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Remote entanglement stabilization for modular quantum computing[1] NICOLAS DIDIER, Inria Paris, S. SHANKAR, Department of Applied Physics, Yale University, M. MIRRAHIMI, Inria Paris and Department of Applied Physics, Yale University — Quantum information processing in a modular architecture requires to distribute and stabilize entanglement in a qubit network. We present autonomous entanglement stabilization protocols between two qubits that are coupled to distant cavities. The cavities coupling is mediated and controlled via a three-wave mixing device that generates either a delocalized mode or a two-mode squeezed state between the remote cavities depending on the pump frequency. Local drives on the qubits and the cavities steer and maintain the system to the desired qubit Bell state. We show that these reservoir-engineering based protocols stabilize entanglement in presence of qubit-cavity asymmetries and losses. Most spectacularly, even a weakly-squeezed state can stabilize a maximally entangled Bell state of two distant qubits through entanglement accumulation.

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