



Master thesis

Are you looking for a challenging and interesting topic with the possibility to publish part of your research after your master thesis? Do you want to approach a problem from multiple angles and enjoy delivering high-quality work, thus moving science forward? Do you want to have a diversified set of tasks consisting of lab work with lasers as well as programming and data processing in Python? If so, this master thesis is perfect for you!

Goals:

- Investigate the material properties of a sample like gallium phosphide (GaP) with higher accuracies at the THz frequency range using a state-of-the-art THz time domain spectrometer in connection with a liquid nitrogen cryostat probing different temperatures down to 80 K.
- After characterizing the samples, your task will be to improve the automation of the setup and improve upon a Python script for extracting the refractive index and absorption coefficient of the samples.
- When properly characterized, you can use our ultrafast, high-power lasers to excite the sample with the possibility of breaking new THz average power records! Besides the lab work, you have the chance to take a dive into data processing to improve the signal-to-noise ratio of the acquired data sets.
- The ultimate goal is to do THz spectroscopy with water, which is a very challenging target due to its high absorption. The research during your master thesis will bring this goal closer!

The PULS group is always on the lookout for talented researchers for PhD positions. If you've got a great master thesis, you're in with a great chance of getting one of these positions.

If you have any further questions, please don't hesitate to contact your proposed supervisor, Tim Vogel.

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What is PULS?

Our group is called Photonics and Ultrafast Laser Science (PULS), and we're based at the Ruhr-University Bochum in Germany. We're not just developing high-power lasers with 100s of watts and beyond — we're also investigating high-power THz sources! We even have the world record for a single-cycle THz source. If you'd like to learn more, just visit <https://www.puls.ruhr-uni-bochum.de/>