Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Bloch States of the Interface Phase CURT BILLMAN, Oak Ridge National Laboratory, FRED WALKER[1], University of Tennessee, MARCO BUONGIORNO-NARDELLI[2], North Carolina State University, RODNEY MCKEE, Oak Ridge National Laboratory — Electrical conductance and capacitance measurements of metal oxide semiconductor devices have revealed the existence of Bloch states that are associated with the interface phase that is formed between commensurate $Ba_{.72}Sr_{.28}O$ and Si(001). Conductance measurements of the interface states show loss peaks that can be modeled using a single relaxation time in contrast to the distribution of relaxation times required to reproduce conductance measurements of interface traps at the amorphous SiO_2 / Si interface. The measured magnitude, which is on the order of $4x10^{13}$ eV^{-1} cm^{-2} and the character of the interface phase Bloch state (IPBS) density is consistent with local density approximation (LDA) calculations using a physical structure based on a one mono-atomic layer silicide. Research sponsored jointly by the Division of Materials Sciences and Engineering, Office of Basic Energy Sciences, U.S. Department of Energy at Oak Ridge National Laboratory under contract DE-AC05-00OR22725 with UT-Battelle, LLC and at the University of Tennessee under contract DE-FG02-01ER45937. Calculations have been performed on CCS supercomputers at Oak Ridge National Laboratory.

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Date submitted: 01 Dec 2004 Electronic form version 1.4