



2020 HGF – OCPC – Programme for the involvement of postdocs in bilateral collaboration projects

Title of the project:

Ultra low noise, high power fiber lasers for Optical Frequency Combs and Free Electron Lasers.

Helmholtz Centre, division/group:

DESY, FS / FS-LA

Project leader:

Ingmar Hartl

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Description of the project (max. 1 page):

Our laboratory advances laser technology to enable next generation Free Electron Lasers (FEL) and Optical Frequency Combs (OFC). We are currently involved in the upgrade program of DESY's soft X-ray FEL FLASH which will have a seeded FEL beam-line which requires high-repetition rate tunable ultraviolet femtosecond lasers for electron beam manipulation and an attosecond FEL beam-line which requires high energy, high repetition-rate carrier-envelope-offset stable lasers. We are also developing laser technology for mid-infrared and extreme ultraviolet frequency comb sources, targeted for frequency-comb spectroscopy experiments on small molecules and highly charged ions.

Ultimate goal of the project is to push Yb-fiber-laser technology to a performance level which is compatible with above applications. We are currently developing a novel laser-front-end comprising a low-noise femtosecond fiber oscillator and an hybrid Yb-fiber and Yb:YAG amplifier chain. The exact project focus can be adjusted to the candidates research interest and can include for example precise characterization and reduction of phase and amplitude noise, scaling to higher average powers and/or higher repetition rates, spectral broadening and re-compression in nonlinear media or frequency conversion to XUV or MIR.

Our laboratory is outstandingly equipped with all necessary tools and instrumentation for laser and nonlinear optics research and development. You will be working under guidance of one of the world



experts in the field: Dr. Ingmar Hartl, 2014 fellow of the optical society for outstanding contributions to femtosecond fiber lasers and frequency combs across the optical spectrum and will be joining a team of highly qualified scientists.

We encourage outstanding applicants with a background in experimental nonlinear optics /laser physics to apply.

Description of existing or sought Chinese collaboration partner institute (max. half page):

Required qualification of the post-doc:

- PhD in Physics or Electrical Engineering
- Experience with lasers and nonlinear optics
- Additional skills in fiber-optics, electronics or frequency combs are beneficial