CHRISTIAN DOPPLER LABORATORY FOR
MID-IR SPECTROSCOPY &
SEMICONDUCTOR OPTICS

Postdoc Position at the University of Vienna

Join the Christian-Doppler laboratory co-funded by the Christian Doppler Research Association and industrial partner Thorlabs Inc., to work on one or more of the following topics:

Single-cavity dual-comb for field-deployable spectroscopy

In this project we extend our work on single-cavity dual-comb lasers [1]–[3] to the Mid-IR spectral region, for application as a portable molecular spectroscopy setup that preserves the noise-cancellation features of our single-cavity approach.

Mid-IR optical frequency combs for precision spectroscopy

This project targets a high-average power frequency comb tunable from 3-5 µm for precision spectroscopy. The system is seeded by a flexible state of the art fiber laser [4], is amplified to about 100 W of average power [publication under preparation] and will be converted to the mid-IR via multiple nonlinear stages.

Precision measurements on novel crystalline mirrors

In our collaboration with Thorlabs we are pushing the limits of mid-IR mirror technology with respect to wavelength coverage, absorption- and scatter losses. This involves precise measurements on optical semiconductor-structures. Our latest work demonstrated a new record of sub 10 ppm absorption losses in mid-IR mirrors around 4.5 µm [5].

Employment conditions:

- Gross salary: 3945.90 € per month, paid 14 times per year, in accordance with the collective bargaining agreement of the universities §48 VwGr. B1 (postdoc)
- Taxes include medical and social insurance
- No teaching duties but the option to get involved in teaching if wanted
- Main working language: English
- Work place at the University of Vienna located in the city center
- Starting date: January 2022

Requirements:

- PhD degree in physics/engineering, in optics/photonics or related fields
- Good knowledge of English (C1)
- Ideally prior experience with: solid-state/fiber lasers, pump-probe experiments, optical fibers, nonlinear optics, precision measurements, frequency stabilization techniques
- Knowledge of MATLAB/Python/LabView is a plus

If you are interested in any part of the projects above, please visit our website cdl-mid-infrared.univie.ac.at and contact Ass.Prof. Oliver Heckl: oliver.heckl@univie.ac.at

[1] J. Fellinger, G. Winkler, A. S. Mayer, L. R. Steidle, and O. H. Heckl, “Tunable dual-color operation of Yb: Fiber laser via mechanical spectral subdivision,” *Opt. Express*, vol. 27, no. 4, 2019, doi: 10.1364/OE.27.005478.

[2] J. Fellinger *et al.*, “Tunable dual-comb from an all-polarization- maintaining single-cavity dual-color Yb:fiber laser,” *Opt. Express*, vol. 27, no. 20, p. 28062, Jun. 2019, doi: 10.1364/oe.27.028062.

[3] J. Fellinger *et al.*, “Simple approach for extending the ambiguity-free range of dual-comb ranging,” *Opt. Lett.*, vol. 46, no. 15, pp. 3677–3680, 2021, doi: 10.1364/OL.427816.

[4] A. S. Mayer *et al.*, “Flexible all-PM NALM Yb:fiber laser design for frequency comb applications: operation regimes and their noise properties,” *Opt. Express*, vol. 28, no. 13, pp. 18946–18968, 2020, doi: 10.1364/OE.394543.

[5] G. Winkler *et al.*, “Mid-infrared interference coatings with excess optical loss below 10 ppm,” *Optica*, vol. 8, no. 5, pp. 686–696, 2021, doi: 10.1364/OPTICA.405938.