## Procedure for the calibration of motor Y2

Why do we have to calibrate the motor Y2?

As the beam energy decreases below 4000 eV, the beam position shifts off-centre, leading to a weakening of the beam. To re-center the beam, it is required to calibrate motor Y2 to maintain the beam integrity at lower energies. Outlined below is the calibration procedure for aligning the beam based on how the beam energy is changed:

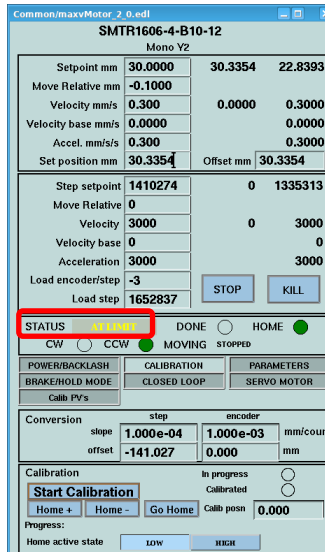### From low beam energy (< 4000 eV) to high beam energy (> 4000 eV)
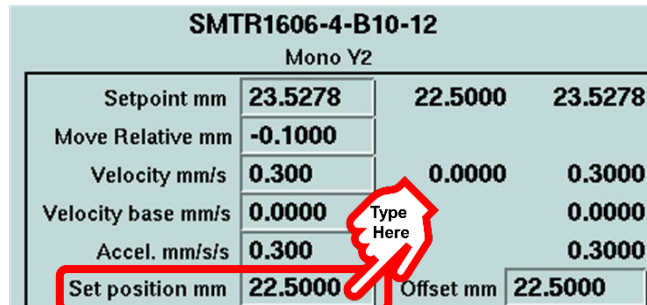
a. Click on "**Beam Off**"
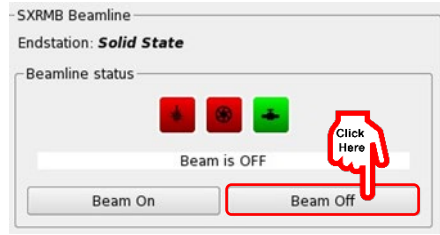
b. Click on "**Home -**" under the Calibration section on the Motor Y2 screen
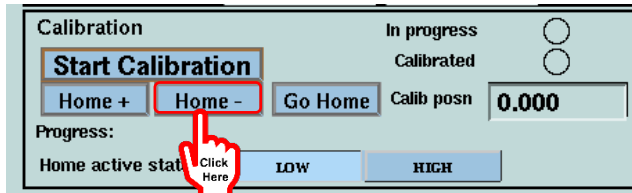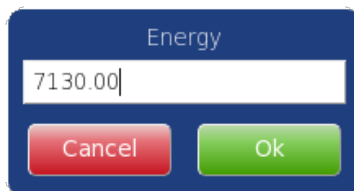

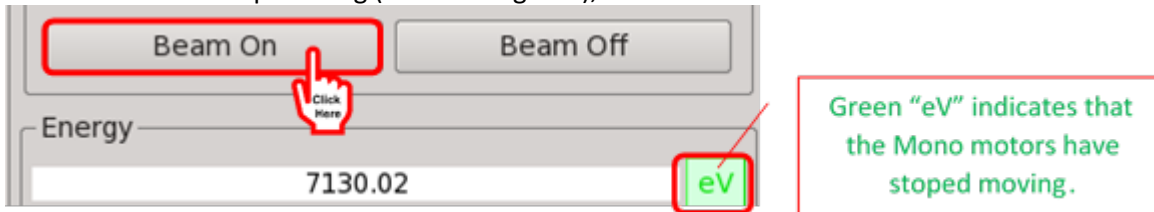c. Wait until STATUS shows "**AT LIMIT**".

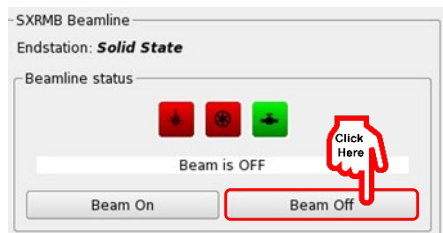d. Type **22.5** at "Set position mm" and hit Enter.

e. Change beam energy (>4000 eV)

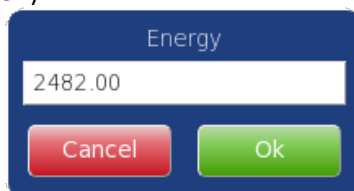e. Once the motors stop running (eV color is green), click the "Beam On".

Green "eV" indicates that the Mono motors have stoped moving.

From high beam energy (> 4000 eV) to low beam energy (< 4000 eV)
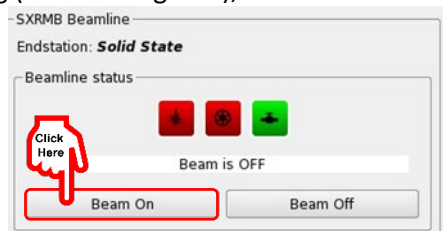
1. Click on "**Beam Off**"

2. Change the beam energy (<4000 eV)

The most common energies/elements are listed in the reference table in this document. (For example, for scanning the S K-edge, use the beam energy of 2482 eV to calibrate Y2)

3. Once the motors stop running (eV color is green), click the "Beam On".


4. If not already, make sure the element of interest is selected for the detector in use. The element should be the first row of the ROI table. (S Ka1 in this example)

Name	Lower Bound	Upper Bound	Value
S Ka1	2242 eV	2374 eV	655143 counts
P Ka1	1952 eV	2075 eV	3502810 count
Ru La1	2489 eV	2628 eV	681573 counts
In La1	3208 eV	3366 eV	3753638 count

5. Go to the position of the sample of interest.

6. Open Flux Calibration window from the General menu, select the detector, and click on "calibrate".
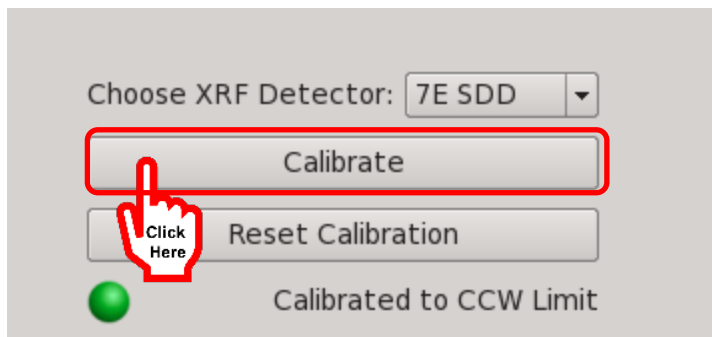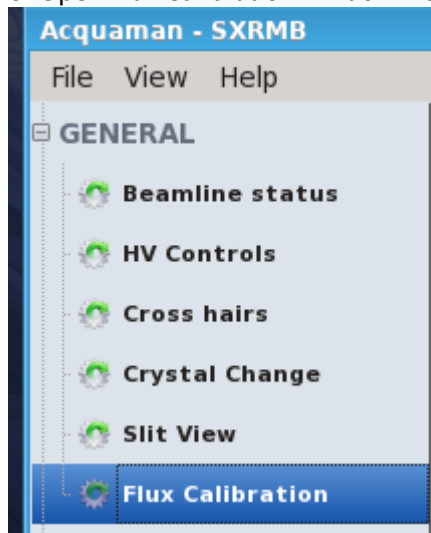
From low beam energy (< 4000 eV) to low beam energy (< 4000 eV)

(For example, from 2152 eV for Phosphorus K-edge scans to 2482 eV for Sulfur K edge scans)

Go through the steps: a —> b —> c —> d —> 2 —> 3 —> 4 —> 5 —> 6

Refrence Table

Element for energy scan	Beam energy for calibration (eV)	Theoretical value shown at setpoint and typed at set position	Reduced value at setpoint for maximum counts
S K-edge	2482	38.0053	~36.4
P K-edge	2152	59.1241	~55.2
Nb L$_3$-edge	2390	40.9934	~38.5934
Pd L$_3$-edge	3175.30	29.1203	~28.5
Ru L$_3$-edge	2858	31.6366	~29.8366
Ag L$_3$-edge	3360	28.1517	~27.3
Si K-edge	1843	53.1639	~50.1
Zr L$_3$-edge	2240	49.3152	~46.3
Cl K-edge	2828	31.9609	~31.10
Mo L$_3$-edge	2525	36.9034	~35.80