Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Single electron transistors at high temperature MINGTING KUO, National Central University, PEI-WEN LI, PEI-WEN LI TEAM — The tunneling current through a germanium (Ge) quantum dot (QD) embedded in SiO_2 matrix is studied theoretically. The energy levels and Coulomb interactions of electrons in a nanometer Ge QD are calculated using an effective mass model. In small Ge QDs, the effect of electron correlation is significant and hence, both the interlevel and intralevel Coulomb interactions are important in electron transport properties. The tunneling current of a Ge-QD single electron transistor (SET) is calculated using the Keldysh Green function method and two-level Anderson model. In addition to four peaks arising from the intralevel Coulomb interactions, extra differential conductance peaks are found due to the interlevel Coulomb interactions and the statistical nature of the open system.

Mingting Kuo
National Central University

Date submitted: 24 Nov 2004 Electronic form version 1.4