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Spin structure of NiFe/FeMn/NiFe trilayers A.M. ALSMADI, Physics Department, Hashemite University, 13115 Zarqa, Jordan and Intense Pulse Neutron Source, Argonne National Laboratoy, Argonne IL 60439 , S.G.E. TE VELTHUIS , G.P. FELCHER , Material Science Division, Argonne National Laboratory, Argonne, IL 60439, H.G. YOON, C.G. KIM, Department of Material Science and Engineering, Chungnam National University, Daejon 305-764, South Korea —
Using polarized neutron reflectometry we studied the layer-by-layer spin structure of NiFe(t)/FeMn(15nm)/NiFe(5nm) trilayers with, t = 3.8, and 12 nm in. For both samples the hysteresis curves show two clearly separated loops, each corresponding to the magnetization reversal of one of the two NiFe layers. For the first sample of t = 3.8 nm the neutrons were reflected without undergoing a spin inversion, indicating that at all fields the magnetization of both NiFe layers are either parallel or antiparallel to the field. However for the second sample of t = 12 nm, at the field where the magnetization of the top NiFe layer starts being hysteretical, the presence of non-zero neutron spin-flip reflectivities signals that some component of the magnetization is perpendicular to the applied field at some depth in the film. The data are consistent with a magnetic configuration where the NiFe layer magnetizations are canted with respect to each other. The polarized neutron results are discussed in terms of the detail FM/AF/FM interactions.

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