Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Conductance and spin-flip of molecular magnets in a time-dependent magnetic field.[1] ANH NGO, SERGIO E. ULLOA, Ohio University — The properties of single molecular magnets and clusters with high spin, such as the Mn- or Fe-acetates, have been under intense study in recent years. The signature of magnetization tunneling on the conductance of films obtained by scanning tunneling microscopy (STM) has been recently studied theoretically [1]. We present here the effects of finite bias voltage and temperature on the STM conductance using a model for tunneling among different magnetic states. The system consists of a single molecule magnet between two conducting leads (the substrate and the STM tip). Because of the spin-phonon interaction and finite bias voltage, a time-dependent magnetic field produces tunneling to different magnetic states even away from the fully resonant condition. We use an approximation to reduce the original $(2s+1)$-level dynamical problem to a four-level sequence for the s-spin system. The differential conductance exhibits stepwise behavior with increasing longitudinal field that deviates substantially for increasing bias voltage and finite temperature. Analysis of the conductance vs. field and bias yields information on the spin-flip mechanisms.

[1] G.-H. Kim and T.-S. Kim, Phys. Rev. Lett. 92, 137203 (2004).

[1]Supported by NSF-NIRT

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Date submitted: 12 Jan 2006 Electronic form version 1.4