

実験報告書様式(一般利用課題・成果公開利用)

(※本報告書は英語で記述してください。ただし、産業利用課題として採択されている方は日本語で記述していただいても結構です。)

 	承認日 Date of Approval 2016/11/11 承認者 Approver Ryoichi Kajimoto 提出日 Date of Report 2016/11/11
課題番号 Project No. 2015A0174 実験課題名 Title of experiment Spin current on garnet ferrite Y3Fe5O12 induced by temperature gradient 実験責任者名 Name of principal investigator Shinichi Shamoto 所属 Affiliation Japan Atomic Energy Agency	装置責任者 Name of Instrument scientist Ryoichi Kajimoto 装置名 Name of Instrument/(BL No.) 4SEASONS (BL01) 実施日 Date of Experiment 2016/11/4-7

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.  Y <sub>3</sub> Fe <sub>5</sub> O <sub>12</sub> (YIG) single crystal rod
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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.  Temperature gradient was applied to YIG rod up to 3K/mm along [111] axis under magnetic field of about 0.1 T. Under this magnetic field, the magnetic domain walls are removed fully in this soft ferromagnet of YIG crystal. The gradient changed the intensity distribution of YIG spin wave at about 4 meV at (220) as shown in Fig. 1 and 2. The uniform spin wave intensity is modified by the temperature gradient, resulting in non-uniform intensity around (220). This change can be attributed to the spin current flow from high-T side to low-T side. This inelastic neutron scattering measurement gives us a chance to estimate spin current physics qualitatively from the Q-dependence of spin wave populations.
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## 2. 実験方法及び結果(つづき) Experimental method and results (continued)

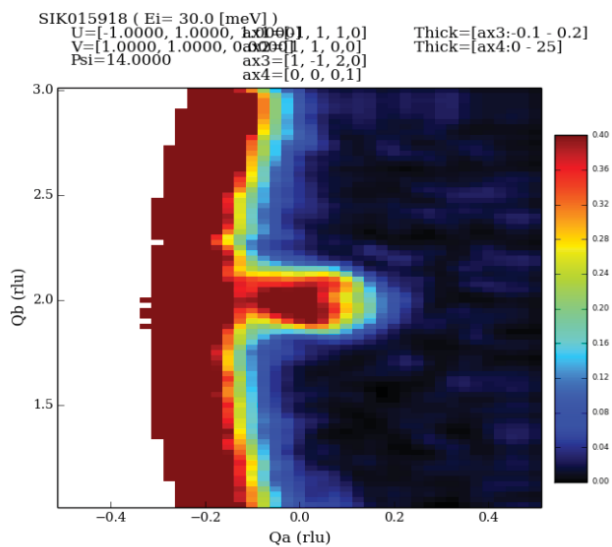


Fig. 1. Low energy spin wave ( $\sim 4$  meV) of YIG under a small temperature gradient condition. The temperature of low-T end is 22.5 K, whereas the other temperature of high-T end is 31.2 K.

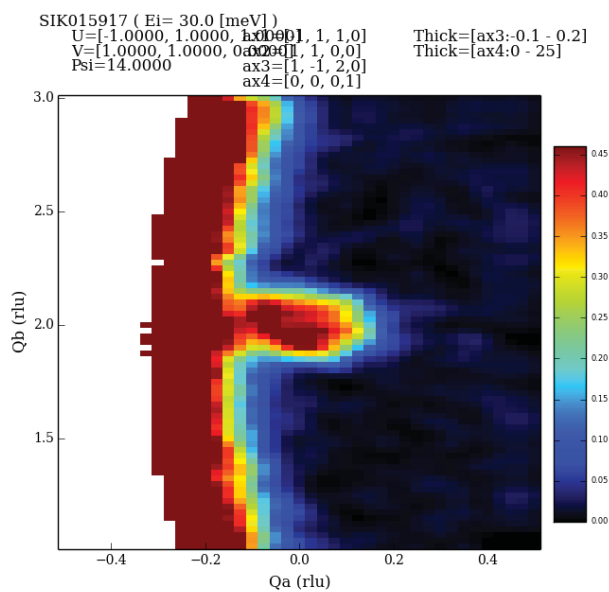


Fig. 2. Low energy spin wave ( $\sim 4$  meV) of YIG under a large temperature gradient condition along the vertical direction. The temperature of low-T end is 8.6 K, whereas the other temperature of high-T end is 45.0 K.