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Non-Markovian damping of Rabi oscillations in semiconductor quantum dots LUIZ E. OLIVEIRA, Instituto de Física - Unicamp - Brazil, DMITRI MOGILEVTSEV, A.P. NISOVTSEV, S. KILIN, Institute of Physics - NASB - Belarus, S.B. CAVALCANTI, Instituto de Física - UFAL - Brazil, H.S. BRANDI, Instituto de Física - UFRJ - Brazil — A systematic investigation is performed on the damping of Rabi oscillations induced by an external electromagnetic field interacting with a two-level semiconductor system. We have considered a coherently driven two-level system coupled to a dephasing reservoir, and shown that in order to explain the dependence of the dephasing rate on the driving intensity, it is essential to consider the non-Markovian character of the reservoir. Moreover, we have demonstrated that intensity- dependent damping may be induced by various dephasing mechanisms due to stationary as well non-stationary effects caused by the coupling with the environment. Finally, present results [1] are able to explain a variety of experimental measurements [2-4] available in the literature.

References: 1. D. Mogilevtsev, A. P. Nisovtsev, S. Kilin, S. B. Cavalcanti, H. S. Brandi and L. E. Oliveira, Phys. Rev. Lett. (in press); 2. A. Zrenner et al., Nature 418, 612 (2002); 3. Q. Q. Wang et al., Phys. Rev. B 72, 035306 (2005); 4. B. Patton, U. Woggon, and W. Langbein, Phys. Rev. Lett. 95, 266401 (2005).

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