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**Generating entanglement via measurement between two remote superconducting qubits**[1]

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Measurement has traditionally been viewed as a means to restore classical behavior to a quantum system: a coherent superposition, once observed, transforms into a single classical state. However, it is possible to design a measurement that instead projects into an entangled state, thereby purifying, rather than destroying, quantum correlations. We use continuous measurement to generate entanglement between two superconducting qubits that are separated by more than a meter of cable, demonstrating that quantum information can be transferred over the metallic wires that comprise a low-loss channel for microwave photon propagation. We further generate a faithful, time-resolved record of single quantum trajectories. Studying the statistics of these trajectories and of the ensemble of measurements provides insight into the dynamics of measurement-induced entanglement in an extended quantum network.

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