QUANTUM INNOVATION 2023

CP-02-02

Semiconductor integration technology for realization of silicon quantum computers

Noriyuki Lee

Hitachi, Ltd.

Abstract

The scalability and long coherence time of silicon quantum dot-based qubits make them promising candidates for large-scale quantum computing. We are developing two-dimensional Si spin-qubit arrays and operating circuits utilizing silicon integrated circuit technologies. In the “Initialization”, “Operation”, and “Readout” schemes required for quantum computing, the technology developed in consideration of large-scale integration and operability by taking advantage of the characteristics of silicon is demonstrated. We will discuss our efforts to realize large-scale quantum computers including hardware and software.