

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Radio Frequency Single Electron Transistors on Si/SiGe¹

MINGYUN YUAN, ZHEN YANG, A.J. RIMBERG, Department of Physics and Astronomy, Dartmouth College, M.A. ERIKSSON, Department of Physics, University of Wisconsin, D.E. SAVAGE, Material Science Center, University of Wisconsin — Superconducting single electron transistors (S-SETs) are ideal for charge state readout due to their high sensitivity and low back-action. Upon successful formation of quantum dots(QDs) on Si/SiGe, aluminum S-SETs are added in the vicinity of the QDs. Coupling of the S-SET to the QD is confirmed by using the S-SET to perform sensing of the QD charge state at 0.3 K. We have formed a matching network for an SET with an off-chip inductor. The reflection coefficient of the radio frequency(RF) signal is shown to be modulated by the SET resistance. Efforts to develop an on-chip matching network and perform charge sensing with the RF-SETs are in progress. Recent experimental results will be discussed.

¹This research was supported by the NSA, LPS and ARO.

Mingyun Yuan
Dartmouth College

Date submitted: 03 Jan 2011

Electronic form version 1.4