Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

**Transition Metal Dimers and Physical Limits on Magnetic Anisotropy** TOR OLOF STRANDBERG, CARLO M. CANALI, Kalmar University, ALLAN H. MACDONALD, University of Texas at Austin — Recent advances in nanoscience have raised interest in the minimum bit size required for classical information storage, i.e. for bistability with suppressed quantum tunnelling and energy barriers that exceed ambient temperatures. In the case of magnetic information storage much attention has centred on molecular magnets with bits consisting of 100 atoms, magnetic uniaxial anisotropy energy barriers 50 K, and very slow relaxation at low temperatures. In our recent article (Nature Materials 6, 648 - 651 (2007)), we draw attention to the remarkable magnetic properties of some transition metal dimers which have energy barriers approaching 500 K with only two atoms. The spin dynamics of these ultra small nanomagnets is strongly affected by a Berry phase which arises from quasi-degeneracies at the electronic Highest Occupied Molecular Orbital (HOMO) energy. In a giant spin-approximation, this Berry phase makes the effective reversal barrier thicker.

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Date submitted: 27 Nov 2007 Electronic form version 1.4