Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Non-monotonic zero point entropy in diluted spin ice[1] X. KE, R. FREITAS, B. UELAND, Penn State Univ., G. LAU, Princeton University, M. DAHLBERG, Penn State Univ., R. CAVA, Princeton University, R. MOESSNER, Oxford Univ., P. SCHIFFER, Penn State Univ. — Water ice and spin ice are important model systems in which theory can directly account for "zero point" entropy associated with quenched configurational disorder. Spin ice differs from water ice in the important respect that its fundamental constituents, the spins of the magnetic ions, can be removed through replacement with non-magnetic ions while keeping the lattice structure intact. In order to investigate the interplay of frustrated interactions and quenched disorder, we have performed systematic heat capacity measurements on spin ice materials which have been thus diluted up to 90%. Investigations of both Ho and Dy spin ices reveal that the zero point entropy depends non-monotonically on dilution and approaches the value of Rln2 in the limit of high dilution. The data are in good agreement with a generalization of Pauling's theory for the entropy of ice.
X. Ke, et al, Phys. Rev. Lett. **99**, 137203 (2007).

[1]We acknowledge the financial support from NSF grant DMR-0353610 and R.S.F. thanks CNPq-Brazil for sponsorship

X. Ke

Date submitted: 26 Nov 2007 Electronic form version 1.4