Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Correlated Spin Networks in Spin Glasses THOMAS E. STONE, SUSAN R. MCKAY, University of Maine — We introduce a network model for frustrated spin systems based on highly correlated spin fluctuations, which allows us to quantify and visualize their ordering. In this model, individual lattice sites are treated as nodes, with links between any two nodes existing only if the correlated fluctuations between those two nodes are above a threshold value. As a test case, we have implemented this model on the two-dimensional Ising antiferromagnet on a triangular lattice with randomly inserted ferromagnetic bonds, which has a finite temperature spin-glass phase transition.[1] In the paramagnetic phase, nodes within a network are spatially contiguous and networks are localized to areas of relieved frustration. In the spin-glass phase, a very broad degree distribution physically manifests itself through networks of strongly correlated but non-contiguous spins. This finding is consistent with that predicted via chaotic rescaling.[2] 1. Grest G.S. and Gabl E.G., Phys. Rev. Lett. **43**, 1182 (1979). 2. McKay S.R., Berker A.N. and Kirkpatrick S., Phys. Rev. Lett. **48**, 767 (1982).

Thomas E. Stone
University of Maine

Date submitted: 21 Nov 2008 Electronic form version 1.4