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In-situ magnetizing interlayer exchange coupled ferromagnetic discs with pinning exchange bias SHENG ZHANG, CHARUDATTA PHATAK, AMANDA PETFORD-LONG, Nanoscience and Technology Division, Argonne National Laboratory, 9700 S. Cass Avenue, Argonne, IL 60439, OLLE HEINONEN, Material Science Division, Argonne National Laboratory, 9700 S. Cass Avenue, Argonne, IL 60439 — Multilayer structures consisting of both interlayer exchange coupling between two ferromagnetic layers separated by a nonmagnetic spacer and exchange bias from an antiferromagnetic layer on top were patterned into 1 micron diameter discs using focused ion beam lithography. The initial domains of the top ferromagnetic film set a linear exchange bias in the adjacent antiferromagnetic layer, causing a bias at the nucleation field of vortex structures in the in-situ magnetization experiments using Lorentz TEM when applying magnetic field in the positive and negative directions. We also observe unexpected vortex core shifting at some specific field during the in-situ magnetization experiment, possibly due to local pinning site and magnetization reversal of the pinned ferromagnetic disc layer. Micromagnetic simulations were performed to understand the magnetization reversal behavior on both ferromagnetic disc layers.

Sheng Zhang
Argonne National Laboratory

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