Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Radio-frequency single-electron transistor coupled to a few-electron double quantum dot[1] FENG PAN, JOEL STTENTHEIM, MUSTAFA BAL, MINGYUN YUAN, ALEX RIMBERG, Dartmouth College, VLADIMIR UMANSKY, Weizmann Institute of Science — The radio frequency single-electron transistor (rf-SET) has been shown to be an ultra fast and highly sensitive electrometer, and can be potentially operated close to the quantum noise limit as a qubit readout device [1]. The interplay between the rf-SET electrometer and a two-level system offers an interesting system for study. Here we report our progress on investigating rf-SETs capacitively coupled to few-electron double quantum dots (DQDs). We fabricate lateral-defined DQDs from an AlGaAs/GaAs heterostructure and the rf-SET from superconducting aluminum embedded in a tank circuit. The sensitivity and bandwidth of on-chip rf-SET electrometer can be used to probe DQD operated in the few-electron regime. We have observed coupling between SET and DQD and have optimized our device design to enhance coupling in the few-electron limit. Recent experimental results will be discussed. [1] M. H. Devoret and R. J. Schoelkopf, Nature, **406**, 1039 (2000).

[1]This work was supported by the NSA, LPS and ARO under Agreement No. W911NF-04-1-0389, by the ARO under Agreements No. W911NF-06-1-0312 and No. W911NF-06-01-0361, and by the NSF under Grant No. DMR-0804488.

Feng Pan
Dartmouth College

Date submitted: 20 Nov 2008 Electronic form version 1.4