Energy transfer and conversion in molecular junctions
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Recent advances in observing and manipulating charge and heat transport at the nanoscale, and recently developed techniques for monitoring temperature at high temporal and spatial resolution, suggest that nanoscale heat engines with control over energy conversion processes may be realized. In this talk I will describe our work on energy conversion in molecular junctions along three main issues: (a) Analyzing the thermodynamics of nanoscale photovoltaic devices. (b) Discussing the thermodynamics of processes involving strong coupling between a nanosystem and its thermal environment. (c) Describing some models for controlled nanoscale energy conversion devices, with particular emphasis on a model heat transistor based on the recently discovered electron-hopping induced heat transfer phenomenon.