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Beamlines

Variable Line Spacing Plane Grating Monochromator (VLS-PGM) Beamline 11ID-2

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Beamline Overview

Status	Operational – accepting proposals
Source	185 mm planar undulator
Monochromator	Variable line spacing plane grating
Spectral range	5.2-250 eV
Flux	10^{12} photons/s (50x50 μm)
Resolving Power	$>10^4$
Spot size	0.5 x 0.5 mm ²

Introduction

The 11ID-2 VLS-PGM beamline covers the soft X-ray energy range of 5.2 – 250 eV by using three variable-line-spacing plane gratings. A plane mirror is used to switch beam between two parallel branches (A and B) allowing the accommodation of two endstations. It has met or exceeded the designed performance with excellent resolution and flux [1,2]. It has been accepting general user proposals through the peer review process since 2006. General users' allocation accounts for 40% to 60% of the VLS-PGM beam time.

We are also pleased to announce the launch of our new website <http://exshare.lightsource.ca/vlspgm>. The website will allow our user community to stay current with recent beamline activities, as well as provide a forum where they are able to share their exciting results. It also acts as a tool for new users to familiarize themselves with the beamline components and staff prior to their visit. For existing users, the website will provide the necessary resources and tools to assist in preparing their publications. We are excited about the website and would like to thank all the contributors. For those who would like to be kept posted on recent news of the VLS-PGM beamline, please visit our webpage and add yourself to our mailing list.

Update 2009

The VLS-PGM beamline is ideal for high resolution, low energy spectroscopic studies of materials of both fundamental and applied nature. The two endstation positions usually house a chamber for solid state studies in Branch B (i.e. the X-ray Absorption Spectroscopy chamber, also routinely used for X-ray Excited Optical Luminescence measurements; the Photoelectron Emission Microscope) and a chamber devoted to gas phase studies in Branch A (e.g. the

Toroidal Photoelectron Spectrometer recently tested [3] and the Time of Flight endstation).

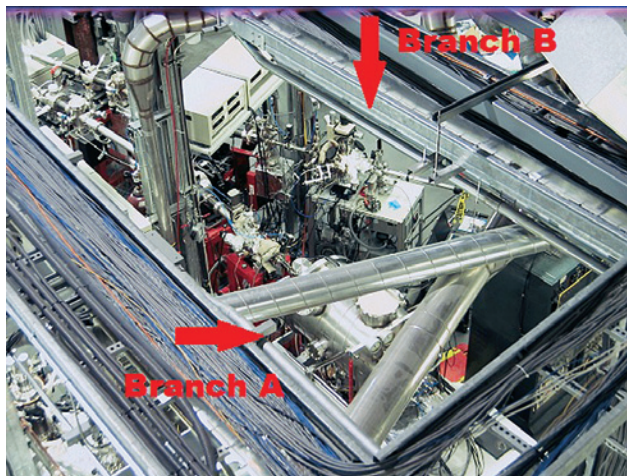


Figure 1: The two endstation positions occupied by the Toroidal Photoelectron Spectrometer (left hand side, Branch A) and by the XAS chamber (right hand side, Branch B).

2009 has seen even more participation of the VLS-PGM beamline in the Students on the Beamline (SotB) program [4]. In the first half of the year the synchrotron club from Centennial Collegiate Institute (Saskatoon, SK) used the beamline for the project “Horizon-Dependent Effects of Nitric Acid Treated Boreal Forest Soil” to determine the susceptibility of various horizons to possible effects of nitric acid rain [5].



Figure 2: The SotB at the VLS-PGM beamline.

Recently, during the beamtime of Dr Liz Robertson (University of Saskatchewan), CLS Outreach Coordinator Tracy Walker organized a one-hour Video Conference with the Langevin Science School (Calgary, AB). The class was able to follow Dr Robertson while she and her group took data, asking questions about the project and gaining a flavour of the excitement of changing samples.



Figure 3: Video conference at VLS-PGM beamline.

As a result of a collaboration by the CLS, the University of Windsor and the University of Western Ontario, the Toroidal Photoelectron Spectrometer is ready to expand the gas phase research capabilities on the beamline. Dr Mike MacDonald started in May as a dedicated research associate for the spectrometer, and early in July Prof. Tim Reddish, after an exhausting four-day cross-country road trip from Windsor to Saskatoon, delivered the spectrometer to the CLS. The testing has begun and the first results can be found at [3]. Very experienced users interested in utilizing this new instrument are welcome to send a letter of interest to Lucia.Zuin@lightsources.ca.

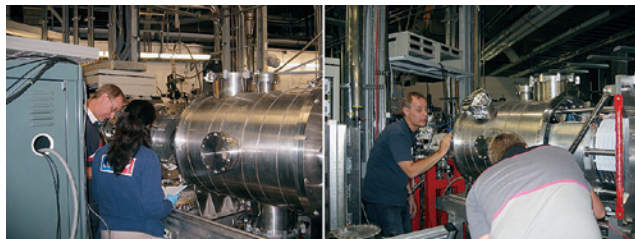


Figure 4: The spectrometer gets assembled.

This October, Dr. Zuin, accompanied by the Staff Scientist of the Far Infrared beamline Dr. Billinghamurst, toured Alberta visiting various universities and departments discussing the diverse research capabilities of the CLS. Among their stops were Edmonton, Calgary and Lethbridge. The trip was to encourage inter-provincial collaboration and to increase awareness of the potential opportunities the CLS may be able to play in the advancement of a diverse range of research. The trip was able to highlight the current research projects underway at the CLS. Due to its success, both beamlines are hoping to make a similar tour each year. If you are interested in participating or having the tour come through your department, please contact the appropriate staff scientist.

References

1. Hu, Y.F., Zuin, L., Reiningger, R., Sham, T.K. 2007. AIP Proceedings for the 9th International Conference on Synchrotron Radiation Instrumentation, 879 535-538.
2. Hu, Y.F., Zuin, L., Wright, G., Igarashi, R., McKibben, M., Wilson, T., Chen, S.Y., Johnson, T., Maxwell, D., Yates, B.W., Sham, T.K., Reiningger, R. 2007. Rev. Sci. Instrum., 78, article 083109 (1-5).
3. Padmanabhan, A., Thorn, P., Reddish, T., Ryan, C., Zuin, L., MacDonald, M. 2009. This report, pp. 172-173.
4. Walker, T. 2008 Activity Report.
5. Suryavensh, P., et al. This report, pp. 182-183.