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Serialized Quantum Error Correction Protocol for High-Bandwidth Quantum Repeaters ANDREW GLAUDELL, Univ. of Maryland, National Institute of Standards and Technology, EDO WAKS, Univ. of Maryland and the National Institute of Standards and Technology, JACOB TAYLOR, Univ. of Maryland, National Institute of Standards and Technology — Advances in single-photon creation, transmission, and detection suggest that sending quantum information over optical fibers may have low enough losses to be overcome using quantum error correction. Such error-corrected communication is equivalent to a novel quantum repeater scheme, but crucial questions regarding implementation and system requirements remain open. In this talk, I will show that long-range entangled bit generation with rates approaching 10^8 entangled bits per second may be possible using a completely serialized protocol, in which photons are generated, entangled, and error corrected via sequential, one-way interactions with as few matter qubits as possible. Provided loss and error rates of the required elements are below the threshold for quantum error correction, this scheme demonstrates improved performance over transmission of single photons. We find improvement in entangled bit rates at large distances using this serial protocol and various quantum error correcting codes.

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