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Charge Transitions in a Quantum Dot Induced by an Adjacent Quantum Point Contact S. AMASHA, K. MACLEAN, MIT, D. M. ZUMBÜHL, U. Basel, I. P. RADU, M. A. KASTNER, MIT, M. P. HANSON, A. C. GOSSARD, UCSB — Quantum point contact (QPC) charge sensors have become an important tool for measuring the occupation of laterally gated quantum dots in AlGaAs/GaAs heterostructures. However, electrical fluctuations across the QPC have been shown to induce changes in the dot occupation. Using real-time charge detection techniques, we observe this effect in the increased rates at which electrons tunnel on and off the dot with increasing bias applied across the adjacent QPC. Applying an in-plane magnetic field splits the orbital states by the Zeeman energy. We present measurements of the probability of being in the excited spin state after a large bias pulse is applied across the QPC. We propose that changes in dot occupation can qualitatively account for an observed enhancement in the probability of being in the excited spin state. This work is supported by the ARO (W911NF-05-1-0062), the NSF (DMR-0353209) and in part by the NSEC Program of the NSF (PHY-0117795).

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