Title:	Experimental demonstration of optimized quantum process tomography on the IBM quantum experience
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Keywords:	Quantum process tomography Constrained convex optimization IBM quantum processor
Issue Date:	2020
Publisher:	World Scientific
Citation:	International Journal of Quantum Information, 2040004
Abstract:	We experimentally performed complete and optimized quantum process tomography of quantum gates implemented on superconducting qubit-based IBM QX2 quantum processor via two constrained convex optimization (CCO) techniques: least squares optimization and compressed sensing optimization. We studied the performance of these methods by comparing the experimental complexity involved and the experimental fidelities obtained. We experimentally characterized several two-qubit quantum gates: identity gate, a controlled-NOT gate, and a SWAP gate. The general quantum circuit is efficient in the sense that the data needed to perform CCO-based process tomography can be directly acquired by measuring only a single qubit. The quantum circuit can be extended to higher dimensions and is also valid for other experimental platforms.
URI:	https://www.worldscientific.com/doi/abs/10.1142/S0219749920400043 (https://www.worldscientific.com/doi/abs/10.1142/S0219749920400043) http://hdl.handle.net/123456789/3436 (http://hdl.handle.net/123456789/3436)
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