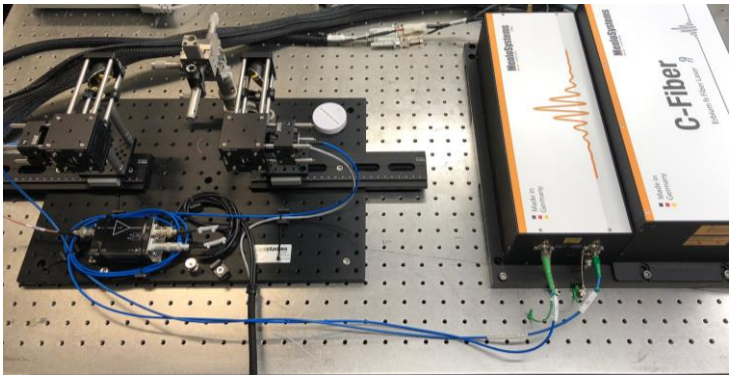

Master thesis

Our group is developing high-power lasers and investigates possible high-power THz sources. One promising candidate in terms of relatively high THz power, broad bandwidth and easy setup is the crystal gallium phosphide (GaP). We have the record THz power for this crystal at Megahertz repetition rates[1] and did a preliminary study on its THz refractive index and how it changes with temperature[2].

With our new, commercial THz-TDS from *Menlo systems* we want to gain a deeper insight into the topic. So far, we only retrieved the normal refractive index and in the meanwhile more sophisticated retrieving algorithms were developed, which would allow us to extract the complex refractive index.

Your task for this master thesis is to study GaP with different thicknesses and extract its complex refractive index for different temperatures in a liquid-flow nitrogen cryostat.

You will have gained the following skills after finishing successful your master:

- ✓ Working as a scientist (Good scientific practice from *idea* to *data management* to *writing*)
- ✓ Working on a fixed topic on your own (with guidance from your supervisor)
- ✓ Basic programming in Python (Minimum: Data analysis, can be extended to laboratory equipment control or simulation, which can be beneficial for the thesis)
- ✓ Handling of laser and cryogenic equipment

If you are interested, please write an e-mail to our master thesis coordinator mansourzadeh.samira@ruhr-uni-bochum.de

Your supervisor for this topic will be Tim Vogel.

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[1] F. Meyer, N. Hekmat, T. Vogel, A. Omar, S. Mansourzadeh, F. Fobbe, M. Hoffmann, Y. Wang, and C. J. Saraceno, "Milliwatt-class broadband THz source driven by a 112 W, sub-100 fs thin-disk laser," Opt. Express 27, 30340-30349 (2019)

[2] Negar Hekmat, Tim Vogel, Yicheng Wang, Samira Mansourzadeh, Farhad Aslani, Alan Omar, Martin Hoffmann, Frank Meyer, and Clara J. Saraceno, "Cryogenically cooled GaP for optical rectification at high excitation average powers," Opt. Mater. Express 10, 2768-2782 (2020)