Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Circuit QED with superconducting flux qubits controlled by a bias current MUN DAE KIM, K. MOON, Yonsei University — We propose a circuit QED scheme for the superconducting flux qubits. It is shown that the bias-current-control of the flux qubit can be performed for the qubit loop with asymmetry. Hence the three-Josephson-junction flux qubit rather than the rf-SQUID qubit or the dc-SQUID loop can be controlled by a bias current as in the usual superconducting phase qubit. The qubit operation and the qubit state detection are performed by bias current, instead of the external magnetic field used for the flux qubit. Our current-biased flux qubit has the advantages of the optimal point operation of the flux qubit and the scalability and fast operation of the phase qubit as well. By coupling the flux qubit with the oscillating current modes in a superconducting cavity, the two-qubit gate between flux qubits can be achieved.

Kim Mun Dae
Yonsei University

Date submitted: 25 Nov 2009 Electronic form version 1.4