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Interlayer coupling in Co/NiO/Fe trilayers studied by element-specific XMCD and XMLD effects

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Authors

Wu, J.
Choi, J.
Won, C.
[et al.](#)

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Abstract Submitted
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Interlayer coupling in Co/NiO/Fe trilayers studied by element-specific XMCD and XMLD effects J. WU, J. CHOI, Dept. of Physics, Univ. of California at Berkeley, Berkeley, CA 94720, C. WON, Dept. of Physics, Kyung Hee Univ., Seoul 130-701, Korea, A. SCHOLL, A. DORAN, E. ARENHOLZ, Advanced Light Source, Lawrence Berkeley National Laboratory, Berkeley, CA 94720, Y.Z. WU, X.F. JIN, Dept. of Physics, Fudan Univ., Shanghai 200433, P. R. China, Z.Q. QIU, Dept. of Physics, Univ. of California at Berkeley, Berkeley, CA 94720 — Co/NiO/Fe trilayers are grown on Ag(001) substrate using Molecular Beam Epitaxy (MBE). Element-specific magnetic domain images on both ferromagnetic (FM) Co and Fe layers and antiferromagnetic NiO layer are obtained using X-ray Magnetic Circular Dichroism (XMCD) and X-ray Linear Dichroism (XMLD), respectively. By comparing these magnetic domain images, we find that the Co-Fe interlayer coupling across the NiO spacer layer exhibits a transition from a 90° -coupling to a collinear coupling as the NiO film thickness increases. This observation is shown to be directly related to the NiO magnetic structure and its interaction at the Co/NiO and NiO/Fe interfaces.

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Z. Q. Qiu
qiu@socrates.berkeley.edu
Dept. of Physics, Univ. of California at Berkeley

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