MAR05-2004-005542

Abstract for an Invited Paper
for the MAR05 Meeting of
the American Physical Society

Electron spin resonance and muon spin relaxation studies of single molecule magnets

STEPHEN BLUNDELL, Oxford University Department of Physics

We use a combination of electron spin resonance, muon-spin relaxation and SQUID magnetometry to study polycrystalline and single crystal samples of various novel single molecule magnets (SMMs). We also describe a theoretical framework which can be used to analyse the results from each technique. Electron spin resonance measurements are performed using a millimetre vector network analyser and data are presented on several SMM systems using microwave frequencies from 40-300 GHz. Muon-spin relaxation measurements have been performed on several SMM systems in applied longitudinal magnetic field and in temperatures down to 20 mK. The results suggest that dynamic local magnetic field fluctuations are responsible for the relaxation of the muon spin ensemble. We discuss what can be learned from these experiments concerning SMMs and suggest experiments which can probe the quantum nature of SMMs. (Work in collaboration with S Sharmin, T Lancaster, A Ardavan, F L Pratt, E J L McInnes and R E P Winpenny) References: S. J. Blundell and F. L. Pratt, J. Phys.: Condens. Matter 16, R771 (2004); T. Lancaster et al., J. Phys.: Condens. Matter 16, S4563 (2004); S. Sharmin et al., Appl. Phys. Lett. in press.