

Oscillating Radial Collimators for the Chopper Spectrometers at MLF in J-PARC

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The needs for inelastic neutron scattering experiments under the special sample environment such as strong magnetic field and high temperature are recently increasing. However, the unwanted scatterings originating from these devices affect the detection of weak inelastic signals. In order to overcome this problem we have developed an oscillating radial collimator specialized for the chopper spectrometer at Materials and Life Science Experimental Facility (MLF) in J-PARC.

The collimator blades composed of mylar foil coated with gadolinium oxide are used for the cold-neutron disk-chopper spectrometer AMATERAS (BL14 MLF) whose maximum incident energy is less than 90 meV. On the other hand, the Fermi chopper spectrometer 4SEASONS (BL01 MLF) provide the relatively high incident energies (several hundred meV), and so the *usual* collimator blades with mylar foil seriously scatter the incoherent background. Therefore, we chose the cadmium-coated thin aluminum plate as the collimator blade for 4SEASONS.

In this study, we will report the performances of newly-developed oscillating radial collimators both for 4SEASONS and AMATERAS.

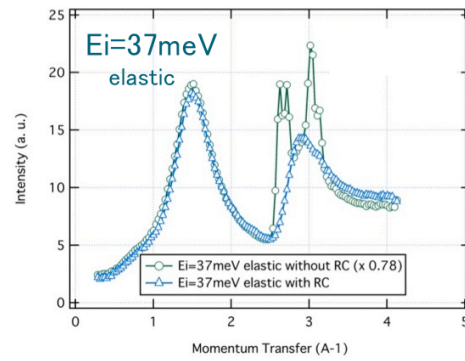


Fig. 1
Elastic scattering spectra of vitreous silica measured by 4SEASONS; with an oscillating radial collimator (blue) and without it (green). Two spurious peaks originating from a closed cycle refrigerator disappear by using the oscillating radial collimator.