

Abstract Submitted
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High-speed polarization-encoded quantum key distribution based on silicon photonic integrated devices¹ DARIUS BUNANDAR, Massachusetts Inst of Tech-MIT, JUNJI URAYAMA, NICHOLAS BOYNTON, NICHOLAS MARTINEZ, CHRISTOPHER DEROSE, ANTHONY LENTINE, PAUL DAVIDS, RYAN CAMACHO, Sandia National Laboratories, FRANCO WONG, DIRK ENGLUND, Massachusetts Inst of Tech-MIT — We present a compact polarization-encoded quantum key distribution (QKD) transmitter near a 1550-nm wavelength implemented on a CMOS-compatible silicon-on-insulator photonics platform. The transmitter generates arbitrary polarization qubits at gigahertz bandwidth with an extinction ratio better than 30 dB using high-speed carrier-depletion phase modulators. We demonstrate the performance of this device by generating secret keys at a rate of 1 Mbps in a complete QKD field test. Our work shows the potential of using advanced photonic integrated circuits to enable high-speed quantum-secure communications.

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