## Abstract Submitted for the MAR06 Meeting of The American Physical Society

Interconvertibility of single-rail optical qubits<sup>1</sup> BARRY SANDERS<sup>2</sup>, Institute for Quantum Information Science, University of Calgary, DOMINIC BERRY, The University of Queensland, A. I. LVOVSKY, Institute for Quantum Information Science, University of Calgary — We show how to convert between partially coherent superpositions of a single photon with the vacuum using linear optics and postselection based on homodyne measurements. We introduce a generalized quantum efficiency for such states and show that any conversion that decreases this quantity is possible. We also prove that our scheme is optimal by showing that no linear optical scheme with generalized conditional measurements, and with one single-rail qubit input can improve the generalized efficiency.

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