Canted spin moment at the ferromagnetic Ni / antiferromagnetic FeMn interface revealed by the depth-resolved X-ray magnetic circular dichroism and polarized neutron reflectivity

K. Amemiya[1#], M. Sakamaki[1], M. Mizusawa[2], and M. Takeda[3]

[1] *Photon Factory and Condensed Matter Research Center, Institute of Materials Structure Science, High Energy Accelerator Research Organization, Tsukuba, Ibaraki 305-0801, Japan*

[2] *Research Center for Neutron Science and Technology, Comprehensive Research Organization for Science and Society, Tokai, Ibaraki 319-1106, Japan*

[3] *Quantum Beam Science Center, Japan Atomic Energy Agency, Tokai, Ibaraki 319-1195, Japan*

 # a corresponding author: E-mail kenta.amemiya@kek.jp

An anomalous magnetic structure in Ni ultrathin films around the interface to antiferromagnetic FeMn is revealed by a combination of the depth-resolved x-ray magnetic circular dichroism (XMCD) and the polarized neutron reflectivity (PNR) techniques [1]. The depth-resolved XMCD data shows that the perpendicular component of the Ni film decreases around the interface to FeMn compared to the inner part of the film, when the film exhibits perpendicular magnetization. On the other hand, the in-plane component is kept constant through the whole film in the case of in-plane magnetization. Moreover, the PNR data under a weak in-plane magnetic field for a perpendicularly magnetized film reveals an in-plane magnetic component in Ni, which is larger at the interface to FeMn than that in the inner part. These results consistently suggest that the Ni spin moment is canted to the in-plane direction around the interface to FeMn. The magnetic field dependence of the interface magnetic structure will be also discussed.

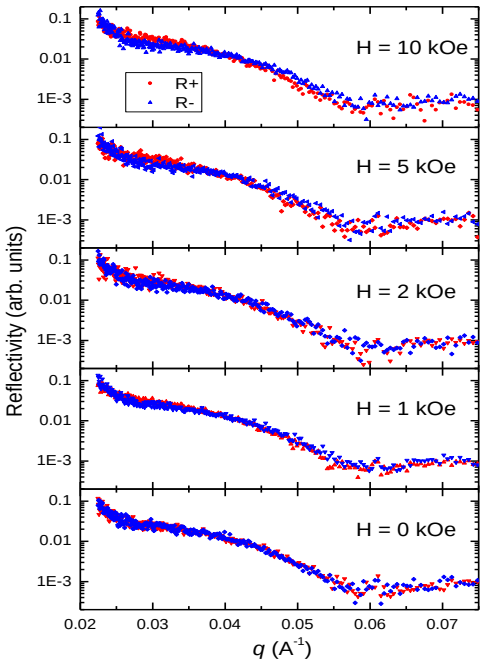

Fig. 1 PNR curves for Cu(74 ML) / FeMn(21ML) / Ni(11ML) / Cu(100) measured at different magnetic fields, H.

Reference

[1] K. Amemiya *et al.*, Phys. Rev. B **89**, 054404 (2014).