

	MLF Experimental Report	提出日 Date of report
実験装置名/BL番号 Name of Instrument/BL AMATERAS/BL14		
実験装置責任者 Name of the person responsible for the instrument: Kenji Nakajima		
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1. 研究成果概要 (a)装置グループ内の成果、(b)ユーザー課題実装時における特筆すべきサポート、(c)ユーザー課題の執行状況について、まとめてください。A4 サイズ用紙使用のこと。

Outline of your activities. Following results at your instrument should be reported in A4 size papers: (a) results of your instrument group, (b) significant user support works, and (c) statistical summary of user experiments.

JFY2012 was the 4th year since AMATERAS (Fig. 1) has been opened to users. Fortunately, AMATERAS did not have any after-effects from the earthquake in 2011. However, we encountered several problems, which caused a certain amount of loss of beam time in JFY2012. In the course of instrumental activities, maintenance, tests and development of auxiliary devices and efforts to improve the spectrometer have been done. It should be also reported that Dr. Yukinobu Kawakita has joined our group since the end of this fiscal year.

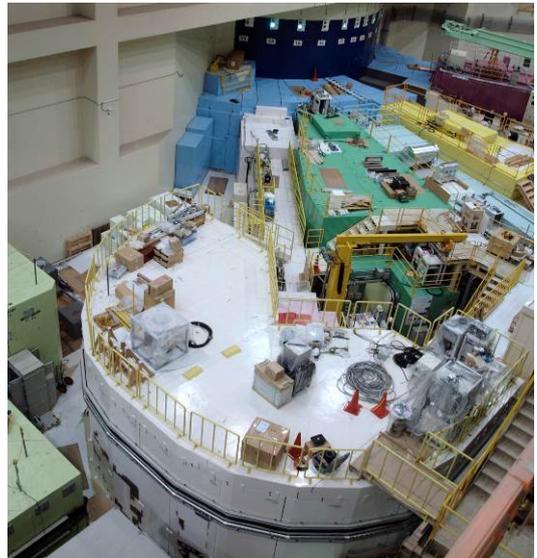


Figure 1. AMATERAS in November, 2012.

In JFY2012, 36 days of beam-time were spent as instrument-group-use. In the end of JFY2011, we have found deformation of one of the disks of high-speed disk-choppers, and we had to stop the operation of this disk, which caused limitation of the achievable resolution and loss of the intensity. A new disk was delivered in the beginning of JFY2012, and we carried out replacement and commissioning of the new disk. Other maintenance works regarding detector electronics and other devices have been also done.

Efforts of development of the auxiliary devices and improvement of the spectrometer performance have also been done. An oscillating radial collimator (ORC) was developed by MLF in-house staff. After off-beam and on-beam tests (Fig. 2), the ORC was used in actual experiments in January, 2013. Further efforts to reduce the background have been continued. The time-independent background became serious in some users' experiments. We spotted that one of the source is from the floor under the scattering chamber. Additional shielding on the floor is under preparation. In the course of the study of the beam-transport to increase the flux at the sample position, we have replaced the end section of the guide mirror with higher-performance one. The increase in the flux was as expected. As a response to

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

this result, we have ordered 8.6 m of new mirror, which will be installed in 2013 together with re-alignment work of the full beam-transport.

AMATERAS experienced a series of problems. During one of users' experiments, a sample stick was unexpectedly blown out from user carry-in Orange cryostat due to a sudden evaporation of the condensed air inside the sample space. Fortunately, there were neither any injuries nor any serious damage to the instruments. However, the investigation of this accident stopped AMATERAS operation for three days. Also, user program was



Figure 2. Test of a new oscillating radial

interrupted twice due to troubles of a cryostat and the beam shutter controller. These problems caused loss of beamtime. The most part of the loss was covered by the instrument- group-use beamtime to minimize the effect on user activities. Some of planned instrumental studies and commissioning were cancelled or postponed to JFY2013.

AMATERAS accepted two project use proposals, 27 general use proposals including four reserved ones and one urgent use proposal in JFY2012. The accepted project use proposals are 'Research on structure and electronic properties of functional materials by AMATERAS spectrometer' (PI: T. Masuda) and 'Project research on structure and dynamics of protonic, superionic and amorphous functional materials' (PI: Y. Kawakita). The general use proposals have the wide variety of their research fields. Note that more than 2/3 of them were of condensed matter physics. Two proposals of them were cancelled because of problems in sample preparation. Two other proposals were interrupted or reduced their beam time due to the problems mentioned above.

We have used a bottom-loading ^4He closed-cycle refrigerator for most experiments as a standard sample environment (SE) equipment of AMATERAS. In this fiscal year, other SE equipments such as user's carry-in and BL-common use ones were required more than before. A project use experiment used a high-temperature furnace by setting into the ORC to cut off neutrons scattered at niobium heaters, adiation shields and outer vacuum chamber. An orange cryostat, which was used for a general use experiment, is quite useful for low-temperature experiments. Since some safety problems were pointed out on its sample stick through the investigation of the accident, we will improve the design for the stick and make a new one in JFT 2013.

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.