Statistical Physics of Quantum Matter 2013

Numerical studies of Adiabatic Quantum Computing applied to optimization and graph isomorphism problems

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We have used Quantum Monte Carlo simulations to study the efficiency of the quantum adiabatic algorithm (QAA) in solving optimization problems on a quantum computer. We have looked at several problems of the SAT type, as well as an Ising spin glass problem (Max-Cut). We find that the QAA fails to solve these problems efficiently, though for different reasons for the SAT and spin glass problems. We have also performed some initial calculations to see whether an idea related to the QAA could solve the graph isomorphism problem efficiently.