Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Magnetic Orders and Fluctuations in the Dipolar Pyrochlore Antiferromagnet OLIVIER CEPAS, Institut Laue Langevin, Grenoble, B. SRIRAM SHASTRY, A. PETER YOUNG, University of California, Santa-Cruz — While the classical Heisenberg antiferromagnet on the pyrochlore lattice does not order, we will discuss, from a theoretical standpoint, possible magnetic phases induced by the dipole-dipole interactions. Such interactions play a role in systems such as $Gd_2Ti_2O_7$ or $Gd_2Sn_2O_7$ in stabilizing exotic forms of magnetic order, a subject of current debate. We will also argue that the external magnetic field induces multiple transitions, one of which is associated with no obvious broken symmetry, but can be characterized by a disorder parameter. Finally, Monte-Carlo simulations and Landau-Ginzburg expansion show that the dipolar Heisenberg model exhibits a fluctuation-induced first-order transition, thanks to the frustration and a continuous set of soft modes.

A. Peter Young
University of California, Santa-Cruz

Date submitted: 23 Nov 2004 Electronic form version 1.4