

Master Position

Chair of Prof. Krausz, LMU & Max Planck Institut für Quantenoptik

Development of high power spectral broadening techniques for a novel 2 μm thin-disk oscillator

Project description:

Nonlinear spectral broadening and pulse compression is a common technique to generate the shortest high energy pulses widely used in ultrafast physics. However fiber based systems are prone to damage and are sensitive to alignment, especially when high average (>50 W) and high peak powers (>10 MW) are combined. Broadening techniques in bulk material [1] represent an alternative approach. Until recently these techniques were limited in efficiency, beam quality and bandwidth. A lately demonstrated concept of multipass spectral broadening in a waveguide-like geometry [2] showed that high efficiency and excellent beam quality can be reached simultaneously. This project aims to spectrally broaden and compress pulses down to 7 fs around 1 μm wavelength (two optical cycles) and implement a similar approach with a new oscillator at 2.1 μm wavelength based on Ho:YAG. This new laser system will find numerous applications in mid-infrared generation and early cancer detection experiments.

Your tasks:

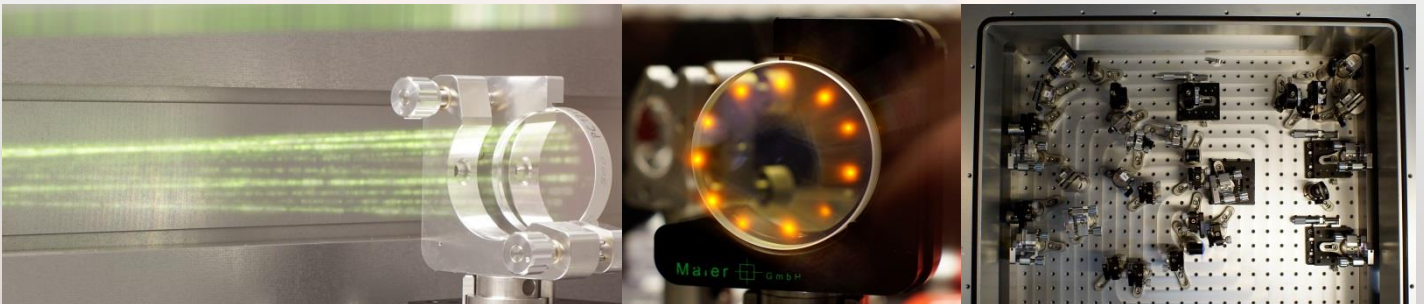
- Understanding, improving and simplifying the existing design to push the limits at 1 μm down to 7 fs
- Transferring the 1 μm technology to a 2 μm driving laser system
- Extensive laser diagnostics methods including frequency resolved optical gating (FROG), intensity noise characterization and long term stability studies

Your qualifications:

- highly motivated
- strong academic record
- basic knowledge in optics
- good English skills

We offer:

- welcoming and friendly work environment
- cutting edge high power laser technology
- prime scientific infrastructure and funding



You are welcome to visit our labs! Please contact:

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[1] Seidel, Marcus, et al., Scientific Reports. 2017. "Efficient High-Power Ultrashort Pulse Compression in Self-Defocusing Bulk Media", accepted for publication.

[2] Schulte, Jan, et al., "Nonlinear pulse compression in a multi-pass cell". Optics Letters. 2016, vol 41, num. 19]