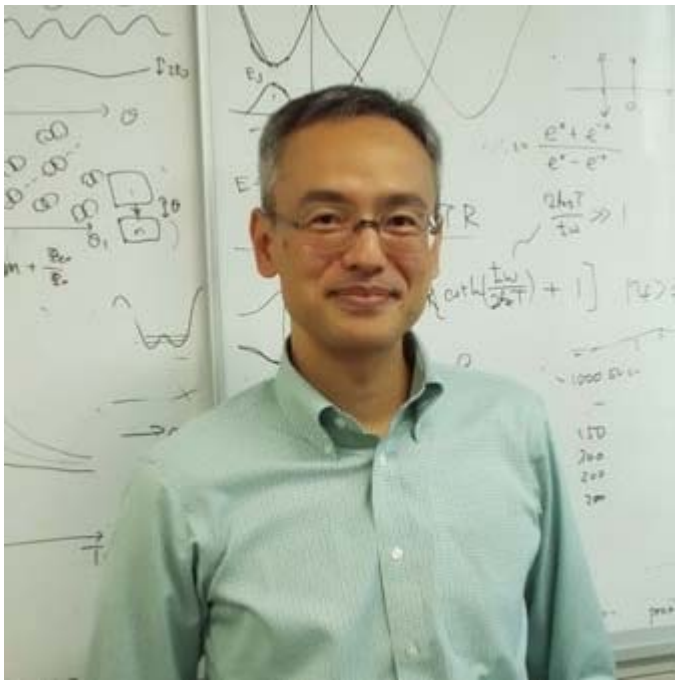

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# Superconducting circuits for quantum technologies

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Superconducting circuits have been widely investigated for various applications in quantum information technologies. Thanks to the drastic improvement of the coherence of superconducting qubits in the last two decades, as well as to their large dipole moment and strong nonlinearity that allow fast control and readout, they are considered as one of the most promising platforms for quantum processors flexibly designed on-chip. In addition, based on circuit quantum electrodynamics, qubits are coupled to resonators and waveguides to exploit the properties of those bosonic modes, either localized or propagating. The auxiliary modes can also be replaced with other collective modes, e.g., magnetic and acoustic ones, to form hybrid quantum systems, expanding the realm of quantum technologies. In this talk, we present our research activities on superconducting quantum circuits in those aspects, i.e., (i) integrated qubits for quantum computing, (ii) microwave quantum optics in superconducting circuits [1-4] and (iii) hybrid quantum systems [6-8].

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