

Abstract Submitted
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Interaction- and Measurement-Free Quantum Zeno Gates for Single-Atom and Single-Photon Qubits¹ YUPING HUANG, MICHAEL MOORE, Michigan State University — By extending the Elitzur Vaidman concept of interaction-free imaging to the few-atom level, we show that on-demand interaction- and measurement-free quantum logic gates can be realized for both single-atom and single-photon qubits [1]. We present a general theory of quantum Zeno phase gates, and describe physical implementations of several useful quantum gates for universal quantum information processing with individual atomic and photonic qubits in a high-Q ring cavity. [1] Y. P. Huang and M. G. Moore, Phys. Rev. A 77, 062332 (2008).

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