



Contribution ID: 61

Type: Poster

## Kookaburra, the ultra-small-angle neutron scattering instrument at ANSTO: design and recent applications

Thursday, 25 November 2021 18:44 (1 minute)

The double-crystal ultra-small-angle neutron scattering (USANS) diffractometer KOOKABURRA at ANSTO was made available for user experiments in 2014. KOOKABURRA allows the characterisation of microstructures covering length scales in the range of 0.1–20  $\mu\text{m}$ . Use of the first- and second-order reflections coming off a doubly curved highly oriented mosaic pyrolytic graphite pre-monochromator at a fixed Bragg angle, in conjunction with two interchangeable pairs of Si(111) and Si(311) quintuple-reflection channel-cut crystals, permits operation of the instrument at two individual wavelengths, 4.74 and 2.37  $\text{\AA}$  (see more details <https://www.ansto.gov.au/our-facilities/australian-centre-for-neutron-scattering/neutron-scattering-instruments/kookaburra>). This unique feature among reactor-based USANS instruments allows optimal accommodation of a broad range of samples, both weakly and strongly scattering, in one sample setup [1,2]. The versatility and capabilities of KOOKABURRA have already resulted in a number of research papers, including studies on hard matter systems like rocks and coal [3,4], as well as soft matter systems like hydrogels or milk [5,6]. This clearly demonstrates that this instrument has a major impact in the field of large-scale structure determination. Some of the recent examples will be presented here.

### References:

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- [3] Blach, T. et al, Journal of Coal Geology, 2018, 186, 135-144.
- [4] Sakurovs, R. et al, Energy & Fuels, 2017, 31(1), 231-238.
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- [6] Li, Z. et al, Food Hydrocolloid, 2018, 79, 170-178.

### Presenter Gender

Man

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### Condition of submission

Yes

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### Level of Expertise

Expert

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Australian Centre for Neutron Scattering

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Session Classification: Poster Session

Track Classification: Instruments & Techniques