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TITLE
Population Transfer Methods on the QREM: a Numerical Study

ABSTRACT
We study numerically the PT dynamics on the Quantum Random Energy Model in its different dynamical phases, for systems of up to 20 quantum spins. We observe a probabilistic oracular advantage of PT over random search, with optimal performance happening close to the Anderson transition. However, this advantage disappears when the time required for an oracle call is factored in the analysis, so that PT and random search show approximately the same performance. Strong finite-size effects limit the extrapolation of these results to the asymptotic case so that a speedup is not ruled out, but our results impose lower-bound constraints on the conditions necessary for such a speedup to concretize.