Performance test on PELICAN – a multi-purpose time of flight cold neutron spectrometer

Dehong Yu\textsuperscript{a}, Richard. A. Mole and Gordon J. Kearley

Bragg Institute, Australian Nuclear Science and Technology Organisation, New Illawarra Road, Lucas Heights, 2234, Australia

\textsuperscript{a} Corresponding author: dyu@ansto.gov.au

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Abstract

Pelican, a direct geometry multi-purpose cold neutron spectrometer has recently been commissioned at the Bragg Institute, ANSTO. The energy resolution and flux at the sample position as a function of neutron wavelength has been evaluated and time focusing at selected energy transfers has also been demonstrated. Several test experiments of quasi-elastic and inelastic neutron scatterings have been performed and these have indicated the realisation of the design specifications and performance of the instrument.

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Performance tests and results from Monte Carlo calculations are presented. 1. Introduction Neutron energy measurements play an important role in diagnosing of fusion reaction, and much effort has been made to develop neutron spectrometers appropriate for these applications [1,2]. In particular, in the search for cold-fusion phenomena the production of neutron is generally considered to be the unambiguous signature of nuclear interaction, and the neutron energies are indicative of the. The resulting uncertainty in the measured neutron energy can be reduced by suitably shaping the second scintillator so that neutrons scattered through a larger angle have a shorter flight-path to the second scintillator. The purpose of this paper is to describe Experiments using inelastic neutron scattering at the Australian Centre for Neutron Scattering have found indications of a possible new quantum spin state in a novel antiferromagnetic material barium ytterbium zinc oxide (Ba3Yb2Zn5O11) which provides both a challenge and validation of the third law of thermodynamics. "The great success of this challenging experiment relied on the excellent performance of the Pelican instrument, wonderful technical support at ANSTO and strong expertise in the relevant field from A/Prof Masuda's group," said Dr Dehong Yu and Dr Richard Mole, co-authors and Pelican instrument scientists.