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Shanghai Branch, CAS Center for Excellence and Synergetic Innovation Center in Quantum Information and
Quantum Physics, USTC, Shanghai 201315, China

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Experimental implementation of the Bacon-Shor code with 10 entangled photons[1] MERCEDES GIMENO-SEGOVIA, Centre for Quantum Photonics, University of Bristol H.H. Wills Physics Laboratory, Tyndall Avenue, Bristol BS8 1TL, UK, BARRY C. SANDERS, Institute for Quantum Science and Technology, University of Calgary, Alberta T2N 1N4, Canada — The number of qubits that can be effectively controlled in quantum experiments is growing, reaching a regime where small quantum error-correcting codes can be tested. The Bacon-Shor code is a simple quantum code that protects against the effect of an arbitrary single-qubit error. In this work, we propose an experimental implementation of said code in a post-selected linear optical setup, similar to the recently reported 10-photon GHZ generation experiment. In the procedure we propose, an arbitrary state is encoded into the protected Shor code subspace, and after undergoing a controlled single-qubit error, is successfully decoded.

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Date submitted: 11 Nov 2016　　　　　　　　　　Electronic form version 1.4