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Operational performance characteristics of the WISH detector array on the ISIS spallation neutron source

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The performance of the position sensitive neutron detector array of the WISH diffractometer is discussed. WISH (Wide angle In a Single Histogram) is one of the seven instruments currently available for users on the second target station (TS2) of the ISIS spallation neutron source, and is used mainly for magnetic studies of materials. WISH is instrumented with an array of 10 detector panels, covering an angular range of 320 degrees, orientated in two semi-cylindrical annuli around a central sample position at a radius of 2.2m. In total the 10 detector panels are composed of 1520 3He based position sensitive detector tubes. Each tube has an active length of one metre, a diameter of 8 mm and is filled with 3He at 15 bars.

The specification for the WISH detectors included a neutron detector efficiency of 50% at a wavelength of 1Å, good gamma rejection and a position resolution better than 8 mm FWHM along the length of the tubes all of which have been met experimentally. Results obtained from the detector arrays showing pulse height and positional information both prior to and post installation will be shown. The first 5 of the 10 detector panels have been operational since 2008, and comparable diffraction data from powder and single crystal samples taken from the remaining 5 panels (installation completed in 2013) shows that we have a highly stable detector array which is easily assembled and maintained.

Finally some real user data will be shown, the quality of which has enabled WISH to become one of ISIS' flagship instruments, providing by far the largest data volume of any of the ISIS TS2 instruments to date.

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