Mid-IR scanning microscopy with undetected light

Our service aims to design and develop tailored photon-pair light sources to be integrated in different microscopic platforms.



The photon-pair are generated via spontaneous parametric down conversion (SPDC) that will propagate through a non-linear induced coherence interferometer to be able to illuminate and detect at two distinct wavelength ranges. The MIR light sources can be integrated to different microscopy platforms, such as wide-field or scanning microscopy in which the Mid-IR photon probes the sample, and the VIS is detected either by a camera or a singlepixel detector.

Currently the photons spam a spectral range of 2400 – 4000 nm at MIR wavelength, and 450 – 460 nm at the VIS wavelength. Depending on the applications,

these ranges can be easily shift and tune by utilizing different crystals such as ppKTP, ppLN, AGS, and LGS, or by selecting a specific poling period or temperature.

| Service | Description |
|---|---|
| Custom MIR SPDC Light Source Development | Design and fabrication of SPDC light sources specifically for MIR applications in microscopy to fill large optical apertures. |
| Consultation on MIR Interferometric Techniques | Expert guidance on implementing MIR interferometric methods using SPDC sources in microscopy. |
| Performance Testing of MIR Light Sources | Characterization and performance testing of MIR SPDC sources for optimal microscopy use. |
| Collaboration on MIR Research Projects | Joint research initiatives exploring novel applications of MIR SPDC sources in microscopy. |
| Technical Support for MIR Integration | Support for integrating MIR SPDC light sources into existing and new microscopy systems. |
| Provision of Calibration Standards for MIR | Calibration services to ensure accuracy and reliability in SPDC- based MIR microscopy. |
| Simulation and Modeling | Computational modelling of SPDC processes in the MIR to optimize design and performance. |
| Performance Test | Resilience test of nonlinear interferometric setup against vibrations. |

In the following we present a more detailed list of services: