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**Dynamics after a sweep through a quantum critical point** JOEL MOORE, University of California, Berkeley, and Lawrence Berkeley National Laboratory, FRANK POLLMANN, University of California, Berkeley, SUBROTO MUKERJEE, Indian Institute of Science, Bangalore, ANDREW GREEN, University of St Andrews — The coherent quantum evolution of a one-dimensional many-particle system after slowly sweeping the Hamiltonian through a critical point is studied using a generalized quantum Ising model containing both integrable and non-integrable regimes. It is known from previous work that universal power laws of the sweep rate appear in such quantities as the mean number of excitations created by the sweep. Several other phenomena are found that are not reflected by such averages: there are two scaling regimes of the entanglement entropy and a relaxation that is power-law in time rather than exponential. The final state of evolution after the quench is not characterized by any effective temperature, and the Loschmidt echo converges algebraically for long times, with cusplike singularities in the integrable case that are dynamically broadened by nonintegrable perturbations.

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