

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Spin Parity effects in STM single magnetic atom manipulation FERNANDO DELGADO, JOAQUÍN FERNÁNDEZ-ROSSIER¹, International Iberian Nanotechnology Laboratory (INL), Av. Mestre José Veiga, 4715-330 Braga, Portugal — Recent experimental work shows that a spin polarized scanning tunneling microscopy tip can be used both to read and write the spin orientation of a single magnetic spin [1]. Inelastic electron tunneling spectroscopy (IETS) shows that spin of the magnetic atom is quantized [2], like the spin of a molecular magnet. Here we discuss two fundamental problems that arise when a bit of classical information is stored on a quantized spin: quantum spin tunneling and back-action of the readout process. Quantum tunneling is responsible of the loss of information due to the relaxation of the spin coupled to the environment, while the detection induced back-action leads to an unwanted modification of the spin state. We find that fundamental differences exist between integer and semi-integer spins when it comes to both, read and write classical information in a quantized spin.

[1] S. Loth et al, Nature Physics 6, 340 (2010).

[2] C. Hirjibehedin et al, Science 317, 1199 (2007).

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Date submitted: 07 Dec 2011

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