Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

**Dephasing and Kerr type interaction effects in circuit quantum electrodynamics** ERAN GINOSSAR, Advanced Technology Institute and Department of Physics, University of Surrey, STEVEN GIRVIN, Department of Physics, Yale University — There has been recently a significant advance in obtaining high quality factor resonators in superconducting circuit architectures. The reduction of the resonator line width motivates us to consider subtle Kerr type interaction effects in small clusters of cavities and transmon type qubits. The Kerr interaction leads to entanglement of cavities, which in the transient regime is manifested in collapse-revival dynamics. For longer time scales, the interaction of the system with its environment becomes important and we discuss how the entangled states are modified. The signal of this steady-state Kerr interaction is a multi-photon port-to-port scattering process which can be observed in homodyne measurements or in a spectral analysis (correlations). We discuss the relevance of these effects to the challenge of building quantum memories.

Eran Ginossar
University of Surrey

Date submitted: 11 Nov 2011 Electronic form version 1.4