

# Horizontal type neutron reflectometer SOFIA at BL16 in J-PARC/MLF

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Neutron reflectometry is one of the powerful tools to investigate surface and interfacial structures of materials in the spatial range from nm to sub- $\mu\text{m}$ . Because hydrogen and deuterium atoms have different scattering length for neutrons, this method can distinguish deuterated materials from normal ones in the mixture of soft-condensed matters, such as polymer blends, bio-mimic membranes, and so on.

At BL16 in J-PARC/MLF, two downward neutron beam lines are transported with different angles, 2.22 and 5.71 degrees, relative to the horizontal for free interface measurement. In 2008, we started to accept the neutron beam at BL16 with an old ARISA reflectometer [1] relocated from KENS, KEK, Japan. Thanks to drastic increase in beam flux and instrumental upgrades, the beam intensity was dozens of times more than that in KENS, and the observable reflectivity reaches around  $10^{-7}$ . Also, we installed a detector consisting of a  $^6\text{LiF/ZnS}$  scintillator plate and 2-dimensional photomultiplier tube [2] with NeuNET data acquisition system [3]. This enables us to measure specular and off-specular reflection simultaneously [4].

But old ARISA does not have the enough strokes to change the vertical positions of sample and detector for both the beam lines with 2.22 and 5.71 degrees. In addition, the sample size must be over 30 mm at incident angle of 0.3 degrees with  $Q$  resolution of 3% because of the limitation of the slit collimation. To dissolve these problems, we recently installed a brand-new reflectometer, SOFt Interface Analyzer (SOFIA), instead of ARISA [5].

We will show and discuss the performance of the new reflectometer in the presentation.

## References

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