



Universität Hamburg

DER FORSCHUNG | DER LEHRE | DER BILDUNG



Seeking Research Associates: PhD student (75% position) and PostDoc equivalent (100% position) in projects related to single exposure attosecond X-ray imaging and super-resolution X-ray coherent diffraction of the nanoscale

Our group is working with Free-Electron-Lasers (FEL) facilities all over the world in Japan, US, Switzerland and Germany. The aim of our work is to improve spatial and temporal resolutions in X-ray imaging and follow conformational changes of individual nanoparticles during chemical reactions and phase transitions. Very recently several FELs started offering isolated attosecond and few fs short X-ray pulses, which are tunable in photon energy and carry unprecedented peak power. This development opens a new chapter in X-ray and attosecond science. We focus on exploring a variety of non-linear transient phenomena and quantum effects, which increase the quality of X-ray diffraction images from individual nanoparticles and molecules. Please visit our website <https://xray.cfel.de/> or contact Prof. Tais Gorkhover, tais.gorkhover@uni-hamburg.de for further information. Please use only the online application form to submit your application. If you experience technical problems, send an email to bewerbungen@uni-hamburg.de.

(1) PhD student position (75% position, 3 years) is part of the ERC Starting Grant "HIGH-Q":

Project: The successful candidate will be part of the ERC Starting Grant funded project called HIGH-Q. The project is dedicated to increasing the spatial resolution and material contrast of images recorded with extremely short X-ray pulses. There are two branches of the project. First, our group is designing experiments which explore non-linear diffraction enhancement in order to increase spatial resolution. Second, we apply super-resolution algorithms, which computationally increase the spatial resolution of diffraction images during post-processing.

The successful candidate will combine both project parts based on first promising results from preliminary studies. In addition, the candidate will conduct and analyze follow-up experiments. The position will include preparation of beam times at international Free-Electron-Lasers facilities in Japan, US, Switzerland and Germany, data analysis and interpretation based on simulations. Possibility to obtain a doctoral degree is included.

Our group offers:

- Unique experiments at user facilities at the forefront of X-ray science
- Support and supervision by experienced scientists
- extended stays abroad with our partners at SLAC/Stanford University, US and others can be arranged
- Vibrant and diverse scientific environment at the CUI Excellence Cluster, CFEL, Uni Hamburg and DESY
- **The official announcement and university benefits can be found here:** <https://www.uni-hamburg.de/stellenangebote/ausschreibung.html?jobID=d362a7294e33536006a1db9a9789921193724528>

Requirements:

- A university degree in physics or a related field with an excellent track record
- Experience in programming with Python
- Strong initiative, effective working style, high level of creativity and drive to experiment
- Willingness to work in a team
- Interest in X-ray imaging and FEL science in general, a background in experimental physics is of benefit
- Ideally experience in X-ray diffraction imaging

(2) Research associate (100% position, 3 years):

Project: The successful candidate will lead and conduct beam times at international Free-Electron-Lasers facilities in Japan, US, Switzerland and Germany dedicated to improving the coherent X-ray imaging technique based on non-linear effects. The position also includes data analysis and interpretation based on simulations. In addition, we are building a new lab-based XUV source which will help us develop new algorithms for improved X-ray imaging based on compressed sensing. The candidate will be part of this project. The position comes with a teaching duty of 4 LVS.

Our group offers:

- Unique experiments at user facilities at the forefront of X-ray science
- Extended stays abroad with our partners at SLAC/Stanford University, US and others can be arranged

- Vibrant and diverse scientific environment within walking/biking distance: CUI excellence cluster, CFEL, FLASH, EuXFEL Uni Hamburg and DESY

Requirements:

- A university degree/ doctoral degree in physics or a related field with an excellent track record, strong experience in programming with Python
- Multi-year experience in experimental physics, an international publication record, ideally in X-ray diffraction imaging
- Strong initiative, effective working style, high level of creativity and drive to experiment
- Willingness to work in a team
- **The official announcement and university benefits can be found here:** <https://www.uni-hamburg.de/stellenangebote/ausschreibung.html?jobID=7d48d28c6561f61dacd7aa03569ffbc55e998b8>