Millisecond fluorescence in InAs quantum dots embedded in AlAs


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Abstract

The temperature dependence of steady-state and time-resolved photoluminescence from self-assembled InAs quantum dots embedded in AlAs has been studied. Millisecond-long nonexponential photoluminescence decay is observed in the temperature range of 4.2–50 K. At higher temperatures, the decay time decreases to a few nanoseconds. The experimental results are interpreted using a model of singlet–triplet splitting of exciton levels in small dots in a dense quantum dot system with local carrier transfer between dots.

Author Keywords: Self-assembled quantum dots; Photoluminescence; Excitons; Singlet–triplet splitting

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