

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Momentum selective imaging of electrons in orbit: autonomous current scanning tunneling microscopy JOONHEE LEE, Department of Chemistry, University of California, Irvine, CA 92697-2025, SHAWN PERDUE, ALEJANDRO RODRIGUEZ PEREZ, VARTKESS ARA APKARIAN, CHEMISTRY AT THE SPACE-TIME LIMIT (CASTL) TEAM — The back-action due to inelastic electron tunneling generates detectable motion of the scanning tunneling microscope (STM) tip, which in turn modulates current. This feedback leads to parametric oscillations of the tip, observable as autonomous current. The modulation frequencies are specific to the angular momentum of the tunneling electron. The principle can be used to image atomic and molecular eigenstates (orbitals) with angular momentum selectivity, and with phase selectivity in the case of electronic superposition states. Captured images of the orbitals of a Ag atom and a Ag-dimer adsorbed on a NiAl(110) surface will be presented to illustrate the principles that allow the recording of images of orbitals in motion, without using timing devices.

Joonhee Lee
Department of Chemistry, University of California, Irvine, CA 92697-2025

Date submitted: 21 Dec 2009

Electronic form version 1.4