


(※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。)

 MLF Experimental Report	提出日 Date of Report 16/08/23
課題番号 Project No. 2014B0335 実験課題名 Title of experiment Dirac Dispersion in the Shastry-Sutherland compound Sr ₂ Cu(BO ₃) ₂ 実験責任者名 Name of principal investigator RONNOW Henrik 所属 Affiliation ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE EPFL	装置責任者 Name of responsible person Kawamura Seiko 装置名 Name of Instrument/(BL No.) BL-14 Cold-neutron disk-chopper spectrometer (AMATERAS) 実施日 Date of Experiment 2015/03/24 ~ 2015/04/01

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. SrCu ₂ (BO ₂) ₂ with 99% ¹¹ B-isotope 3000mg single crystal on Aluminium mount
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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. <p>The sample was inserted in the 15T ISSP magnet and cooled to 1.5K. After checking the alignment with the white beam, we found out that (100) is in scattering plane with ~+2 degrees and (010) with ~-2 degrees.</p> <p>The choppers were tuned to CH01 (pulse shaping chopper) open, CH02 300 Hz and CH03 150 Hz with incident energy $E_i=3.9$ meV. Additional obtained $E_i=11.04$ and 1.87 meV. We then optimized the incident energy in order to get a spurious-free magnetic signal for the single-triplet mode around 3 meV ; which was for $E_i=4.2$meV (see Figure 1 for the magnon mode of interest).</p> <p>We then applied a vertical magnetic field of 1.4T (critical field for magnon dispersion) and did measurements with Psi rotation in order to cover a large part of reciprocal space (see Figure 2 top left panel for the Q-coverage of the magnon mode in 1.4 T field).</p>

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

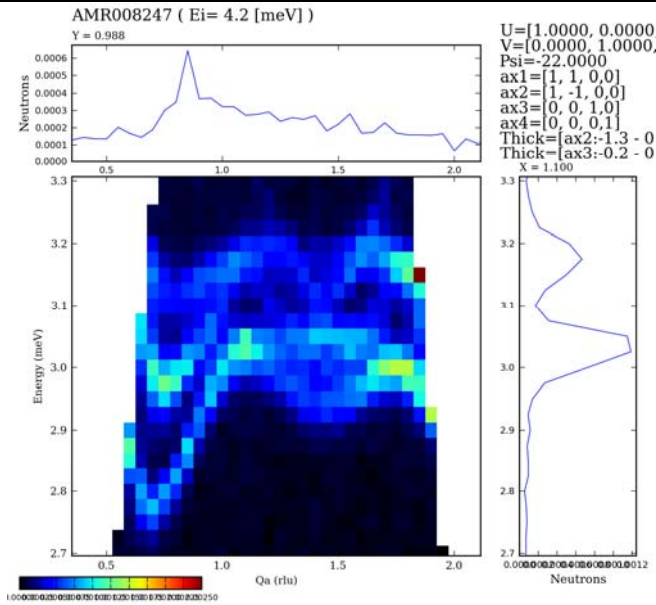


Figure 1 : 0T single triplet mode for $E_i=4.2$ meV

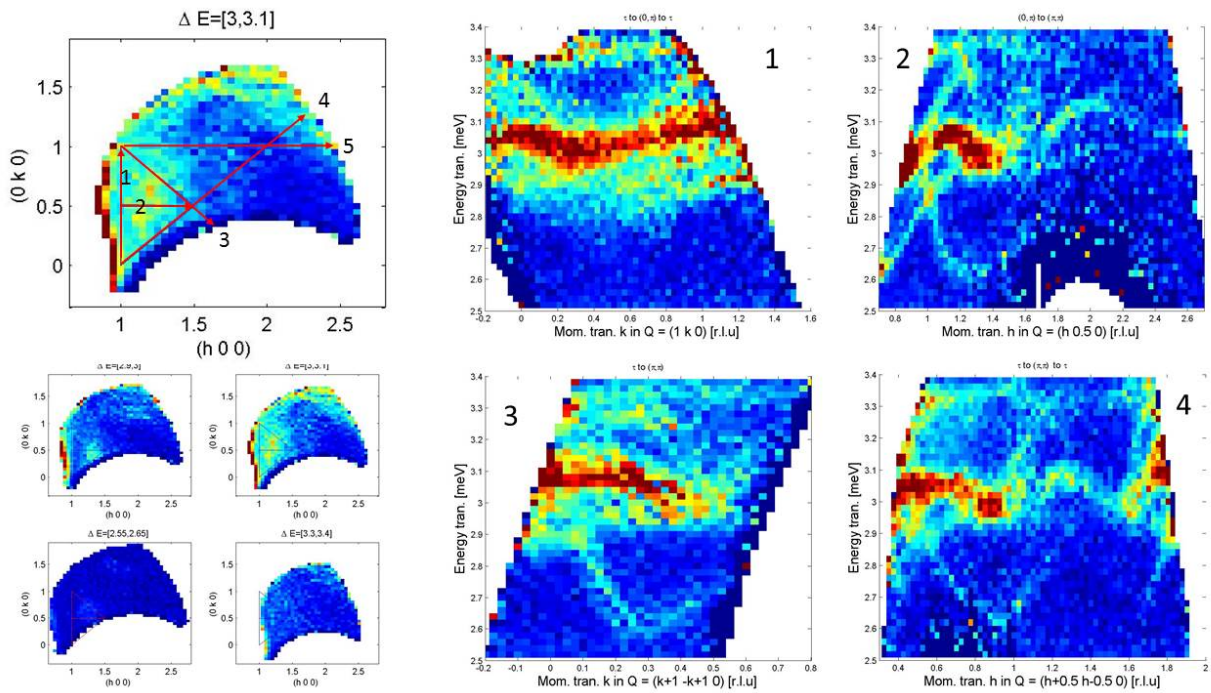


Figure 2 : Left (top and bottom) : Q-coverage for different energy transfers around 3 meV. Right (1:4) Energy slices showing the dispersion of the single triplet mode at 1.4T along directions 1:4 shown in top left panel.

As shown by figure 2, The single triplet mode could be measured at the critical field of 1.4T around the Q-points of interests, and have been further analyzed in order to compare with the theoretical model.