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Spin relaxation time dependence on optical pumping in GaAs:Mn

VERONIKA BUROBINA, University of California, San Diego, CHRISTIAN BINEK, University of Nebraska-Lincoln — We analyze the dependence of electron spin relaxation time on optical pumping in a partially-compensated acceptor semiconductor GaAs:Mn using analytic solutions for the kinetic equations of the charge carrier concentrations [1]. Our results are applied to previous experimental data of spin-relaxation time vs. excitation power for magnetic concentrations of approximately 10^{17}cm^{-3} [2]. The agreement of our analytic solutions with the experimental data supports the mechanism of the earlier-reported atypically long electron-spin relaxation time in the magnetic semiconductor.

[1] V. Burobina and Ch. Binek, J. Appl. Phys. 115, 163909 (2014).

[2] G. V. Astakhov et al., Phys. Rev. Lett. 101, 076602 (2008).

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