Abstract Submitted
for the DAMOP17 Meeting of
The American Physical Society

Generation of subnatural-linewdith biphotons from a hot rubidium atomic vapor cell[1] LINGBANG ZHU, CHI SHU, XIANXIN GUO, PENG CHEN, Department of Physics, Hong Kong University of Science and Technology, YANHONG XIAO, Department of Physics, Fudan University, HEEJEONG JEONG, SHENGWANG DU, Department of Physics, Hong Kong University of Science and Technology — We report the generation of narrowband entangled photon pairs (biphotons) from a hot atomic vapor cell. Making use of backward spontaneous four-wave mixing with electromagnetically induced transparency (EIT), we produced subnatural-linewidth (1.9 MHz ¡ 6 MHz) biphotons from a Doppler-broadened (0.5 GHz) hot (63 C) paraffin-coated rubidium 87 vapor cell. The biphoton coherence time is controable and can be tuned up to 100 ns by EIT. The uncorrelated photons from resonance Raman scattering are suppressed by a spatially separated and tailored optical pumping beam. The spectral brightness is as high as 14,000 $s^{-}1MHz^{-}1$. As compared with the cold-atom experiment , the hot atomic vapour cell configuration is much simpler for operation and maintenance, and it is a continuous biphoton source. Our demonstration may lead to miniature narrowband biphoton sources based on atomic vapour cells for practical quantum applications and engineering.

[1]The work was supported by Hong Kong Research Grants Council (Project No. 16301214), and in part by the CAS/SAFEA International Partnership Program for Creative Research Teams. L.Z. acknowledges support from the Undergraduate Research Opportunities Program

Shengwang Du
Hong Kong University of Science and Technology

Date submitted: 06 Feb 2017 Electronic form version 1.4