

Abstract Submitted  
for the MAR09 Meeting of  
The American Physical Society

**Hot Electron Transport Properties of Thin Copper Films Using Ballistic Electron Emission Microscopy** J.J. GARRAMONE, J.R. ABEL, I.L. SITNITSKY, University at Albany, L. ZHAO, I. APPELBAUM, University of Delaware, V.P. LABELLA, University at Albany — Copper is widely used material for electrical interconnects within integrated circuits and recently as a base layer for hot electron spin injection and readout into silicon. Integral to both their applications is the knowledge of the electron scattering length. To the best of our knowledge, little work exists that directly measures the scattering length of electrons in copper. In this study we used ballistic electron emission microscopy (BEEM) to measure the hot electron attenuation length of copper thin films deposited on Si(001). BEEM is a three terminal scanning tunneling microscopy (STM) based technique that can measure transport and Schottky heights of metal/semiconductor systems. We find a Schottky height of 0.67 eV and an attenuation length approaching 40 nm just above the Schottky height at 77 K. We also measure a decrease in the attenuation length with increasing tip bias to determine the relative roles of inelastic and elastic scattering.

John Garramone  
University at Albany

Date submitted: 30 Nov 2008

Electronic form version 1.4