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Superconducting SFQ Circuits Research Progress in China

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Although it has been about 30 years since the birth of superconducting circuits, research activities on them have remained quietly in China, if not none, until recently. The first wafer-level single flux quantum (SFQ) process in China appeared about 3 years ago at SIMIT. Since then, we have gone through several upgrades and changes. Corresponding design and measurement infrastructure have been developed on site simultaneously to enable close-loop feedback research cycles. In particular, we have established process control monitor (PCM) analysis for the latest SIMIT Nb03 SFQ process, and carried out systematically measurement and verification of cell libraries optimized for this process and move towards benchmark circuits demonstration, such as shift register, frequency divider and so on. Besides, EDA tools for optimization and buildup of SFQ cell libraries: model, behavior and timing libraries, as well as automatic placement and routing for large scale SFQ circuits design have been developed. In this report, we will present these latest progresses.

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