Customized SPEC Macros for REIXS Beamline and RSXS endstation

Elliptically polarized undulator (EPU) macros

- **setEPU** *epu_comp value* [*angle*]

  Options for *epu_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 state of EPU

Monochromator macros

- **moveE** *energy* — moves to the specified *energy* in eV (*300 – 3000* eV for Au HEG; *99 – 850* eV for Ni LEG; *94 – 275* 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*
- **setE** *energy_in_eV* — used for setting user energy at the current monochromator position
- **statMONO**— displays state of monochromator

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*] of *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 state of beam

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 um for exit slit vertical gap
- **setFLUX** *value* — value of *on* or *off* for toggling chopper open or close as fast shutter, OR value of *0* to *100* in % for setting beam flux (using 4jaws #2)

- **statBL** — displays state of 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 shutter
- **setVVR** *state* — opens or closes endstation gate valve with *state* options of *open* or *close*
- **statVVR** — displays state of endstation gate valve

Current amplifiers macros

- **setAMP** *mne value* — with *mne = tey* or *i0* and sensitivity *value* options is either *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 (only available for FOURC), it is recommended to scan from high to low energy.

RSXS detector filters and slits selection

- **slitselect** *slit_number detector_name*

  Option for *slit_number*: 1 to 10 with *detector_name* of either *cht* (for channeltron) or *pd* (for photodiode).

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

- **setSDD** *nme low_energy high_energy* — with *nme* of *sddroi1*, *sddroi2*, or *sddroi3*, and the energy range from *low_energy* to *high_energy* up to 2700 eV
- **statSDD** — displays state of SDD

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*] *pxl1 pxl2* [[*y,x*] *pxl3 pxl4*] — with *mne of mcproi1* or *mcproi2*; *x* coordinate for two theta, *y* coordinate for detz; *pxl1* to *pxl4* for ROIs in pixel from 0 to 127
- **statMCP** — displays state of MCP