

Abstract Submitted
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Entanglement Spectroscopy using Quantum Monte Carlo CHIA-MIN CHUNG, National Tsing Hua University, LARS BONNES, University of Innsbruck, POCHUNG CHEN, National Tsing Hua University, ANDREAS LÄUCHLI, University of Innsbruck — We present a numerical scheme to reconstruct a subset of the entanglement spectrum of quantum many body systems using quantum Monte Carlo. The approach builds on the replica trick to evaluate particle number resolved traces of the first n of powers of a reduced density matrix. From this information we reconstruct n entanglement spectrum levels using a polynomial root solver. We illustrate the power and limitations of the method by an application to the extended Bose-Hubbard model in one dimension where we are able to resolve the quasi-degeneracy of the entanglement spectrum in the Haldane-Insulator phase. In general the method is able to reconstruct the largest few eigenvalues in each symmetry sector and typically performs better when the eigenvalues are not too different.

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