

	Experimental Report 	提出日 Date of Report 2013/05/08
実験装置名/BL番号 Name of Instrument/BL		
BL18		
実験装置責任者 Name of the person responsible for the instrument:		
Takashi Ohhara		
所属 Affiliation: J-PARC center, JAEA		

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.

(a) Results of your instrument group

BL18 is a newly built single crystal diffractometer, which received the first beam on 5 March in 2012. Since then, much time has been devoted for the commissioning of the instrument, especially in the 2012A period.

Followings are some works done by the instrument group for the commissioning.

1) Determination of instrumental parameters

Instrumental parameters such as the flight path (L1 and L2) and the positions of detectors have to be, first of all, established to successfully do any measurements on the instrument. The angular positions of the detectors were determined by observing some Bragg reflections on each detector, rotating an NaCl single crystal several times little by little

(Fig. 1). From these data, the scattering plane and the vertical angles of the detectors from the scattering plane were determined. These values were confirmed to coincide well with the designed values.

The instrumental parameters including L1 and L2 will be re-measured in 2013A since six new detectors were installed on the instrument.

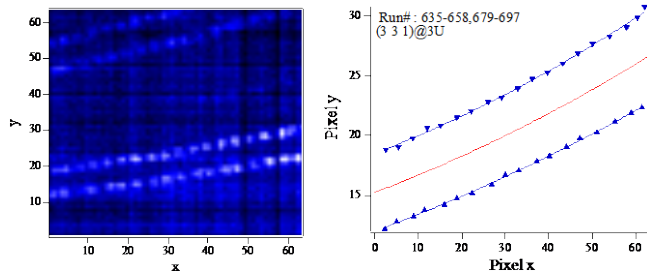


Fig. 1 Observed Bragg reflections from an NaCl single crystal for the determination of the angular positions of the detectors.

2) Measurement of instrumental basic data

As instrumental basic data, the spectrum of the incident beam and the empty background, were measured. The incident spectrum was measured utilizing the incoherent scattering from V-Ni alloy placed at the sample position. The empty background was measured placing nothing at the sample position in order to assess the noise level detected by the detectors. From the empty data, rather high background, especially in the detector at the lowest angle, was found, presumably due to neutrons scattered by obstacles placed in the upper stream. In order to reduce the background, a set of collimators was installed in the receiving

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

duct of the vacuum sample chamber, and the background was reduced by about a half of the original (Fig. 2).



Fig. 2 Installed collimator

3) Tuning of sample handling and environmental devices

At BL18, piezo-rotators are adopted to rotate a sample crystal. On the low temperature goniometer, the piezo-rotators were attached

on the cold head of the fridge to rotate only the sample crystal but not the whole device. In order to achieve decent cooling time down to the lowest temperature with this setting, heat paths were attached to the goniometer. The fastest cooling time, about 5.5 hours, was achieved with the heat path consisting of hundreds of thin gold wires. In addition, the piezo-rotator on the low temperature device was replaced with a new one with higher torque because the rotator often got stuck due to the weakening of the torque of the rotator at low temperature.

The new rotator was confirmed to finely work even at the lowest temperature, and automatic measurements at low temperature are now practicable.

(b) Significant user support works

BL18 is a newly built diffractometer and all users were new users, thus all the members of the instrument have thoroughly devoted user support works covering setting up experiments, planning of the experiments, data visualization and the data analyses. While most of the users used our in-house devices like the room temperature goniometer and the low temperature goniometer, one user brought in his own device for his pulsed high magnetic measurement. For this experiment, the support ranged from the set up of the experiment to modification of the DAQ system and data reduction system.

(c) Statistical summary of user experiments

For 2012A, three general proposals were approved and all of them were conducted. The rest of the time in 2012A was exclusively used for the instrumental commissioning by BL members, as mentioned above. For 2012B, five general proposals were approved and two general proposals were assigned as reserved. These proposed experiments were all conducted. In addition, one trial use was also conducted. Besides these experiments, six experiments were conducted under project uses (two projects) and the rest of the time in 2012B was used for the instrumental commissioning under the BL proposal and CROSS development proposals.

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.