Basic GDA commands

Moving motors

There are two ways to move a motor. The first one is to move to an absolute position:

```
>> pos x 2
```

The second one is to increase the motor position by a relative amount, either positive or negative

```
>> inc x 0.2
```

Changing energy and polarization

*The command **energy** moves both the monochromator and the ID gap to the correct position for the demanded energy.*

```
>> pos energy 531
```

To change the polarization one must use the following command.

*For **Linear Vertical** polarization:*

```
>> goLV(531)
```

*For **Linear Horizontal** polarization:*

```
>> goLH(531)
```

changing size of exit slits

*The motor to move the exit slits is **s5v1gap** and the units are **microns**. So to set the opening of the exit slits to 20 microns for instance:*

```
>> pos s5v1gap 20
```

Collecting an image with xcam detector

```
>> acquireRIXS 1 xcam 60
```

1 corresponds to the number of images to acquire and 60 is the time of exposure in seconds.

scanning

There are different modes in which we can scan a motor with GDA.

Absolute scans

The first one is to scan between two specific positions setting the step size for the scanning and the counter. For instance, to scan energy between 630 eV and 660 eV in steps of 25 meV using the photodiode:

>> scan energy 630 660 0.25 diff1

If we would want to repeat the same scan but using the ***xcam*** *detector counting 20 seconds per point:*

>> scan energy 630 660 0.25 xcam 20

We could also use two or more counters at the same time. For instance if we are collecting XAS and we want to measure both the signal in the photodiode and the drain current. We just need to add the other counter to the scan.

>> scan energy 630 660 0.25 diff1 draincurrent

One must remember that at the end of this scan the motor remains in the position of the last point.

When using this counters we only use the preset gain in the femto boxes. To use in autogain, integration mode we need to use different names for the counters and it that case we need to add the counting time.

>> scan energy 630 660 0.25 diff1_i 1

>> scan energy 630 660 0.25 diff1_i draincurrent_i 1

Relative scans

We can also measure scans relative to the current position of the motor. The advantage of this type of scan is that at the end of the scan, the motor will come back to the position it had before the scan.

For instance, if we were at E= 643 and we would like to repeat the previous scan between 630 and 660 in steps of 25 meV but in relative mode:

>> rscan energy -13 17 0.25 diff1_i 1

*Analogously with the **xcam** detector:*

```
>> rscan energy 630 660 0.25 xcam 20
```

We can also launch relative scans setting the number of points of the scan instead of the step (spec style). For the same scan as the previous with 100 points:

```
>> dscan energy 630 660 100 diff1_i 1
```

*Analogously with the **xcam** detector:*

```
>> dscan energy 630 660 100 xcam 20
```

theta / 2theta scans

Sometimes, especially for diffraction measurements is useful to scan two motors at the same time as for instance one does in a theta / 2 theta scan where the step of the two theta motor is double of the step of the theta motor.

```
>> rscan th -4 4 0.2 diffth -8 0.4 diff1_i 1
```

If we include an ending point for the second motor, then the scan will run like a mesh scan.

Scan processing feature

Often it could be useful to use the scan processing feature included in GDA. To switch it on one must type:

```
>> scan_processing_on()
```

This feature fits the scan that is collected, and it gives back the peak position, maximum intensity position and COM. Then one can move to these positions by simply typing go:

```
>> go peak
```

```
>> go COM
```

The scan processing slows the data collection, so once having this feature is no longer helpful, like when collecting RIXS data, it is best to switch it off.

```
>> scan_processing_off()
```

Checkbeam

The checkbeam function will pause the scan during the refills and if the beam is lost. We just need to add the function at the end of the scan.

>> rscan energy 630 660 0.25 xcam 20 checkbeam

Collecting I0 for normalization of data

The I0 is measured as the drain current in the refocussing mirror before the sample. Mirror 4. The counter for this is m4c1 and we just need to add to the scan this counter with the same counting time as the CCD exposure in case we want to collect the I0.

>> rscan energy 630 660 0.25 xcam 20 checkbeam m4c1 20

Integrated reading monitors

draincurrent → draincurrent_i

diff1 → diff1_i

diff2 → diff2_i

diff3 → diff3_i

fy1 → fy1_i

fy2 → fy2_i

fy3 → fy3_i