Electron Transport in Molecular Transistors
ZHENG YAO, Department of Physics, The University of Texas at Austin, Austin, TX 78712

We have fabricated molecular transistors by depositing molecules between nanometer-spaced electrodes created via electromigration. Electron transport in these devices is dominated by the single-electron tunneling effect. Several examples will be discussed including (1) excitations of intramolecule vibrations in single trimetal-molecule transistors, (2) room-temperature single-electron tunneling transistors using alkanedithiols where the transport occurs through ultrasmall Au nanoparticles spontaneously formed during thiol assembly, and (3) Kondo resonance and co-tunneling behavior in metal-porphyrin and expanded-porphyrin molecule transistors.