Abstract Submitted
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Synthesizing Skyrmion Molecules in Fe-Gd Thin Films[1] J. C. T LEE, Materials Sciences Division, Lawrence Berkeley National Laboratory, J. CHESS, Dept. of Physics, University of Oregon, Eugene, S. A. MONTOYA, Center for Magnetic Recording Research, UC San Diego, X. W. SHI, Dept. of Physics, University of Oregon, Eugene, NOBUMICHI TAMURA, S. K. MISHRA, Advanced Light Source, LBNL, D. H. PARKS, Dept. of Physics, University of Oregon, Eugene, P. FISCHER, MSD, LBNL; and Dept. of Physics, UC Santa Cruz, B. MCMORRAN, Dept. of Physics, University of Oregon, Eugene, S. K. SINHA, Dept. of Physics, UC San Diego, E. FULLERTON, Center for Magnetic Recording Research, UC San Diego, S. D. KEVAN, Dept. of Physics, University of Oregon, Eugene; ALS and MSD, LBNL, S. ROY, Advanced Light Source, LBNL — Controlled creation of tunable skyrmion phases at room temperature holds the promise of advanced spintronics applications using these topological entities. By varying the composition and thickness of an amorphous Fe-Gd thin film and optimizing the applied field protocol, we produced at room temperature an ordered, achiral phase of skyrmion molecules, that is, bound pairs of magnetic skyrmions having the same polarity but opposite helicity. This phase appears between stripe and uniform magnetization phase and its origin lies in the existence of mirror planes in the stripe domain structure. Dipolar, exchange, and anisotropy forces are the dominant interactions in these materials, while the role of bulk and surface chiral exchange interactions is small.

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