



Einladung zum Vortrag

Optimal control, lattice gauge theories, and quantum annealing

von

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Abstract:

Quantum optimal control allows finding the optimal strategy to drive a quantum system in a target state. We review an efficient algorithm to optimally control many-body quantum dynamics and apply it to quantum annealing, going beyond the adiabatic strategy. We present an information theoretical analysis of quantum optimal control processes and its implications.

We review some recent advancements we have obtained in tensor network algorithms that enable such investigations and that can be exploited to support the development of quantum technologies via classical numerical simulations: novel approaches to study abelian and non-abelian lattice gauge theories, open many-body quantum systems and systems with long-range interactions or periodic boundary conditions.

Finally, we report some theoretical and experimental applications of these approaches to relevant scenarios, such as Rydberg atoms in optical lattices and the gauge theory resulting from the mapping of classical hard problems to short-range quantum Hamiltonians.