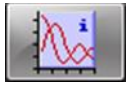
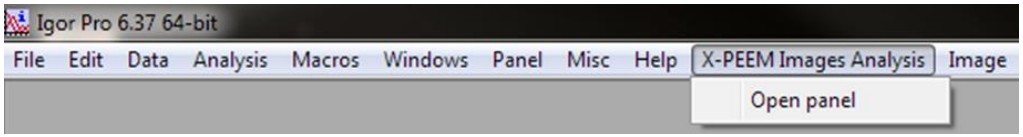
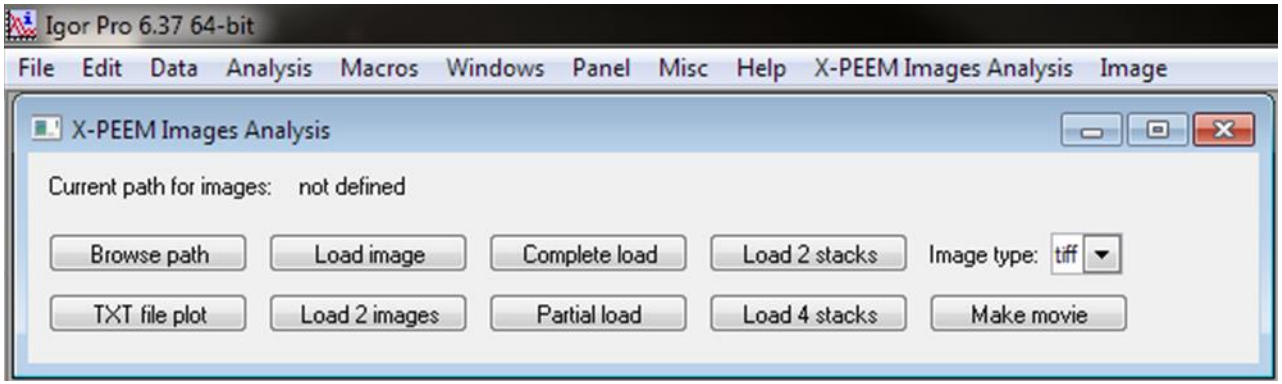
X-PEEM processing with Igor Pro:

- Launch Igor Pro 
- Open the Images Analysis panel
  X-PEEM Images Analysis/Open panel





Sections:

1. Normalization images
2. Stack import, normalization, drift correction
3. Assymetry ratio image (XMCD)
4. Spectra from stack
5. SpeLeem panel buttons
6. Image stack panel buttons

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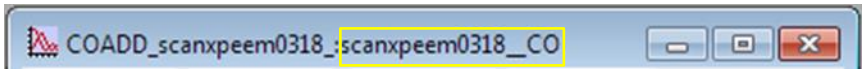
X-PEEM processing with Igor Pro:
1. Normalization Images

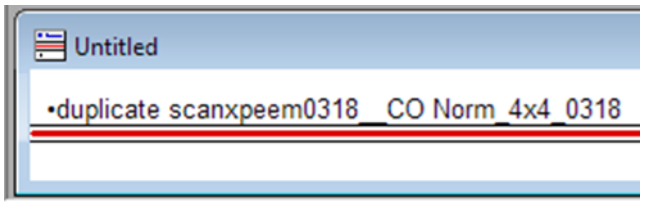
- From the panel, import the normalization images stack (cf. section 6 for more details):
  - Set the path (Browse path), the path is updated: Current path for images: Z:tempdata:com-hermes:
  - Import the sequence completely (Complete load)

- In the stack panel, sum images using co-add

- COADD panel: save the normalization image as tiff using tiff frame . Use the file name:
  Norm_bin_scannumber.tif (*bin = 1x1, 2x2 or 4x4)*

- In the command panel duplicate the normalization image:
  `duplicate oldname newname`
  the old name is given by the COADD panel window name





- Delete the data from the stack and COADD panel using kill

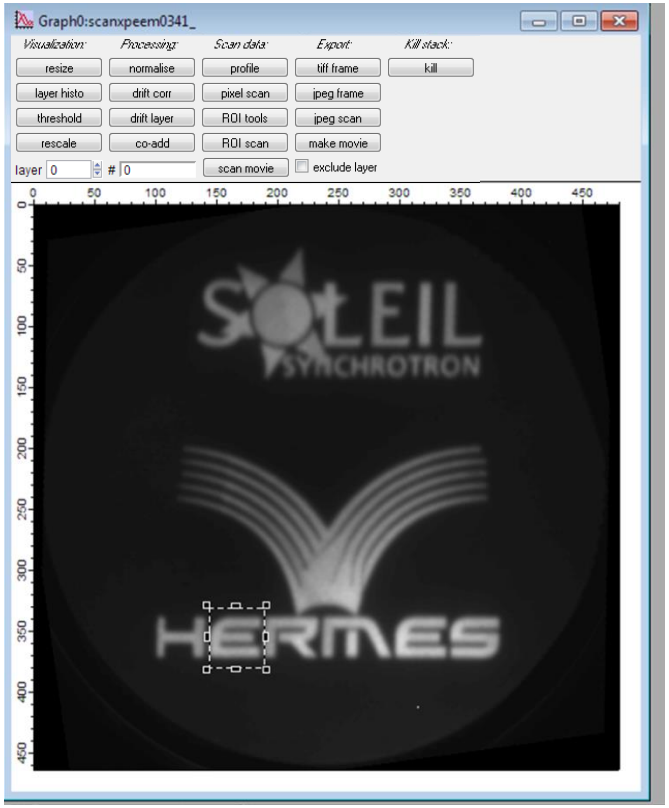
- Save the Igor file in a processing folder with the name *Processing_yyyy-mm-dd_##.pxp.*

Now you can start from this file to process your data !
The normalization images will be already implemented.

X-PEEM processing with Igor Pro:
2. Stack import, normalization, drift correction

- Start from a processing igor file previously created (see 1.)
- Import the desired images stack: Browse path + Complete load / Partial load
- In the stack panel, normalize the stack using normalise
  select the appropriate norm. image
- Drift correction :
  - Select a remarkable zone on a layer using the mouse
  - Click on drift corr
  - Select the oversampling factor (pixel fraction)
  - Wait for the drift correction to go on
  - Repeat until the drift is satisfactory

  Pay attention while selecting the zone and the oversampling factor !
  (The larger they are, the much longer the drift correction will take !)



- Advise for data processing on ***your*** computers:
  - Export the normalized stacks
  - Export the normalized + drift corrected stacks

X-PEEM processing with Igor Pro:
3 Assymetry ratio image (XMCD)

- A. Import the two desired stacks using [Load 2 stacks] and process the resulting single Igor stack (normalization, drift correction, see section 2)
  !!! The two stacks must have the same binning and number of images !!!
  Then obtain the average image of each stack using [avg 2 stacks]
  Two panels are opened, one for each averaged image

- B. If the drift correction is impossible or if the number of images is different between the two stacks (or any other hindrance): import and process each stack separately (section 2)
  Then obtain the average image using [co-add]

- COADD panel(s): save the images as tiff using [tiff frame].
  Use the file name:
  scannamenumber_POL.tif (*POL = CL, CR, LH, LV, …)*

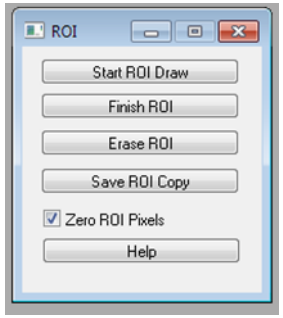
→ *Now you should have in your processing folder one tiff image for each polarization*

- On the import panel, import subsequently the two images in the desired order using [load 2 images]

- A stack composed of the 2 images is opened, use [XMCD image] to calculate the assymetry ratio image.
  Prior to calculate the assymetry ratio image, correct the drift between the two images if necessary (use [loop] *to check)*

X-PEEM processing with Igor Pro:
4. Spectra from stack

(A)



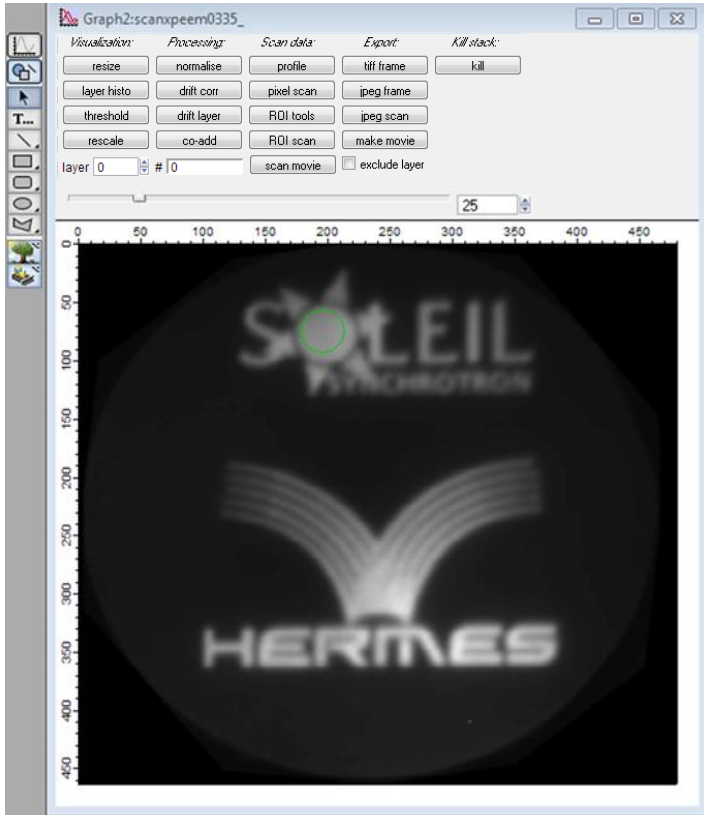
- Realize section 2 with the desired stack (import, normalization, drift correction)

- Define the region of interest for which you want to plot the spectra:
  - Click on ROI tools to make appear the ROI panel (A)
  - Click on `Start ROI Draw` and design the ROI (it can be several zones)
  - Click on `Finish ROI`, then on `Save ROI Copy`
  - You can hide the drawing tools with Ctrl+t or  (necessary to use the panel buttons).

- Plot the associated spectra using ROI scan

- You can also use pixel scan, which is a ROI scan of a single pixel defined using cursor A.

- You can save the data using Data/Save Waves/Save General text



X-PEEM processing with Igor Pro:
5. SpeLeem panel buttons

Browse path

- Select the path where are the data you want to process
  you can copy/paste the path from windows explorer
  the path is shown on the panel Current path for images: Z:tempdata:com-hermes:

Load image

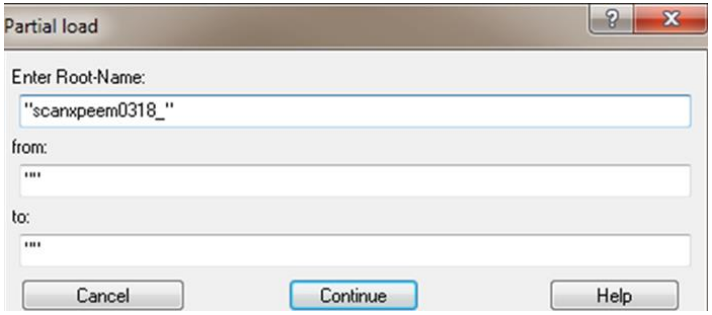
- Loads an image from the path

Load 2 images

- Loads 2 images successively chosen from the path

Partial load

- Loads a partial stack of images from the chosen path:
  opens the partial load panel
  - Enter Root-name (a priori foldername_)
  - From xxxx to yyyy: 1st and last image



Complete load

- Loads a complete stack from the chosen path

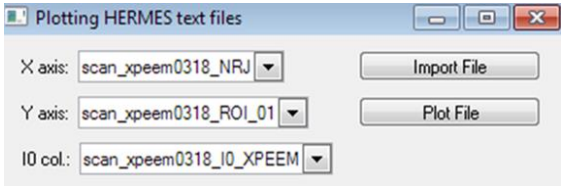
Load 2 stacks
Load 4 stacks

- Loads 2/4 stacks from the chosen paths

After importing images, the macro imports the corresponding .txt file (NRJ, ROIs, I0 data, …) which is usually in the parent folder of the tiff files.

TXT file plot

- Opens the Plotting HERMES text files panel
  *you can plot data from scan_xpeem****.txt files*
  (NRJ, I0, ROIs, Machine Current, …) already imported or not



- Image type (tiff) and frame char. (-) should not change.

X-PEEM processing with Igor Pro:
6. Image stack panel buttons

resize
- Changes the panel dimensions

tiff frame
jpeg frame
jpeg scan
- Saves the current layer/frame or the whole stack/scan to jpeg or tiff

co-add
- Averages the layers of the stack

Hint: you can use exclude layer

kill
- Deletes the stack data (images) from Igor

ROI tools
ROI scan
pixel scan
- Used to plots spectra corresponding to a pixel or a region of interest. See *spectra from stack* section

profile
- Plots a profile of the signal along the line of variable width defined by the two cursors (use Ctrl+i for cursors appearing)

layer histo
- Plots the histogram of the current 16 bits layer/frame

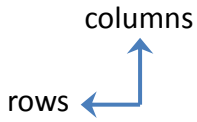
threshold
- Modifies the color scale (min and max level)

Use layer histo *to have a hint on relevant values*

rescale
- Modifies the data so that the values are comprised between the two chosen boundaries

drift corr
- Corrects the drift for all layers of the stack, using an area selected on the image by the user as control zone and a variable oversampling factor

drift layer
- Applies the asked drift for the current layer according to:



normalise
- Normalises the stack with the chosen normalisation image

the normalization image name MUST start by Norm

make movie
- Creates a movie with the desired speed of all images in the stack

Attention: Keeps profiles, ROIs, …