Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Quantized Conductance and Electromigration[1] KIRK BEVAN, Oak Ridge National Laboratory, Materials Science & Technology Division, HONG GUO, McGill University, Department of Physics, ZHENYU ZHANG, Oak Ridge National Laboratory, Materials Science & Technology Division and University of Tennessee, Department of Physics, ELLEN D. WILLIAMS, University of Maryland, Department of Physics — We present a theoretical study of the low bias electromigration wind force acting on Ag(111) nanoscale surface step edges and surface atomic wires. The electromigration wind force is determined self-consistently, within the low bias Landauer-Buttiker ballistic conduction picture. Numerical estimates of the wind force on step edges are found to agree well with recently reported thin film measurements of surface electromigration. In general, the results underscore the challenging nanoscale reliability problem posed by surface electromigration and the need for a quantum transport description of the electron wind force.

[1]DOE Basic Energy Sciences and the Natural Sciences and Engineering Research Council of Canada.

Kirk Bevan
Oak Ridge National Laboratory

Date submitted: 24 Nov 2009 Electronic form version 1.4