実験報告書様式（緊急課題）

（ ※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。 ）

CROSS TOKAI **Experimental Report** J-PARC	承認日 Date of Approval 4/18/2014 承認者 Approver Ryoichi Kajimoto 提出日 Date of Report; April 17, 2014
課題番号 Project No. 2013A0002(U) 実験課題名 Title of experiment Neutron-scattering research on element-strategy project for electronic materials 実験責任者名 Name of principal investigator Youichi Murakami 所属 Affiliation Institute of Materials Structure Science, KEK	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 5/10 17:00-5/13 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.

Name of sample: Deuterium-doped lanthanum iron pnictide.

Chemical formula: $LaFeAsO_{0.65}D_{0.35}$.

Form of shape: Powder (wrapped in an Al foil with cylindrical shape, ϕ16 × 40 mm).

Quantity: 30 g.

Physical property: Superconducting-transition temperature, T_c = 34 K.

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.

Instrumental configuration of 4SEASONS

Chopper speed; 150 Hz.

Multi E_i; 280.4, 45.0, 17.6, 9.3, and 5.7 meV.

MLF beam power; 300 kW.

Temperature; 10, 20, 30, 35, 40, 45, 50, 60 and 80 K.

Results

Figure 1 shows energy profiles at Q = 2.3 Å^{-1} measured from at 10 K well below T_c to 60 K above T_c, in which each data point represents the value integrated in Q over 2.25-2.35 Å^{-1}. In addition to a peak at 11 meV, a gap-like structure appears significantly below 5 meV below 30 K. The 11-meV peak intensity begins to increase below around T_c, as shown in the inset of Fig. 1.

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

We infer that the gap-like feature below 5 meV and the intensity enhancement at 11 meV are closely coupled and possibly related to the emergence of superconductivity.

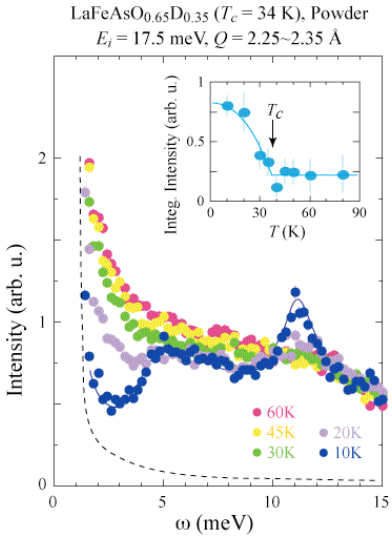

Fig. 1. Temperature variation of energy spectra at Q = 2.25-2.35 Å^{-1}. The inset shows thermal evolution of 11-meV peak.