Soft X-ray Micro-characterization Beamline 06B1-1 (SXRMB)

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Beamline Overview

Status	Construction
Source	Bending Magnet
Monochromator	Fixed Exit Double Crystal InSb(111), Si (111)
Spectral range	1700 – 10000 eV
Flux	XAS: >10^{12} ph/s Micro-probe: >10^{9} ph/s
Brilliance	XAS: >2.5 10^{13} ph/s/mm^2 Micro. >1.3 10^{14} ph/s/mm^2
Resolving power	InSb (111): up to 3700 Si (111): up to 10000
Spot size	XAS: 0.5 x 0.5 mm Micro. ~10 x 10 µm

Introduction

SXRMB was designed and is being built with the intent of providing users with a wide range of scientific capabilities, without sacrificing performance, in the difficult to access "intermediate" energy range between what are defined as "hard" and "soft" X-rays. In doing so, this beamline follows the tradition of the Canadian DCM beamline at SRC in Wisconsin, while at the same time vastly improving performance, and expanding the range of energies and experiments that a user may conduct.

Science

The main focus of science on this beamline falls in the "intermediate" energy range (between 1700 and 4000 ev). Covering the *K*, *L*, and *M*-edges of many main group and transition elements, this beamline will find wide application in a number of fields including but not limited to: materials science, life science, environmental science, geo- and soil science, and tribology. This beamline will be attractive to both scientific and industrial users.

Beamline Instrumentation

The following endstation are planned and/or are under construction for this beamline (an asterisk indicates completion):

- High Throughput HV Compatible XAS *
- Microprobe and Micro-XANES
- High KE Hemispherical Analyzer
- Transmission / Gas Phase

Layout

Please refer to the beamline layout drawings presenting the beamline in both side and top down view. The primary optical enclosure houses the white beams slits, vertical collimating mirror, double crystal monochromator, and post-monochromator focusing and collimating mirrors. The second optical enclosure houses an in-line ionization chamber and two endstation areas, one modular and the other dedicated solely to microprobe.

Performance

Projected performance characteristics are listed in the beamline overview. Performance milestones will be released after commencement of beamline commissioning in 2007.

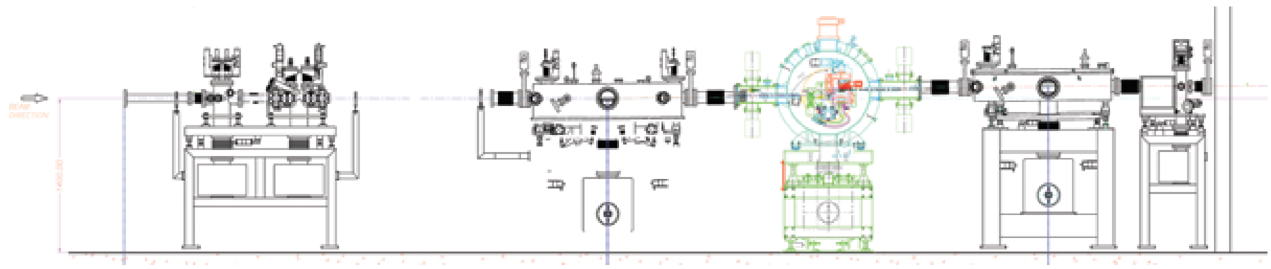

Figure 1: Elevation view of SXRMB from the front-end to the primary optical enclosure.

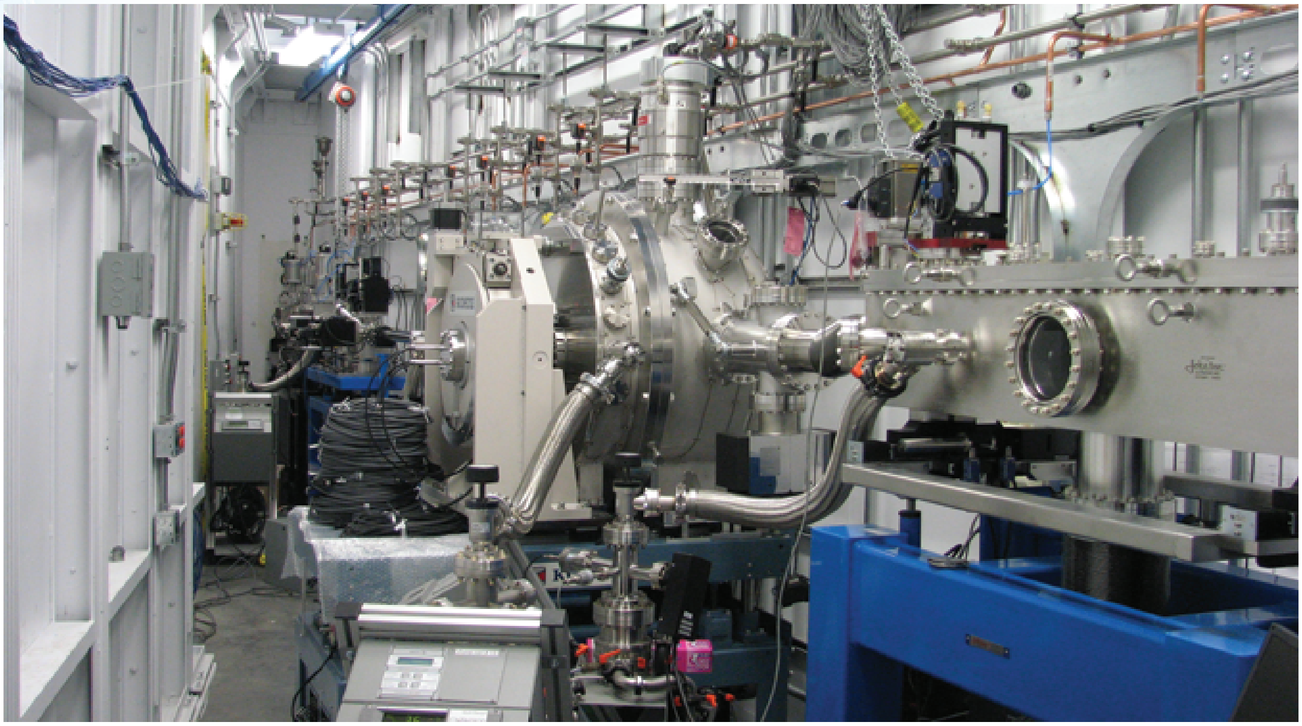

Figure 2: The SXRMB double crystal monochromator inside the primary optical enclosure.

Beamline Design and Beamline Teams

Ian Coulthard	CLSI	Beamline Scientist
Alex Sitnikov	CLSI	Engineering Lead
Glen Wright	CLSI	Controls / Instrumentation Lead
Emil Hallin	CLSI	Phase II Beamlines Manager
T.K. Sham	UWO	Beam Team Leader

Timelines:

Date	Item
April 2007	Beamline components and optics arrive
Summer 2007	Begin vacuum conditioning and alignment
January 2008	First monochromatic beam
Spring 2008	Begin scientific commissioning

Conclusion

The future for SXRMB is bright and we look forward to a time in 2008 when we have users lining up to use SXRMB to take their research to a new level of excellence.

Acknowledgements

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