Current Status of the New Polarized Neutron Reflectometer SHARAKU at Material Life Science Facility (MLF)

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SHARAKU（写楽）is the second neutron reflectometer of MLF, and open to the general users from the 2011B user beamtime period. This reflectometer focuses on solid-state physics, particularly on magnetism in contrast with the first neutron reflectometer (SOPHIA) whose main subject is the soft matter science with capability of free surface and interface investigation. Thus this reflectometer was designed as the polarized neutron reflectometer with the vertical sample geometry, and is capable of the full neutron spin polarization analysis of the reflected neutrons using the Fe/Si supermirror polarizer and analyzer. We also have a plan to perform the off-specular reflectivity, the grazing incidence small-angle neutron scattering (GISANS) and the grazing incidence diffraction (GID) measurements. Consequently, four different kinds of detectors were prepared to cover a wide q-range with an appropriate q-resolution. One is an orthodox ^{3}He gas tube detector without spatial resolution, and the other three are two-dimensional position-sensitive-detectors (2D-PSDs); a multiwire proportional neutron counter (MWPC), a 2D scintillator detector using a wavelength-shifting-fiber (WLSF) readout, and a scintillator detector based on a position-sensitive photomultiplier. An electromagnet (<1.0 T) and a superconducting magnet (< 7.0 T) can be used to apply an external magnetic field to the sample with a 4K cryocooler or a variable temperature insert (VTI). Current status of SHARAKU will be reported in the symposium.

References

[1] Takeda M., Yamazaki. D. *et al.*, Chinese J. Phys. **50**, 161 (2012).