MAR05-2004-003717

Abstract for an Invited Paper
for the MAR05 Meeting of
the American Physical Society

Phonon effects in molecular conduction junctions

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This talk will give an overview of our work on effects of electron-phonon coupling on molecular conduction, including dephasing, dissipation and heating, then describe some recent observations, interpretations and predictions on three phenomena involving phonons in molecular junctions: (a) Heat conduction and its rectification by molecular wires[1,2]; (b) inelastic electron tunneling spectroscopy[3–5] and (c) phonon-induced multi-stability, hysteresis and negative differential resistance in molecular conduction.[6] [1] D. Segal, A. Nitzan and P. Hänggi, J. Chem. Phys. **119,** 6840-6855 (2003) [2] D. Segal and A. Nitzan, cond-mat/0405472 [3]M. Galperin, M. Ratner and A. Nitzan, J. Chem. Phys. **121**, 11965-11979 (2004) [4] M. Galperin, M. Ratner and A. Nitzan, Nano Lett., **4**, 1605-1611 (2004) [5] M. Galperin, A. Nitzan, M. A. Ratner and D. R. Stewart, to be published http://atto.tau.ac.il/∼nitzan/253.pdf [6] M. Galperin, M. A.Ratner and A. Nitzan, Nano Letters, in press http://atto.tau.ac.il/∼nitzan/254.pdf