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Spin Relaxation in Spherical CdS Quantum Dots P. NAHALKOVA, Charles University in Prague, Ke Karlovu 3, 121 16 Prague, Czech Republic and Universiteit Antwerpen, Universiteitsplein 1, B-2610 Antwerpen, Belgium, D. SPRINZL, P. NEMEC, P. MALY, Charles University in Prague, Ke Karlovu 3, 121 16 Prague, Czech Republic, V. N. GLADILIN, J. T. DEVREESE, Universiteit Antwerpen, Universiteitsplein 1, B-2610 Antwerpen, Belgium — We present results of the time-resolved spin-sensitive differential transmission experiments and the quantitative theoretical analysis of the spin relaxation mechanism in quasi-spherical CdS quantum dots (QD) in a glass matrix. The measured decay of the degree of circular polarization (DCP) on ns timescale can be explained well by intralevel exciton transitions with electron spin flip, driven by the electron-hole exchange interaction and assisted by two LO phonons. The predicted spin relaxation rates for different QD sizes and temperatures are in line with experimentally determined values. The developed theoretical model provides also a qualitative understanding of the observed behavior of DCP as a function of central energy of pump and probe pulses. This work was supported by the Ministry of Education of the Czech Republic in the framework of research plan MSM 0021620834 and the research centre LC510, as well as by the GOA BOF UA 2000, IUAP, FWO-V projects G.0274.01N, G.0435.03, WOG WO.035.04N (Belgium) and the European Commission SANDiE Network of Excellence, contract No. NMP4-CT-2004-500101.

Jozef T. Devreese
Universiteit Antwerpen, Universiteitsplein 1, B-2610 Antwerpen, Belgium

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