Abstract Submitted
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Distribution of quantum Fisher information in asymmetric cloning machines[1] XING XIAO, YAO YAO, Beijing Computational Science Research Center, LEI-MING ZHOU, Key Laboratory of Quantum Information, University of Science and Technology of China, XIAOGUANG WANG, Zhejiang Institute of Modern Physics, Department of Physics, Zhejiang University — An unknown quantum state cannot be copied and broadcast freely due to the no-cloning theorem. Approximate cloning schemes have been proposed to achieve the optimal cloning characterized by the maximal fidelity between the original and its copies. Here, from the perspective of quantum Fisher information (QFI), we investigate the distribution of QFI in asymmetric cloning machines which produce two nonidentical copies. As one might expect, improving the QFI of one copy results in decreasing the QFI of the other copy, roughly the same as that of fidelity. It is perhaps also unsurprising that asymmetric phase-covariant cloning outperforms universal cloning in distributing QFI since a priori information of the input state has been utilized. However, interesting results appear when we compare the distributabilities of fidelity (which quantifies the full information of quantum states), and QFI (which only captures the information of relevant parameters) in asymmetric cloning machines. Unlike the results of fidelity, where the distributability of symmetric cloning is always optimal for any d-dimensional cloning, we find that any asymmetric cloning outperforms symmetric cloning on the distribution of QFI for $d \leq 18$, whereas some but not all asymmetric cloning strategies could be worse

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