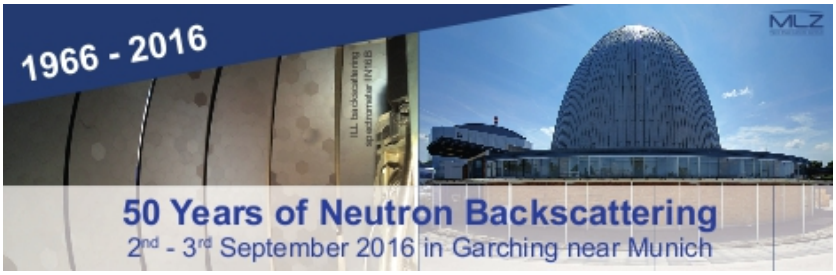

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Design and first results from EMU at ANSTO

Saturday, 3 September 2016 12:05 (20 minutes)

The Australian Neutron Scattering Centre at ANSTO has recently installed a cold-neutron backscattering spectrometer at the OPAL research reactor. The spectrometer, called EMU, is based on Si (111) crystal backscattering and extracts neutrons from a cold neutron guide via a double HOPG (002) crystal premonochromator setup. Backscattering is realized by implementing spherical focusing between the Si (111) crystal monochromator and analyser arrays, as first performed on the IN16 spectrometer. Incident neutron energies are modulated through fast oscillations of the monochromator using a "Doppler drive", yielding a net energy transfer range of ± 31 μeV. The FWHM energy transfer resolution is 1.2 μeV at the elastic line.

A unique feature of EMU is maintaining its high energy resolution from 1.95 to ~0.1 Å-1 momentum transfers that is, the backscattering condition is equally satisfied at all scattering angles, albeit at the cost of neutron incident flux at low scattering angles. Neutron events are resolved by two 3He linear-position sensitive detector arrays.

Key results from the instrument commissioning are presented to compare performance against design objectives. Upgrades possibilities are also presented.

EMU is available with standard sample environment from late 2016 to external users .

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