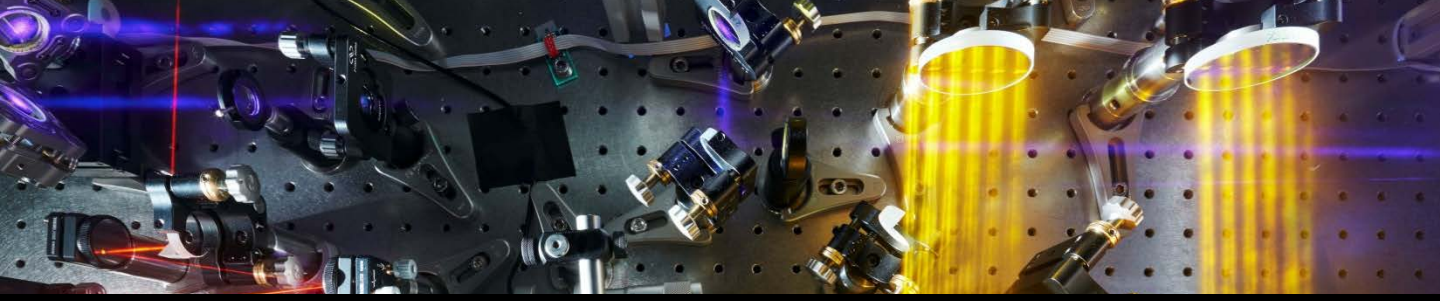
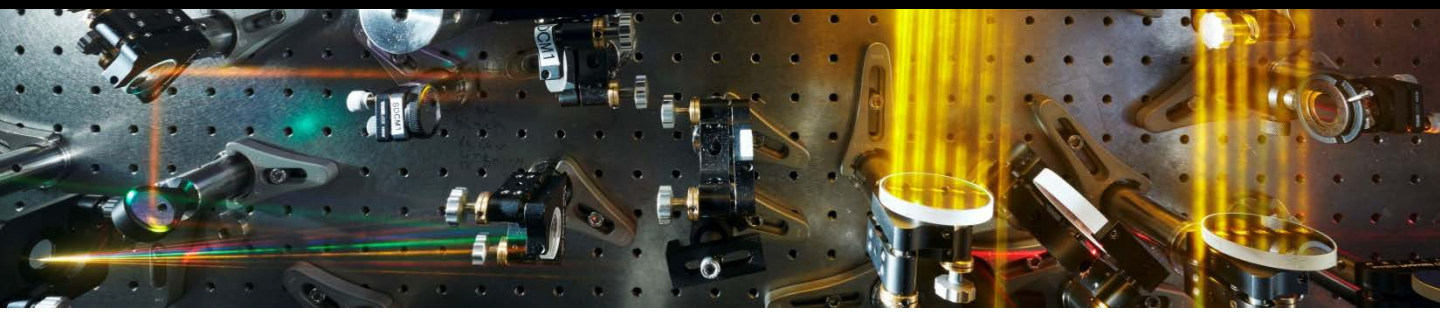


MASTER THESIS



CFEL SCIENCE
Ultrafast Optics and X-Rays

The ultrafast optics and X-rays group headed by Professor Franz X. Kärtner at CFEL/DESY is investigating on major areas in ultrafast optical science. Sources such as hollow core fiber compressors, optical parametric amplifiers and Ti:sapphire laser oscillators are developed to explore the femtosecond phenomena and via High Harmonic Generation gives access attosecond phenomena. High energy and power laser systems are used for THz generation and new forms of all optical driven electron acceleration and X-ray generation.

We seek a master student for the following project:

"Simulation of nonlinear femtosecond pulse propagation in hollow core fibers"

This project enables the student to understand the basics of programming and nonlinear optics to model the beam dynamics in fibers very close to experimental implementations. The finite difference method and split-step Fourier method will be established. The numerical methods can be extended to other applications beyond solving the coupled nonlinear wave equations.

Further details:
Fourier transform, Runge Kutta method, nonlinear pulse propagation, split-step Fourier method

Professor Franz X. Kärtner
Ultrafast Optics and
X-Rays division
CFEL/DESY
Notkestrasse 85,
22607 Hamburg,
Building 99

Besides a basic knowledge in linear and nonlinear optics, sufficient knowledge of English for daily communication and basic mathematics and programming skills are welcome.

If you are interested, please contact
Lu Wang **lu.wang@desy.de**

Other topics i.e. for bachelor students are available as well.