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Dynamics of thermalisation: a Gaussian regime[1] SAM GENWAY, Imperial College London, ANDREW HO, Royal Holloway, University of London, DEREK LEE, Imperial College London — We study numerically the thermalisation and temporal evolution of subsystems in a fermionic Hubbard model prepared far from equilibrium at a definite energy. Taking motivation from cold atoms in optical lattices with single-site addressability, we consider measurements on a two-site subsystem. We ask the question: how do observables on the subsystem thermalise when the total system is in a pure state? Even for very small systems near quantum degeneracy, the subsystem can reach a steady state resembling thermal equilibrium. This occurs for a non-perturbative coupling between the subsystem and the rest of the lattice where relaxation to equilibrium sharply contrasts perturbative results. To examine the extent to which this behaviour is generic for small quantum systems, we also investigate small Bose-Hubbard model systems and fermionic systems with random couplings between the subsystem and the rest of the lattice.

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