Performance of quantum annealing on random Ising problems implemented using the D-Wave Two ZHIHUI WANG, JOSHUA JOB, University of Southern California, TROELS F. RØNNOW, MATTHIAS TROYER, Institut f. Theoretische Physik, ETH Zurich, DANIEL A. LIDAR, University of Southern California, USC COLLABORATION, ETH COLLABORATION — Detecting a possible speedup of quantum annealing compared to classical algorithms is a pressing task in experimental adiabatic quantum computing. In this talk, we discuss the performance of the D-Wave Two quantum annealing device on Ising spin glass problems. The expected time to solution for the device to solve random instances with up to 503 spins and with specified coupling ranges is evaluated while carefully addressing the issue of statistical errors. We perform a systematic comparison of the expected time to solution between the D-Wave Two and classical stochastic solvers, specifically simulated annealing, and simulated quantum annealing based on quantum Monte Carlo, and discuss the question of speedup.

Zhihui Wang
University of Southern California

Electronic form version 1.4