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Low-energy crystal-field excitations observed using inelastic Neutron Scattering

The time-of-flight spectrometer, PELICAN, at ANSTO operates two choppers which provide a fixed initial energy of neutrons to the sample. Configuring the instrument to a wavelength of 4.75\AA , sets this initial neutron energy to 3.6meV . By phasing the choppers, however, harmonic wavelengths can be obtained such as $\lambda/2$, etc. By measuring a powder sample of ErNiAl_4 at $\lambda/2$ ($\lambda=4.75\text{\AA}$) we could observe a greater range of positive energy transfers (to the sample) and, after appropriate background removal, confirm the presence of an excitation at 7meV . This excitation represents the emission from the crystal field level at 7meV to 0meV confirming the result obtained in a previous experiment.

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