

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Engineered optical nonlinearity for a quantum light source
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ANDREW WHITE, The University of Queensland — Many applications in optical quantum information processing benefit from careful spectral shaping of single-photon wave-packets. By engineering the nonlinearity profile of a poled crystal, we were able to tailor the joint spectral wave-function of photons created in parametric down-conversion. We designed a crystal with an approximately Gaussian nonlinearity profile and confirmed successful wave-packet shaping by two-photon interference experiments. To further explore the underlying spectral correlations in the spectral amplitude, we also measured spatial quantum beating patterns. We numerically show how our method can be applied for attaining one of the currently most important goals of single-photon quantum optics, the creation of pure single photons without spectral correlations.

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Date submitted: 16 Dec 2010

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