



Universität Hamburg

DER FORSCHUNG | DER LEHRE | DER BILDUNG

As a University of Excellence, Universität Hamburg is one of the strongest research universities in Germany. As a flagship university in the greater Hamburg region, it nurtures innovative, cooperative contacts to partners within and outside academia. It also provides and promotes sustainable education, knowledge, and knowledge exchange locally, nationally, and internationally.

The Faculty of Mathematics, Informatics and Natural Sciences, CUI: Advanced Imaging of Matter invites applications for a

## RESEARCH ASSOCIATE FOR THE PROJECT

# “LASER-INDUCED ELECTRON DIFFRACTION OF ULTRAFAST CHEMICAL DYNAMICS”

- SALARY LEVEL 13 TV-L -

---

The position in accordance with Section 28 subsection 3 of the Hamburg higher education act (Hamburgisches Hochschulgesetz, HmbHG) commences on 01.01.2021.

This is a fixed-term contract in accordance with Section 2 of the academic fixed-term labor contract act (Wissenschaftszeitvertragsgesetz, WissZeitVG). The term is fixed for a period of 3 years. The position calls for 75 % of standard work hours per week\*\*.

### RESPONSIBILITIES:

Duties include academic services in the project named above. Research associates may also pursue independent research and further academic qualifications.

### SPECIFIC DUTIES:

We are seeking a new graduate student to become a part of our team, as we start a new initiative in investigating the ultrafast chemical dynamics of molecular systems using Laser Induced Electron Diffraction (LIED).

In the CFEL-CMI group we develop novel approaches to cool and control molecules and nanoparticles, to spatially separate individual species, to align and orient them in space, to create well-defined quantum-mechanical wavepackets and novel states of molecular matter. We record movies of “molecules at work” using novel ion, electron, and x-ray imaging techniques with atomic spatial and ultrafast temporal resolution. These experiments are accompanied by sophisticated data analysis, computational modelling, and ab initio theory developments and machine learning applications.

\* Full-time positions currently comprise 39 hours per week.

We are exploring the applicability of laser-induced electron diffraction (LIED) to complex molecular systems and to unravel their chemical dynamics in order to fully disentangle the dynamic atomic nature of chemistry. We have already unraveled the influence of the molecular frame onto the strong-field-ionization and rescattering process underlying LIED and have developed theoretical approaches to describe these processes (see Karamatskos, J. Chem. Phys. 150, 244301 (2019); <https://doi.org/10.1063/1.5093959> and Wiese, <https://arxiv.org/abs/2003.02116>). Furthermore, we have demonstrated unprecedented degrees of field-free alignment of linear and asymmetric top molecules. In this continuation of the project we will exploit our experimental and theoretical advances for the investigation of chemical dynamics in chemical model systems and the imaging of the dynamical interactions between molecular building blocks of life and water, the matrix of life.

## REQUIREMENTS:

A university degree in a relevant field. We are looking for a highly-motivated individual with a strong background in experimental physics or gas-phase physical chemistry as well as in quantum mechanics. A knowledge of and desire to work with molecular beams, ion or electron imaging, ultrafast lasers and optics as well as capabilities for programming are strongly desired and need to be present or acquired within the first part of the project.

Strong motivation for independent research work within the team and collaborations are assumed.

Work will primarily be based at the Center for Free-Electron Laser Science (CFEL) at the Deutsches Elektronen-Synchrotron (DESY) in Hamburg, Germany and its surrounding laboratories. This will provide ample opportunity to for the applicant to be exposed to a wide range of scientific activities and become a part of a larger scientific community.

The Free and Hanseatic City of Hamburg promotes equal opportunity. As women are currently underrepresented in this job category at Universität Hamburg according to the evaluation conducted under the Hamburg act on gender equality (Hamburgisches Gleichstellungsgesetz, HambGleiG), we encourage women to apply for this position. Equally qualified and suitable female applicants will receive preference.

Qualified disabled candidates or applicants with equivalent status receive preference in the application process.

For further information, please contact Dr. Matthew Robinson or Prof. Dr. Jochen Küpper, [matthew.robinson@cfel.de](mailto:matthew.robinson@cfel.de), [jochen.kuepper@cfel.de](mailto:jochen.kuepper@cfel.de) or consult our website at <https://www.controlled-molecule-imaging.org> .

Applications should include a cover letter, a tabular curriculum vitae, and copies of degree certificate(s). Please send applications by 26.10.2020 to: [office.kuepper@cfel.de](mailto:office.kuepper@cfel.de). Please also arrange for 2 or more letters of recommendation to be sent directly to us.

Please do not submit original documents as we are **not** able to return them. Any documents submitted will be destroyed after the application process has concluded.