Quasi-adiabatic Quantum Monte Carlo algorithm for non-equilibrium quantum phase transitions[1] CHENG-WEI LIU, ANDERS W. SANDVIK, ANATOLI POLKOVNIKOV, Department of Physics, Boston University — We investigate a new quantum Monte Carlo algorithm for studying static and dynamic properties of quantum phase transitions. The method, called the quasi-adiabatic quantum Monte Carlo algorithm, is based on evolution with a changing Hamiltonian to derive information pertinent to a quantum quench according to an arbitrary protocol. We demonstrate the method with results for 1D and 2D transverse-field Ising models, showing finite-size and finite-velocity scaling according to a generalization of the Kibble-Zurek mechanism. We explore ways to extract critical points and critical exponents to high precision.

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