Magnetic Capping Layer Induced Spin Reorientation: Multi-domain or Spin Canting?

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Spin reorientation phase transformations can occur by continuous processes, such as spin canting, or by abrupt spin rotations. The continuity of a spin reorientation provides important information on the order of a phase transformation. We investigate the spin reorientation of ultrathin Fe/Cu(100) films induced by Co capping layers by magneto-optical Kerr effect. The spin axis reorients from the perpendicular to the in-plane direction when the Co thickness exceeds some critical value. In the transition thickness regime, we have measured the ratio of remanent to saturation magnetization in both the perpendicular and the in-plane directions. Experimental evidence indicates that in this system, the reorientation involves the formation of multidomains, which implies that the phase transformation is of first order. Magnetization curves that were recorded with applied field canted with respect to the surface normal also support this conclusion.

ORNL is managed by LMER Corp. for US DOE under contract No. DE-AC05-96OR22464.