Sample Alignment Steps

1. ***Align sample and carbon tape y and z positions using CAM3***

   To go to Cam3, we need to move theta to 140 and for this to be possible M5tth should be at least at 90.

   >> pos m5tth 90

   >> pos th 140

   To open the Cam3 view in GDA:

   window > EPICSStreams > Sample Camera 3

   Then a window for Cam3 will open at the same place as the Andor window is opened. In the Cam3 window you can switch the camera on by pressing the on button.

   To turn the lights on:

   >> lightOn

   Align the sample position to the cross that marks the beam position moving y and z:

   >> pos y

   >> pos z

   You should now switch off Cam3 on the Cam3 window in the stop button.

   To turn the lights off:

   >> lightOff

2. ***Move the sample to Theta 90 deg and measure a coarse XAS scan with diff1 and draincurrent.***

   The first is to move the fast shutter to the erio mode:

   >> erio()

   If the fast shutter is closed, we can open it with the following comand

   >>fastshutter('Open')

Whenever using the erio mode, the beam will be continuously on the sample, then the best is to close the valve between the SGM and the arm to protect the CCD detector:

>>gv17('Close')

Move sample to theta = 90

>> pos th 90

Move M5tth to 150 deg and the rotating photodiode to the optimal position with respect to the mirror:

>> pos m5tth 150

>> pos diffth 151.5

If we don't have any special request about the resolution we can open the exit slits to 50 microns to win intensity:

>> pos s5v1gap 50

To make an XAS scan at the current position:

>> scan energy 928 935 1 draincurrent diff1

To make the scans with the integration mode, note that we need to add the counting time for each counter:

>> scan energy 928 935 1 draincurrent_i 1 diff1_i 1

With this scan we identify the relevant energy values.

3. ***Still at theta = 90, measure z and y scans with diff1 and draincurrent on and off the resonant energy to improve the alignment.***

>> pos energy [on resonance]

>> rscan z -0.5 0.5 0.05 draincurrent_i 1 diff1_i 1

>> pos energy [off resonance]

>> rscan z -0.5 0.5 0.05 draincurrent_i 1 diff1_i 1

>> pos z [central position]

>> pos energy [on resonance]

>> rscan y -0.5 0.5 0.05 draincurrent_i 1 diff1_i 1

>> pos energy [off resonance]

>> rscan y -0.5 0.5 0.05 draincurrent_i 1 diff1_i 1

>> pos y [central position]

4. ***Move sample manipulator to theta = 0 deg and do half cutting of sample and carbon tape (combination of x and theta scans)***

>> pos th 0

>> pos diffth 0

>> rscan x -1 1 0.1 diff1_i 1

Move to halfcutting of the beam and do a finer scan

>> rscan x -0.1 0.1 0.05 diff1_i 1

Move to halfcutting, the best is to use the differential plotting. In GDA:

xy plotting tools > Maths and Fitting > Derivative view

Once x is at half cutting, do a theta scan.

>> rscan th -2 2 0.2 diff1_i 1

Move th to the centre of the scan and repeat the iteration of x scans and theta scans until the theta scan looks like a symmetric triangle.

Sometimes to do the half cutting is better to do the scans with a fixed gain rather than with an integrated monitor. For doing this: ***Set the gain to 5 for the diff1 photodiode in EPICS and use diff1 instead of the integrated mode diff1_i.***

>> rscan x -1 1 0.1 diff1

>> rscan x -0.1 0.1 0.05 diff1

>> rscan th -2 2 0.2 diff1

5. ***Test sample RIXS***

Once we have found the optimal positions for x, y and z, we test the quality of the RIXS image.

First we change the mode of the fastshutter to camera mode.

>> primary()

Then we open the valve between the SGM and the detector:

>>gv17('Open')

We move the theta of the sample to any desired position:

>> pos th 70

We move the energy to the resonance value.

>> pos energy [resonance energy]

We acquire an image:

>> acquireRIXS 1 xcam 20