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Quantum entanglement with a Hermite-Gaussian pump

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Abstract :

Typically, a Gaussian mode is used to pump a non-linear crystal to produce pairs of entangled photons. We demonstrate orbital angular momentum (OAM) entanglement when a non-fundamental mode is used to pump a non-linear crystal. An approximation to an HG₁₀ Hermite-Gaussian beam is produced by introducing a phase step into the transverse profile of the pump beam. We show both OAM and angular position correlations between the entangled pair of photons, by using two separate spatial light modulators to perform the measurements. The transfer of the OAM spectrum of the pump beam to the entangled photons is clearly illustrated and corresponds well with previous results demonstrating OAM conservation. This is the first step towards tailoring the entangled quantum states.

Award :

Yes

Level :

PhD

Supervisor :

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Paper :

No

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