Abstract Submitted
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Persistent optical charging of Electric-field tunable ensembles of Quantum Dots KULVINDER GILL, Department of Physics, UCSB, NICHOLAS MOSKOVITZ[1], Department of Physics, UCSB, MARK SHERWIN, Department of Physics, UCSB, PIERRE PETROFF GROUP, DEPARTMENT OF MATERIALS, UCSB COLLABORATION — Controllably-charged semiconductor quantum dots have appeared in many proposals for quantum bits. Typical charging methods involve static electric fields that also distort the confining potential and the electronic energy states. We demonstrate a method of optically loading charges into InAs/GaAs quantum dot ensembles in a controllable way, while independently applying static electric fields to tune the quantum dot energy levels. We use a semiconductor N-I-N structure and a series of voltage and non-resonant inter-band light pulses. Charge storage times of 100's of ms to seconds have been achieved at 4K. This charging method promises to facilitate the use of quantum dots in quantum information processors. This work was supported by the DARPA QuIST program under Grant No. MDA972-01-1-0027 and Sun Microsystems.

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