

Experimental Report

02/10/2013

Proposal:	4-01-1203	Council:	4/2012
Title:	Spin Anisotropy in NaFe0.95Co0.05As		
This proposal is a new proposal			
Research Area:	Physics		

Main proposer:	SONG Yu
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Experimental Team:	SONG Yu
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Local Contact:	ENDERLE Mechthild KULDA Jiri
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Samples:	NaFe0.95Co0.05As
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Instrument	Req. Days	All. Days	From	To
IN20	7	7	06/11/2012	13/11/2012
IN3	0	1		

Abstract: Previous polarisation measurements on 122 family of pnictide superconductors revealed spin anisotropy in its excitations, which also had electron/hole doping dependence. Recently we have found well defined resonance in 111 family compound NaFe0.95Co0.05As, we propose to measure what the anisotropy is like in this system.
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Spin Isotropy in overdoped $\text{NaFe}_{0.95}\text{Co}_{0.05}\text{As}$

We have carried out polarized neutron scattering experiment on overdoped $\text{NaFe}_{0.95}\text{Co}_{0.05}\text{As}$ with $T_c=18\text{K}$. Our results indicate magnetic excitations in overdoped $\text{NaFe}_{0.95}\text{Co}_{0.05}\text{As}$ are isotropic/weakly anisotropic with respect to different polarizations, both in the superconducting and the normal state. Our results is consistent with earlier work on overdoped $\text{BaFe}_{1.9}\text{Co}_{0.1}\text{As}_2$ [1], further given the significant spectral weight of the resonance mode, we conclude that the resonance mode is also isotropic/weakly anisotropic in spin space.

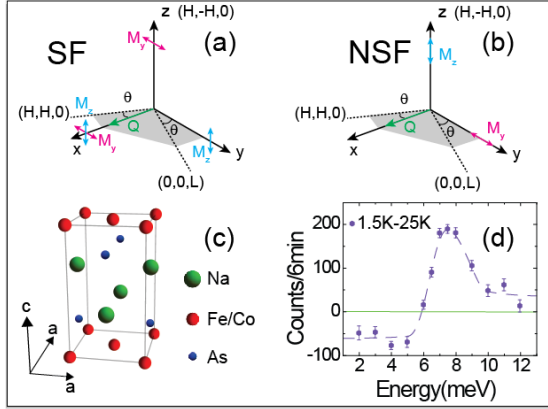


Fig. 1

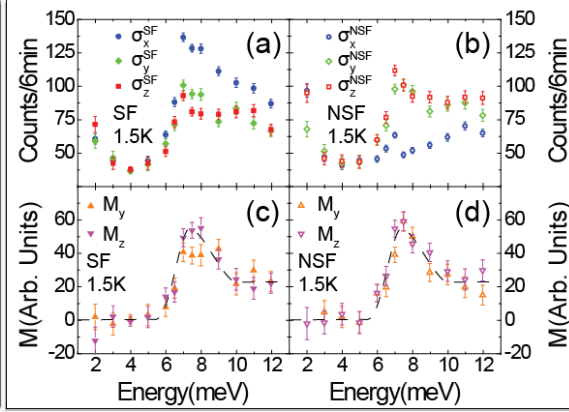


Fig.2

Fig.1 (a) and (b) shows the scattering geometry we have employed, we have measured both the spin-flip (SF) and non-spin-flip (NSF) channels. Fig.1 (c) shows the unit cell of Na(Fe,Co)As and a simulated unpolarized neutron scattering data is shown in Fig. 1 (d) obtained by combining our polarized data, it is consistent with our earlier report with unpolarized neutron scattering [2]. Fig. 2 (a) and (b) shows our raw data collected in the superconducting for both SF and NSF channels, Fig. 2 (c) and (d) shows the magnetic response along y and z directions as shown in Fig. 1 (a) and (b). The results in the two channels are consistent within error and demonstrate isotropic or weakly anisotropic scattering in the superconducting state.

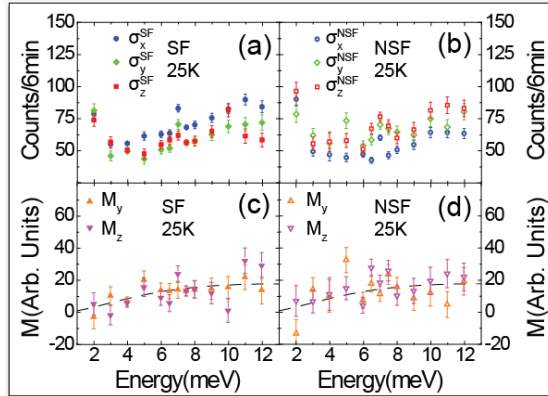


Fig. 3

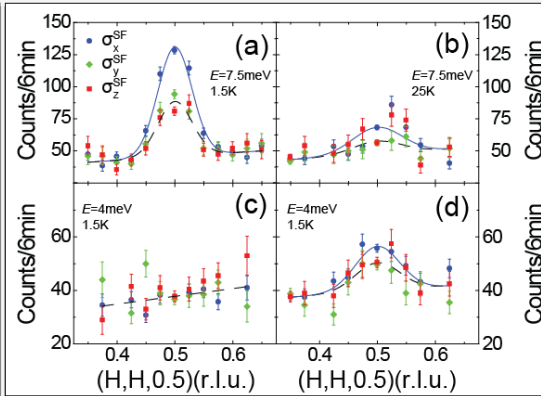


Fig. 4

Fig. 3 is shows similar data as in Fig. 2 but in the normal state, again we see isotropic scattering in data obtained in both SF and NSF channels. Fig. 4 shows some constant-E scans in both superconducting and normal states at typical energies.

[1] M. Liu et al., Phys. Rev. B 85, 214516 (2012)

[2] C. Zhang et al., Phys. Rev. B 88, 064504 (2013)