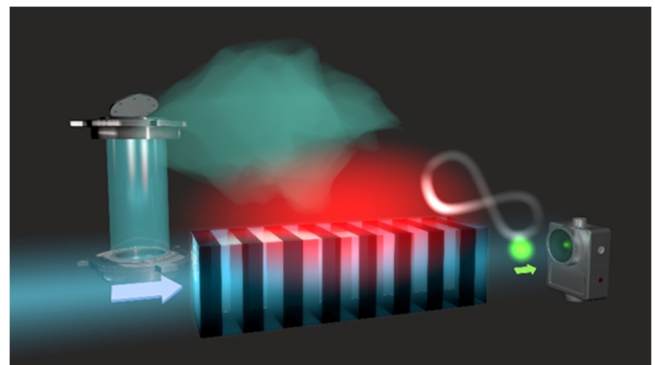
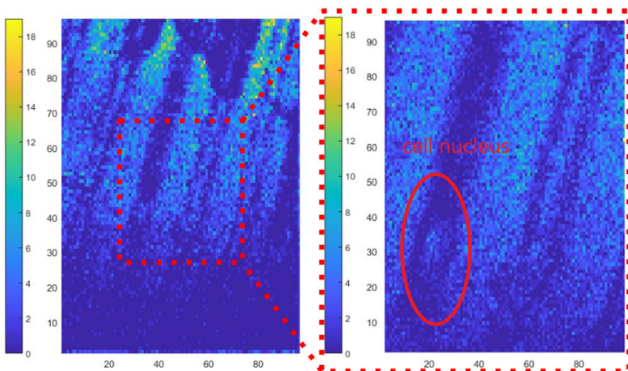


PhD or PostDoc position in the subject area of "Quantum Imaging and Sensing"

The strong correlations and entanglement present in quantum states of light, e.g. photon pairs generated by spontaneous parametric down-conversion, allow for novel sensing, spectroscopy, and imaging modalities. These can operate at lower intensities, with better signal-to-noise-ratio, and in extended spectral ranges compared to traditional approaches.

We are developing such imaging and sensing methods based on different measurement approaches. In Ghost Imaging, images are created based on the spatial correlations between the two photons of a pair, which enables to image objects without looking at them with a camera. Instead, a single-pixel detector observes the object illuminated by one photon of a pair and the image is formed by correlating the detector measurements with the measurements of a camera that interrogates the paired photons that do not interact with the object. On the other hand, induced coherence by quantum interference of several photon-pair sources enables imaging and spectroscopy without detecting any of the photons the saw the object.

The task of the scientist is the development and optimization of such quantum sensing and imaging schemes, e.g. by implementing and testing dedicated photon-state sources, specific measurement geometries, or improved data processing. Furthermore, the application prospects of the optimized methods shall be evaluated in realistic sensing scenarios.



(Left) Image of an onion cell measured with a microscopy using correlated photon pairs. (Right) Artistic sketch of an integrated sensing scheme for gas sensing with photon pairs, where the red photons interact with the substance under test but only their green partner photons are detected.

PhD position requirements

Applications are invited for candidates with a good understanding of quantum optics and light-matter interaction. A proven ability to tackle scientific problems independently and simultaneously work cooperatively is highly desirable.

Your qualifications:

- Very good master's degree in physics, optics, or a related discipline
- Background knowledge in quantum optics, optical experiments, microscopy or optical sensing
- Very good communication skills in written and spoken English

Supervisor, affiliation: Dr. Frank Setzpfandt, Institute of Applied Physics

Further information

Further information on our research, publications, and group members can be found at www.iap.uni-jena.de/setzpfandt. For further information about the position, please contact Frank Setzpfandt, f.setzpfandt@uni-jena.de.