Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Ballistic Electron Emission Spectroscopy Studies of Gold Nanocrystals SAMEH DARDONA, JIANFEI SHAO, RYAN PRICE, ROBERT WHETTEN, PHILLIP FIRST, School of Physics, Georgia Institute of Technology — We report experimental measurements of ballistic electron emission spectroscopy (BEES) on single gold nanocrystals. Nanocrystals with core diameters from 1 nm to 3 nm were chemically attached to a 10-nm thick gold film that was vapor-deposited on a silicon substrate. Low temperature (77 K) scanning tunneling microscopy and spectroscopy were used to image and identify nanocrystals prior to BEES measurements. A comparison of BEES spectra acquired by tunneling through a nanocrystal with those acquired by tunneling directly to the gold film, shows attenuation of the BEES signal by a factor of typically 4-10. From a simple rate equation, electron relaxation times in these gold nanocrystals are estimated to be of order 10 picoseconds.

Sameh Dardona
Georgia Institute of Technology

Date submitted: 04 Jan 2006 Electronic form version 1.4