

Customized SPEC Macros for REIXS Beamline and RSXS endstation

Elliptically polarized undulator (EPU) macros

- **setEPU** *epr_comp value [angle]*

Options for *epr_comp*: *polar*, *harmo*, or *offset*

value for *polar*: *cl*, *cr*, *lh*, *lvp*, *lvn*, or *li* — for circular left, circular right, linear horizontal, linear vertical +, linear vertical -, or linear inclined angle with *[angle]* is between -90 to +90 (degrees). Circular polarization is available for the **first** harmonic only.

value for *harmo*: 1, 3, or 5

value for *offset* in mm

- **statEPU** — displays the ring current, EPU polarization, EPU harmonic, EPU girder gap, and EPU gap offset

Monochromator macros

- **moveE** *energy* — moves to the specified *energy* in eV (300 – 3000 eV for Au-HEG; 145 – 850 eV for Ni LEG; 94 – 1200 eV for Au LEG)
- **moveG** *grating* — moves *grating* with options of *AuHEG*, *NiLEG*, or *AuLEG*
- **moveM** *mirror* — moves *mirror* with options of *Nickel*, *Silicon*, *Gold*, or *Carbon*
- **statMONO** — displays the selected monochromator mirror, grating, and energy

Beam status macros

- **setBEAM** *state* — ensures availability of beam with *state* options of *on* or *off*
- **chkBEAM** *parameter [state]*

Options for *parameter*: *ring*, *psh*, or *vvr* with *[state]* *on* or *off* — checks ring state and safety shutters, state of photon shutters, or state of gate valves
on or *off* — turns all above parameters on or off

- **statBEAM** — displays the check status of ring, valves, and shutters, as well as the state of endstation valves and beamline shutters

Beamline components (apertures, diagnostic stages, 4jaws, exit slit) macros

- **setBL** *bl_comp value*

Options for *bl_comp*: *vah*, *vav*, *bds3*, *bds4*, or *bds5*

value for *vah* and *vav* in mm — variable aperture horizontal and vertical gap in mm
value for *bds3*: *out*, *yag*, or *au* — beam diagnostic stage 3 (out, YAG, or Gold mesh)

- **setES** *value* — value in μm for exit slit vertical gap

- **setFLUX** *value* — value of *on* or *off* as fast shutter (using 4-Jaw #2 vertical gap), OR value of 0 to 100 in % for setting beam flux (using 4-Jaw #2 horizontal gap)

- **statBL** — displays state of all beamline components (position, gap, centre)

Photon shutters and gate valve macros

- **setPSH state** — opens or closes endstation shutter with *state* options of *open* or *close*
- **statPSH** — displays state of photon shutters
- **setVVR state** — opens or closes endstation gate valve with *state* options of *open* or *close*
- **statVVR** — displays state of gate valves

Current amplifiers macros

- **setAMP mne value** — with *mne* = *tey* or *i0* and sensitivity *value* options is *up* or *down* for relative change OR exact value for example *1pA/V* or *2nA/V*.
Notes: The exhaustive list of sensitivity are 1, 2, and 5 with a range of 1 mA/V to 1pA/V and all orders of magnitude in between.
- **statAMP** — displays the current sensitivity of both amplifiers

Special scanning macros

- **Escan start1 end1 intervals1 [end2 intervals2 ...] time [fixQ]**

Notes: **Escan** works for single and multiple region energy scan with and without [fixQ].
For fixQ energy scan, it is recommended to scan from high to low energy.

RSXS detector filters and slits selection

- **slitselect slit_number det_mne**

Option for *slit_number*: 1 to 10 with *det_mne* of *sdd* (for Silicon drift detector) or *pd* (for photodiode).

Silicon drift detector (SDD) multi channel analyzer (MCA) and region of interest (ROI) macros

- **setSDD sdd_key low_energy high_energy** — with *sdd_key* of *sddx* and *sddxroi* for SDD XRF as well as of *sdd*, *sddroi1*, *sddroi2*, or *sddroi3* for SDD ARM
- **statSDD [sdd_mne]** — displays the state of both SDDs or an individual SDD by *sdd_mne* = *arm* or *xrf*

Microchannel plate (MCP) 2D image and region of interest (ROI) macros

- **setMCP state** — acquiring MCP 2D in *sum* (as default) or *stack* mode
- **setMCP mne [x,y] pxi1 pxi2 [[y,x] pxi3 pxi4]** — with *mne* of *mcproj1* or *mcproj2*; *x* coordinate for two theta, *y* coordinate for detz; *pxi1* to *pxi4* for ROIs in pixel from 0 to 127
- **statMCP** — displays state of MCP