

Abstract Submitted  
for the MAR05 Meeting of  
The American Physical Society

**Photo-electron storage in a one-electron quantum dot** DEEPAK RAO, THOMAS SZKOPEK, HANS ROBINSON, ELI YABLONOVITCH, Department of Electrical Engineering, UCLA, HONG-WEN JIANG, Department of Physics and Astronomy, UCLA — We report on the trapping, storage and detection of a single photo-electron in an electrostatic quantum dot defined by surface metallic gates on a GaAs/AlGaAs modulation doped heterostructure. The dot can be emptied and reset in a controlled fashion before the arrival of each photon. The trapped photo-electron is detected by the photoconductive gain mechanism of a point contact transistor integrated adjacent to the electron trap. Each photo-electron causes a persistent negative step in the transistor channel current. Such a controllable, non-invasive, single photo- electron detector could allow for quantum information transfer between flying photon qubits and stored electron qubits.

Deepak Rao  
Department of Electrical Engineering, UCLA

Date submitted: 07 Dec 2004

Electronic form version 1.4