

Mohammad Amin

D-Wave Systems Inc.

Is quantum annealing efficiently simulatable?

Past research on quantum annealing (QA) has primarily focused on optimization, and therefore the commercially available quantum annealers have been mainly designed to that end. In this talk, I will present sampling from the Boltzmann distribution of a quantum Hamiltonian as another use of quantum annealers, with applications in quantum machine learning. I will show that the equilibration dynamics of a quantum annealer cannot be simulated efficiently by classical means and argue that the existence of highly entangled eigenstates can lead to quantum advantage at some points during the annealing. I will end by showing preliminary experimental evidence of this advantage.