

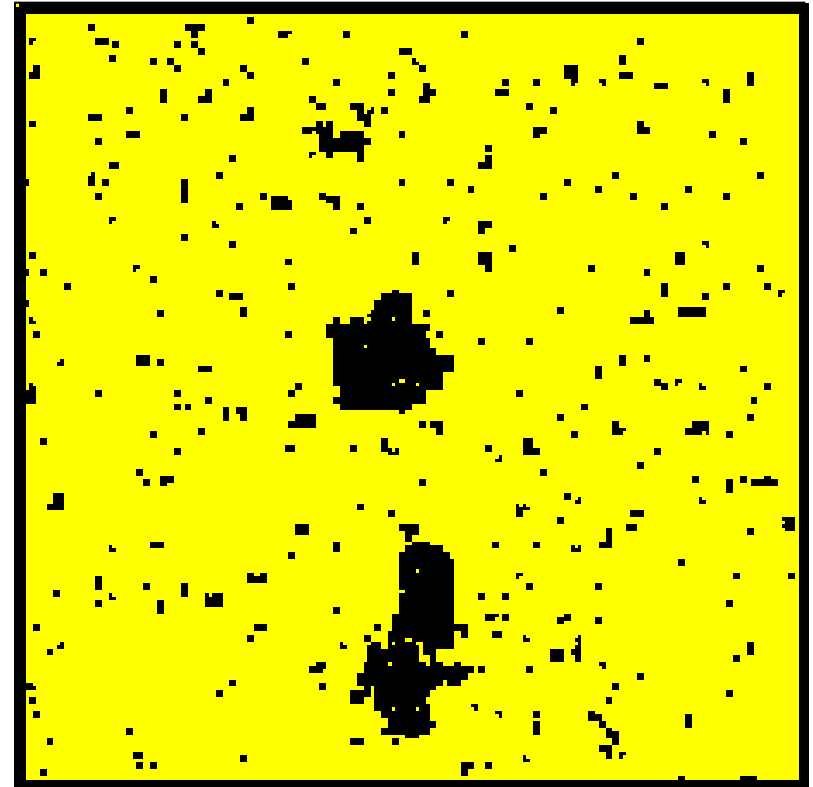
# Kinetic Monte Carlo Simulations of Heat-assisted Magnetization Reversal in Ultrathin Films

Per Arne Rikvold (Florida State University) NSF-DMR-0802288

Heat-assisted Magnetization Reversal (HAMR) is a promising method to increase the thermal stability of magnetically stored information without sacrificing writing speed. The idea is to use a high-coercivity, ultrathin ferromagnetic film, but temporarily decrease its coercivity during writing by localized heating by a laser beam. In the heated region, the magnetization of the medium easily aligns with the writing field. Kinetic Monte Carlo simulations of HAMR were performed with FSU graduate student W.R. Deskins, former FSU Ph.D. student S.H. Thompson (Northrop Grumman Corp.), and Dr. G. Brown (Oak Ridge National Laboratory).

W.R. Deskins, G. Brown, S.H. Thompson, P.A. Rikvold, Phys. Rev. B **84**, 094431 (2011).

$$H = 0.0725, t = 200, m = -0.865$$



Snapshot of the simulated spin system during magnetization reversal. The reversal starts in the central area, which was briefly heated at the beginning of the simulation.

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**Outreach:** The PI demonstrates some of his LEGO physics creations at the FSU Physics Department's 2009 open house. For more on the LEGO project, see:

<http://www.physics.fsu.edu/users/rikvold/info/legostuff.html>

**Education:** Three undergraduate students, three graduate students, and one postdoc were supported in part by this grant.

**Collaborations:** 1. The PI spent one month in the Summer of 2011 as a visiting Professor in the Department of Applied Physics, University of Tokyo, Japan. 2. Prof. Gloria M. Buendía from Universidad Simón Bolívar in Venezuela visited the PI's group for collaborations, 2008, '09, '10, and '11. 3. Collaborated on research projects with various groups at Mississippi State University, University of New Mexico, The University of Tokyo, Japan, and McGill University and Université de Montréal, Canada.