

Abstract Submitted
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Quantum computing with an electron spin ensemble KLAUS MOELMER, Aarhus University, ARZHANG ARDAVAN, ANDREW BRIGGS, JOHN MORTON, JANUS WESENBERG, Oxford University, ROBERT SCHOELKOPF, DAVE SCHUSTER, Yale University — We propose to encode a register of quantum bits in different collective electron spin wave excitations in a solid medium. Communication between spins is enabled by locating them in the vicinity of a stripline cavity, and making use of their strong collective coupling to the quantized radiation field. The transformation between different spin waves is achieved by applying gradient magnetic fields across the sample, while a Cooper Pair Box, resonant with the cavity field, may be used to carry out one- and two-qubit gate operations. In the presentation we will address the achievable number of bits and number of gates with current measured and estimated physical parameters.

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