Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Nonlinear Photonic Crystals as a Source of Entangled Photons
WILLIAM IRVINE, University of California, Santa Barbara and University of Oxford, MICHIEL DE DOOD, University of California, Santa Barbara and University of Leiden, the Netherlands, DIRK BOUWMEESTER, University of California, Santa Barbara — Nonlinear photonic crystals can be used to provide phase matching for frequency conversion in optically isotropic materials. The phase-matching mechanism proposed here is a combination of form birefringence and phase velocity dispersion in a periodic structure. Since the phase matching relies on the geometry of the photonic crystal, it becomes possible to use highly nonlinear materials. This is illustrated considering implementable one-dimensional periodic structures for the generation of light at wavelengths between 700nm and 1500nm. We show that phase-matching conditions used in schemes to create entangled photon pairs can be achieved in photonic crystals.

William Irvine
University of California, Santa Barbara and University of Oxford

Date submitted: 05 Jan 2005 Electronic form version 1.4