

Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Entanglement and Shot Noise in a two-qubit c-QED¹ L.D. CONTRERAS-PULIDO, Instituto de Ciencia de Materiales de Madrid-CSIC, C. EMARY, T. BRANDES, Technische Universitaet Berlin, R. AGUADO, Instituto de Ciencia de Materiales de Madrid-CSIC — It has been proved in the last few years that circuit quantum electrodynamics (c-QED) is a promising architecture for quantum information processing and quantum computation realizations [1]. We theoretically study a c-QED system consisting of two charge-qubits (defined in two Cooper-Pair boxes) coupled to a common bosonic mode (photon, phonon) inside a transmission line cavity. In particular, we analyze a transport setup in which each qubit is attached to a drain electrode such that the Josephson Quasiparticle cycle induces an electrical current flow across them [2]. By means of a Quantum Master Equation approach, shot noise cross-correlations of the electrical current are studied and their remarkable behavior is related with the degree of entanglement induced between the qubits by the coupling with the boson mode.

[1] L. DiCarlo et al., *Nature* 460, 240 (2009); J. Mayer et al., *Nature* 449, 443 (2007), Y. Bishop et al., *New J.Phys.* 11, 073040 (2009), Hutchinson et al., *Can. J. Phys.* 87, 225 (2009).

[2] For example O. Astafiev, et al., *Nature* 449, 588 (2007).

¹LDC-P acknowledges support from CONACyT.

L.D. Contreras-Pulido
Instituto de Ciencia de Materiales de Madrid-CSIC

Date submitted: 18 Nov 2009

Electronic form version 1.4