Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Overlap as a Measure of Spin-Glass Memory and a Probe of Free Energy Landscape WEN LUO[1], University of Nebraska-Lincoln, MICHAEL MIHALCO, THOMAS E. STONE, SUSAN R. MCKAY, University of Maine — The degree of history dependence and the structure of the free energy landscape of the spin glass are both indicators of the complexity of this ordered phase. Using the Ising antiferromagnet on a triangular lattice, diluted with quenched random ferromagnetic bonds, we probe these indicators through repeated cycling between two temperatures. We consider cases in which both temperatures are within the spin-glass phase, and systematically vary the temperature difference between initial and final states. These results are compared with the same cycling pattern with one temperature inside and the other outside of the spin-glass phase. The average overlap between low-temperature states provides a quantitative measure of the system's memory, and is non-zero when the system remains within the spin-glass phase during cycling. A plot of the overlaps of the low temperature states and their differences in internal energy shows no simple relationship between overlap and internal energy. States with almost identical internal energies often have very little overlap.

[1]Supported by the University of Maine's Research Experience for Undergraduates, funded by NSF/DoD Grant No. 0754951.

Susan McKay
University of Maine

Date submitted: 21 Nov 2008 Electronic form version 1.4