Day 1 (Poster A)

Narendra N. Hegade, Shanghai University

Title: Digital-Adiabatic Quantum Factorization using Counter-diabatic Driving

Abstract:
Shortcuts to adiabaticity techniques are known to enhance adiabatic quantum computation by re-designing the original time-dependent Hamiltonian. This work shows that an optimally designed approximate counterdiabatic protocol can enhance the adiabatic quantum factorization algorithm by suppressing the nonadiabatic excitations. Using digitized adiabatic quantum computing, we examined various instances of prime factorization by turning it into an optimization problem using two different approaches. We show that the proposed method can perform the factorization with a shallow quantum circuit while bettering the success probability. Furthermore, we successfully implement our proposal on IBM's superconducting quantum processors with up to six qubits.