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Spin relaxation of Mn + h complexes in III-V semiconductors
TOMASZ DIETL[1], CEZARY SLIWA, Insitute of Physics, Polish Academy of Sciences — Splitting between heavy and light hole levels is known to results in long spin relaxation times of holes confined in compressively strained InAs quantum dots [1]. We show theoretically that T_1 can be elongated by orders of magnitudes if the hole resides on a Mn acceptor, as the $p-d$ exchange interaction introduces a magnetic anisotropy barrier for spin relaxation. In order to compare the magnitudes of thermally activated over-barrier spin relaxation with a competing non-stationary quantum tunnelling at level anticrossings we evaluate also the expected magnitude of the ground state splitting by various intrinsic and extrinsic effects, including random in-plane strains. The relevance of our results for optical [2] and transport studies [3] of Mn-containing InAs quantum dots and quantum wells, respectively is examined and shown to elucidate the origin of the observed anisotropies and hystereses.

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[2] O Krebs et al., *Phys. Rev. B* 80, 165315 (2009).
[3] U. Wurstbauer et al., *J. Crystal Growth* 311, 2160 (2009); *Phys. Rev. B* 79, 155444 (2009); *Phys. E* [doi:10.1016/j.physe.2009.11.012].

[1]also, Institute of Theoretical Physics, University of Warsaw

Tomasz Dietl
Insitute of Physics, Polish Academy of Sciences

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