

実験装置名/BL番号 Name of Instrument/BL

SHARAKU/BL17

実験装置責任者 Name of the person responsible for the instrument:

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所属 Affiliation: Japan Atomic Energy Agency(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

(a)-1 Installation of a new vacuum chamber

We installed a new vacuum chamber between the sample position and the detector bank. The chamber has two cells along the beam line, and each cell has an elevator as shown in Fig. 1. An electromagnet to maintain the neutron polarization is on the elevator in the upstream cell, and a spin flipper and a spin analyzer are set on another elevator in the downstream cell. These elevators enable us to quickly and safely switch between the setup for polarization analysis mode and the setup without the analysis. We used a crane to mount and dismount the spin analyzer, and it takes almost an hour before using these elevators. The time has been reduced to five minutes, and what we only have to do is to push a button on a touch panel of controller.

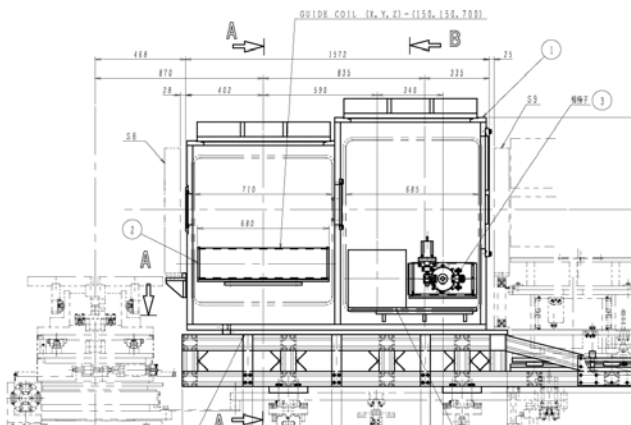


Fig.1 Crosssectional plan of the newly insralled vacuum chamber (left), and a picture taken from the down stream side (right).

(a)-2 Installation of a two-dimensional position sensitive detector

A main detector of BL17 was a ^3He tube without a spatial resolution as of the end of 2013B term. We have

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

prepared three types of two-dimensional (2D) position-sensitive detector (PSD) for a variety of advanced reflectometry such as off-specular reflection, grazing incidence small-angle neutron scattering (GISANS), the grazing incidence diffraction (GID) measurements, and so on.

The first is a multiwire proportional neutron counter (MWPC). This detector has better spatial resolution than other detectors have, a high counting-rate, and a high efficiency. The second is a 2D scintillator detector using a wavelength-shifting-fiber (WLSF) readout. The effective area is 256 mm × 256 mm, with a 4 mm × 4 mm spatial resolution. The last one is a scintillator detector based on a position-sensitive photomultiplier. The effective area is 100 mm ϕ , with a 0.5 mm × 0.5 mm spatial resolution. These detectors were tested their performance using a DAQ system of BL17, and we confirmed that all detectors have satisfactory performance as expected. Figure 2 shows a GUI panel for analysis of the 2D data obtained by the 2D-PSDs of BL17.

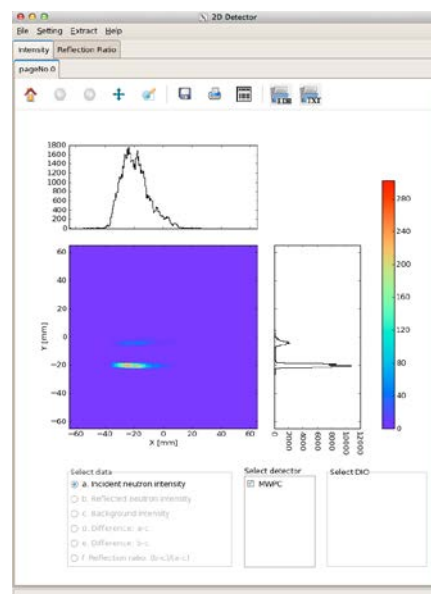


Fig. 2 Two-dimensional intensity map of an incident and a reflected neutron beam and their cross sections along two diagonal directions extracted from data taken by MWPC.

(a)-3 Improvement of sample alignment scans

Scanning time for the sample alignment has been much shortened by introduction of the TrigNET module. We would like to express our thanks to Dr. Inamura, and Dr. Nakatani for their invaluable technical assistance.

(b) significant user support work

We assisted two applicants in writing their trial use proposals.

(c) statistical summary of user experiments.

2013A(the number of proposals)

General use proposal: 7 (Completed:1, Incompleted: 3, and Canceled by MLF: 3)

Trial use proposal:1 (Canceled by MLF:1)

Strategic use proposal: 1 (Canceled by MLF:1)

Project use proposal: 2 (Canceled by MLF: 2)

AONSA School: 1 (Canceled by MLF: 1)

2013B(the number of proposals)

General use proposal: 3 (Completed:3)

Trial use proposal:1 (Completed:1)

Strategic use proposal: 1 (Completed:1)

Project use proposal: 2 (Completed: 2)

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.