

 MLF Experimental Report	提出日 Date of Report
課題番号 Project No. <p style="text-align: center;">2009A0069</p> 実験課題名 Title of experiment Neutron micrometer-scale imaging using electronic zooming tube 実験責任者名 Name of principal investigator Kazuhiko Soyama 所属 Affiliation Japan Atomic Energy Agency, J-PARC center,	装置責任者 Name of responsible person Dr. F. Maekawa 装置名 Name of Instrument/(BL No.) NOBORU /(BL10) 実施日 Date of Experiment December 11 -12, 2009

試料、実験方法、利用の結果得られた主なデータ、考察、結論等を、記述して下さい。(適宜、図表添付のこと)
 Please report your samples, experimental method and results, discussion and conclusions. Please add figures and tables for better explanation.

1. 試料 Name of sample(s) and chemical formula, or compositions including physical form.
None

2. 実験方法及び結果 (実験がうまくいかなかった場合、その理由を記述してください。) Experimental method and results. If you failed to conduct experiment as planned, please describe reasons.
(1) Experimental Method <p>The purpose of experiments is to evaluate a neutron zooming tube which has been developed for a neutron imaging detector with micrometer resolution. A prototype zooming tube used a photocathode as a neutron-photoelectron converter was tested at NOBORU (BL10).</p> <p>The system consists of the neutron zooming tube, the electron magnetic coil assembly, the CCD camera with microchannel plates (MCP) and the signal processor etc. . The photocathode is a combination with a gadolinium foil of 20 μm thickness and a CsI layer of 300 nm thickness. A neutron image entering the photocathode is converted into the photocathode image. The photocathode image is magnified using the zooming coil assembly and focused on the MCP. Observed cadmium slit which is installed in the photocathode area has an area of 2mm x 1mm and 0.5mm thickness. The magnification factor of the tube is 5, and the measurement time is 10 minutes.</p>

2. 実験方法及び結果(つづき) Experimental method and results (continued)

(2) Results of Neutron Imaging Test

Figure 2 shows a neutron output image of the cadmium slit has the area of 2mm x 1mm and 0.5mm thickness. The figure shows the system can obtain a bright output with good signal to noise ratio. The background noise has been eliminated by bending the tube and deflecting the signal photoelectron beam by means of the deflection coil .

The evaluation of space resolution was tried using an edge spread function method. But high-precision measurement could not be conducted, because fine adjustment of the sample position and control parameters could not be conducted during the user beam time.

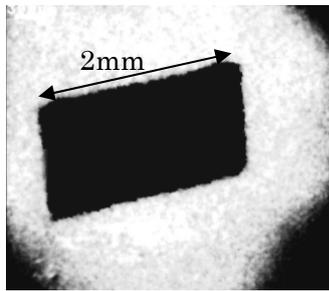


Figure 1 Neutron zooming image of cadmium slit (Magnification ratio : x 5)