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Optimizing Quantum Repeater Protocols LIANG JIANG, JACOB TAYLOR, Harvard University Department of Physics, NAVIN KHANEJA, Harvard University, MIKHAIL LUKIN, Harvard University Department of Physics — By using dynamical programming, we systematically investigation methods for optimizing quantum repeaters protocols. We focus on balancing error-correction stages, such as purification, with connection stages which extend the distance of the generated entanglement. Given parameters describing apparatus imperfections, we can find the most time-efficient arrangement of entanglement connection and purification to achieve a targeted fidelity for the final entangled pair. Application of the method to various practical protocols yields substantial improvements compared to the existing schemes.

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