

Abstract Submitted
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Finite representations of continuum environments MICHAEL ZWOLAK, Los Alamos National Laboratory — Understanding dissipative and decohering processes is fundamental to the study of non-equilibrium systems and quantum computing, and such processes can even induce quantum phase transitions. A typical construction is to have a system connected to a continuum environment, which acts as the source of dissipation or decoherence, or as a reservoir of particles. If the connection is strong or the environment has long-range correlations in time, the system dynamics are not easily separated from the dynamics of the environment. To study this situation numerically, one option is to simulate both the system and environment. This is a viable option so long as an efficient finite representation of the environment can be constructed. We will discuss a procedure to construct finite representations based on the concept of two-site recurrence and increasing smoothness. For solvable cases of non-interacting bosons, the procedure gives an exponential reduction in the number of discrete modes necessary to achieve some given accuracy in a real-time simulation. We will also discuss application of this procedure to interacting systems.

Michael Zwolak
Los Alamos National Laboratory

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