

Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Temporal Quantum-State Tomography of Narrowband Biphotons¹ XIANXIN GUO, PENG CHEN, CHI SHU, M.M.T. LOY, SHENGWANG DU, the Hong Kong University of Science and Technology — We demonstrate a technique of quantum-state tomography for measuring the complex temporal wave function of narrowband biphotons with polarization-dependent and time-resolved two-photon interference. While the amplitude function of the biphoton waveform is directly related to the second-order correlation function which is determined by the two-photon coincidence measurement, the phase function is retrieved from six sets of time-resolved two-photon interference measurements projected onto different polarization subspaces. We apply this technique to experimentally reconstruct the temporal quantum states of the narrow-band biphotons generated from the spontaneous four-wave mixing in cold atoms. As compared with the homodyne detection, our method doesn't require any external phase reference.

¹The work was supported by the Hong Kong Research Grants Council (Project No. 601113).

Xianxin Guo
the Hong Kong University of Science and Technology

Date submitted: 18 Jan 2015

Electronic form version 1.4