# Masters/Bachelors Project

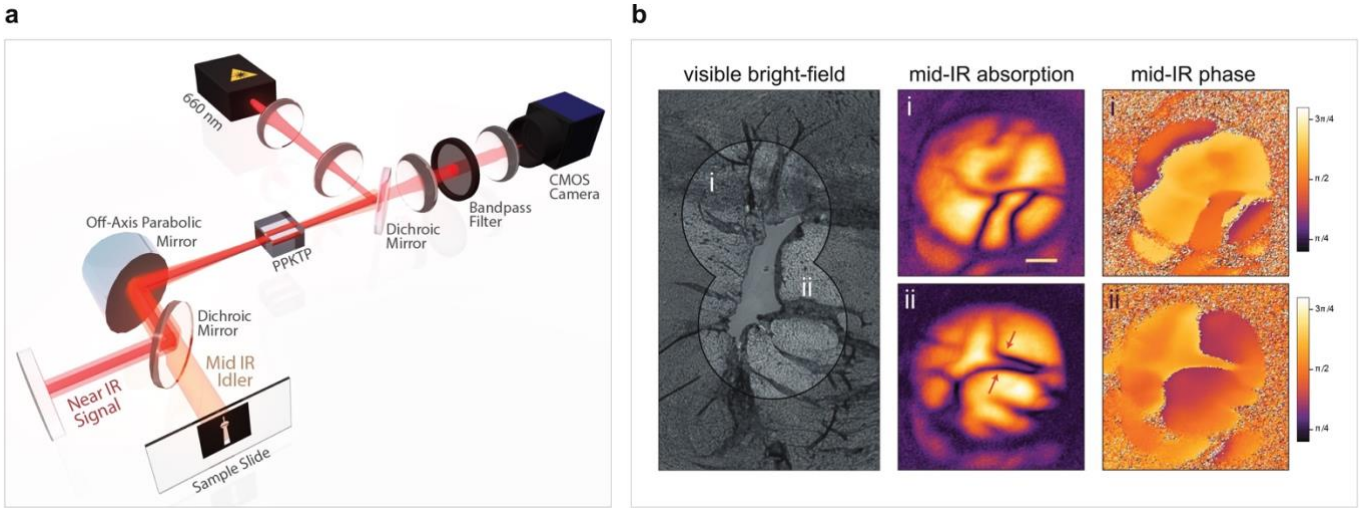
Nonlinear quantum optics group (NIQO)

## Quantum imaging with undetected photons in the mid-infrared

The functionality to image samples in the mid to far infrared (IR) holds the promise of new perspective on problems of tremendous biological and industrial relevance. The principal limitation, however, remains one of detection, with mid-IR imaging technology being prohibitively expensive, technically demanding and suffering from poor sensitivity and resolution.

Quantum imaging with undetected photons has recently emerged as a new powerful imaging tool. Exploiting the spatial entanglement of photon pairs, it allows decoupling of the sensing and detection wavelengths, facilitating imaging in the mid-IR with mature silicon-based detection technology.

Our imaging/microscopy setup was used for the first demonstration of the applicapility of this new emerging method to image biosamples. Now, we are interested in extending our imaging approches and exploiting it further towards mid-IR targeted samples.




**a. Experimental Setup:** Wide-field imaging with undetected photons. **b. Bioimaging:** Imaging of a histology sample of a mouse heart with bright field microscopy, and absorption and phase imaging obtained with quantum microscopy with undetected photons.

We are currently looking for a motivated Masters or Bachelors student to join our reasearch group. The activities of a Masters or Bachelors will include assembly, operation and automization of a table-top optical systems, data aquizition and analysis.

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