Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Out-of-plane nesting of spin spiral in ultrathin Fe/Cu(001) films revealed by SX-ARPES[1] JUN MIYAWAKI, ASHISH CHAINANI, YASUTAKA TAKATA, MATTIA MULAZZI, MASAKI OURA, RIKEN/SPring-8, YASUNORI SENBA, HARUHIKO OHASHI, JASRI/SPring-8, SHIK SHIN, RIKEN/SPring-8, ISSP Univ. Tokyo — We investigate the origin of the spin spiral (SS) state in epitaxial ultrathin Fe films on Cu(001) using soft x-ray (SX)-ARPES. Fe/Cu(001) films exhibit a SS, in contrast to the ferromagnetic bulk bcc Fe. We study the in-plane and out-of-plane Fermi surfaces (FSs) of the SS in 8 monolayer Fe/Cu(001) films. It was found that the SS is due to nested regions confined to out-of-plane FSs, which are drastically modified compared to in-plane FSs. From precise reciprocal space maps along k_z in successive Brillouin zones, we identify the associated real space compressive strain of 1.5±0.5% along c-axis. An autocorrelation analysis quantified the incommensurate ordering vector $\mathbf{q}$=$(2\pi/a)$ (0,0,∼0.86), favoring a SS. These results are consistent with magneto-optic Kerr effect [1] and surface x-ray diffraction experiments [2] on the Fe/Cu(001) films, and suggest the importance of in-plane and out-of-plane FS mapping for ultrathin films. [1] D. Qian, *et al.*, Phys. Rev. Lett. **87**, 227204 (2001). [2] H. L. Meyerheim, *et al.*, Phys. Rev. B **71**, 035409 (2005).

[1]The present work has been performed under the approval of RIKEN (Proposal No. 20080050).

Jun Miyawaki
RIKEN/SPring-8

Date submitted: 24 Nov 2009 Electronic form version 1.4