

Topological barrier for skyrmion lattice formation in MnSi

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We report the observation of a topological skyrmion energy barrier through a hysteresis of the skyrmion lattice in the prototypical helimagnet MnSi. Measurements of the energy barrier were made using small-angle neutron scattering and a bespoke DC field coil to allow for high-precision hysteresis loops. Data has been analyzed using an adapted Preisach model to quantify the energy barrier for skyrmion formation and the magnetic behavior of the sample as a whole. This analysis was then compared with minimum-energy path analysis based on atomistic spin simulations to verify the topological nature of the barrier. This reveals that the skyrmion lattice in MnSi forms with an activation barrier of several eV and in domains that are several hundred skyrmions in size.

Level of Expertise

Student

Speakers Gender

Male

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No

Primary authors: LEISHMAN, Allan (Department of Physics, University of Notre Dame); MENEZES, Raí (Department of Physics, University of Antwerp); LONGBONS, Grace (Department of Physics, University of Notre Dame); Dr BAUER, Eric (Los Alamos National Laboratory); Dr JANOSCHEK, Marc (Laboratory for Neutron and Muon Instrumentation, Paul Scherrer Institute); Dr HONECKER, Dirk (Institut Laue-Langevin); Dr DEBEER-SCHMITT, Lisa (Large Scale Structures Group, Neutron Sciences Directorate, Oak Ridge National Laboratory); Dr WHITE, Jonathan (Laboratory for Neutron Scattering and Imaging, Paul Scherrer Institute); Dr SOKOLOVA, Anna (Australian Centre for Neutron Scattering, Australian Nuclear Science and Technology Organization); Prof. MILOŠEVIĆ, Milorad (Department of Physics, University of Antwerp); Prof. ESKILDSEN, Morten (Department of Physics, University of Notre Dame)

Presenter: LEISHMAN, Allan (Department of Physics, University of Notre Dame)

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