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Quantum transport in chains with noisy off-diagonal couplings
ANDEREY PEREVERZEV, ERIC BITTNER, University of Houston — We present a model for conductivity and energy diffusion in a linear chain described by a quadratic Hamiltonian with Gaussian noise. We show that when the correlation matrix is diagonal, the noise-averaged Liouville-von Neumann equation governing the time-evolution of the system reduces to the Lindblad equation with Hermitian Lindblad operators. We show that the noise-averaged density matrix for the system expectation values of the energy density and the number density satisfy discrete versions of the heat and diffusion equations. Transport coefficients are given in terms of model Hamiltonian parameters. We discuss conditions on the Hamiltonian under which the noise-averaged expectation value of the total energy remains constant. For chains placed between two heat reservoirs, the gradient of the energy density along the chain is linear.

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