



Max-Planck-Institut  
für Quantenoptik

Ludwig-Maximilians-Universität München  
Fakultät für Physik  
Lehrstuhl für Experimentalphysik

Max-Planck-Institut für Quantenoptik  
Hans-Kopfermann-Str. 1  
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## MASTER THESIS – POSITION OPENINGS

### ***Interested in devising new laser tools for direct applications in life sciences?***

If so, we have multiple open positions for master students to be appointed at the earliest possible date with the overall aim to advance the frontiers of cancer detection with novel laser-based approaches.

#### **About us**

The Laboratory of Attosecond Physics (LAP), based at the Chair of Experimental Physics at Ludwig-Maximilians-Universität München and the Max Planck Institute for Quantum Optics, is one of the world's leading research institutions in the area of Laser Science.

The researchers at LAP have developed lasers that are capable of emitting trains of ultrashort light pulses, which enable physicists to observe the motions of electrons in real time with unprecedented precision (<http://www.attoworld.de>). LAP's ultrashort-pulse lasers are also at the heart of the work being carried out at the *Munich-Centre for Advanced Photonics* (MAP). Now a unique collaborative venture involving laser specialists, medical physicists, bioinformaticians and clinicians, is devoted to the use newly developing laser-based technologies for the early diagnosis and treatment of cancer. The goal of the research avenue is to probe the feasibility and efficacy of newly developing infrared laser technologies for analyses of pathophysiologically relevant cancer paradigms for early cancer detection.

#### **Job Description**

The research will be centered around a new highly sensitive mid-infrared (MIR) spectroscopy method and its application to cancer screening. Generally, MIR spectroscopy enables measurements of chemical fingerprints of a given substance and thus, in principle, has the unique capacity to identify any molecular composition by its unique spectral fingerprint. For example, this approach can be applied to distinguish cancerous cells and their metabolic products from healthy cells by the difference in their absorption spectra.

In scope of this project you will use this new spectroscopic tool to conduct proof of principle experiments in one of several approaches for early cancer detection using infrared laser technologies. We are happy to discuss the details with interested candidates in person.

The positions offer inter-disciplinary research environment with multicultural atmosphere. The students will get the chance to gain experience in newest frontiers of femtosecond laser technologies, infrared spectroscopy and molecular fingerprinting and their applications to tackle real-world questions!

#### **Applications**

We would be glad to invite interested candidates to come by and would be happy to show them the lab. High level of motivation, scientific thinking, enthusiasm for solving problems, as well as good grades are expected.

Please send a brief cover letter explaining your interest and your CV with grades included to  
Dr. Mihaela Zigman: [mihaela.zigman@mpq.mpg.de](mailto:mihaela.zigman@mpq.mpg.de).

Review of applications starts immediately and the positions stay open until filled.

