

Centre for Photonics and Photonic Materials,
University of Bath

PhD project in physics, theoretical and computational nano-photonics, quantum optics

Title of PhD Project: Photon manipulation in lithium niobate photonic nano-wires, arrays and circuits

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Application deadline: 22nd January

Project Funding: PhD Scholarship is available for Chinese candidate under special joint UK-China programme, see more details here:

<http://www.bath.ac.uk/guides/china-scholarship-council-university-of-bath-phd-programme/>

Project description:

Lithium Niobate (LN) is a nonlinear crystal that offers excellent optical transparency and one of the strongest second-order nonlinearities in the infrared and visible range. With recent developments in nano-fabrication, LN photonic nano-wires of cross-sections below $1\mu\text{m}^2$ became in focus of intensive theoretical and experimental research [1]. Such nano-wires enable development of ultra-compact and highly efficient photonic integrated devices and circuits, including on-chip integrated single photon sources and quantum circuits [2].

This project will focus on theoretical and numerical studies of nonlinear classical and quantum effects, including generation of entangled photons and studies of many-photon quantum coherence effects, in Lithium Niobate photonic nano-wires [2,3] and circuits based on them. There will be an opportunity to collaborate with research teams working on nano-fabrication (Institute of Physics, Beijing) and performing experimental studies of LN nano-structures (Bath).

[1] G. Poberaj *et al.* Laser & Photonics Reviews **6**, 488 (2012).

[2] P. Main *et al.* Phys. Rev. A **94**, 63844 (2016).

[3] A. Gorbach, and W. Ding, Photonics **2**, 946 (2015).

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