

Abstract Submitted
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Wavefunction Monte Carlo for Transport in Open Quantum Systems¹ JAMES GUBERNATIS, Los Alamos National Laboratory — The wave function Monte Carlo method is a technique for solving the stochastic differential equation associated with the master equation (Lindblad equation) for transport in an open quantum system. For an anisotropic, spin 1/2, XXZ Heisenberg chain in an external magnetic field, whose ends interact with heat baths, we compute the heat transport through the chain as a function of chain length, temperature difference at the ends, and the anisotropy of the chain's exchange interaction from both a wavefunction Monte Carlo simulation and a deterministic solution of the master equation for the open system's density matrix. Having both solutions creates benchmarks for the more fundamental objective of studying the consequence of replacing a piecewise deterministic step, which is typically part of the wavefunction Monte Carlo method, with a stochastic step. This replacement affords the potential of simulating longer chain lengths.

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