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Tunable exchange length in laminate exchange coupled composite media B.J. KIRBY, National Institute of Standards and Technology, HAO-CHENG HOU, CHIH-HUANG LAI, National Tsing Hua University, Taiwan — Exchange coupled composites - with a hard layer (HL) to anchor against thermal instabilities, and a soft layer (SL) to assist magnetization reversal - have been proposed for advanced recording applications. The reversal assist relies on a non-coherent rotation between the HL and SL, - the exchange-spring (ES) - in which the interfacial domain wall traverses the hard/soft interface, and promotes switching. Typically, the soft region is a single layer, with the emergent composite properties mainly determined by the choice of soft material. We are pursuing a more sophisticated approach, using a hard CoPtCr-SiO2 layer adjacent to a multilayer of the same material, [CoPtCr-SiO2/Pt]N, softened by lamination with Pt layers. Simulations predict that when the SL thickness exceeds a critical exchange length, a significant portion should decouple from the HL, becoming a domain wall nucleation site. Thus, ES behavior should be tunable via the Pt thickness. To test this, we have used polarized neutron reflectometry to measure the field-dependent magnetic depth profiles - and directly characterize ES formation - for a series of samples with varying Pt laminate thickness. The experimentally determined relationship between laminate thickness and ES formation will be discussed.

[X] Prefer Oral Session
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