

	承認日 Date of Approval: 2016/1/18 承認者 Approver: Ryoichi Kajimoto 提出日 Date of Report: 2016/1/18
実験課題番号 Project No. 2014P0801 実験課題名 Title of experiment On-beam commissioning of MAGIC chopper system 実験責任者名 Name of principal investigator Mitsutaka Nakamura 所属 Affiliation Japan Atomic Energy Agency	装置責任者 Name of Instrument scientist Ryoichi Kajimoto 装置名 Name of Instrument/(BL No.) 4SEASONS (BL01) 利用期間 Dates of experiments 2014/11/5 11:00 – 2014/11/7 11:00

<p>1. 研究成果概要(試料の名称、組成、物理的・化学的性状を明記するとともに、実験方法、利用の結果得られた主なデータ、考察、結論、図表等を記述してください。</p> <p>Outline of experimental results (experimental method and results should be reported including sample information such as composition, physical and/or chemical characteristics.</p>
<p><u>Sample Information</u></p> <p>Name: Vanadium (Standard sample) Chemical Formula: V</p> <p><u>Results</u></p> <p>We proposed the application of a supermirror-coated slit package (MAGIC chopper) to a monochromating chopper in order to optimize the experimental conditions for each of the incident energies in an inelastic neutron scattering experiment on a pulsed neutron source[1], and succeeded in experimentally validating the characteristic performance of MAGIC chopper system using the prototype slit package [2].</p> <p>Based on these preliminary R&D, the actual MAGIC chopper system was installed on the chopper spectrometer 4SEASONS. In this study we carried out the performance test of this system. Figure 1 shows the time-of-flight (TOF) spectra of scattered neutrons from Vanadium with the old Fermi chopper system (red) and the new MAGIC chopper system (blue). The rotation frequency was 150Hz for both cases, and each of the phase delay was tuned to select 185 meV incident energy. Unfortunately, it is found that the performance of the new system is worse than the old system. We have investigated the cause of low-performance of new system. In fact, the reflectivity of supermirrors used in the new system was found to be poor, and we confirmed that the quality of supermirror remarkably affects the performance of MAGIC chopper system by Monte Carlo simulation as shown in Fig.2.</p> <p>We are now remaking the MAGIC chopper system using newly developed supermirrors with higher reflectivity.</p>

1. 研究成果概要(つづき) Outline of experimental results (continued).

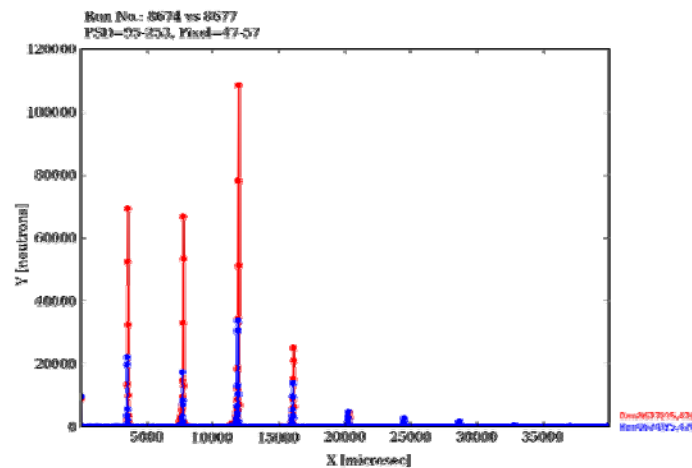


Fig.1: Comparison of the TOF spectra between the old Fermi chopper (red) and the new MAGIC chopper (blue)

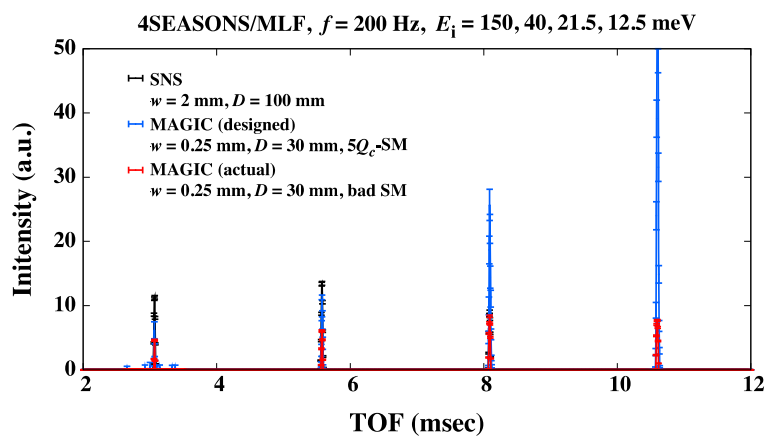


Fig.2: Scattered neutron intensities calculated by Monte Carlo simulation. “SNS” (black) means the design of the existing Fermi chopper. A slit package designed according to the specification (blue) should provide high performance.

[1] M. Nakamura *et al.*, J. Neutron Res. **15** (2007) 31.

[2] M. Nakamura *et al.*, Nucl. Instrum. Methods Phys. Res. Sect. A **737** (2014) 142.

必要に応じて、A4 サイズの用紙に続きを記入して下さい。

Please use A4-size papers for further reporting, if necessary.