

Group Report

BL01 4SEASONS - June 2012

Beamline Update

Recent problems

A defect in the slit package of the Fermi chopper was discovered during an inspection following the earthquake of March 2011. This defect limits the maximum rotation speeds of the Fermi chopper to 400 Hz. The T0 chopper is also not in perfect operating condition and can only rotate at 25 Hz. These limitations may degrade the performance of the instrument during high energy measurements with incident energies (E_i 's) of several hundred meV. Fortunately, however, most measurements using lower E_i 's should not be affected.

The inspection also revealed that the beam center was ~ 6 mm off the designed position.

Recent progress

Recently, shielding vanes of B_4C -resin and shielding blocks of thick polyethylene were installed inside and outside the vacuum scattering chamber, respectively (Fig. 1). As a result of these measures, background scattering is much reduced. The much improved signal-to-noise ratio enables us to measure smaller samples. Figure 2 shows a comparison of some typical data collected before and after the installation. The new data show a clean intensity distribution, while the previous data are very noisy and contaminated by spurious signals.

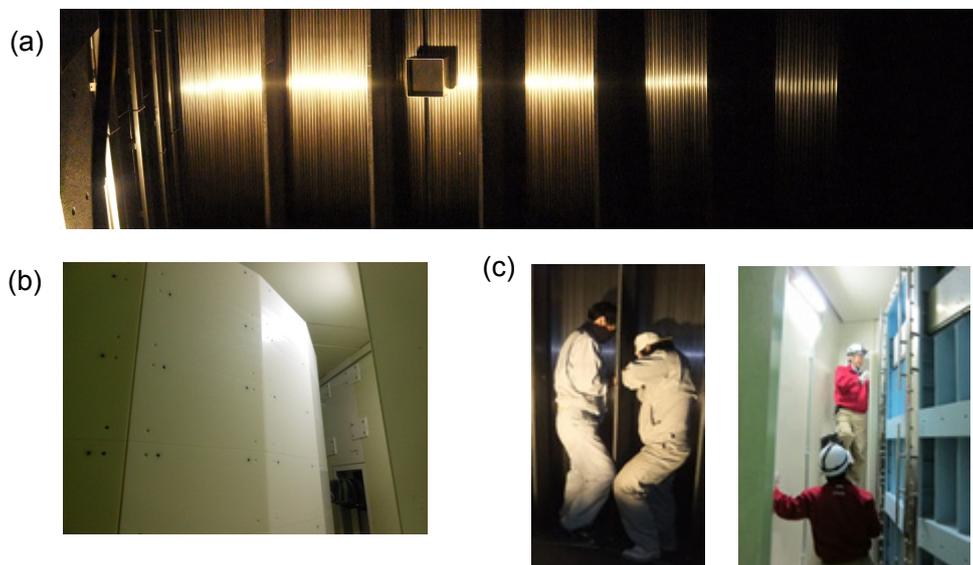


Fig. 1: Newly installed B_4C vanes (a) and polyethylene blocks (b). The installation work was carried out by engineers of CROSS and the MLF (c).

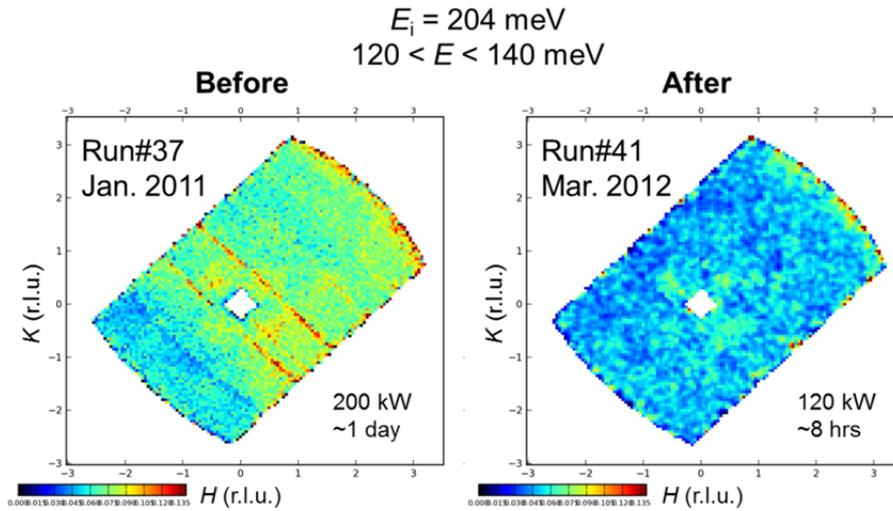


Fig. 2: Comparison of data before and after the installation of the shielding materials. For both measurements, the incident energy is 204 meV and the rotation speed of the Fermi chopper is 300 Hz. The figures show constant-energy (E) cuts of the excitation spectra at $120 < E < 140$ meV. The intensity is normalized versus the proton beam current incident on the neutron target so that the two data can be directly compared. Weak spots at $(H, K) = (\pm 0.5, \pm 0.5)$ are magnetic excitation signals.