

SANS time-of-flight instrument Bilby at ACNS, ANSTO

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

Bilby exploits neutron Time-of-Flight (ToF) to extend the measurable Q-range, over and above what is possible on a conventional reactor-based monochromatic SANS instrument. In ToF mode, the choppers are used to create neutron pulses of variable (~3% – 30%) wavelength resolution.

Two arrays of position-sensitive detectors in combination with utilizing of wide wavelength range provide the capability to collect scattering data of wide angular diapason without changing the experimental set-up (maximum accessible Q on the instrument is 0.001-1.8Å⁻¹). Additionally to the ToF, Bilby can operate in monochromatic mode.

The question is how the advanced design features can be applied to the real scientific questions.

In short, having a large dynamic range available in one go opens up a possibility to study complex systems like micelles and hierarchical materials. Additionally, there is a range of sample environments available allowing to change conditions in situ, which is priceless for study a range of samples stretching from colloids to metals.

In my presentation, I will be giving several examples demonstrating how ToF SANS can bring light to structural changes of the surfactant wormlike micelles structure under various conditions.

Some cases will be presented to show that the monochromatic mode is also the one producing valuable results.

The main accent will be made on a recently published work, done solely on Bilby along with examples of combining SANS and USANS techniques.

[1] K.Wood et al, J. Appl. Crystallogr. 51, 294-341 (2018)

[2] A. Sokolova et al, J. Appl. Crystallogr. 52, 1-12 (2019)

[3] C. Rehm et al, J. Appl. Crystallogr. 51, 1-8 (2018)

Level of Expertise

Expert

Speakers Gender

Female

Do you wish to take part in the poster slam

No

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