Abstract Submitted
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Design and modeling of electro-optomechanical devices for microwave to optical quantum state transfer[1] P.S. BURNS, R.W. ANDREWS, R.W. PETERSON, University of Colorado Boulder, T.P. PURDY, JILA, K. CICAK, R.W. SIMMONDS, NIST Boulder, C.A. REGAL, K.W. LEHNERT, JILA — A transducer that could transfer quantum information between the microwave and optical domains would connect the information processing and storage power of superconducting qubits with the long distance communication power of light in optical fibers. Electro-optomechanical structures, which parametrically couple mechanical vibration to both optical and microwave resonantors, have emerged as promising candidates for realizing such a transducer. Following on the recent demonstration of bidirectional and efficient conversion of classical information between the microwave and optical domains [1], we report on the design of improved electro-optomechnical transducers. These new transducers are designed to operate with higher conversion bandwidth and in a dilution refrigerator, thereby reaching the regime of quantum transduction.

[1] R.W. Andrews, R.W. Peterson, T.P. Purdy, K. Cicak, R.W. Simmonds, C.A. Regal, K.W. Lehnert, Nat. Phys. 10, 321-326 (2014)

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