

Abstract Submitted
for the OSS12 Meeting of
The American Physical Society

Feasibility of atomic identification of adsorbates with a scanning tunneling microscope XIAOYUE NI, CRAIG HOWALD, Marietta College — A study of the feasibility of using a scanning tunneling microscope (STM) to detect differences between individual molecules or atoms adsorbed on a metal surface is reported. For a manageable model, the current through a one-dimensional metal-vacuum-metal junction is numerically simulated. The effect of an additional molecule on the sample is modeled as a modification of the vacuum potential barrier. Because the tunnel current is used to sense the distance to the sample, the value of the tunneling current has no absolute significance. Therefore we investigate how tunneling current varies with applied bias (tip-sample voltage) and with displacement of the tip relative to the sample for a given setpoint current at the largest applied bias. With varying strengths of the molecule's perturbation to the vacuum potential, maximum differences in tunneling currents are found. These can be compared to experimental noise in scanning tunneling microscope current to determine the smallest differences in potential that a given microscope can resolve.

Craig Howald
Marietta College

Date submitted: 16 Mar 2012

Electronic form version 1.4