

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Cooperative effects for Qubits in a Transmission Line: Theory K. LALUMIÈRE, A. BLAIS, Université de Sherbrooke , B.C. SANDERS, University of Calgary, A.F. VAN LOO, A. FEDOROV, A. WALLRAFF, ETH Zurich — Strong extinction of the transmitted power in a 1D transmission line coupled to an artificial atom has recently been achieved [1]. In contrast to the 3D case, large extinctions are made possible by the strong light-matter coupling occurring because of reduced dimensionality. Motivated by this, here we consider the situation where multiple artificial atoms (ie transmon qubits) are coupled to the 1D line. Following the work of Lehmborg for the 3D case [2], we obtain a master equation describing the dynamics of an arbitrary number of qubits coupled to the line. This master equation reveals interaction between the qubits mediated by the line. Using the input-output formalism, the model is compared to experimental results for multiple qubits coupled to the 1D line. [1] O. Astafiev et al., Science 327, 840 (2010) [2] R. H. Lehmborg. Phys. Rev. A 2, 883 (1970).

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Date submitted: 15 Nov 2011

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