New Sample Environment projects and developments at the Australian Centre for Neutron Scattering

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The sample environment team at the Australian Centre for Neutron Scattering (ACNS) has been recently awarded funding for a new superconducting split-coil magnet, a fast closed cycle cryostat and a closed cycle dilution refrigerator of the latest generation.

The new magnet design is of particular interest; the brief is complicated by the request to serve two separate classes of instruments: small angle scattering and time of flight. The magnet will have low fringe field, active shield design, and specific requirements for the asymmetric field gradient to allow experiments with polarised neutrons. Low fringe field values are combined with a minimum central field of 7 Tesla, wide “clean” scattering angle and dimensional and weight constraints. The design challenges and possible solutions will be detailed, together with a time frame for delivery and commissioning.

The new compact closed cycle cryostat (1.5 K to 800 K) with a small He dump, aims to halve the system and sample cooling time, generating performances comparable to that of wet type “orange” cryostats without the necessity to refill with cryogenic liquids.

The closed cycle dilution refrigerator will have high cooling power and large sample space, allowing new class of experiments with neutrons at ultra-low temperature.

The most recent equipment built in-house and unique to the ACNS, such as the Peltier sample changer and the thermalised sample tumblers for SANS and USANS, will also be discussed.