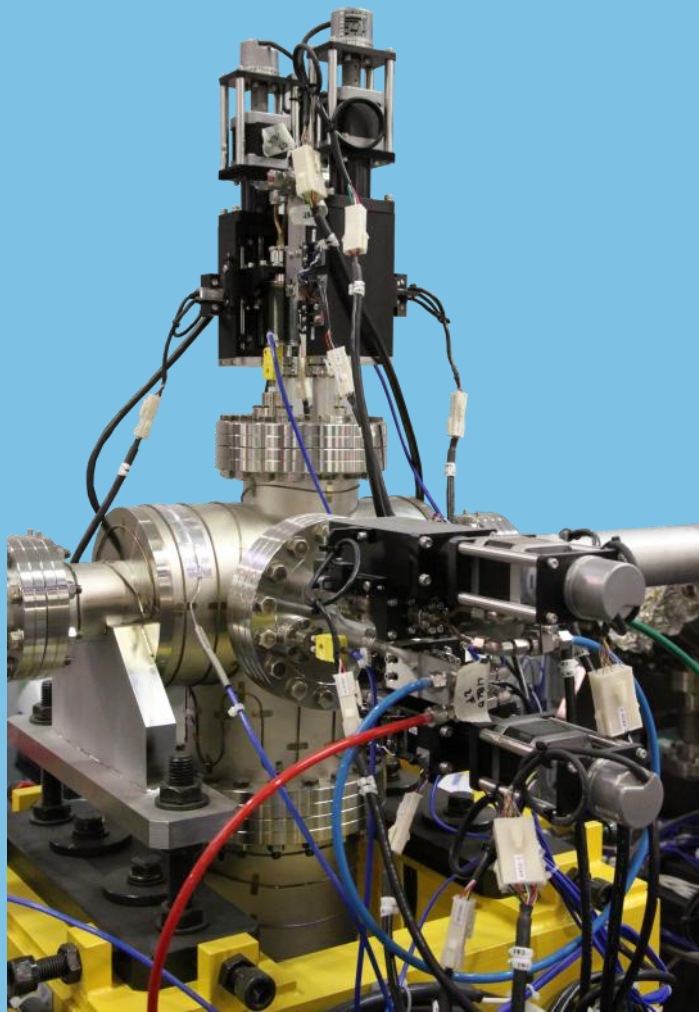


Pioneering New Horizons in Science

TOYAMA

*Front End Components
and Slit Systems*



www.toyama-en.com

Front End Components

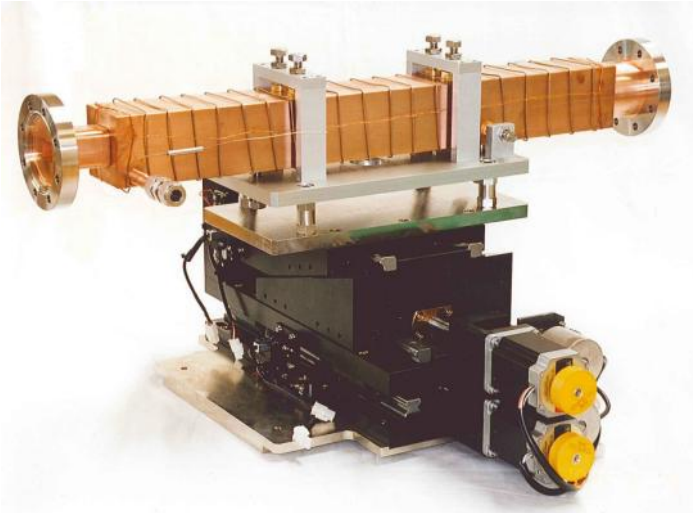
Front End Components

XY-Slits, Masks and Absorbers

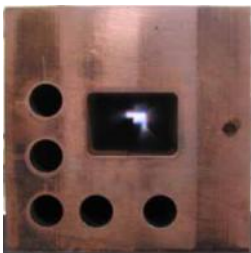
These high heat load components are used to shape and collimate the Synchrotron beam, removing unwanted beam energy. The main body can be made from GLIDCOP® which has high thermal conductivity and high strength at elevated temperatures. The internal profile is created with a wire cutting process to produce a tapered shape to spread out the beam and reduce the local power density.

XY-Slit

In the XY-Slit the internal profile of the main body is tapered on two sides. Complex water cooling channels are bored into the block to ensure effective heat removal from the tapered absorbing surfaces. This water cooled body is mounted on a stepper motor driven XY stage which allows very precise positioning in the beam. By placing two such slit bodies one after the other the SR beam can be shaped as required for the subsequent optics.



XY-Slit (one part) showing the main body mounted on the XY stage



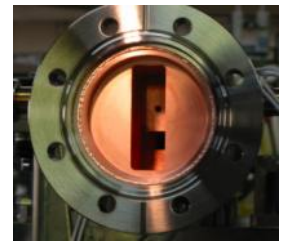
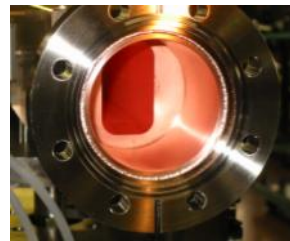
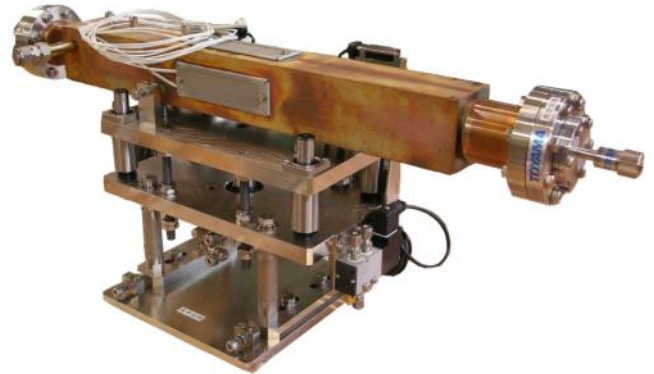
Main body of the XY slit looking from the upstream (left hand image) and downstream (right hand image) directions

XY Alignment Stage

The ultra-precise alignment stage is used to align heavy front end components such as XY slits, absorbers and masks. The precise positioning, even under heavy load, is achieved by the combination of high stiffness guide rails and high torque stepper motors. The design is compact using a wedge-shaped stage which saves vertical space.

Mask and Absorber

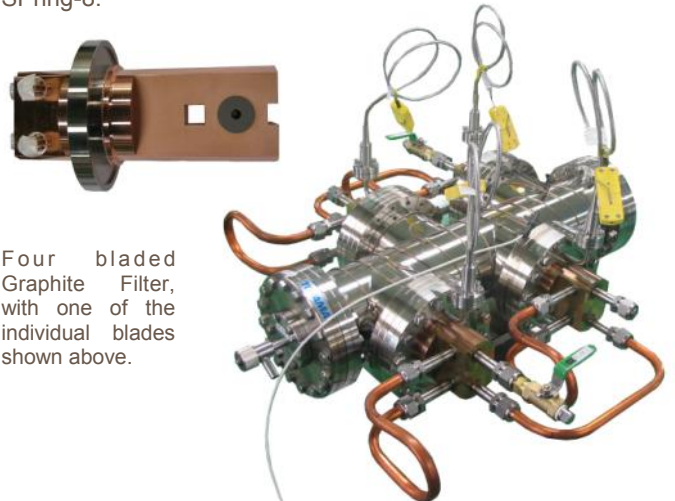
The Mask and Absorber combines the functions of a beam mask and an absorber into one body which saves space in the front end of a beamline. The internal profile is shaped so that the upper part of the body is the absorber and the lower a beam transfer channel in the shape of the mask. This combined component is moved up and down with a pneumatic actuator. At the upper limit it acts as the mask and the beam is allowed to pass through while at the lower limit it acts as the photon absorber and the beam is stopped.



Main body of the mask and absorber looking from the upstream (left hand image) and downstream (right hand image) directions

Pre-slit / Graphite Filter

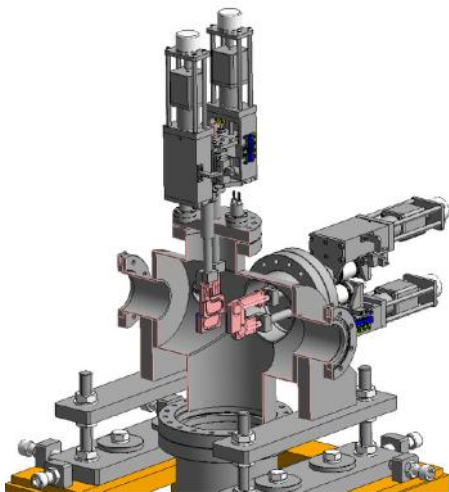
The Graphite Filter is used to eliminate the low energy part of the radiation. It has to be designed to withstand continuous exposure to high energy densities and so a full understanding of how to manage the white beam heat loads is critical. Toyama has a rich experience in managing such heat load requirements based on equipment supplied to the 8GeV synchrotron at SPring-8.



Four bladed Graphite Filter, with one of the individual blades shown above.

Motorised 2-Jaw and 4-Jaw Slit Systems

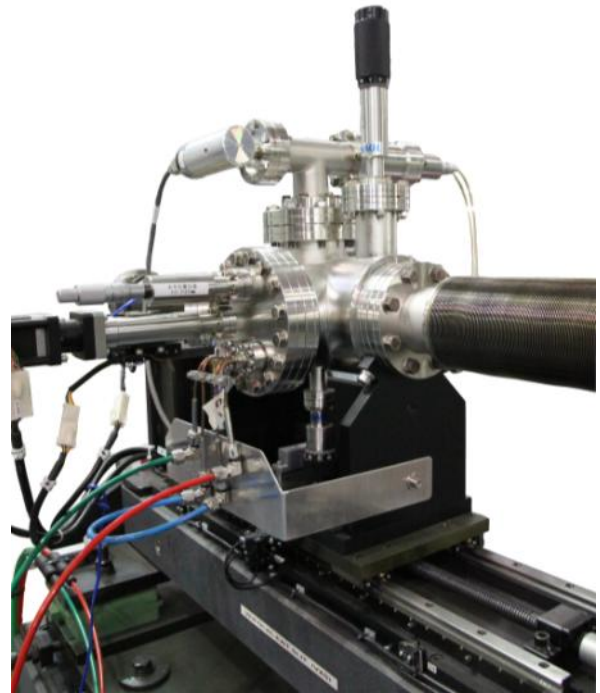
- 2 or 4 jaw designs
- High and low precision designs
- Beam current measuring
- Variety of blade materials
- Temperature monitoring for beamline safety
- Mounting arrangements for precision alignment of slits



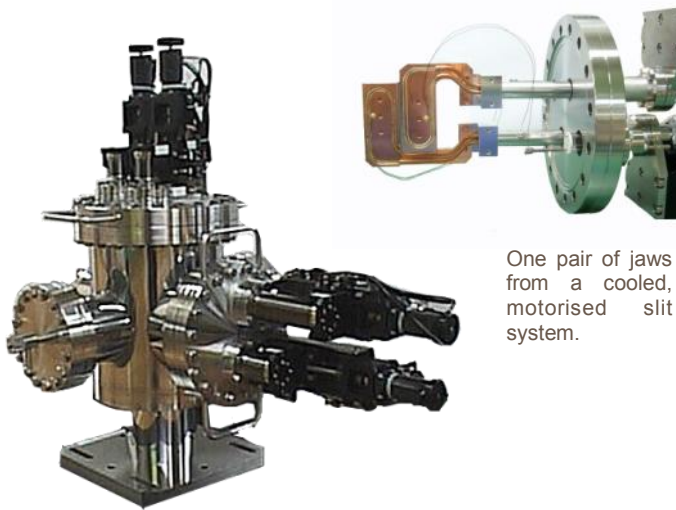
Motorised 4-jaw slit shown in a cut away 3D model.

Precision Entrance and Exit Slits

The entrance and exit slits form an integral part of any soft x-ray monochromator. Toyama has considerable experience in the design of motorised precision slits; these can be supplied as a stand alone component or as part of the monochromator package.



Precision exit slit installed on the BOREAS beamline at ALBA



One pair of jaws from a cooled, motorised slit system.

4-jaw motorised slit

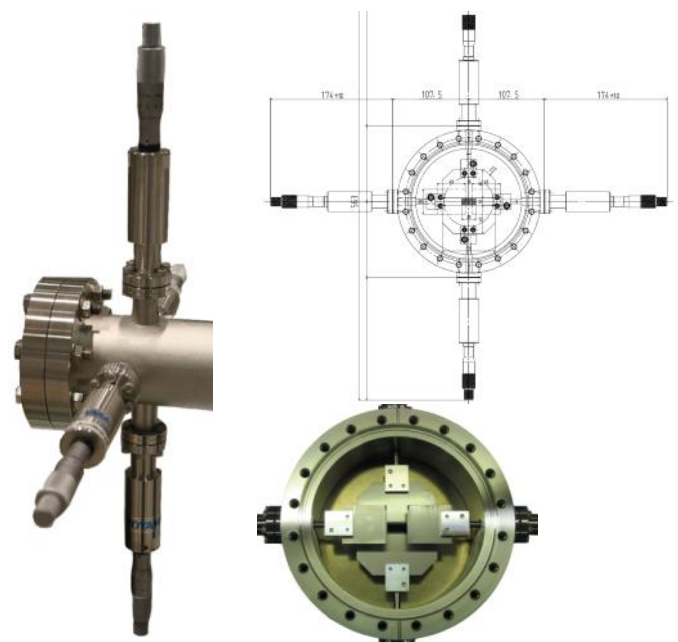
Specification of 4-jaw motorised slit

Typical range and resolution for a low precision 4-jaw motorised slit are shown below.

	Actuator	Encoder	Range	Resolution	Stability / Repeatability
Horizontal	in-air motor	yes	±20mm	0.1mm	0.1mm
Vertical	in-air motor	yes	±10mm	01.mm	0.1mm

Manual Slit Systems

Manual slits are also available in 2-jaw and 4-jaw versions. The blades can be made from stainless steel or tantalum with a standard thickness of 2mm. Beam current and temperature measurement are offered as options.



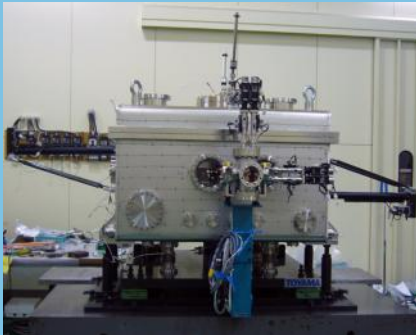
4-jaw manual slits, showing the arrangement of the jaws on the right

Other areas of Toyama expertise

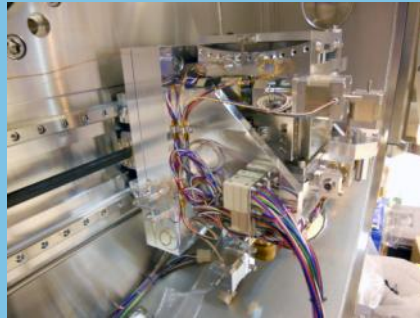
Synchrotron Applications

Toyama has developed an extensive range of components and systems for synchrotron beamlines and front ends including:

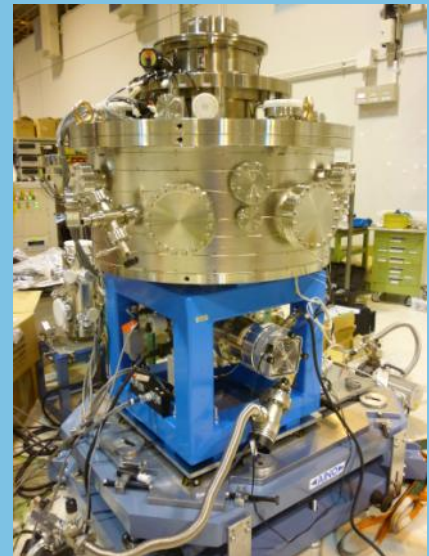
- Soft X-ray Monochromators
- Hard X-ray Monochromators
- Mirror systems
- High heat load front ends
- Beam Monitors
- End stations such as Ellipsometers, Reflectometers and Diffractometers



Soft X-ray VLSPGM



Crystal stage in the hard X-ray DCM



Diffractometer



XFEL Monochromator



Liquid nitrogen cooled mirror



Screen Monitor

XFEL Components

Toyama has developed components for XFEL accelerators and beamlines:

- XFEL Monochromator
- XFEL Mirror Systems
- XFEL Beam Monitors for beam position, beam profile and beam current
- Energy Slits for XFEL accelerator

ISO 9001 and 14001 certification



Contact Toyama:

Japan (Headquarters and Plant)

Toyama
Tel: +81-46-253-1411
Email: sales@toyama-jp.com

Australia

AP Scientific Pty Ltd
Tel: +61-448-750-885
Email: andrepeters@optusnet.com.au

Europe and North America

CRC
Tel: +44-7802-832-377
Email: carl@toyama-jp.com

India

SREEVAC
Tel: +91-22-2583 7815
Email: karandikarks@sreevac.com

Korea

Motion Hightech Co., Ltd.
Tel +82-2-2164-8760
Email: lee@himotion.co.kr

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