Data Slice View

Process all files in the panel

Remove selected file

Remove all files

Browse through the frames of a selected file to visualise them as 2D plots below

Current slice of data: [1, :2048, :2048]

Input

data[1, :, :]

Y-Axis

0 500 1000 1500 2000

0 1000 2000

0 50 100 150 200 250 300 350

Viewing processed RIXS files: PostRIXS perspective



The screenshot displays the PostRIXS software interface. On the left is a 'RIXS Results Files' panel with a 'Filename' header and a list area. A red arrow points from a text box to this panel. The central area is a 'RIXS Plot' window showing a blank grid with axes ranging from 0 to 100. The x-axis is labeled 'X-Axis'. On the right is a 'RIXS Plot Options' panel with a 'Process:' dropdown menu and a 'Dataset Name' input field. The top of the window shows a menu bar with 'File', 'Window', and 'Help', and a toolbar with various icons. A red arrow points from the top-left icon to the 'PostRIXS' tab in the top-right corner. At the bottom left, a file path is visible: '/dls/i21/data/2020/cm26439-4'. At the bottom right, there is an 'Align...' button.

Go to file and browse and select the processed RIXS files

/dls/i21/data/2020/cm26439-4

Align...

Viewing processed RIXS files: PostRIXS perspective



The screenshot displays the PostRIXS software interface. On the left, the 'RIXS Results Files' panel shows a list of three files: 'i21-148504_processed_combined_rixs_spectra_200909_194357.nxs', 'i21-148506_processed_combined_rixs_spectra_200909_194412.nxs', and 'i21-148508_processed_combined_rixs_spectra_200909_194428.nxs'. A right-click context menu is open over the files, with the 'Check' option selected. A red arrow points from a text box to the 'Check' option. The central 'RIXS Plot' area is empty, showing a grid with the X-axis labeled 'X-Axis' ranging from 0 to 100. The right panel, 'RIXS Plot Options', contains a 'Process:' dropdown menu and a 'Dataset Name' text area. The top menu bar includes 'File', 'Window', and 'Help'. The top toolbar includes icons for search, zoom, and other plot functions. The bottom right corner has an 'Align...' button.

File Window Help

RIXS Results Files

Filename

- i21-148504_processed_combined_rixs_spectra_200909_194357.nxs
- i21-148506_processed_combined_rixs_spectra_200909_194412.nxs
- i21-148508_processed_combined_rixs_spectra_200909_194428.nxs

- Check
- Uncheck
- Display
- Create joined file
- Deselect datasets
- Close
- Transfer
- Convert

RIXS Plot

100

90

80

70

60

50

40

30

20

10

0

0 10 20 30 40 50 60 70 80 90 100

X-Axis

RIXS Plot Options

Process:

Dataset Name

Align...

Shift select all the files, right click and click on 'Check'

Viewing processed RIXS files: PostRIXS perspective



The screenshot displays the PostRIXS software interface. On the left, the 'RIXS Results Files' panel lists three files: `i21-148504_processed_combined_rixs_spectra_200909_194357.nxs`, `i21-148506_processed_combined_rixs_spectra_200909_194412.nxs`, and `i21-148508_processed_combined_rixs_spectra_200909_194428.nxs`. The central 'RIXS Plot' area is currently empty, with the x-axis labeled 'Energy loss' ranging from -1 to 6 and the y-axis ranging from 0 to 7. On the right, the 'RIXS Plot Options' panel shows the 'Process' dropdown set to 'Combined RIXS image reduction'. A list of dataset names is provided, with `normalized_correlated_spectrum_0` selected and highlighted in blue. A red arrow points from this selection to a text box in the plot area that reads 'Check the 'normalized_correlated_spectrum_0''. The software title bar includes 'DataVis', 'Processing', 'QuickRIXS', 'PostRIXS', and 'DExplore'.

Viewing processed RIXS files: PostRIXS perspective



File Window Help

RIXS Results Files

- Filename
- i21-148504_processed_combined_rixs_spectra_200909_194357.nxs
- i21-148506_processed_combined_rixs_spectra_200909_194412.nxs
- i21-148508_processed_combined_rixs_spectra_200909_194428.nxs

RIXS Plot

Sometimes legends are not visible. In that case click the maximise button and the restore button again.

I_0 normalised RIXS data summed over different frames corresponding to the checked files can now be seen.

Legend:

- i21-148504_processed_combined_rixs_spectra_200909_194357.nxs:normalized_correlated_spectrum_0:0
- i21-148506_processed_combined_rixs_spectra_200909_194412.nxs:normalized_correlated_spectrum_0:0
- i21-148508_processed_combined_rixs_spectra_200909_194428.nxs:normalized_correlated_spectrum_0:0

RIXS Plot Options

Process: Combined RIXS image reduction

Dataset Name

- spectrum_0
- Log10 of Number of events
- correlated_multiple_photon_spectra_0
- correlated_multiple_photon_spectrum_0
- correlated_shift_0
- correlated_single_photon_spectra_0
- correlated_single_photon_spectrum_0
- correlated_spectra_0
- correlated_spectrum_0
- counts_per_photon
- drain_current
- elastic_spectrum_0
- elastic_spectrum_area_0
- elastic_spectrum_fit_0
- elastic_spectrum_fwhm_0
- elastic_spectrum_height_0
- elastic_spectrum_posn_0
- line_0_residual
- multiple_photon_count_0
- multiple_photon_minimum
- multiple_photon_spectra_0
- multiple_photon_spectrum_0
- normalized_correlated_spectrum_0
- photon_positions_0
- photon_values_0
- single_events_fraction_0
- single_events_total_fraction_0

Align...

Viewing processed RIXS files: PostRIXS perspective



The screenshot displays the PostRIXS software interface. On the left, the 'RIXS Results Files' panel shows a list of files with checkboxes. A context menu is open over the selected files, with 'Display' and 'Set Label' highlighted. A red arrow points from a text box to the 'Display' option. The main 'RIXS Plot' window shows a graph of Energy loss (x-axis, -1 to 6) versus intensity (y-axis, 0 to 7). Three data series are plotted: blue, red, and green. A legend at the bottom of the plot identifies the series. On the right, the 'RIXS Plot Options' panel shows a list of dataset names, with 'normalized_correlated_spectrum_0' selected. The 'Process' dropdown is set to 'Combined RIXS image reduction'.

File List:

- i21-148504_processed_combined_rixs_spectra_200909_194357.nxs
- i21-148506_processed_combined_rixs_spectra_200909_194412.nxs
- i21-148508_processed_combined_rixs_spectra_200909_194428.nxs

Context Menu:

- Check
- Uncheck
- Display** (sub-menu open)
 - Set Label**
 - Clear
 - User Editable Labels
- Create joined file
- Deselect datasets
- Close
- Transfer
- Convert

Plot Legend:

- i21-148504_processed_combined_rixs_spectra_200909_194357.nxs:normalized_correlated_spectrum_0:0
- i21-148506_processed_combined_rixs_spectra_200909_194412.nxs:normalized_correlated_spectrum_0:0
- i21-148508_processed_combined_rixs_spectra_200909_194428.nxs:normalized_correlated_spectrum_0:0

Plot Options:

Process: Combined RIXS image reduction

Dataset Name:

- spectrum_0
- Log10 of Number of events
- correlated_multiple_photon_spectra_0
- correlated_multiple_photon_spectrum_0
- correlated_shift_0
- correlated_single_photon_spectra_0
- correlated_single_photon_spectrum_0
- correlated_spectra_0
- correlated_spectrum_0
- counts_per_photon
- drain_current
- elastic_spectrum_0
- elastic_spectrum_area_0
- elastic_spectrum_fit_0
- elastic_spectrum_fwhm_0
- elastic_spectrum_height_0
- elastic_spectrum_posn_0
- line_0_residual
- multiple_photon_count_0
- multiple_photon_minimum
- multiple_photon_spectra_0
- multiple_photon_spectrum_0
- normalized_correlated_spectrum_0**
- photon_positions_0
- photon_values_0
- single_events_fraction_0
- single_events_total_fraction_0

Align...

Right click the selected data and select 'Display' and 'Set label'.

Viewing processed RIXS files: PostRIXS perspective



File Window Help

RIXS Results Files

Filename

- i21-148504_processed_combined_rixs_spectra_200909_194357.nxs
- i21-148506_processed_combined_rixs_spectra_200909_194412.nxs
- i21-148508_processed_combined_rixs_spectra_200909_194428.nxs

RIXS Plot

Select item for label

- /entry1/before_scan/sgmh/sgmh
- /entry1/before_scan/sgmpitch/sgmpitch
- /entry1/before_scan/sgmr1/sgmr1
- /entry1/before_scan/sgmwedgeinside/sgmwedgeinside
- /entry1/before_scan/sgmwedgeoutside/sgmwedgeoutside
- /entry1/before_scan/sgmx/sgmx
- /entry1/before_scan/specgamma/specgamma
- /entry1/before_scan/spech/spech
- /entry1/before_scan/spec1/spec1
- /entry1/before_scan/th/th**
- /entry1/before_scan/x/x
- /entry1/before_scan/y/y

Process: Combined RIXS image reduction

Dataset Name

- spectrum_0
- Log10 of Number of events
- correlated_multiple_photon_spectra_0
- correlated_multiple_photon_spectrum_0
- correlated_shift_0
- correlated_single_photon_spectra_0
- correlated_single_photon_spectrum_0
- correlated_spectra_0
- correlated_spectrum_0
- counts_per_photon
- drain_current
- elastic_spectrum_0
- elastic_spectrum_area_0
- elastic_spectrum_fit_0
- elastic_spectrum_fwhm_0
- elastic_spectrum_height_0
- elastic_spectrum_posn_0
- line_0_residual
- multiple_photon_count_0
- multiple_photon_minimum
- multiple_photon_spectra_0
- multiple_photon_spectrum_0
- normalized_correlated_spectrum_0
- photon_positions_0
- photon_values_0
- single_events_fraction_0
- single_events_total_fraction_0

Align...

Energy loss

- i21-148504_processed_combined_rixs_spectra_200909_194357.nxs:normalized_correlated_spectrum_0:0
- i21-148506_processed_combined_rixs_spectra_200909_194412.nxs:normalized_correlated_spectrum_0:0
- i21-148508_processed_combined_rixs_spectra_200909_194428.nxs:normalized_correlated_spectrum_0:0

You can select an item to display as legend in this way. Say you select entry1/before_scan/th/th, this will display the incidence angles for the files.

You can select entry1/before_scan/energy/energy, that will display the incident energies corresponding to the files.

Viewing processed RIXS files: PostRIXS perspective



File Window Help

RIXS Results Files

Filename	entry1/bef
<input checked="" type="checkbox"/> i21-148504_processed_combined_rixs_spectra_200909_194357.nxs	93.890960
<input checked="" type="checkbox"/> i21-148506_processed_combined_rixs_spectra_200909_194412.nxs	74.178590
<input checked="" type="checkbox"/> i21-148508_processed_combined_rixs_spectra_200909_194428.nxs	73.055614

As you can see now, the incident angles are listed and the legends are showing the angles. The files can be sorted either by clicking on the 'Filename' or the 'entry1/...'

RIXS Plot

Process: Combined RIXS image reduction

Dataset Name

- spectrum_0
- Log10 of Number of events
- correlated_multiple_photon_spectra_0
- correlated_multiple_photon_spectrum_0
- correlated_shift_0
- correlated_single_photon_spectra_0
- correlated_single_photon_spectrum_0
- correlated_spectra_0
- correlated_spectrum_0
- counts_per_photon
- drain_current
- elastic_spectrum_0
- elastic_spectrum_area_0
- elastic_spectrum_fit_0
- elastic_spectrum_fwhm_0
- elastic_spectrum_height_0
- elastic_spectrum_posn_0
- line_0_residual
- multiple_photon_count_0
- multiple_photon_minimum
- multiple_photon_spectra_0
- multiple_photon_spectrum_0
- normalized_correlated_spectrum_0
- photon_positions_0
- photon_values_0
- single_events_fraction_0
- single_events_total_fraction_0

Align...

Energy loss

- i21-148504_processed_combined_rixs_spectra_200909_194357.nxs:normalized_correlated_spectrum_0:0 (93.8909597773)
- i21-148506_processed_combined_rixs_spectra_200909_194412.nxs:normalized_correlated_spectrum_0:0 (74.1785901666)
- i21-148508_processed_combined_rixs_spectra_200909_194428.nxs:normalized_correlated_spectrum_0:0 (73.0556140981)

Aligning processed RIXS files: PostRIXS perspective



File Window Help

RIXS Results Files

- Filename
- i21-148504_processed_combined_rixs_spectra_200909_19435
- i21-148506_processed_combined_rixs_spectra_200909_19441
- i21-148508_processed_combined_rixs_spectra_200909_19442

RIXS Plot

Click on the 'Align' button

RIXS Plot Options

Process: Combined RIXS image reduction

Dataset Name

- spectrum_0
- Log10 of Number of events
- correlated_multiple_photon_spectra_0
- correlated_multiple_photon_spectrum_0
- correlated_shift_0
- correlated_single_photon_spectra_0
- correlated_single_photon_spectrum_0
- correlated_spectra_0
- correlated_spectrum_0
- counts_per_photon
- drain_current
- elastic_spectrum_0
- elastic_spectrum_area_0
- elastic_spectrum_fit_0
- elastic_spectrum_fwhm_0
- elastic_spectrum_height_0
- elastic_spectrum_posn_0
- line_0_residual
- multiple_photon_count_0
- multiple_photon_minimum
- multiple_photon_spectra_0
- multiple_photon_spectrum_0
- normalized_correlated_spectrum_0
- photon_positions_0
- photon_values_0
- single_events_fraction_0
- single_events_total_fraction_0

Align...

Legend:

- i21-148504_processed_combined_rixs_spectra_200909_194357.nxs:normalized_correlated_spectrum_0:0 (93.8909597773)
- i21-148506_processed_combined_rixs_spectra_200909_194412.nxs:normalized_correlated_spectrum_0:0 (74.1785901666)
- i21-148508_processed_combined_rixs_spectra_200909_194428.nxs:normalized_correlated_spectrum_0:0 (73.0556140981)

Aligning processed RIXS files: PostRIXS perspective



File Window Help

RIXS Results Files

- Filename
- i21-148504_processed_combined_rixs_spectra_200909_194357
- i21-148506_processed_combined_rixs_spectra_200909_194412
- i21-148508_processed_combined_rixs_spectra_200909_194428

RIXS Plot

RIXS Plot Options

Process: Combined RIXS image reduction

Dataset Name

- spectrum_0
- Number of events
- ed_multiple_photon_spectra_0
- ed_multiple_photon_spectrum_0
- ed_shift_0
- ed_single_photon_spectra_0
- ed_single_photon_spectrum_0
- ed_spectra_0
- ed_spectrum_0
- per_photon
- rrent
- spectrum_0
- spectrum_area_0
- elastic_spectrum_fit_0
- elastic_spectrum_fwhm_0
- elastic_spectrum_height_0
- elastic_spectrum_posn_0
- line_0_residual
- multiple_photon_count_0
- multiple_photon_minimum
- multiple_photon_spectra_0
- multiple_photon_spectrum_0
- normalized_correlated_spectrum_0
- photon_positions_0
- photon_values_0
- single_events_fraction_0
- single_events_total_fraction_0

Plot aligner

Align Reset Force to zero Resample Show average

Dataset Name	Auto-align	Manual
i21-148504_processed_combined_rixs	0.0	0.0
i21-148506_processed_combined_rixs	0.0	0.0
i21-148508_processed_combined_rixs	0.0	0.0

Cancel OK

Click on the 'Align' button

Legend:

- i21-148504_processed_combined_rixs_spectra_200909_194357.nxs:normalized_correlated_spectrum_0:0 (93.8909597773)
- i21-148506_processed_combined_rixs_spectra_200909_194412.nxs:normalized_correlated_spectrum_0:0 (74.1785901666)
- i21-148508_processed_combined_rixs_spectra_200909_194428.nxs:normalized_correlated_spectrum_0:0 (73.0556140981)

Aligning processed RIXS files: PostRIXS perspective



The screenshot displays the PostRIXS software interface. On the left, a 'RIXS Results Files' panel lists three processed RIXS spectra files. The main window shows a 'RIXS Plot' with three overlaid spectra (blue, red, and green) and a shaded teal region around the elastic line. A 'Plot aligner' dialog box is open, showing alignment parameters for each dataset. A red arrow points from the dialog to the teal region in the plot. A text box explains the alignment process. On the right, a 'RIXS Plot Options' panel lists various plot settings, with 'normalized_correlated_spectrum_0' checked. The legend at the bottom identifies the three spectra by dataset name and correlation value.

Plot aligner

Dataset Name	Auto-align	Manual
i21-148504_processed_combined_rixs_0	0.01451774	0.0
i21-148506_processed_combined_rixs_0	0.01311141	0.0
i21-148508_processed_combined_rixs_0	0.01288825	0.0

Select a region around the elastic line and you will see them getting aligned to zero energy. If you are not satisfied you can also add values manually.

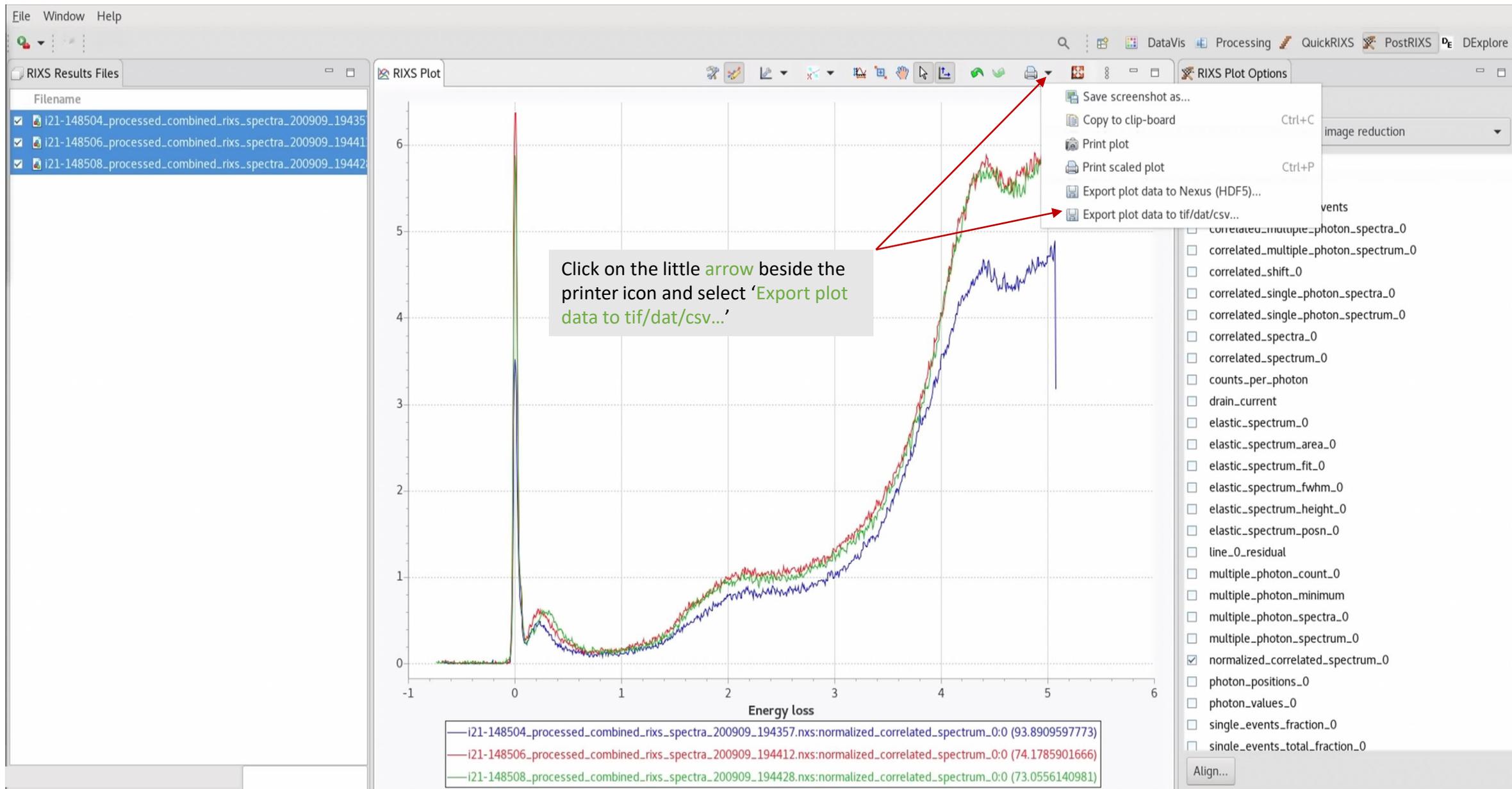
RIXS Plot Options

- spectrum_0
- Number of events
- ed_multiple_photon_spectra_0
- ed_multiple_photon_spectrum_0
- ed_shift_0
- ed_single_photon_spectra_0
- ed_single_photon_spectrum_0
- ed_spectra_0
- ed_spectrum_0
- per_photon
- rrent
- spectrum_0
- spectrum_area_0
- elastic_spectrum_fit_0
- elastic_spectrum_fwhm_0
- elastic_spectrum_height_0
- elastic_spectrum_posn_0
- line_0_residual
- multiple_photon_count_0
- multiple_photon_minimum
- multiple_photon_spectra_0
- multiple_photon_spectrum_0
- normalized_correlated_spectrum_0
- photon_positions_0
- photon_values_0
- single_events_fraction_0
- single_events_total_fraction_0

Legend:

- i21-148504_processed_combined_rixs_spectra_200909_194357.nxs:normalized_correlated_spectrum_0:0 (93.8909597773)
- i21-148506_processed_combined_rixs_spectra_200909_194412.nxs:normalized_correlated_spectrum_0:0 (74.1785901666)
- i21-148508_processed_combined_rixs_spectra_200909_194428.nxs:normalized_correlated_spectrum_0:0 (73.0556140981)

Aligning processed RIXS files: PostRIXS perspective



Aligning processed RIXS files: PostRIXS perspective



The screenshot displays the PostRIXS software interface. On the left, the 'RIXS Results Files' panel lists three processed RIXS spectra files. The central 'RIXS Plot' window shows a plot of intensity versus energy loss, with three data series overlaid. An 'Export Data' dialog box is open, allowing the user to export the plotted data to a file. The dialog box includes fields for the file name, format, and number of files. A red arrow points from a text box on the left to the 'Number of files' section of the dialog box.

RIXS Results Files

Filename
<input checked="" type="checkbox"/> i21-148504_processed_combined_rixs_spectra_200909_19435
<input checked="" type="checkbox"/> i21-148506_processed_combined_rixs_spectra_200909_19441
<input checked="" type="checkbox"/> i21-148508_processed_combined_rixs_spectra_200909_19442

Export Data

Export plotted data to file

File:

Overwrite file if it already exists

Format: dat csv

Number of files: single multiple single x column

RIXS Plot Options

Process: Combined RIXS image reduction

Dataset Name

- spectrum_0
- Log10 of Number of events
- correlated_multiple_photon_spectra_0
- correlated_multiple_photon_spectrum_0
- correlated_shift_0
- correlated_single_photon_spectra_0
- correlated_single_photon_spectrum_0
- correlated_spectra_0
- correlated_spectrum_0
- counts_per_photon
- drain_current
- elastic_spectrum_0
- elastic_spectrum_area_0
- elastic_spectrum_fit_0
- elastic_spectrum_fwhm_0
- elastic_spectrum_height_0
- elastic_spectrum_posn_0
- line_0_residual
- multiple_photon_count_0
- multiple_photon_minimum
- multiple_photon_spectra_0
- multiple_photon_spectrum_0
- normalized_correlated_spectrum_0
- photon_positions_0
- photon_values_0
- single_events_fraction_0
- single_events_total_fraction_0

Legend:

- i21-148504_processed_combined_rixs_spectra_200909_194357.nxs:normalized_correlated_spectrum_0:0 (93.8909597773)
- i21-148506_processed_combined_rixs_spectra_200909_194412.nxs:normalized_correlated_spectrum_0:0 (74.1785901666)
- i21-148508_processed_combined_rixs_spectra_200909_194428.nxs:normalized_correlated_spectrum_0:0 (73.0556140981)

You can export the files as multiple files having XY columns or a single file as multiple XY column. Whatever is plotted will be exported.

Viewing a processed RIXS file: DataVIS perspective



The screenshot shows the DataVIS software interface. The main window is titled "DataVIS" and includes a menu bar (File, Plot, Tools, Transfer, Window, Help) and a toolbar. The interface is divided into three main panels:

- Data Files:** A file browser on the left with a "Filename" field and a list area. A red arrow points from the "File" menu to this panel.
- Plot:** A large central plot area with a grid. The X-axis is labeled "X-Axis" and ranges from 0 to 100. The Y-axis ranges from 0 to 100. The plot is currently empty.
- Datasets:** A panel on the right with a table for "Dataset Name" and "Shape". Below the table are controls for "Plot Type:", "Dimension Display", "Start:Stop:S", and "Axes". The status bar at the bottom right shows "Ready".

A red arrow points from the DataVIS logo icon to the "DataVIS" window title. A grey callout box with a red arrow pointing to the "Data Files" panel contains the text:

Go to file and browse and select any **one** of processed RIXS files

The status bar at the bottom left shows the path: /dls/i21/data/2020/cm26439-4

Viewing a processed RIXS file: DataVIS perspective



File Plot Tools Transfer Window Help

0 255

Data Files

Filename

i21-148500_processed_combined_rixs_spectra_200

Plot

100

90

80

70

60

50

40

30

20

10

0

0 10 20 30 40 50 60 70 80 90 100

X-Axis

Uncheck the default
/processed/result/data and scroll down

Datasets

Dataset Name Shape

- /processed/result/data [10, 986]
- /entry1/instrument/xcam/count_time [10]
- /processed/process/origin/data_dimensions [2]
- /processed/auxiliary/0-Image background subtraction - Fitted tc [10]
- /processed/auxiliary/0-Image background subtraction - Fitted tc [10, 307]
- /processed/auxiliary/0-Image background subtraction - Fitted tc [10]
- /processed/auxiliary/0-Image background subtraction - Fitted tc [10, 307]
- /processed/auxiliary/0-Image background subtraction - Fitted tc [10]
- /processed/auxiliary/0-Image background subtraction - Fitted tc [3932]
- /processed/auxiliary/0-Image background subtraction - Fitted tc [10]
- /processed/auxiliary/0-Image background subtraction - Fitted tc [10, 3932]
- /processed/auxiliary/0-Image background subtraction - Fitted tc [3932]
- /processed/auxiliary/0-Image background subtraction - Fitted tc [10]
- /processed/auxiliary/0-Image background subtraction - Fitted tc [10, 3932]
- /processed/auxiliary/0-Image background subtraction - Fitted tc [10]

Plot Type: Image

Dimension	Display	Start:Stop:Step	Axis
0 [10]	Y	:	/processed/result/checktopup_time_beamok
1 [986]	X	:	/processed/result/Energy loss

Ready

Viewing a processed RIXS file: DataVIS perspective



File Plot Tools Transfer Window Help

0 255

Data Files

Filename

- i21-148500_processed_combined_rixs_spectra_201

Plot

100

90

80

70

60

50

40

30

20

10

0

0 10 20 30 40 50 60 70 80 90 100

Check the '/processed/summary/1-Combined RIXS image reduction/normalized_correlated_spectrum_0/data'

Datasets

Dataset Name	Shape
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/elastic_spectrum_height_0/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/elastic_spectrum_posn_0/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/line_0_residual/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_count_0/data	[10]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_minimum/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_spectra_0/Energy loss	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_spectra_0/data	[10, 3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_spectrum_0/Energy loss	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_spectrum_0/data	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/normalized_correlated_spectrum_0/Energy	[986]
<input checked="" type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/normalized_correlated_spectrum_0/data	[986]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/photon_positions_0/data	[25034]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/photon_positions_0/x	[25034]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/photon_values_0/data	[25034]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_events_fraction_0/data	[10]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_events_total_fraction_0/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_count_0/data	[10]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_minimum/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_spectra_0/Energy loss	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_spectra_0/data	[10, 3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_spectrum_0/Energy loss	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_spectrum_0/data	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_spectrum_0/data	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/total_count_time/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/total_spectrum_0/Energy loss	[986]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/total_spectrum_0/data	[986]

Plot Type: Line

Dimension	Display	Start:Stop:Step	Axis
0 [986]	X	:	/processed/summary/1-Combined RIXS image reduction/n

Ready

Viewing a processed RIXS file: DataVIS perspective



File Plot Tools Transfer Window Help

0 255

Data Files

Filename

- i21-148500_processed_combined_rixs_spectra_201

Plot

Energy loss

Datasets

Dataset Name	Shape
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/elastic_spectrum_height_0/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/elastic_spectrum_posn_0/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/line_0_residual/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_count_0/data	[10]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_minimum/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_spectra_0/Energy loss	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_spectra_0/data	[10, 3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_spectrum_0/Energy loss	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_spectrum_0/data	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/normalized_correlated_spectrum_0/Energy	[986]
<input checked="" type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/normalized_correlated_spectrum_0/data	[986]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/photon_positions_0/data	[25034]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/photon_positions_0/x	[25034]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/photon_values_0/data	[25034]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_events_fraction_0/data	[10]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_events_total_fraction_0/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_count_0/data	[10]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_minimum/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_spectra_0/Energy loss	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_spectra_0/data	[10, 3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_spectrum_0/Energy loss	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_spectrum_0/data	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/total_count_time/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/total_spectrum_0/Energy loss	[986]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/total_spectrum_0/data	[986]

Plot Type: Line

Dimension	Display	Start:Stop:Step	Axis
0 [986]	X	:	/processed/summary/1-Combined RIXS image reduction/n

Ready

Check the file to visualise the I_0 normalised RIXS data summed over different frames.

Viewing a processed RIXS file: DataVIS perspective



File Plot Tools Transfer Window Help

0 255

Data Files

Filename

- i21-118500_processed_combined_rixs_spectra_201

Open the other processed files. Now all files will have I_0 normalised RIXS data channel selected.

Plot

Energy loss

Datasets

Dataset Name	Shape
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/elastic_spectrum_height_0/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/elastic_spectrum_posn_0/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/line_0_residual/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_count_0/data	[10]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_minimum/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_spectra_0/Energy loss	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_spectra_0/data	[10, 3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_spectrum_0/Energy loss	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_spectrum_0/data	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/normalized_correlated_spectrum_0/Energy	[986]
<input checked="" type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/normalized_correlated_spectrum_0/data	[986]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/photon_positions_0/data	[25034]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/photon_positions_0/x	[25034]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/photon_values_0/data	[25034]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_events_fraction_0/data	[10]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_events_total_fraction_0/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_count_0/data	[10]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_minimum/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_spectra_0/Energy loss	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_spectra_0/data	[10, 3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_spectrum_0/Energy loss	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_spectrum_0/data	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/total_count_time/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/total_spectrum_0/Energy loss	[986]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/total_spectrum_0/data	[986]

Plot Type: Line

Dimension	Display	Start:Stop:Step	Axis
0 [986]	X	:	/processed/summary/1-Combined RIXS image reduction/n

Ready

Viewing a processed RIXS file: DataVIS perspective



File Plot Tools Transfer Window Help

0 255

Data Files

Filename

- i21-148500_processed_combined_rixs_spectra_20
- i21-148506_processed_combined_rixs_spectra_20
- i21-148508_processed_combined_rixs_spectra_20

- Check
- Uncheck
- Display
- Create joined file
- Deselect datasets
- Close
- Transfer
- Convert

Plot

Energy loss

Datasets

Dataset Name	Shape
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/elastic_spectrum_height_0/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/elastic_spectrum_posn_0/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/line_0_residual/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_count_0/data	[10]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_minimum/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_spectra_0/Energy loss	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_spectra_0/data	[10, 3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_spectrum_0/Energy loss	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/multiple_photon_spectrum_0/data	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/normalized_correlated_spectrum_0/Energy	[986]
<input checked="" type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/normalized_correlated_spectrum_0/data	[986]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/photon_positions_0/data	[25034]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/photon_positions_0/x	[25034]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/photon_values_0/data	[25034]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_events_fraction_0/data	[10]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_events_total_fraction_0/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_count_0/data	[10]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_minimum/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_spectra_0/Energy loss	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_spectra_0/data	[10, 3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_spectrum_0/Energy loss	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_spectrum_0/data	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/single_photon_spectrum_0/data	[3220]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/total_count_time/data	[1]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/total_spectrum_0/Energy loss	[986]
<input type="checkbox"/> /processed/summary/1-Combined RIXS image reduction/total_spectrum_0/data	[986]

Plot Type: Line

Dimension	Display	Start:Stop:Step	Axis
0 [986]	X	:	/processed/summary/1-Combined RIXS image reduction/n

Ready

Shift select all the files, right click and click on 'Check'

Exporting processed RIXS files: DataVIS perspective



The screenshot shows the DataVIS software interface. On the left, the 'Data Files' panel lists three processed RIXS spectra files. The central 'Plot' window displays a line graph of Energy loss (x-axis, 0 to 5) versus intensity (y-axis, 0 to 6). Three data series are plotted in blue, red, and green. A context menu is open over the printer icon in the plot toolbar, with options including 'Save screenshot as...', 'Copy to clip-board', 'Print plot', 'Print scaled plot', 'Export plot data to Nexus (HDF5)...', and 'Export plot data to tif/dat/csv...'. A text box with a green arrow points to the printer icon, and another green arrow points to the 'Export plot data to tif/dat/csv...' option. The 'Datasets' panel on the right shows a list of datasets, with one selected. The 'Plot Type' is set to 'Line'. The status bar at the bottom shows 'Ready'.

Click on the little **arrow** beside the printer icon and select 'Export plot data to tif/dat/csv...'

— 75.482740 — 74.178590 — 73.055614

Dimension	Display	Start:Stop:Ste	Axis
0 [986]	X	:	/processed/summary/1-Combined RIX:

Finding energy dispersion value:

Drag and drop the energy dispersion file containing different frames with different incident energies into **Data Slice View** and choose **RIXS elastic line reduction** in **Processing**. As you sequentially scroll through the frames, each would be processed until you reach the last frame, where in the output you will see the energy dispersion value in eV/pixel.

Browse through all frames

Current slice of data: [1, :, 2048]

data[1, :, :]

Output

Plot of col0, line_0_fit against row0

Name	Value
Slope override	0.0
Width of strip	1

Final fitted line is 'Linear' has 2 parameters
m = -0.0190102 in range [-0.200000, 1)
c = 550.571 in range [0.000000, 2048)
At frame 1/5

Update...

Do not rush through the frames, let the processing of each frame finish (elastic line fit will appear, slope value for the frame will be shown and the update sign will disappear)

Finding energy dispersion value:

Drag and drop the energy dispersion file containing different frames with different incident energies into **Data Slice View** and choose **RIXS elastic line reduction** in **Processing**. As you sequentially scroll through the frames, each would be processed until you reach the last frame, where in the output you will see the energy dispersion value in eV/pixel.

When you reach the last frame, the output will show the energy dispersion fitting and the panel below will show the value of energy dispersion in eV/pixel. Note this value as it will be needed for all the RIXS processing.

