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Adiabatic quantum computation and Boltzmann sampling with a network of driven nonlinear oscillators

Last year, we proposed adiabatic quantum computation with a network of parametrically driven Kerr-nonlinear oscillators (KPO for short), where no dissipation was assumed [1]. Recently, we have investigated the network with dissipation by numerical simulation. Interestingly, the results suggest that the distribution of the outputs from the dissipative KPO network seems to become the Boltzmann distribution. This phenomenon can be explained by extending the theory of quantum heating in a single dissipative nonlinear oscillator to the network case. This result also provides a new application of the KPO network: Boltzmann sampling. This is useful for Boltzmann machine learning. [1] H. Goto, Sci. Rep. 6, 21686 (2016).