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Quantum annealer based on Kerr parametric oscillators

Tsuyoshi Yamamoto*NEC Corporation*

Abstract

Josephson parametric oscillator is a superconducting driven oscillator, in which the resonance frequency is modulated at twice of it with a modulation amplitude larger than a threshold. The oscillation states of a JPO composed of two different states with the same amplitude but opposite phase (0π or 1π) can be used as two basis states of a qubit. In this talk, I will show our study on the basic physical properties of a JPO toward the realization of a quantum annealing machine. I will also introduce our three-dimensional packaging technologies, which are necessary for the large-scale integration in the future.