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Entanglement-based Free Space Quantum Cryptography in Daylight ILJA GERHARDT, MATTHEW P. PELOSO, CALEB HO, ANTIA LAMAS-LINARES, CHRISTIAN KURTSIEFER, National University of Singapore — In quantum key distribution (QKD) two families of protocols are established: One, based on preparing and sending approximations of single photons, the other based on measurements on entangled photon pairs, which allow to establish a secret key using less assumptions on the size of a Hilbert space. The larger optical bandwidth of photon pairs in comparison with light used for the first family makes establishing a free space link challenging. We present a complete entanglement based QKD system following the BBM92 protocol, which generates a secure key continuously 24 hours a day between distant parties. Spectral, spatial and temporal filtering schemes were introduced to a previous setup, suppressing more than 30 dB of background. We are able to establish the link during daytime, and have developed an algorithm to start and maintain time synchronization with simple crystal oscillators.

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