

interface on one of the quantum processors available through the IBM Quantum Experience platform. Customized control pulses were constructed using the open-source Qiskit Pulse framework by Kanazawa-san, and the calibration and refinement of the CS gate were accomplished without significant intervention during the experiment from lab personnel at IBM's T.J. Watson Research Center in Yorktown Heights, NY, USA where IBM's quantum computing systems are maintained. When asked if this paves the way for the development of new gates and calibration techniques by the community at large on IBM's cloud-based quantum processors, Kanazawa-san said, "True... everything was done remotely with Qiskit. Everyone in the community can reproduce our work."

As of July 2020, IBM launched the IBM Quantum Researchers Program that provides free priority access to their 5-qubit systems. Applicants must have published at least one paper in the field of quantum information science to be considered for access. However, the deeper access that would be necessary to develop customized microwave pulses, like the CS, is only available to paying customers. IBM's Sebastian Hassinger says on their official blog that one may apply for "special grants to perform projects for periods of time sufficient to complete experiments and publish papers" [4]. Access to IBM's premium processors is also becoming more attainable as third-party companies like Cambridge Quantum Computing are beginning to broker short-term (*i.e.* 6 months) access to the IBM Q Network [5]. As access to high-coherence qubits spreads to the community, further advances in the calibration and optimization of superconducting qubits are surely on the horizon.

References:

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