

Stellenbezeichnung: PhD student »Interferometry-based field-resolved spectroscopy«



We advance top-level research – and ourselves.

Change starts with us.

PhD student »Interferometry-based field-resolved spectroscopy«

Our »Optical Quantum Metrology« research group develops innovative measurement technologies for clinical and industrial applications based on the ability to measure individual the oscillations of optical electric fields in the infrared and terahertz spectral ranges.

As part of the Laboratory for Lightwave Metrology, the research group on the one hand offers the opportunity to fundamentally examine light at the quantum limit, and on the other hand to apply this knowledge in order to develop novel spectroscopic tools for medicine, biology and industrial material characterisation.

The advertised PhD program aims to develop novel photonic measurement techniques based on interferometry and nonlinear optics that enable spectroscopic measurements of the entire physiologically relevant concentration range of molecules in biological fluids and gases.

Achieving these ambitious goals requires substantial further development of key femtosecond technologies, which will be realised in the frame of a prestigious Max-Planck-Fraunhofer cooperation project.

Selection of relevant publications:

- [1] I. Pupeza, et al., "Field-resolved infrared spectroscopy of biological systems", Nature (2020)
- [2] P. Sulzer, et al, "Cavity-enhanced field-resolved spectroscopy", Nature Photonics (2022)

What you will do

- Participation in a Max-Planck-Fraunhofer cooperation project
- Support in setting up an ultra-stable, compact laser system for generating ultra-short and ultra-broadband laser pulses for field-resolved infrared spectroscopy
- Setup of a novel, enhancement-cavity-based spectrometer for the analysis of medically relevant gases

What you bring to the table

- Master's degree in experimental physics or similar, preferably with a specialisation in photonics, laser physics, nonlinear optics
- Independence, a high degree of personal responsibility and motivation
- Experience with optical laser setups
- Good English skills

What you can expect

- Exciting tasks in a dedicated, international team of scientists
- Unique opportunity to work at research forefront of applications of optics in medicine and biology
- Mentoring with university supervision at the RPTU in Kaiserslautern, at the chair of Prof. Dr. Joachim Pupeza
- Opportunity for further education and training and Prospect of authorship in high-impact publications

The doctorate is awarded as part of an ITWM-Scholarship.

We value and promote the diversity of our employees' skills and therefore welcome all applications - regardless of age, gender, nationality, ethnic and social origin, religion, ideology, disability, sexual orientation and identity. Severely disabled persons are given preference in the event of equal suitability.

Interested? Apply online now. We look forward to getting to know you!

If you have any questions regarding content, please contact:
Prof. Dr. Joachim Pupeza - joachim.pupeza@itwm.fraunhofer.de

If you have any questions regarding the application process:
Isabelle Dieckhoff - isabelle.dieckhoff@itwm.fraunhofer.de

Fraunhofer Institute for Industrial Mathematics ITWM
www.itwm.fraunhofer.de