



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。)

 Experimental Report 	承認日 Date of Approval 2015/2/23 承認者 Approver Kajimoto Ryoichi 提出日 Date of Report 2015/2/21
課題番号 Project No. 2014A0316 実験課題名 Title of experiment: Understanding of strain effects on superconductivity in practical composite Nb ₃ Sn wires by the phonon density of states measurement. 実験責任者名 Name of principal investigator 淡路 智 所属 Affiliation 東北大学	装置責任者 Name of Instrument scientist 梶本亮一 装置名 Name of Instrument/(BL No.) BL-01 4 次元空間中性子探査装置 実施日 Date of Experiment 2014/05/30 – 2014/06/03

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.
(Nb,Ti) ₃ Sn filaments

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.
<p>The phonon dispersion of Nb₃Sn filaments, which were taken from the practical CuNb/ Nb₃Sn wires, was measured by an inelastic neutron diffraction at the BL01 four seasons. The experiments were performed at room temperature and 6 K. The Nb₃Sn filaments were put into an aluminum foil cylinder. The sample cylinder was mounted to the cold stage of the GM-cryocooler. Total experimental time at 6 K was 36 hours to get enough intensity. Figure 1 shows the obtained phonon dispersion data at 6 K. Two broad peaks were observed at 17 and 23 meV. The broadening of the dispersion is due to the distribution of Sn content in Nb₃Sn filaments, which is significant for the bronze route Nb₃Sn wires. The 1st principle calculation of the phonon dispersion shows the off-stoichiometry of Nb₃Sn influences the phonon dispersion spectra. In addition, it is well known that the critical temperature and upper critical field also changes depending on the Sn contents. Now we are analyzing the obtained data under the collaboration with the ENEA in Italy, which performs the 1st principle calculation. In addition, the inelastic neutron study on the phonon dispersion of stoichiometric Nb₃Sn filaments</p>

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

of the powder-in-tube or internal Sn processed wires will be planned. In order to clarify the strain effects on superconductivity in practical composite Nb_3Sn wires, we need more data of the phonon dispersion.

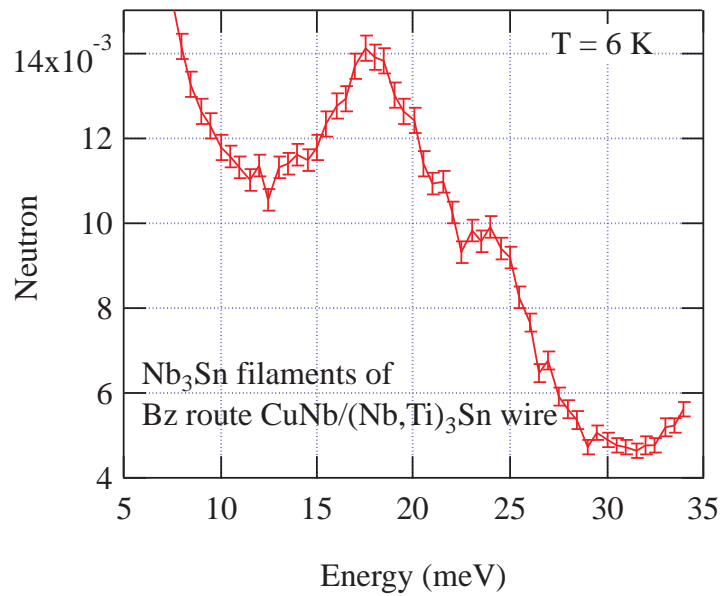


Fig.1 Phonon dispersion of Nb_3Sn filaments at 6K