

Foundry service for superconducting digital and quantum circuits in G-QuAT/AIST

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Abstract

National Institute of Advanced Industrial Science and Technology (AIST) established a new center regarding quantum technologies whose name is Global Research and Development Center for Business by Quantum-AI Technology (G-QuAT). G-QuAT possesses a clean room for superconducting devices. The clean room is Superconducting Quantum Circuit Fabrication Facility (Qufab). Qufab took over superconducting circuit fabrication technologies which have been developed and implemented many circuits for more than 40 years in AIST and other Japanese institutes. Up to now, supply destinations of Qufab devices were limited to several collaborated institutes with AIST. October 2024, Qufab started open foundry service to wide range of users. Expected users are domestic and international, public and private institutes. Both research and commercial uses are acceptable. Superconducting digital circuits which consist of four Nb layers, one Nb/Al-AIO_x/Nb Josephson junction layer, one Mo resistance layer and planarized SiO₂ between the metal layers are fabricated for the first foundry service and multiple users share one 4-inch wafer. Because Qufab will stop from January to March in 2025 by replacing several equipment, Qufab foundry start in full swing will be spring 2025. Quantum circuits will be added to the foundry service in the future.