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Quantum-state tomography of single-photon entangled states E. BURCH, C. HENELSMITH, W. LARSON, M. BECK, Whitman College — We have performed quantum-state tomography of several different single-photon entangled states, that is, states in which a single photon is shared between two possible paths. We do this by projecting the states corresponding to the two paths onto a tomographically complete set of states (within the one-photon subspace) using interference. We simultaneously verify that our states exist in a single-photon subspace by measuring the degree of second-order coherence, $g^{(2)}(0)$. We are able to create high purity, path-entangled states. The measured states are found to have fidelities of larger than 0.95 when compared to the states that we had intended to prepare.

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