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Antiferromagnetic Spin Reorientation Transition induced by the coupling at NiO/CoO interface JIE ZHU, QIAN LI, JUNXUE LI, ZHAO DING, JIANHUI LIANG, XIA XIAO, YIZHENG WU, Department of Physics, Fudan University, Shanghai 200433, People's Republic of China, C.Y. HUA, M.J. HUANG, H.-J LIN, National Synchrotron Radiation Research Center, Hsinchu 30077, Taiwan, Republic of China, DEPARTMENT OF PHYSICS, FUDAN UNIVERSITY COLLABORATION, NATIONAL SYNCHROTRON RADIATION RESEARCH CENTER COLLABORATION — Manipulating the antiferromagnetic (AFM) spin orientation is important for spitronic researches. But AFM spin-reorientation transition (SRT) can be realized only through limited mechanisms. In this contribution, we realized an in-plane to out-of-plane AFM SRT in NiO/CoO/MgO(001) system through a new mechanism, i.e., the exchange coupling between AFM spins. NiO and CoO spin orientations were determined by X-ray magnetic linear dichroism (XMLD) measurements. The CoO spin was fixed in-plane below Nel temperature (T_N), while the NiO spin undergoes an in-plane to out-of-plane SRT above a critical NiO thickness. The SRT is attributed to the competition between NiO out-of-plane anisotropy from expansive strain and in-plane anisotropy from interfacial coupling with CoO spin. The SRT was influenced by CoO AFM ordering modulated by temperature, CoO thickness and interfacial coupling strength tuned by the thickness of MgO layer inserted between NiO and CoO. Besides, temperature-dependent XMLD measurement indicated a rise of CoO T_N by 80K with the proximity effect from NiO. Our experimental results can be further understood by Monte Carlo simulations.

Yizheng Wu
Department of Physics, Fudan University, Shanghai 200433,
People's Republic of China

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