s7'.m1.o1 State-of-the-art in time-of-flight neutron diffraction. C.C. Wilson, *ISIS, Rutherford Appleton Laboratory, Chilton, Didcot, Oxon OX11 0QX, UK.*.
Keywords: instrumentation, neutron diffraction.

The advent of pulsed neutron sources in the 1980s promised to yield exciting new opportunities for the development of novel instrumentation for crystallographic studies. This stems from the use of the time-of-flight (tof) technique which offers many advantages in diffraction studies. In tof powder diffraction, for example, very high resolution, constant across the entire diffraction pattern, can be achieved simply by increasing the length of the instrument, while the ability to record the entire diffraction pattern, at high resolution, at a single scattering angle, is particularly beneficial for studies in complex sample environment equipment such as chemical reaction cells or high pressure apparatus. In addition, combining large area detectors with the pulsed nature of the beam offers the potential for very high flux while maintaining high resolution - a powerful combination. On the single crystal side, the use of tof techniques with large area position-sensitive detectors offers a fully three-dimensional sampling of reciprocal space, offering potentially rapid data collection times and also the ability to survey reciprocal space efficiently and completely.

It is pleasing to record that many of these potential benefits have been realised and exploited with great success, at pulsed sources in the US, Japan, Russia and the UK.

The drive towards developing advanced instrumentation to exploit the tof technique has perhaps been most apparent recently at the ISIS source in the UK, and the result is a suite of instruments which offers a wide choice of high resolution, high flux and specialised extreme sample environment conditions for diffraction measurements.

We will attempt to review the current status of the available tof diffraction facilities with a particular emphasis on the novel scientific applications to which these are being put.

Ongoing developments will also be highlighted, with new opportunities in both powder and single crystal diffraction being discussed. We note the recent commissioning of the high flux/high resolution GEM powder diffractometer, and the upgraded SXD instrument at ISIS, which will have more than 2π solid angle coverage of position-sensitive detectors.

Future possibilities in both technique development and novel applications will also be assessed.

s7'.m1.o2 The use of neutron polarimetry for general antiferro-magnetic structure determination and the measurement of antiferro-magnetic density. F. Tasset, *Institut Laue-langevin, BP156, F-38042 Grenoble Cedex 9*
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The rotation of the magnetic moment of a neutron when it interacts with an arbitrary magnetic structure was calculated in 1963[1].

Due to technical difficulties, it was not until 25 years later that a zero-field polarimeter could be built[2], allowing for the first time the measurement of such a rotation at appropriate momentum transfer. This device was called Cryopad, (Cryogenic Polarisation Analysis Device) because it makes use of cryocooled superconducting magnetic shields.

First measurements on antiferromagnetic structures being quite rewarding[3], a second polarimeter was built. Cryopad-II is now offered as an option for IN20 and D3[4] polarised neutron spectrometers at ILL and the method is called Spherical Neutron Polarimetry [SNP] .

In this talk we shall give a few selected examples of magnetic structures which have been studied with SNP and show how the observation of the scattered polarisation vector is decisive in building a realistic model for a non-colinear spin arrangement. We will also explain the completely new possibility to obtain high-precision magnetisation densities with k=o propagation vector, like in our recent work on the antiferromagnetic Cr_2O_3 magneto-electric phase[5].

[1] Blume, M., *Polarization Effects in the magnetic Elastic Scattering of Slow Neutrons.* Phys. Rev., 1963. **130**: p. 1670-1676.
[2] Tasset, F., *Zero field neutron polarimetry.* Physica B, 1989. **156-157**: p. 627-630.
[3] Brown, P.J., J.B. Forsyth, and F. Tasset, *Neutron polarimetry.* Proc. R. Soc. Lond. A, 1993. **442**: p. 147-160.
[4] Tasset, F., *et al.*, *Spherical neutron polarimetry with Cryopad-II.* Physica B, 1999. **267-268**: p. 69-74.
[5] Brown, P.J., *et al.*, *High-precision determination of the antiferromagnetic form factor of Cr3+*, ILL annual report 99, p. 52-53.