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Accessible Hong-Ou-Mandel Measurements of Frequency-Entangled Light[1] AMOS MANNESCHMIDT, Univ of Tennessee, Knoxville — A technology for reliably generating entangled photon pairs would greatly help other emerging technologies, such as quantum key distribution and optical computing. We sought to analyze the entanglement of photons correlated across their frequency degree of freedom. This avenue of research is warranted because traditional means of creating joint spectral probability distributions require continuous time tagging superconducting nanowire single photon detectors (SNSPDs), in conjunction with low-jitter time-of-arrival electronics. This method instead uses standard InGaAs avalanche photodetectors (APDs) to create a joint spectral probability distribution from photon pairs generated via downconversion processes in a non-linear media waveguide. In this setup, the sum of two entangled photon energies will exactly equal the energy of the incident pump photon. By launching the downconverted photons into a Hong-Ou-Mandel interference setup consisting of hundreds of meters of fiber optic cable, pair separation is achieved; individual photon arrival times are correlated to energy. By selecting the proper length of cable, g^2, can be measured to indicate downconversion efficiency.

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Amos Manneschmidt
Univ of Tennessee, Knoxville

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