Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Spin echo experiments on dilute ensembles of single molecule magnets GRÉGOIRE DE LOUBENS, ANDREW D. KENT, NYU, Physics, VLADIMIR KRYMOV, GARY J. GERFEN, Yeshiva University, AECOM, Physiology & Biophysics, CHRIS C. BEEDLE, DAVID N. HENDRICKSON, UCSD, Chemistry & Biochemistry — Single molecule magnets (SMMs) have been suggested as candidates for qubits in quantum processors. However, the coherence time (T_2) of high-spin molecules has not been determined. In SMM single crystals the strong dipolar interactions between molecules (separated by only 1 nm) is expected to drastically reduce the coherence time. In order to determine the coherence times in SMMs, we work with dilute ensembles of molecules. In particular, dilute frozen solutions of the SMM Ni_4 have been studied using a high frequency D-band (130 GHz) EPR setup [1]. Despite the random orientation of the molecules, well defined EPR absorption peaks are observed, due to the strong variation of the splittings between the different spin-states on magnetic field. Temperature dependent studies (> 4 K) and comparison with simulations enable identification of the spin transitions and determination of the Hamiltonian parameters, found to be close to those of Ni_4 single crystals. The absence of echo in pulsed experiments sets an upper bound of about 50 ns on the spin coherence time in Ni_4 at 130 GHz and T = 5.5 K. [1] G. de Loubens *et al.*, arXiv:0709.2146

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Date submitted: 26 Nov 2007 Electronic form version 1.4