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Steady-state entanglement of distant transmons, stabilised against high transmission loss FELIX MOTZOI, ELI HALPERIN, University of California, Berkeley, XIAOTING WANG, Massachusetts Institute of Technology, BIRGITTA WHALEY, University of California, Berkeley, SOPHIE SCHIRMER, Swansea University — Being able to stabilise entanglement over long distances and long times provides numerous advantages over pulsed experiments (avoiding variability, synchronisation, and calibration issues) while providing an important resource on-demand, which can then be potentially distilled and used to construct a quantum network. We show how existing superconducting technologies can be entangled over distances of tens of meters providing resilient stabilisation even in the presence of high inefficiency of the transmission channel. This can be achieved both in the dispersive and near-resonant cavity regimes using simple protocols that employ correlated environmental interactions and symmetry breaking. These require only a single-frequency drive that interacts sequentially with each cavity-qubit system. The dispersive regime protocol uses feedback while the near-resonant regime protocol is autonomous.

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