

We are looking for a PhD student in the Department of Physics, Universität Hamburg and working at DESY in the Ultrafast Optics & X-rays Group <https://ufox.cfel.de/>

DESY in Hamburg, <https://www.desy.de/>, with its 2300 employees is one of the world's leading research centres with a focus on decoding the structure and function of matter, from the smallest particles of the universe to the building blocks of life and is located in the Science City Hamburg Bahrenfeld, <https://www.hamburg.de/sciencecity/>. DESY contributes to solving the major questions and urgent challenges facing science, society and industry. With its ultramodern research infrastructure, its interdisciplinary research platforms and its international networks, DESY offers a highly attractive working environment in the fields of science, technology and education.

### The position

- Participate in the design and test of integrated femtosecond lasers
- Perform simulations of the linear and nonlinear optical processes in femtosecond lasers and its dynamics
- Design linear and nonlinear optical circuit components for integrated optical systems
- Use the PDKs of our fabricators to layout individual components and fully integrated systems on a chip geared towards ultra-high speed optoelectronic systems
- Develop and build setups to test integrated optical devices and systems

### Requirements

- MS in physics or electrical engineering or equivalent qualification
- Ability to work in a team and excellent communication skills
- Can work independently and organize her-/himself
- Good problem-solving skills
- Experience in any of the following areas is a plus
  - integrated optics
  - working with fiber optic components and systems
  - in ultrafast and nonlinear optics
  - in using design software like Lumerical, Simulink, ...
  - in programming with Python, Matlab, or C++.

For further information please contact Prof. Franz X. Kärtner at [franz.kaertner@desy.de](mailto:franz.kaertner@desy.de).

### References:

- Silicon photonics optical frequency synthesizer, *Laser Photonics Rev.* **14**, 1900449 (2020).
- Integrated CMOS-compatible Q switched mode locked lasers at 1900 nm with an on-chip artificial saturable absorber, *Opt. Express* **27**, 3542 (2019).
- Octave-spanning coherent supercontinuum generation in silicon on insulator from 1.06  $\mu\text{m}$  to beyond 2.4  $\mu\text{m}$ , *Light Sci. Appl.* **7**, 17131 (2018).
- Optical flywheels with attosecond jitter, *Nat. Photonics* **6**, 97-100, (2012).
- Photonics ADC: overcoming the bottleneck of electronic jitter, *Opt. Express* **20**, 4454, (2012).