Electronic transport through Impurities: Finite size vs. finite time effects

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Rigorous analytic results for transport properties for strongly correlated systems are rare and often one has to resort to numerical techniques to gain insight. In my talk I will introduce simulations based on the Density matrix renormalization group method (DMRG). I discuss the Kubo approach for linear transport properties and results based on simulating time dependent quenches with respect to a charge imbalance. Since the DMRG is a lattice method one has to take care of finite size effects. In the linear regime this problem can be addressed by suitable boundary conditions for the leads. In switching to the description within the framework of full counting statics (FCS) we can show that in addition to finite size effects there are intrinsic finite time effects which persist even for infinite leads.