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Recent Scientific Highlights and Developments on the Spatz Neutron Reflectometer

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The Spatz neutron reflectometer is a time-of-flight reflectometer with a vertical sample geometry. The reflectometer was originally the V18 BioRef reflectometer at the BER-II reactor in Berlin, Germany, and transferred to Australia. Spatz currently sits at the end of the CG2B cold guide and views the cold-neutron source of the 20 MW OPAL Research Reactor [1]. Spatz entered user service in late 2020 and since then the instrument has produced several high impact publications and implemented a program of upgrades. Due to the vertical sample geometry this means that sample environments that could not be used on the Platypus reflectometer due to its horizontal sample geometry can now be utilised for reflectometry. One such example of this is the use of the high temperature vacuum furnace to look at the formation of epitaxial graphene films on silicon carbide [2]. Other recent instrument upgrades include the installation of a vertical sample changer for automated sample changing and installation of high precision collimation slits. Upgrades for the near-future include new solid-liquid cells, and scoping for a new infra-red spectroscopy set-up. Recent scientific highlights include work investigating virus binding to cell membranes [3, 4], how changes in bacterial membrane composition relate to antibiotic resistance [5], determining the vertical morphology of different electron acceptor and donor blends in organic solar cells [6], characterisation of new biosensors [7], and re-entrant swelling of polyelectrolyte brushes [8]. This presentation will showcase some of the recent develops and highlights and outline future plans.

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[2] A. Pradeepkumar et al., *RSC Adv.* **14,** 3232 (2024)
[3] Y. Correa et al., *J. Colloid Interface Sci.* **645,** 627 (2023)
[4] I. Milogrodzka et al., *J. Colloid Interface Sci.* **670,** 563 (2024)
[5] M.-L. Han et al. *Cell Reports* **43,** 114410 (2024)
[6] T.-Y. Huang et al., *ACS Appl. Nano Mater.* **7,** 17588 (2024)
[7] U.M. Lankage et al., *ACS Appl. Mater. Interfaces* **15,** 52237 (2023)
[8] H. Robertson et al., *Phys. Chem. Chem. Phys.* **25,** 24770 (2023)

Topics

Neutron Instruments and Techniques

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