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Mid-IR quantum sensing with entangled photons

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Abstract

A severe limitation for real-world adaptation of mid-IR sensing is that broadband mid-IR sources and detectors are often prohibitively expensive, technically demanding and suffer from poor sensitivity and resolution. This has lead to different approaches of side-stepping these by moving the detection wavelength to the visible regime, where one can enjoy the maturity of CCD and CMOS technology driven by the life sciences, mobile phone and automotive industry. A convenient means for this, also making sources in the mid-IR obsolete are nonlinear interferometers based on entangled photons. They enable compact and cost-effective sensing in the mid-IR, for which I will present experimental results on microscopy, spectroscopy and OCT and highlight their potential on real-world, industry-ready applications.