

Abstract Submitted
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Coupling of Electron Spin Ensembles to Superconducting Transmission Line Resonators ADAM SEARS, DAVID SCHUSTER, LEO DICARLO, LEV BISHOP, ERAN GINOSSAR, LUIGI FRUNZIO, Yale University, JANUS WESENBERG, ARZHANG ARDAVAN, ANDREW BRIGGS, University of Oxford, KLAUSS MOELMER, University of Aarhus, JOHN MORTON, University of Oxford, ROBERT SCHOELKOPF, Yale University — Recent proposals have suggested using a mesoscopic ensemble of electron spins to create a quantum memory for superconducting qubits in solid state systems[1]. Such ensembles can have large cavity couplings (\sim MHz) and should have long coherence times. Here we show the measurement and coupling of electron spins in ruby and diamond to multiplexed superconducting coplanar waveguide (CPW) cavities, as well as broadband spectroscopy of ruby using a CPW transmission line. We discuss the application of these techniques to electron spin resonance at low power, millikelvin temperatures, and over many gigahertz and evaluate the suitability of our materials for quantum computing.

[1] Wesenberg J et al 2009 Phys. Rev. Lett. 103 070502

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