

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Towards a spin-ensemble quantum memory for superconducting qubits PATRICE BERTET, YUIMARU KUBO, CECILE GREZES, DENIS VION, DANIEL ESTEVE, CEA Saclay, IGOR DINIZ, ALEXIA AUFFEVES, Institut Neel, JUNICHI ISOYA, Tsukuba University, ANAIS DREAU, JEAN-FRANÇOIS ROCH, VINCENT JACQUES, ENS Cachan, BRIAN JULSGAARD, KLAUS MOELMER, Aarhus University — A multi-mode quantum memory able to store coherently large numbers of qubit states is a desirable resource for quantum information. We report progress towards this direction, using an ensemble of electronic spins (NV centers in diamond) coupled to a superconducting transmon qubit via a tunable resonator. We demonstrate the reversible coherent storage and retrieval of a single microwave photon from the qubit into the spin ensemble [1]. In this experiment the storage time was however limited by inhomogeneous broadening of the ensemble of spins. We propose a realistic protocol that should extend the ensemble storage time by several orders of magnitude, based on spin-echo like pulse sequences; first experimental results will be presented.

[1] Y. Kubo et al., PRL 107, 220501 (2011).

Patrice Bertet
CEA Saclay

Date submitted: 04 Dec 2012

Electronic form version 1.4