Title:	Implementing efficient selective quantum process tomography of superconducting quantum gates on IBM quantum experience
Authors:	Gaikwad, Akshay (/jspui/browse?type=author&value=Gaikwad%2C+Akshay) Shende, Krishna (/jspui/browse?type=author&value=Shende%2C+Krishna) Arvind (/jspui/browse?type=author&value=Arvind) Dorai, Kavita (/jspui/browse?type=author&value=Dorai%2C+Kavita)
Keywords:	Implementing Quantum process Tomography Superconducting quantum
Issue Date:	2022
Publisher:	Scientific Reports
Citation:	Scientific Reports, 12(1), 77213.
Abstract:	The experimental implementation of selective quantum process tomography (SQPT) involves computing individual elements of the process matrix with the help of a special set of states called quantum 2-design states. However, the number of experimental settings required to prepare input states from quantum 2-design states to selectively and precisely compute a desired element of the process matrix is still high, and hence constructing the corresponding unitary operations in the lab is a daunting task. In order to reduce the experimental complexity, we mathematically reformulated the standard SQPT problem, which we term the modified SQPT (MSQPT) method. We designed the generalized quantum circuit to prepare the required set of input states and formulated an efficient measurement strategy aimed at minimizing the experimental cost of SQPT. We experimentally demonstrated the MSQPT protocol on the IBM QX2 cloud quantum processor and selectively characterized various two- and three-qubit quantum gates
Description:	Only IISER Mohali authors are available in the record.
URI:	https://doi.org/10.1038/s41598-022-07721-3 (https://doi.org/10.1038/s41598-022-07721-3) http://hdl.handle.net/123456789/4411 (http://hdl.handle.net/123456789/4411)
Appears in Collections:	Research Articles (/jspui/handle/123456789/9)

Files in This Item:

File	Description	Size	Format	
Need To Add…Full Text_PDF..pdf (/jspui/bitstream/123456789/4411/1/Need%20To%20Add%e2%80%a6Full%20Text_PDF..pdf)		15.36 kB	Adobe PDF	View/Open (/jspu

Show full item record (/jspui/handle/123456789/4411?mode=full)
(/jspui/handle/123456789/4411/statistics)