Strong thermalization of a mesoscopic two-component Bose-Hubbard model

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We study thermalization of a two-component Bose-Hubbard model by exact diagonalization. Initially the two components do not interact and are each at equilibrium but with different temperatures. As the on-site inter-component interaction is turned on, perfect thermalization occurs. Remarkably, not merely those simple "realistic" physical observables thermalize but even the density matrix of the *whole* system—the time-averaged density matrix of the system can be well approximated by that of a canonical ensemble. A conjecture about this fact is put forward.

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