

MAR06-2005-001639

Abstract for an Invited Paper
for the MAR06 Meeting of
the American Physical Society

Universal Mechanism of Spin Relaxation in Solids

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Conventional elastic theory ignores internal local twists and torques. Meantime, spin-lattice relaxation is inherently coupled with local elastic twists through conservation of the total angular momentum (spin + lattice). This coupling gives universal lower bound (free of fitting parameters) on the relaxation of the atomic or molecular spin in a solid [1] and on the relaxation of the electron spin in a quantum dot [2].

[1] E. M. Chudnovsky, D. A. Garanin, and R. Schilling, Phys. Rev. B **72**, 094426 (2005).

[2] C. Calero, E. M. Chudnovsky, and D. A. Garanin, Phys. Rev. Lett. **95**, 166603 (2005).