Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Fluctuation-Induced Heat Release from Temperature-Quenched Nuclear Spins near a Quantum Critical Point Y. H. KIM, University of Florida, N. KAUR, Florida State University, B. M. ATKINS, Rhodes College, N. S. DALAL, Florida State University, Y. TAKANO, University of Florida — The quasi-two-dimensional quantum antiferromagnet Cr(diethylenetriamine)$(O_2)_2 \cdot H_2O$ [1] has a magnetic-field-tuned quantum critical point (QCP) at 12.3 T, where a highly polarized antiferromagnetic phase turns into a field-induced ferromagnetic phase. We report a novel relaxation phenomenon near this QCP: quantum-fluctuation-driven annealing of hydrogen nuclear spins frozen in a non-equilibrium high-energy state by temperature quenching. This relaxation phenomenon, with readily detectable heat release from the nuclear spins as they are annealed, reveals the extent of a quantum critical region around the QCP and provides a unique avenue to investigate the dynamics of the divergent quantum fluctuations that underlie quantum criticality. [1] C. M. Ramsey *et al.*, Chem. Mater. **15**, 92 (2003).

Younghak Kim
University of Florida

Date submitted: 19 Nov 2009 Electronic form version 1.4