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Title:	Constructing valid density matrices on an NMR quantum information processor via maximum likelihood estimation
Authors:	Singh, Harpreet (/jspui/browse?type=author&value=Singh%2C+Harpreet) Arvind (/jspui/browse?type=author&value=Arvind) Dorai, K. (/jspui/browse?type=author&value=Dorai%2C+K.)
Keywords:	Quantum information processing State estimation Nuclear magnetic resonance
Issue Date:	2016
Publisher:	Elsevier
Citation:	Physics Letters, Section A: General, Atomic and Solid State Physics, 380(38),pp. 3051-3056.
Abstract:	Estimation of quantum states is an important step in any quantum information processing experiment. A naive reconstruction of the density matrix from experimental measurements can often give density matrices which are not positive, and hence not physically acceptable. How do we ensure that at all stages of reconstruction, we keep the density matrix positive? Recently a method has been suggested based on maximum likelihood estimation, wherein the density matrix is guaranteed to be positive definite. We experimentally implement this protocol on an NMR quantum information processor. We discuss several examples and compare with the standard method of state estimation.
URI:	https://www.sciencedirect.com/science/article/pii/S0375960116304698 (https://www.sciencedirect.com/science/article/pii/S0375960116304698) http://hdl.handle.net/123456789/2483 (http://hdl.handle.net/123456789/2483)
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