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Quantum bath engineering in near-resonance regime ZHAOQI LENG, GENGYAN ZHANG, ANDREI VRAJITOAREA, ANDREW HOUCK, Princeton Univ — Quantum bath engineering aims to stabilize entangled qubit states through carefully engineered dissipation and well-chosen drives, as opposed to traditional gate-based approaches. Recent experimental efforts have demonstrated two qubits autonomous entanglement by dispersively coupling them through one or two resonators. Instead of working in the dispersive regime and tracing out the resonator, we bring qubits and a resonator near resonance so their energy levels hybridize into joint eigenstate ladders. Here, we present results of stabilizing an entangled state of two qubits near resonance with a lossy resonator. In addition, we propose a new way of modularize a qubit-resonator system to achieve remote entanglement between two qubits.

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