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Engineering pseudo-thermal distributions in quantum simulators

vendredi 9 février 2024 09:15 (45 minutes)

In this talk I will describe our research on QAOA-like algorithms, in which a quantum simulator is used for brief periods of time, in combination with local drives. We have shown in Ref. [1] that using a quantum simulator for an Ising mode just once, for an arbitrarily brief period of time, results in a pure state that resembles a Boltzmann distribution up to a limiting temperature, that scales favorably with problem size.

This result, which can be shown analytically for a single use of the simulator, has been extended recently for multiple layers, reaching arbitrarily low temperatures. I will discuss the connection between this and errors in adiabatic quantum computation and quantum annealing.

[1] Quantum Approximate Optimization Algorithm Pseudo-Boltzmann States, Pablo Díez-Valle, Diego Porras, and Juan José García-Ripoll, Phys. Rev. Lett. 130, 050601 (2023)

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