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Spin Dynamics of Charged Colloidal Quantum Dots[1] N.P. STERN, M. POGGIO, M.H. BARTL, E.L. HU, G.D. STUCKY, D.D. AWSCHALOM, Center for Spintronics and Quantum Computation, University of California, Santa Barbara, CA 93106 — Colloidal semiconductor quantum dots are promising structures for controlling spin phenomena because of their highly size- tunable physical properties, ease of manufacture, and nanosecond-scale spin lifetimes at room temperature. Recent experiments have succeeded in controlling the charging of the lowest electronic state of colloidal quantum dots [2]. Here we use time-resolved Faraday rotation measurements in the Voigt geometry to investigate the spin dynamics of colloidal CdSe quantum dot films in both a charged and uncharged state at room temperature. The charging of the film is controlled by applying a voltage in an electrochemical cell and is confirmed by absorbance measurements. Significant changes in the spin precession are observed upon charging, reflecting the voltage- controlled electron occupation of the quantum dot states and filling of surface states.

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[2]C. Wang, B. L. Wehrenberg, C. Y. Woo, and P. Guyot-Sionnest, *J. Phys. Chem B* **108**, 9027 (2004).

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