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Small Angle Neutron Scattering instrument Bilby: capabilities to study mainstream and complex systems

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ANSTO for more than ten years successfully operates the Small Angle Neutron Scattering (SANS) instrument Quokka[1] and in 2016 commenced the user operation of the second SANS instrument, Bilby[2]. The Ultra-small angle scattering instrument Kookaburra[3] is completing the set of the SANS instruments at ANSTO.

Bilby exploits neutron Time-of-Flight (ToF) to extend the simultaneous measurable Q-range over and above what is possible on a conventional reactor-based monochromatic SANS instrument. In ToF mode, choppers are used to create neutron pulses comprising wavelengths between 2 and 20 Å of variable wavelength resolution (~3% - 30%). In addition, Bilby can operate in monochromatic mode using a velocity selector.

Two arrays of position sensitive detectors in combination with utilizing the wide wavelength range provide the capability to collect scattering data of a wide simultaneous angular range without changing the experimental set-up (maximum accessible Q on the instrument is 0.001-1.8Å⁻¹).

Additionally, there is a range of sample environment available allowing to change sample conditions in situ, which is priceless for the study of a wide variety of samples ranging from colloids and hierarchical materials to metals. Here we present some recent examples.

References

1. K. Wood et al, QUOKKA, the pinhole small-angle neutron scattering instrument at the OPAL Research Reactor, Australia: design, performance, operation and scientific highlights. J. Appl. Crystallogr. 51 (2018) 294-341.
2. A. Sokolova et al, Performance and characteristics of the BILBY time-of-flight small-angle neutron scattering instrument. J. Appl. Crystallogr. 52 (2019) 1-12.
3. C. Rehm et al, Design and performance of the variable-wavelength Bonse-Hart ultra-small-angle neutron scattering diffractometer KOOKABURRA at ANSTO. J. Appl. Crystallogr. 51 (2018) 1-8.

Level of Expertise

Expert

Presenter Gender

Woman

Pronouns

She/Her

Which facility did you use for your research

Students Only - Are you interested in AINSE student funding

Do you wish to take part in the Student Poster Slam

Condition of submission

Yes

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