**Fabrication of integrated optical waveguides for use in new quantum technologies**

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A century ago the first quantum revolution defined our understanding of atomic and subatomic physics. A few decades later this understanding lead to a technological revolution where the semiconductor, the laser, and the optical technologies that enable our current digital information age were created. Today, quantum research is primed for the next revolution in systems technology; ‘Quantum 2.0’ promises solutions for unhackable communications (quantum cryptography), navigation and sensing (atomic clocks), and solving complex analytical problems at the speed of light (quantum computing).

In Quantum 2.0, photonics represents a stable and established technology platform upon which new quantum systems can be built. Photonics enables the generation of new wavelengths for interaction of light and matter, single photons and integrated optical circuits for quantum information processing, and optical fibre networks for the long-haul transmission of quantum information. For commercial adoption, photonics will provide an important interface between emerging quantum products and our existing telecoms networks and digital infrastructure.

At the University of Southampton we are developing new manufacturing technologies in silica-on-silicon and periodically-poled lithium niobate to enable the fabrication of scalable integrated optical components as the building blocks of Quantum 2.0; in particular our focus is the development of processes suitable for transfer and adoption by industry. We will report on our progress in this area and discuss recent results enabled by our devices.