Photonics and Ultrafast Laser Science

puls

Job application to:
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High average power few-cycle THz technology and applications

Project Description This project is part of the EXPLORE project and aims to develop efficient broadband single-cycle Terahertz sources with high average powers and repetition rates for advanced imaging applications. The focus lies on developing nonlinear conversion setups based on optical rectification suitable for high average powers, as well as the realization of imaging concepts and implementation of advanced THz detection concepts. The project encompasses both theoretical and experimental work and is conducted in collaboration with world-renowned experts in advanced imaging techniques.

Task List

Development of THz Sources:

- design of THz source setups adapted for high average powers
- characterization of the generated THz transients by established and novel detection concepts
- optimization of the conversion efficiency and stability at high repetition rates and average powers

Theoretical Modeling and Simulation:

- numerical simulations of the nonlinear conversion mechanism
- adapting theoretical models for the high power regimes
- analyzing the scaling potential for stable high power operation

Development of Detection Methods:

- development of novel THz detection methods
- implementation and characterization of these detection schemes
- integration of detection schemes into imaging setups

THz Imaging Applications:

- apply developed THz sources and detection schemes for novel imaging concepts
- characterization of imaging performance with a focus on rapid data acquisition

Collaborations and Technology Transfer:

- collaborate with world-renowned experts in advanced fast detection methods and imaging
- exchange know-how and technologies with industrial partners
- participate in international conferences and symposiums