Tool collection b_tools_1 – Help

credits

Scripts in this collection were made by Bernhard Schaffer.
Email: how.to.script@tavernmaker.de
Web : http://DMScript.TavernMaker.de
Version: 2015-03-10

purpose

Scripts in this package have all been submitted as source-code to the DM Script database hosted by FELMI [1].
There they can be downloaded and modified to any needs.
The package installs the current scripts as menu commands for convenience.

Contents

---

[1] http://www.felmi-zfe.tugraz.at/

Setup

Copy the *b_tools_1.gtk* file into the plugins folder and restart DigitalMicrograph. There should now be a new menu entry: **B_**

It is possible, that other packages (of the same author) have already created a menu entry **B_**. In this case, installed commands are added to the menu.

Contained scripts – SI sub menu

Extract SI LineScan

This script extends the functionality of the standard line profile tool to work on 3D datasets. Where a standard line profile extracts a 1D profile out of a 2D image, the SI LineScan extracts a 2D dataset from a 3D spectrum-image.

A typical STEM spectrum-image data set consists of a survey image, and a 3D spectrum-image as shown below. The standard profile tool, when drawn on the SI data, extracts the 1D profile across the *displayed* data in the SI, which is either the intensity at a specific energy-loss value, or integrated over a specified energy-loss range. The extracted profile can be averaged perpendicular to the profile direction by widening the extraction marker (+/- keys):
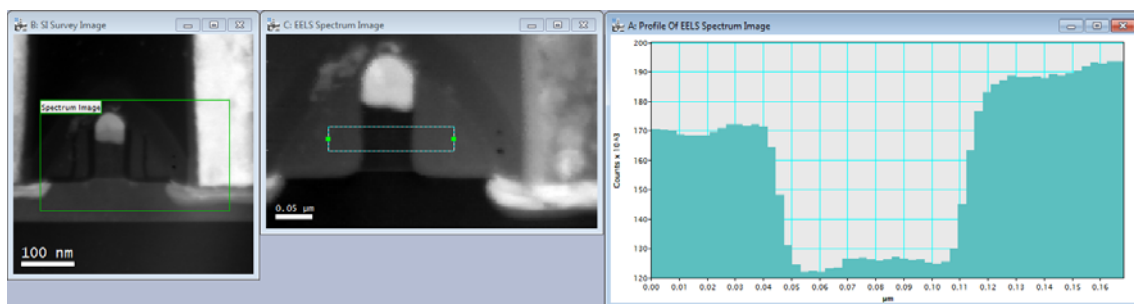

Exectuting the "Extract SI LineScan" command with the Spectrum-Image as front most image, will convert the standard line profile into the SI LineScan profile:
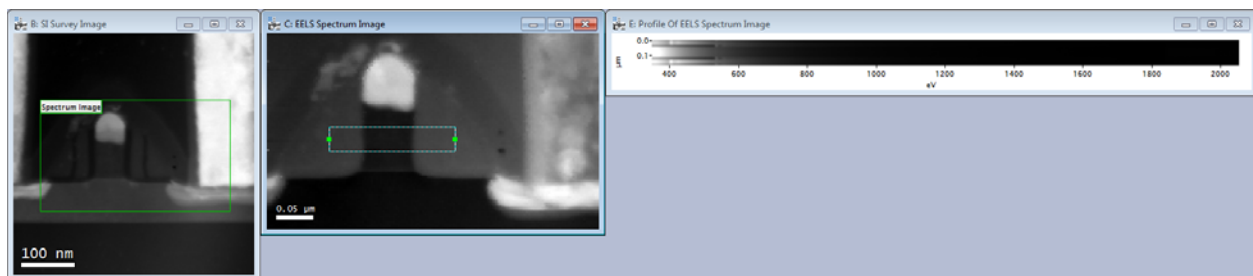
The tool now extracts the full spectral information along the profile and displays it in the format of a SI linescan (energy-loss as x-axis, LineScan position y-axis starting from top.). If the extraction tool has some 'averaging width', then the spectra of the perpendicular profile direction are averaged.

The extracted LineScan profile contains modified meta-data tags from the original SI such that it can be used like a regular LineScan SI itself. This included:
- Spectrum-Picker tool to select individual (or summed) spectra from the LineScan
- Computation of maps (profiles) using the default SI tools for the signal
- ROI-mirroring of spectrum-picker tool to indicate the extraction position
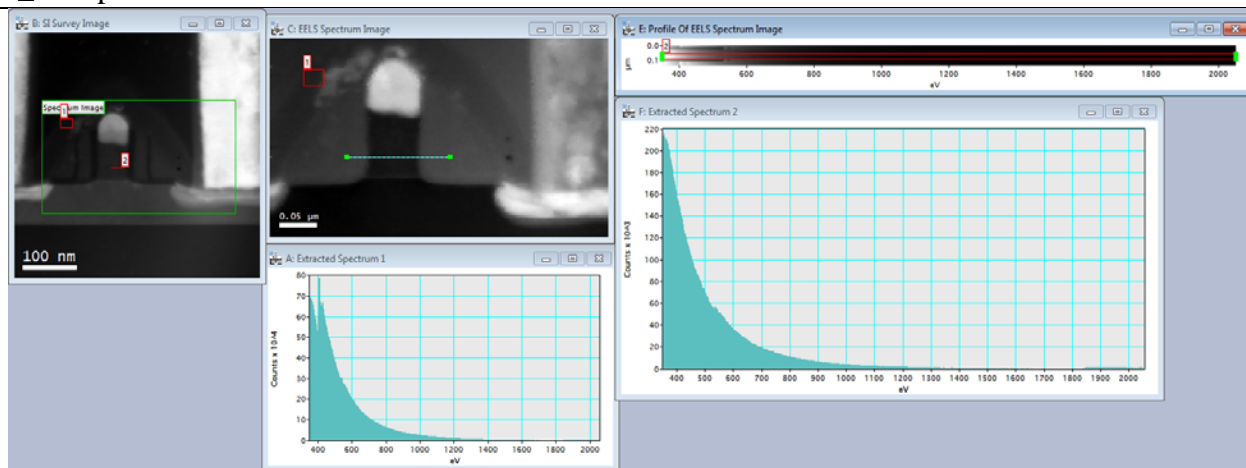
Example of survey, SI and extracted LineScan SI with two spectrum-picker-tool extracted spectra. The extraction positions are 'mirrored' onto the survey image.

The tool is interactive as the default tool, but updating the data may take a while during which the LineScan image displays the image name "???".

The script can be started with either a profile-extraction marker or a line-ROI on the SI image and will convert either into a SI LineScan extraction marker. In the first case, the (generally existing) original 1D profile image is orphaned, i.e. loose the link to the marker and doesn't update on marker changes anymore. However, if the tool is started with the SHIFT key pressed, the linkages will remain, and *both* the 1D profile and the 2D LineScan will update on changes of the marker.

Clone SI extraction

This tool allows a like-for-like comparison of extracted spectra from different, similar SIs in within the same spectrum-display. This is f.e. useful to compare a 'raw' with a 'processed' SI like before/after denoising the data. The standard SI picker-tool with mirroring allows to simultaneously extract profiles in two datasets via 'linked' ROIs. However, the comparison is done in separate displays only:
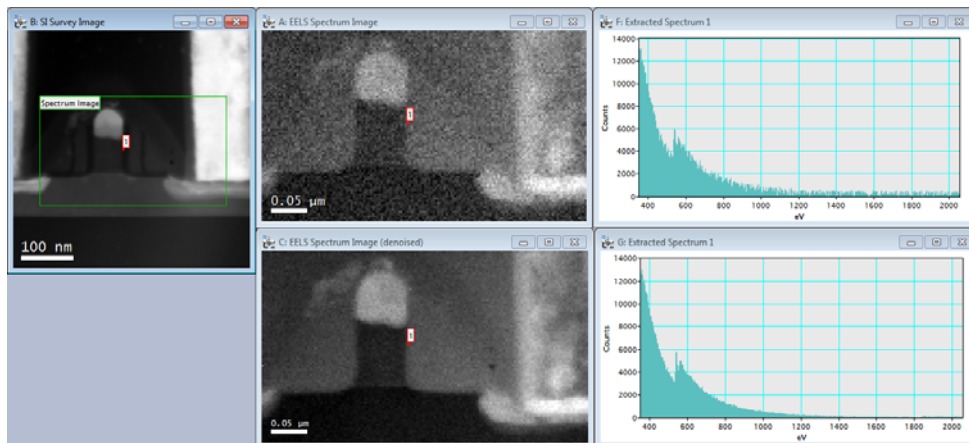
The command 'Clone SI extraction' clones the picker-tool of one SI into another SI of same format and combines the two extracted spectra into a single display for direct comparison. The ROIs of both SIs are still linked and move simultaneously.
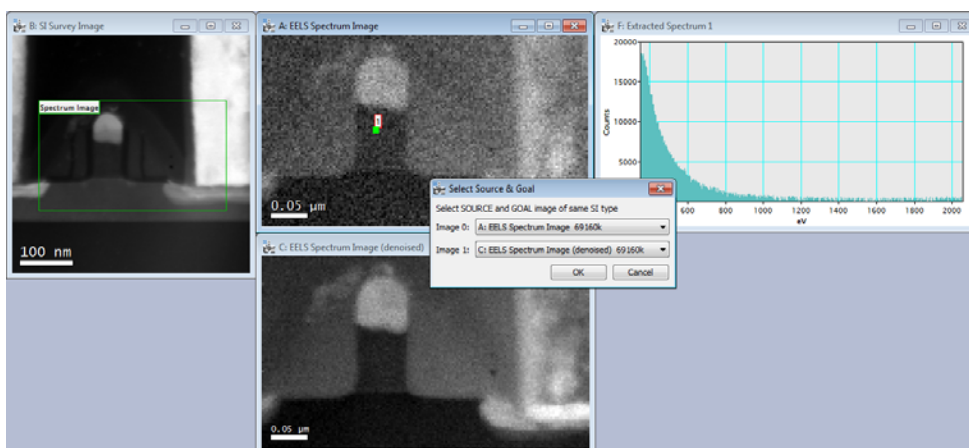

First use the picker-tool on one SI. Then call the command and select the two SI's in the dialog. Image 0 is the SI with the existing picker tool. Image 1 the SI which should be added.
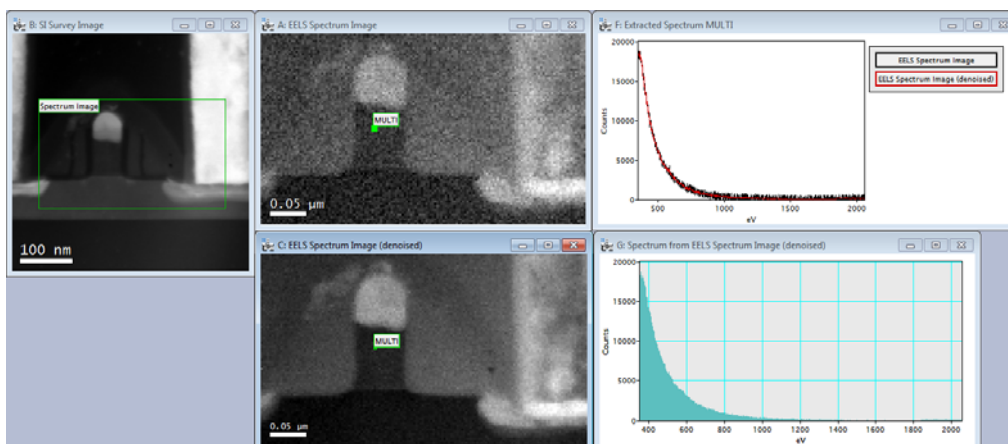
Afterwards both SI's have a green "Multi" picker-ROI and the LinePlot shows the overlay of both.
It is possible to add additional SI's to the plot by repeating the procedure.

Crop SI selection

This is a quick convenience tool to crop a volume of an SI using a rectangular ROI and the slice-tool to specify the limits. When the command is called, the front-most image is cropped to the rectangular area demarked by a rectangular ROI (if no ROI is found, the XY range is not cropped) and to the 'z-range' indicated by the integration width of the slice tool.
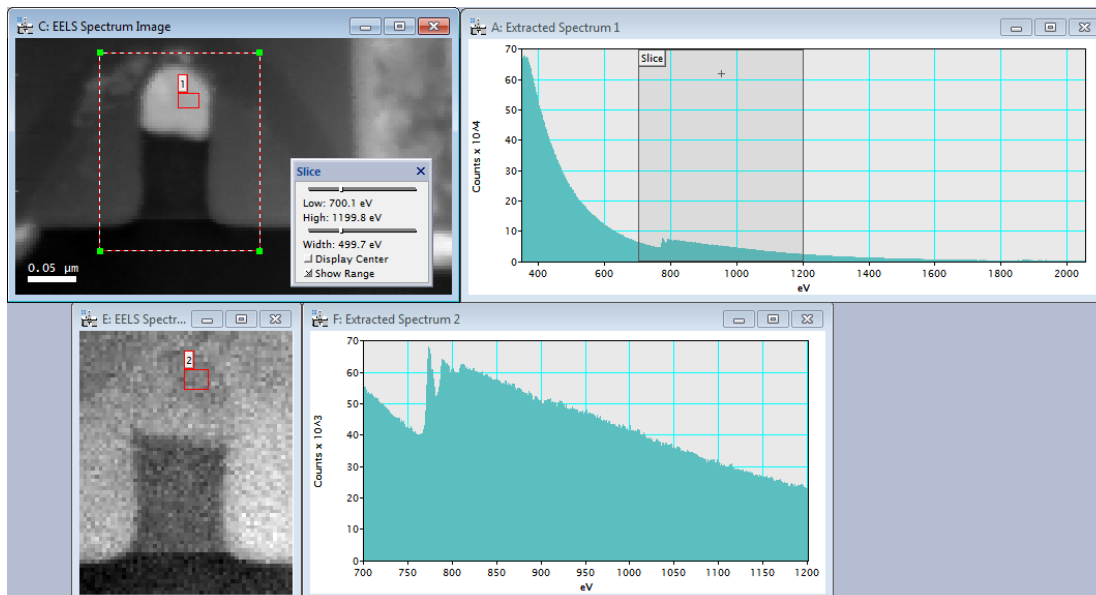
If the slice tool is set to use a "width" of 1, i.e. only one slice of the SI is displayed, then <u>no</u> cropping in the z-axis is performed, and the SI is only cropped in X&Y according to the ROI.

The command can also be called with the ALT button pressed. Then, the user is presented with a pre-populated dialog to enter the cropping values directly (in uncalibrated units):


If the command is called with the SHIFT button pressed, the source SI will be *replaced* by the cropped version. (Good for systems with few memory, but be careful as data might be lost!)

SI manipulation

This script installs and launches a tool palette to quickly manipulate 3D data sets. The installed palette looks like below and offers quick orthogonal rotation, inversion, sampling and binning along any of the 3 coordinate axes.

- On the left, select the action axis (X/Y/Z) from the radios.
  On the right, select the wanted action.
  For *sampling* and *binning*, also define a step size (in pixels)
- Start the action with the "Do It" button.
- If the "clone" checkbox is checked, you will get a new data set in addition to the old one, otherwise, the old data set is automatically deleted.
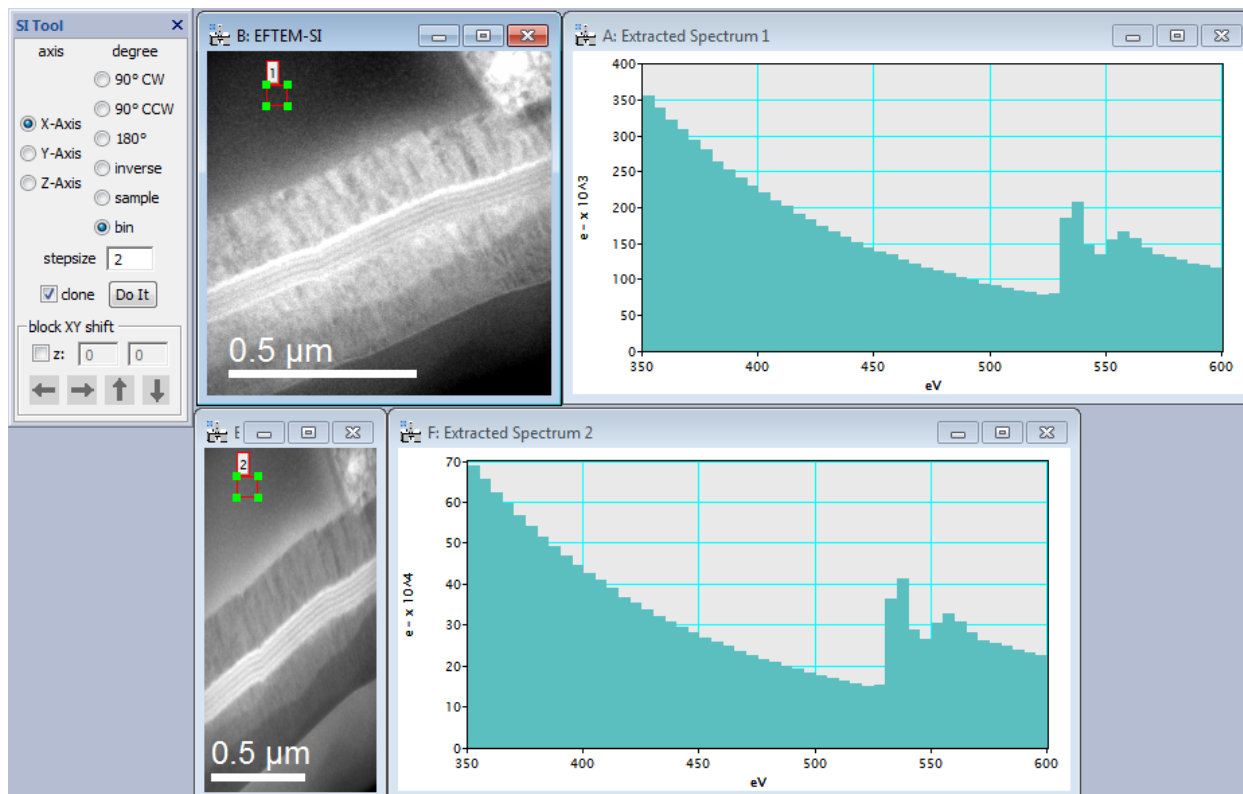
The "block XY shift" functionality allows to shift a sub-volume of the stack in x-y direction with an integer number of pixels. Values 'warp' around the border, i.e. things moving out on the left/bottom reenter on the right/top.

The affected volume is defined by an ROI on the image (for x&y) and the displayed slices (with the slice tool). If the checkbox is checked, the restriction in z can be entered (as plane numbers) instead.
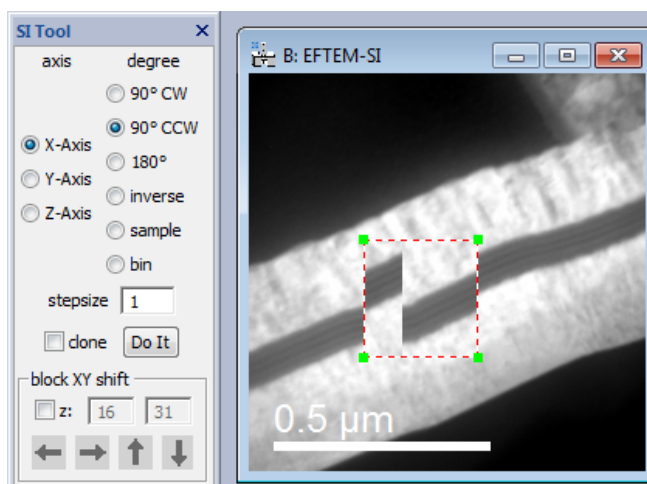
Open Image Browser

This script allows to quickly "flick" through all currently opened images of DM while having them maximized on the screen. Once started, the current front-most image becomes *maximized* and the user can use the following keys to navigate through all images:

LEFT	show previous image
UP	show previous image
RIGHT	show next image
DOWN	show next image
SPACE	stop script & return to default image (de-maximize image)
ESCAPE	stop script & return to default image (de-maximize image)

Time bar on image

This little script displays a text annotation on the front most image to display the current clock. The text is updated automatically, until the keys CONTROL, SHIFT and ALT are pressed simultaneously.

The format of the annotation may be changed.