Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Generation of Microwave Single Photons and Homodyne Tomography on a Chip[1] MATTEO MARIANTONI, Walter-Meissner Institute, Bavarian Academy of Sciences, MARKUS STORCZ, FRANK WILHELM[2], Ludwig-Maximilians-Universitaet, WILLIAM OLIVER, MIT Lincoln Laboratories, ANDREAS EMMERT, ACHIM MARX, RUDOLF GROSS, Walter-Meissner Institute, Bavarian Academy of Sciences, HENNING CHRIST, ENRIQUE SOLANO, Max-Planck Institute for Quantum Optics — We show that flux-based qubits can be coupled to superconductive resonators by means of a quantum-optical Raman excitation scheme and utilized for the deterministic generation of propagating microwave single photons. We introduce also a microwave quantum homodyning technique that enables the detection of single photons and other weak signals, and full state reconstruction via quantum tomography, realizing linear optics on a chip. These generation and detection protocols are building blocks for the advent of quantum information processing in the field of circuit QED (M. Mariantoni *et al.* cond-mat/0509737) . We discuss further applications of these ideas to create multipartite nonclassical states of the electromagnetic field.

[1]supported by the Deutsche Forschungsgemeinschaft within SFB 631
[2]present address: University of Waterloo

Frank Wilhelm
University of Waterloo

Date submitted: 11 Jan 2006 Electronic form version 1.4