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Completion of polarised neutron equipment deployment and development of methodology and data reduction in using polarised ^3He on ANSTO instruments

We report the completion of the deployment project to incorporate neutron polarisation analysis capabilities on 6 ANSTO instruments. The instruments include high-intensity diffractometer WOMBAT, SANS QUOKKA, thermal triple-axis spectrometer TAIPAN, cold triple-axis spectrometer SIKA, cold neutron chopper spectrometer PELICAN, and reflectometer PLATYPUS (for off-specular scattering). We can now provide user research with neutron polarisation analysis option to study materials in length scales from Ångström to micrometers and in energy transfer from 1meV to 50meV.

The use of polarised ^3He comes with its unique challenges. The trade-off between neutron polarisation and neutron transmission needs to be taken into account when planning an experiment. Regular monitoring measurements and proper data reduction must be applied to account for the neutron spin filter efficiency change over time. We have implemented a reliable measurement methodology and data reduction procedure to correct the data.

Some user experiments have already been carried out on instruments that acquired the capabilities early in the deployment. We will use some of the measurements to illustrate both our measurement capabilities and the reliability of our methodology and data reduction procedures.

Topic

Neutron Instruments & Techniques

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