The goal of the project is to deliver deterministic and compact sources of highly non-classical states, from sub-Poissonian light to multi-mode entanglement, all using a single technological platform of integrated waveguide networks with engineered loss.

We will build working prototypes and develop the technological foundation for the applications of the PhoG sources in advanced optical imaging and metrology.
• Why – Objectives and Addressed challenges
  • sub-Poissoninan statistics + multi-partite entanglement for range of applications: deterministic source
  • applications: metrology & imaging, quantum simulations, “cheap” quantum source for Qtechnologies


• Expected deliverables:
  • integrated photonic sources, in well-defined modes, with user-selected quantum properties
  • optical equalizer and quantum networks based on management of quantum correlation flow in waveguide arrays
  • entanglement-enhanced imaging with benchmarked improvement in resolution and SNR
  • atomic clocks with entanglement-enhanced frequency stability
  • assessment of technology benefits & roadmap for metrology applications and TRL expansion.
1. Natalia Korolkova, University of St Andrews, UK
2. Robert Thomson, Heriot Watt University, Edinburgh, UK
3. Dmitry Mogilevtsev, Institute of Physics, Belarus Academy of Sciences, Minsk, Belarus
4. Christine Silberhorn, University of Paderborn, Germany
5. Dmitry Boiko, Centre Suisse d'Electronique et Microtechnique (CSEM), Switzerland
Dr Natalia Korolkova,
School of Physics & Astronomy, University of St Andrews,
North Haugh, St Andrews, KY16 9SS, Scotland, UK
nvk@st-andrews.ac.uk

http://www.st-andrews.ac.uk/~phog