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Spin-transfer torque on a single magnetic adatom FERNANDO DELGADO, Departamento de Física Aplicada, Universidad de Alicante, San Vicente del Raspeig, 03690 Spain, JUAN JOSÉ PALACIOS[1], Universidad de Alicante, San Vicente del Raspeig, 03690 Spain, JOAQUíN FERNÁNDEZ-ROSSIER, Departamento de Física Aplicada, Universidad de Alicante, San Vicente del Raspeig, 03690 Spain — We theoretically show how the spin orientation of a single magnetic adatom can be controlled by spin polarized electrons in a scanning tunnelling microscope configuration. The underlying physical mechanism is spin assisted inelastic tunnelling. Experiments with Mn adatoms deposited on a Cu2N surface have been reported for non-polarized currents [1-2]. We show that by changing the direction of the applied current, the orientation of the magnetic adatom can be completely reversed on a time scale that ranges from a few nanoseconds to microseconds, depending on bias and temperature. The changes in the adatom magnetization direction are, in turn, reflected in the tunnelling conductance. Therefore, this effect opens the possibility of writing/reading a single spin without the need of a local magnetic field.

[1] C.F. Hirjibehedin, C. P. Lutz, A. J. Heinrich, Science 312, 1021 (2006).
[2] C. Hirjibehedin et al., Science 317, 1199 (2007).

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