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Hong-Ou-Mandel Interference Between Triggered And Heralded Single Photons From Separate Atomic Systems ALESSANDRO CERE, VICTOR LEONG, GURPREET KAUR GULATI, BHARATH SRIVATHSAN, SANDOKO KOSEN, Centre for Quantum Technologies, NUS, CHRISTIAN KURTSIEFER, Centre for Quantum Technologies, NUS and National University of Singapore — The realization of quantum networks and long distance quantum communication rely on the capability of generating entanglement between separated nodes. We demonstrate the compatibility of two different sources of single photons: a single atom and four-wave mixing in a cold cloud of atoms. The four-wave mixing process in a cloud of cold ^{87}Rb generates photon pairs. The cascade level scheme used ensures the generation of heralded single photons with exponentially decaying temporal envelope. The temporal shape of the heralding photons matches the shape of photons emitted by spontaneous decay but for the shorter coherence time A single ^{87}Rb atom is trapped in an far-off-resonance optical dipole trap and can be excited with high probability using a short ($\approx$3 ns) intense pulse of resonant light, emitting a single photon by spontaneous decay. A large numerical aperture lens collects $\approx$4% of the total fluorescence. The heralded and the triggered photons are launched into a Houng-Ou-Mandel interferometer: a symmetrical beam-splitter with outputs connected to single photon detectors. Scanning the relative delay between the two sources we observe the HOM dip with a maximum visibility of 70$\pm$4%.

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