

(※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。)

	提出日 Date of Report 2012/12/19
課題番号 Project No. 2012A0103 実験課題名 Title of experiment “Comparison between superconducting volume fraction and low energy spin excitation intensity on single crystal $\text{FeTe}_{1-x}\text{Se}_x$ ” 実験責任者名 Name of principal investigator Shin-ichi Shamoto 所属 Affiliation Japan Atomic Energy Agency	装置責任者 Name of responsible person Ryoichi Kajimoto 装置名 Name of Instrument/(BL No.) BL01 実施日時 Date and time of Experiment 2012/11/3 11:00 ~ 2012/11/8 11:00

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.
Measured single crystal samples are $\text{Fe}_{1.05}\text{Te}_{0.7}\text{Se}_{0.3}$ (~8g) with $T_c=14\text{K}$ , 10% superconducting volume fraction, and $\text{Fe}_{1.05}\text{Te}_{0.7}\text{Se}_{0.3}$ (~8g) with $T_c=14\text{K}$ , 40% superconducting volume fraction.

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.
Experimental conditions: c-axis of all the crystals is aligned along the beam direction to observe (hk0)-plane. Experimental conditions are optimized at $E_i=45$ meV, which are typical and standard ones at BL01. Measured temperatures are 5-6 and 20 K for both samples.  Experimental results: We have measured two samples of $\text{Fe}_{1.05}(\text{Te}_{0.7}\text{Se}_{0.3})$ with partially superconducting shielding volume fraction (10% and 40%) samples. In general, non-superconducting sample shows spin excitation at $(\pi, 0)$ position. Conversely, superconducting sample shows spin excitation at $(\pi, \pi)$ position, which is called spin resonance. Our purpose of the study is to observe the evolution of the spin excitation with the superconducting shielding volume fraction change. But, in this experiment, we cannot observe clear q-position shift of the spin excitation. Spin excitation is observed at $(\pi, 0)$ position for two samples. Spin resonance at $(\pi, \pi)$ should be observed in the superconducting sample of $\text{Fe}_{1.05}(\text{Te}_{0.7}\text{Se}_{0.3})$ . Accordingly, more superconducting volume fraction sample is needed to observe the spin resonance. If the spin

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

resonance at  $(\pi, \pi)$  is true, it is new observation. So we have to measure another sample with more superconducting shielding volume fractions such as 65% and 100%.