

Quantum many-body systems out of equilibrium

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How do closed quantum many-body systems driven out of equilibrium eventually achieve equilibration? And how do these systems thermalize, given that they comprise so many degrees of freedom? Progress in answering these—and related—questions has accelerated in recent years—a trend that can be partially attributed to success with experiments performing quantum simulations using ultracold atoms and trapped ions. Here we provide an overview of this progress, specifically in studies probing dynamical equilibration and thermalization of systems driven out of equilibrium by quenches, ramps and periodic driving. In doing so, we also address topics such as the eigenstate thermalization hypothesis, typicality, transport, many-body localization and universality near phase transitions, as well as future prospects for quantum simulation.

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