MLF Experimental Report	提出日 Date of Report
課題番号 Project No. 2013A0041 実験課題名 Title of experiment Coexistence and Competition of Magnetism and Superconductivity in NaFe1-xCoxAs 実験責任者名 Name of principal investigator Lei Shu 所属 Affiliation: Physics Department Fudan University	装置責任者 Name of responsible person Lei Shu 装置名 Name of Instrument/（BL No.） D1 実施日 Date of Experiment 2013/05/22-24

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.

$NaFe_{1-x}Co_xAs$ x=0.015

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.

The single crystals of $NaFe_{1-x}Co_xAs$ x=0.015 are very sensitive to the air. The samples were sealed in vacuum bottle and delivered from University of Tennessee, Knoxvil to J-PARC directly. We mounted the samples in to a sample cell made by titanium in a glove box at CROSS. The sample cell were then loaded onto muon instrument D1 at MLF. Zero-field (ZF) and transverse-field (TF) muSR experiments have been performed to study whether antiferromagnetic order coexist with superconductivity and to give information of the superconducting pairing symmetry.

ZF-muSR data can be described by the equation$A(t) = A_1 \cos(2\pi\nu t)\, e^{-\frac{1}{2}\sigma^2 t^2} + A_2 e^{-\lambda t} + A_{bg}$.

Figure 1and Figure 2 show the temperature dependence of the frequency ν and asymmetry A_1 and A_2. It look like there is a transition in the “magnetic” fraction between 25 and 30 K..

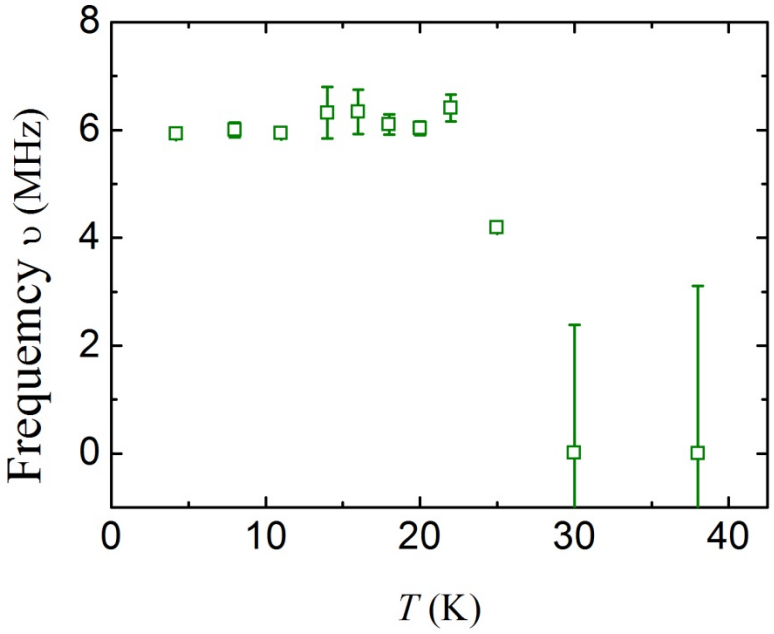

Figure 1

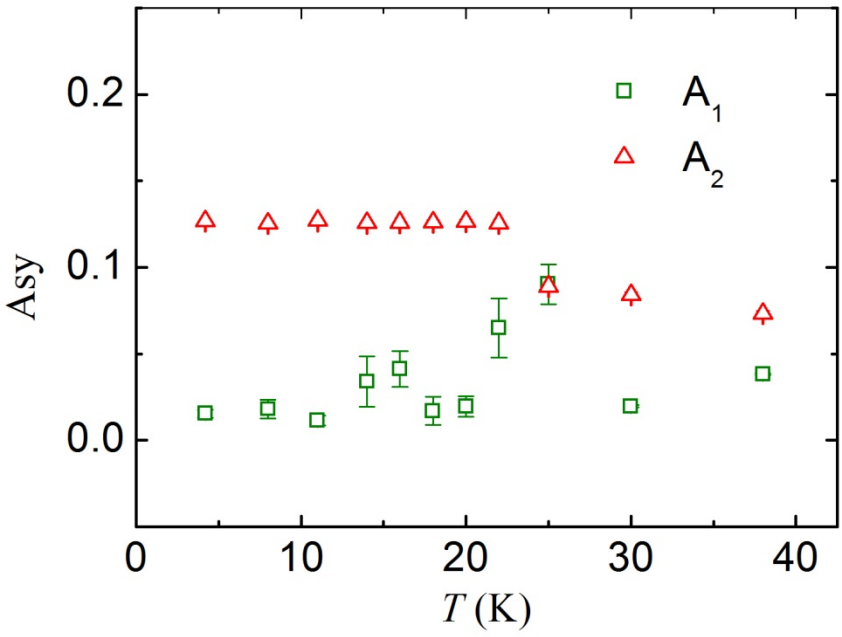

Figure 2

For the TF-muSR data, there is not much temperature dependence, probably due to the fact that the magnetic order overlap with the vortex lines.