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Thermal Fluctuation and Finite- Temperature Performance of Hard-Soft Composite Magnets[1] ALEXANDER BELEMUK, S.T. CHUI, University of Delaware — The demagnetization behavior of exchange-coupled hard/soft magnets was studied by finite temperature Monte Carlo simulation. Hard phase cube inclusions ($Nd_2Fe_{14}B$, $SmCo_5$ and $Sm_2Fe_{17}N_3$) into a soft matrix (FeCo) and hard/soft multilayer structure were studied. The easy axis of the hard and soft phase and the initial magnetization are parallel to the applied field. We found significant thermal fluctuations and lowering of the remnant magnetization with increasing soft magnet content than is anticipated from zero-temperature models, especially at higher temperatures. This greatly diminishes the expected performances of composites. For cube inclusions there is a boundary mismatch of the magnetization on the hard/soft interface. We investigated this mismatch as function of the soft phase content and temperature. The spin wave spectrum due to the mismatched dipolar interaction will be discussed.

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