Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Two-port directional parametric amplifier[1] ARCHANA KAMAL, MICHEL DEVORET, Departments of Physics and Applied Physics, Yale University, JOHN CLARKE, Department of Physics, University of California Berkeley and Materials Sciences Division, Lawrence Berkeley National Laboratory — Parametric amplifiers working at the quantum limit are indispensable for fast, accurate measurements of superconducting qubits and other sensitive mesoscopic systems. Conventional microwave parametric amplifiers usually operate as one-port reflection devices and rely on non-reciprocal components like circulators. Besides affecting the magnetic environment near delicate superconducting devices, circulators are problematic for on-chip integration owing to their relatively bulky size. We will present the results of a theoretical analysis of a minimal-noise directional amplifier based on parametric Josephson devices, which would avoid the need for circulators in quantum-limited measurements. The link between the non-reciprocal operation of this amplifier and the dynamics of the microwave dc SQUID amplifier will be discussed.

[1]Work supported by ARO and NSF (AK and MHD) and DOE BES (JC)

Archana Kamal
Departments of Physics and Applied Physics, Yale University

Date submitted: 20 Nov 2009 Electronic form version 1.4