

Preliminary experiments of D2O scattering for MIEZE spectrometer with AGNES

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Mieze spectrometer is a modified version of NSE spectrometer, in which echo condition (cancellation of Larmor precession phase) is realized when the distance between the detector and the last $p/2$ -flipper is adjusted and hence, contrast of NSE signal depends on the distance. Since the sensitivity on the distance is proportional to the energy resolution of the Mieze spectrometer, the thickness of the detector and the size of the sample should be small (less than a few millimeter) for high resolution. Since besides the other NSE spectrometer, no spin analyzer is required between the sample and the detector in Mieze spectrometer, new types of experiments such as inelastic or quasi-elastic scattering with neutron spin flip is measurable with Mieze.

We intend to construct Mieze spectrometer as one of the three NSE spectrometers. In order to reduce the sensitivity on the detector position, the energy resolution of the Mieze spectrometer is confined to that of the conventional inelastic scattering spectrometers. The advantage of the Mieze comparing to the inelastic scattering spectrometer is the compactness of its size and the beam intensity at the sample position.

In order to check the properties of Mieze, it is important to measure standard samples and compare the measured data to that of some conventional spectrometer. For this purpose, we measured the inelastic scattering of D2O (as the standard sample) using the inelastic scattering spectrometer AGNES (as reference spectrometer).

D2O is contained in a Al-cell and the measurements were performed at various temperatures under normal pressure. An example of the results for the temperature of 4 degree is shown in Fig.1. Coherent scattering in the low Q region is obviously observed. Scattering intensity in high Q region (over 1.5 \AA^{-1}) is much reduced when

the sample temperature rises. Due to the improvement of AGNES spectrometer, S/N -ratio is much improved especially when the count rate is low. These data will be used for calibration of Mieze spectrometer.

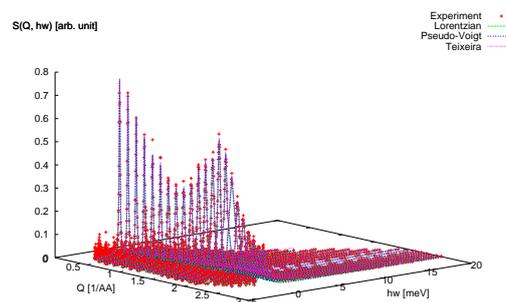


Fig. 1. The result of neutron inelastic scattering from D2O at 4 degree.