MAR10-2009-000805

Abstract for an Invited Paper
for the MAR10 Meeting of
the American Physical Society

Imaging Photoinduced Charge Transport in Single Molecules

WILSON HO, University of California, Irvine

The ability to perform sub-Angstrom imaging of photoinduced charge transport in single molecules in ultrahigh vacuum with a low temperature scanning tunneling microscope (STM) indicates the defeat of diffraction limited resolution and the opportunity to understand in new directions nanostructures and their functions. The experiments are enabled by the enhanced field due to coupling of the light from cw and femtosecond lasers to the plasmons in the STM nano-junction and the enhanced field to the molecule that can be monitored by tunneling electrons. By imaging the tunneling electrons as a function of energy and time, it is then possible to record the spatial and temporal evolution of the topography, and the electronic, vibrational, and magnetic states of single molecules. The observation of photoinduced phenomena in nanostructures, including molecules, is relevant to a number of technologies, such as photocatalysis, solar energy harvesting, and optical communication.