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Generating distributable and unconditional entanglement on-chip at microwave frequencies W.F. KINDEL, H.S. KU, JILA and the University of Colorado, S. GLANCY, G.C. HILTON, K.D. IRWIN, E. KNILL, L.R. VALE, NIST, K.W. LEHNERT, JILA and the University of Colorado — Entanglement is a critical requirement for quantum teleportation protocols. In a strategy to generate entanglement between two separate microwave lines, we integrate two Josephson Parametric Amplifiers (JPAs) and a quadrature hybrid onto a single chip making the entangler circuit. When two squeezed states created by the JPAs are combined on the hybrid (microwave beam splitter), the two output modes are entangled. We observe entanglement using a quantum efficient two channel quadrature measurement device. In our initial tests, the degree of entanglement has been limited by undesirable coupling among the elements of our entangler circuit. We present our investigation of the undesired coupling along with design strategies to reduce it.

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