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Pelican focussing guide project

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The Pelican spectrometer has been in operation at the Australian Centre for Neutron Scattering (ACNS) for the past decade. This versatile instrument is designed for a wide range of measurements on powders, single crystals, and liquids, offering broad wavelength and resolution capabilities suitable for various scientific applications. Inelastic neutron scattering (INS) experiments often require high neutron fluxes due to the inherently weak intensity of scattered neutrons. This requirement limits the minimum sample size for neutron scattering measurements and poses challenges for experiments involving high pressure, deuteration, and single crystal growth.

To address these challenges, the Pelican team has designed, procured, and installed a supermirror focusing neutron guide. This upgrade has been optimized to significantly enhance the neutron flux at the sample position, increasing it by an order of magnitude at a 1 cm × 1 cm spot. While this improvement boosts the flux at the sample, it does lead to an increase in beam divergence and thus a reduction in Q resolution. The guide system is installed on a pair of translatable stages so they can be moved into the beam as required.

In this presentation, I will discuss the scientific rationale behind this major upgrade, provide details on the design and installation of the supermirror focusing neutron guide, and share preliminary results from this enhancement to the Pelican spectrometer.

Topics

Neutron Instruments and Techniques

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