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Production of Entangled Photon Pairs in Optical Fiber via Four-Wave Mixing JOSHUA SLATER, AHDIYEH DELFAN, ALLISON RUBENOK, IQIS, University of Calgary, FÉLIX BUSSIÈRES, IQIS, University of Calgary; COPL, Polytechnique Montréal, NICOLAS GODBOUT, COPL, Polytechnique Montréal, WOLFGANG TITTEL, IQIS, University of Calgary — Building a quantum cryptography network with optical fiber is desirable as fiber is well understood and networks are already widespread. Transmitting through free-space is also desirable as it allows key distribution where optical fibers are not available. However, the absorption minima for these methods are at widely separated wavelengths: 1550 nm for fiber and around 800 nm for free-space. To create a hybrid network we are working towards teleporting quantum information from a photon suitable for fiber transmission to a photon suitable for free-space transmission. To achieve this, we require entangled photons at widely separated wavelengths, which are normally produced in non-linear crystals. Our research focuses on producing the entangled pair directly in optical fiber using four-wave mixing (FWM). We examined the possibility of using two pump lasers at widely separated wavelengths, whereas previous FWM photon pair source experiments have used a single pump laser. We present initial results of phase matching for feasible experimental setups.

Joshua Slater
IQIS, University of Calgary

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