Performance of two Public Beamlines with insertion devices at SAGA Light Source

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SAGA Light Source is a compact-size synchrotron radiation facility which has a 1.4 GeV electron storage ring with a circumference of 75.6 m and a 270 MeV liniac [1, 2]. The facility opened in February 2006 with three public and a contracted beamlines. The public beamlines use bending magnets as a light source, one for hard X-rays (BL15) [3], one for soft X-rays (BL12), and one for white X-rays (BL09). A hard X-ray beamline (BL11) was also constructed in 2009.

In addition, two beamlines has been constructed in recent years which utilize insertion devices at the straight section on the storage ring as a light source. One is a soft X-ray beamline named BL10 with an APPLE-II type undulator which enables polarity control [4]. The light is monochromatized by a varied-line-spacing plane grating (VLSPG). Designed resolving power and photon flux are 3,000 - 10,000 and 1012 - 109 photons/second at 300 mA stored ring current. High-resolution angle-resolved photoemission spectroscopy (ARPES) and photoelectron emission microscopy (PEEM) have been performed in this beamline. Another one is a beamline named BL07 [5] for the use of high-energy X-rays from a newly developed 4-Tesra superconducting wiggler [6]. The critical energy of the X-rays becomes much higher as 5.2 keV than the one of the bending magnet as 1.9 keV. At the energy of 20 keV, the brilliance from the wiggler is 100 times as high as from the bending magnet. The experimental station was separated by two hutches. The front hutch is for X-ray protein crystallography, in which a diffractometer and a CCD camera have been installed. In the rear hutch, computed tomography by diffraction enhanced imaging (DEI) method and scanning microscopic analysis using X-ray microbeam generated by Fresnel zone plate have been performed. XAFS measurement is also performed in the rear hutch for analyses of electronic state and local structure of heavy atoms such as Zr, Mo, Ag and Sn, which are difficult for the bending magnet beamlines.

In the presentation, we will present the details of the two public beamlines with insertion devices. The typical examples of the measurements at these beamlines will be demonstrated

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[1] T. Tomimasu, S. Koda, Y. Iwasaki, H. Ohgaki, M. Yasumoto, K. Kitsuta, Y. Yamatsu, M. Mori, and Y. Oshiai, Proc. PAC2003, 902-905 (2003).
[2] Y. Iwasaki, S. Koda, T. Tomimasu, H. Ohgaki, M. Yasumoto, Y. Yamatsu, T. Kitsuka, Y. Hashiguchi, and Y. Ochiai, Proc. PAC2003, 3270-3272 (2003).
[3] T. Okajima, Y. Chikaura, Y. Suzuki, M. Tabata, Y. Soejima, K. Hara, R. Haruki, K. Nagata, N. Hiramatsu, A. Kohno, M. Takumi, H. Setoyama, and D. Yoshimura, AIP Conf. Proc. 879, 820-823 (2007).
[4] D. Yoshimura, H. Setoyama, and T. Okajima, AIP Conf. Proc. 1234, 423 (2009).
[5] M. Kawamoto, K. Sumitani, and T. Okajima, AIP Conf. Proc. 1234 355 (2009).
[6] S. Koda, Y. Iwasaki, Y. Takabayashi, T. Kaneyasu, T. Semba, T. Yamamoto, Y. Murata, and M. Abe, IEEE Trans. Appl. Supercond. 21, 32 (2011).