Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Nanomagnet Characterization Using Scanning SQUID Microscopy LISA QIAN, BEENA KALISKY, JOHN KIRTLEY, Stanford University, JAEMIN KIM, Brown University, MICHAEL BENOIT, Stanford University, SHOUHENG SUN, Brown University, A. MATIN, KATHRYN MOLER, Stanford University — Magnetic nanoparticles 5-50nm in size are of wide interest in the biological and medical fields. For instance, magnetotatic bacteria containing nanoscale mangnetite particles show potential for MRI contrast agents and targeting tumors. To date, characterization of nanomagnets has been done in large ensembles, where variations in shape and structure cannot be determined and interparticle coupling may cause bulk properties from those of isolated particles. We report our progress towards the detection and magnetic characterization of individual nanomagnets using a variable temperature scanning SQUID microscope (SSM). SSM is ideal for this challenge due to its high spin sensitivity, $\sim$100 μ_B/sqrt(Hz). AC and DC modes of operation allow for direct probing of susceptibility, magnetic moment and switching times. Thermal separation between SQUID and sample allows temperature dependent studies of the transition between ferromagnetism and superparamagnetism. Results for both FePt nanomagnets and magnetosomes from magnetotactic bacteria will be shown.

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Date submitted: 04 Jan 2010 Electronic form version 1.4