

Day 2 (Poster C)

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Title: Quantum annealing in a degenerate two-level system

Abstract:

Quantum annealing is an innovative idea and method for avoiding the increase of the calculation cost of the combinatorial optimization problem. Since the combinatorial optimization problems are ubiquitous, quantum annealing machine with high efficiency and scalability will give an immeasurable impact on many fields. However, the conventional quantum annealing machine may not have a high success probability for finding the solution because the energy gap closes exponentially as a function of the system size. To propose an idea for finding high success probability is one of the most important issues. In this talk, we talk about the performance of a quantum annealing machine in a degenerate two-level system, which may provide the higher success probability than the conventional spin-1/2 model in a weak longitudinal magnetic field region. The physics behind this is that the quantum annealing in this model can be reduced into that in the spin-1/2 model, where the effective longitudinal magnetic field may open the energy gap, which suppresses the Landau-Zener tunneling providing leakage of the ground state.