

Eugene Wigner Colloquium

joint event of GRK 1558 and SFB 910



Dvira Segal

University of Toronto, Canada

“Charge and heat transport at the nanoscale: Lessons from elementary models”

Quantum systems are never truly isolated from their surroundings, and this openness allows for phase decoherence and particle and energy exchange processes in the quantum system. I will discuss our efforts in simulating different families of nonequilibrium many body impurity models, relevant for describing charge and energy transport phenomena in molecules and at the nanoscale. I will focus on our recent studies of phonon-assisted electron transport in nanojunctions. Working with a minimal model, we develop a range of techniques (numerically exact, perturbative, phenomenological) to probe fundamental and practical questions concerning charge transport characteristics, current noise, fluctuation symmetries, and means for improving thermoelectric energy conversion efficiency. Delightfully, the generic inelastic transport model can be recast to describe engineered hybrid light-matter devices. This correspondence allows us to suggest strategies for enhancing photon gain - by tuning the electronic gain medium to counteract photon loss. Beyond toy models, our techniques can be scaled up to simulate intermediate coherent-incoherent electrical conduction in organic polymers and DNA molecules.

G. Schaller

Thursday, 08.12.16 · 16:15h · EW 202

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