MLF Experimental Report	提出日 Date of Report
課題番号 Project No. 2014B0240 実験課題名 Title of experiment Visualization of 3D local atomic structure by developing pulsed neutron holography technique 実験責任者名 Name of principal investigator Kenji Ohoyama 所属 Affiliation Ibaraki University	装置責任者 Name of responsible person K. Oikawa 装置名 Name of Instrument/(BL No.) BL10 実施日 Date of Experiment 12-DEC-1026-16-DEC-2016

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.

0.13 mol % ^{10}B doped Si single crystal

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.

We are developing white neutron holography on BL10 in J-PARC. Neutron holography is the unique method to observe local structures around small amount of light element dopants, such as B. Although the importance of the light element dopants for the functional materials, the positions and the local structural environment are not clear because normal diffraction methods is useless because of the lack of the translation symmetry in the local structure around the dopants.

Based on the strong support of the BL10 group, we already succeeded in observing the local structure around doped Eu in 1 % Eu doped CaF2, which is a typical scintillation crystal, by the white neutron holography on BL10. Based on this success, we tried to observe local structures around B in 0.13mol% B doped Si single crystal. Since the γ-ray intensity is measured in the holography experiments, we replaced natural B with ^{10}B to enhance γ-ray intensity. The experimental condition is simple, which consists with a BGO γ-ray counter, and dual axes (ϕ-ω) goniometer. The sample is rotated from 20°< ω<160°, and 0°< ϕ<360°. Consequently,angular dependence of the γ-ray intensity gives holograms.

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

From the holograms, we succeeded in visualizing the atomic images around B in Si. This is the very first data in the world which provide the information on the B position in Si single crystal.