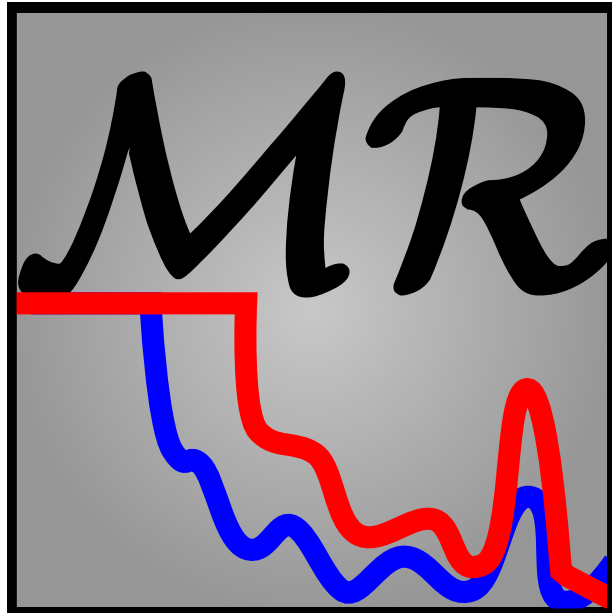


QuickNXS Users Manual

Version 0.5



Extraction software
of the
SNS Magnetism Reflectometer
Beamline - 4A.

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1 Introduction and Background

1.1 The data recorded at Beamline 4A

1.2 What does QuickNXS data reduction do?

2 User Interface

2.1 Overview

2.2 Menu and toolbar actions



File -> Open...



File -> Next File



File -> Previous File



Reduction -> Set Normalization



Reduction -> Set Scaling



Reduction -> Keep Item in List



Reduction -> Remove Line



Reduction -> Clear List



Reduction -> Reduce...



Advanced -> Automatic Peak Finder



Advanced -> Automatic Y Limits



Advanced -> Refine X



Advanced -> Adjust Direct Beam

Advanced -> Clear Overwrite

2.3 Docked Windows

Dock windows are the the regions on the left and right of the window containing e.g. the projection plots and extraction parameters. They are visible on any tab of the main interface. These windows positions can be customized by the user anywhere around the center, on top of each other, detached from the main window or completely closed (will be saved on exit). Closed dock windows can be restored by right clicking any dock window title or the empty region next to the toolbar and menu. You can easily detach and reattach them by clicking the diamond button at the top right. Here is a list of available dock windows:

Files A list of all datafile in the current directory together with an entry to search for a file by number and select to extract either histogram or event mode data.

X-Projection A plot with the data of the loaded file projected on the detector X-axis. Green lines indicate the background region defined at the moment. The X-position is marked with a black line and the X-width with two red lines. The mouse can be used to change the background region and X-center using the left mouse button and set the X-width using the right mouse button.

Y-Projection An equivalent projection on the detector Y-axis, showing the selected Y-region with red lines.

Reflectivity Show all datasets already added to the reduction list and the currently selected one. For unnormalized datasets it show intensity and background vs. wavelength.

Reflectivity Extraction The parameters used to extract the active reflectivity. When adding a dataset to the reduction list, these parameters are stored.

Plot Options Global settings for the shown plots, does not effect the data reduction in any way. Here you can also chose to show the 2D datasets in wavelength and angle instead of time of flight and pixel.

Advanced Background Additional parameters for the background subtraction, normally not in use.

Advanced Parameters Settings to change the extraction method or overwrite parameters otherwise read from the datafile.

Algorithm Parameters Settings for the peak finder and curve stitching algorithms.

Event Mode Readout Define the binning to be used when reading event mode data.

2.4 Plots

2.5 Data reduction table

3 Data Reduction

3.1 Open and view a dataset

3.2 Go full-automatic: Reduction for dummies

For good quality data the program supports a fully automatized mode, where all reduction parameters are automatically calculated. This mode will be applied automatically when more than one dataset is selected at the File Open Dialog. The direct beam measurement have to have lower numbers than the actual measurements or need to be set in advance for this method to work.

The automatic algorithm performs the same steps as described in section 3.3, while trying to guess the best parameters. The datasets are read one-by-one and, depending on the 2θ -angle, they are either set as normalization or reflectivity data in the reduction list. Here is an example how the interface might look after the algorithm has finished:

You can now scale individual datasets as described in 3.3.5, if the stitching was not performed optimally. When satisfied with the result, you can save the data as described in the export section 3.3.6.

3.3 Quick start: Step-by-step standard reduction

For most datasets the reduction is done very similar to the fully automatized method but with more control of the user. Every dataset is examined by the operator to select the best extraction parameters.

3.3.1 Step 1: Set wavelength normalization from direct beam

3.3.2 Step 2: Define a suitable background- and y-region

3.3.3 Step 3: Normalize total reflection plateau

3.3.4 Step 4: Add additional datasets

3.3.5 Step 5: Refine the dataset scaling and cutting

3.3.6 Step 6: Export the result

3.4 Examples

This section will give three example datasets, which you can use to try the reduction yourself and compare the result with the images in this manual.

3.5 Common problems to be aware of

4 Advanced Usage

4.1 GUI Customization

4.2 Event mode data

4.3 Re-reduction of already exported data

4.4 Overwrite direct beam parameters

4.5 Advanced background subtraction

4.6 "Fan"-Reflectivity

4.7 Off-specular scattering