Abstract Submitted
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Cooling Field Dependence of Magnetization Depth Profiles in Exchange-coupled Superlattices[1] MICHAEL FITZSIMMONS, Los Alamos National Laboratory, KARINE DUMESNIL, CATHERINE DUFOUR, Laboratoire de Physique des Materiaux, Universite Henri Poincare Nancy, France — In $DyFe_2/YFe_2$ superlattices, competition between ferromagnetic exchange coupling of adjacent Fe spins and antiferromagnetic coupling of Fe spins with rare earth spins leads to an antiparallel arrangement (confirmed with XMCD and neutron scattering) of magnetization across the $DyFe_2/YFe_2$ interfaces in low fields at 300 K. After cooling this simple structure to 12 K, the $DyFe_2$ magnetization becomes pinned and the sample exhibits very large exchange bias ($\sim$2 T) and a large (35%) negative shift of the sample magnetization along the magnetization axis. However, when a large magnetic field is applied at room temperature, the magnetization adopts a spin-flop configuration across the $DyFe_2/YFe_2$ interfaces (confirmed with XMCD and neutron scattering). When cooled in a large field, the sample yields neither exchange bias nor a shift of the sample magnetization along the magnetization axis.

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